K2

STORAGE SYSTEM

Instruction Manual

SOFTWARE VERSION 3.2

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THOMSON
images & beyond

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Safety Summaries

General Safety Summary

Review the following safety precautions to avoid injury and prevent damage to this product or any products connected to it.

Only qualified personnel should perform service procedures.

While using this product, you may need to access other parts of the system. Read the *General Safety summary* in other system manuals for warnings and cautions related to operating the system.

Injury Precautions

Use Proper Power Cord

To avoid fire hazard, use only the power cord specified for this product.

Ground the Product

This product is grounded through the grounding conductor of the power cord. To avoid electric shock, the grounding conductor must be connected to earth ground. Before making connections to the input or output terminals of the product, ensure that the product is properly grounded.

Do Not Operate Without Covers

To avoid electric shock or fire hazard, do not operate this product with covers or panels removed.

Do Not operate in Wet/Damp Conditions

To avoid electric shock, do not operate this product in wet or damp conditions.

Do Not Operate in an Explosive Atmosphere

To avoid injury or fire hazard, do not operate this product in an explosive atmosphere.

Avoid Exposed Circuitry

To avoid injury, remove jewelry such as rings, watches, and other metallic objects. Do not touch exposed connections and components when power is present.

Product Damage Precautions

Use Proper Power Source

Do not operate this product from a power source that applies more than the voltage specified.

Provide Proper Ventilation

To prevent product overheating, provide proper ventilation.

Do Not Operate With Suspected Failures

If you suspect there is damage to this product, have it inspected by qualified service personnel.

Battery Replacement

To avoid damage, replace only with the same or equivalent type. Dispose of used battery according to the circuit board manufacturer's instructions.

Safety Terms and Symbols

Terms in This Manual

These terms may appear in this manual:

WARNING: Warning statements identify conditions or practices that can result in personal injury or loss of life.

CAUTION: Caution statements identify conditions or practices that may result in damage to equipment or other property, or which may cause equipment crucial to your business environment to become temporarily non-operational.

Terms on the Product

These terms may appear on the product:

DANGER indicates a personal injury hazard immediately accessible as one reads the marking.

WARNING indicates a personal injury hazard not immediately accessible as you read the marking.

CAUTION indicates a hazard to property including the product.

Symbols on the Product

The following symbols may appear on the product:

DANGER high voltage

Protective ground (earth) terminal

ATTENTION – refer to manual

Service Safety Summary

WARNING: The service instructions in this manual are intended for use by qualified service personnel only. To avoid personal injury, do not perform any servicing unless you are qualified to do so. Refer to all safety summaries before performing service.

Do Not Service Alone

Do not perform internal service or adjustment of this product unless another person capable of rendering first aid and resuscitation is present.

Disconnect Power

To avoid electric shock, disconnect the main power by means of the power cord or, if provided, the power switch.

Use Care When Servicing With Power On

Dangerous voltages or currents may exist in this product. Disconnect power and remove battery (if applicable) before removing protective panels, soldering, or replacing components.

To avoid electric shock, do not touch exposed connections

Certifications and Compliances

Canadian Certified Power Cords

Canadian approval includes the products and power cords appropriate for use in the North America power network. All other power cords supplied are approved for the country of use.

FCC Emission Control

This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense. Changes or modifications not expressly approved by Grass Valley can affect emission compliance and could void the user's authority to operate this equipment.

Canadian EMC Notice of Compliance

This digital apparatus does not exceed the Class A limits for radio noise emissions from digital apparatus set out in the Radio Interference Regulations of the Canadian Department of Communications.

Le présent appareil numérique n'émet pas de bruits radioélectriques dépassant les limites applicables aux appareils numériques de la classe A préscrites dans le Règlement sur le brouillage radioélectrique édicté par le ministère des Communications du Canada.

EN55103 1/2 Class A Warning

This product has been evaluated for Electromagnetic Compatibility under the EN 55103-1/2 standards for Emissions and Immunity and meets the requirements for E4 environment.

This product complies with Class A (E4 environment). In a domestic environment this product may cause radio interference in which case the user may be required to take adequate measures.

FCC Emission Limits

This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) This device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesirable operation.

Laser Compliance

Laser Safety Requirements

The device used in this product is a Class 1 certified laser product. Operating this product outside specifications or altering its original design may result in hazardous radiation exposure, and may be considered an act of modifying or new manufacturing of a laser product under U.S. regulations contained in 21CFR Chapter 1, subchapter J or CENELEC regulations in HD 482 S1. People performing such an act are required by law to recertify and reidentify this product in accordance with provisions of 21CFR subchapter J for distribution within the U.S.A., and in accordance with CENELEC HD 482 S1 for distribution within countries using the IEC 825 standard.

Laser Safety

Laser safety in the United States is regulated by the Center for Devices and Radiological Health (CDRH). The laser safety regulations are published in the "Laser Product Performance Standard," Code of Federal Regulation (CFR), Title 21, Subchapter J.

The International Electrotechnical Commission (IEC) Standard 825, "Radiation of Laser Products, Equipment Classification, Requirements and User's Guide," governs laser products outside the United States. Europe and member nations of the European Free Trade Association fall under the jurisdiction of the Comité Européen de Normalization Electrotechnique (CENELEC).

Safety Certification

This product has been evaluated and meets the following Safety Certification Standards:

Standard	Designed/tested for compliance with:
ANSI/UL60950, CAN/CSA C22.2 No. 60950-00 12/01/2000	Safety of Information Technology Equipment, including Electrical Business Equipment (Third edition).
IEC 950	Safety of Information Technology Equipment, including Electrical Business Equipment (Third edition, 1999).
EN60950	Safety of Information Technology Equipment, including Electrical Business Equipment (Third Edition 2000).

Finding Information

This manual describes the K2 Storage System and provides instructions for installing and using the product in a variety of applications. The manual contains information for pre-defined levels, in both redundant and non-redundant configurations. Refer to the sections that apply to the level of your K2 Storage System. For custom K2 Storage Systems that do not fit one of these pre-defined levels, you must work with your Grass Valley representative for installation and operation.

This manual does not provide the complete information for devices that function as clients to the K2 Storage System. For information on client devices, refer to other documentation, as follows:

- For Aurora Edits, refer to the *Aurora Edit Installation and Configuration Guide*.
- For K2 Media Clients, refer to the *K2 Media Client System Guide*.

How this manual is organized

This manual is organized around the tasks required to install, configure, and operate the K2 Storage System. The following describes the chapters included in this manual:

Chapter 1, *Product Description* — Provides the product functional description and an overview of the key features.

Chapter 2 to Chapter 6— These sections provide procedures for installing, configuring, and operating the different levels of the previously released 2 Gig K2 Storage System, as follows:

- Chapter 2, *Installing the Level 2 Storage System*
- Chapter 3, *Installing the Level 2R Storage System*
- Chapter 4, *Installing the Level 3 Storage System*
- Chapter 5, *Installing the Level 3R Storage System*
- Chapter 6, *Installing the Nearline Storage System*

Chapter 7 to Chapter 13 — These chapters provide procedures for installing, configuring, and operating the different levels of the 4 Gig K2 Storage System, as follows:

- Chapter 7, *Installing the Level 10 Storage System*
- Chapter 8, *Installing the Level 10R Storage System*
- Chapter 9, *Installing the Level 20 Storage System*
- Chapter 10, *Installing the Level 20R Storage System*
- Chapter 11, *Installing the Level 30 Storage System*
- Chapter 12, *Installing the Level 30R Storage System*
- Chapter 13, *Installing the Nearline 10 Storage System*

Chapter 14, *Description of K2 Storage Devices* — Provides descriptions and specifications of the devices of the K2 Storage System.

Chapter 15, *Overview of K2 Storage Tools* — Contains overview descriptions for the system tools used with the K2 Storage System.

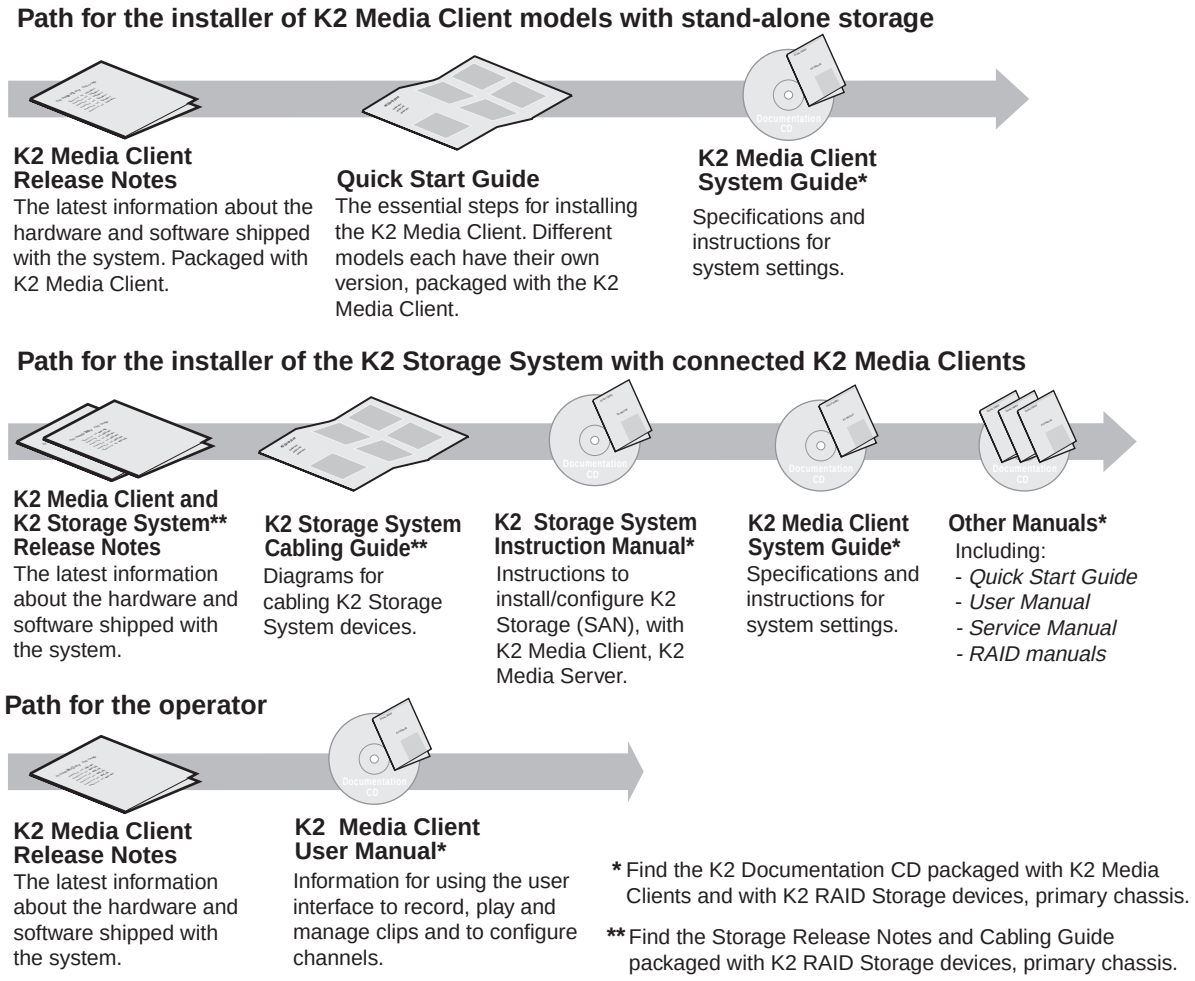
Chapter 16, *Managing K2 software* — Contains descriptions of the software components that provide the K2 Storage System functionality.

Chapter 17, *FTP on the K2 Storage System* — Contains descriptions of networking and interface requirements for FTP/streaming transfers.

Chapter 18, *Administering and maintaining the K2 Storage System* — Contains instructions for customizing and maintaining the K2 Storage System so that it meets your site's workflow requirements.

Getting more information

The following illustration shows the recommended order in which to reference the documentation.



K2 Storage System Release Notes

The release notes contain the latest information about the software shipped on your system. The release notes include software upgrade instructions, software specifications and requirements, feature changes from the previous releases, and any known problems. Because release notes contain the latest information, they are printed out rather than included in the Documentation CD-ROM. You can find the release notes packaged with the primary RAID storage chassis.

K2 Storage System Cabling Guide

The cabling guides provide diagrams for storage system cabling and external configuration, such as setting addresses on RAID devices. There is a cabling guide for each pre-defined level of K2 Storage System. Each cabling guide covers both redundant and non-redundant systems. You can find the cabling guide packaged with the primary RAID storage chassis.

Documentation CD-ROM

Except for the release notes, the full set of support documentation, including this manual, is available on the Documentation CD-ROM that you receive with your K2 Storage System. You can find the Documentation CD-ROM packaged with the RAID storage chassis.

The Documentation CD-ROM includes the following:

- **K2 Storage System Instruction Manual** — Contains installation, configuration, and maintenance procedures for shared storage options.
- **K2 Storage System Cabling Guide** — Contains diagrams for cabling the devices of the K2 Storage System.
- **RAID Instruction Manuals** — There is an Instruction Manual for each type of RAID storage device that can be a part of a K2 Storage System. These manuals contain procedures for configuring and servicing the device.
- **K2 Media Client System Guide** — Contains the product specifications and step-by-step instructions for modifying system settings. Includes instructions for adding a K2 Media Client to the K2 Storage System.
- **K2 Media Client Quick Start Guides** — The Quick Start Guides provides step-by-step installation instructions for basic installation and operation of the K2 Media Client, including recording and playing clips.
- **K2 Media Client User Manual** — Describes the K2 Media Client and provides instructions for configuring and operating the product.
- **K2 Media Client Service Manual** — Contains information on servicing and maintenance.

On-line Help Systems

K2 Media Client Help — You can access the on-line help through the AppCenter user interface as follows:

- In the menu bar select **Help,** then choose **AppCenter Help Topics** from the drop-down menu.

NetCentral Help — From the NetCentral interface access on-line help as follows:

- For general help with NetCentral manager, select **Help | NetCentral Help Topics**.
- For help specific to monitoring K2 Storage System system devices, select **Help | Device Providers** and then select the monitored device.

Thomson Grass Valley Web Site

This public Web site contains all the latest manuals and documentation, and additional support information. Use the following URL.

http://www.thomsongrassvalley.com.

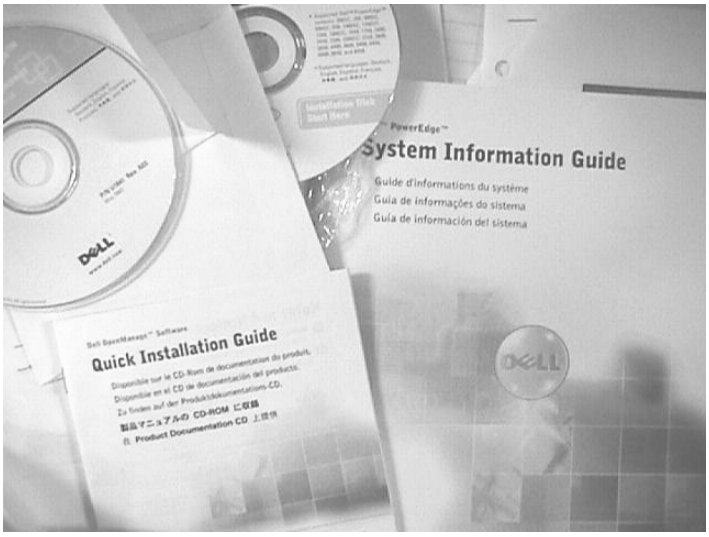
Using the Dell Server documentation

This manual contains all of the information you need to install the K2 Storage System, however, a full set of Dell server documentation has been provided on the *Dell Product Documentation* CD-ROM. The Dell server documentation applies to the K2 Media Server. Refer to the documents on this CD-ROM only as required by procedures in this manual.

Information referenced on the *Dell Product Documentation* CD-ROM includes, but is not limited to:

- Unpacking and rack-mounting the K2 Media Server
- Important safety and regulatory information
- K2 Media Server Status indicators, messages, and error codes
- Troubleshooting help for the K2 Media Server hardware.

⚠ ***CAUTION: Do not use the Dell Quick Installation Guide provided with the Dell CD-ROM package. This guide includes instructions for using the OpenManage software CD-ROM to install an operating system. The K2 Media Server comes fully configured and is ready for installation. To begin installation, refer to one of the installation chapters in this manual.***



Grass Valley Product Support

To get technical assistance, check on the status of a question, or to report new issue, contact Grass Valley Product Support via e-mail, the Web, or by phone or fax. Contact Grass Valley first regarding problems with third party software on Grass Valley products, such as the Microsoft® Windows® operating system, Windows Media® player, Internet Explorer® internet browser, and SQL Server™.

Web Technical Support

To access support information on the Web, visit the product support Web page on the Grass Valley Web site. You can download software or find solutions to problems by searching our Frequently Asked Questions (FAQ) database.

World Wide Web: http://www.thomsongrassvalley.com/support/
Technical Support E-mail Address: gvgtechsupport@thomson.net.

Phone Support

Use the following information to contact product support by phone during business hours. Afterhours phone support is available for warranty and contract customers.

International (France)	+800 80 80 20 20 +33 1 48 25 20 20	Italy	+39 02 24 13 16 01 +39 06 87 20 35 42
International (United States, Canada)	+1 800 547 8949 +1 530 478 4148	Belarus, Russia, Tadzikistan, Ukraine, Uzbekistan	+7 095 258 09 20 +33 (0) 2 334 90 30
Hong Kong, Taiwan, Korea, Macau	+852 2531 3058	Indian Subcontinent	+91 11 515 282 502 +91 11 515 282 504
Australia, New Zealand	+61 1300 721 495	Germany, Austria, Eastern Europe	+49 6150 104 444
Central, South America	+55 11 5509 3440	Near East, Africa	+33 1 48 25 20 20
China	+861 066 0159 450	Netherlands	+31 (0) 35 62 38 421
Belgium	+32 (0) 2 334 90 30	Northern Europe	+45 45 96 88 70
Japan	+81 3 5484 6868	Singapore	+65 6379 1313
Malaysia	+603 7805 3884	Spain	+41 487 80 02
Middle East	+971 4 299 64 40	UK, Ireland, Israel	+44 118 923 0499

Authorized Support Representative

A local authorized support representative may be available in your country. To locate the support representative for your country, visit the product support Web page on the Grass Valley Web site.

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END-OF-LIFE PRODUCT RECYCLING NOTICE

Grass Valley's innovation and excellence in product design also extends to the programs we've established to manage the recycling of our products. Grass Valley has developed a comprehensive end-of-life product take back program for recycle or disposal of end-of-life products. Our program meets the requirements of the European Union's WEEE Directive, the United States Environmental Protection Agency, and U.S. state and local agencies.

Grass Valley's end-of-life product take back program assures proper disposal by use of Best Available Technology. This program accepts any Grass Valley branded equipment. Upon request, a Certificate of Recycling or a Certificate of Destruction, depending on the ultimate disposition of the product, can be sent to the requester.

Grass Valley will be responsible for all costs associated with recycling and disposal, including freight. However, you are responsible for the removal of the equipment from your facility and packing the equipment to make it ready for pickup.

For further information on the Grass Valley product take back system please contact Grass Valley at + 800 80 80 20 20 or +33 1 48 25 20 20 from most other countries. In the U.S. and Canada please call 800-547-8949 or 530-478-4148, and ask to be connected to the EH&S Department. Additional information concerning the program can be found at: www.thomsongrassvalley.com/environment

THOMSON images & beyond

Chapter 1

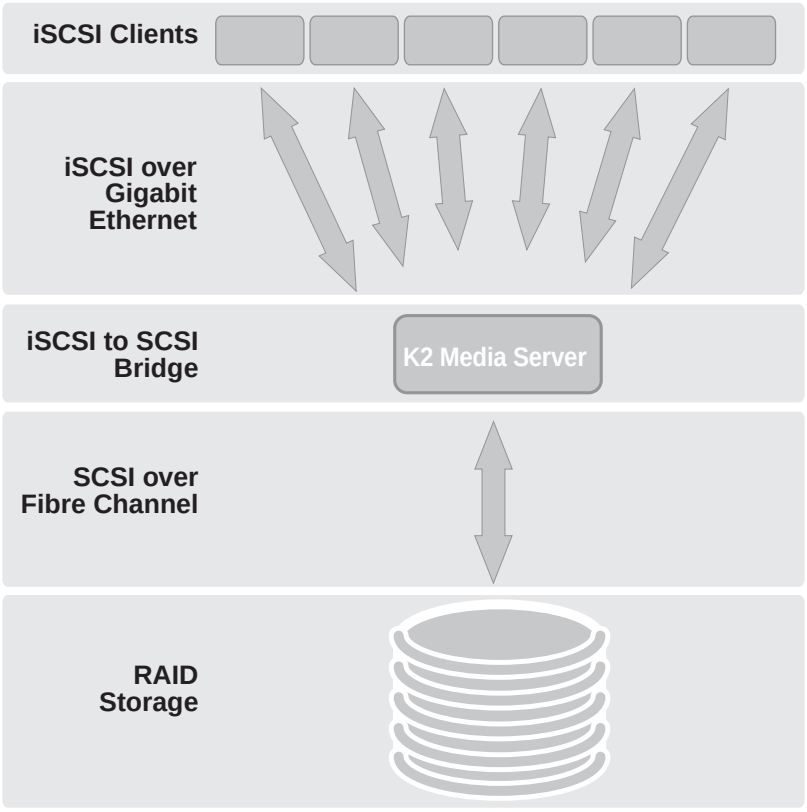
Product Description

This chapter describes the K2 Storage System as follows:

- "Overview Description" on page 28
- "Key features" on page 28

Overview Description

The K2 Storage System is Grass Valley's shared storage solution that gives multiple clients access to a common pool of media. Clients access the shared media storage via a Gigabit Ethernet network and a Fibre Channel connection. Data is communicated using the Small Computer System Interface (SCSI) data transfer interface and the Internet SCSI (iSCSI) protocol.



Refer to the "Installing…" chapters later in this manual for the system description of each of the different levels of storage available.

Refer to the *K2 Media Client System Guide* for diagrams and explanations of the media file system and the media database.

Key features

The key features of the K2 Storage System are as follows:

- iSCSI storage access protocol
- Gigabit Ethernet connectivity
- RAID 1, 5, and 6 storage
- FTP transfers
- Standard IT networked storage configurations to fit a wide variety of size and

performance requirements.

- Scaling from 100 to < 1000MB/s
- Redundancy and fault recovery with no single point of failure
- Tuned and optimized file system for reliable and robust transaction of media files
- Best in class storage management for high throughput, deterministic performance with load balancing

Chapter 2

Installing the Level 2 Storage System

The K2 Level 2 (L2) storage system was initially released with K2 system software version 3.0 in December 2005.

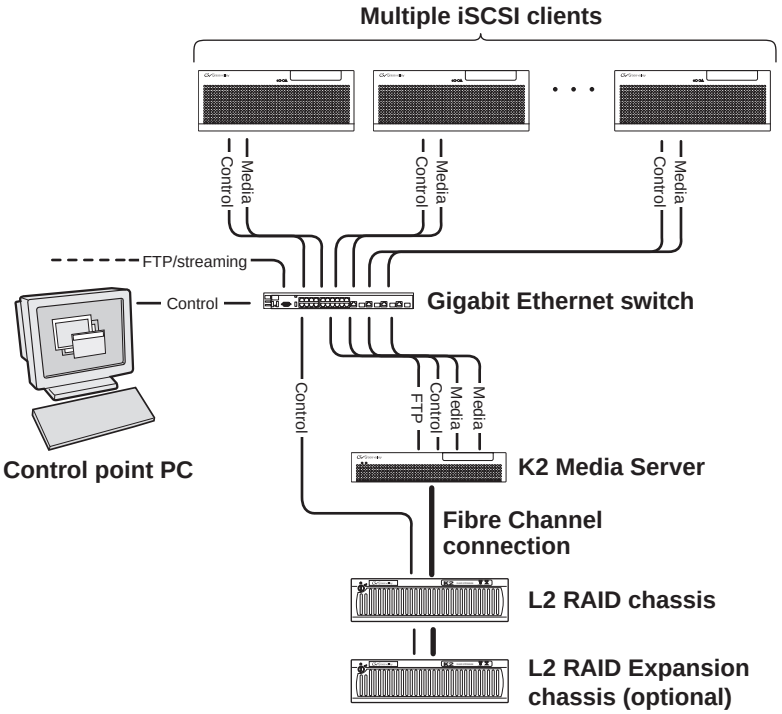
Use this chapter to install the Level 2 storage system.

This chapter includes the following topics:

- "Level 2 system description" on page 32
- "Preparing Level 2 devices" on page 33
- "K2 configuration and NetCentral" on page 50
- "Networking for Level 2" on page 51
- "Configuring the Level 2 storage system" on page 55
- "Adding K2 Storage System clients" on page 69
- "Basic operations for Level 2 storage" on page 69

Work through these topics sequentially to install the storage system.

Level 2 system description



The Level 2 storage system has one K2 Media Server and one L2 RAID chassis. An Expansion chassis is optional for increased storage capacity.

K2 Media Clients and other iSCSI clients, such as Aurora Edits, are connected to the GigE switch. Each client has one GigE connection for media and one GigE connection for control. The GigE switch is configured with V-LANs to keep the control/FTP traffic and the media (iSCSI) traffic separate.

The K2 Media Server has two GigE connections for media, one GigE connection for control, one GigE connection for FTP, and one Fibre Channel connection to the RAID storage. The server hosts iSCSI interface cards for the GigE media connections and a Fibre Channel card for the RAID storage connection. The iSCSI interface cards provide a bridge between GigE iSCSI and Fibre Channel SCSI. The server also hosts software components that allow it to function in various roles, including media file system manager, media database server, and FTP server.

The L2 RAID chassis is connected via a single Fibre Channel connection to the K2 Media Server. It is also connected to the GigE control network, which is required for SNMP (NetCentral) monitoring.

The K2 configuration control point PC is connected to the GigE control network. The K2 System Configuration application runs on this PC for configuring the storage system.

FTP/streaming traffic accesses the K2 Storage System via the FTP GigE port on K2 Media Servers. FTP/streaming traffic does not go to K2 Media Clients.

Refer to Chapter 14, *Description of K2 Storage Devices* for more information. Also refer to "Design considerations for Ethernet switches" on page 759.

Preparing Level 2 devices

Use the topics in this section to prepare each device so that it is ready to become part of the Level 2 storage system.

- "Setting up the Control Point PC" on page 33
- "Setting up the Level 2 GigE switch" on page 34
- "Setting up the K2 Media Server" on page 44
- "Setting up the L2 RAID chassis" on page 45
- "Preparing K2 Storage System clients" on page 49

Setting up the Control Point PC

To set up the K2 configuration Control Point PC, you have the following options:

- Use the Grass Valley Control Point PC that comes from the factory with software pre-installed. This includes the K2 System Configuration application, remote AppCenter, and NetCentral software. Refer to the *K2 Media Client System Guide* for rack mount instructions.
- Use a PC that you own and install the required software.

For either option, you must do the following for the Control Point PC that runs the K2 System Configuration application:

- Assign a control network IP address to the PC. Refer to "Networking tips".
- Connect the PC to the GigE control network.

To use your own PC, you must additionally do the following:

- Verify that the PC meets system requirements, then install the Control Point software and other supporting software, as specified in the *K2 Media Client System Guide*.
- Install and license NetCentral server software. You can install this on the NetCentral server PC, which can be the K2 configuration Control Point PC. Refer to the *NetCentral User Guide*.

Also refer to "Control point PC description" on page 650.

To fix the screen resolution problem seen with NetCentral on the Grass Valley Control Point PC, do the following:

1. Go to Display properties (right mouse selection of properties on the display area)
2. Select Settings tab
3. Select the Advanced button
4. In the General tab, set the DPI setting to Normal size (96 DPI)
5. Restart the PC

Setting up the Level 2 GigE switch

These procedures are for the HP ProCurve switch.

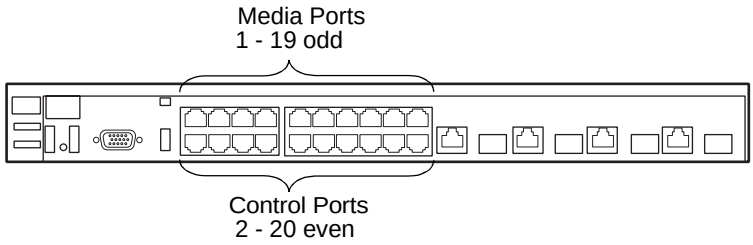
For iSCSI traffic, you must use the HP ProCurve switch. Both the 3400cl series and 2900 series switches are qualified for iSCSI traffic, and both types are fully compatible and can coexist on the network.

For control and FTP/streaming traffic, it is allowed to use a different brand of switch, such as a Cisco Catalyst switch, if required by your site. If you are using a non-HP switch, apply the information in the following procedures accordingly. Refer to the documentation you received with the switch as necessary.

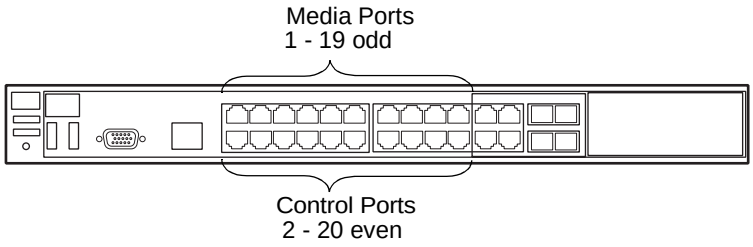
Also refer to "Design considerations for Ethernet switches" on page 759.

- Use CAT5e or CAT6 cables. The maximum cable length is 50 meters for CAT5e and 100 meters for CAT6.
- Assign an IP address and logon to the switch. Refer to "Configuring the GigE switch via serial connection" on page 35.
- Set up VLANs on the switch. Refer to "Configuring the GigE switch via the Web interface" on page 38.
- Install the switch in its permanent location.
- Provide power to the switch.
- Connect cables as follows:

3400cl series switch



2900 series switch



To the media ports make one iSCSI connection from each K2 Media Client or other iSCSI client, and two iSCSI connections from the K2 Media Server.

To the control ports make a connection from each K2 Media Client or other iSCSI client, from the RAID storage chassis, and from the control point PC. Also make the FTP network connection and the control network connection from the K2 Media Server.

Refer to "Level 2 system description" on page 32 for a diagram of the complete system.

Refer to cabling procedures later in this chapter for the GigE connections at each of the devices of the K2 Storage System.

Also refer to "K2 Ethernet switch description" on page 651 and "Design considerations for Ethernet switches" on page 759.

Configuring the GigE switch via serial connection

NOTE: Make sure you check the switch firmware and upgrade if necessary, as instructed at the end of this procedure.

The following procedure is for the HP ProCurve switch and applies to both the 3400cl series and 2900 series switches.

Use a direct console connection to the switch, start a console session, and access the Switch Setup screen to set the IP address.

1. Configure the PC terminal emulator on the control point PC or another PC as a DEC VT-100 (ANSI) terminal or use a VT-100 terminal, and configure either one to operate with these settings:
   - Baud rate 115200
   - 8 data bits, 1 stop bit, no parity, and flow control set to Xon/Xoff
   - Also disable (uncheck) the "Use Function, Arrow, and Ctrl Keys for Windows" option
2. Connect the PC to the switch's Console Port using the console cable included with the switch. (If your PC or terminal has a 25-pin serial connector, first attach a 9-pin to 25-pin straight-through adapter at one end of the console cable.)
3. Turn on the PC's power and start the PC terminal program.
4. Press **Enter** two or three times and you will see the copyright page and the message "Press any key to continue". Press a key, and you will then see the switch console command (CLI) prompt.

NOTE: If you press Enter too many times and get past the log in, enter the command EN to get into the command line.

5. Type the following, then press **Enter**:

   ```
   menu
   ```

   If prompted to save the current configuration, answer no (press the n key) to proceed. The main menu opens.
6. On the main menu, choose **Switch Configuration,** then press **Enter**.
7. Select **IP Configuration**, then press **Enter**.
8. Press the right-arrow key to choose **Edit**, then press **Enter**. Tab to fields and enter information as follows:
   a. Change **Gateway** to be the default router.

b. Tab to the **IP Config (DHCP/Bootp)** field and use the Space bar to select the **Manual** option.

c. Tab to the **IP Address** field and enter the switch's control network IP address. Refer to "Networking tips".

d. Tab to the **Subnet Mask** field and enter the subnet mask used for your network.

9. Press **Enter**, then right-arrow to **Save**. Press **Enter** and revert to previous menu.

10. Select **Return to Main Menu** and press **Enter**.

11. From the main menu, chose **Console Passwords** and press **Enter**. The Set Password Menu opens.

12. Chose **Set Manager Password** and press **Enter**.

13. When prompted for the password, type a password of up to 16 ASCII characters with no spaces and press **Enter**. The password can be one that is used on other K2 devices, such as "adminK2" or "K2admin", or it can be your site's administrator password.

14. When prompted to enter the password again, retype the password and press **Enter**.

15. Select **Return to Main Menu** and press **Enter**.

16. From the main menu, tab to **Command Line (CLI)** and press **Enter**. The command prompt appears.

17. Type the following, then press **Enter**:

```
configure
```

You are now in configuration mode.

18. Configure an administrator username. The username can be one that is used on other K2 devices, such as "administrator" or "K2admin", or it can be your site's administrator username. For example, to set the username to "administrator" type the following, then press **Enter**:

```
password manager user-name administrator
```

19. When prompted, enter and re-enter the password.

20. Set spanning tree to RSTP. Type the following, then press **Enter**:

```
spanning-tree force-version rstp-operation
```

This configures spanning tree, but it does not turn spanning tree on. You must turn spanning tree on using the switch's Web interface, as explained in the next procedure "Configuring the GigE switch via the Web interface".

21. Decide your SNMP community name as explained in the following options, then proceed with the next step:

- If you decide to use a unique SNMP community name (not "public"), add the community and set its RW permissions. For example, if the community name is "K2", type the following, then press **Enter**:

```
snmp-server community K2 unrestricted
```

- If you decide to use the default SNMP community "public" for NetCentral monitoring, which already has RW permissions set as required by NetCentral,

proceed to the next step.

22. Enter the SNMP community and IP address of the NetCentral server PC. For example, if the IP address is “192.168.40.11” and the community is “public”, you type the following, then press **Enter**:

```
snmp-server host public 192.168.40.11
```

23. Enable Authentication traps. Type the following, then press **Enter**:

```
snmp-server enable traps authentication
```

This allows NetCentral to test the switch to verify that it can send its SNMP trap messages to NetCentral.

24. Type the following, then press **Enter**:

```
menu
```

When prompted, save the configuration by pressing the y key. The main menu opens.

25. If you need a trunk for ISLs to gang switches together, use the following steps. These steps illustrate trunking the last three 1 Gig ports for three 1 Gig ISLs, which is the recommended configuration for ISLs on all multi-switch K2 Storage Systems. Refer to “Design considerations for Ethernet switches” on page 759 and consult with your Grass Valley representative if your requirements deviate from the recommended policy:

    a. At the main menu, select **Switch Configuration** and press **Enter**.

    b. Choose selection **Port/Trunk Settings** and press **Enter**.

    c. Press the right-arrow key to choose **Edit**, then press **Enter**.

    d. Down arrow until at the bottom of the list of ports and select the last (highest port number) 1 Gig port in the list.

    e. Right-arrow over to the Group column.

    f. Use the Space bar and set the bottom 1 Gig port to **Trk1**.

    g. Set the next port up also to **Trk1**.

    h. Set the next port up also to **Trk1**.

    i. Press **Enter**, then right-arrow to **Save**. Press **Enter** and revert to previous menu.

26. Select **Return to Main Menu** and press **Enter**.

27. From the main menu, tab to **Command Line (CLI)** and press **Enter**. The command prompt appears.

28. Check the version of firmware currently installed on the switch. Type the following, then press **Enter**:

```
show flash
```

Information is displayed similar to the following example:

```
HP_iSCSI_switch1# show flash
Image           Size(Bytes)   Date   Version
-----           ----------  -------- -------
```

```
Primary Image   : 3287779   03/15/05 M.08.66
Secondary Image : 3287779   03/15/05 M.08.66
Boot Rom Version: I.08.07
Current Boot    : Primary
```

29. Check the Primary Image Version and refer to your *K2 Storage System Release Notes* for information about currently supported versions. Then proceed as follows:
    - If *K2 Storage System Release Notes* instruct you to change the firmware on the switch, do so before continuing. Refer to the documentation you received with the switch for instructions to change the firmware. Then continue with the next procedure "Configuring the GigE switch via the Web interface".
    - If *K2 Storage System Release Notes* confirm that the version on the switch is a currently supported version, continue with the next procedure.
30. Type the following, then press **Enter**:

    ```
    menu
    ```

    The main menu opens.
31. From the main menu, choose **Reboot Switch** and press **Enter**. When prompted "Continue Reboot…?', answer yes (press the y key) to proceed. The switch restarts.
32. You can now use the switch's web browser interface for further configuration, as instructed in the next procedure.
33. Close the PC terminal program and disconnect the console cable.

Continue with the next procedure "Configuring the GigE switch via the Web interface".

Configuring the GigE switch via the Web interface

The following procedure is for the HP ProCurve switch and applies to both the 3400cl series and 2900 series switches.

1. From the control point PC or another PC, make sure that you have a direct Ethernet cable connection to the switch, with no switches, routers, proxies, or other networking devices in between.
2. On the PC, open Internet Explorer and type the switch's IP address in the Address field, as in the following example.

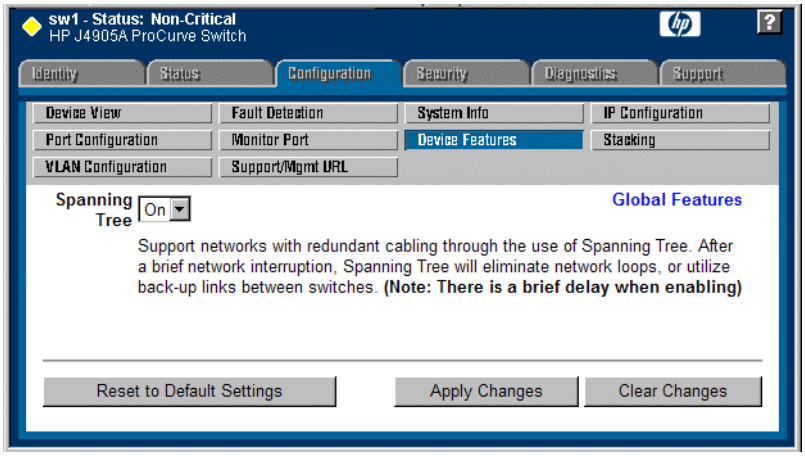
   ```
   http://192.168.100.61
   ```

   This should be the name or IP address as currently configured on the switch.
3. Press **Enter** to open the switch's configuration application.

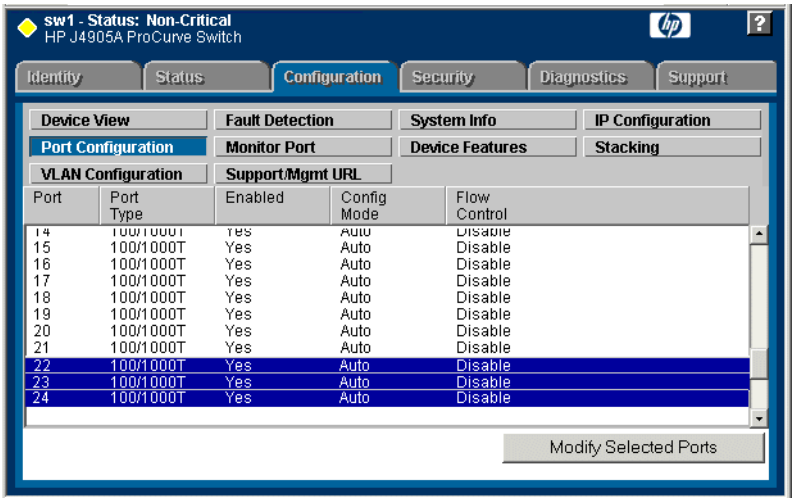
NOTE: The configuration application for the HP ProCurve switch requires Java.

You can also access the switch's configuration application from the K2 System Configuration application.

4. In the switch's configuration application, choose **Configuration**, then **Device Features**.



5. Set Spanning Tree to **On** and click **Apply Changes**. If prompted, log in with the switch's administrator username and password.
6. Click **Port Configuration**.

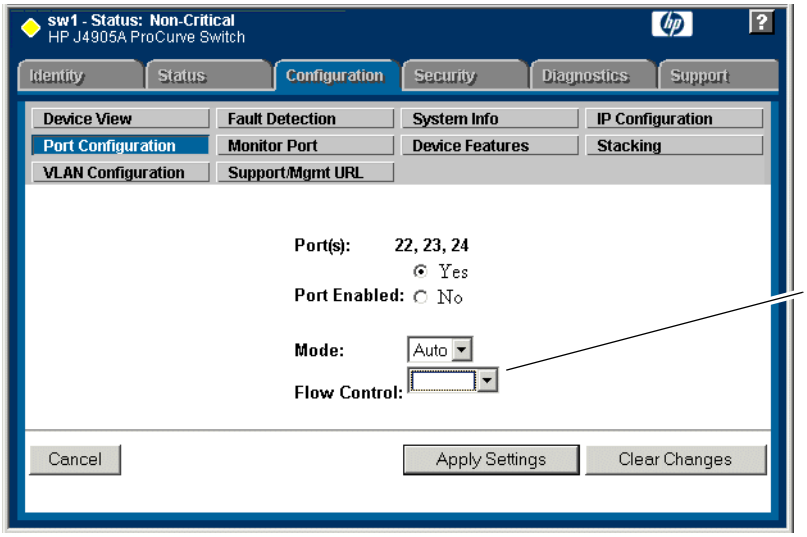


7. If you do not need trunks, such as on a one-switch system, skip to the next step in this procedure. If you need trunks, such as on a two-switch system with ISLs, do the following:

   a. Select (Ctrl + Click) the trunked ports. Typically the trunked ports are at the bottom of the list and are labeled Trk1.

   b. Click **Modify Selected Ports**.

      If prompted, log in as administrator.



c. For the trunked ports, set Port Enabled to **Yes**. On some switch models, some ports are disabled by default, so make sure you enable them. Leave Mode as default of **Auto**.

d. Set Flow Control as follows:

   - For the 3400cl series switch, set to **Disable**.
   - For the 2900 series switch, set to **Enable**.

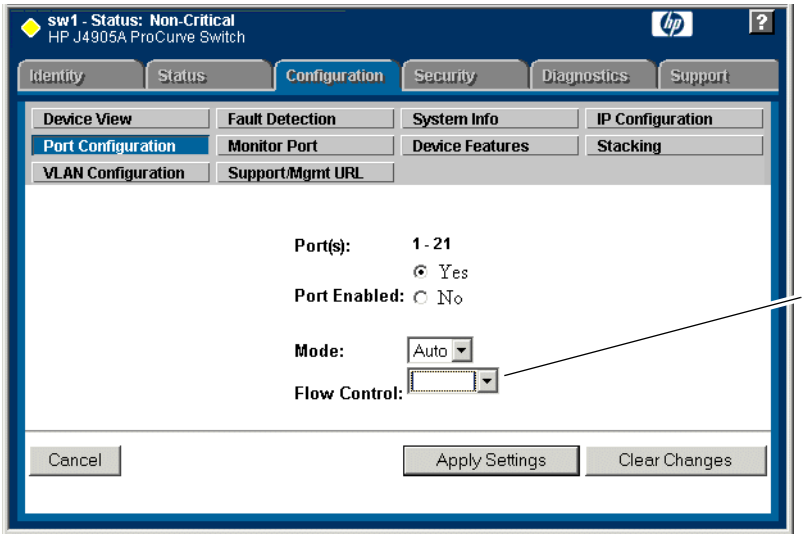
   If you have both 3400cl series and 2900 series on your network, having different Flow Control settings (disable for 3400cl, enable for 2900) does not cause problems.

e. Click **Apply Settings**.

8. On the Port Configuration page, do one of the following:

   - If you do not have trunks, select all ports.
   - If you have trunks, select the remaining ports (the ports not trunked).

9. Click **Modify Selected Ports.**



10. Make sure Port Enabled is set to **Yes**, leave Mode as default of **Auto**.

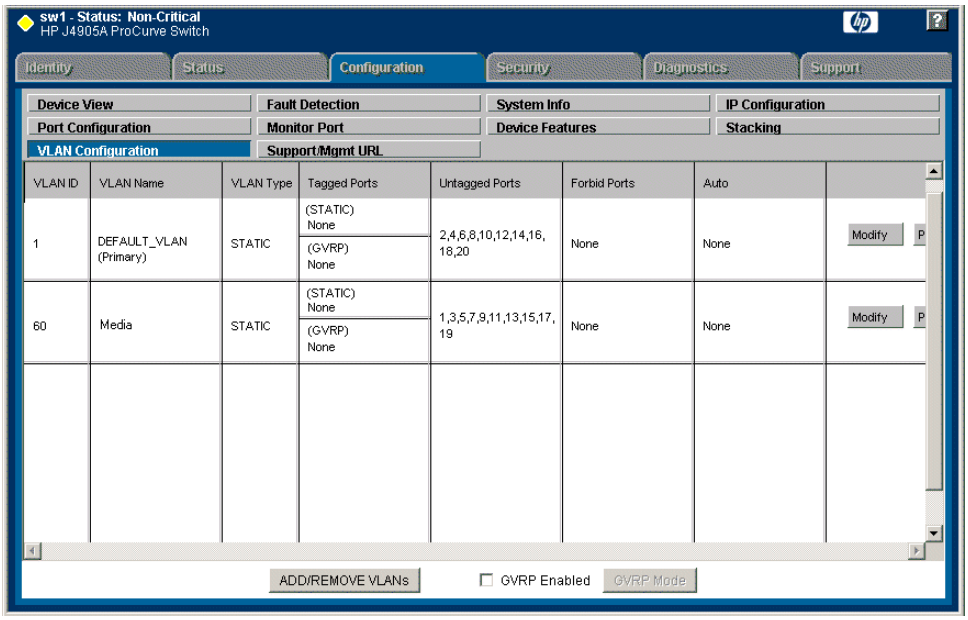
11. Set Flow Control as follows:

    - For the 3400cl series switch, set to **Disable**.
    - For the 2900 series switch, set to **Enable**.

    If you have both 3400cl series and 2900 series on your network, having different Flow Control settings (disable for 3400cl, enable for 2900) does not cause problems.

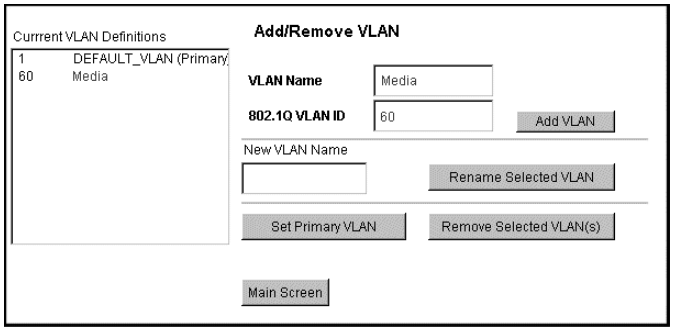
12. Click **Apply Settings**. Wait until settings are applied and the Web interface becomes active.

13. Choose **VLAN Configuration**. If prompted, log in with the switch's administrator username and password.



14. Create a new Media (iSCSI) VLAN as follows:

    a. Click **Add/Remove VLANs**.



    b. In the VLAN Name field enter `Media`.

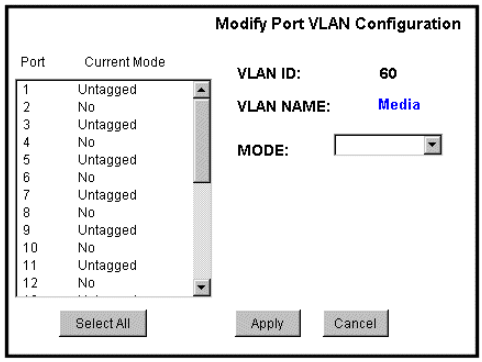
    c. In the VLAN ID field enter `60`.

    d. Click **Add VLAN**.

    e. Click **Main Screen** to return to VLAN Configuration.

15. Configure the Media VLAN as follows:

    a. In the Media VLAN row, click **Modify**.



b. Select all the odd numbered ports. (Tip: Use Ctrl + Click.)

c. In the Mode drop-down list, select **Untagged**, then click **Apply**. This removes the odd ports from the default (Control) VLAN.

   If you have a trunk, do not configure it as "Tagged". Media VLAN traffic (iSCSI) does not go over the trunk.

16. Click the **VLAN Configuration** tab.

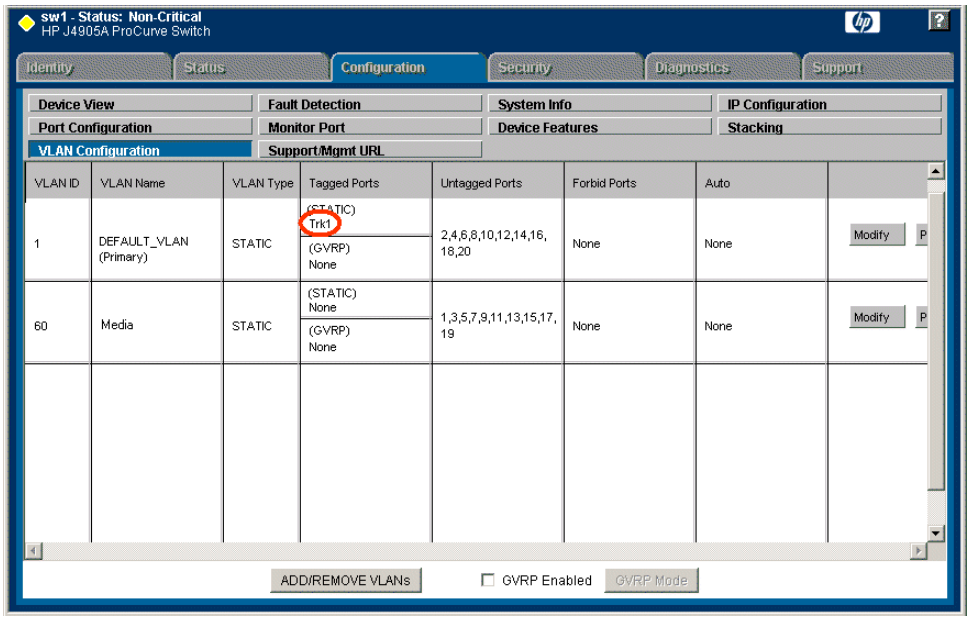
17. If you have a trunk, configure the default (Control) VLAN as follows:

    a. In the DEFAULT_VLAN row, click **Modify**.

    b. In the Current Mode list box, scroll down and select the trunk.

    c. In the Mode drop-down list, select **Tagged**, then click **Apply**. This allows default VLAN traffic (non-iSCSI) to go over the trunk.

18. Click the **VLAN Configuration** tab.



19. If you have a trunk, verify that for the default VLAN the trunk is displayed in the Tagged Ports column.
20. If you have two switches, repeat this procedure for the other switch.
21. Close the switch configuration application.

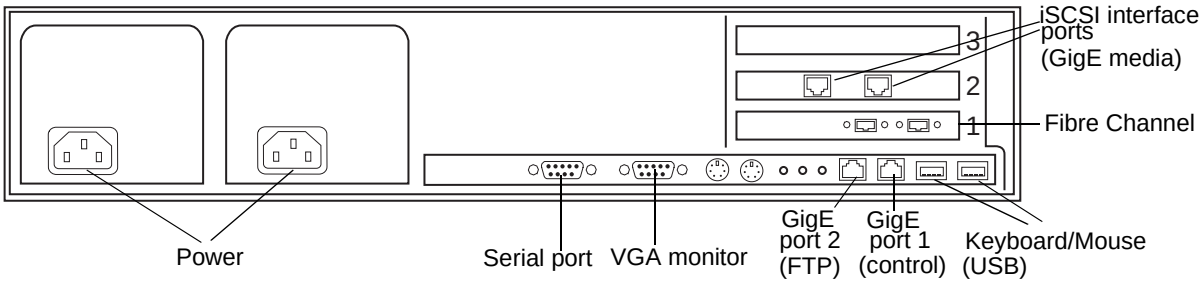
Setting up the K2 Media Server

Both the Dell PowerEdge 2850 and the Dell PowerEdge 2950 are qualified as platforms for the K2 Media Server. This section provides information on both platforms.

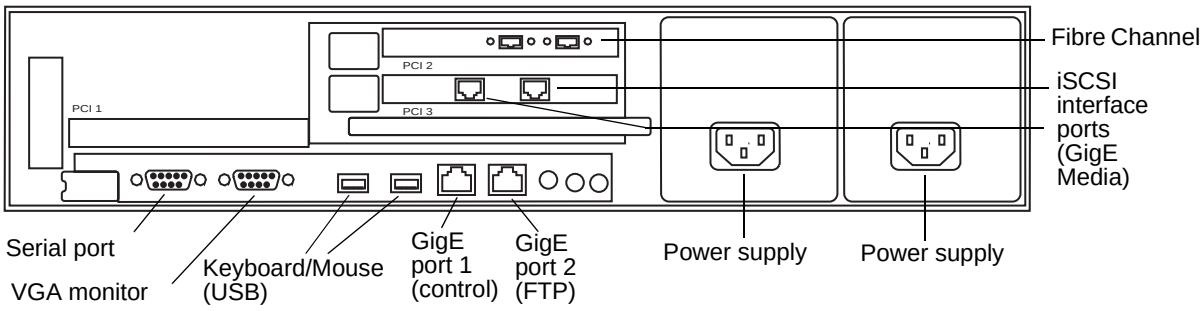
Do the following to prepare a K2 Media Server:

- Install the server in its permanent location. Refer to the rack mount instructions that you received with the server's product bundle.
- Provide power to the server.
- Connect cables as follows:

Dell 2850 PowerEdge server



Dell 2950 PowerEdge server



Connect the two iSCSI interface ports to media ports on the GigE switch.

Connect the motherboard GigE port 1 and GigE port 2 to control ports on the GigE switch.

Connect one of the Fibre Channel ports to the RAID storage device.

- Assign a control network IP address to GigE port 1. Use standard Windows procedures. Refer to "Networking tips".
- Change the hostname. Use standard Windows procedures.

- Configure SNMP properties so the trap destination points to the NetCentral server PC. Use standard Windows procedures. If you are not using the SNMP community name “public”, configure the community name and set permissions to RW. Also make sure that the Authentication trap is enabled.

Also refer to “K2 Media Server descriptions” on page 653.

Setting up the L2 RAID chassis

Do the following to prepare the L2 RAID storage devices:

- Install the chassis in its permanent location. Refer to the *L2 RAID Instruction Manual* for rack mount instructions.
- “Assign Fibre Channel address ID” on page 46.
- “Connect the L2 RAID chassis” on page 46
- “Assign chassis address on Expansion chassis” on page 47.
- “Power on the L2 RAID chassis” on page 49

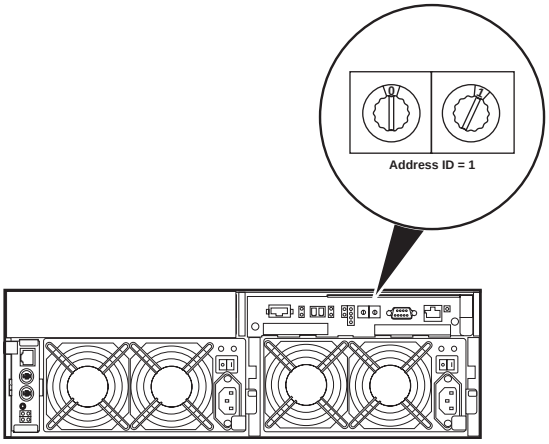
In addition, you will configure network settings, SNMP settings, and bind LUNs. These tasks are part of the K2 System Configuration application and Storage Utility procedures later in this chapter. The process of binding LUNs can take a significant amount of time—as much as eight hours—so you might want to put priority on the tasks necessary to start the LUN binding process, then catch up with other tasks while the LUNs are binding.

Also refer to “K2 RAID storage description” on page 659.

Assign Fibre Channel address ID

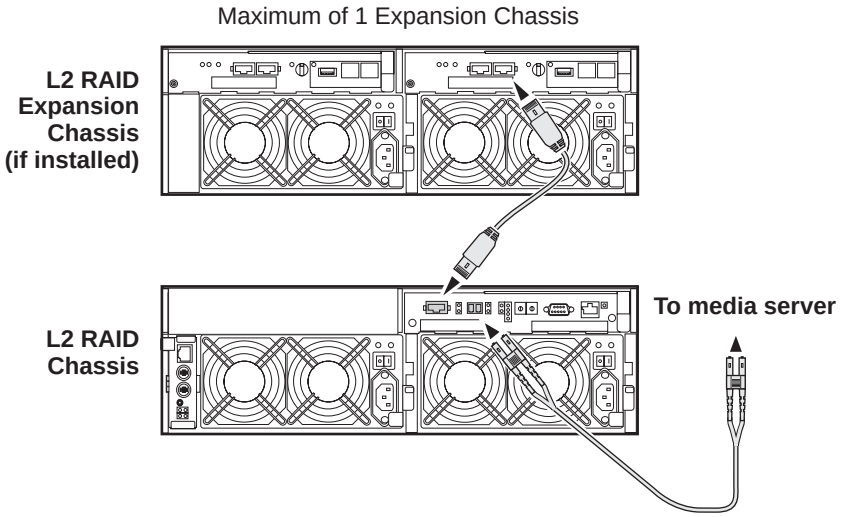
Every RAID controller must have a unique Fibre Channel address ID that identifies the controller on the Fibre Channel fabric. To set the Fibre Channel address ID on the L2 RAID, refer to the following diagram:

Set a Fibre Channel address on the L2 RAID controller.



Connect the L2 RAID chassis

Connect Fibre Channel cabling.

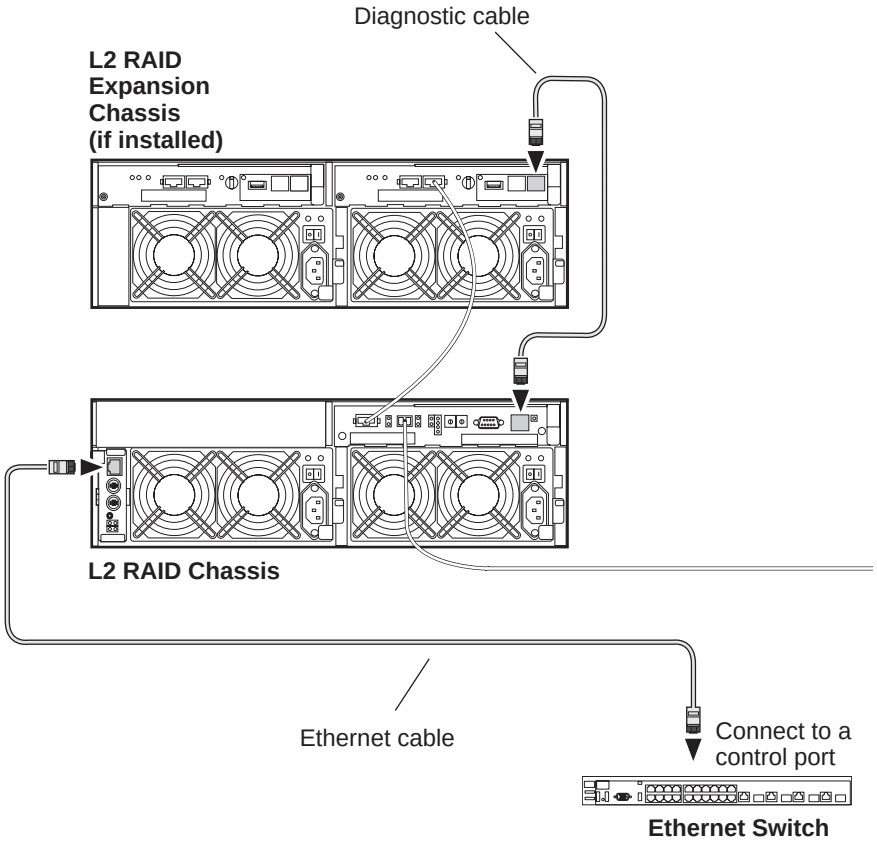


Connect Ethernet and diagnostic cabling as shown in the following diagram. Be aware of the following cabling requirements of the Level 2 storage devices:

- Each L2 RAID chassis has a single connection to the Ethernet fabric through its LAN card.
- The Expansion Adapter on the L2 RAID Expansion chassis requires a diagnostic

cable, which must be connected.

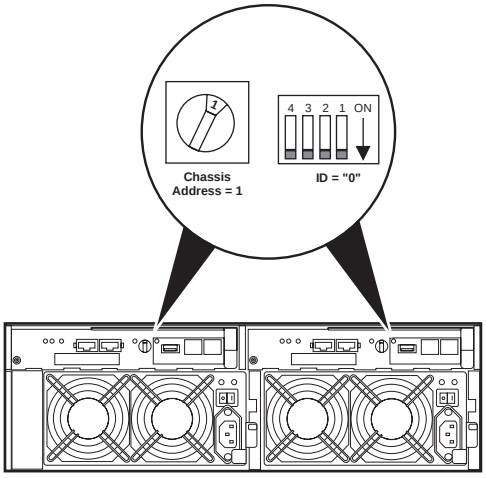
Install Ethernet and diagnostic cabling as shown.



Assign chassis address on Expansion chassis

Every chassis must have a chassis address. The Level two RAID chassis address is fixed at 0, so no configuration is required. However, if you have a L2 RAID Expansion chassis you must set its chassis address to 1 as shown in the following illustration. Also verify that the diagnostic ID switches are in the position shown.

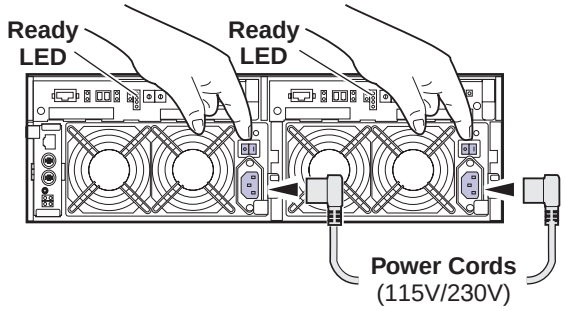
Set the chassis address to 1 on both L2 RAID Expansion adapters.



Do not swap Expansion chassis or otherwise reconfigure storage. If you connect a L2 RAID Expansion chassis to the wrong controller such that the Expansion chassis contains disk modules that were bound using a different controller you will lose your media file system.

Power on the L2 RAID chassis

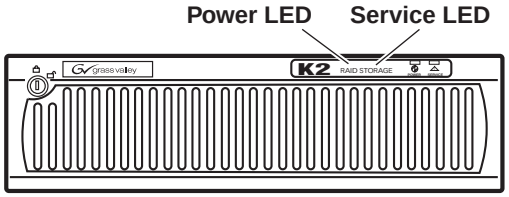
Connect power cords, and turn on power as shown. You must power-up any RAID Expansion chassis prior to, or at the same time as the RAID Controller chassis. Verify power-up as shown.



Power-up Verification

- Ready LEDs on RAID controllers are steady ON.
- Front panel Power LED is ON, Service LED is OFF after approximately 3 minutes.

  Refer to the *L2 RAID Instruction Manual* if there is a problem.



Your preparations for L2 RAID storage are now complete.

Preparing K2 Storage System clients

Any devices that function as iSCSI clients to the K2 Storage System must be prepared with the following requirements:

- One or more connections to the control network.
- A static IP address for the control network.
- For a non-redundant K2 Storage System, one connection to the media (iSCSI) network.

Additional steps that are required for Aurora Edits include the following:

- Implement Aurora Edit security features.

- Install SNFS software and K2 software.

For more information, refer to the *Aurora Edit Installation and Configuration Guide*.

For more information refer to the *K2 Media Client System Guide*.

K2 configuration and NetCentral

Before you begin using the K2 System Configuration application to configure the storage system, you should set up the NetCentral system according to the following requirements:

- **NetCentral installed** — NetCentral server software must be installed on a NetCentral server PC. This can be the K2 configuration Control Point PC or another PC that has network communication with the K2 Storage System control network.
- **Device providers installed** — A device provider must be installed on the NetCentral server PC for each type of device in the K2 Storage System. For a Level 2 storage system, the following device providers must be installed:
  - Control point PC device provider — This is the Windows monitoring device provider.
  - K2 Media Server device provider
  - HP Gigabit Switch device provider or Cisco Gigabit Switch device provider
  - K2 Media Client device provider, if any K2 Media Clients are accessing the Level 2 storage system.
  - Device provider for iSCSI clients, if any iSCSI clients such as Aurora Edits are accessing the Level 2 storage system.
  - K2 Level 2/Level 3 RAID storage device provider. This device provider supports both Level 2 and Level 3 RAID devices.
- **Grass Valley PC Monitoring software installed** — This software must be installed on the K2 configuration Control Point PC. It includes Grass Valley SNMP agents and other WMI based components to perform process monitoring. This provides the information for some of the SNMP trap messages that must be sent to NetCentral.
- **Control Point PC monitored by NetCentral** — The K2 configuration Control Point PC should be added to the NetCentral system and fully monitored by NetCentral. This means that its SNMP trap destination is set to send SNMP traps to the NetCentral server PC. Whether the Control Point PC and the NetCentral server PC are the same PC or are different PCs, you should still add the Control Point PC to NetCentral.

Refer to the *NetCentral User Guide* to set up the NetCentral system. After installing a device provider, you can find additional documentation about monitoring that type of device on the NetCentral Help menu.

Networking for Level 2

Use the topics in this section to configure the Gigabit Ethernet (GigE) network for the Level 2 storage system.

- "Networking requirements" on page 51
- "Networking tips" on page 52
- "Setting up host tables" on page 53
- "Testing the control network" on page 54

Networking requirements

Required networking strategies for a Level 2 K2 Storage System (a non-redundant K2 Storage System) are as follows:

- Three networks:
  - Media network — Exclusively for iSCSI traffic.
  - Streaming/FTP network — For media transfers and FTP traffic.
  - Control network — For all other non-streaming, non-iSCSI traffic.
- Networks must be on separate subnets.
- The Media (iSCSI) network traffic is kept separate from any other traffic. This separation is provided by dedicated Gigabit ports, cables, and by a dedicated VLAN on the HP GigE switch or by separate switches.
- K2 Media Servers have a dedicated FTP port. If the server takes the role of FTP server, make a dedicated FTP connection to the FTP port.
- While control and FTP traffic is each on its own subnet, it is not required that each type of traffic has its own VLAN on GigE switches. For example, you make both FTP and control connections to the "control" ports (DEFAULT_VLAN) on the HP GigE switch.
- Static IP addresses are required for the media network on K2 Storage System iSCSI devices. This includes K2 Media Servers, generic iSCSI clients (such as Aurora Edits), and K2 Media Clients.
- Machine names (host names) assigned to each K2 device.
- Host tables (hosts files) provide name resolution on each K2 Media Client, iSCSI client, and K2 Media Server.
- IP addresses for FTP/streaming ports must have name resolution such that hostnames are appended with the "_he0" suffix. You can use host tables (as in "Setting up host tables" on page 53) or another mechanism to provide the name resolution. This directs the streaming traffic to the correct port. Refer to the *K2 Media Client System Guide* for a complete explanation.
- K2 Media Servers must be on the streaming network, as they provide the FTP interface for shared storage streaming traffic. Shared storage K2 Media Clients do not need to be on the streaming network because they do not send or receive streaming traffic.

- On the shared storage K2 Media Client, the two control GigE ports are configured as a team. The control team shares a single IP address. Do not attempt to un-team the control ports. On the Level 2 K2 Storage System, only one control port is connected, as control team redundancy is not supported.
- On the shared storage K2 Media Client, the two media (iSCSI) GigE ports are not teamed. On the Level 2 K2 Storage System, only one media port is connected, as iSCSI redundancy is not supported.

Also refer to "About networks and FTP" on page 684 and "Design considerations for Ethernet switches" on page 759.

Use the following procedures as necessary to implement your networking strategies.

NOTE: It is recommended that you configure Media network (iSCSI) IP addresses and Streaming network IP addresses using the K2 System Configuration application, rather than doing so on the local machine using standard Windows procedures.

Networking tips

- Before beginning network configuration, determine the IP addresses and names needed for the machines in your K2 system. Work with the network administrator at your facility to have those IP addresses and names available for your use.
- Establish a consistent convention for machine names and IP addresses. It is recommended that you embed a root name or other unique identifier for this particular K2 Storage System in the computer name. Also, a common convention for IP addresses is to use a numerical pattern or sequence in the IP addresses to indicate device-types and/or ports, as in the following example:

NOTE: This example assumes a subnet mask of 255.255.255.0

Example of Level 2 names and IP addresses

Computer name	Device type	Streaming network addresses	Control network addresses	Media network addresses	Comments
root_server_1	K2 Media Server	192.168.101.11[a]	192.168.100.11	192.168.99.11	—
				192.168.99.12	—
root_raid_1	RAID	—	192.168.100.51	—	—
root_gige_1	GigE switch	—	192.168.100.61	—	—
root_cppc_1	Control point PC	—	192.168.100.81	—	—
root_client_1	iSCSI client	—	192.168.100.111	192.168.99.111	—
root_client_2	iSCSI client	—	192.168.100.121	192.168.99.121	
root_client_3	iSCSI client	—	192.168.100.131	192.168.99.131	
root_client_4	iSCSI client	—	192.168.100.141	192.168.99.141	

[a]. This IP address must resolve to hostname root_server_1_he0

Setting up host tables

The *hosts* file is used by the control network and the streaming/FTP network to determine the IP address of devices on the network when only a the device name (hostname) is given. The steps that follow describe how to edit the *hosts* file located at *C:\Windows\system32\drivers\etc\hosts* on Windows XP and Windows 2003 Server operating system computers. If you include the names and addresses of all the devices on the network, then you can copy the same file onto all the other K2 devices instead of editing the *hosts* file on each K2 device.

For FTP transfers on a K2 Storage System, transfers go to/from K2 Media Servers that have the role of FTP server. No transfers go directly to/from the shared storage K2 Media Clients that are on the K2 Storage System. So in the hosts file, you must add the "he_0" extension to a K2 Media Server hostname and associate that hostname with the K2 Media Server's FTP/streaming network IP address.

Refer to the *K2 Media Client System Guide* for more information.

To edit the *hosts* file manually:

1. Open the following file using Notepad or some other text editing application:

   C:\Windows\system32\drivers\etc\hosts

2. Enter all IP addresses with machine names. The text format is simple. First type the Ethernet IP address, then use the TAB key or Space bar to insert a few spaces. Then type the machine name.

   Here is an example:

   ```
   192.168.100.11      root_server_1
   192.168.101.11      root_server_1_he0
   192.168.100.51      root_raid_1
   192.168.100.61      root_gige_1
   ```

3. Save the file and exit the text editor.

4. Copy the new *hosts* file onto all the other machines. This is easier than editing the file on each machine.

Host table tips

- If transferring to or from a Profile XP or Open SAN system via UIM, the *hosts* file must also follow UIM naming conventions for those systems. Refer to the UIM Instruction Manual.
- Do not enter media (iSCSI) network IP addresses in the host table, as hostname resolution is not required for the media network.
- Use the following tip with care. While it can solve a problem, it also introduces a name resolution "anomaly" that might be confusing if not considered in future troubleshooting activities.

  For each SAN (shared storage) K2 Media Client, add the "_he0" suffix to the hostname but then associate that hostname with the K2 Media ***Server's*** FTP/streaming network IP address, ***not*** the K2 Media ***Client's*** IP address. Aliasing K2 Media Client hostnames in this way would not be required if the transfer source/destination was always correctly specified as the K2 Media Server. However, a

common mistake is to attempt a transfer in which the source/destination is incorrectly specified as the K2 Media Client. The host file aliasing corrects this mistake and redirects to the K2 Media Server, which is the correct transfer source/destination.

An example of a *hosts* file entry with this type of aliasing is as follows:

```
192.168.101.11     server_1_he0 client_1_he0 client_2_he0
```

Testing the control network

To test the control network use the *ping* command as follows:

1. On the control point PC, click **Start | Run**. The Run dialog box opens.
2. Type `cmd` and click **OK**. The command prompt window opens.
3. Type `ping`, then a space, then the name of one of your K2 Storage System devices, such as the Gigabit Ethernet switch, as in the following example:

   ```
   ping root_gige_1
   ```

4. Press **Enter**.

   The ping command should return the IP address of the device, as in the following example:

   ```
   Pinging root_gige_1.mycorp.com [192.168.100.61] with
   32 bytes of data:


   Reply from 192.168.100.61: bytes=32 time=10ms TTL=127
   Reply from 192.168.100.61: bytes=32 time<10ms TTL=127
   Reply from 192.168.100.61: bytes=32 time<10ms TTL=127
   Reply from 192.168.100.61: bytes=32 time<10ms TTL=127
   ```

   This verifies that the name of the device is being correctly resolved to the IP address, which indicates that on the Control Point PC the host table entry is correct.

5. Ping the other K2 Storage System devices to which you have assigned control network IP addresses.
6. Go to each Windows device in the K2 Storage System and repeat this procedure. This verifies that network communication is correct to and from all devices.

Configuring the Level 2 storage system

Use the topics in this section to do the initial configuration of the Level 2 storage system.

- "Prerequisites for initial configuration" on page 55
- "Defining a new K2 Storage System" on page 56
- "Configuring the server - Part 1" on page 58
- "Configuring RAID" on page 60
- "Creating a new file system" on page 65
- "Configuring the server - Part 2" on page 66

Prerequisites for initial configuration

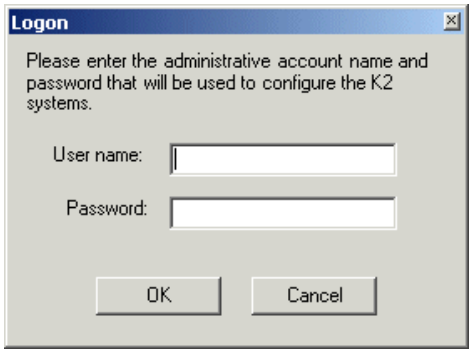
Before beginning your initial configuration, make sure the devices of the K2 Storage System meet the following prerequisites. Refer to sections earlier in this manual for detailed information. Also refer to Chapter 14, "Description of K2 Storage Devices".

Devices	Prerequisite for Level 2 configuration
Control point PC	Ethernet cable connected Control Point software installed Control network IP address assigned Network communication over the control network with all other K2 devices Power on
Ethernet switch	Ethernet cables connected Control network IP address assigned VLANs set up Power on
K2 Media Server	Ethernet cables connected Fibre Channel cable connected Software installed, as from the factory, including QuickTime 7 Control network IP address assigned Power on
L2 RAID chassis	Fibre Channel address ID assigned to RAID controller(s) Fibre Channel cable(s) connected Ethernet cable(s) connected Power on
L2 RAID Expansion chassis (optional)	Chassis address assigned (for Fibre Channel) Fibre channel cable(s) connected Power on

Defining a new K2 Storage System

Define a Level 2 K2 Storage System as follows:

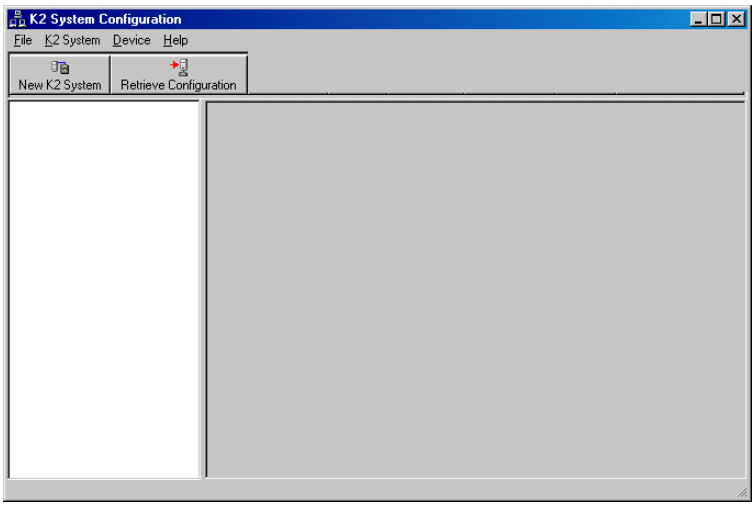
1. On the control point PC, open the K2 System Configuration application. A login dialog box opens.



2. Log in to the K2 System Configuration application with the Windows administrator account. By default this as follows:

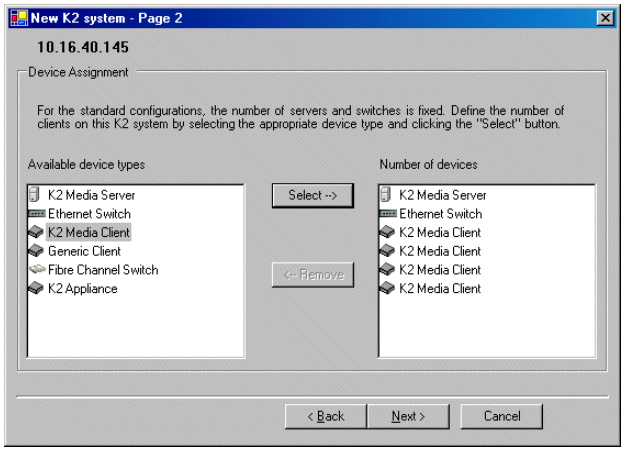
   - Username: administrator
   - Password: adminK2

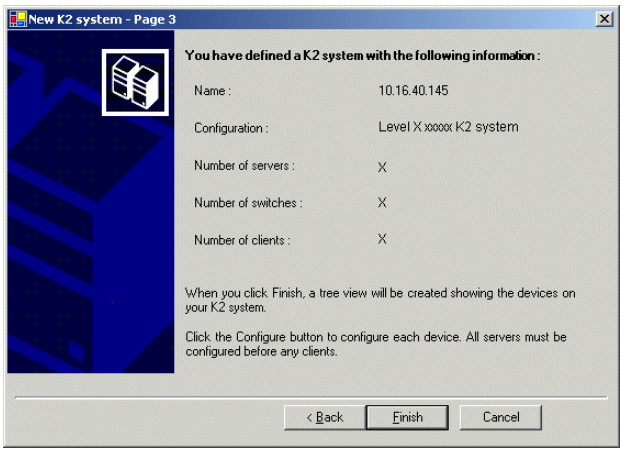
   Refer to "Setting up application security" on page 688 for more information about administrator accounts and logging in to applications.



3. Click **New K2 System**. The New K2 System wizard opens.

4. Follow the on-screen text to define your Level 2 K2 Storage System, as described in the following table.

On this page…	Do this…
Page 1	 Create a name for your Level 2 K2 Storage System and type it in the Name box. Select **Level 2**. The Server redundancy option is unchecked and disabled. Click **Next**
Page 2	 Move clients into the Number of Devices box as appropriate for your system. You cannot change the number of K2 Media Servers or Ethernet Switches, as these are pre-configured based on the level you selected in the previous page. Click **Next**.

On this page...	Do this...
Page 3	 Review the information on this page and verify that you have correctly defined your K2 Storage System. For a Level 2 storage system you should have the following: • One Gigabit Ethernet switch • One K2 Media Server • The number and type of clients appropriate for your system. Click **Finish**. The Define New K2 Storage System wizard closes.

Your K2 Storage System appears in the tree view of the K2 System Configuration application.

5. Continue with the next procedure.

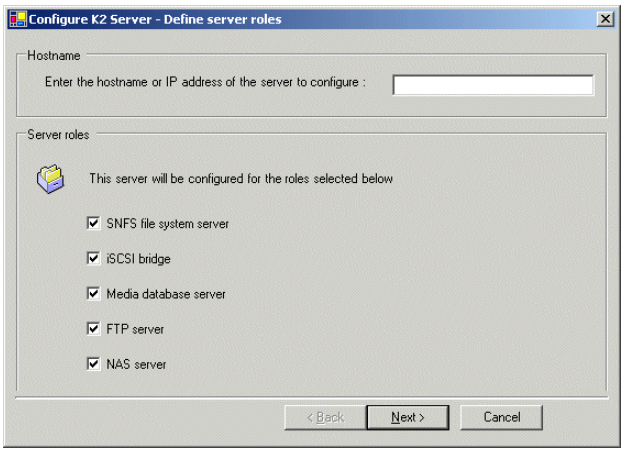
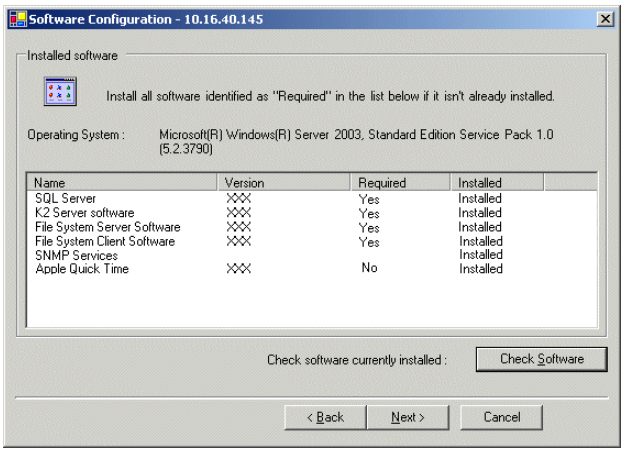
Configuring the server - Part 1

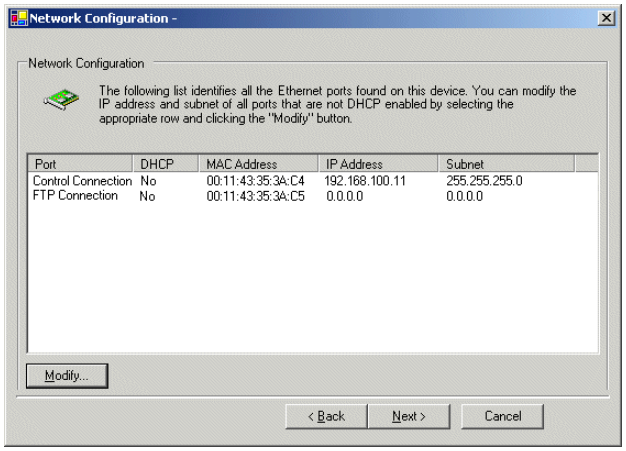
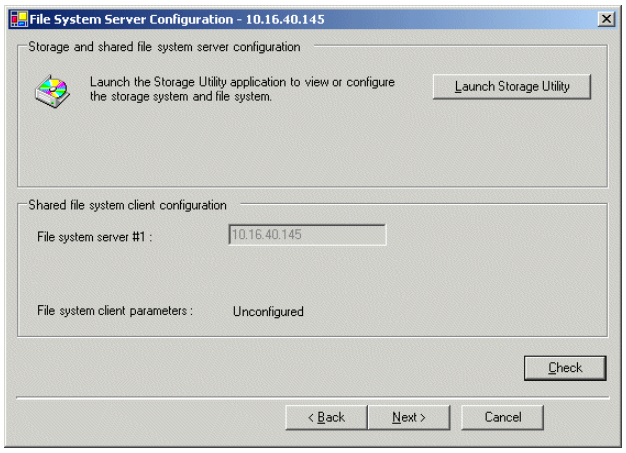
1. In the K2 System Configuration application tree view, select [**K2Server1]**.

2. Click the **Configure** button.

The Configure K2 Server wizard opens. Follow the on-screen text to configure theK2 Media Server for a Level 2 K2

Storage System, as described in the following table:

On this page…	Do this…
Define server roles	 Enter the name or IP address for the K2 Media Server, as currently configured on the machine. For Level 2, leave all roles selected. Click **Next**
Software Configuration This page checks for the software required to support the roles you selected on the previous page. Software required on the Level 2 K2 Media Server is as follows: • SQL Server • K2 Server • File System Server • File System Client • SNMP Services • QuickTime •	 If software with *Yes* in the Required column reports as *Not Installed*, you must first install it on the K2 Media Server before continuing. Refer to *Chapter 16, Managing K2 software*. After installing the software, click **Check Software**. When all required software reports as *Installed*, click **Next**.

On this page…	Do this…
Network Configuration This page displays the control network Ethernet port, and allows you to configure the FTP/ Streaming network Ethernet port. ***NOTE: This page does not configure the iSCSI interface (media network) ports.***	 The top port is the port over which the K2 System Configuration application is communicating with the K2 Media Server. If correctly configured, it is already assigned the control network IP address, as displayed on this page. Select the other port and click **Modify**. A network configuration dialog box opens. Enter the FTP/Streaming IP address and the subnet mask and click **Apply**. Click **Next**.
File System Server Configuration	 Click **Launch Storage Manager**. Storage Utility opens.

3. Continue with the next procedure to use Storage Utility to configure the storage and file system.

   Leave the Configure K2 Server wizard open while you are using Storage Utility. When you are done with Storage Utility, you continue with the wizard.

Configuring RAID

Use Storage Utility to complete the configuration of the L2 RAID chassis, as explained in the following topics:

- "Configuring RAID network and SNMP settings"

- "Binding disk modules"

Refer to "Prerequisites for initial configuration" on page 55 to confirm that the RAID storage is ready for configuration.

Configuring RAID network and SNMP settings

Use the Storage Utility to configure the following settings for the Level 2 RAID chassis:

- IP address
- Subnet mask
- Gateway Address
- SNMP trap destinations

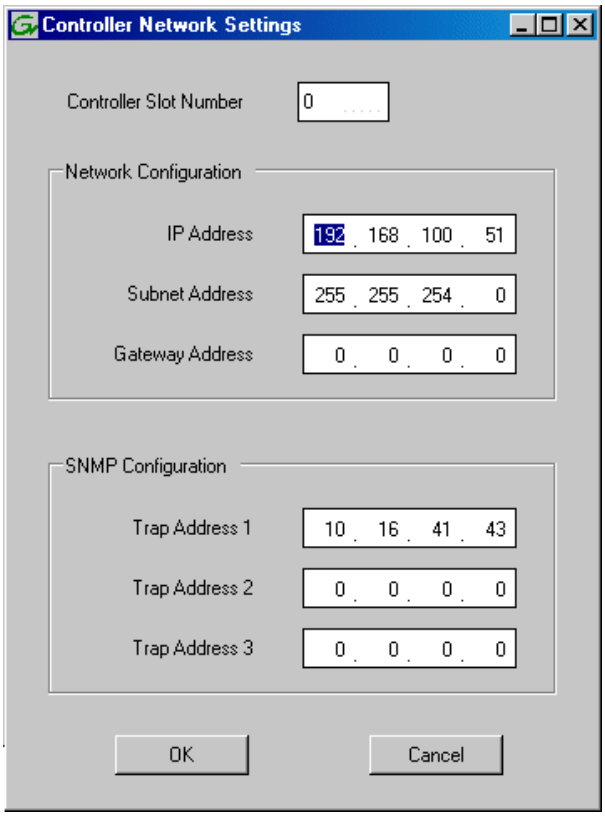
For Level 2 RAID, network and SNMP settings are set and stored on the RAID LAN card. Therefore the combined RAID storage devices, including the RAID controller and the optional Expansion chassis, is a single entity on the control network.

The RAID storage device is configured by default for the SNMP community name "public". If your site's policies require using a different SNMP community name, contact your Grass Valley representative.

To configure these settings, do the following:

1. Launch Storage Utility from the K2 System Configuration application as in the previous procedure.
2. As prompted, wait while Storage Utility gathers system information, then Storage Utility opens.
3. In Storage Utility tree view, expand the node for the L2 RAID, right-click the icon for a L2 RAID controller, and select **Configuration | Network Properties**.

   The Controller Network Settings dialog box opens.



4. Enter the control network IP address and other network settings.
5. You want SNMP trap messages go to the NetCentral server PC, so for SNMP Configuration enter the IP address of the NetCentral server PC. You can also enter IP addresses for other SNMP managers to which you want to send SNMP trap messages.
6. Click **OK** to save settings and close.
7. In Storage Utility click **View | Refresh**. Continue with the next procedure "Binding disk modules".

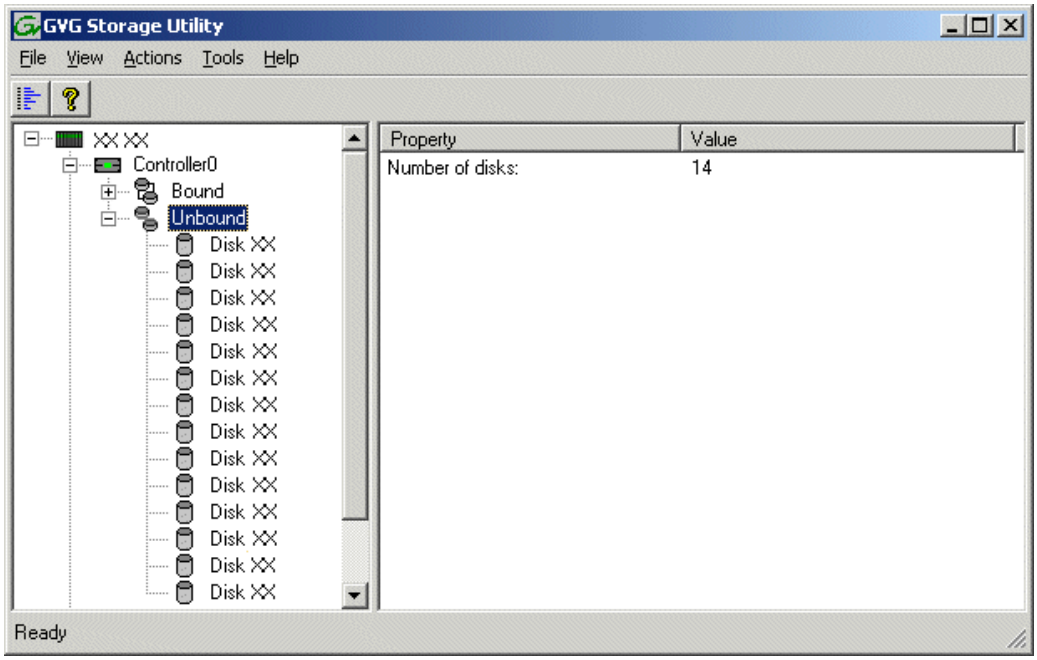
Binding disk modules

Use the following procedure to bind disk modules as required for the Level 2 storage system.

Also refer to "About RANKs and LUNs in Storage Utility" in Chapter 15, *Overview of K2 Storage Tools*.

NOTE: Binding destroys all user data on the disks.

1. In the Storage Utility main window, identify bound RANKs and unbound disks by their placement in the hierarchy of the tree view. In the following illustration, disk numbers are represented by "XX". Refer to "Identifying disks" on page 744 for an explanation of how disks are actually numbered in Storage Utility.

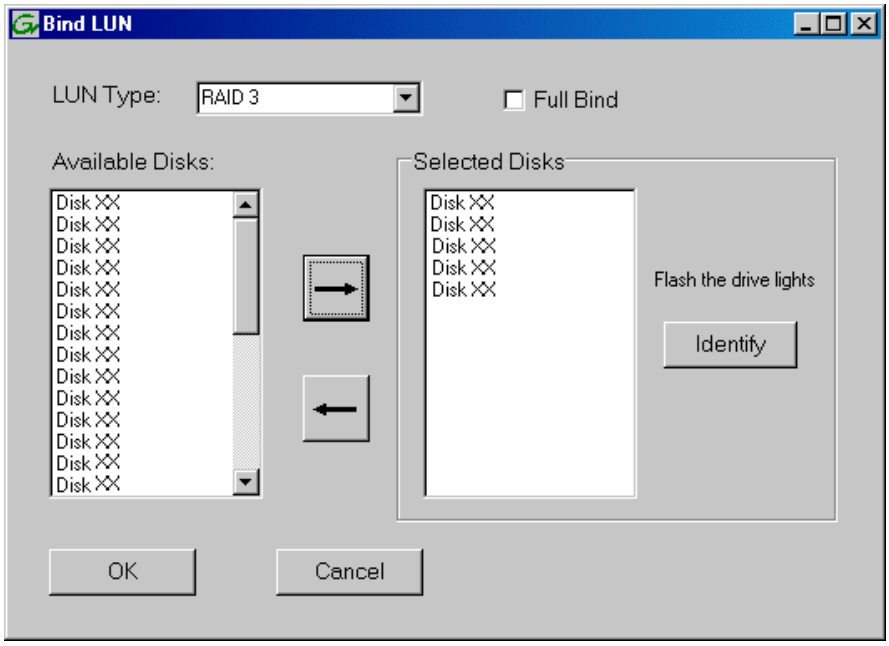


View disk properties and identify the four disks you will use for the metadata/journal RAID 1 RANKs, the one metadata/journal Hot Spare disk, any other disks that you intend to use for Hot Spares, and the remainder of the disks that are available for media storage. Make sure you select disks appropriately as you bind disks in the remainder of this procedure.

2. To bind unbound disks for media storage, do the following:

   a. Right-click the **Unbound** node for a controller, then select **Bind** in the context menu.

      The Bind dialog box opens showing all unbound disks for the controller listed in the Available Disk list.



b. Leave Full Bind unchecked. Refer to "About full/background bind" on page 748.

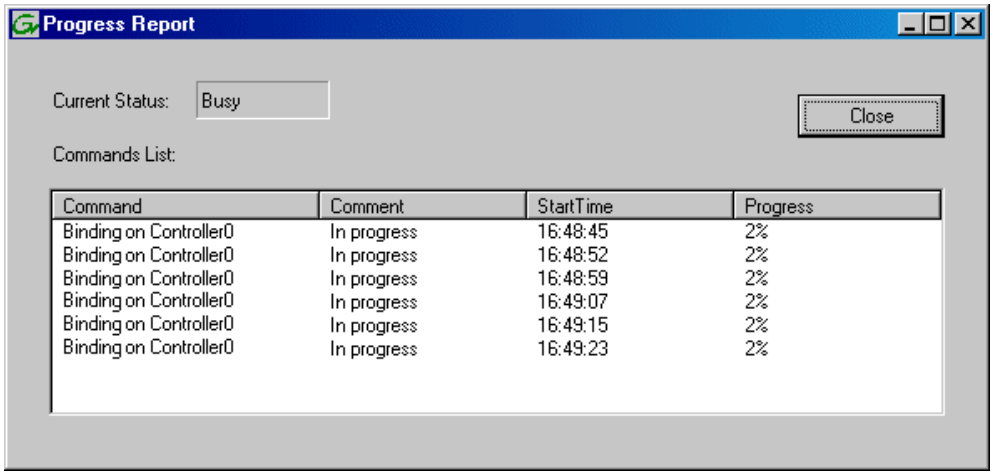
c. In the **Bind Type** drop down box, select **RAID 3**.

d. In the Available Disks box, select five contiguous disks at the top of the list. (TIP: Use 'shift-click' or 'control-click' to select disks.)

e. Click the add (arrow) button to add disks to the Selected Disks list.

NOTE: As an aid in identifying a disk module's physical location, select it in the Selected Disks list, then click* Identify Disks. *This causes the disk drive light to flash.

f. Click **OK** to close the Bind dialog box and begin the binding process. The Progress Report dialog box opens, showing the status of the binding process.



g. Close the Progress Report and repeat these steps for other unbound disks. If specified by your system design, you can bind some disks as Hot Spares, as explained in "Binding Hot Spare drives" on page 751. When you are done, if you did not bind any extra Hot Spares, you should have the following results:

   For Level two storage you should have three RAID 3 RANKs of five disks each on a RAID storage device. If you have the optional Expansion chassis, you would have an additional three RAID 3 RANKs of five disks each.

h. Click **Close** in Progress Report window.

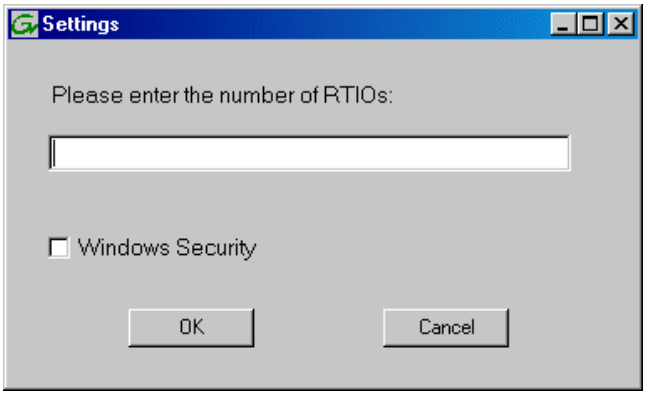
3. Restart the K2 Media Server.

NOTE: Make sure start up processes on the K2 Media Server are complete before proceeding.

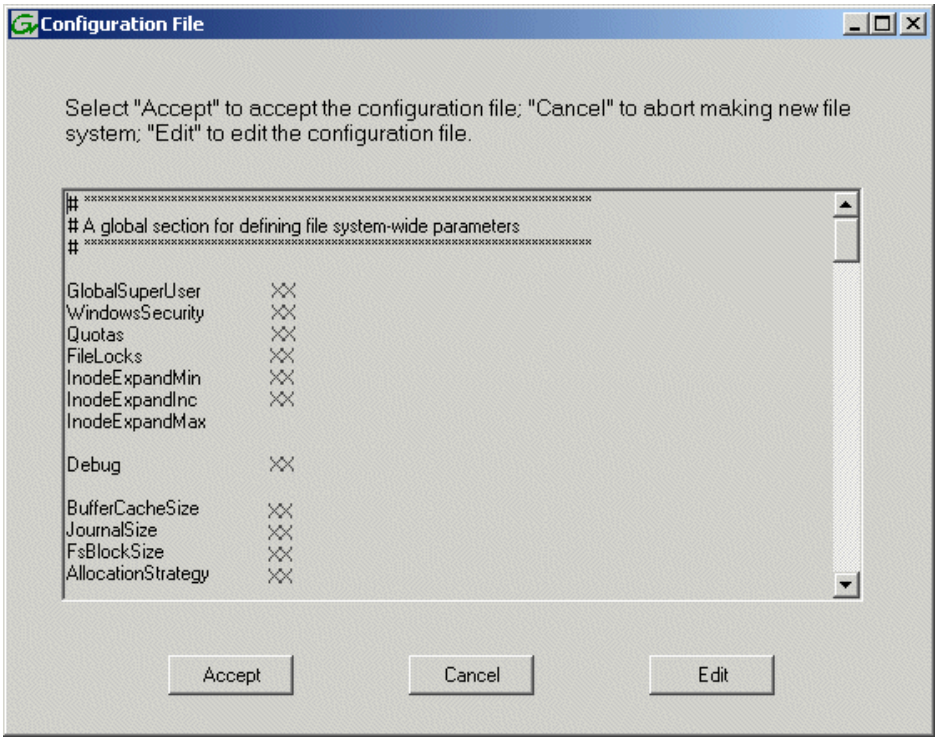
4. Continue with the next procedure "Creating a new file system".

Creating a new file system

1. In Storage Utility, click **Tools | Make New File System**. The Setting dialog box opens.



2. For the Real Time Input/Output (RTIO) rate, enter the value specified by your system design. If you do not know this value, contact your Grass Valley representative.
3. If the K2 Storage System is to be accessed by only K2 Media Clients you can leave Windows Security unchecked. If accessed by Aurora Edits, refer to the *Aurora Edit Installation and Configuration Guide* for instructions.
4. Click **OK**. The Configuration File dialog box opens.



The configuration file for the media file system is displayed. You can verify media file system parameters by viewing this file. Do not edit this file. Click **Accept**.

A "…Please wait…" message box displays progress and a "…succeeded…" message confirms the process is complete.

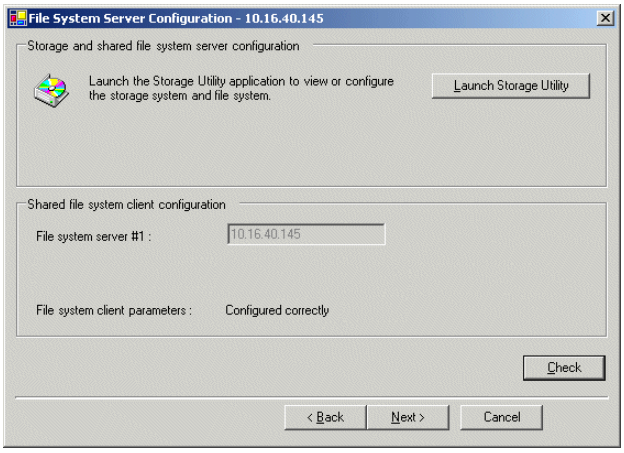
5. A message informs you that you must restart the K2 Media Server, however the restart at the end of the Configure K2 Server wizard suffices, so you do not need to restart now.
6. Close the Storage Utility.

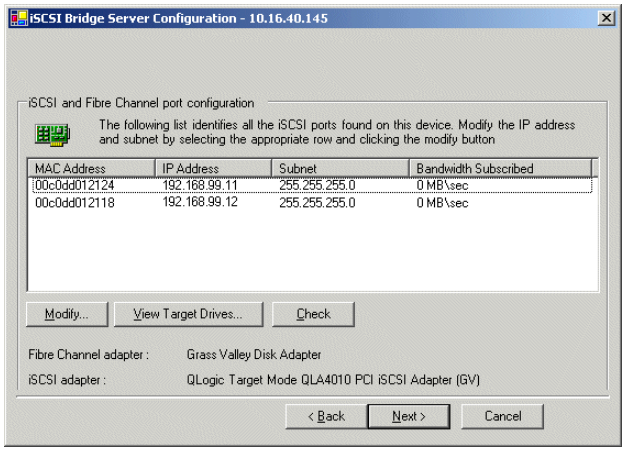
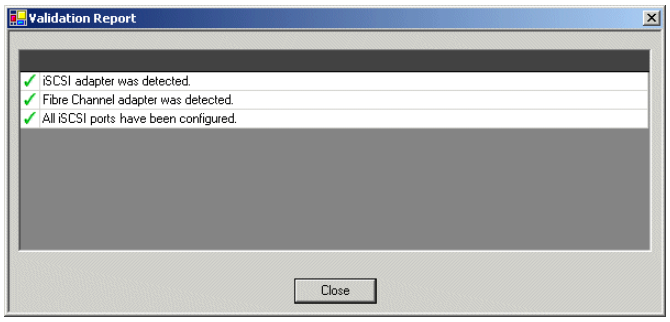
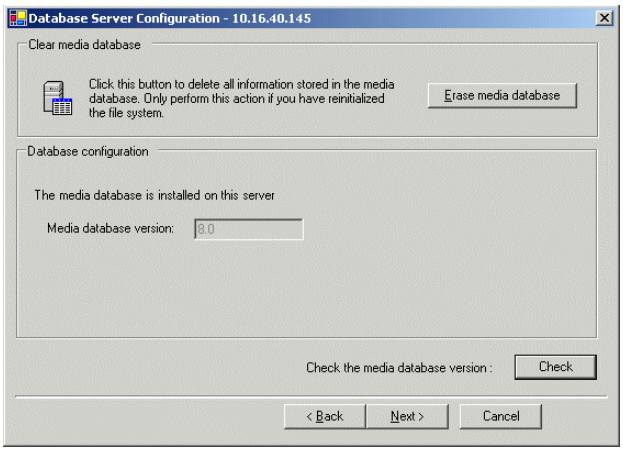
NOTE: Do not attempt to start K2 Media Clients or otherwise bring the K2 Storage System online until instructed to do so later in this chapter.

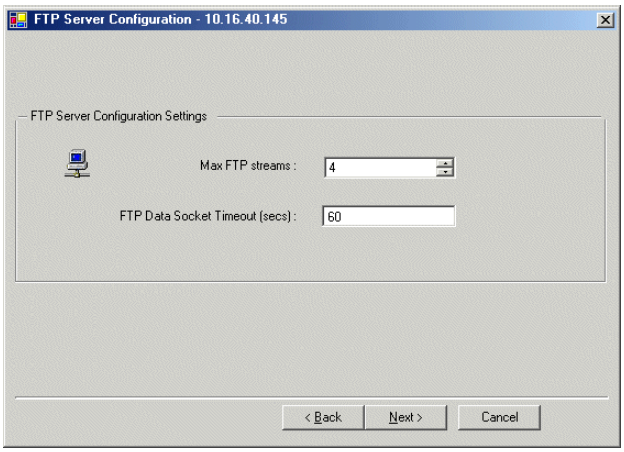
7. Continue with the next procedure.

Configuring the server - Part 2

1. Return to the Configure K2 Server page from which you launched Storage Utility and proceed as described in the following table:

On this page…	Do this…
File System Server Configuration This page checks on the configuration of the server in one of its main roles as a file system server. The server also functions as a file system client, which is also checked from this page.	 Click **Check**. When the wizard reports that the configuration is correct, click **Next**. If you get a “The V: will not be available until this device is rebooted…” message, you can safely continue with this procedure and follow the instructions related to this message later in the procedure.

On this page…	Do this…
iSCSI Bridge Server Configuration This page manages the components that bridge between iSCSI (the GigE media network) and the Fibre Channel connection to the RAID storage. You configure network settings on the iSCSI adapters and the page validates that the Fibre Channel adapter is in place and that the media RANKs are visible as iSCSI targets.	 Select an iSCSI adapter and click **Modify**. A network configuration dialog box opens. Enter the media network IP address and the subnet mask and click **Apply**. Do the same for the other iSCSI adapter. Click **Check**. The Validation Report opens.  Confirm that the iSCSI configuration is successful. Close the Validation Report and then click **Next**.
Database Server Configuration	 You do not need to enter or configure anything on this page. Click **Next**.

On this page…	Do this…
FTP Server Configuration	 Do not modify these settings. Leave at default values of Max FTP streams = 4 and FTP Data Socket Timeout = 60. Only qualified Grass Valley personnel should specify other values, as these settings are intended for use only with custom systems designed by Grass Valley. Click **Next**
Completing the Configuration Wizard	Click **Finish**. The wizard closes. The server restarts. Wait until all startup processes have completed before continuing.

Your configurations for the Level 2 K2 Storage System are complete.

Adding K2 Storage System clients

You can add now clients, such as K2 Media Clients or Aurora Edits, to the K2 Storage System and configure them using the K2 System Configuration application.

- For Aurora Edits, refer to the *Aurora Edit Installation and Configuration Guide* for instructions.
- For K2 Media Clients, refer to *K2 Media Client System Guide* for instructions.

Basic operations for Level 2 storage

Use the following procedures as you work on your Level 2 storage system:

- "Level 2 system power-off procedure"
- "Level 2 system power-on procedure"

For other procedures refer to "Administering and maintaining the K2 Storage System" on page 687.

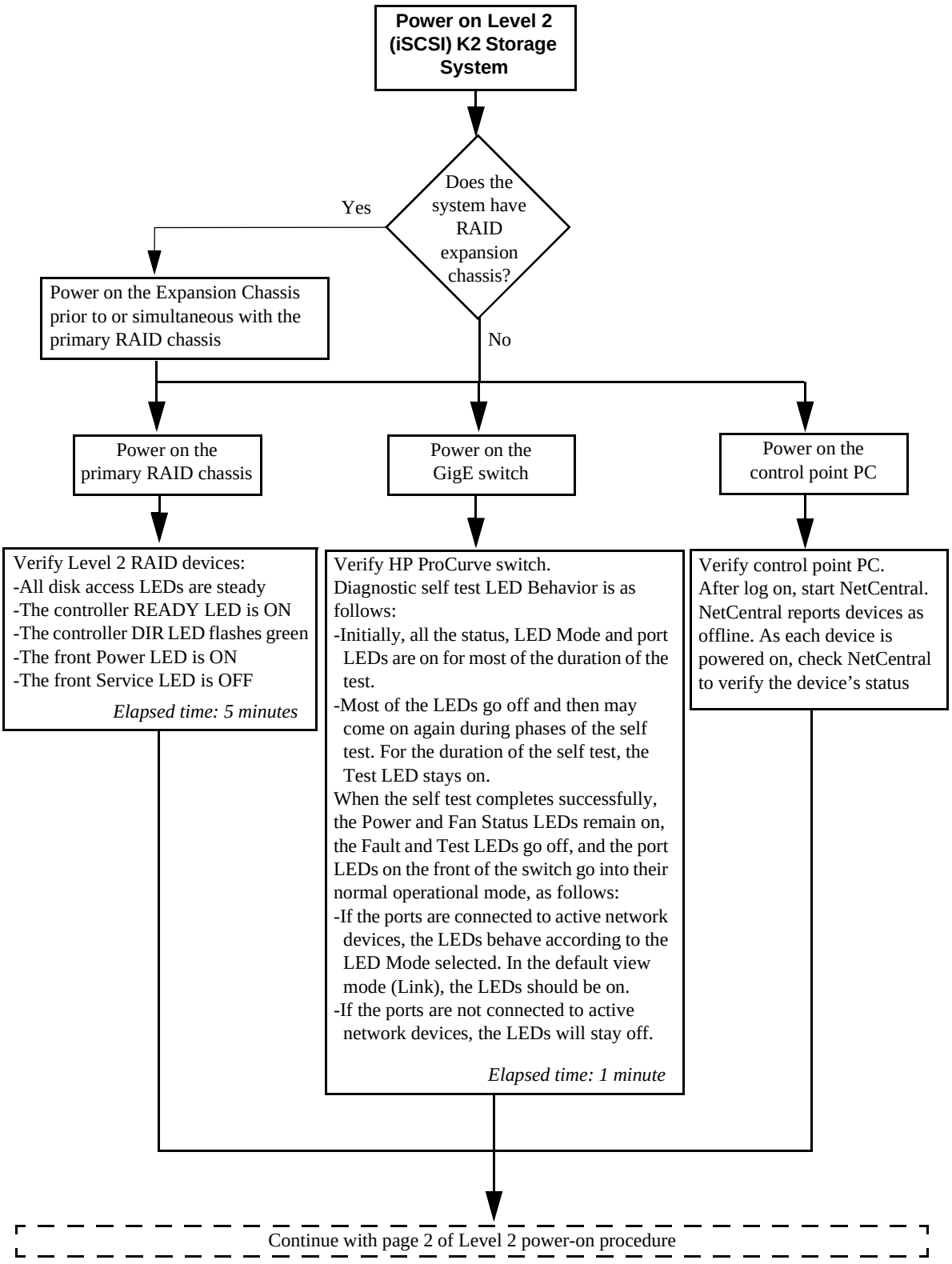
Level 2 system power-off procedure

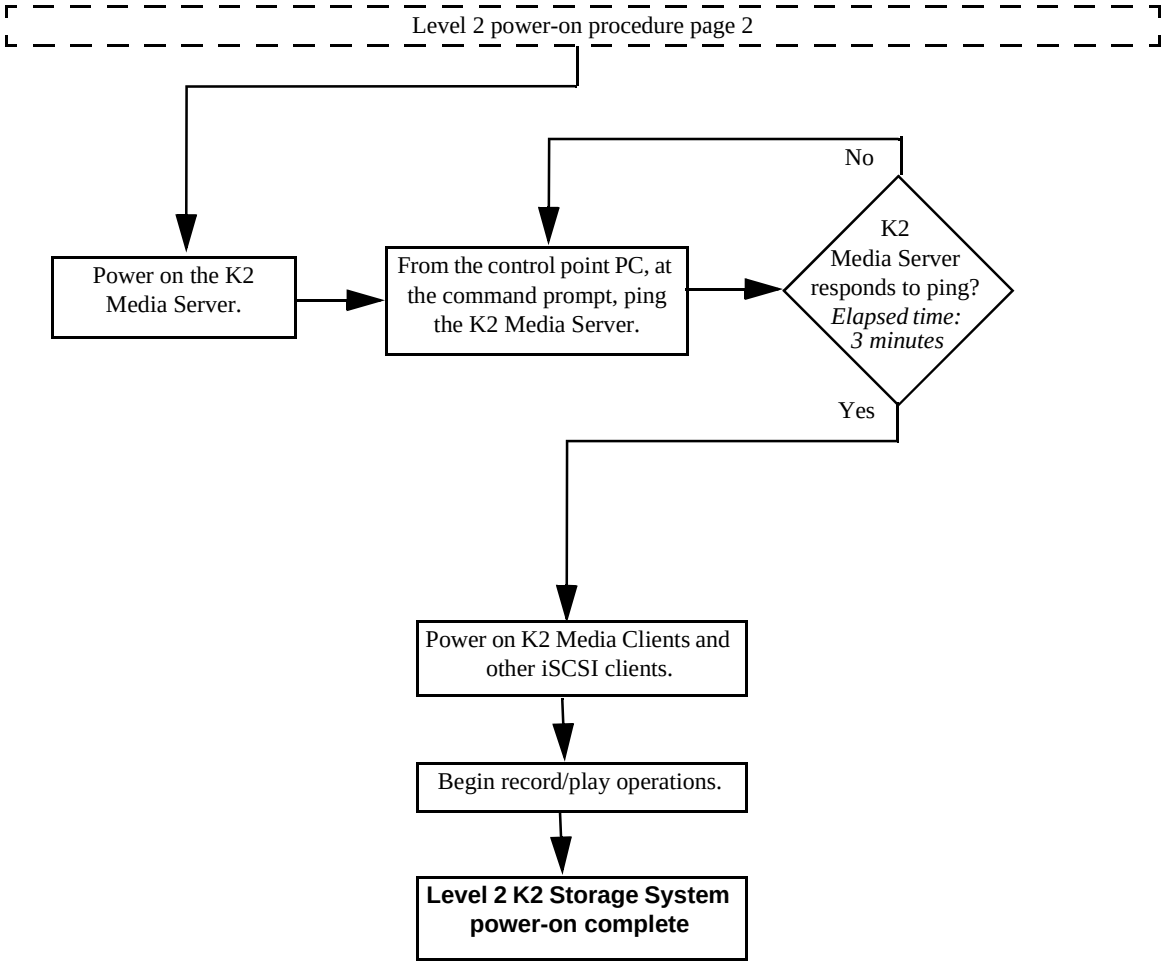
Use the following sequence to power-off the Level 2 storage system.

1. Power-off all K2 Media clients or other iSCSI clients.
2. Shut down the K2 Media Server.

3. Power-off the primary RAID controller chassis. If expansion chassis are connected, make sure the power-off of the controller chassis is prior to or simultaneous with the power-off of its connected expansion chassis. Wait approximately 30 seconds for the disk drives to spin down before proceeding.
4. Power-off all Ethernet switches.
5. Power-off the control point PC and/or the NetCentral server PC, if necessary.

Level 2 system power-on procedure




Level 2 power-on procedure page 2
Power on the K2 Media Server.
From the control point PC, at the command prompt, ping the K2 Media Server.
K2 Media Server responds to ping?
Elapsed time: 3 minutes
No
Yes
Power on K2 Media Clients and other iSCSI clients.
Begin record/play operations.
Level 2 K2 Storage System power-on complete

Chapter 3

Installing the Level 2R Storage System

The K2 Level 2 Redundant (L2R) storage system was initially released with K2 system software version 3.0 in December 2005.

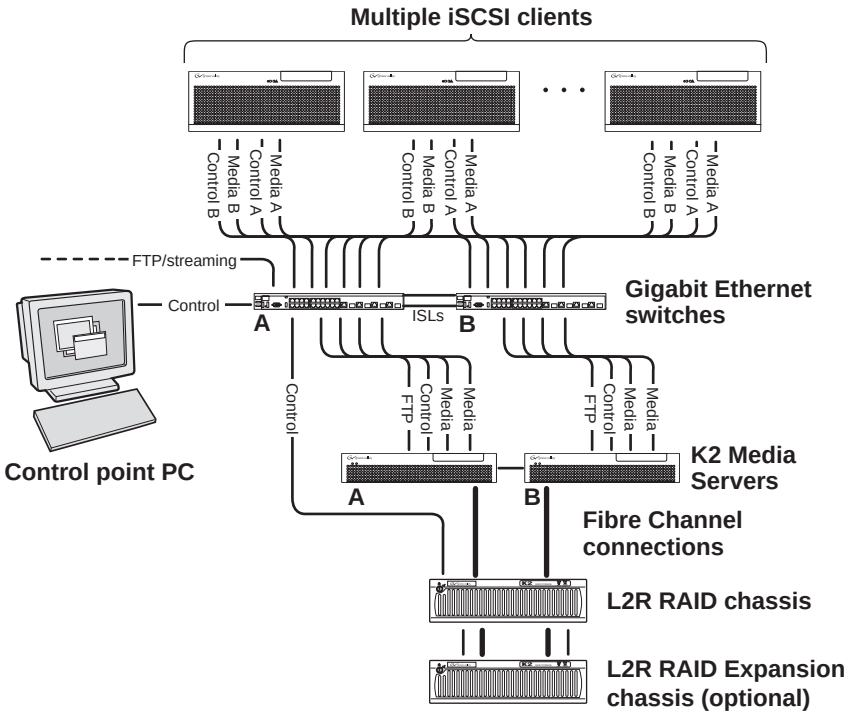
Use this chapter to install the Level 2R storage system.

This chapter includes the following topics:

- "Level 2R system description" on page 74
- "Preparing Level 2R devices" on page 75
- "Networking for Level 2R" on page 95
- "Configuring the Level 2R storage system" on page 100
- "Adding K2 Storage System clients" on page 119
- "Basic operations for Level 2R storage" on page 120

Work through these topics sequentially to install the storage system.

Level 2R system description



The Level 2 redundant (Level 2R) storage system has two Gigabit Ethernet switches connected by Inter-Switch Links (ISLs) to support a redundant Ethernet fabric. The storage system also has redundant K2 Media Servers. The servers are configured to have identical roles. This provides redundancy for database, file system, iSCSI bridge, and FTP roles. One L2 RAID supports redundant Fibre Channel connections. An Expansion chassis is optional for increased storage capacity.

K2 Media Clients have a pair of redundant (teamed) Gigabit Ethernet ports for control and two Gigabit Ethernet ports (A and B) for media (iSCSI). Each port of the control team is connected to a different switch. The A media port goes to the A GigE switch and the B media port goes to the B GigE switch. The GigE switches are configured with V-LANs to keep the control/FTP and media (iSCSI) traffic separate.

Each K2 Media Server has two GigE connections for media, one GigE connection for control, one GigE connection for FTP, and one Fibre Channel connection to the RAID storage. All GigE connections on a server go to the same GigE switch. The server hosts iSCSI interface cards for the GigE media connections and a Fibre Channel card for the RAID storage connection. The iSCSI interface cards provide a bridge between GigE iSCSI and Fibre Channel SCSI. The server also hosts software components that allow it to function in various roles, including media file system manager, media database server, and FTP server. Redundant K2 Media Servers are connected by a serial cable which supports the heartbeat signal required for automatic system recovery (failover) features.

The L2 RAID chassis has redundant RAID controllers to support the Fibre Channel connections from the K2 Media Servers. The L2 RAID chassis is also connected to the GigE control network, which is required for SNMP (NetCentral) monitoring.

On the L2 RAID chassis there are two RAID 1 LUNs for media file system metadata files and journal files. The remainder of the RAID storage is RAID 3 LUNs for media.

The K2 configuration control point PC is connected to the GigE control network. The K2 System Configuration application runs on this PC for configuring the storage system.

FTP/streaming traffic accesses the K2 Storage System via the FTP GigE port on K2 Media Servers. FTP/streaming traffic does not go to K2 Media Clients.

Refer to Chapter 14, *Description of K2 Storage Devices* for more information. Also refer to "Design considerations for Ethernet switches" on page 759.

Preparing Level 2R devices

Use the topics in this section to prepare each device so that it is ready to become part of the Level 2R storage system.

- "Setting up the Control Point PC" on page 75
- "Setting up the Level 2R redundant GigE switches" on page 76
- "Setting up the K2 Media Server" on page 87
- "Setting up the L2 RAID chassis" on page 88
- "Preparing K2 Storage System clients" on page 92

Setting up the Control Point PC

To set up the K2 configuration Control Point PC, you have the following options:

- Use the Grass Valley Control Point PC that comes from the factory with software pre-installed. This includes the K2 System Configuration application, remote AppCenter, and NetCentral software. Refer to the *K2 Media Client System Guide* for rack mount instructions.
- Use a PC that you own and install the required software.

For either option, you must do the following for the Control Point PC that runs the K2 System Configuration application:

- Assign a control network IP address to the PC. Refer to "Networking tips".
- Connect the PC to the GigE control network.

To use your own PC, you must additionally do the following:

- Verify that the PC meets system requirements, then install the Control Point software and other supporting software, as specified in the *K2 Media Client System Guide*.
- Install and license NetCentral server software. You can install this on the NetCentral server PC, which can be the K2 configuration Control Point PC. Refer

to the *NetCentral User Guide*.

Also refer to "Control point PC description" on page 650.

To fix the screen resolution problem seen with NetCentral on the Grass Valley Control Point PC, do the following:

1. Go to Display properties (right mouse selection of properties on the display area)
2. Select Settings tab
3. Select the Advanced button
4. In the General tab, set the DPI setting to Normal size (96 DPI)
5. Restart the PC

Setting up the Level 2R redundant GigE switches

These procedures are for the HP ProCurve switch.

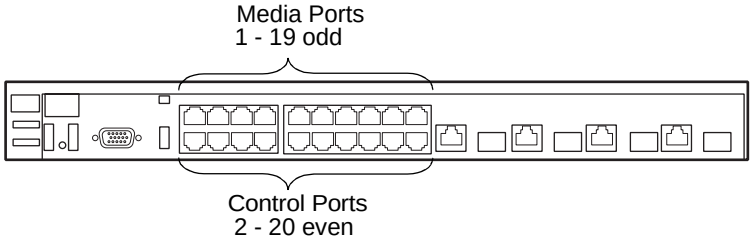
For iSCSI traffic, you must use the HP ProCurve switch. Both the 3400cl series and 2900 series switches are qualified for iSCSI traffic, and both types are fully compatible and can coexist on the network.

For control and FTP/streaming traffic, it is allowed to use a different brand of switch, such as a Cisco Catalyst switch, if required by your site. If you are using a non-HP switch, apply the information in the following procedures accordingly. Refer to the documentation you received with the switch as necessary.

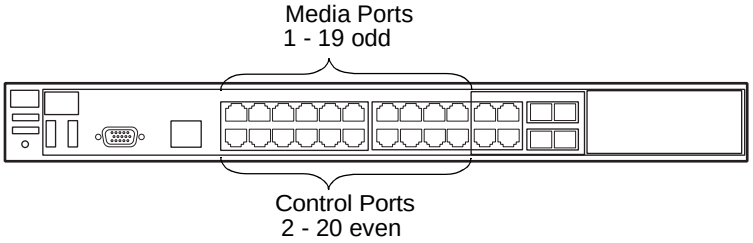
Also refer to "Design considerations for Ethernet switches" on page 759.

- You need at least two switches, so that the "A" media (iSCSI) network and the "B" media (iSCSI) network each have their own switch.
- Use CAT5e or CAT6 cables. The maximum cable length is 50 meters for CAT5e and 100 meters for CAT6.
- Assign an IP address and logon to each switch. Refer to "Configuring the GigE switch via serial connection" on page 78.
- Set up VLANs on each switch. Refer to "Configuring the GigE switch via the Web interface" on page 81.
- Install the switches in their permanent location.
- Provide power to the switches.
- Connect cables as follows:

3400cl series switch



2900 series switch



To the media ports on switch A, make the “A” media (iSCSI) network connection from each K2 Media Client. Also make two media (iSCSI) connections from K2 Media Server A.

To the media ports on switch B, make the “B” media (iSCSI) network connection from each K2 Media Client. Also make two media (iSCSI) connections from K2 Media Server B.

To the control ports on switch A, make one control connection from each K2 Media Client or other iSCSI client, from the RAID storage chassis, and from the control point PC. Also make the FTP network connection and the control network connection from K2 Media Server A.

To the control ports on switch B, make the second control connection from each K2 Media Client or other iSCSI client. Also make the FTP network connection and the control network connection from K2 Media Server B.

If you have other iSCSI clients, such as Aurora Edits, that have just one iSCSI connection and one control connection, approximately half of the clients should be connected to switch A and half of the clients should be connected to switch B. In a failover event, only the clients connected to one of the switches will remain operational, so make connections accordingly. Connect the client’s iSCSI connection to one of the media ports on a switch and the client’s control connection to one of the control ports on the same switch.

Interconnect switch A and switch B with two 10 Gig ISLs.

Refer to “Level 2R system description” on page 74 for a diagram of the complete system.

Refer to cabling procedures later in this chapter for the GigE connections at each of the devices of the K2 Storage System.

Also refer to “K2 Ethernet switch description” on page 651 and “Design considerations for Ethernet switches” on page 759.

Configuring the GigE switch via serial connection

NOTE: Make sure you check the switch firmware and upgrade if necessary, as instructed at the end of this procedure.

The following procedure is for the HP ProCurve switch and applies to both the 3400cl series and 2900 series switches.

For Level 2R with two switches, do the following on each switch.

Use a direct console connection to the switch, start a console session, and access the Switch Setup screen to set the IP address.

1. Configure the PC terminal emulator on the control point PC or another PC as a DEC VT-100 (ANSI) terminal or use a VT-100 terminal, and configure either one to operate with these settings:
   - Baud rate 115200
   - 8 data bits, 1 stop bit, no parity, and flow control set to Xon/Xoff
   - Also disable (uncheck) the "Use Function, Arrow, and Ctrl Keys for Windows" option
2. Connect the PC to the switch's Console Port using the console cable included with the switch. (If your PC or terminal has a 25-pin serial connector, first attach a 9-pin to 25-pin straight-through adapter at one end of the console cable.)
3. Turn on the PC's power and start the PC terminal program.
4. Press **Enter** two or three times and you will see the copyright page and the message "Press any key to continue". Press a key, and you will then see the switch console command (CLI) prompt.

NOTE: If you press Enter too many times and get past the log in, enter the command EN to get into the command line.

5. Type the following, then press **Enter**:

   ```
   menu
   ```

   If prompted to save the current configuration, answer no (press the n key) to proceed. The main menu opens.
6. On the main menu, choose **Switch Configuration,** then press **Enter**.
7. Select **IP Configuration**, then press **Enter**.
8. Press the right-arrow key to choose **Edit**, then press **Enter**. Tab to fields and enter information as follows:
   a. Change **Gateway** to be the default router.
   b. Tab to the **IP Config (DHCP/Bootp)** field and use the Space bar to select the **Manual** option.
   c. Tab to the **IP Address** field and enter the switch's control network IP address. Refer to "Networking tips" on page 106.
   d. Tab to the **Subnet Mask** field and enter the subnet mask used for your network.

9. Press **Enter**, then right-arrow to **Save**. Press **Enter** and revert to previous menu.
10. Select **Return to Main Menu** and press **Enter**.
11. From the main menu, chose **Console Passwords** and press **Enter**. The Set Password Menu opens.
12. Chose **Set Manager Password** and press **Enter**.
13. When prompted for the password, type a password of up to 16 ASCII characters with no spaces and press **Enter**. The password can be one that is used on other K2 devices, such as “adminK2” or “K2admin”, or it can be your site's administrator password.
14. When prompted to enter the password again, retype the password and press **Enter**.
15. Select **Return to Main Menu** and press **Enter**.
16. From the main menu, tab to **Command Line (CLI)** and press **Enter**. The command prompt appears.
17. Type the following, then press **Enter**:

    ```
    configure
    ```

    You are now in configuration mode.
18. Configure an administrator username. The username can be one that is used on other K2 devices, such as “administrator” or “K2admin”, or it can be your site's administrator username. For example, to set the username to “administrator” type the following, then press **Enter**:

    ```
    password manager user-name administrator
    ```
19. When prompted, enter and re-enter the password.
20. Set spanning tree to RSTP. Type the following, then press **Enter**:

    ```
    spanning-tree force-version rstp-operation
    ```

    This configures spanning tree, but it does not turn spanning tree on. You must turn spanning tree on using the switch’s Web interface, as explained in the next procedure “Configuring the GigE switch via the Web interface”.
21. Decide your SNMP community name as explained in the following options, then proceed with the next step:

    - If you decide to use a unique SNMP community name (not “public”), add the community and set its RW permissions. For example, if the community name is “K2”, type the following, then press **Enter**:

      ```
      snmp-server community K2 unrestricted
      ```

    - If you decide to use the default SNMP community “public” for NetCentral monitoring, which already has RW permissions set as required by NetCentral, proceed to the next step.
22. Enter the SNMP community and IP address of the NetCentral server PC. For example, if the IP address is “192.168.40.11” and the community is “public”, you type the following, then press **Enter**:

    ```
    snmp-server host public 192.168.40.11
    ```

23. Enable Authentication traps. Type the following, then press **Enter**:

```
snmp-server enable traps authentication
```

This allows NetCentral to test the switch to verify that it can send its SNMP trap messages to NetCentral.

24. Type the following, then press **Enter**:

```
menu
```

When prompted, save the configuration by pressing the y key. The main menu opens.

25. If you need a trunk for ISLs to gang switches together, use the following steps. These steps illustrate trunking the last three 1 Gig ports for three 1 Gig ISLs, which is the recommended configuration for ISLs on all multi-switch K2 Storage Systems. Refer to "Design considerations for Ethernet switches" on page 759 and consult with your Grass Valley representative if your requirements deviate from the recommended policy:

    a. At the main menu, select **Switch Configuration** and press **Enter**.

    b. Choose selection **Port/Trunk Settings** and press **Enter**.

    c. Press the right-arrow key to choose **Edit**, then press **Enter**.

    d. Down arrow until at the bottom of the list of ports and select the last (highest port number) 1 Gig port in the list.

    e. Right-arrow over to the Group column.

    f. Use the Space bar and set the bottom 1 Gig port to **Trk1**.

    g. Set the next port up also to **Trk1**.

    h. Set the next port up also to **Trk1**.

    i. Press **Enter**, then right-arrow to **Save**. Press **Enter** and revert to previous menu.

26. Select **Return to Main Menu** and press **Enter**.

27. From the main menu, tab to **Command Line (CLI)** and press **Enter**. The command prompt appears.

28. Check the version of firmware currently installed on the switch. Type the following, then press **Enter**:

```
show flash
```

Information is displayed similar to the following example:

```
HP_iSCSI_switch1# show flash
Image            Size(Bytes)   Date   Version
-----            ----------  -------- -------
Primary Image    : 3287779   03/15/05 M.08.66
Secondary Image  : 3287779   03/15/05 M.08.66
Boot Rom Version: I.08.07
Current Boot     : Primary
```

29. Check the Primary Image Version and refer to your *K2 Storage System Release Notes* for information about currently supported versions. Then proceed as follows:
    - If *K2 Storage System Release Notes* instruct you to change the firmware on the switch, do so before continuing. Refer to the documentation you received with the switch for instructions to change the firmware. Then continue with the next procedure "Configuring the GigE switch via the Web interface".
    - If *K2 Storage System Release Notes* confirm that the version on the switch is a currently supported version, continue with the next procedure.
30. Type the following, then press **Enter**:

    ```
    menu
    ```

    The main menu opens.
31. From the main menu, choose **Reboot Switch** and press **Enter**. When prompted "Continue Reboot…?', answer yes (press the y key) to proceed. The switch restarts.
32. You can now use the switch's web browser interface for further configuration, as instructed in the next procedure.
33. Close the PC terminal program and disconnect the console cable.
34. Repeat this procedure on the other switch.

Continue with the next procedure "Configuring the GigE switch via the Web interface".

Configuring the GigE switch via the Web interface

The following procedure is for the HP ProCurve switch and applies to both the 3400cl series and 2900 series switches.

For Level 2R with two switches, do the following on each switch.

1. From the control point PC or another PC, make sure that you have a direct Ethernet cable connection to the switch, with no switches, routers, proxies, or other networking devices in between.
2. On the PC, open Internet Explorer and type the switch's IP address in the Address field, as in the following example.

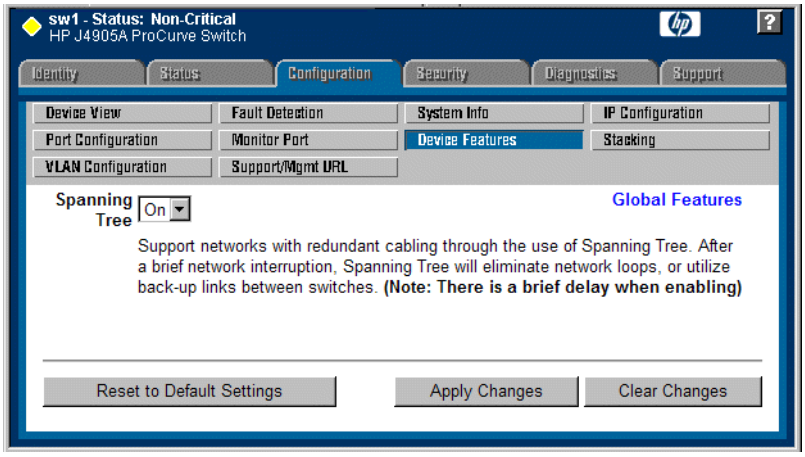
   ```
   http://192.168.100.61
   ```

   This should be the name or IP address as currently configured on the switch.
3. Press **Enter** to open the switch's configuration application.

NOTE: The configuration application for the HP ProCurve switch requires Java.

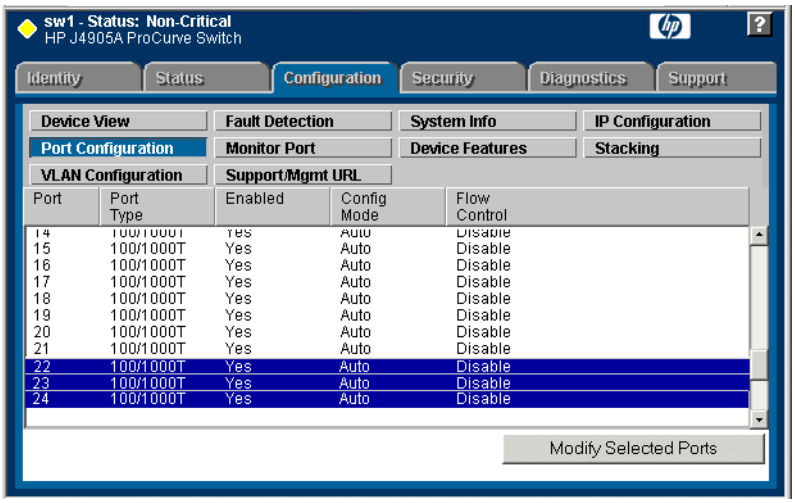
You can also access the switch's configuration application from the K2 System Configuration application.

4. In the switch's configuration application, choose **Configuration**, then **Device Features**.



5. Set Spanning Tree to **On** and click **Apply Changes**. If prompted, log in with the switch's administrator username and password.

6. Click **Port Configuration**.

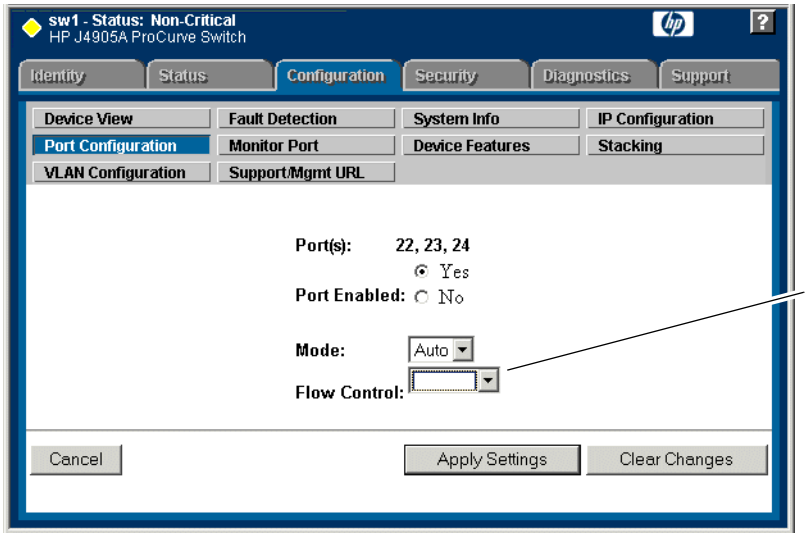


7. If you do not need trunks, such as on a one-switch system, skip to the next step in this procedure. If you need trunks, such as on a two-switch system with ISLs, do the following:

   a. Select (Ctrl + Click) the trunked ports. Typically the trunked ports are at the bottom of the list and are labeled Trk1.

   b. Click **Modify Selected Ports**.

      If prompted, log in as administrator.



c. For the trunked ports, set Port Enabled to **Yes**. On some switch models, some ports are disabled by default, so make sure you enable them. Leave Mode as default of **Auto**.

d. Set Flow Control as follows:

   - For the 3400cl series switch, set to **Disable**.
   - For the 2900 series switch, set to **Enable**.

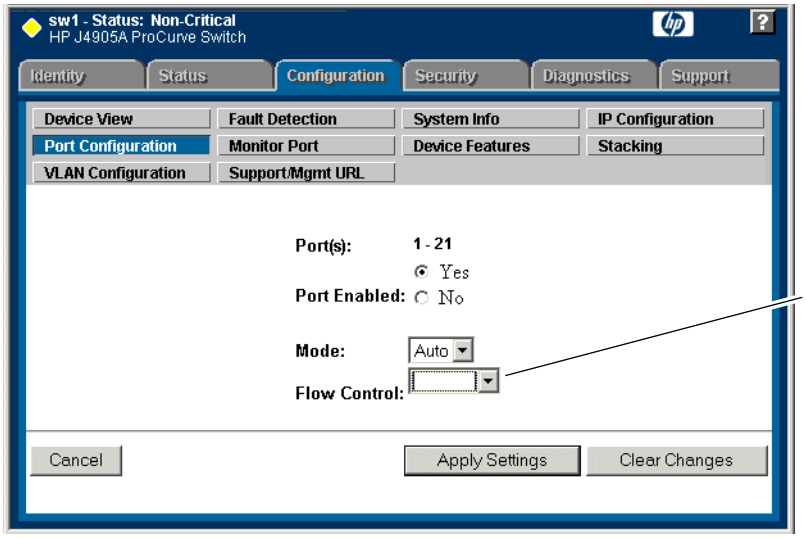
   If you have both 3400cl series and 2900 series on your network, having different Flow Control settings (disable for 3400cl, enable for 2900) does not cause problems.

e. Click **Apply Settings**.

8. On the Port Configuration page, do one of the following:

   - If you do not have trunks, select all ports.
   - If you have trunks, select the remaining ports (the ports not trunked).

9. Click **Modify Selected Ports**.



10. Make sure Port Enabled is set to **Yes**, leave Mode as default of **Auto**.

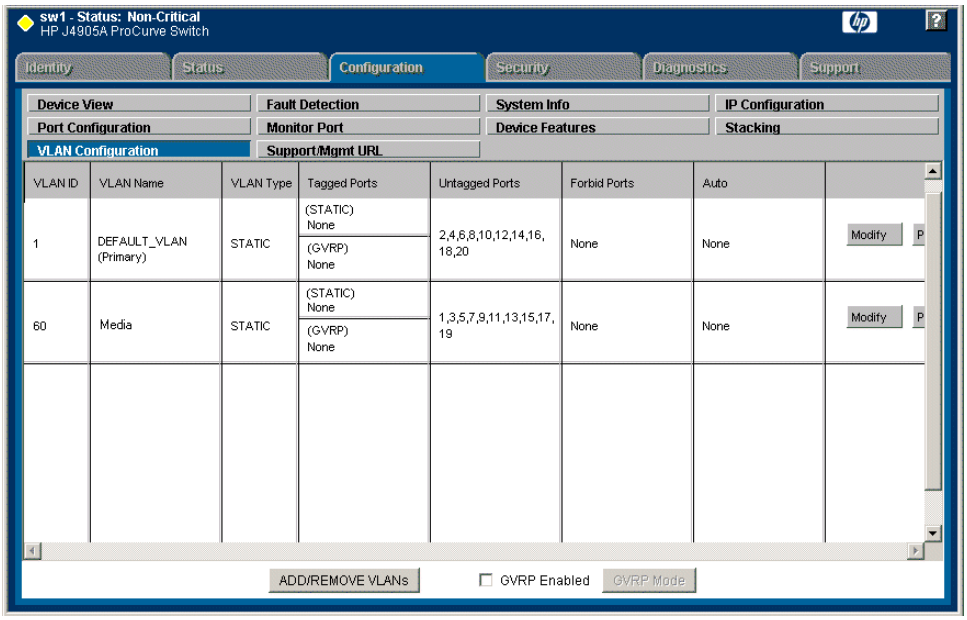
11. Set Flow Control as follows:

    - For the 3400cl series switch, set to **Disable**.
    - For the 2900 series switch, set to **Enable**.

    If you have both 3400cl series and 2900 series on your network, having different Flow Control settings (disable for 3400cl, enable for 2900) does not cause problems.

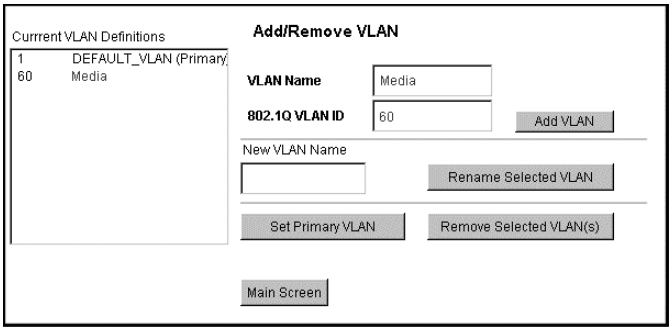
12. Click **Apply Settings**. Wait until settings are applied and the Web interface becomes active.

13. Choose **VLAN Configuration**. If prompted, log in with the switch's administrator username and password.



14. Create a new Media (iSCSI) VLAN as follows:

    a. Click **Add/Remove VLANs**.



    b. In the VLAN Name field enter `Media`.

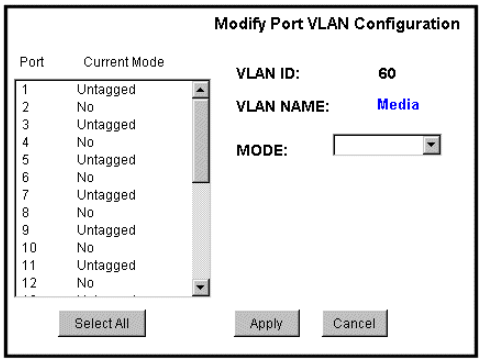
    c. In the VLAN ID field enter `60`.

    d. Click **Add VLAN**.

    e. Click **Main Screen** to return to VLAN Configuration.

15. Configure the Media VLAN as follows:

    a. In the Media VLAN row, click **Modify**.



b. Select all the odd numbered ports. (Tip: Use Ctrl + Click.)

c. In the Mode drop-down list, select **Untagged**, then click **Apply**. This removes the odd ports from the default (Control) VLAN.

   If you have a trunk, do not configure it as "Tagged". Media VLAN traffic (iSCSI) does not go over the trunk.

16. Click the **VLAN Configuration** tab.

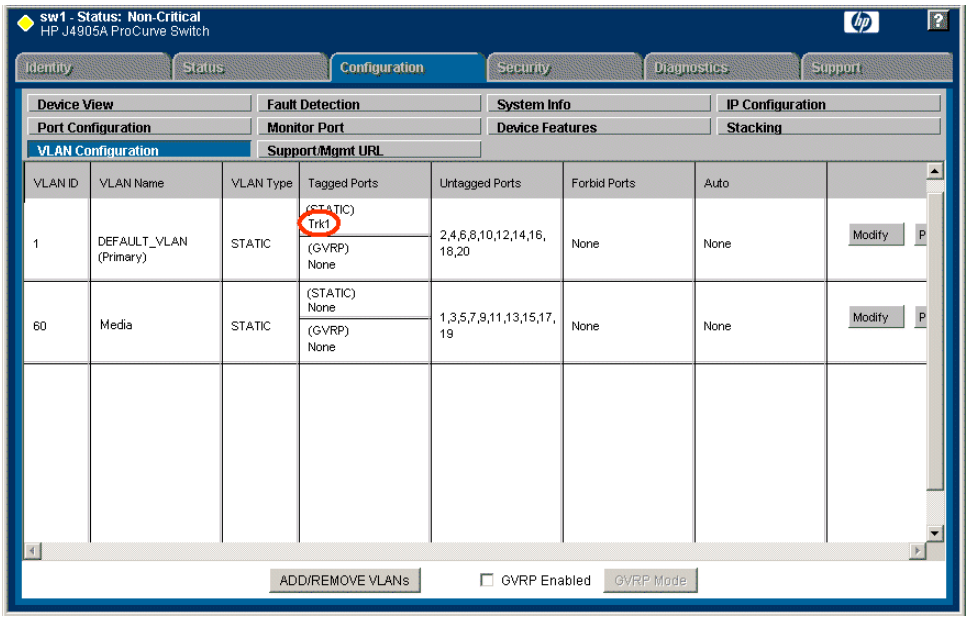
17. If you have a trunk, configure the default (Control) VLAN as follows:

    a. In the DEFAULT_VLAN row, click **Modify**.

    b. In the Current Mode list box, scroll down and select the trunk.

    c. In the Mode drop-down list, select **Tagged**, then click **Apply**. This allows default VLAN traffic (non-iSCSI) to go over the trunk.

18. Click the **VLAN Configuration** tab.



19. If you have a trunk, verify that for the default VLAN the trunk is displayed in the Tagged Ports column.
20. If you have two switches, repeat this procedure for the other switch.
21. Close the switch configuration application.

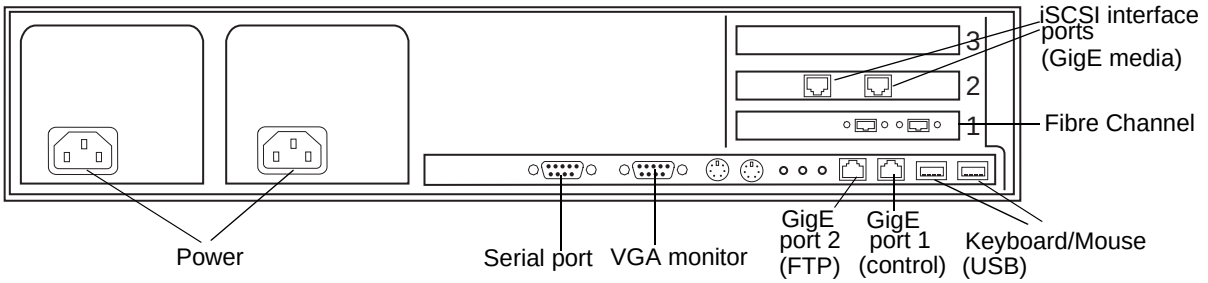
Setting up the K2 Media Server

Both the Dell PowerEdge 2850 and the Dell PowerEdge 2950 are qualified as platforms for the K2 Media Server. This section provides information on both platforms.

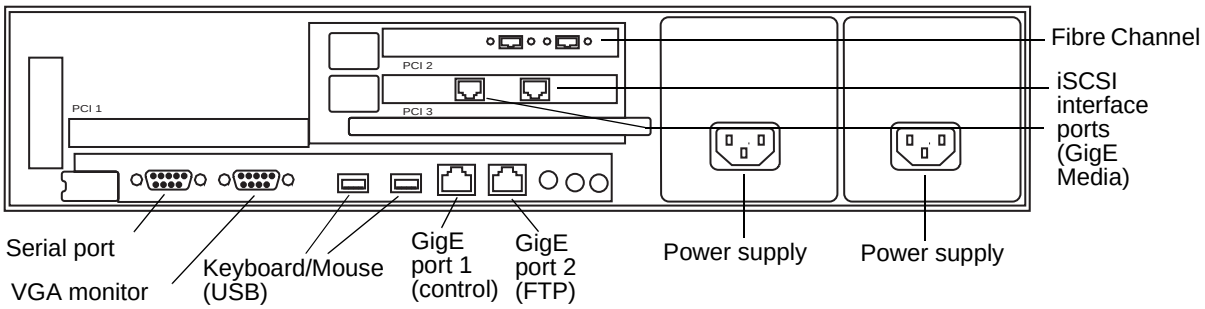
Do the following to prepare a K2 Media Server:

- Install the server in its permanent location. Refer to the rack mount instructions that you received with the server's product bundle.
- Provide power to the servers.
- Connect cables as follows:

Dell 2850 PowerEdge server



Dell 2950 PowerEdge server



Connect the two iSCSI interface ports to media ports on the GigE switch. Connect A servers to the A GigE switch. Connect B servers to the B GigE switch.

Connect the motherboard GigE port 1 and GigE port 2 to control ports on the GigE switch. Connect A servers to the A GigE switch. Connect B servers to the B GigE switch.

Connect one of the Fibre Channel ports to the RAID storage device.

Make a direct connection between the serial ports of the two servers.

Take care to use the proper serial cable to interconnect redundant K2 Media Servers that take the role of file system/database servers. This cable supports the heartbeat mechanism whereby the servers monitor each other's health. It is a 9 pin serial cable, but it is not a standard RS-232 null modem cable. The heartbeat cable is supplied with your system (Grass Valley part number 174-8137-00) and has a pin configuration as follows:

1 – 4

2 – 3

3 – 2

4 – 1&6

5 – 5

6 – 4

7 – 8

8 – 7

9 – No Connect

- Assign a control network IP address to GigE port 1. Use standard Windows procedures. Refer to "Networking tips".
- Change the hostname. Use standard Windows procedures.
- Configure SNMP properties so the trap destination points to the NetCentral server PC. Use standard Windows procedures. If you are not using the SNMP community name "public", configure the community name and set permissions to RW. Also make sure that the Authentication trap is enabled.

Also refer to "K2 Media Server descriptions" on page 653.

Setting up the L2 RAID chassis

Do the following to prepare the L2 RAID storage devices:

- Install the chassis in its permanent location. Refer to the *L2 RAID Instruction Manual* for rack mount instructions.
- "Assign Fibre Channel address ID" on page 89.
- "Connect the L2 RAID chassis" on page 89
- "Assign chassis address on Expansion chassis" on page 90.
- "Power on the L2 RAID chassis" on page 92

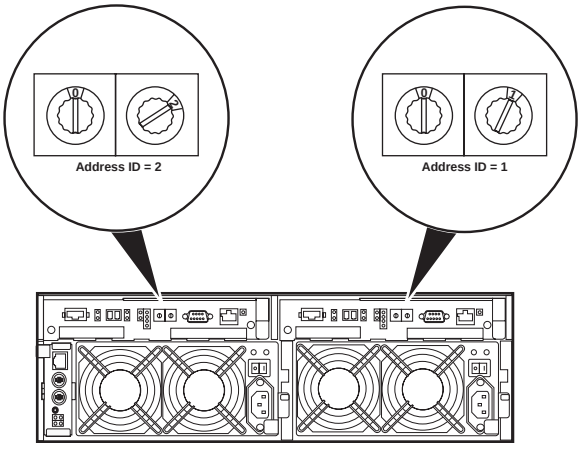
In addition, you will configure network settings, SNMP settings, and bind LUNs. These tasks are part of the K2 System Configuration application and Storage Utility procedures later in this chapter. The process of binding LUNs can take a significant amount of time—as much as eight hours—so you might want to put priority on the tasks necessary to start the LUN binding process, then catch up with other tasks while the LUNs are binding.

Also refer to "K2 RAID storage description" on page 659.

Assign Fibre Channel address ID

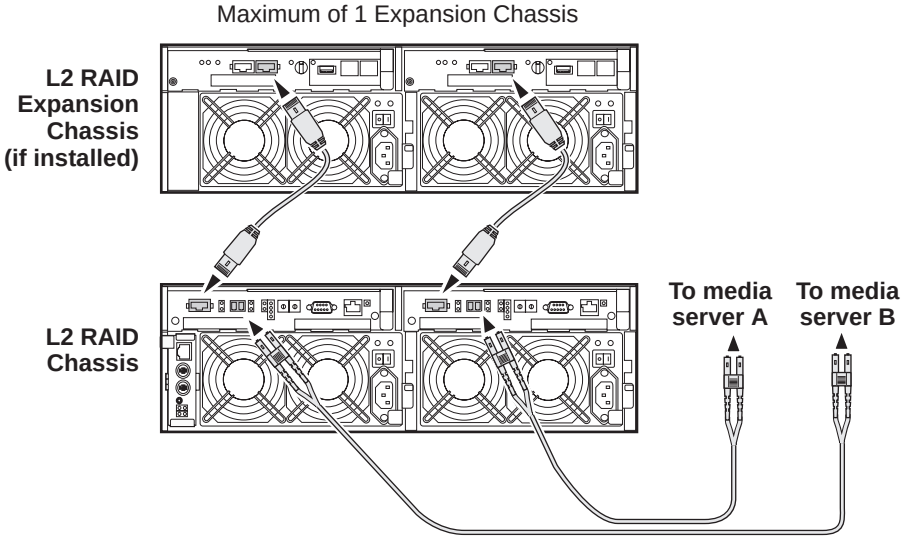
Every RAID controller must have a unique Fibre Channel address ID that identifies the controller on the Fibre Channel fabric. To set the Fibre Channel address ID on the L2 RAID, refer to the following diagram:

Set a unique Fibre Channel address on both L2 RAID controllers.



Connect the L2 RAID chassis

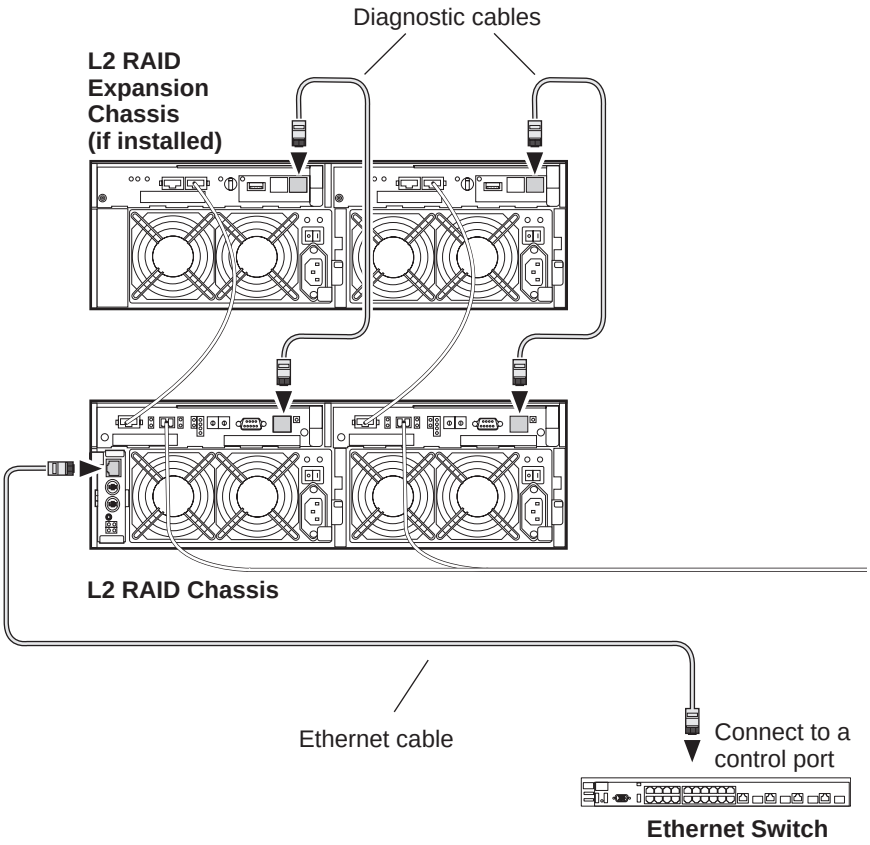
Connect Fibre Channel cabling.



Connect Ethernet and diagnostic cabling as shown in the following diagram. Be aware of the following cabling requirements of the Level 2 storage devices:

- Each L2 RAID chassis has a single connection to the Ethernet fabric through its LAN card.
- Each Expansion Adapter on the L2 RAID Expansion chassis requires a diagnostic cable, which must be connected.

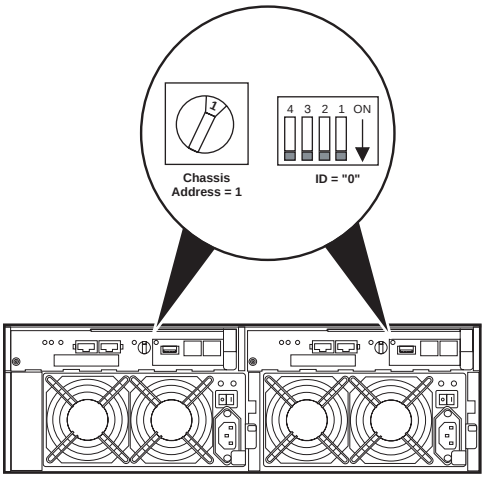
Install Ethernet and diagnostic cabling as shown.



Assign chassis address on Expansion chassis

Every chassis must have a chassis address. The Level two RAID chassis address is fixed at 0, so no configuration is required. However, if you have a L2 RAID Expansion chassis you must set its chassis address to 1 as shown in the following illustration. Also verify that the diagnostic ID switches are in the position shown.

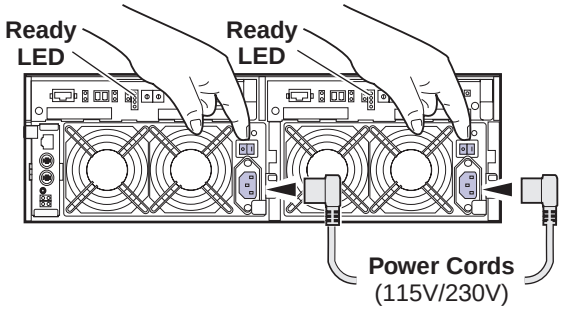
Set the chassis address to 1 on both L2 RAID Expansion adapters.



Do not swap Expansion chassis or otherwise reconfigure storage. If you connect a L2 RAID Expansion chassis to the wrong controller such that the Expansion chassis contains disk modules that were bound using a different controller you will lose your media file system.

Power on the L2 RAID chassis

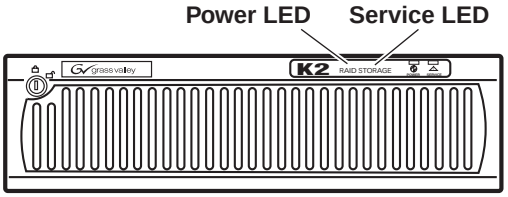
Connect power cords, and turn on power as shown. You must power-up any RAID Expansion chassis prior to, or at the same time as the RAID Controller chassis. Verify power-up as shown.



Power-up Verification

- Ready LEDs on RAID controllers are steady ON.
- Front panel Power LED is ON, Service LED is OFF after approximately 3 minutes.

  Refer to the *L2 RAID Instruction Manual* if there is a problem.



Your preparations for L2 RAID storage are now complete.

Preparing K2 Storage System clients

Any devices that function as iSCSI clients to the K2 Storage System must be prepared with the following requirements:

- One or more connections to the control network.
- A static IP address for the control network.
- For a redundant K2 Storage System, K2 Media Clients have one connection to the A media (iSCSI) network and one connection to the B media (iSCSI) network. Other iSCSI clients with just one media port connect to either the A or the B network.

Additional steps that are required for Aurora Edits include the following:

- Implement Aurora Edit security features.
- Install SNFS software and K2 software.

For more information, refer to the *Aurora Edit Installation and Configuration Guide*.

Additional steps that are required for K2 Media Clients include the following:

- You must install Multi-path I/O software if the K2 Media Client connects to the K2 Storage System with a redundant Ethernet (iSCSI) fabric. For example, the following K2 Storage Systems have a redundant Ethernet fabric:
  - Level 2R
  - Level 3R
  - Level 10R
  - Level 20R
  - Level 30R

For more information refer to the *K2 Media Client System Guide*.

K2 configuration and NetCentral

Before you begin using the K2 System Configuration application to configure the storage system, you should set up the NetCentral system according to the following requirements:

- **NetCentral installed** — NetCentral server software must be installed on a NetCentral server PC. This can be the K2 configuration Control Point PC or another PC that has network communication with the K2 Storage System control network.
- **Device providers installed** — A device provider must be installed on the NetCentral server PC for each type of device in the K2 Storage System. For a Level 2R storage system, the following device providers must be installed:
  - Control point PC device provider — This is the Windows monitoring device provider.
  - K2 Media Server device provider
  - HP Gigabit Switch device provider or Cisco Gigabit Switch device provider
  - K2 Media Client device provider, if any K2 Media Clients are accessing the Level 2R storage system.
  - Device provider for iSCSI clients, if any iSCSI clients such as Aurora Edits are accessing the Level 2R storage system.
  - K2 Level 2/Level 3 RAID storage device provider. This device provider supports both Level 2 and Level 3 RAID devices.
- **Grass Valley PC Monitoring software installed** — This software must be installed on the K2 configuration Control Point PC. It includes Grass Valley SNMP agents and other WMI based components to perform process monitoring. This provides the information for some of the SNMP trap messages that must be sent to NetCentral.

- **Control Point PC monitored by NetCentral** — The K2 configuration Control Point PC should be added to the NetCentral system and fully monitored by NetCentral. This means that its SNMP trap destination is set to send SNMP traps to the NetCentral server PC. Whether the Control Point PC and the NetCentral server PC are the same PC or are different PCs, you should still add the Control Point PC to NetCentral.

Refer to the *NetCentral User Guide* to set up the NetCentral system. After installing a device provider, you can find additional documentation about monitoring that type of device on the NetCentral Help menu.

Networking for Level 2R

Use the topics in this section to configure the Gigabit Ethernet (GigE) network for the Level 2R storage system.

- "Networking requirements" on page 95
- "Networking tips" on page 96
- "Setting up host tables" on page 97
- "Testing the control network" on page 98

Networking requirements

Required networking strategies for a Level 2R (a redundant K2 Storage System) are as follows:

- Four networks:
  - Media network A — Exclusively for iSCSI traffic. For failover purposes, this network restricts traffic between an "A" media port on a K2 Media Client and the "A" K2 Media Server with the role of media file system/database server.
  - Media network B — Exclusively for iSCSI traffic. For failover purposes, this network restricts traffic between a "B" media port on a K2 Media Client and the "B" K2 Media Server with the role of media file system/database server.
  - Streaming/FTP network — For media transfers and FTP traffic.
  - Control network — For all other non-streaming, non-iSCSI traffic.
- Networks must be on separate subnets.
- The real-time iSCSI traffic of the media networks (A and B) is kept separate from traffic that is not real-time, such as that of the streaming/FTP network and the control network. This separation is provided by dedicated Gigabit ports, cables, and by a dedicated VLAN on the HP GigE switch or by separate switches.
- K2 Media Servers have a dedicated FTP port. If the server takes the role of FTP server, make a dedicated FTP connection to the FTP port.
- While control and FTP traffic is each on its own subnet, it is not required that each type of traffic has its own VLAN on GigE switches. For example, you make both FTP and control connections to the "control" ports (DEFAULT_VLAN) on the HP GigE switch.
- Static IP addresses are required for the media networks on K2 Storage System iSCSI devices. This includes K2 Media Servers, generic iSCSI clients (such as Aurora Edits), and K2 Media Clients.
- Machine names (host names) assigned to each K2 device.
- Host tables (hosts files) provide name resolution on each K2 Media Client, iSCSI client, and K2 Media Server.
- IP addresses for FTP/streaming ports must have name resolution such that hostnames are appended with the "_he0" suffix. You can use host tables (as in "Setting up host tables" on page 97) or another mechanism to provide the name

resolution. This directs the streaming traffic to the correct port. Refer to the *K2 Media Client System Guide* for a complete explanation.

- K2 Media Servers must be on the streaming network, as they provide the FTP interface for shared storage streaming traffic. Shared storage K2 Media Clients do not need to be on the streaming network because they do not send or receive streaming traffic.
- On the shared storage K2 Media Client, the two control GigE ports are configured as a team. The control team shares a single IP address. Do not attempt to un-team the control ports. On the Level 2R K2 Storage System (a redundant K2 Storage System), both control ports are connected and the control team provides redundancy.
- On the shared storage K2 Media Client, the two media (iSCSI) GigE ports are not teamed. On the Level 2R K2 Storage System (a redundant K2 Storage System), both media ports are connected and each media port is assigned to a different media (iSCSI) network, which is required for redundancy.

Also refer to "About networks and FTP" on page 684 and "Design considerations for Ethernet switches" on page 759.

Use the following procedures as necessary to implement your networking strategies.

NOTE: It is recommended that you configure Media network (iSCSI) IP addresses and Streaming network IP addresses using the K2 System Configuration application, rather than doing so on the local machine using standard Windows procedures.

Networking tips

- Before beginning network configuration, determine the IP addresses and names needed for the machines in your K2 system. Work with the network administrator at your facility to have those IP addresses and names available for your use.
- Establish a consistent convention for machine names and IP addresses. It is recommended that you embed a root name or other unique identifier for this particular K2 Storage System in the computer name. Also, a common convention for IP addresses is to use a numerical pattern or sequence in the IP addresses to indicate device-types and/or ports, as in the following example:

NOTE: This example assumes a subnet mask of 255.255.255.0

Example of Level 2R names and IP addresses

Computer name	Device type	Streaming network addresses	Control network addresses	Media network addresses	Comments
root_server_1	K2 Media Server	192.168.101.11[a]	192.168.100.11	192.168.99.11	These two servers are a redundant pair.
				192.168.99.12	
root_server_2	K2 Media Server	192.168.101.21[b]	192.168.100.21	192.168.98.21	
				192.168.98.22	
root_raid_1	RAID	—	192.168.100.51	—	Both controllers share the same IP address.
root_gige_1	GigE switch	—	192.168.100.61	—	—
root_gige_2	GigE switch	—	192.168.100.62	—	—
root_cppc_1	Control point PC	—	192.168.100.81	—	—
root_client_1	iSCSI client	—	192.168.100.111	192.168.99.111	For the control network, one IP address is shared between the two teamed ports. For media networks, subnet 99 is the "A" network and subnet 98 is the "B" network.
				192.168.98.112	
root_client_2	iSCSI client	—	192.168.100.121	192.168.99.121	
				192.168.98.122	
root_client_3	iSCSI client	—	192.168.100.131	192.168.99.131	
				192.168.98.132	
root_client_4	iSCSI client	—	192.168.100.141	192.168.99.141	
				192.168.98.142	

[a.] This IP address must resolve to hostname root_server_1_he0
[b.] This IP address must resolve to hostname root_server_2_he0

Setting up host tables

The *hosts* file is used by the control network and the streaming/FTP network to determine the IP address of devices on the network when only a the device name (hostname) is given. The steps that follow describe how to edit the *hosts* file located at *C:\Windows\system32\drivers\etc\hosts* on Windows XP and Windows 2003 Server operating system computers. If you include the names and addresses of all the devices on the network, then you can copy the same file onto all the other K2 devices instead of editing the *hosts* file on each K2 device.

For FTP transfers on a K2 Storage System, transfers go to/from K2 Media Servers that have the role of FTP server. No transfers go directly to/from the shared storage K2 Media Clients that are on the K2 Storage System. So in the hosts file, you must add the "he_0" extension to a K2 Media Server hostname and associate that hostname with the K2 Media Server's FTP/streaming network IP address.

Refer to the *K2 Media Client System Guide* for more information.

To edit the *hosts* file manually:

1. Open the following file using Notepad or some other text editing application:

   C:\Windows\system32\drivers\etc\hosts

2. Enter all IP addresses with machine names. The text format is simple. First type the Ethernet IP address, then use the TAB key or Space bar to insert a few spaces. Then type the machine name.

   Here is an example:

```
192.168.100.11      root_server_1
192.168.101.11      root_server_1_he0
192.168.100.21      root_server_2
192.168.101.21      root_server_2_he0
192.168.100.51      root_raid_1
192.168.100.61      root_gige_1
```

3. Save the file and exit the text editor.
4. Copy the new *hosts* file onto all the other machines. This is easier than editing the file on each machine.

Host table tips

- If transferring to or from a Profile XP or Open SAN system via UIM, the *hosts* file must also follow UIM naming conventions for those systems. Refer to the UIM Instruction Manual.
- Do not enter media (iSCSI) network IP addresses in the host table, as hostname resolution is not required for the media network.
- Use the following tip with care. While it can solve a problem, it also introduces a name resolution "anomaly" that might be confusing if not considered in future troubleshooting activities.

  For each SAN (shared storage) K2 Media Client, add the "_he0" suffix to the hostname but then associate that hostname with the K2 Media ***Server's*** FTP/ streaming network IP address, ***not*** the K2 Media ***Client's*** IP address. Aliasing K2 Media Client hostnames in this way would not be required if the transfer source/ destination was always correctly specified as the K2 Media Server. However, a common mistake is to attempt a transfer in which the source/destination is incorrectly specified as the K2 Media Client. The host file aliasing corrects this mistake and redirects to the K2 Media Server, which is the correct transfer source/ destination.

  An example of a *hosts* file entry with this type of aliasing is as follows:

```
192.168.101.11      server_1_he0 client_1_he0 client_2_he0
```

Testing the control network

To test the control network use the *ping* command as follows:

1. On the control point PC, click **Start | Run**. The Run dialog box opens.
2. Type `cmd` and click **OK**. The command prompt window opens.
3. Type `ping`, then a space, then the name of one of your K2 Storage System devices,

such as the Gigabit Ethernet switch, as in the following example:

```
ping root_gige_1
```

4. Press **Enter**.

   The ping command should return the IP address of the device, as in the following example:

   ```
   Pinging root_gige_1.mycorp.com [192.168.100.61] with
   32 bytes of data:


   Reply from 192.168.100.61: bytes=32 time=10ms TTL=127
   Reply from 192.168.100.61: bytes=32 time<10ms TTL=127
   Reply from 192.168.100.61: bytes=32 time<10ms TTL=127
   Reply from 192.168.100.61: bytes=32 time<10ms TTL=127
   ```

   This verifies that the name of the device is being correctly resolved to the IP address, which indicates that on the Control Point PC the host table entry is correct.

5. Ping the other K2 Storage System devices to which you have assigned control network IP addresses.

6. Go to each Windows device in the K2 Storage System and repeat this procedure. This verifies that network communication is correct to and from all devices.

Configuring the Level 2R storage system

Use the topics in this section to do the initial configuration of the Level 2R storage system.

- "Prerequisites for initial configuration" on page 100
- "Defining a new K2 Storage System" on page 101
- "Configuring the server - Part 1" on page 103
- "Configuring RAID" on page 105
- "Creating a new file system" on page 110
- "Configuring the server - Part 2" on page 112
- "Configuring the redundant server" on page 115

Prerequisites for initial configuration

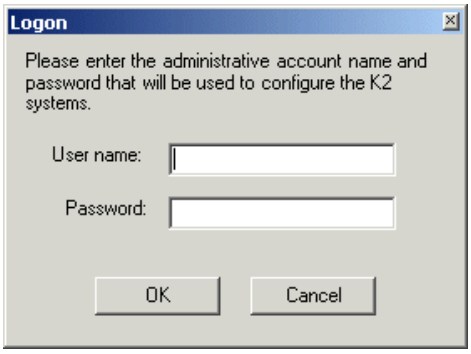
Before beginning your initial configuration, make sure the devices of the K2 Storage System meet the following prerequisites. Refer to sections earlier in this manual for detailed information. Also refer to Chapter 14, "Description of K2 Storage Devices".

Devices	Prerequisite for Level 2R configuration
Control point PC	Ethernet cable connected Control Point software installed Control network IP address assigned Network communication over the control network with all other K2 devices Power on
Ethernet switch	Ethernet cables connected Control network IP address assigned VLANs set up Trunks set up Power on
K2 Media Server	Ethernet cables connected Fibre Channel cable connected Redundant servers connected by serial cable Software installed, as from the factory, including QuickTime 7 Control network IP address assigned Power on for all servers
L2 RAID chassis	Fibre Channel address ID assigned to RAID controller(s) Fibre Channel cable(s) connected Ethernet cable(s) connected Power on
L2 RAID Expansion chassis (optional)	Chassis address assigned (for Fibre Channel) Fibre channel cable(s) connected Power on

Defining a new K2 Storage System

Define a Level 2R K2 Storage System as follows:

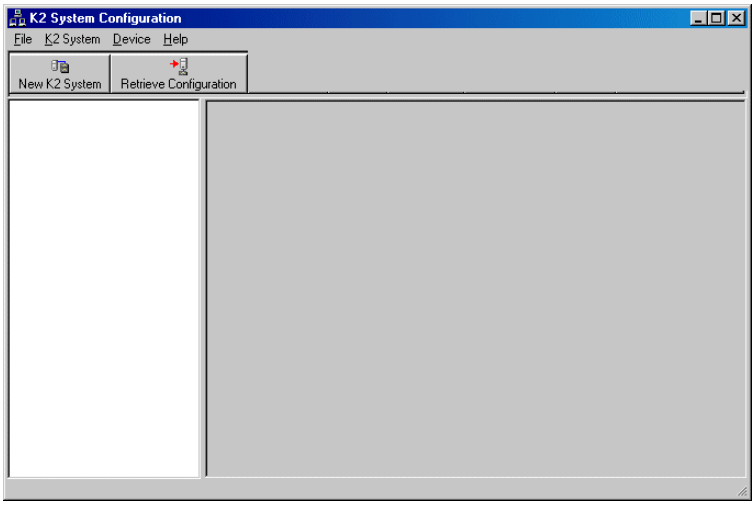
1. On the control point PC, open the K2 System Configuration application. A login dialog box opens.



2. Log in to the K2 System Configuration application with the Windows administrator account. By default this as follows:

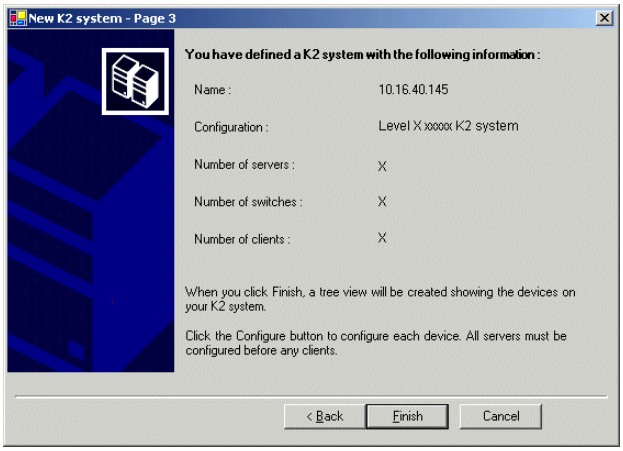
   - Username: administrator
   - Password: adminK2

   Refer to "Setting up application security" on page 688 for more information about administrator accounts and logging in to applications.



3. Click **New K2 System**. The New K2 System wizard opens.

4. Follow the on-screen text to define your Level 2R K2 Storage System, as described in the following table.

On this page...	Do this...
Page 1	 Create a name for your Level 2R K2 Storage System and type it in the Name box. Select **Level 2**. Select the **Server redundancy** option. Click **Next**
Page 3	 Review the information on this page and verify that you have correctly defined your K2 Storage System. For a Level 2R storage system you should have the following: • Two Gigabit Ethernet switches • Two K2 Media Servers • The number and type of clients appropriate for your system. Click **Finish**. The Define New K2 Storage System wizard closes.

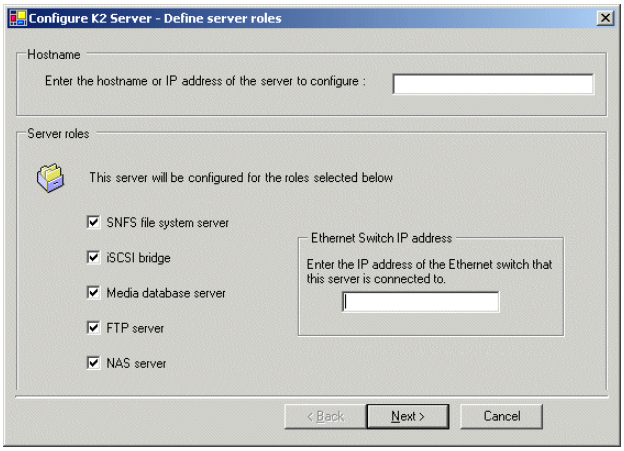
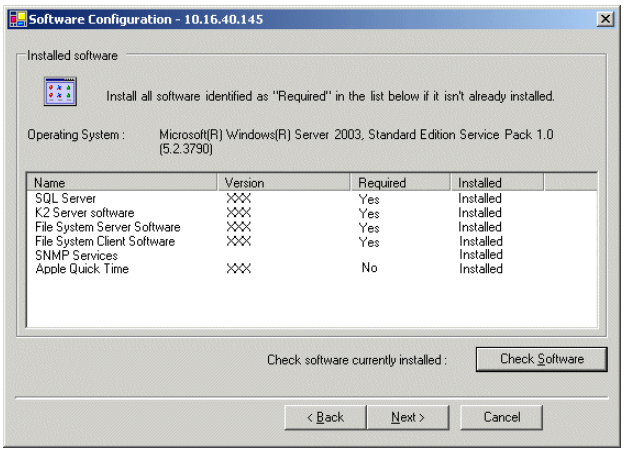
Your K2 Storage System appears in the tree view of the K2 System Configuration application.

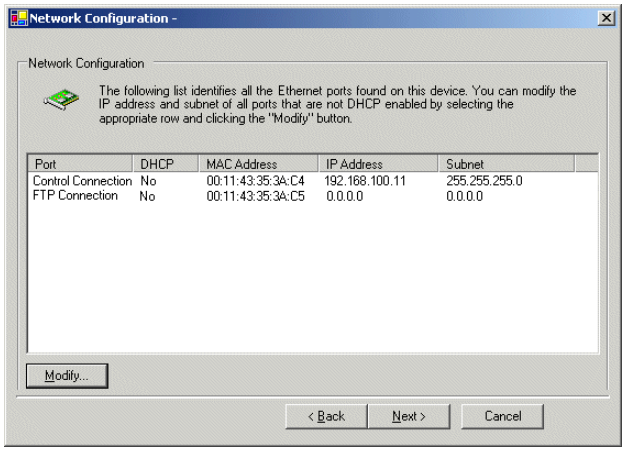
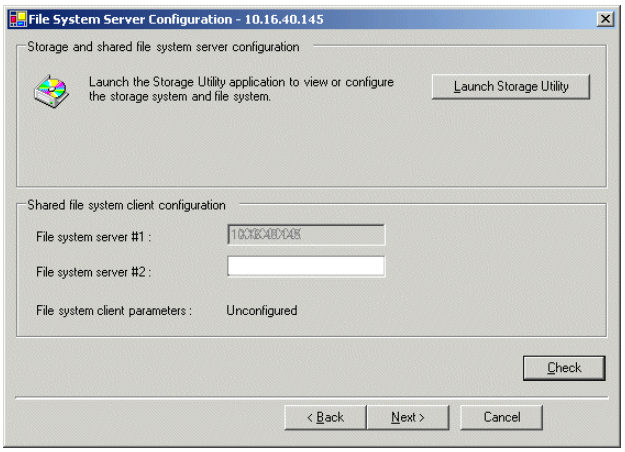
5. Continue with the next procedure.

Configuring the server - Part 1

1. In the K2 System Configuration application tree view, select [**K2Server1]**.

2. Click the **Configure** button. The Configure K2 Server wizard opens. Follow the on-screen text to configure theK2 Media Server for a Level 2R K2 Storage System, as described in the following table:

On this page...	Do this...
Define server roles	 Enter the name or IP address for the K2 Media Server, as currently configured on the machine. Enter the name or IP address of the Ethernet switch, as currently configured on the switch, to which the K2 Media Server is connected. For Level 2 redundant, leave all roles selected. Click **Next**
Software Configuration This page checks for the software required to support the roles you selected on the previous page. Software required on the Level 2R K2 Media Server A is as follows: • SQL Server • K2 Server • File System Server • File System Client • SNMP Services • QuickTime •	 If software with *Yes* in the Required column reports as *Not Installed*, you must first install it on the K2 Media Server before continuing. Refer to *Chapter 16, Managing K2 software*. After installing the software, click **Check Software**. When all required software reports as *Installed*, click **Next**.

On this page…	Do this…
Network Configuration This page displays the control network Ethernet port, and allows you to configure the FTP/ Streaming network Ethernet port. ***NOTE: This page does not configure the iSCSI interface (media network) ports.***	 The top port is the port over which the K2 System Configuration application is communicating with the K2 Media Server. If correctly configured, it is already assigned the control network IP address, as displayed on this page. Select the other port and click **Modify**. A network configuration dialog box opens. Enter the FTP/Streaming IP address and the subnet mask and click **Apply**. Click **Next**.
File System Server Configuration	 Enter the name or IP address of the redundant K2 Media Server (server B). Do not yet click Next. Do not yet enter anything in the File System Server #2 box. Click **Launch Storage Manager**. Storage Utility opens.

3. Continue with the next procedure to use Storage Utility to configure the storage and file system.

   Leave the Configure K2 Server wizard open while you are using Storage Utility. When you are done with Storage Utility, you continue with the wizard.

Configuring RAID

Use Storage Utility to complete the configuration of the L2 RAID chassis, as explained in the following topics:

- "Configuring RAID network and SNMP settings"
- "Binding disk modules"

Refer to "Prerequisites for initial configuration" on page 100 to confirm that the RAID storage is ready for configuration.

Configuring RAID network and SNMP settings

Use the Storage Utility to configure the following settings for the Level 2R RAID chassis:

- IP address
- Subnet mask
- Gateway Address
- SNMP trap destinations

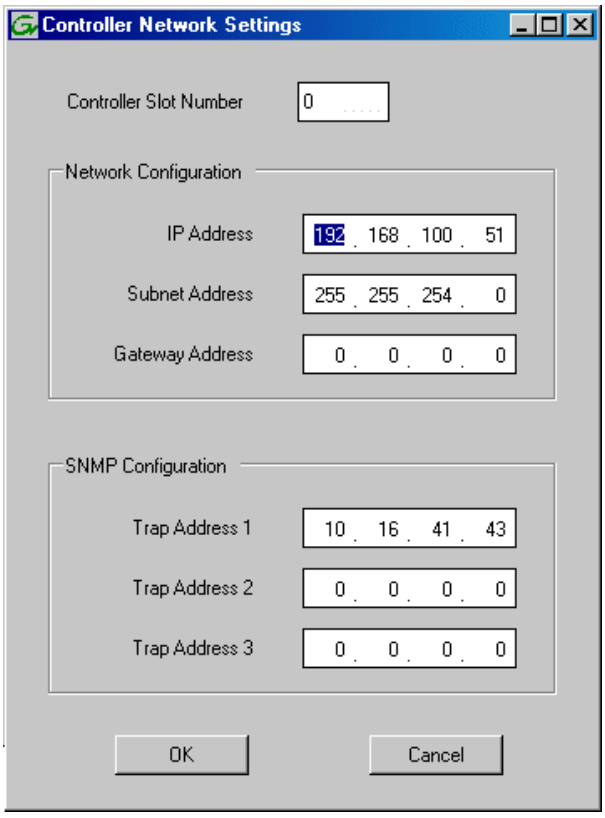
For Level 2R RAID, network and SNMP settings are set and stored on the RAID LAN card. Therefore the combined RAID storage devices, including the two RAID controllers and the optional Expansion chassis, is a single entity on the control network.

The RAID storage device is configured by default for the SNMP community name "public". If your site's policies require using a different SNMP community name, contact your Grass Valley representative.

To configure these settings, do the following:

1. Launch Storage Utility from the K2 System Configuration application as in the previous procedure.
2. As prompted, wait while Storage Utility gathers system information, then Storage Utility opens.
3. In Storage Utility tree view, expand the node for the L2 RAID, right-click the icon for a L2 RAID controller, and select **Configuration | Network Properties**.

   The Controller Network Settings dialog box opens.



4. Enter the control network IP address and other network settings.
5. You want SNMP trap messages go to the NetCentral server PC, so for SNMP Configuration enter the IP address of the NetCentral server PC. You can also enter IP addresses for other SNMP managers to which you want to send SNMP trap messages.
6. Click **OK** to save settings and close.
7. In Storage Utility click **View | Refresh**. Continue with the next procedure "Binding disk modules".

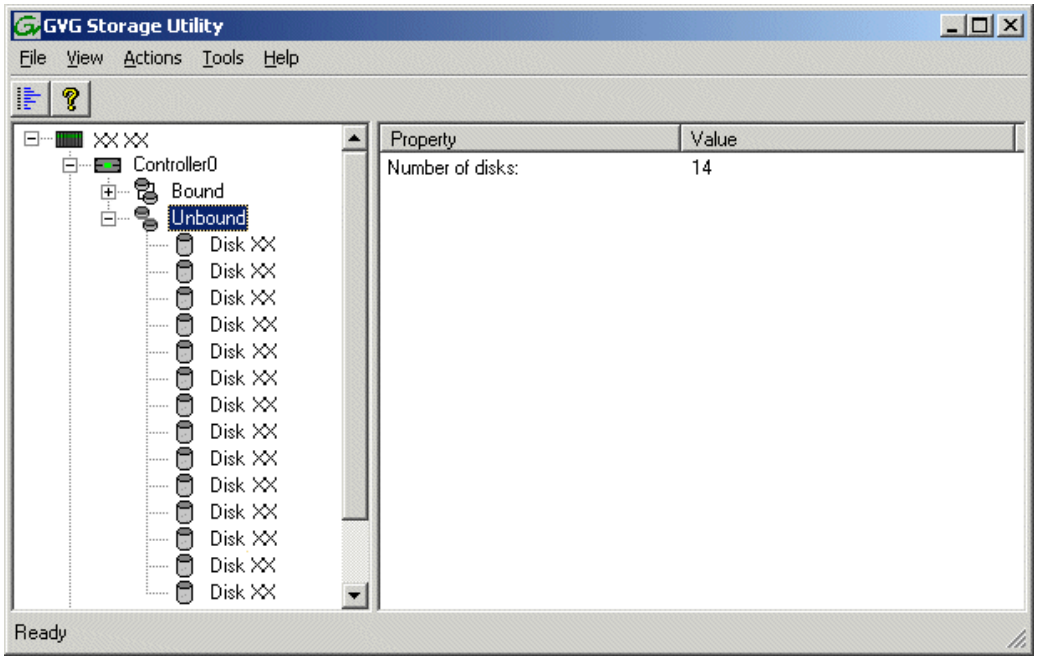
Binding disk modules

Use the following procedure to bind disk modules as required for the Level 2R storage system.

Also refer to "About RANKs and LUNs in Storage Utility" in Chapter 15, *Overview of K2 Storage Tools*.

NOTE: Binding destroys all user data on the disks.

1. In the Storage Utility main window, identify bound RANKs and unbound disks by their placement in the hierarchy of the tree view. In the following illustration, disk numbers are represented by "XX". Refer to "Identifying disks" on page 744 for an explanation of how disks are actually numbered in Storage Utility.



Redundant systems store metadata files and journal files on the primary RAID chassis, which requires a RAID 1 RANK (two disks) for metadata storage and a RAID 1 RANK (two disks) for journal storage. The RAID 1 RANKs must be bound from the first four disks (counting from left to right as you face the front of the RAID chassis) in the primary RAID chassis. In addition, the fifth disk in the primary RAID chassis is bound as a Hot Spare. Optionally, you can also use some of your other disks (in groups of five) as Hot Spares Refer to "Binding Hot Spare drives" on page 751 for more information.

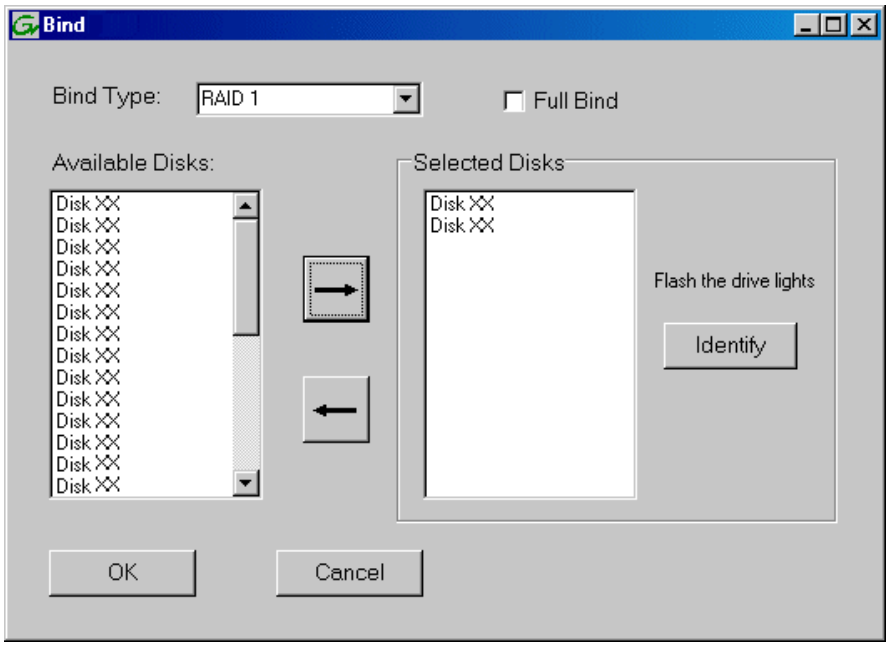
View disk properties and identify the four disks you will use for the RAID 1 RANKs, the one Hot Spare disk, any other disks that you intend to use for Hot Spares, and the remainder of the disks that are available for media storage RANKs. Make sure you select disks appropriately as you bind RANKs in the remainder of this procedure.

View disk properties and identify the four disks you will use for the metadata/journal RAID 1 RANKs, the one metadata/journal Hot Spare disk, any other disks that you intend to use for Hot Spares, and the remainder of the disks that are available for media storage. Make sure you select disks appropriately as you bind disks in the remainder of this procedure.

2. For systems that use RAID 1 RANKs, you must now create the separate RAID 1 storage for metadata files and journal files. To bind unbound disks for metadata and journal storage, do the following:

   a. Right-click the **Unbound** node for the controller, then select **Bind** in the context menu. (If the RAID chassis has two controllers, both controllers are represented by the single "Controller" node)

      The Bind dialog box opens showing all unbound disks for the controller listed in the Available Disk list.



b. Leave **Full Bind** unchecked. Refer to "About full/background bind" on page 748.

c. In the **Bind Type** drop down box, select **RAID 1**.

d. In the Available Disks box, select two contiguous disks at the top of the list. These should be the first two disks in the primary RAID chassis. (TIP: Use 'shift-click' or 'control-click' to select disks.) This creates a RAID 1 RANK for metadata storage.

e. Click the add (arrow) button to add disks to the Selected Disks list.

NOTE: As an aid in identifying a disk module's physical location, select it in the Selected Disks list, then click* Identify Disks. *This causes the disk drive light to flash.

f. Click **OK** to close the Bind dialog box and begin the binding process. The Progress Report dialog box opens, showing the status of the binding process.

g. Close the Progress Report and repeat the previous steps, selecting two more contiguous disks to create another RAID 1 RANK for journal storage. These should be the next two disks in the primary RAID chassis.

h. Make the fifth disk in the primary RAID chassis a Hot Spare. In the **Bind Type** drop down box, select **Hot Spare**.

i. In the Available Disks box, select the fifth disk in the primary RAID chassis.

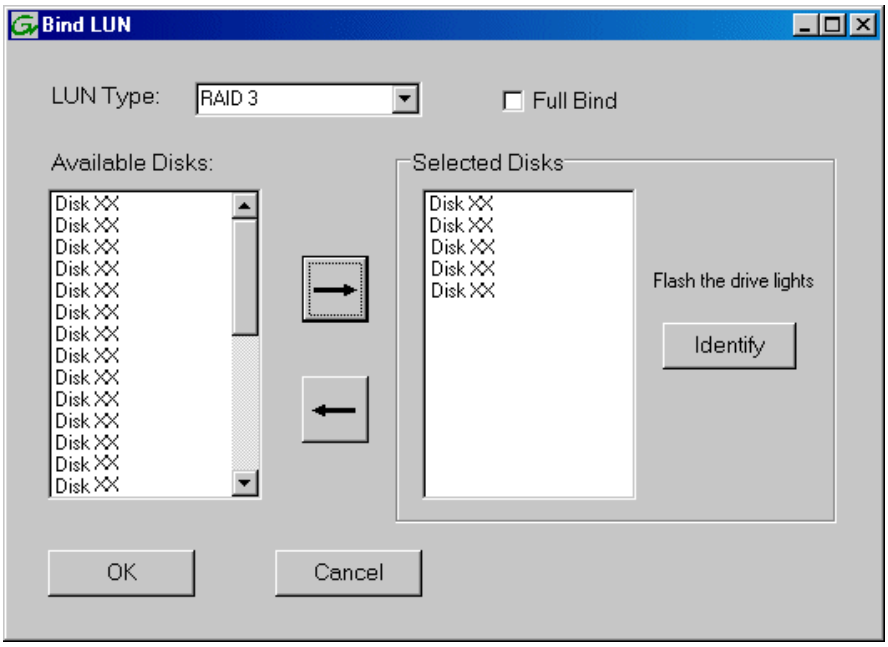
j. Click the add (arrow) button to add the disk to the Selected Disks list.

k. Click **OK** to close the dialog box and begin the binding process.

3. To bind unbound disks for media storage, do the following:

a. Right-click the **Unbound** node for a controller, then select **Bind** in the context menu. (If the RAID chassis has two controllers, both controllers are represented by the single "Controller" node)

The Bind dialog box opens showing all unbound disks for the controller listed in the Available Disk list.



b. Leave Full Bind unchecked. Refer to "About full/background bind" on page 748.

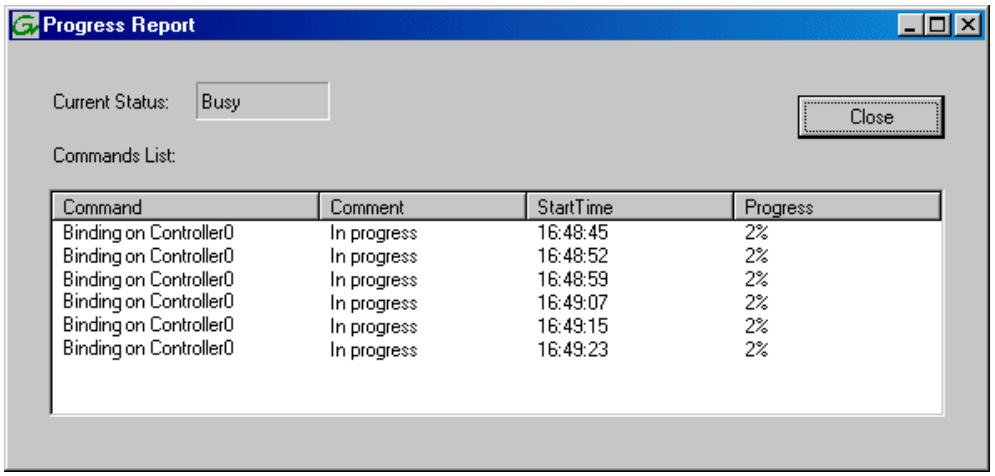
c. In the **Bind Type** drop down box, select **RAID 3**.

d. In the Available Disks box, select five contiguous disks at the top of the list. (TIP: Use 'shift-click' or 'control-click' to select disks.)

e. Click the add (arrow) button to add disks to the Selected Disks list.

NOTE: As an aid in identifying a disk module's physical location, select it in the Selected Disks list, then click* Identify Disks. *This causes the disk drive light to flash.

f. Click **OK** to close the Bind dialog box and begin the binding process. The Progress Report dialog box opens, showing the status of the binding process.



g. Close the Progress Report and repeat these steps for other unbound disks. If specified by your system design, you can bind some disks as Hot Spares, as explained in "Binding Hot Spare drives" on page 751. When you are done, if you did not bind any extra Hot Spares, you should have the following results:

   For Level two redundant storage, on the primary RAID storage chassis you should have two RAID 1 RANKs of two disks each, one Hot Spare disk, and two RAID 3 RANK of five disks each. If you have the optional Expansion chassis, you would have an additional three RAID 3 RANKs of five disks each.

h. Click **Close** in Progress Report window.

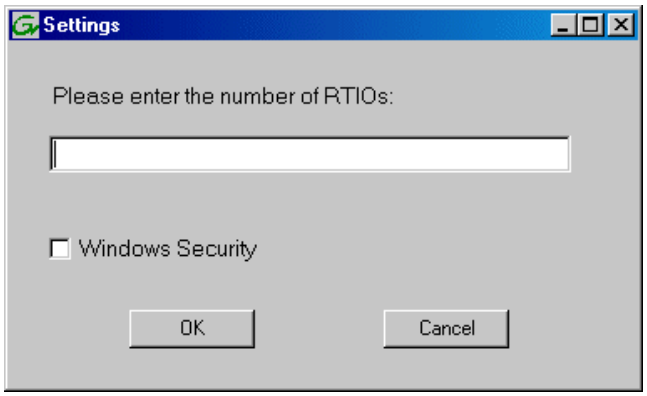
4. Restart the K2 Media Server.

NOTE: Make sure start up processes on the K2 Media Server are complete before proceeding.

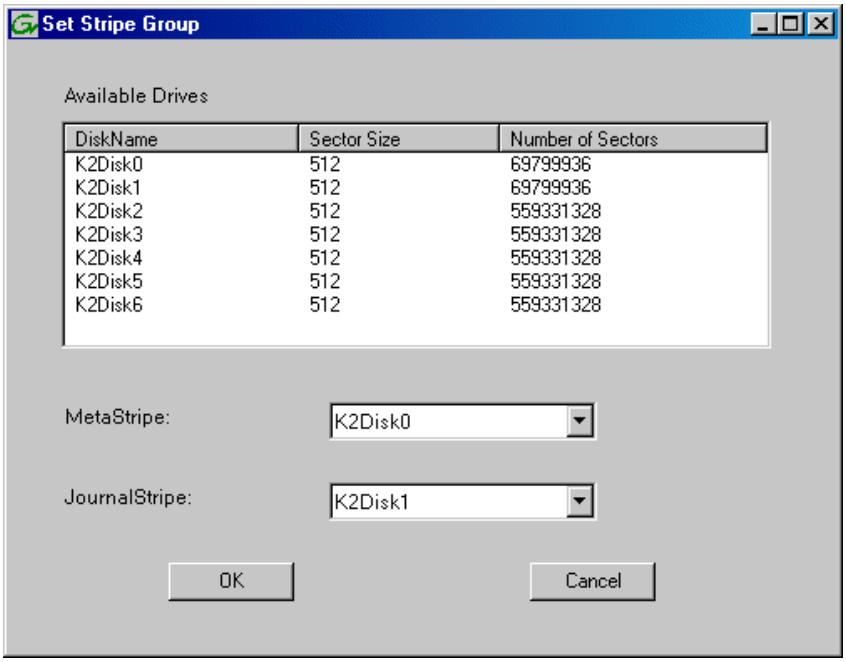
5. Continue with the next procedure "Creating a new file system".

Creating a new file system

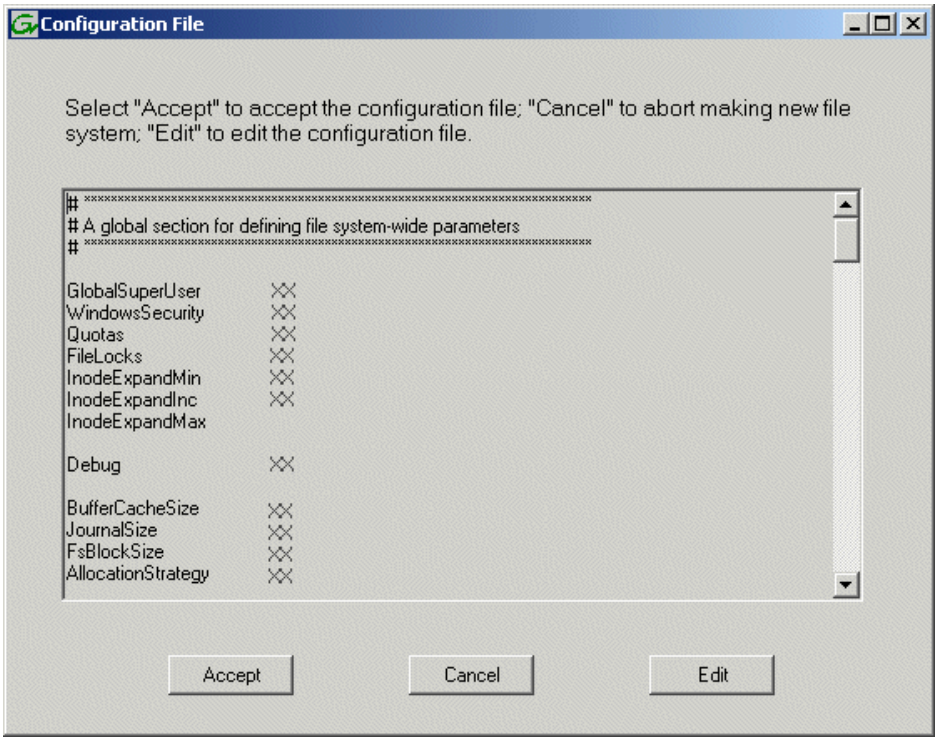
1. In Storage Utility, click **Tools | Make New File System**. The Setting dialog box opens.



2. For the Real Time Input/Output (RTIO) rate, enter the value specified by your system design. If you do not know this value, contact your Grass Valley representative.
3. If the K2 Storage System is to be accessed by only K2 Media Clients you can leave Windows Security unchecked. If accessed by Aurora Edits, refer to the *Aurora Edit Installation and Configuration Guide* for instructions.
4. Click **OK**. The Set Stripe Group dialog box opens.



5. If you have RAID 1 RANKS, assign a RAID 1 RANK as a metadata stripe and another RAID 1 RANK as a journal stripe. You can distinguish RAID 1 RANKs from media RANKs by the value in the Number of Sectors column.
6. Click **OK**. The Configuration File dialog box opens.



The configuration file for the media file system is displayed. You can verify media file system parameters by viewing this file. Do not edit this file. Click **Accept**.

A "…Please wait…" message box displays progress and a "…succeeded…" message confirms the process is complete.

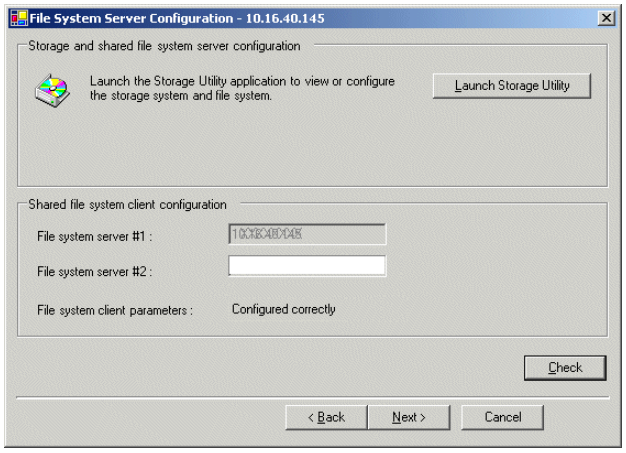
7. A message informs you that you must restart the K2 Media Server, however the restart at the end of the Configure K2 Server wizard suffices, so you do not need to restart now.
8. Close the Storage Utility.

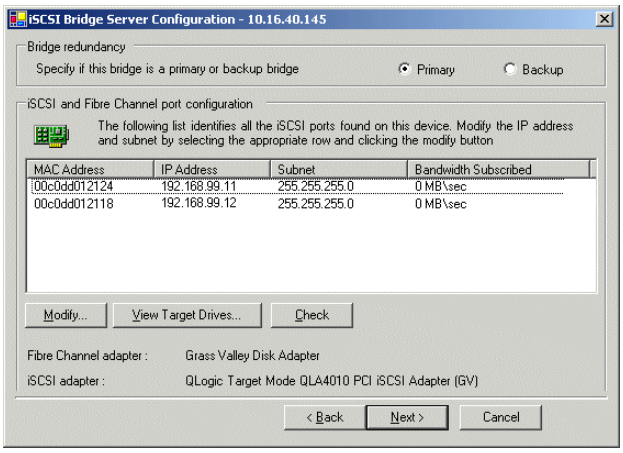
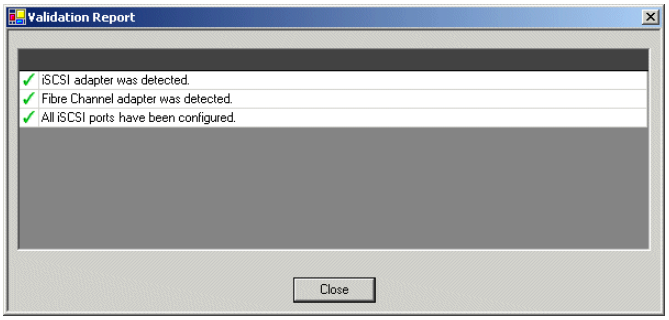
NOTE: Do not attempt to start K2 Media Clients or otherwise bring the K2 Storage System online until instructed to do so later in this chapter.

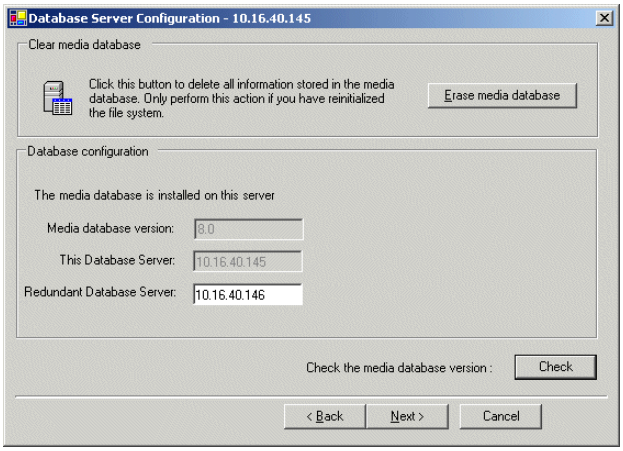
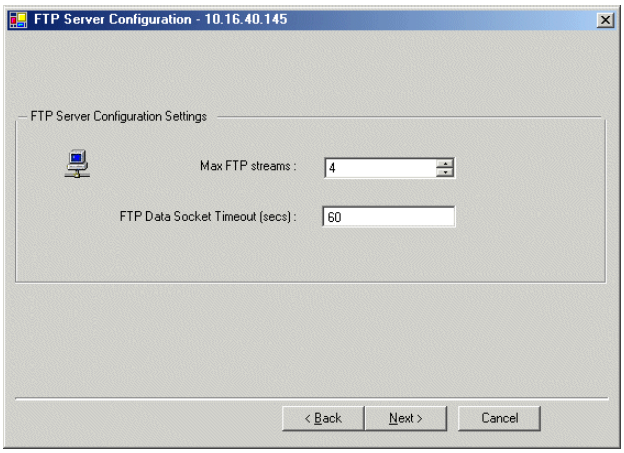
9. Continue with the next procedure.

Configuring the server - Part 2

1. Return to the Configure K2 Server page from which you launched Storage Utility and proceed as described in the following table:

On this page…	Do this…
File System Server Configuration This page checks on the configuration of the K2 Media Server in one of its main roles as a file system server. The K2 Media Server also functions as a file system client, which is also checked from this page.	 If you have not already done so, enter the name or IP address of the redundant K2 Media Server (server B). Click **Check**. When the wizard reports that the configuration is correct, click **Next**. If you get a "The V: will not be available until this device is rebooted…" message, you can safely continue with this procedure and follow the instructions related to this message later in the procedure.

On this page…	Do this…
iSCSI Bridge Server Configuration This page manages the components that bridge between iSCSI (the GigE media network) and the Fibre Channel connection to the RAID storage. You configure network settings on the iSCSI adapters and the page validates that the Fibre Channel adapter is in place and that the media RANKs are visible as iSCSI targets.	 Select **Primary**. Select an iSCSI adapter and click **Modify**. A network configuration dialog box opens. Enter the media network IP address and the subnet mask and click **Apply**. Do the same for the other iSCSI adapter. Click **Check**. The Validation Report opens.  Confirm that the iSCSI configuration is successful. Close the Validation Report and then click **Next**.

On this page…	Do this…
Database Server Configuration	 Enter the name or IP address of K2 Media server B. This is the redundant partner of the server you are now configuring. Click **Next**.
FTP Server Configuration	 Do not modify these settings. Leave at default values of Max FTP streams = 4 and FTP Data Socket Timeout = 60. Only qualified Grass Valley personnel should specify other values, as these settings are intended for use only with custom systems designed by Grass Valley. Click **Next**
Completing the Configuration Wizard	Click **Finish**. The wizard closes. The server restarts. Wait until all startup processes have completed before continuing.

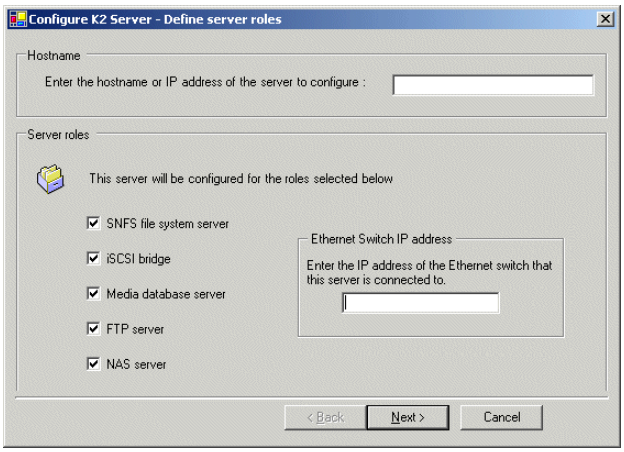
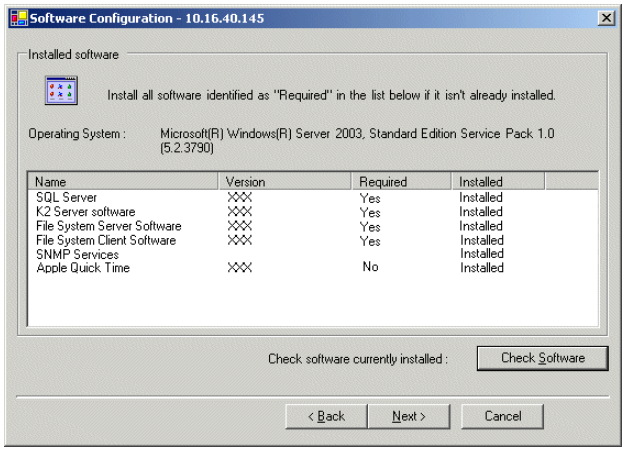
Configuring the redundant server

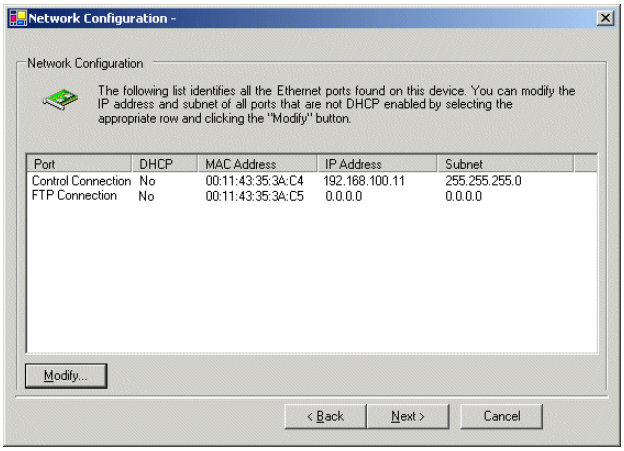
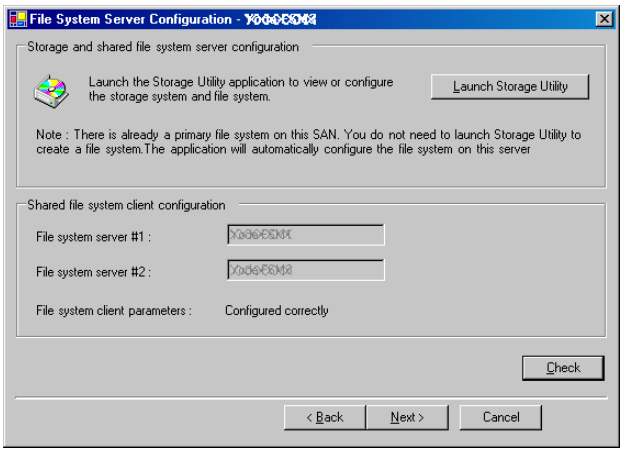
You must wait for the primary K2 Media Server to restart before continuing. To verify, from the control point PC open the MS-DOS command prompt and use the “ping” command.

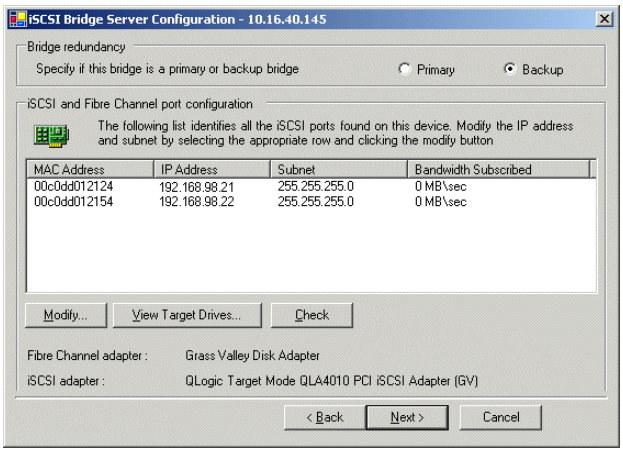
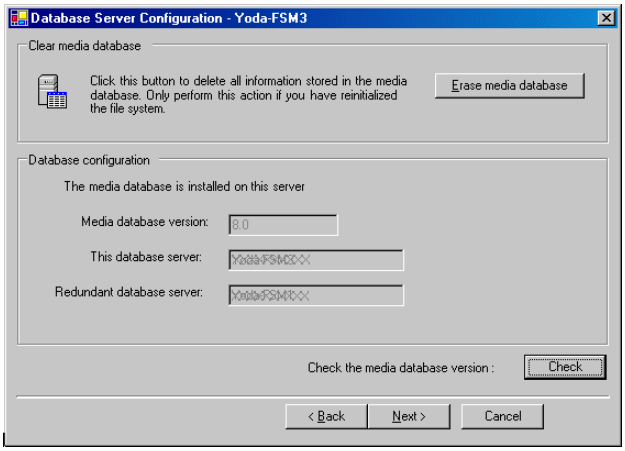
For Level 2 redundant, after you have configured the first K2 Media Server (server A) you next configure the redundant K2 Media Serer (server B).

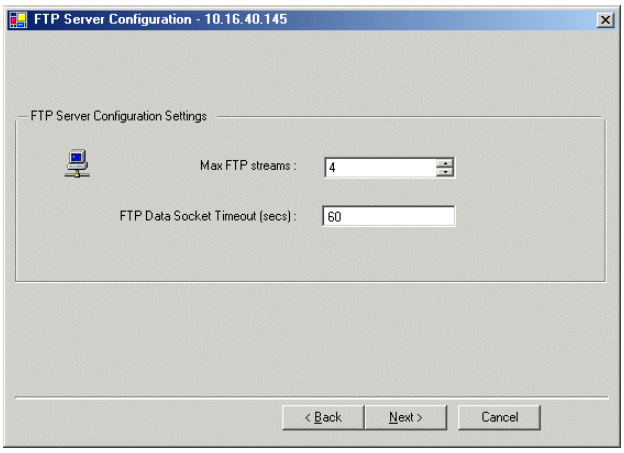
1. In the K2 System Configuration application tree view, select the K2 Media Server you are configuring as server B.

2. Click the **Configure** button. The Configure K2 Storage System Server wizard opens. Follow the on-screen text to configure the server for a Level 2R K2 Storage System, as described in the following table. Some screens require no input from you, as they are based on the configurations already completed on a previously configured K2 Media Server.

On this page...	Do this...
Define server roles	 Enter the name for the K2 Media Server. This should be the current network name of the machine. Enter the name or IP address of the Ethernet switch, as currently configured on the switch, to which the K2 Media Server is connected. Select all roles. Click **Next**
Software Configuration This page checks for the software required to support the roles you selected on the previous page. Software required on the Level 2R K2 Media Server B is as follows: • SQL Server • K2 Server • File System Server • File System Client • SNMP Services • QuickTime	 If software with *Yes* in the Required column reports as *Not Installed*, you must first install it on the K2 Media Server before continuing. Refer to *Chapter 16, Managing K2 software*. After installing the software, click **Check Software**. When all required software reports as *Installed*, click **Next**.

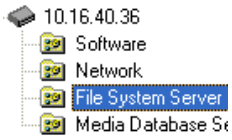
On this page…	Do this…
Network Configuration This page displays the control network Ethernet port, and allows you to configure the FTP/ Streaming network Ethernet port. ***NOTE: This page does not configure the iSCSI interface (media network) ports.***	 The top port is the port over which the K2 System Configuration application is communicating with the K2 Media Server. If correctly configured, it is already assigned the control network IP address, as displayed on this page. Select the other port and click **Modify**. A network configuration dialog box opens. Enter the FTP/Streaming IP address and the subnet mask and click **Apply**. Click **Next**.
File System Server Configuration This page checks on the configuration of the K2 Media Server in one of its main roles as a file system server. The K2 Media Server also functions as a file system client, which is also checked from this page. It is not necessary to bind RANKs or create a file system, since this task was completed when you configured the previous K2 Media Server.	 Click **Next**. Confirm messages about copying *default.cfg* to the other server. If you get a "The V: will not be available until this device is rebooted…" message, you can safely continue with this procedure and follow the instructions related to this message later in the procedure.

On this page…	Do this…
iSCSI Bridge Server Configuration This page manages the components that bridge between iSCSI (the GigE media network) and the Fibre Channel connection to the RAID storage. You configure network settings on the iSCSI adapters and the page validates that the Fibre Channel adapter is in place and that the media RANKs are visible as iSCSI targets. ***NOTE: The iSCSI adapters on this server must be on a different subnet than those on its redundant server partner.***	 Select **Backup**. Select an iSCSI adapter and click **Modify**. A network configuration dialog box opens. Enter the media network IP address and subnet mask and click **Apply**. Do the same for the other iSCSI adapter. To verify drives, click **Check** then **View Target Drives**. You should see all your media drives listed. Click **Next**.
Database Server Configuration	 You do not need to enter or configure anything on this page. Click **Next**.

On this page…	Do this…
FTP Server Configuration	 Do not modify these settings. Leave at default values of Max FTP streams = 4 and FTP Data Socket Timeout = 60. Only qualified Grass Valley personnel should specify other values, as these settings are intended for use only with custom systems designed by Grass Valley. Click **Next**
Completing the Configuration Wizard	Click **Finish**. The wizard closes. The K2 Media Server restarts. Do not proceed until restart processes are finished.

3. If you got a “The V: will not be available until this device is rebooted…” message on the File System Server Configuration page, after the K2 Media Server restarts, do the following:

   a. In the K2 System Configuration application tree view, under the K2 Media Server select the File System Server node.



   The File System Server Configuration page appears.

   b. Click **Check** and verify that the V: drive is shared. This is required for NAS server functionality.

Your configurations for the Level 2R K2 Storage System are complete.

Adding K2 Storage System clients

You can add now clients, such as K2 Media Clients or Aurora Edits, to the K2 Storage System and configure them using the K2 System Configuration application.

- For Aurora Edits, refer to the *Aurora Edit Installation and Configuration Guide* for instructions.

- For K2 Media Clients, refer to *K2 Media Client System Guide* for instructions.

NOTE: You must install MPIO software on K2 Media Clients that access shared storage on a redundant K2 Storage System.

Basic operations for Level 2R storage

Use the following procedures as you work on your Level 2R storage system:

- "Level 2R system power-off procedure"
- "Level 2R system power-on procedure"

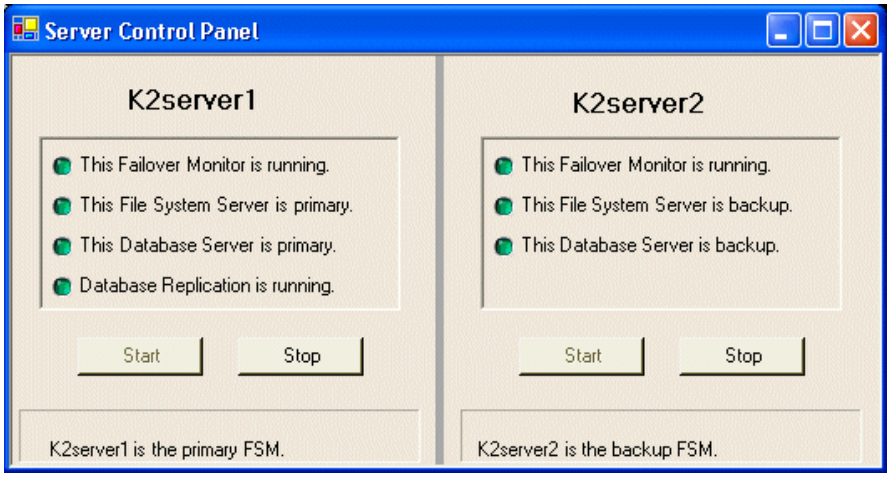
For other procedures refer to "Administering and maintaining the K2 Storage System" on page 687.

Level 2R system power-off procedure

Use the following sequence to power-off the Level 2R storage system.

1. Power-off all K2 Media clients or other iSCSI clients.
2. From the K2 System Configuration application, in the tree view select the name of the K2 Storage System, which is the top node of the storage system tree. Then click the **Server Control Panel** button.

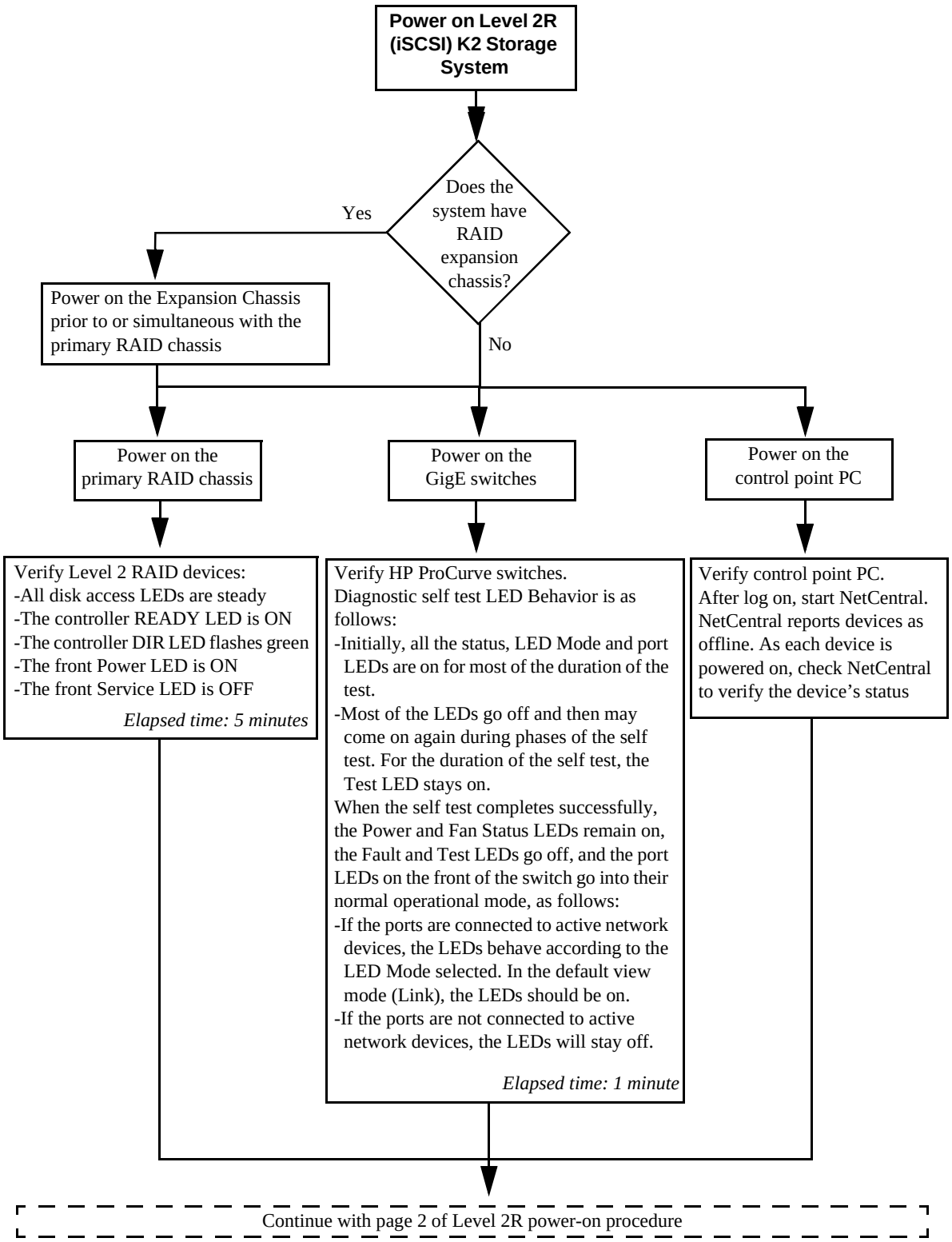
The Server Control Panel opens.

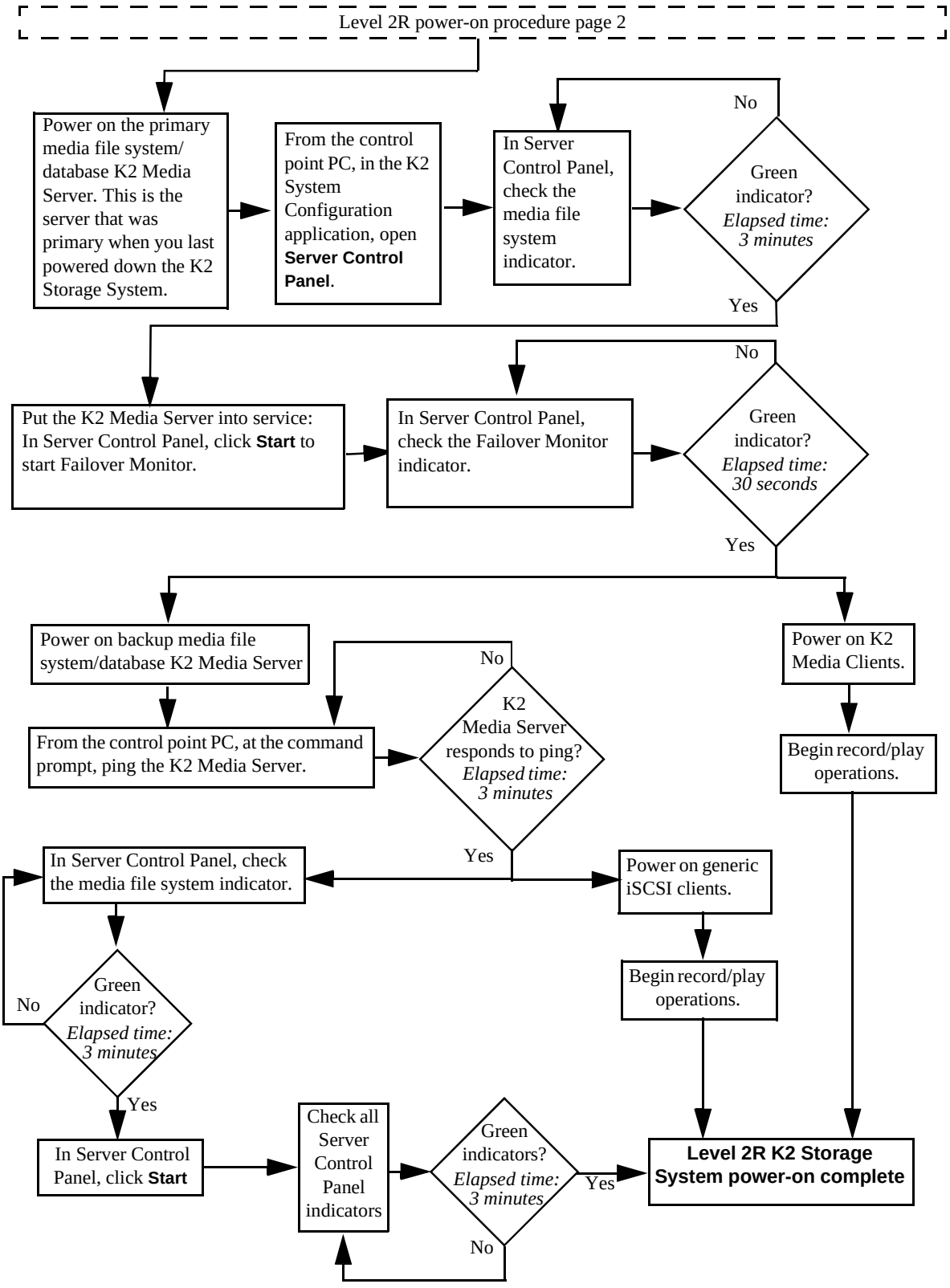


3. Take note of which is the primary K2 Media Server and which is the backup K2 Media Server. The order in which you put servers back into service when you power up the K2 Storage System is dependent on their primary/backup roles at the time when you power down the K2 Storage System.
4. For the backup K2 Media Server, click **Stop**. This takes the server out of service.
5. Shut down the backup K2 Media Server, if it does not shut down automatically.
6. For the primary K2 Media Server, click **Stop**. This takes the server out of service.
7. Shut down the primary K2 Media Server, if it does not shut down automatically.

8. Power-off the primary RAID controller chassis. If expansion chassis are connected, make sure the power-off of the controller chassis is prior to or simultaneous with the power-off of its connected expansion chassis. Wait approximately 30 seconds for the disk drives to spin down before proceeding.
9. Power-off all Ethernet switches.
10. Power-off the control point PC and/or the NetCentral server PC, if necessary.

Level 2R system power-on procedure



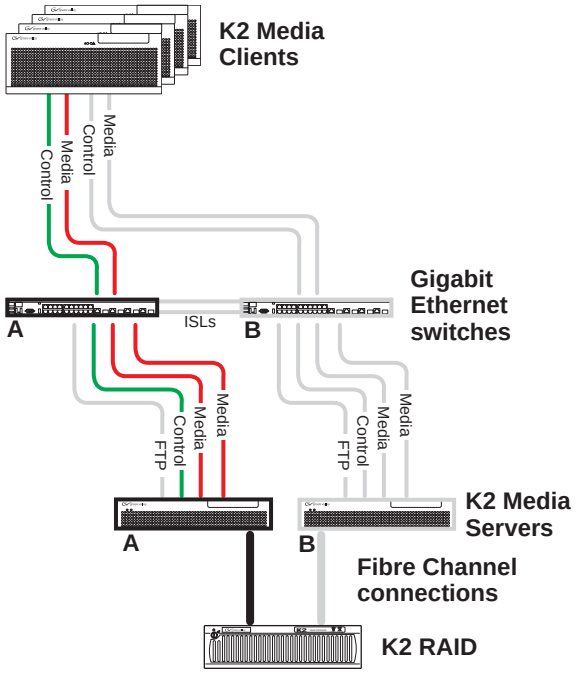

Level 2R power-on procedure page 2
Power on the primary media file system/ database K2 Media Server. This is the server that was primary when you last powered down the K2 Storage System.
From the control point PC, in the K2 System Configuration application, open **Server Control Panel**.
In Server Control Panel, check the media file system indicator.
Green indicator? *Elapsed time: 3 minutes*
No
Yes
Put the K2 Media Server into service: In Server Control Panel, click **Start** to start Failover Monitor.
In Server Control Panel, check the Failover Monitor indicator.
Green indicator? *Elapsed time: 30 seconds*
No
Yes
Power on backup media file system/database K2 Media Server
From the control point PC, at the command prompt, ping the K2 Media Server.
K2 Media Server responds to ping? *Elapsed time: 3 minutes*
No
Yes
Power on K2 Media Clients.
Begin record/play operations.
In Server Control Panel, check the media file system indicator.
Green indicator? *Elapsed time: 3 minutes*
No
Yes
Power on generic iSCSI clients.
Begin record/play operations.
In Server Control Panel, click **Start**
Check all Server Control Panel indicators
Green indicators? *Elapsed time: 3 minutes*
No
Yes
Level 2R K2 Storage System power-on complete

Failover behaviors

If a fault occurs and one of the failover mechanisms is triggered, a redundant K2 Storage System behaves as explained in following sections.

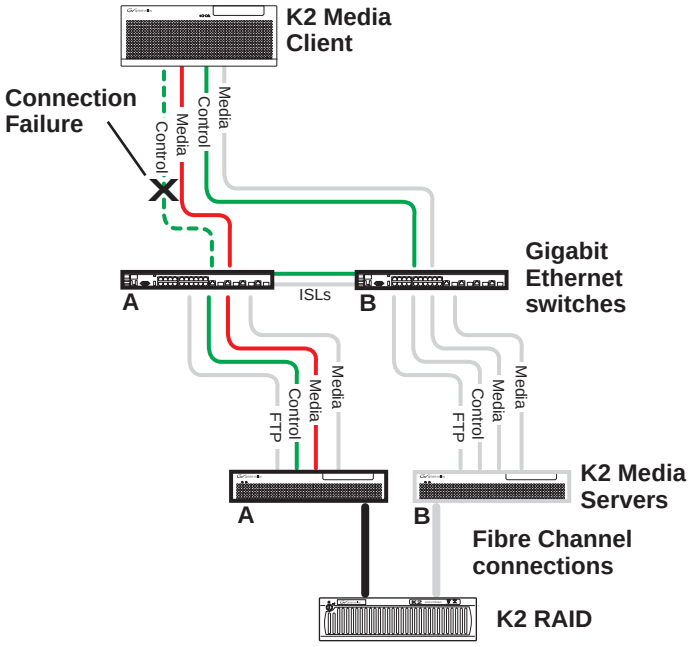
The diagrams that follow are representative of a generic redundant K2 Storage System. Some details, such as the number of media connections, might not be the same as your K2 Storage System. These diagrams illustrate the media (iSCSI) and control paths as they interact with the redundant K2 Media Servers in their role of media file system/database server and iSCSI bridge. Interactions of FTP traffic and/or paths involving K2 Media Servers with other roles are not illustrated.

Pre-failover behavior



The system operates initially with both media and control traffic on GigE switch “A” and K2 Media Server “A”. Media (iSCSI) traffic is using media network “A”. The iSCSI adapters (TOEs) on the “A” K2 Media Server provide access to the Fibre Channel connected RAID storage. K2 Media Server “A” is the media file system/database server.

Control team failover behavior



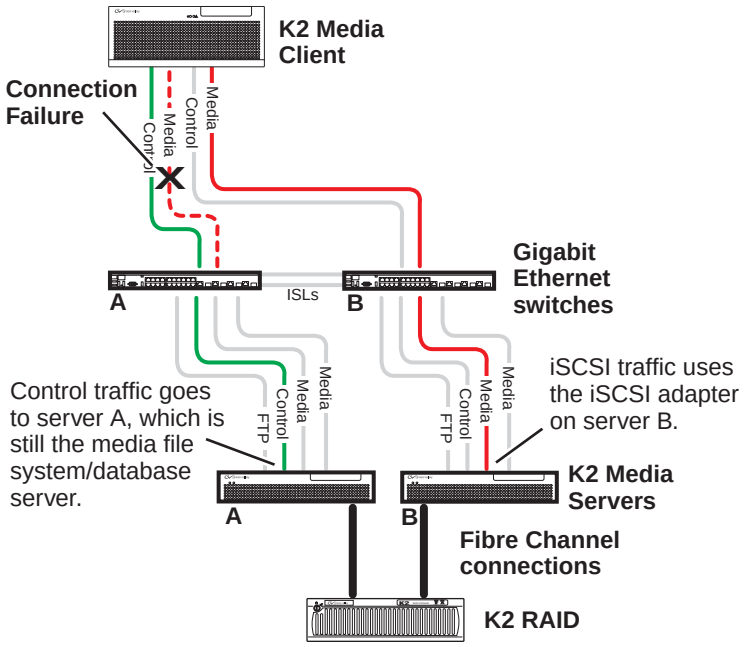
If the following system connection fails to respond to network communication:

- The control connection between a K2 Media Client and GigE switch “A”.

Then the following failover behavior occurs:

1. The control team on the K2 Media Client fails over and communication begins on the other control port.
2. The control communication finds a path through GigE “B” switch and across an ISL to GigE switch “A” to reach the same control port on the same K2 Media Server.
3. Media (iSCSI) traffic keeps using the same path.
4. K2 Media Server “A” is still the media file system/database server. The media file system (SNFS) and media database (SQL) do not fail over.
5. The other K2 Media Clients (not affected by the connection failure) keep using the same paths for media and control, as in the previous diagram “Pre-failover behavior”.

K2 Media Client media (iSCSI) connection failover behavior



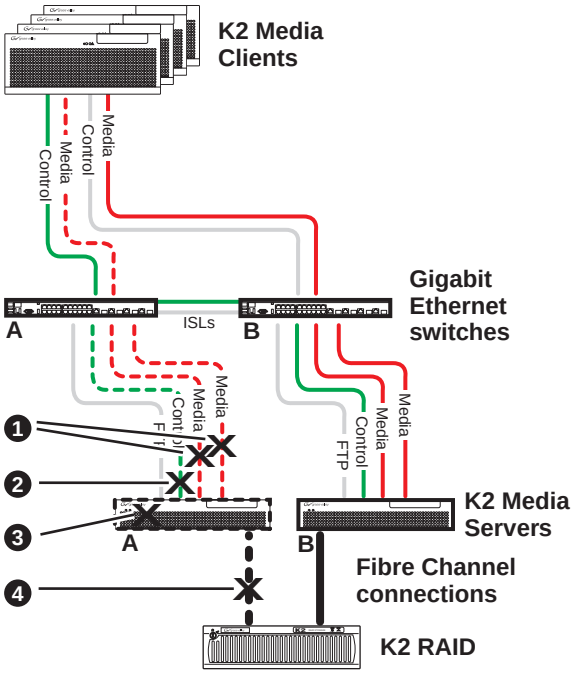
If the following system connection fails to respond to network communication:

- Media (iSCSI) network “A” connection between a K2 Media Client and the GigE switch.

Then the following failover behavior occurs:

1. The K2 Media Client drops communication on its “A” media port and begins using its “B” media port and the “B” media (iSCSI) network. The iSCSI adapter (TOE) on the “B” K2 Media Server provides access to the Fibre Channel connected RAID storage.
2. Control traffic keeps using the same path to K2 Media Server “A”.
3. K2 Media Server “A” is still the media file system/database server. The media file system (SNFS) and media database (SQL) do not fail over.
4. The other K2 Media Clients (not affected by the component failure) keep using the same paths for media and control, as in the previous diagram “Pre-failover behavior”. This means the K2 Media Clients unaffected by the failover are using the iSCSI adapter (TOE) on the “A” K2 Media Server to provide access to the Fibre Channel connected RAID storage, while at the same time the affected K2 Media Clients are using the iSCSI adapter (TOE) on the “B” K2 Media Server to provide access to the Fibre Channel connected RAID storage. In this case both RAID controller are simultaneously providing disk access.

K2 Media Server failover behavior



If the following system connection or component fails to respond to network communication:

❶ Either of the Media (iSCSI) network “A” connections between the GigE switch and the K2 Media Server

❷ The control connection between GigE switch “A” and K2 Media Server “A”

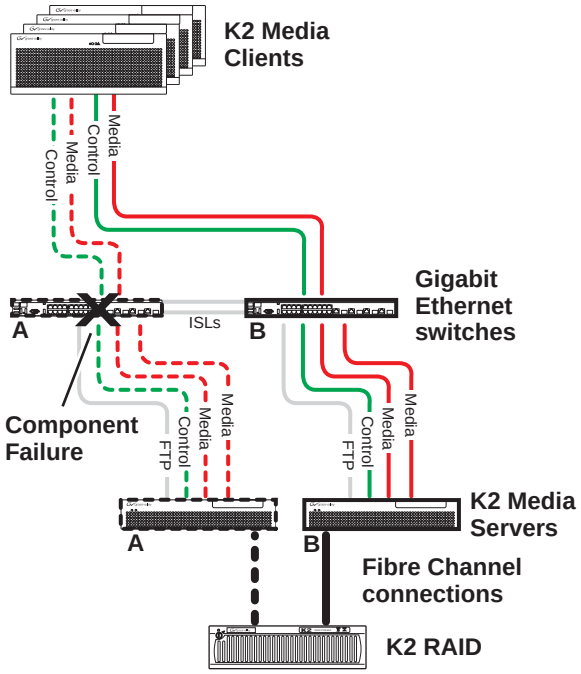
❸ K2 Media Server “A”

❹ The Fibre Channel connection between K2 Media Server “A” and RAID controller “A”

Then the following failover behavior occurs:

1. The media file system (SNFS) and media database (SQL) on K2 Media Server “A” fail over and K2 Media Server “B” becomes the active media file system/database server.
2. All K2 Media Clients drop communication on the “A” media port and begin using the “B” media port, finding a path through GigE switch “B” to K2 Media Server “B”. All K2 Media Clients use an iSCSI adapter (TOE) on the “B” K2 Media Server to provide access to the Fibre Channel connected RAID storage.
3. All K2 Media Clients keep communicating on the same control port, finding a new path through GigE switch “A” and across an ISL to GigE switch “B” to reach K2 Media Server “B”.

K2 Media Server failover with Control team failover behavior



If the following system component fails to respond to system communication:

- The “A” GigE switch

Then the following failover behavior occurs:

1. The media file system (SNFS) and media database (SQL) on K2 Media Server “A” fail over and K2 Media Server “B” becomes the active media file system/database server.
2. All K2 Media Clients drop communication on the “A” media port and begin using the “B” media port, finding a path through GigE switch “B” to K2 Media Server “B”. All K2 Media Clients use an iSCSI adapter (TOE) on the “B” K2 Media Server to provide access to the Fibre Channel connected RAID storage.
3. For all K2 Media Clients, communication fails on the control port, so the control team fails over and communication begins on the other control port.
4. For all K2 Media Clients, control communication finds a path through GigE switch “B” to K2 Media Server “B”.

Chapter 4

Installing the Level 3 Storage System

The K2 Level 3 (L3) storage system was initially released with K2 system software version 3.0 in December 2005.

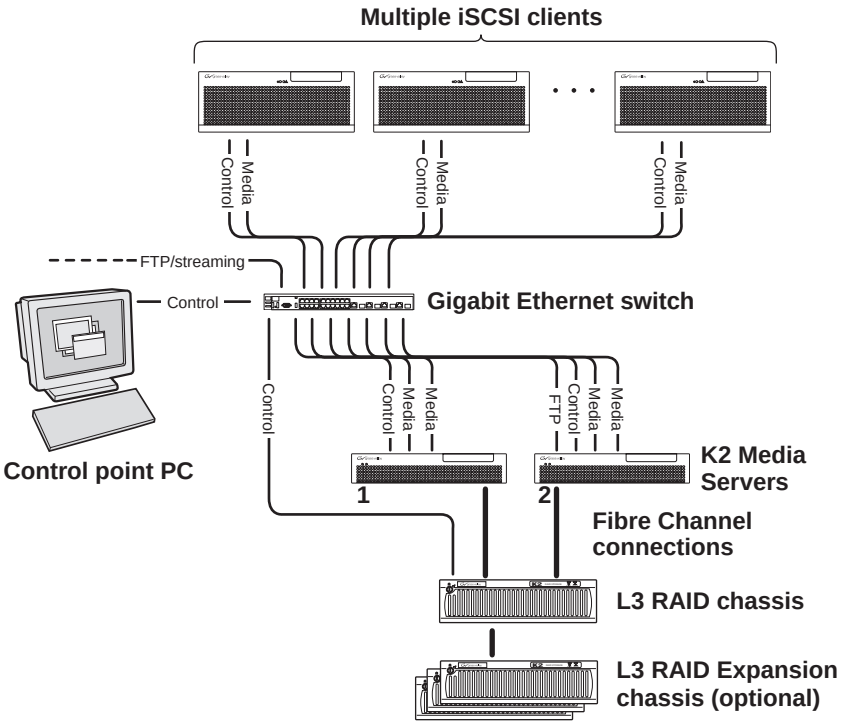
Use this chapter to install the Level 3 storage system.

This chapter includes the following topics:

- "Level 3 system description" on page 130
- "Preparing Level 3 devices" on page 131
- "Networking for Level 3" on page 150
- "Configuring the Level 3 storage system" on page 155
- "Adding K2 Storage System clients" on page 172
- "Basic operations for Level 3 storage" on page 172

Work through these topics sequentially to install the storage system.

Level 3 system description



The Level 3 storage system has two K2 Media Servers, between which the server roles are distributed. Typically one server runs as the media file system and database server while the other server runs as the FTP server. This boosts performance, as the system resources of each server can be optimized for specific roles. In addition, both servers take the role of iSCSI bridge, so that there are a total of four iSCSI media connections for increased bandwidth.

The Level three storage system has one L3 RAID chassis. Up to seven optional Expansion chassis are available for increased storage capacity.

K2 Media Clients and other iSCSI clients, such as Aurora Edits, are connected to the GigE switch. Each client has one GigE connection for media and one GigE connection for control. The GigE switch is configured with V-LANs to keep the traffic on these connections separate.

Each K2 Media Server has two GigE connections for media, one GigE connection for control, and one Fibre Channel connection to the RAID storage. Only the K2 Media Server in the role of FTP server has the GigE connection for FTP. K2 Media Servers host iSCSI interface cards for the GigE media connections and a Fibre Channel card for the RAID storage connection. The iSCSI interface cards provide a bridge between GigE iSCSI and Fibre Channel SCSI. Each server also runs the software components that allow it to function in its specific roles.

The L3 RAID chassis is connected via a Fibre Channel connection to each K2 Media Server. These connections access the disks simultaneously, providing increased bandwidth. The L3 RAID chassis is also connected to the GigE control network, which is required for SNMP (NetCentral) monitoring.

The K2 configuration control point PC is connected to the GigE control network. The K2 System Configuration application runs on this PC for configuring the storage system.

FTP/streaming traffic accesses the K2 Storage System via the FTP GigE port on K2 Media Servers. FTP/streaming traffic does not go to K2 Media Clients.

Refer to Chapter 14, *Description of K2 Storage Devices* for more information. Also refer to "Design considerations for Ethernet switches" on page 759.

Preparing Level 3 devices

Use the topics in this section to prepare each device so that it is ready to become part of the Level 3 storage system.

- "Setting up the Control Point PC" on page 131
- "Setting up the Level 3 GigE switch" on page 132
- "Setting up the K2 Media Server" on page 143
- "Setting up the L3 RAID chassis" on page 144
- "Preparing K2 Storage System clients" on page 148

Setting up the Control Point PC

To set up the K2 configuration Control Point PC, you have the following options:

- Use the Grass Valley Control Point PC that comes from the factory with software pre-installed. This includes the K2 System Configuration application, remote AppCenter, and NetCentral software. Refer to the *K2 Media Client System Guide* for rack mount instructions.
- Use a PC that you own and install the required software.

For either option, you must do the following for the Control Point PC that runs the K2 System Configuration application:

- Assign a control network IP address to the PC. Refer to "Networking tips".
- Connect the PC to the GigE control network.

To use your own PC, you must additionally do the following:

- Verify that the PC meets system requirements, then install the Control Point software and other supporting software, as specified in the *K2 Media Client System Guide*.
- Install and license NetCentral server software. You can install this on the NetCentral server PC, which can be the K2 configuration Control Point PC. Refer to the *NetCentral User Guide*.

Also refer to "Control point PC description" on page 650.

To fix the screen resolution problem seen with NetCentral on the Grass Valley Control Point PC, do the following:

1. Go to Display properties (right mouse selection of properties on the display area)

2. Select Settings tab
3. Select the Advanced button
4. In the General tab, set the DPI setting to Normal size (96 DPI)
5. Restart the PC

Setting up the Level 3 GigE switch

These procedures are for the HP ProCurve switch.

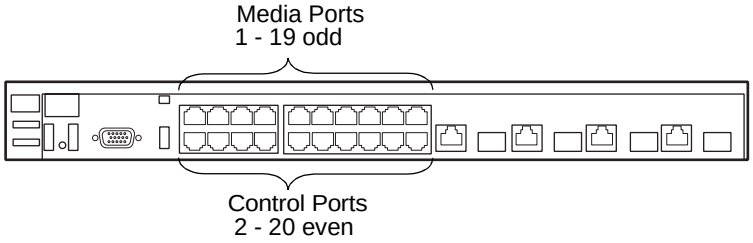
For iSCSI traffic, you must use the HP ProCurve switch. Both the 3400cl series and 2900 series switches are qualified for iSCSI traffic, and both types are fully compatible and can coexist on the network.

For control and FTP/streaming traffic, it is allowed to use a different brand of switch, such as a Cisco Catalyst switch, if required by your site. If you are using a non-HP switch, apply the information in the following procedures accordingly. Refer to the documentation you received with the switch as necessary.

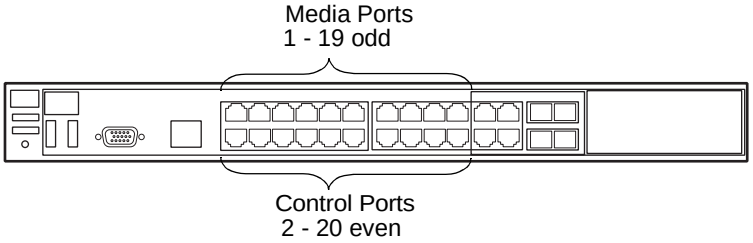
Also refer to “Design considerations for Ethernet switches” on page 759.

- Use CAT5e or CAT6 cables. The maximum cable length is 50 meters for CAT5e and 100 meters for CAT6.
- Assign an IP address and logon to the switch. Refer to “Configuring the GigE switch via serial connection” on page 133.
- Set up VLANs on the switch. Refer to “Configuring the GigE switch via the Web interface” on page 137.
- Install the switch in its permanent location.
- Provide power to the switch.
- Connect cables as follows:

3400cl series switch



2900 series switch



To the media ports make one iSCSI connection from each K2 Media Client or other iSCSI client and two iSCSI connections from each K2 Media Server.

To the control ports make one connection from each K2 Media Client or other iSCSI client, from the RAID storage chassis, and from the control point PC. Also make the FTP network connection and the control network connection from each K2 Media Server.

Refer to "Level 3 system description" on page 130 for a diagram of the complete system.

Refer to cabling procedures later in this chapter for the GigE connections at each of the devices of the K2 Storage System.

Also refer to "K2 Ethernet switch description" on page 651 and "Design considerations for Ethernet switches" on page 759.

Configuring the GigE switch via serial connection

NOTE: Make sure you check the switch firmware and upgrade if necessary, as instructed at the end of this procedure.

The following procedure is for the HP ProCurve switch and applies to both the 3400cl series and 2900 series switches.

Use a direct console connection to the switch, start a console session, and access the Switch Setup screen to set the IP address.

1. Configure the PC terminal emulator on the control point PC or another PC as a DEC VT-100 (ANSI) terminal or use a VT-100 terminal, and configure either one to operate with these settings:
   - Baud rate 115200
   - 8 data bits, 1 stop bit, no parity, and flow control set to Xon/Xoff

- Also disable (uncheck) the “Use Function, Arrow, and Ctrl Keys for Windows” option

2. Connect the PC to the switch’s Console Port using the console cable included with the switch. (If your PC or terminal has a 25-pin serial connector, first attach a 9-pin to 25-pin straight-through adapter at one end of the console cable.)
3. Turn on the PC’s power and start the PC terminal program.
4. Press **Enter** two or three times and you will see the copyright page and the message “Press any key to continue”. Press a key, and you will then see the switch console command (CLI) prompt.

NOTE: If you press Enter too many times and get past the log in, enter the command EN to get into the command line.

5. Type the following, then press **Enter**:

   `menu`

   If prompted to save the current configuration, answer no (press the n key) to proceed. The main menu opens.
6. On the main menu, choose **Switch Configuration,** then press **Enter**.
7. Select **IP Configuration**, then press **Enter**.
8. Press the right-arrow key to choose **Edit**, then press **Enter**. Tab to fields and enter information as follows:
   a. Change **Gateway** to be the default router.
   b. Tab to the **IP Config (DHCP/Bootp)** field and use the Space bar to select the **Manual** option.
   c. Tab to the **IP Address** field and enter the switch’s control network IP address. Refer to “Networking tips”.
   d. Tab to the **Subnet Mask** field and enter the subnet mask used for your network.
9. Press **Enter**, then right-arrow to **Save**. Press **Enter** and revert to previous menu.
10. Select **Return to Main Menu** and press **Enter**.
11. From the main menu, chose **Console Passwords** and press **Enter**. The Set Password Menu opens.
12. Chose **Set Manager Password** and press **Enter**.
13. When prompted for the password, type a password of up to 16 ASCII characters with no spaces and press **Enter**. The password can be one that is used on other K2 devices, such as “adminK2” or “K2admin”, or it can be your site's administrator password.
14. When prompted to enter the password again, retype the password and press **Enter**.
15. Select **Return to Main Menu** and press **Enter**.
16. From the main menu, tab to **Command Line (CLI)** and press **Enter**. The command prompt appears.

17. Type the following, then press **Enter**:

    ```
    configure
    ```

    You are now in configuration mode.

18. Configure an administrator username. The username can be one that is used on other K2 devices, such as “administrator” or “K2admin”, or it can be your site's administrator username. For example, to set the username to “administrator” type the following, then press **Enter**:

    ```
    password manager user-name administrator
    ```

19. When prompted, enter and re-enter the password.

20. Set spanning tree to RSTP. Type the following, then press **Enter**:

    ```
    spanning-tree force-version rstp-operation
    ```

    This configures spanning tree, but it does not turn spanning tree on. You must turn spanning tree on using the switch’s Web interface, as explained in the next procedure “Configuring the GigE switch via the Web interface”.

21. Decide your SNMP community name as explained in the following options, then proceed with the next step:

    - If you decide to use a unique SNMP community name (not “public”), add the community and set its RW permissions. For example, if the community name is “K2”, type the following, then press **Enter**:

      ```
      snmp-server community K2 unrestricted
      ```

    - If you decide to use the default SNMP community “public” for NetCentral monitoring, which already has RW permissions set as required by NetCentral, proceed to the next step.

22. Enter the SNMP community and IP address of the NetCentral server PC. For example, if the IP address is “192.168.40.11” and the community is “public”, you type the following, then press **Enter**:

    ```
    snmp-server host public 192.168.40.11
    ```

23. Enable Authentication traps. Type the following, then press **Enter**:

    ```
    snmp-server enable traps authentication
    ```

    This allows NetCentral to test the switch to verify that it can send its SNMP trap messages to NetCentral.

24. Type the following, then press **Enter**:

    ```
    menu
    ```

    When prompted, save the configuration by pressing the y key. The main menu opens.

25. If you need a trunk for ISLs to gang switches together, use the following steps. These steps illustrate trunking the last three 1 Gig ports for three 1 Gig ISLs, which is the recommended configuration for ISLs on all multi-switch K2 Storage Systems. Refer to “Design considerations for Ethernet switches” on page 759 and consult with your Grass Valley representative if your requirements deviate from the recommended policy:

a. At the main menu, select **Switch Configuration** and press **Enter**.

b. Choose selection **Port/Trunk Settings** and press **Enter**.

c. Press the right-arrow key to choose **Edit**, then press **Enter**.

d. Down arrow until at the bottom of the list of ports and select the last (highest port number) 1 Gig port in the list.

e. Right-arrow over to the Group column.

f. Use the Space bar and set the bottom 1 Gig port to **Trk1**.

g. Set the next port up also to **Trk1**.

h. Set the next port up also to **Trk1**.

i. Press **Enter**, then right-arrow to **Save**. Press **Enter** and revert to previous menu.

26. Select **Return to Main Menu** and press **Enter**.

27. From the main menu, tab to **Command Line (CLI)** and press **Enter**. The command prompt appears.

28. Check the version of firmware currently installed on the switch. Type the following, then press **Enter**:

```
show flash
```

Information is displayed similar to the following example:

```
HP_iSCSI_switch1# show flash
Image            Size(Bytes)    Date    Version
-----            -----------  --------  -------
Primary Image    : 3287779    03/15/05  M.08.66
Secondary Image  : 3287779    03/15/05  M.08.66
Boot Rom Version: I.08.07
Current Boot     : Primary
```

29. Check the Primary Image Version and refer to your *K2 Storage System Release Notes* for information about currently supported versions. Then proceed as follows:

- If *K2 Storage System Release Notes* instruct you to change the firmware on the switch, do so before continuing. Refer to the documentation you received with the switch for instructions to change the firmware. Then continue with the next procedure "Configuring the GigE switch via the Web interface".
- If *K2 Storage System Release Notes* confirm that the version on the switch is a currently supported version, continue with the next procedure.

30. Type the following, then press **Enter**:

```
menu
```

The main menu opens.

31. From the main menu, choose **Reboot Switch** and press **Enter**. When prompted "Continue Reboot…?', answer yes (press the y key) to proceed. The switch restarts.

32. You can now use the switch's web browser interface for further configuration, as

instructed in the next procedure.

33.Close the PC terminal program and disconnect the console cable.

Continue with the next procedure "Configuring the GigE switch via the Web interface".

Configuring the GigE switch via the Web interface

The following procedure is for the HP ProCurve switch and applies to both the 3400cl series and 2900 series switches.

1. From the control point PC or another PC, make sure that you have a direct Ethernet cable connection to the switch, with no switches, routers, proxies, or other networking devices in between.
2. On the PC, open Internet Explorer and type the switch's IP address in the Address field, as in the following example.

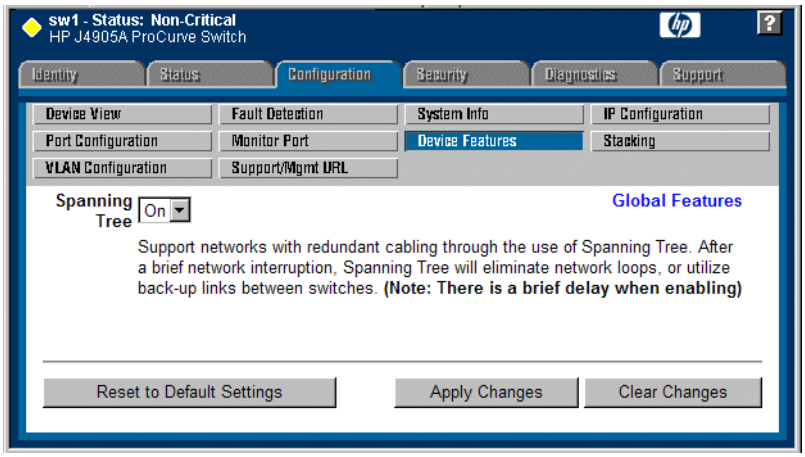
   `http://192.168.100.61`

   This should be the name or IP address as currently configured on the switch.
3. Press **Enter** to open the switch's configuration application.

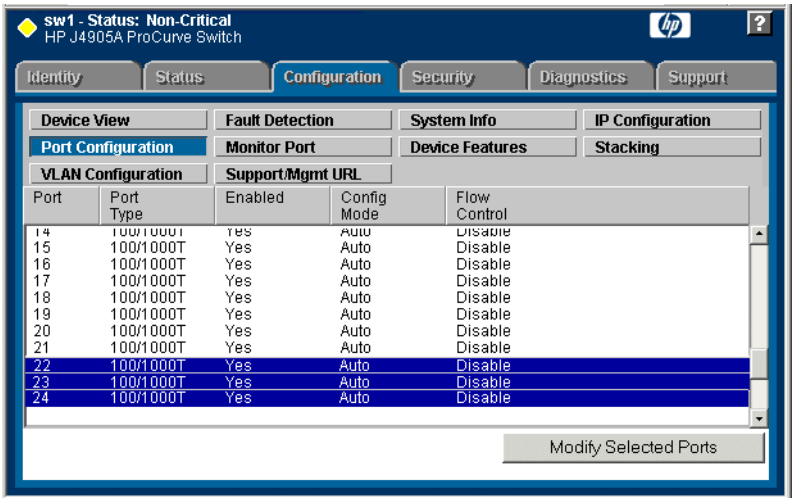
NOTE: The configuration application for the HP ProCurve switch requires Java.

   You can also access the switch's configuration application from the K2 System Configuration application.

4. In the switch's configuration application, choose **Configuration**, then **Device Features**.



5. Set Spanning Tree to **On** and click **Apply Changes**. If prompted, log in with the switch's administrator username and password.
6. Click **Port Configuration**.

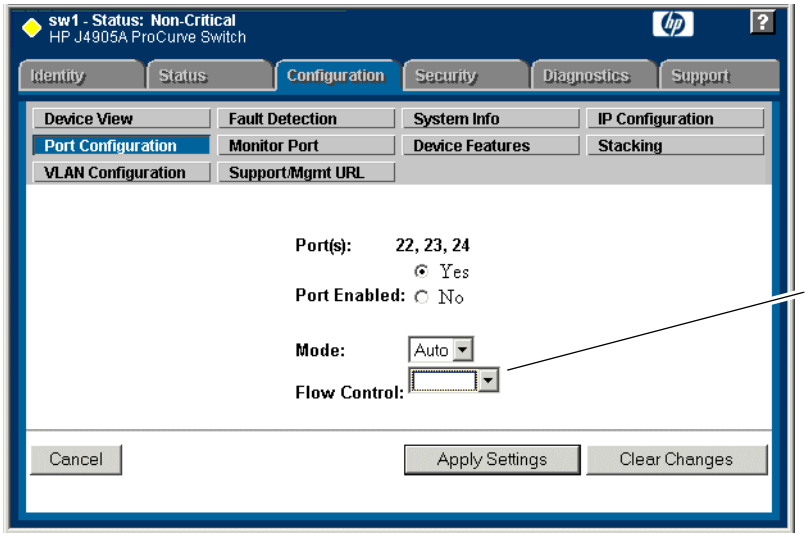


7. If you do not need trunks, such as on a one-switch system, skip to the next step in this procedure. If you need trunks, such as on a two-switch system with ISLs, do the following:

   a. Select (Ctrl + Click) the trunked ports. Typically the trunked ports are at the bottom of the list and are labeled Trk1.

   b. Click **Modify Selected Ports**.

      If prompted, log in as administrator.



c. For the trunked ports, set Port Enabled to **Yes**. On some switch models, some ports are disabled by default, so make sure you enable them. Leave Mode as default of **Auto**.

d. Set Flow Control as follows:

   - For the 3400cl series switch, set to **Disable**.
   - For the 2900 series switch, set to **Enable**.

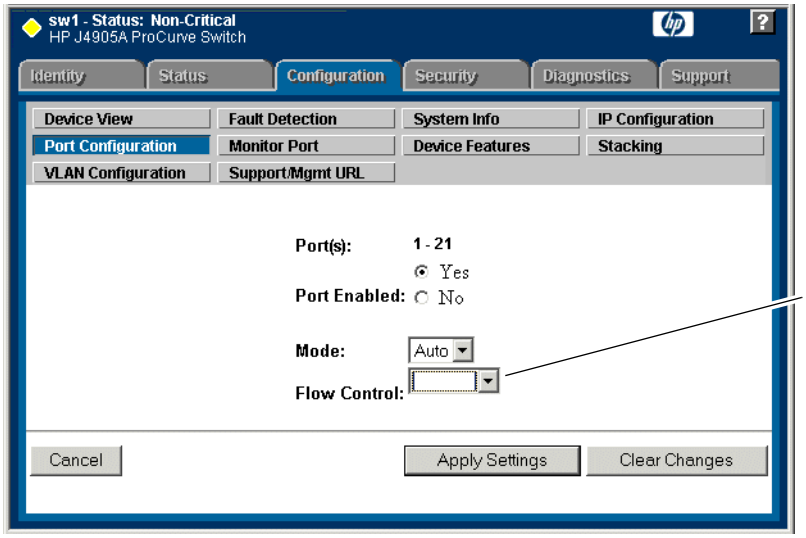
   If you have both 3400cl series and 2900 series on your network, having different Flow Control settings (disable for 3400cl, enable for 2900) does not cause problems.

e. Click **Apply Settings**.

8. On the Port Configuration page, do one of the following:

   - If you do not have trunks, select all ports.
   - If you have trunks, select the remaining ports (the ports not trunked).

9. Click **Modify Selected Ports**.



10. Make sure Port Enabled is set to **Yes**, leave Mode as default of **Auto**.

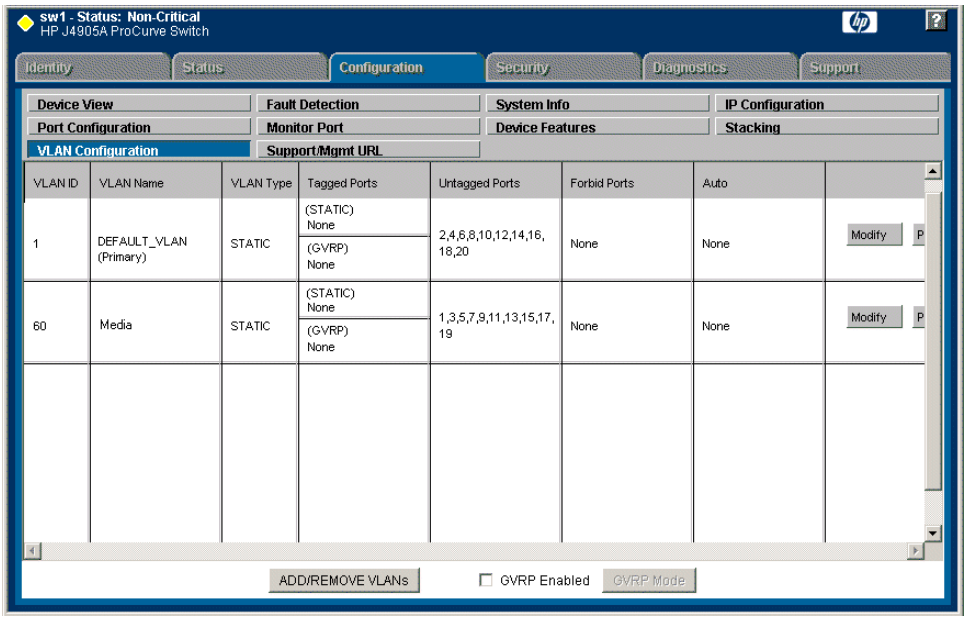
11. Set Flow Control as follows:

    - For the 3400cl series switch, set to **Disable**.
    - For the 2900 series switch, set to **Enable**.

    If you have both 3400cl series and 2900 series on your network, having different Flow Control settings (disable for 3400cl, enable for 2900) does not cause problems.

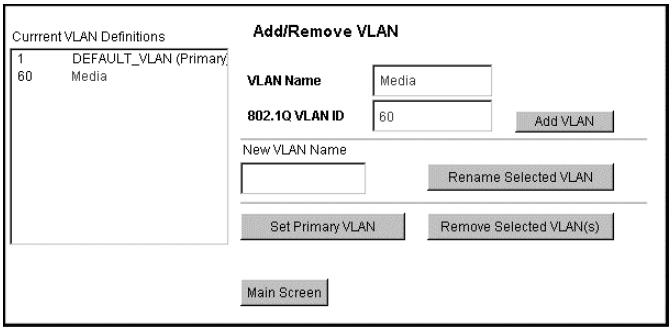
12. Click **Apply Settings**. Wait until settings are applied and the Web interface becomes active.

13. Choose **VLAN Configuration**. If prompted, log in with the switch's administrator username and password.



14. Create a new Media (iSCSI) VLAN as follows:

    a. Click **Add/Remove VLANs**.



    b. In the VLAN Name field enter `Media`.

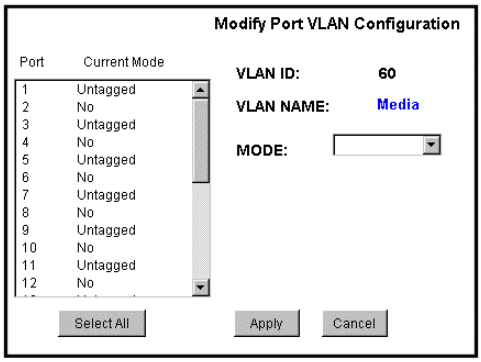
    c. In the VLAN ID field enter `60`.

    d. Click **Add VLAN**.

    e. Click **Main Screen** to return to VLAN Configuration.

15. Configure the Media VLAN as follows:

    a. In the Media VLAN row, click **Modify**.



b. Select all the odd numbered ports. (Tip: Use Ctrl + Click.)

c. In the Mode drop-down list, select **Untagged**, then click **Apply**. This removes the odd ports from the default (Control) VLAN.

   If you have a trunk, do not configure it as "Tagged". Media VLAN traffic (iSCSI) does not go over the trunk.

16. Click the **VLAN Configuration** tab.

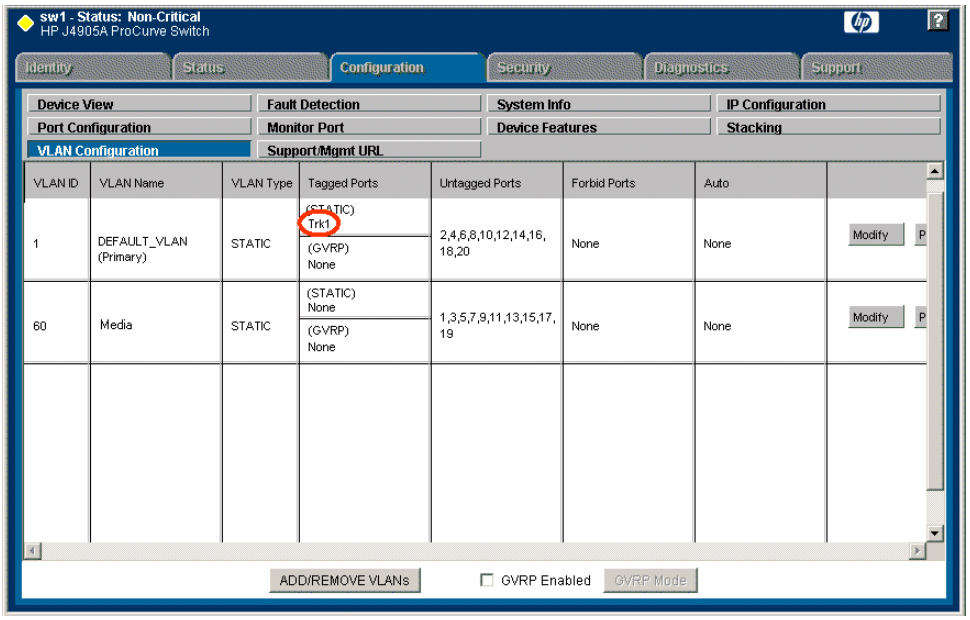
17. If you have a trunk, configure the default (Control) VLAN as follows:

    a. In the DEFAULT_VLAN row, click **Modify**.

    b. In the Current Mode list box, scroll down and select the trunk.

    c. In the Mode drop-down list, select **Tagged**, then click **Apply**. This allows default VLAN traffic (non-iSCSI) to go over the trunk.

18. Click the **VLAN Configuration** tab.



19. If you have a trunk, verify that for the default VLAN the trunk is displayed in the Tagged Ports column.
20. If you have two switches, repeat this procedure for the other switch.
21. Close the switch configuration application.

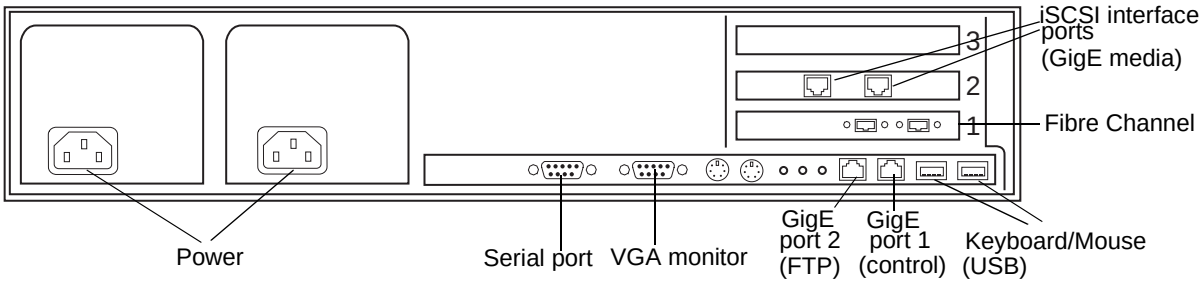
Setting up the K2 Media Server

Both the Dell PowerEdge 2850 and the Dell PowerEdge 2950 are qualified as platforms for the K2 Media Server. This section provides information on both platforms.

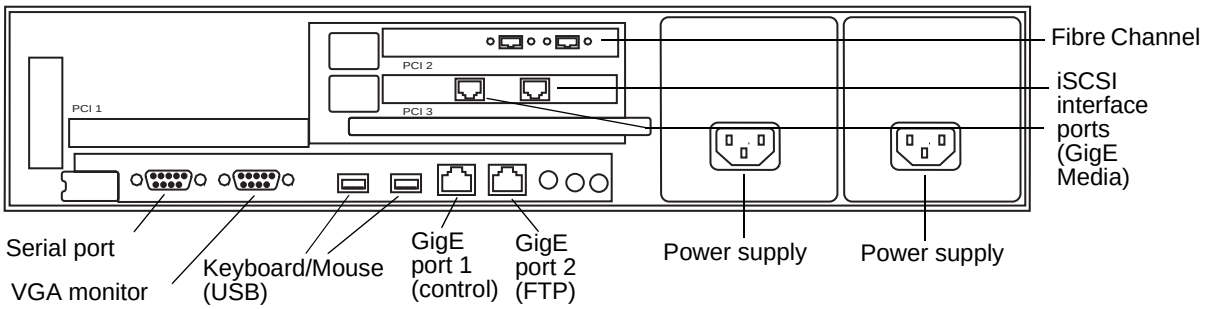
Do the following to prepare a K2 Media Server:

- Install the server in its permanent location. Refer to the rack mount instructions that you received with the server's product bundle.
- Provide power to the servers.
- Connect cables as follows:

Dell 2850 PowerEdge server



Dell 2950 PowerEdge server



Connect the two iSCSI interface ports to media ports on the GigE switch.

Connect the motherboard GigE port 1 and GigE port 2 to control ports on the GigE switch.

Connect one of the Fibre Channel ports to the RAID storage device.

- Assign a control network IP address to GigE port 1. Use standard Windows procedures. Refer to "Networking tips".
- Change the hostname. Use standard Windows procedures.

- Configure SNMP properties so the trap destination points to the NetCentral server PC. Use standard Windows procedures. If you are not using the SNMP community name “public”, configure the community name and set permissions to RW. Also make sure that the Authentication trap is enabled.

Also refer to “K2 Media Server descriptions” on page 653.

Setting up the L3 RAID chassis

Do the following to prepare the L3 RAID storage devices:

- Install the chassis in its permanent location. Refer to the *L3 RAID Instruction Manual* for rack mount instructions.
- “Assign Fibre Channel address ID” on page 145.
- “Connect the L3 RAID chassis” on page 145
- “Assign chassis address on Expansion chassis” on page 146.
- “Power on the L3 RAID chassis” on page 148

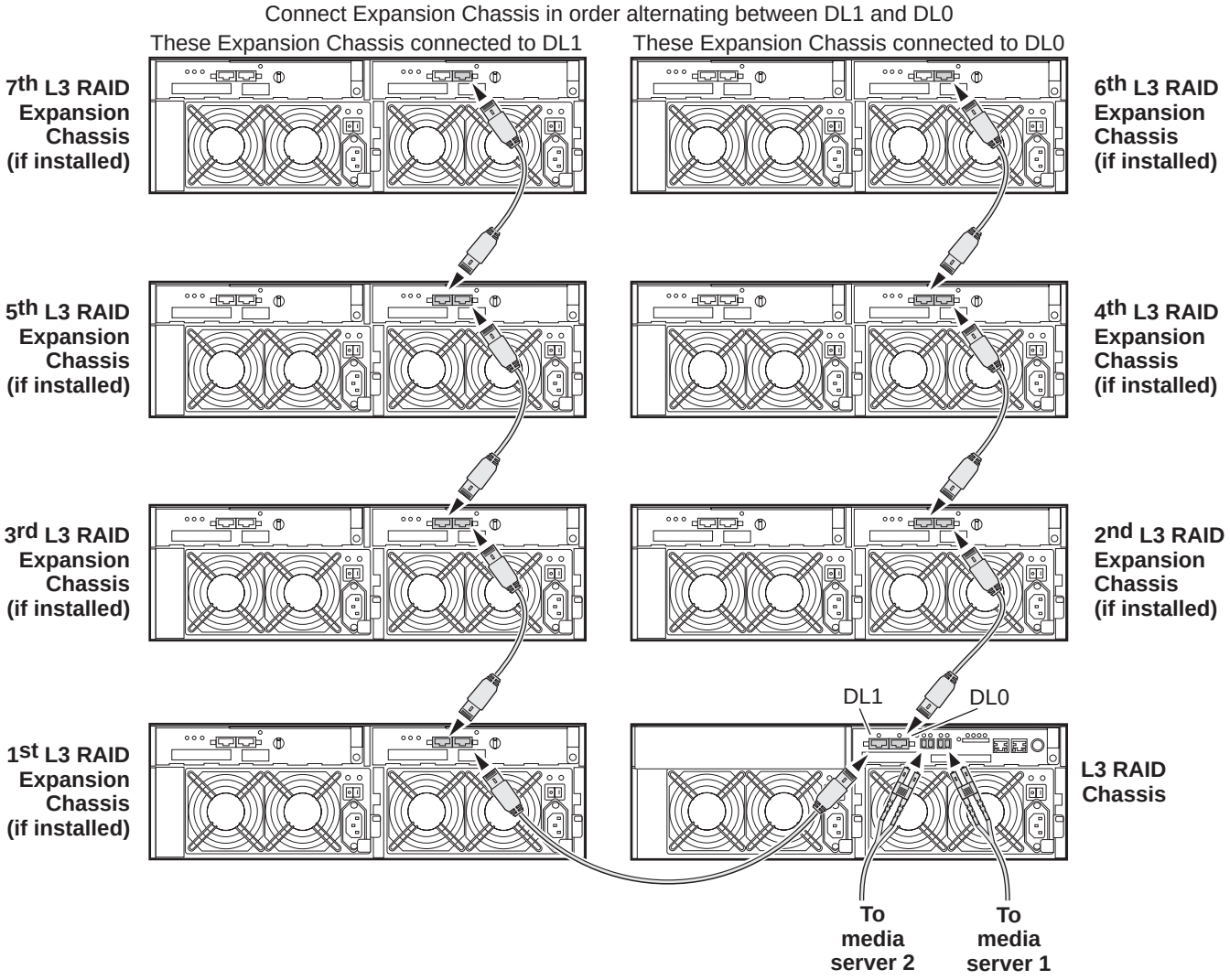
In addition, you will configure network settings, SNMP settings, and bind LUNs. These tasks are part of the K2 System Configuration application and Storage Utility procedures later in this chapter. The process of binding LUNs can take a significant amount of time—as much as eight hours—so you might want to put priority on the tasks necessary to start the LUN binding process, then catch up with other tasks while the LUNs are binding.

Assign Fibre Channel address ID

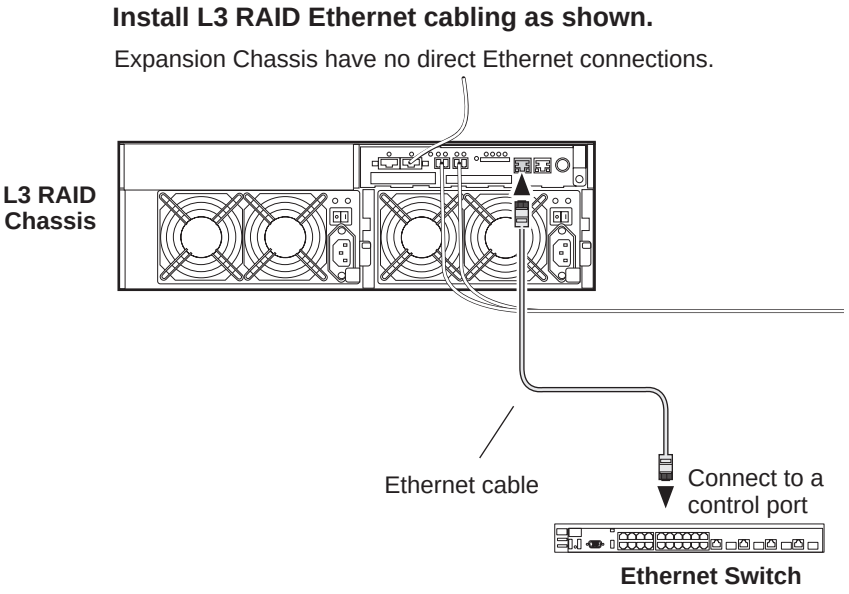
Every RAID controller must have a unique Fibre Channel address ID that identifies the controller on the Fibre Channel fabric. On the L3 RAID, you do not need to manually set the Fibre Channel address ID, as it is pre-set at the factory.

Connect the L3 RAID chassis

Connect Fibre Channel cabling.



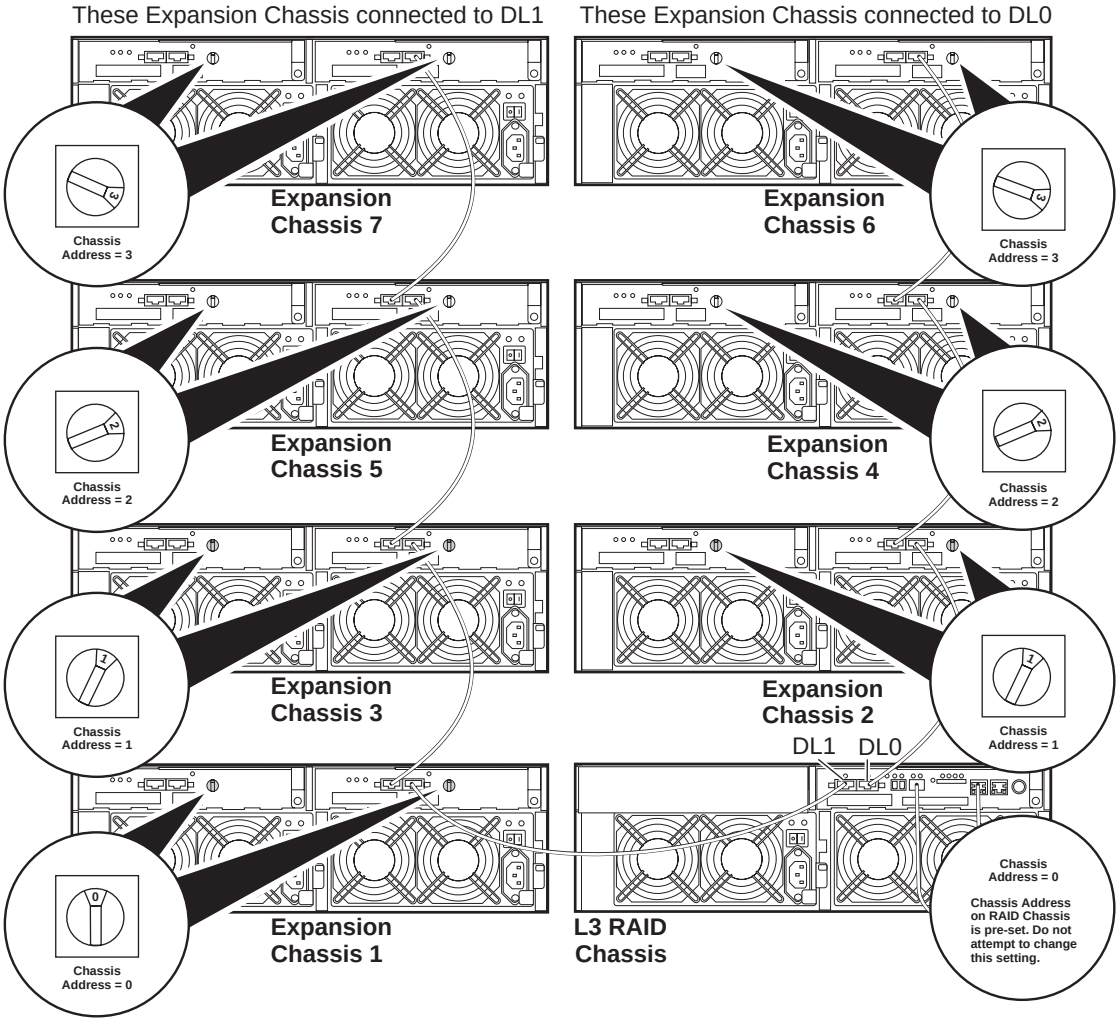
Connect Ethernet cabling as shown in the following diagram.



Assign chassis address on Expansion chassis

Every chassis must have a chassis address. The Level three RAID chassis address is fixed at 0, so no configuration is required. However, if you have any L3 RAID Expansion chassis you must set their chassis addresses as shown in the following illustration. One each Expansion Chassis, set the same address on both Expansion adapters, regardless of whether or not the second Expansion adapter is connected to a second RAID controller.

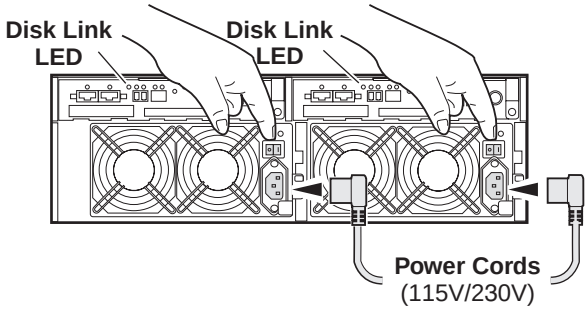
On each L3 RAID Expansion Chassis (if installed) set the same chassis address on both Expansion adapters.



Do not swap Expansion chassis or otherwise reconfigure storage. If you connect a L3 RAID Expansion chassis to the wrong controller such that the Expansion chassis contains disk modules that were bound using a different controller you will lose your media file system.

Power on the L3 RAID chassis

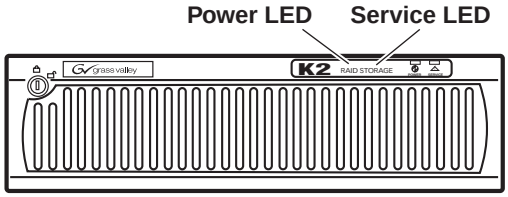
Connect power cords, and turn on power as shown. You must power-up any RAID Expansion chassis prior to, or at the same time as the RAID Controller chassis. Verify power-up as shown.



Power-up Verification

- DIR and SVP LEDs on the RAID controllers are blinking green
- Disk Link LED is steady ON green.
- FLT and BAT LEDs are OFF.
- The front Power LED is ON, Service LED is OFF after about 5 minutes.

  Refer to the *L3 RAID Instruction Manual* if there is a problem.



Your preparations for L3 RAID storage are now complete.

Preparing K2 Storage System clients

Any devices that function as iSCSI clients to the K2 Storage System must be prepared with the following requirements:

- One or more connections to the control network.
- A static IP address for the control network.
- For a non-redundant K2 Storage System, one connection to the media (iSCSI) network.

Additional steps that are required for Aurora Edits include the following:

- Implement Aurora Edit security features.

- Install SNFS software and K2 software.

For more information, refer to the *Aurora Edit Installation and Configuration Guide*.

For more information refer to the *K2 Media Client System Guide*.

K2 configuration and NetCentral

Before you begin using the K2 System Configuration application to configure the storage system, you should set up the NetCentral system according to the following requirements:

- **NetCentral installed** — NetCentral server software must be installed on a NetCentral server PC. This can be the K2 configuration Control Point PC or another PC that has network communication with the K2 Storage System control network.
- **Device providers installed** — A device provider must be installed on the NetCentral server PC for each type of device in the K2 Storage System. For a Level 3 storage system, the following device providers must be installed:
  - Control point PC device provider — This is the Windows monitoring device provider.
  - K2 Media Server device provider
  - HP Gigabit Switch device provider or Cisco Gigabit Switch device provider
  - K2 Media Client device provider, if any K2 Media Clients are accessing the Level 3 storage system.
  - Device provider for iSCSI clients, if any iSCSI clients such as Aurora Edits are accessing the Level 3 storage system.
  - K2 Level 2/Level 3 RAID storage device provider. This device provider supports both Level 2 and Level 3 RAID devices.
- **Grass Valley PC Monitoring software installed** — This software must be installed on the K2 configuration Control Point PC. It includes Grass Valley SNMP agents and other WMI based components to perform process monitoring. This provides the information for some of the SNMP trap messages that must be sent to NetCentral.
- **Control Point PC monitored by NetCentral** — The K2 configuration Control Point PC should be added to the NetCentral system and fully monitored by NetCentral. This means that its SNMP trap destination is set to send SNMP traps to the NetCentral server PC. Whether the Control Point PC and the NetCentral server PC are the same PC or are different PCs, you should still add the Control Point PC to NetCentral.

Refer to the *NetCentral User Guide* to set up the NetCentral system. After installing a device provider, you can find additional documentation about monitoring that type of device on the NetCentral Help menu.

Networking for Level 3

Use the topics in this section to configure the Gigabit Ethernet (GigE) network for the Level 3 storage system.

- "Networking requirements" on page 150
- "Networking tips" on page 151
- "Setting up host tables" on page 152
- "Testing the control network" on page 153

Networking requirements

Required networking strategies for a Level 3 K2 Storage System (a non-redundant K2 Storage System) are as follows:

- Three networks:
  - Media network — Exclusively for iSCSI traffic.
  - Streaming/FTP network — For media transfers and FTP traffic.
  - Control network — For all other non-streaming, non-iSCSI traffic.
- Networks must be on separate subnets.
- The Media (iSCSI) network traffic is kept separate from any other traffic. This separation is provided by dedicated Gigabit ports, cables, and by a dedicated VLAN on the HP GigE switch or by separate switches.
- K2 Media Servers have a dedicated FTP port. If the server takes the role of FTP server, make a dedicated FTP connection to the FTP port.
- While control and FTP traffic is each on its own subnet, it is not required that each type of traffic has its own VLAN on GigE switches. For example, you make both FTP and control connections to the "control" ports (DEFAULT_VLAN) on the HP GigE switch.
- Static IP addresses are required for the media network on K2 Storage System iSCSI devices. This includes K2 Media Servers, generic iSCSI clients (such as Aurora Edits), and K2 Media Clients.
- Machine names (host names) assigned to each K2 device.
- Host tables (hosts files) provide name resolution on each K2 Media Client, iSCSI client, and K2 Media Server.
- IP addresses for FTP/streaming ports must have name resolution such that hostnames are appended with the "_he0" suffix. You can use host tables (as in "Setting up host tables" on page 152) or another mechanism to provide the name resolution. This directs the streaming traffic to the correct port. Refer to the *K2 Media Client System Guide* for a complete explanation.
- K2 Media Servers in the role of FTP server must be on the streaming network, as they provide the FTP interface for shared storage streaming traffic. Shared storage K2 Media Clients do not need to be on the streaming network because they do not send or receive streaming traffic.

- On the shared storage K2 Media Client, the two control GigE ports are configured as a team. The control team shares a single IP address. Do not attempt to un-team the control ports. On the Level 3 K2 Storage System, only one control port is connected, as control team redundancy is not supported.
- On the shared storage K2 Media Client, the two media (iSCSI) GigE ports are not teamed. On the Level 3 K2 Storage System, only one media port is connected, as iSCSI redundancy is not supported.

Also refer to "About networks and FTP" on page 684 and "Design considerations for Ethernet switches" on page 759.

Use the following procedures as necessary to implement your networking strategies.

NOTE: It is recommended that you configure Media network (iSCSI) IP addresses and Streaming network IP addresses using the K2 System Configuration application, rather than doing so on the local machine using standard Windows procedures.

Networking tips

- Before beginning network configuration, determine the IP addresses and names needed for the machines in your K2 system. Work with the network administrator at your facility to have those IP addresses and names available for your use.
- Establish a consistent convention for machine names and IP addresses. It is recommended that you embed a root name or other unique identifier for this particular K2 Storage System in the computer name. Also, a common convention for IP addresses is to use a numerical pattern or sequence in the IP addresses to indicate device-types and/or ports, as in the following example:

NOTE: This example assumes a subnet mask of 255.255.255.0

Example of Level 3 names and IP addresses

Computer name	Device type	Streaming network addresses	Control network addresses	Media network addresses	Comments
root_server_1	K2 Media Server	192.168.101.11[a]	192.168.100.11	192.168.99.11 192.168.99.12	Media file system/ database server
root_server_2	K2 Media Server	192.168.101.21[b]	192.168.100.21	192.168.99.21 192.168.99.22	FTP server
root_raid_1	RAID	—	192.168.100.51	—	
root_gige_1	GigE switch	—	192.168.100.61	—	—
root_gige_2	GigE switch	—	192.168.100.62	—	—
root_cppc_1	Control point PC	—	192.168.100.81	—	—
root_client_1	iSCSI client	—	192.168.100.111	192.168.99.111	—
root_client_2	iSCSI client	—	192.168.100.121	192.168.99.121	
root_client_3	iSCSI client	—	192.168.100.131	192.168.99.131	
root_client_4	iSCSI client	—	192.168.100.141	192.168.99.141	

[a] This NIC is not used, since this server does not take the role of FTP server
[b] This IP address must resolve to hostname root_server_2_he0

Setting up host tables

The *hosts* file is used by the control network and the streaming/FTP network to determine the IP address of devices on the network when only a the device name (hostname) is given. The steps that follow describe how to edit the *hosts* file located at *C:\Windows\system32\drivers\etc\hosts* on Windows XP and Windows 2003 Server operating system computers. If you include the names and addresses of all the devices on the network, then you can copy the same file onto all the other K2 devices instead of editing the *hosts* file on each K2 device.

For FTP transfers on a K2 Storage System, transfers go to/from K2 Media Servers that have the role of FTP server. No transfers go directly to/from the shared storage K2 Media Clients that are on the K2 Storage System. So in the hosts file, you must add the “he_0” extension to a K2 Media Server hostname and associate that hostname with the K2 Media Server’s FTP/streaming network IP address.

Refer to the *K2 Media Client System Guide* for more information.

To edit the *hosts* file manually:

1. Open the following file using Notepad or some other text editing application:

   C:\Windows\system32\drivers\etc\hosts

2. Enter all IP addresses with machine names. The text format is simple. First type the Ethernet IP address, then use the TAB key or Space bar to insert a few spaces. Then type the machine name.

   Here is an example:

   ```
   192.168.100.11      root_server_1
   ```

```
192.168.100.21      root_server_2
192.168.101.21      root_server_2_he0
192.168.100.51      root_raid_1
192.168.100.61      root_gige_1
```

3. Save the file and exit the text editor.
4. Copy the new *hosts* file onto all the other machines. This is easier than editing the file on each machine.

Host table tips

- If transferring to or from a Profile XP or Open SAN system via UIM, the *hosts* file must also follow UIM naming conventions for those systems. Refer to the UIM Instruction Manual.
- Do not enter media (iSCSI) network IP addresses in the host table, as hostname resolution is not required for the media network.
- Use the following tip with care. While it can solve a problem, it also introduces a name resolution "anomaly" that might be confusing if not considered in future troubleshooting activities.

  For each SAN (shared storage) K2 Media Client, add the "_he0" suffix to the hostname but then associate that hostname with the K2 Media ***Server's*** FTP/ streaming network IP address, ***not*** the K2 Media ***Client's*** IP address. Aliasing K2 Media Client hostnames in this way would not be required if the transfer source/ destination was always correctly specified as the K2 Media Server. However, a common mistake is to attempt a transfer in which the source/destination is incorrectly specified as the K2 Media Client. The host file aliasing corrects this mistake and redirects to the K2 Media Server, which is the correct transfer source/ destination.

  An example of a *hosts* file entry with this type of aliasing is as follows:

```
192.168.101.11      server_1_he0 client_1_he0 client_2_he0
```

Testing the control network

To test the control network use the *ping* command as follows:

1. On the control point PC, click **Start | Run**. The Run dialog box opens.
2. Type `cmd` and click **OK**. The command prompt window opens.
3. Type `ping`, then a space, then the name of one of your K2 Storage System devices, such as the Gigabit Ethernet switch, as in the following example:

   ```
   ping root_gige_1
   ```

4. Press **Enter**.

   The ping command should return the IP address of the device, as in the following example:

   ```
   Pinging root_gige_1.mycorp.com [192.168.100.61] with
   32 bytes of data:
   ```

```
Reply from 192.168.100.61: bytes=32 time=10ms TTL=127
Reply from 192.168.100.61: bytes=32 time<10ms TTL=127
Reply from 192.168.100.61: bytes=32 time<10ms TTL=127
Reply from 192.168.100.61: bytes=32 time<10ms TTL=127
```

This verifies that the name of the device is being correctly resolved to the IP address, which indicates that on the Control Point PC the host table entry is correct.

5. Ping the other K2 Storage System devices to which you have assigned control network IP addresses.
6. Go to each Windows device in the K2 Storage System and repeat this procedure. This verifies that network communication is correct to and from all devices.

Configuring the Level 3 storage system

Use the topics in this section to do the initial configuration of the Level 3 storage system.

- "Prerequisites for initial configuration" on page 155
- "Defining a new K2 Storage System" on page 156
- "Configuring the server - Part 1" on page 158
- "Configuring RAID" on page 160
- "Creating a new file system" on page 165
- "Configuring the server - Part 2" on page 167
- "Configuring server 2" on page 169

Prerequisites for initial configuration

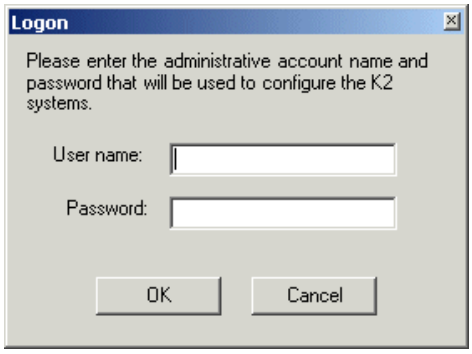
Before beginning your initial configuration, make sure the devices of the K2 Storage System meet the following prerequisites. Refer to sections earlier in this manual for detailed information. Also refer to Chapter 14, "Description of K2 Storage Devices".

Devices	Prerequisite for Level 3 configuration
Control point PC	Ethernet cable connected Control Point software installed Control network IP address assigned Network communication over the control network with all other K2 devices Power on
Ethernet switch	Ethernet cables connected Control network IP address assigned VLANs set up Power on
K2 Media Server	Ethernet cables connected Fibre Channel cable connected Software installed, as from the factory, including QuickTime 7 Control network IP address assigned Power on for all servers
L3 RAID chassis	Fibre Channel address ID assigned to RAID controller(s) Fibre Channel cable(s) connected Ethernet cable(s) connected Power on
L3 RAID Expansion chassis (optional)	Chassis address assigned (for Fibre Channel) Fibre channel cable(s) connected Power on

Defining a new K2 Storage System

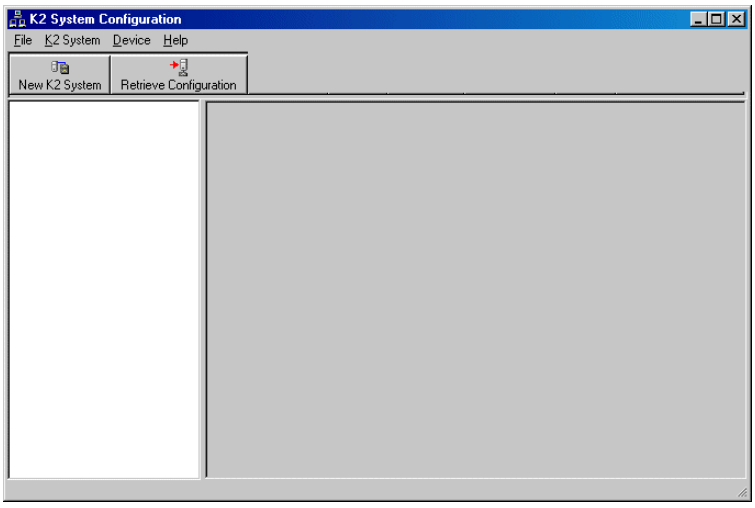
Define a Level 3 K2 Storage System as follows:

1. On the control point PC, open the K2 System Configuration application. A login dialog box opens.



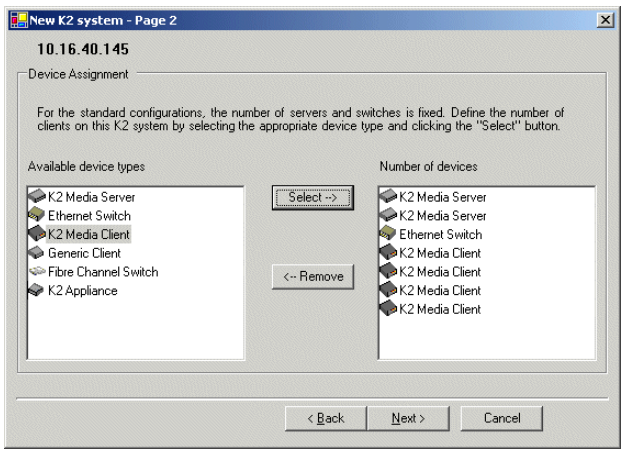
2. Log in to the K2 System Configuration application with the Windows administrator account. By default this as follows:
   - Username: administrator
   - Password: adminK2

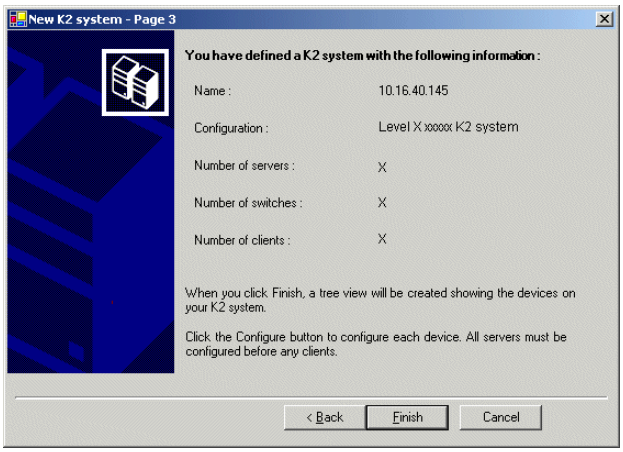
   Refer to "Setting up application security" on page 688 for more information about administrator accounts and logging in to applications.



3. Click **New K2 System**. The New K2 System wizard opens.

4. Follow the on-screen text to define your Level 3 K2 Storage System, as described in the following table.

On this page…	Do this…
Page 1	 Create a name for your Level 3 K2 Storage System and type it in the Name box. Select **Level 3**. The Server redundancy option is unchecked and disabled. Click **Next**
Page 2	 Move clients into the Number of Devices box as appropriate for your system. You cannot change the number of K2 Media Servers or Ethernet Switches, as these are pre-configured based on the level you selected in the previous page. Click **Next**.

On this page...	Do this...
Page 3	 Review the information on this page and verify that you have correctly defined your K2 Storage System. For a Level 3 storage system you should have the following: • One Gigabit Ethernet switch • Two K2 Media Servers • The number and type of clients appropriate for your system. Click **Finish**. The Define New K2 Storage System wizard closes.

Your K2 Storage System appears in the tree view of the K2 System Configuration application.

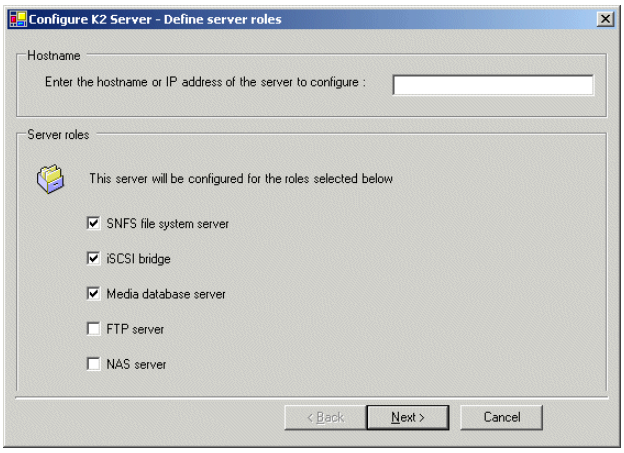
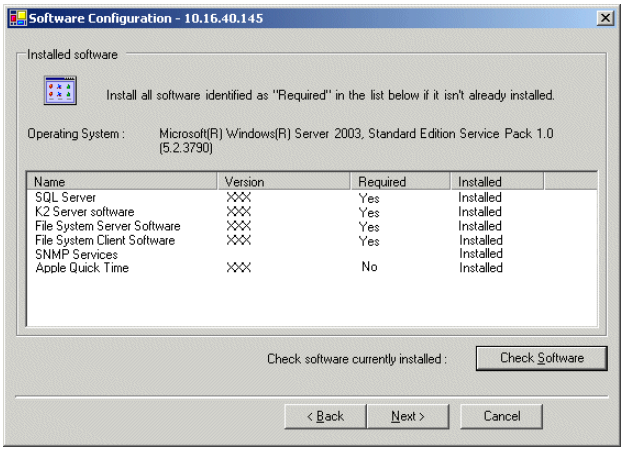
5. Continue with the next procedure.

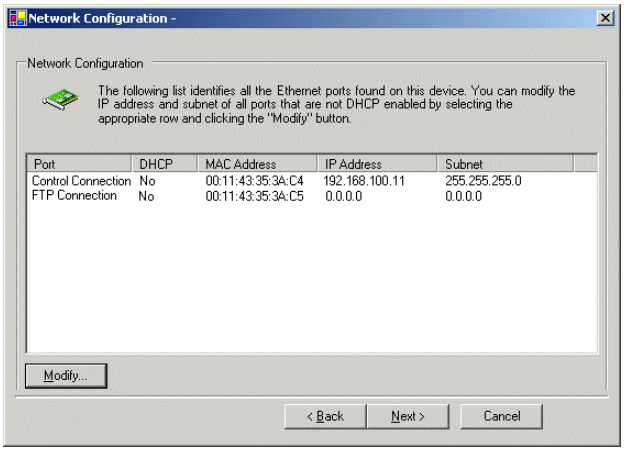
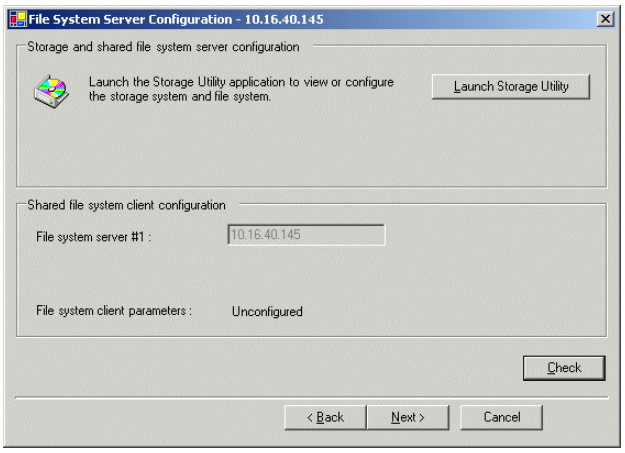
Configuring the server - Part 1

1. In the K2 System Configuration application tree view, select [**K2Server1]**.

2. Click the **Configure** button. The Configure K2 Server wizard opens. Follow the on-screen text to configure theK2 Media Server for a Level 3 K2

Storage System, as described in the following table:

On this page…	Do this…
Define server roles	 Enter the name or IP address for the K2 Media Server, as currently configured on the machine. For Level 3 server roles, leave **SNFS file system server**, **iSCSI bridge,** and **Media database server** selected. Click **Next**
Software Configuration This page checks for the software required to support the roles you selected on the previous page. Software required on a Level 3 K2 Media Server 1 is as follows: • SQL Server • K2 Server • File System Server • File System Client • SNMP Services • QuickTime •	 If software with *Yes* in the Required column reports as *Not Installed*, you must first install it on the K2 Media Server before continuing. Refer to *Chapter 16, Managing K2 software*. After installing the software, click **Check Software**. When all required software reports as *Installed*, click **Next**.

On this page…	Do this…
Network Configuration This page displays the control network Ethernet port, and allows you to configure the FTP/ Streaming network Ethernet port. ***NOTE: This page does not configure the iSCSI interface (media network) ports.*** For Level 3, since this server does not take the role of FTP server, configuring the second port here for the FTP/ streaming network is not required.	 The top port is the port over which the K2 System Configuration application is communicating with the K2 Media Server. If correctly configured, it is already assigned the control network IP address, as displayed on this page. Select the other port and click **Modify**. A network configuration dialog box opens. Enter the FTP/Streaming IP address and the subnet mask and click **Apply**. Click **Next**.
File System Server Configuration	 Click **Launch Storage Manager**. Storage Utility opens.

3. Continue with the next procedure to use Storage Utility to configure the storage and file system.

   Leave the Configure K2 Server wizard open while you are using Storage Utility. When you are done with Storage Utility, you continue with the wizard.

Configuring RAID

Use Storage Utility to complete the configuration of the L3 RAID chassis, as explained in the following topics:

- "Configuring RAID network and SNMP settings"

- "Binding disk modules"

Refer to "Prerequisites for initial configuration" on page 155 to confirm that the RAID storage is ready for configuration.

Configuring RAID network and SNMP settings

Use the Storage Utility to configure the following settings for the Level 3 RAID controller:

- IP address
- Subnet mask
- Gateway Address
- SNMP trap destinations

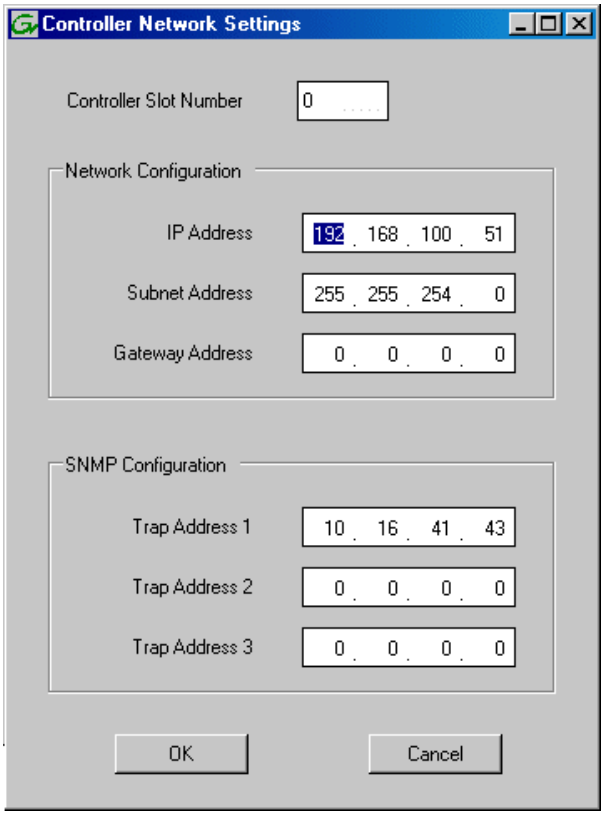
For Level 3 RAID, network and SNMP settings are set and stored on the RAID controller module, so the combined RAID storage devices, including the optional Expansion chassis, exist as a single entity on the control network.

The RAID storage device is configured by default for the SNMP community name "public". If your site's policies require using a different SNMP community name, contact your Grass Valley representative.

To configure these settings, do the following:

1. Launch Storage Utility from the K2 System Configuration application as in the previous procedure.
2. As prompted, wait while Storage Utility gathers system information, then Storage Utility opens.
3. In Storage Utility tree view, expand the node for the L3 RAID, right-click the icon for a L3 RAID controller, and select **Configuration | Network Properties**.

   The Controller Network Settings dialog box opens.



4. In the Controller Slot Number field enter **0** and then press **Enter**. The settings from controller 0 are loaded into the Controller Network Settings dialog box and are available for you to modify.
5. Enter the control network IP address and other network settings.
6. You want SNMP trap messages go to the NetCentral server PC, so for SNMP Configuration enter the IP address of the NetCentral server PC. You can also enter IP addresses for other SNMP managers to which you want to send SNMP trap messages.
7. Click **OK** to save settings and close.
8. In Storage Utility click **View | Refresh**. Continue with the next procedure "Binding disk modules".

Binding disk modules

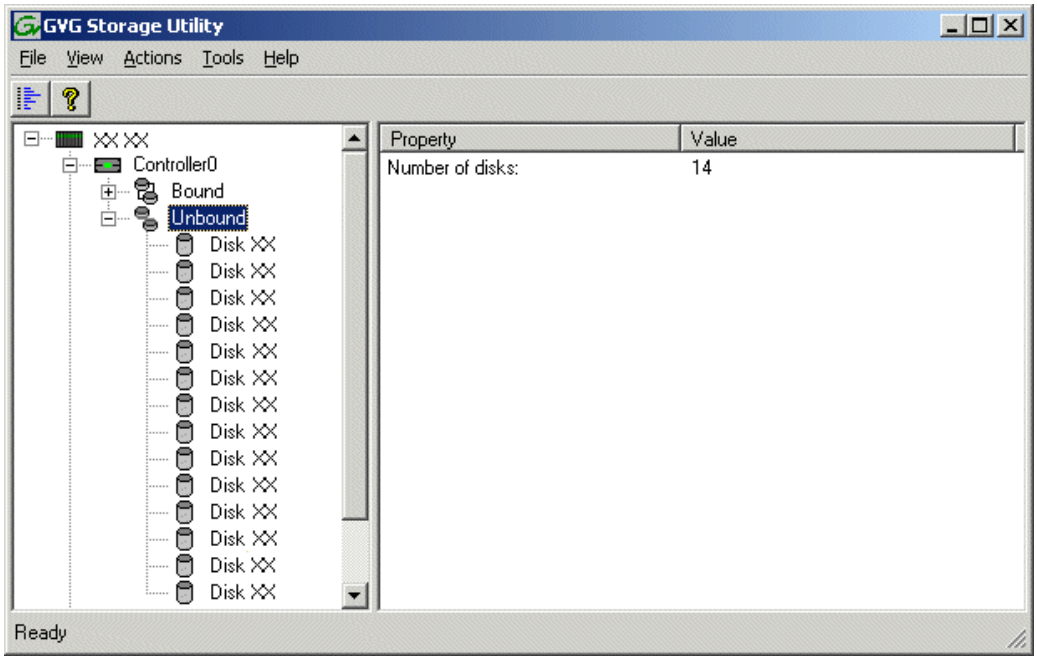
Use the following procedure to bind disk modules as required for the Level 3 storage system.

Also refer to "About RANKs and LUNs in Storage Utility" in Chapter 15, *Overview of K2 Storage Tools*.

NOTE: Binding destroys all user data on the disks.

1. In the Storage Utility main window, identify bound RANKs and unbound disks by

their placement in the hierarchy of the tree view. In the following illustration, disk numbers are represented by “XX”. Refer to “Identifying disks” on page 744 for an explanation of how disks are actually numbered in Storage Utility.

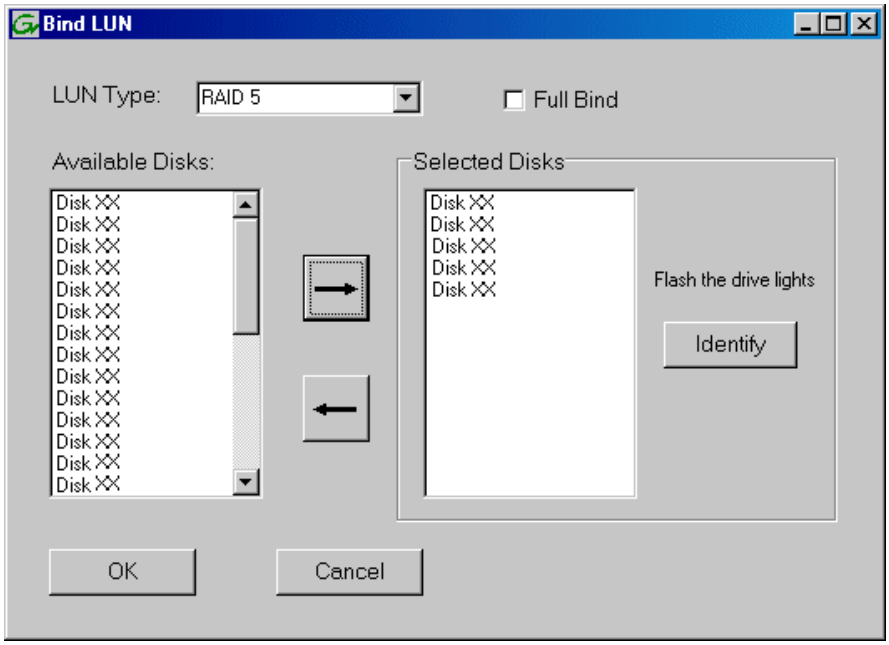


View disk properties and identify the four disks you will use for the metadata/journal RAID 1 RANKs, the one metadata/journal Hot Spare disk, any other disks that you intend to use for Hot Spares, and the remainder of the disks that are available for media storage. Make sure you select disks appropriately as you bind disks in the remainder of this procedure.

2. To bind unbound disks for media storage, do the following:

   a. Right-click the **Unbound** node for a controller, then select **Bind** in the context menu.

      The Bind dialog box opens showing all unbound disks for the controller listed in the Available Disk list.



b. Leave Full Bind unchecked. Refer to "About full/background bind" on page 748.

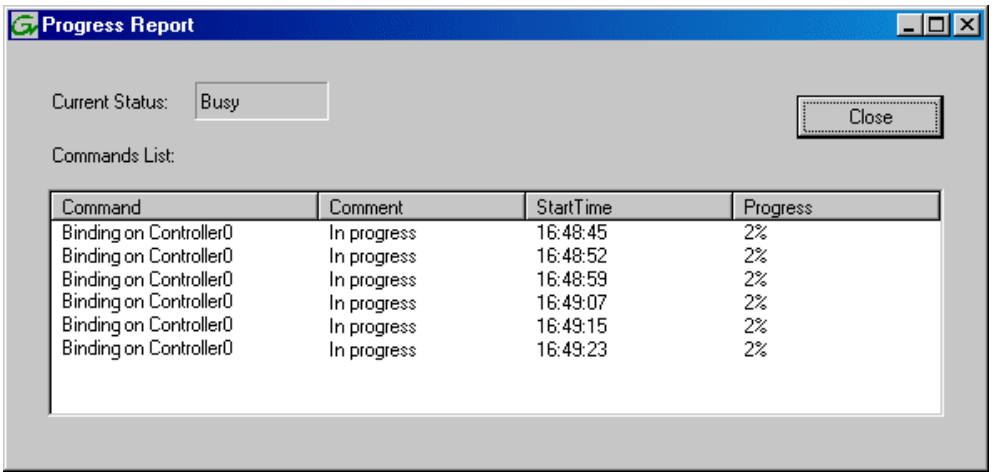
c. In the **Bind Type** drop down box, select **RAID 5**. If specified by your system design, RAID 6 is also supported. Refer to the Nearline chapter for more information on RAID 6.

d. In the Available Disks box, select five contiguous disks at the top of the list. (TIP: Use 'shift-click' or 'control-click' to select disks.).

e. Click the add (arrow) button to add disks to the Selected Disks list.

NOTE: As an aid in identifying a disk module's physical location, select it in the Selected Disks list, then click* Identify Disks. *This causes the disk drive light to flash.

f. Click **OK** to close the Bind dialog box and begin the binding process. The Progress Report dialog box opens, showing the status of the binding process.



g. Close the Progress Report and repeat these steps for other unbound disks. If specified by your system design, you can bind some disks as Hot Spares, as explained in "Binding Hot Spare drives" on page 751. When you are done, if you did not bind any extra Hot Spares, you should have the following results:

   For Level three storage you should have three RAID 5 RANKs of five disks each on a RAID storage device. For each optional Expansion chassis, you would have an additional three RAID 5 RANKs of five disks each. If using RAID 6, RANKs are six disks each.

h. Click **Close** in Progress Report window.

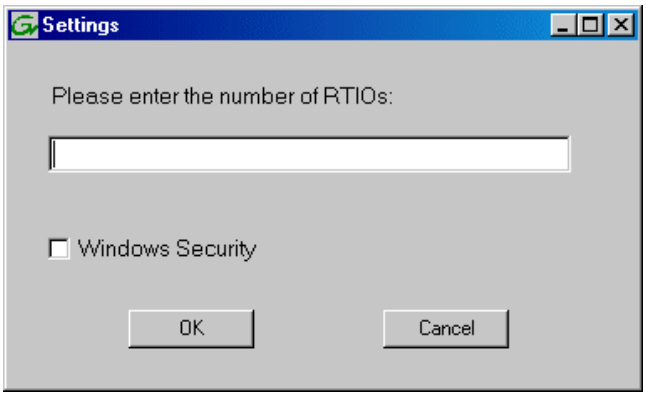
3. Restart the K2 Media Server.

NOTE: Make sure start up processes on the K2 Media Server are complete before proceeding.

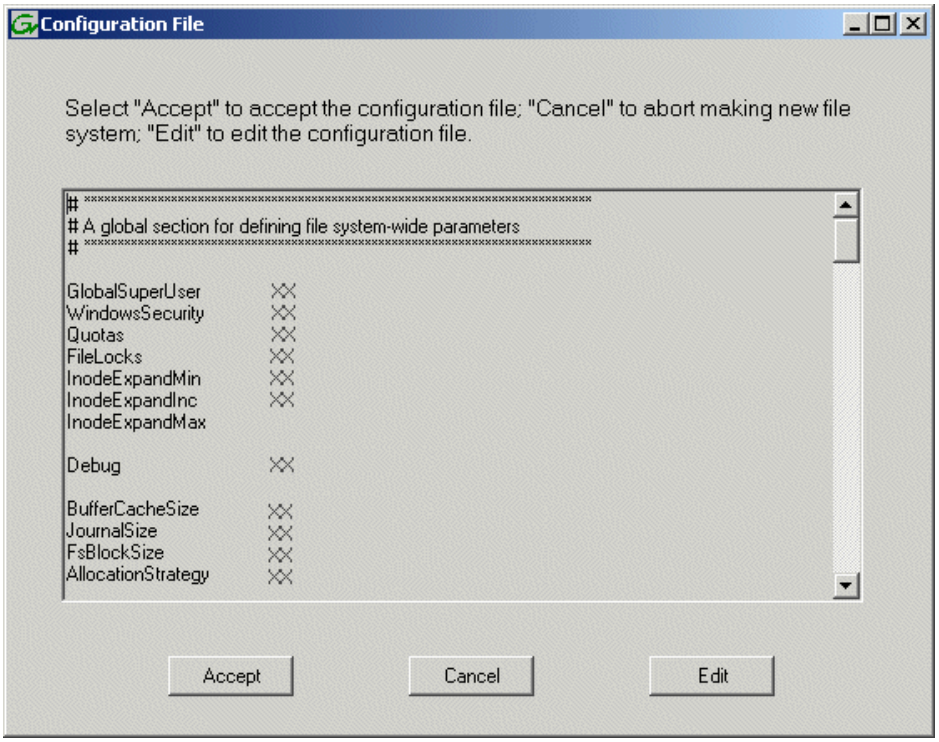
4. Continue with the next procedure "Creating a new file system".

Creating a new file system

1. In Storage Utility, click **Tools | Make New File System**. The Setting dialog box opens.



2. For the Real Time Input/Output (RTIO) rate, enter the value specified by your system design. If you do not know this value, contact your Grass Valley representative.
3. If the K2 Storage System is to be accessed by only K2 Media Clients you can leave Windows Security unchecked. If accessed by Aurora Edits, refer to the *Aurora Edit Installation and Configuration Guide* for instructions.
4. Click **OK**. The Configuration File dialog box opens.



The configuration file for the media file system is displayed. You can verify media file system parameters by viewing this file. Do not edit this file. Click **Accept**.

A "…Please wait…" message box displays progress and a "…succeeded…" message confirms the process is complete.

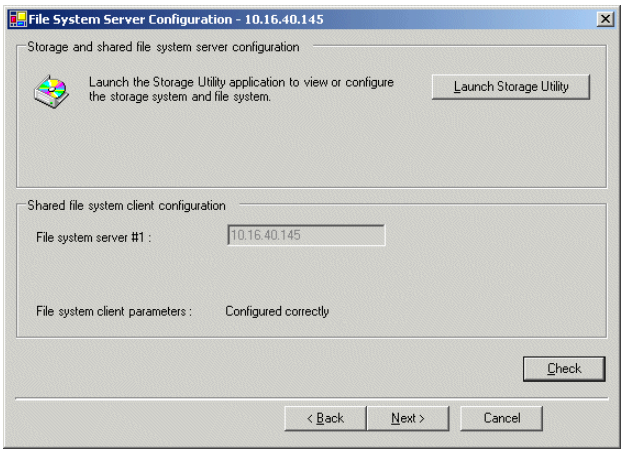
5. A message informs you that you must restart the K2 Media Server, however the restart at the end of the Configure K2 Server wizard suffices, so you do not need to restart now.
6. Close the Storage Utility.

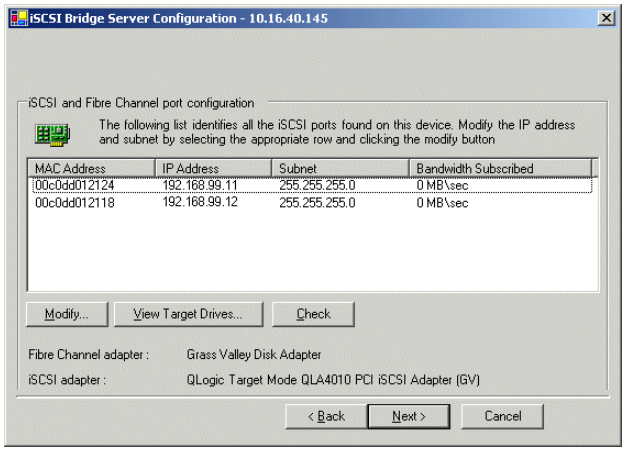
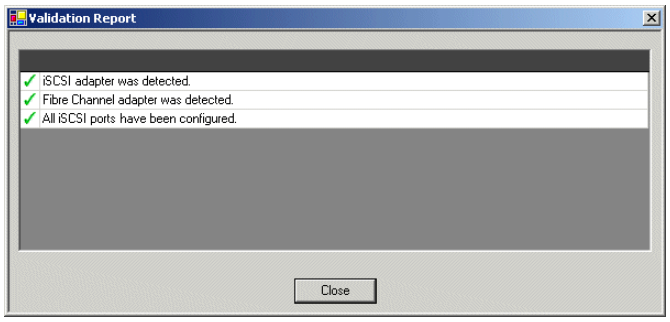
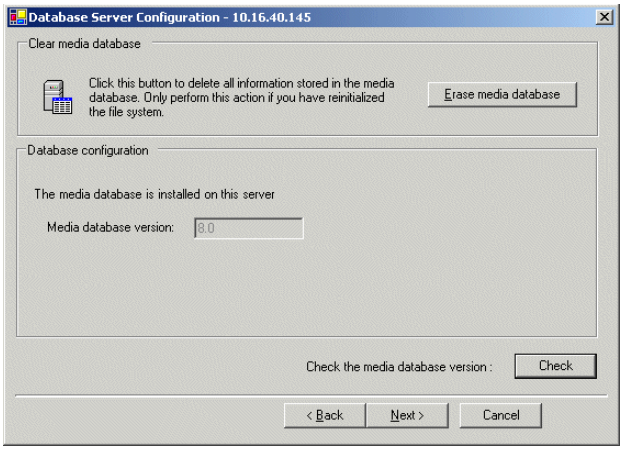
NOTE: Do not attempt to start K2 Media Clients or otherwise bring the K2 Storage System online until instructed to do so later in this chapter.

7. Continue with the next procedure.

Configuring the server - Part 2

1. Return to the Configure K2 Server page from which you launched Storage Utility and proceed as described in the following table:

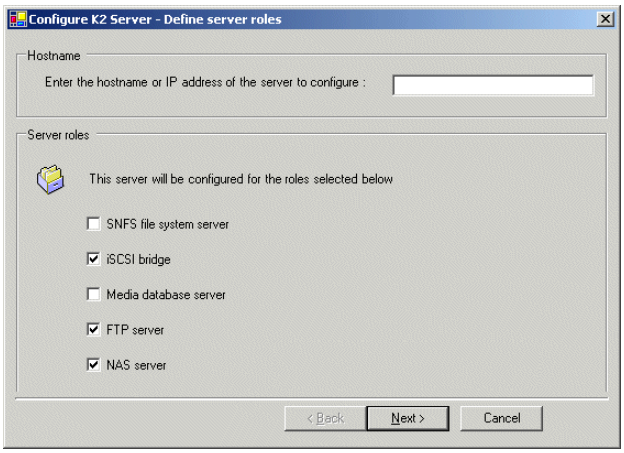
On this page…	Do this…
File System Server Configuration This page checks on the configuration of the server in one of its main roles as a file system server. The server also functions as a file system client, which is also checked from this page.	 Click **Check**. When the wizard reports that the configuration is correct, click **Next**. If you get a "The V: will not be available until this device is rebooted…" message, you can safely continue with this procedure and follow the instructions related to this message later in the procedure.

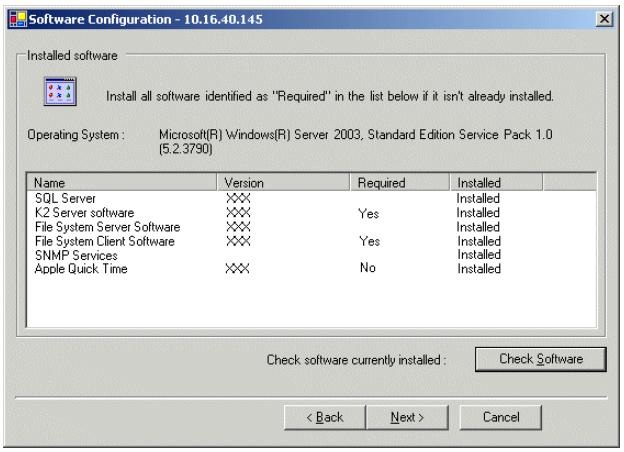
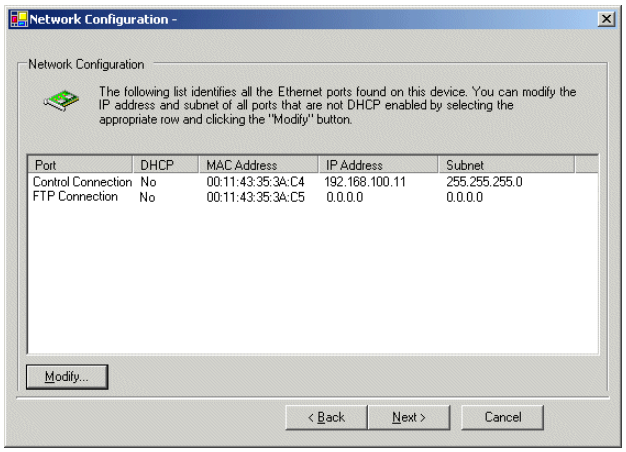
On this page…	Do this…
iSCSI Bridge Server Configuration This page manages the components that bridge between iSCSI (the GigE media network) and the Fibre Channel connection to the RAID storage. You configure network settings on the iSCSI adapters and the page validates that the Fibre Channel adapter is in place and that the media RANKs are visible as iSCSI targets.	 Select an iSCSI adapter and click **Modify**. A network configuration dialog box opens. Enter the media network IP address and the subnet mask and click **Apply**. Do the same for the other iSCSI adapter. Click **Check**. The Validation Report opens.  Confirm that the iSCSI configuration is successful. Close the Validation Report and then click **Next**.
Database Server Configuration	 You do not need to enter or configure anything on this page. Click **Next**.
Completing the Configuration Wizard	Click **Finish**. The wizard closes. The server restarts. Wait until all startup processes have completed before continuing.

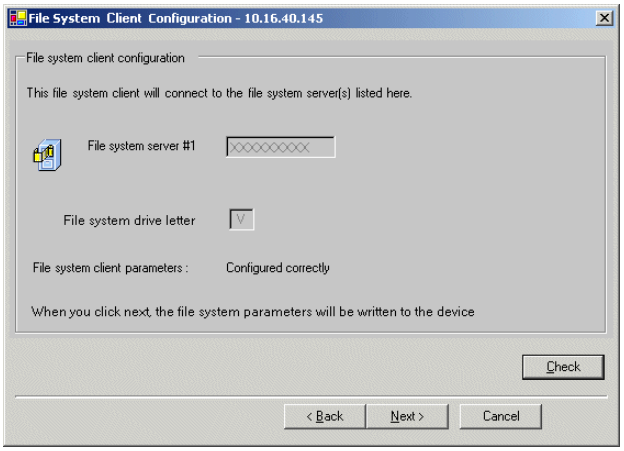
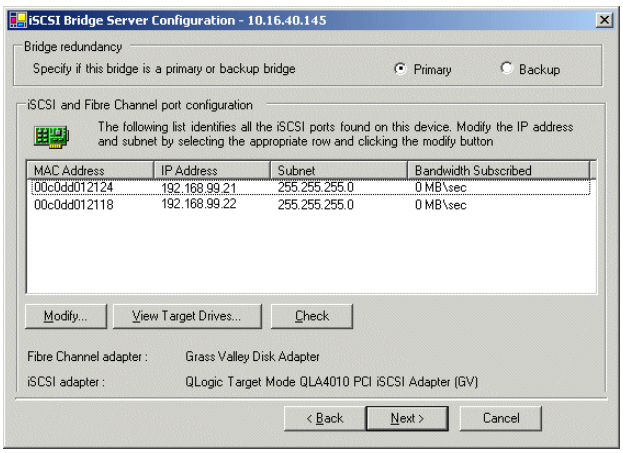
Configuring server 2

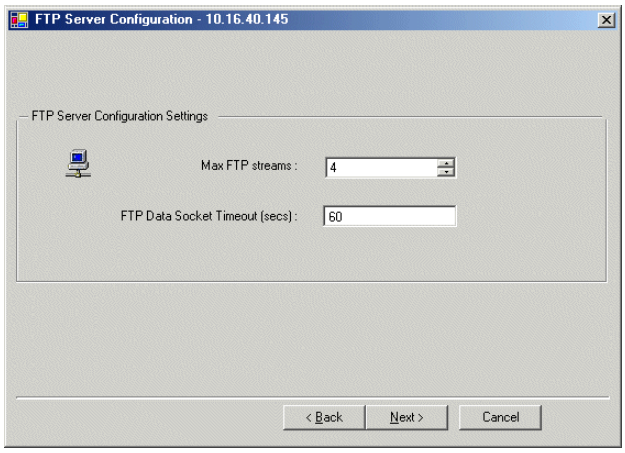
For Level 3, after you have configured your first K2 Media Server (server 1) you next configure the other K2 Media Server (server 2).

1. In the K2 System Configuration application tree view, select the K2 Media Server you are configuring as server 2.
2. Click the **Configure** button. The Configure K2 Server wizard opens. Follow the on-screen text to configure the server for a Level 3 K2 Storage System, as described in the following table. Some screens require no input from you, as they are based on the configurations already completed on a previously configured K2 Media Server.

On this page…	Do this…
Define server roles	 Enter the name for the K2 Media Server. This should be the current network name of the machine. For Level 3, select iSCSI bridge, FTP server, and NAS server. Click **Next**

On this page…	Do this…
Software Configuration This page checks for the software required to support the roles you selected on the previous page. Software required on a Level 3 K2 Media Server 2 is as follows: • K2 Server • File System Client • QuickTime	 If software with *Yes* in the Required column reports as *Not Installed*, you must first install it on the K2 Media Server before continuing. Refer to *Chapter 16, Managing K2 software*. After installing the software, click **Check Software**. When all required software reports as *Installed*, click **Next**.
Network Configuration This page displays the control network Ethernet port, and allows you to configure the FTP/ Streaming network Ethernet port.	 The top port is the port over which the K2 System Configuration application is communicating with the K2 Media Server. If correctly configured, it is already assigned the control network IP address, as displayed on this page. Select the other port and click **Modify**. A network configuration dialog box opens. Enter the FTP/Streaming IP address and the subnet mask and click **Apply**. Click **Next**.

On this page…	Do this…
File System Client Configuration This K2 Media Server does not function as a file system server. It does function as a file system client, which is validated from this page.	 Click **Check**. When the wizard reports that the configuration check is successful, click **Next**.
iSCSI Bridge Server Configuration This page manages the components that bridge between iSCSI (the GigE media network) and the RAID storage. You configure network settings on the iSCSI adapter and the page validates that the media RANKs are visible as iSCSI targets.	 Select **Primary**. Select an iSCSI adapter and click **Modify**. A network configuration dialog box opens. Enter the media network IP address and subnet mask and click **Apply**. Do the same for the other iSCSI adapter. To verify drives, click **Check** then **View Target Drives**. You should see all your media drives listed. Click **Next**.

On this page…	Do this…
FTP Server Configuration	 Do not modify these settings. Leave at default values of Max FTP streams = 4 and FTP Data Socket Timeout = 60. Only qualified Grass Valley personnel should specify other values, as these settings are intended for use only with custom systems designed by Grass Valley. Click **Next**
Completing the Configuration Wizard	Click **Finish**. The wizard closes. The K2 Media Server restarts. Do not proceed until restart processes are finished.

Your configurations for the Level 3 K2 Storage System are complete.

Adding K2 Storage System clients

You can add now clients, such as K2 Media Clients or Aurora Edits, to the K2 Storage System and configure them using the K2 System Configuration application.

- For Aurora Edits, refer to the *Aurora Edit Installation and Configuration Guide* for instructions.
- For K2 Media Clients, refer to *K2 Media Client System Guide* for instructions.

Basic operations for Level 3 storage

Use the following procedures as you work on your Level 3 storage system:

- “Level 3 system power-off procedure”
- “Level 3 system power-on procedure”

For other procedures refer to “Administering and maintaining the K2 Storage System” on page 687.

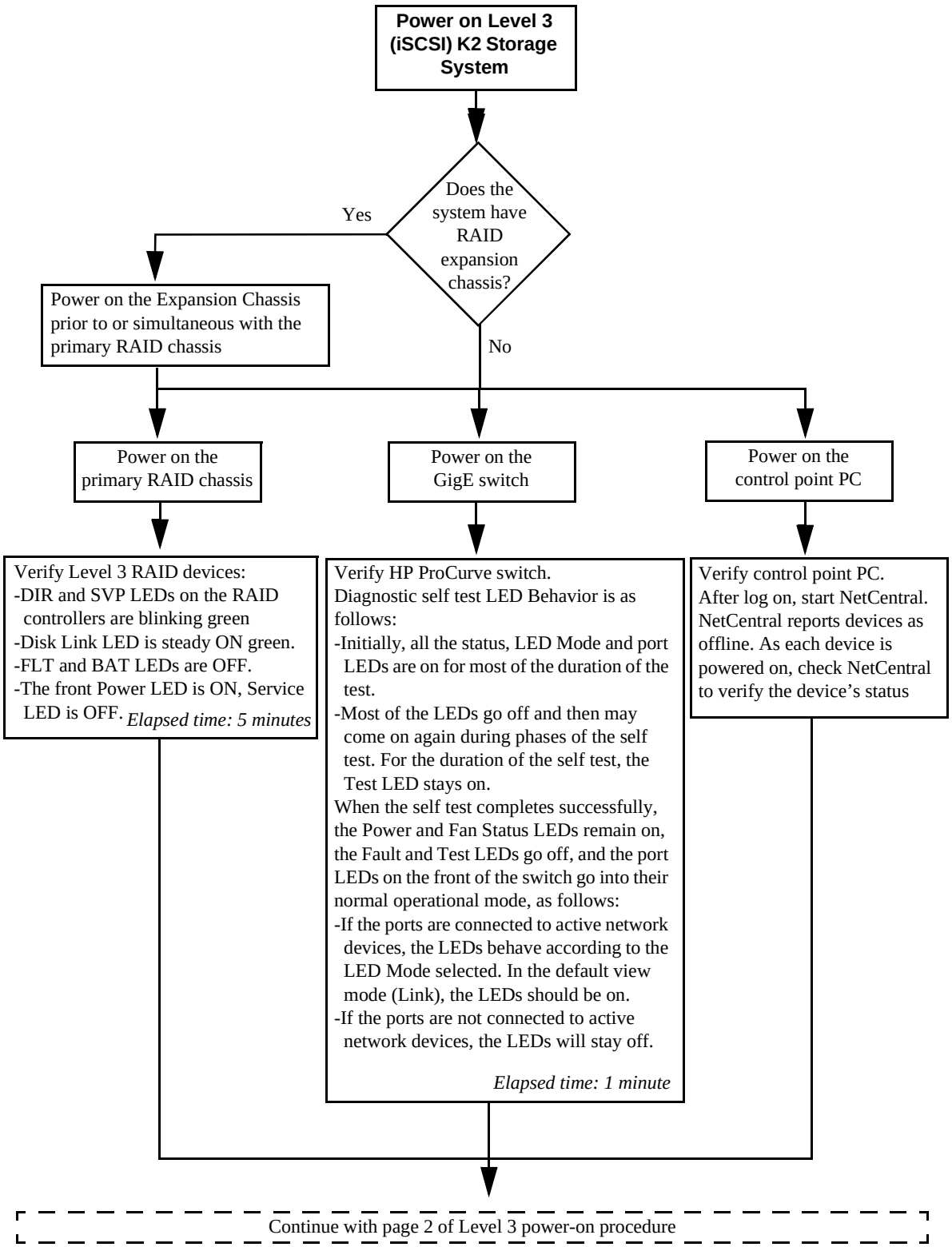
Level 3 system power-off procedure

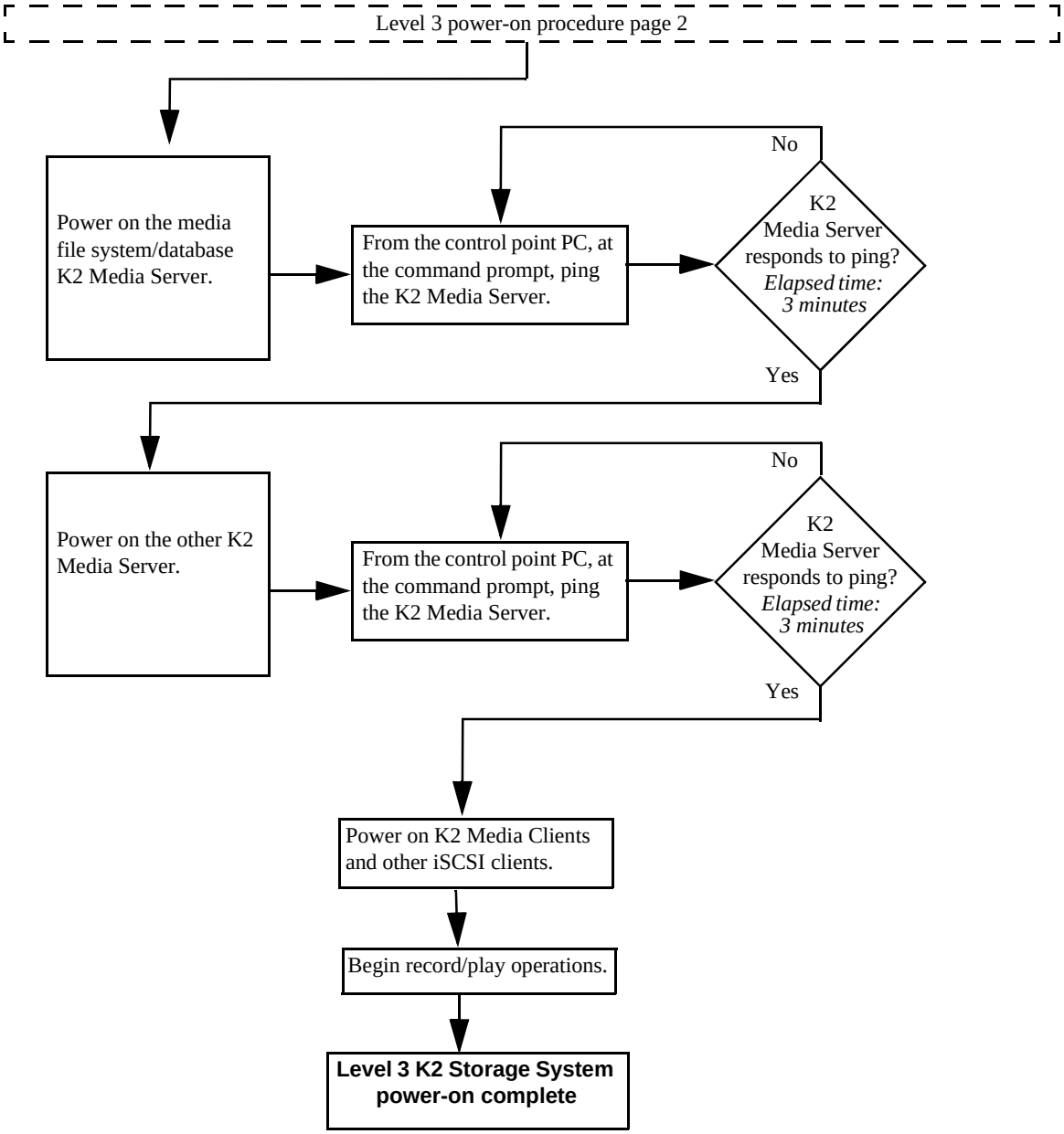
Use the following sequence to power-off the Level 3 storage system.

1. Power-off all K2 Media clients or other iSCSI clients.
2. Shut down the K2 Media Server that is the media file system and database server.

3. Shut down the K2 Media Server that is the FTP server.
4. Power-off the primary RAID controller chassis. If expansion chassis are connected, make sure the power-off of the controller chassis is prior to or simultaneous with the power-off of its connected expansion chassis. Wait approximately 30 seconds for the disk drives to spin down before proceeding.
5. Power-off all Ethernet switches.
6. Power-off the control point PC and/or the NetCentral server PC, if necessary.

Level 3 system power-on procedure




Level 3 power-on procedure page 2
Power on the media file system/database K2 Media Server.
From the control point PC, at the command prompt, ping the K2 Media Server.
K2 Media Server responds to ping? Elapsed time: 3 minutes
No
Yes
Power on the other K2 Media Server.
From the control point PC, at the command prompt, ping the K2 Media Server.
K2 Media Server responds to ping? Elapsed time: 3 minutes
No
Yes
Power on K2 Media Clients and other iSCSI clients.
Begin record/play operations.
Level 3 K2 Storage System power-on complete

Chapter 5

Installing the Level 3R Storage System

The K2 Level 3 Redundant (L3R) storage system was initially released with K2 system software version 3.0 in December 2005.

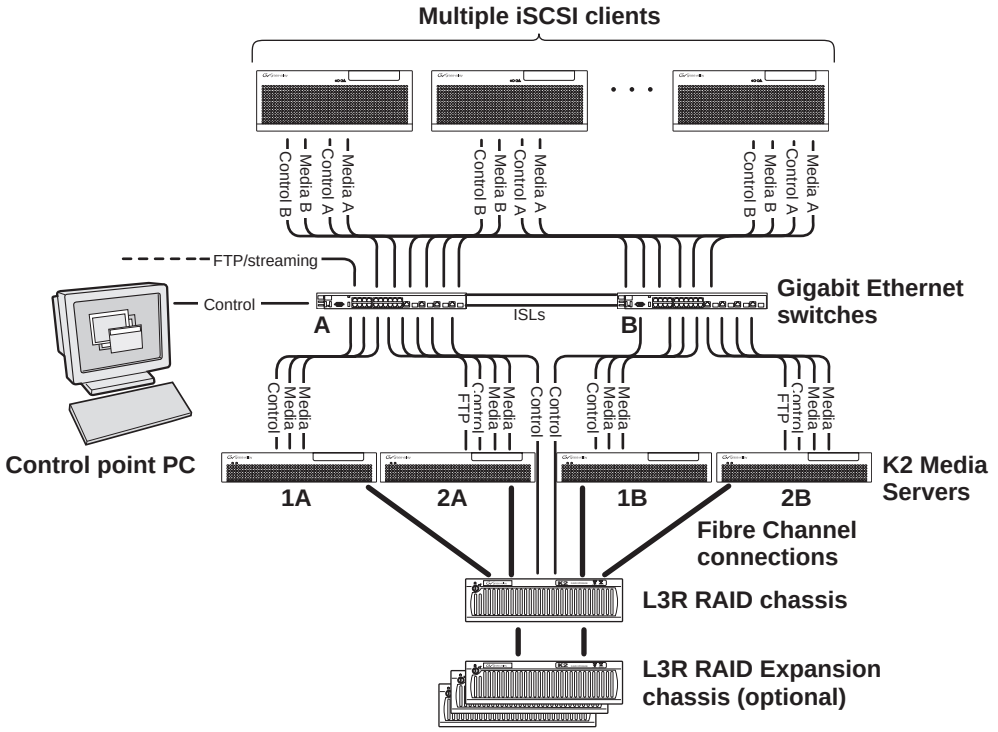
Use this chapter to install the Level 3R storage system.

This chapter includes the following topics:

- "Level 3R system description" on page 178
- "Preparing Level 3R devices" on page 179
- "Networking for Level 3R" on page 200
- "Configuring the Level 3R storage system" on page 205
- "Adding K2 Storage System clients" on page 232
- "Basic operations for Level 3R storage" on page 232

Work through these topics sequentially to install the storage system.

Level 3R system description



The Level 3 redundant (Level 3R) storage system has four K2 Media Servers. They are configured as two redundant pairs. In this diagram, servers 1A and 2A each take on a subset of the server roles. For example, server 1A takes the roles of media file system server, database server, and iSCSI bridge, while server 2A takes the roles of FTP server, NAS server, and iSCSI bridge. The four servers provide a total of four iSCSI media connections for increased bandwidth. Media server 1B is the redundant server to 1A. Media server 2B is the redundant server to 2A. In addition, the Level three redundant storage system has one L3R RAID chassis. Up to five optional Expansion chassis are available for increased storage capacity.

K2 Media Clients have a pair of redundant (teamed) Gigabit Ethernet ports for control and two Gigabit Ethernet ports (A and B) for media (iSCSI). Each port of the control team is connected to a different switch. The A media port goes to the A GigE switch and the B media port goes to the B GigE switch. The GigE switches are configured with V-LANs to keep the control/FTP and media (iSCSI) traffic separate.

Each K2 Media Server has two GigE connections for media, one GigE connection for control, and one Fibre Channel connection to the RAID storage. Only K2 Media Servers with the role of FTP server (2A and 2B) have the GigE connection for FTP. All GigE connections on a server go to the same GigE switch. The server hosts iSCSI interface cards for the GigE media connections and a Fibre Channel card for the RAID storage connection. The iSCSI interface cards provide a bridge between GigE iSCSI and Fibre Channel SCSI. Each server also runs the software components that allow it to function in its specific roles. Redundant K2 Media Servers with the role of media file system/database server are connected by a serial cable which supports the heartbeat signal required for automatic system recovery (failover) features.

The L3R RAID chassis is connected via a Fibre Channel connection to each K2 Media Server. The connections to servers 1A and 2A access the disks simultaneously for increased bandwidth. Likewise the connections to servers 1B and 2B access the disks simultaneously. In addition, since the A connections and the B connections are redundant, at most two K2 Media Servers are active at any given time. Each controller in the L3R RAID chassis is also connected to the GigE control network, which is required for SNMP (NetCentral) monitoring.

Level 3 redundant systems have both RAID 1 and RAID 5 LUNs in the RAID storage. On the Level 3 RAID chassis there are two RAID 1 LUNs for media file system metadata files and journal files. The remainder of the RAID storage is RAID 5 LUNs for media.

The K2 configuration control point PC is connected to the GigE control network. The K2 System Configuration application runs on this PC for configuring the storage system.

FTP/streaming traffic accesses the K2 Storage System via the FTP GigE port on K2 Media Servers. FTP/streaming traffic does not go to K2 Media Clients.

Refer to Chapter 14, *Description of K2 Storage Devices* for more information. Also refer to "Design considerations for Ethernet switches" on page 759.

Preparing Level 3R devices

Use the topics in this section to prepare each device so that it is ready to become part of the Level 3R storage system.

- "Setting up the Control Point PC" on page 179
- "Setting up the Level 3R redundant GigE switches" on page 180
- "Setting up the K2 Media Server" on page 191
- "Setting up the L3R RAID chassis" on page 192
- "Preparing K2 Storage System clients" on page 197

Setting up the Control Point PC

To set up the K2 configuration Control Point PC, you have the following options:

- Use the Grass Valley Control Point PC that comes from the factory with software pre-installed. This includes the K2 System Configuration application, remote AppCenter, and NetCentral software. Refer to the *K2 Media Client System Guide* for rack mount instructions.
- Use a PC that you own and install the required software.

For either option, you must do the following for the Control Point PC that runs the K2 System Configuration application:

- Assign a control network IP address to the PC. Refer to "Networking tips" on page 106.
- Connect the PC to the GigE control network.

To use your own PC, you must additionally do the following:

- Verify that the PC meets system requirements, then install the Control Point software and other supporting software, as specified in the *K2 Media Client System Guide*.
- Install and license NetCentral server software. You can install this on the NetCentral server PC, which can be the K2 configuration Control Point PC. Refer to the *NetCentral User Guide*.

Also refer to "Control point PC description" on page 650.

To fix the screen resolution problem seen with NetCentral on the Grass Valley Control Point PC, do the following:

1. Go to Display properties (right mouse selection of properties on the display area)
2. Select Settings tab
3. Select the Advanced button
4. In the General tab, set the DPI setting to Normal size (96 DPI)
5. Restart the PC

Setting up the Level 3R redundant GigE switches

These procedures are for the HP ProCurve switch.

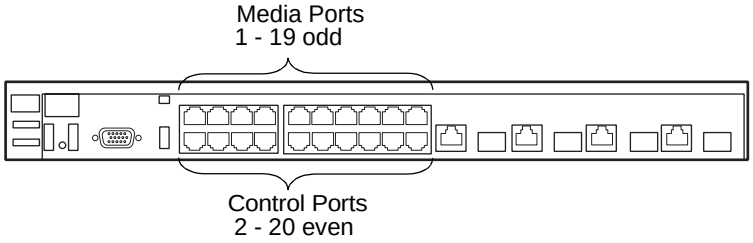
For iSCSI traffic, you must use the HP ProCurve switch. Both the 3400cl series and 2900 series switches are qualified for iSCSI traffic, and both types are fully compatible and can coexist on the network.

For control and FTP/streaming traffic, it is allowed to use a different brand of switch, such as a Cisco Catalyst switch, if required by your site. If you are using a non-HP switch, apply the information in the following procedures accordingly. Refer to the documentation you received with the switch as necessary.

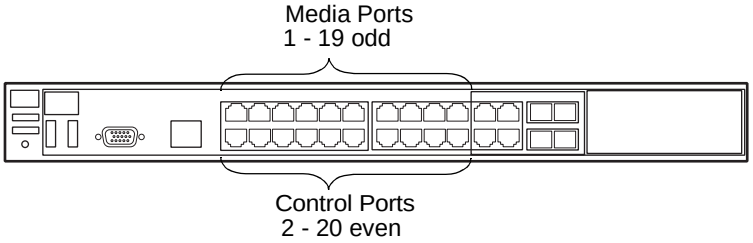
Also refer to "Design considerations for Ethernet switches" on page 759.

- You need at least two switches, so that the "A" media (iSCSI) network and the "B" media (iSCSI) network each have their own switch.
- Use CAT5e or CAT6 cables. The maximum cable length is 50 meters for CAT5e and 100 meters for CAT6.
- Assign an IP address and logon to each switch. Refer to "Configuring the GigE switch via serial connection" on page 182.
- Set up VLANs on each switch. Refer to "Configuring the GigE switch via the Web interface" on page 185.
- Install the switches in their permanent location.
- Provide power to the switches.
- Connect cables as follows:

3400cl series switch



2900 series switch



To the media ports on switch A, make the “A” media (iSCSI) network connection from each K2 Media Client. Also make two media (iSCSI) connections from K2 Media Server 1A, and two media (iSCSI) connections from K2 Media Server 2A.

To the media ports on switch B, make the “B” media (iSCSI) network connection from each K2 Media Client. Also make two media (iSCSI) connections from K2 Media Server 1B, and two media (iSCSI) connections from K2 Media Server 2B.

To the control ports on switch A, make one connection from each K2 Media Client, from RAID controller 0, and from the control point PC. Also make the control network connection and the FTP network connection from K2 Media Server 1A and from K2 Media Server 2A.

To the control ports on switch B, make the second control connection from each K2 Media Client, and from RAID controller 1. Also make the control network connection and the FTP network connection from K2 Media Server 1B and from K2 Media Server 2B.

If you have other iSCSI clients, such as Aurora Edits, that have just one iSCSI connection and one control connection, approximately half of the clients should be connected to switch A and half of the clients should be connected to switch B. In a failover event, only the clients connected to one of the switches will remain operational, so make connections accordingly. Connect the client’s iSCSI connection to one of the media ports on a switch and the client’s control connection to one of the control ports on the same switch.

Interconnect switch A and switch B with two 10 Gig ISLs.

Refer to “Level 3R system description” on page 178 for a diagram of the complete system.

Refer to cabling procedures later in this chapter for the GigE connections at each of the devices of the K2 Storage System.

Also refer to “K2 Ethernet switch description” on page 651 and “Design considerations for Ethernet switches” on page 759.

Configuring the GigE switch via serial connection

NOTE: Make sure you check the switch firmware and upgrade if necessary, as instructed at the end of this procedure.

The following procedure is for the HP ProCurve switch and applies to both the 3400cl series and 2900 series switches.

For Level 3R with two switches, do the following on each switch.

Use a direct console connection to the switch, start a console session, and access the Switch Setup screen to set the IP address.

1. Configure the PC terminal emulator on the control point PC or another PC as a DEC VT-100 (ANSI) terminal or use a VT-100 terminal, and configure either one to operate with these settings:
   - Baud rate 115200
   - 8 data bits, 1 stop bit, no parity, and flow control set to Xon/Xoff
   - Also disable (uncheck) the "Use Function, Arrow, and Ctrl Keys for Windows" option
2. Connect the PC to the switch's Console Port using the console cable included with the switch. (If your PC or terminal has a 25-pin serial connector, first attach a 9-pin to 25-pin straight-through adapter at one end of the console cable.)
3. Turn on the PC's power and start the PC terminal program.
4. Press **Enter** two or three times and you will see the copyright page and the message "Press any key to continue". Press a key, and you will then see the switch console command (CLI) prompt.

NOTE: If you press Enter too many times and get past the log in, enter the command EN to get into the command line.

5. Type the following, then press **Enter**:

   ```
   menu
   ```

   If prompted to save the current configuration, answer no (press the n key) to proceed. The main menu opens.
6. On the main menu, choose **Switch Configuration,** then press **Enter**.
7. Select **IP Configuration**, then press **Enter**.
8. Press the right-arrow key to choose **Edit**, then press **Enter**. Tab to fields and enter information as follows:
   a. Change **Gateway** to be the default router.
   b. Tab to the **IP Config (DHCP/Bootp)** field and use the Space bar to select the **Manual** option.
   c. Tab to the **IP Address** field and enter the switch's control network IP address. Refer to "Networking tips" on page 106.
   d. Tab to the **Subnet Mask** field and enter the subnet mask used for your network.

9. Press **Enter**, then right-arrow to **Save**. Press **Enter** and revert to previous menu.
10. Select **Return to Main Menu** and press **Enter**.
11. From the main menu, chose **Console Passwords** and press **Enter**. The Set Password Menu opens.
12. Chose **Set Manager Password** and press **Enter**.
13. When prompted for the password, type a password of up to 16 ASCII characters with no spaces and press **Enter**. The password can be one that is used on other K2 devices, such as “adminK2” or “K2admin”, or it can be your site's administrator password.
14. When prompted to enter the password again, retype the password and press **Enter**.
15. Select **Return to Main Menu** and press **Enter**.
16. From the main menu, tab to **Command Line (CLI)** and press **Enter**. The command prompt appears.
17. Type the following, then press **Enter**:

    ```
    configure
    ```

    You are now in configuration mode.
18. Configure an administrator username. The username can be one that is used on other K2 devices, such as “administrator” or “K2admin”, or it can be your site's administrator username. For example, to set the username to “administrator” type the following, then press **Enter**:

    ```
    password manager user-name administrator
    ```
19. When prompted, enter and re-enter the password.
20. Set spanning tree to RSTP. Type the following, then press **Enter**:

    ```
    spanning-tree force-version rstp-operation
    ```

    This configures spanning tree, but it does not turn spanning tree on. You must turn spanning tree on using the switch’s Web interface, as explained in the next procedure “Configuring the GigE switch via the Web interface”.
21. Decide your SNMP community name as explained in the following options, then proceed with the next step:

    - If you decide to use a unique SNMP community name (not “public”), add the community and set its RW permissions. For example, if the community name is “K2”, type the following, then press **Enter**:

      ```
      snmp-server community K2 unrestricted
      ```

    - If you decide to use the default SNMP community “public” for NetCentral monitoring, which already has RW permissions set as required by NetCentral, proceed to the next step.
22. Enter the SNMP community and IP address of the NetCentral server PC. For example, if the IP address is “192.168.40.11” and the community is “public”, you type the following, then press **Enter**:

    ```
    snmp-server host public 192.168.40.11
    ```

23. Enable Authentication traps. Type the following, then press **Enter**:

```
snmp-server enable traps authentication
```

This allows NetCentral to test the switch to verify that it can send its SNMP trap messages to NetCentral.

24. Type the following, then press **Enter**:

```
menu
```

When prompted, save the configuration by pressing the y key. The main menu opens.

25. If you need a trunk for ISLs to gang switches together, use the following steps. These steps illustrate trunking the last three 1 Gig ports for three 1 Gig ISLs, which is the recommended configuration for ISLs on all multi-switch K2 Storage Systems. Refer to "Design considerations for Ethernet switches" on page 759 and consult with your Grass Valley representative if your requirements deviate from the recommended policy:

    a. At the main menu, select **Switch Configuration** and press **Enter**.

    b. Choose selection **Port/Trunk Settings** and press **Enter**.

    c. Press the right-arrow key to choose **Edit**, then press **Enter**.

    d. Down arrow until at the bottom of the list of ports and select the last (highest port number) 1 Gig port in the list.

    e. Right-arrow over to the Group column.

    f. Use the Space bar and set the bottom 1 Gig port to **Trk1**.

    g. Set the next port up also to **Trk1**.

    h. Set the next port up also to **Trk1**.

    i. Press **Enter**, then right-arrow to **Save**. Press **Enter** and revert to previous menu.

26. Select **Return to Main Menu** and press **Enter**.

27. From the main menu, tab to **Command Line (CLI)** and press **Enter**. The command prompt appears.

28. Check the version of firmware currently installed on the switch. Type the following, then press **Enter**:

```
show flash
```

Information is displayed similar to the following example:

```
HP_iSCSI_switch1# show flash
Image            Size(Bytes)    Date    Version
-----            -----------  --------  -------
Primary Image    : 3287779    03/15/05  M.08.66
Secondary Image  : 3287779    03/15/05  M.08.66
Boot Rom Version: I.08.07
Current Boot     : Primary
```

29. Check the Primary Image Version and refer to your *K2 Storage System Release Notes* for information about currently supported versions. Then proceed as follows:
    - If *K2 Storage System Release Notes* instruct you to change the firmware on the switch, do so before continuing. Refer to the documentation you received with the switch for instructions to change the firmware. Then continue with the next procedure "Configuring the GigE switch via the Web interface".
    - If *K2 Storage System Release Notes* confirm that the version on the switch is a currently supported version, continue with the next procedure.
30. Type the following, then press **Enter**:

    ```
    menu
    ```

    The main menu opens.
31. From the main menu, choose **Reboot Switch** and press **Enter**. When prompted "Continue Reboot…?', answer yes (press the y key) to proceed. The switch restarts.
32. You can now use the switch's web browser interface for further configuration, as instructed in the next procedure.
33. Close the PC terminal program and disconnect the console cable.
34. Repeat this procedure on the other switch.

Continue with the next procedure "Configuring the GigE switch via the Web interface".

Configuring the GigE switch via the Web interface

The following procedure is for the HP ProCurve switch and applies to both the 3400cl series and 2900 series switches.

For Level 3R with two switches, do the following on each switch.

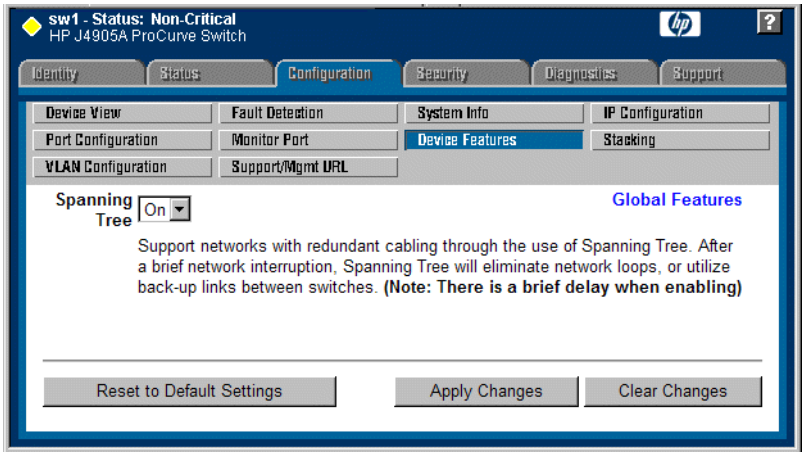
1. From the control point PC or another PC, make sure that you have a direct Ethernet cable connection to the switch, with no switches, routers, proxies, or other networking devices in between.
2. On the PC, open Internet Explorer and type the switch's IP address in the Address field, as in the following example.

   ```
   http://192.168.100.61
   ```

   This should be the name or IP address as currently configured on the switch.
3. Press **Enter** to open the switch's configuration application.

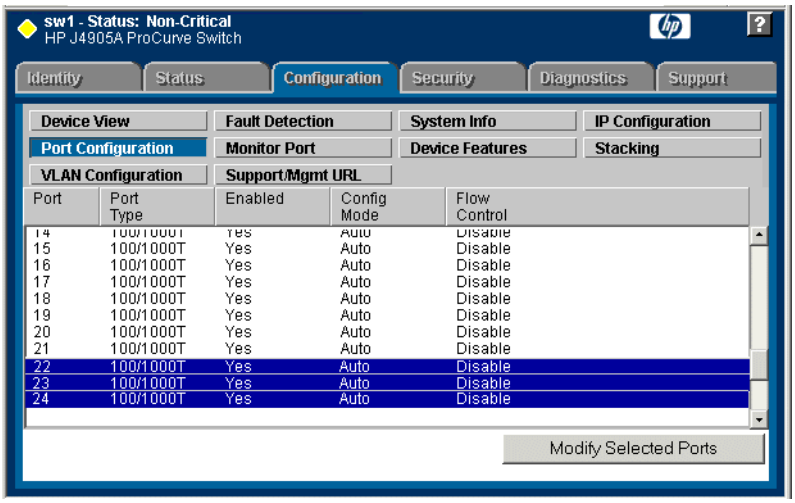
   NOTE: The configuration application for the HP ProCurve switch requires Java.

   You can also access the switch's configuration application from the K2 System Configuration application.
4. In the switch's configuration application, choose **Configuration**, then **Device Features**.



5. Set Spanning Tree to **On** and click **Apply Changes**. If prompted, log in with the switch's administrator username and password.

6. Click **Port Configuration**.

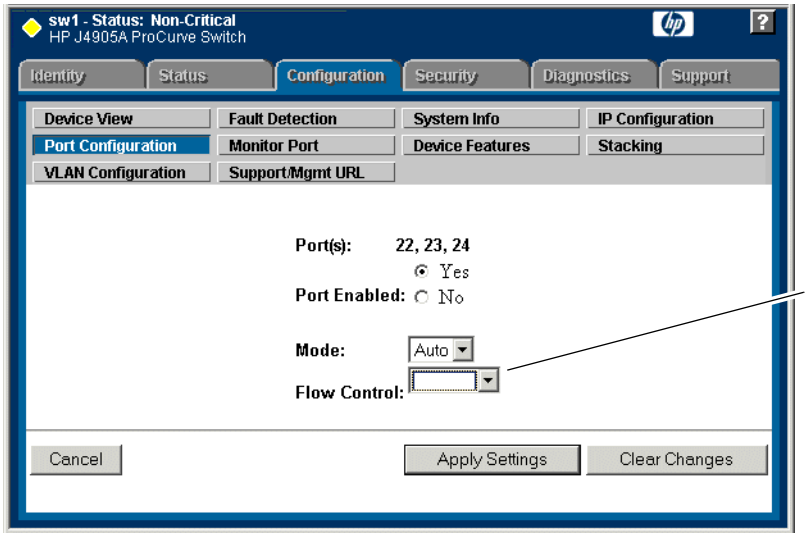


7. If you do not need trunks, such as on a one-switch system, skip to the next step in this procedure. If you need trunks, such as on a two-switch system with ISLs, do the following:

   a. Select (Ctrl + Click) the trunked ports. Typically the trunked ports are at the bottom of the list and are labeled Trk1.

   b. Click **Modify Selected Ports**.

      If prompted, log in as administrator.



c. For the trunked ports, set Port Enabled to **Yes**. On some switch models, some ports are disabled by default, so make sure you enable them. Leave Mode as default of **Auto**.

d. Set Flow Control as follows:

   - For the 3400cl series switch, set to **Disable**.
   - For the 2900 series switch, set to **Enable**.

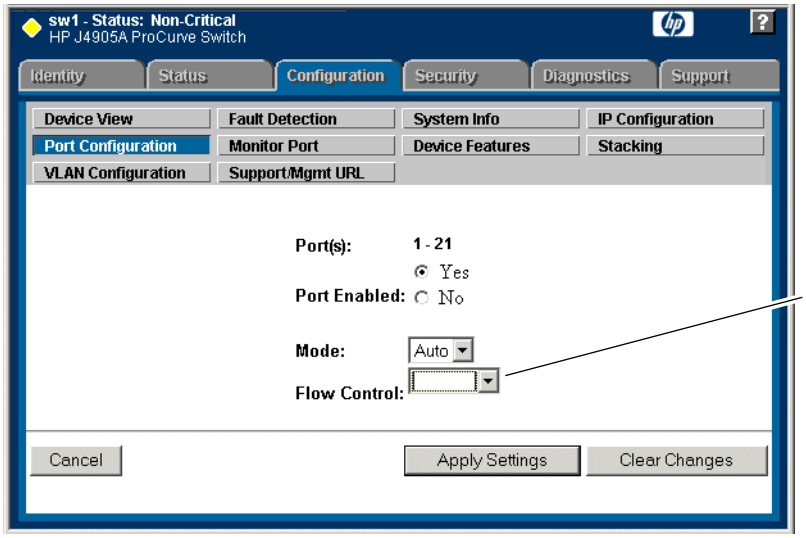
   If you have both 3400cl series and 2900 series on your network, having different Flow Control settings (disable for 3400cl, enable for 2900) does not cause problems.

e. Click **Apply Settings**.

8. On the Port Configuration page, do one of the following:

   - If you do not have trunks, select all ports.
   - If you have trunks, select the remaining ports (the ports not trunked).

9. Click **Modify Selected Ports**.



10. Make sure Port Enabled is set to **Yes**, leave Mode as default of **Auto**.

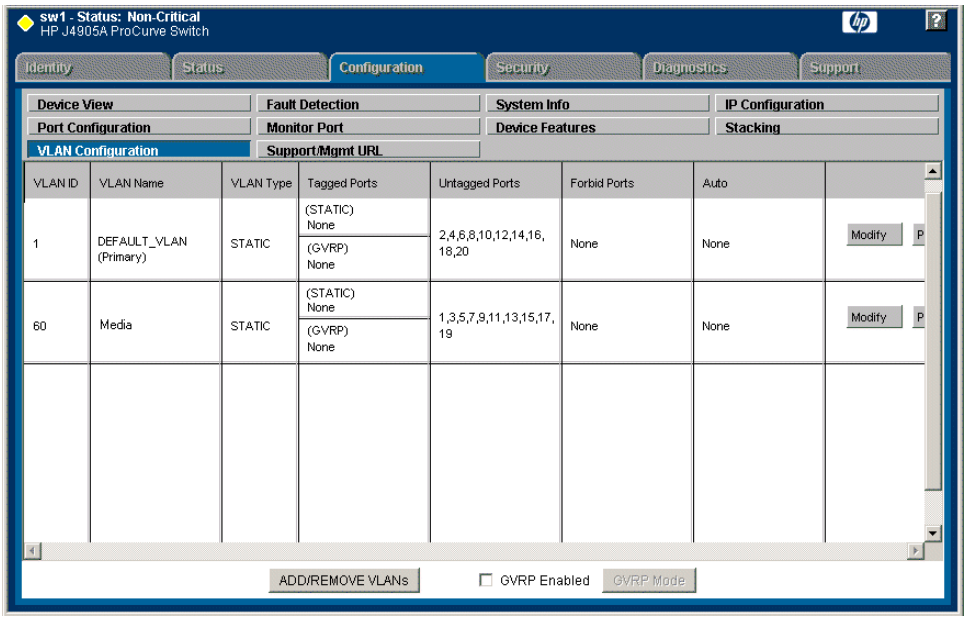
11. Set Flow Control as follows:

    - For the 3400cl series switch, set to **Disable**.
    - For the 2900 series switch, set to **Enable**.

    If you have both 3400cl series and 2900 series on your network, having different Flow Control settings (disable for 3400cl, enable for 2900) does not cause problems.

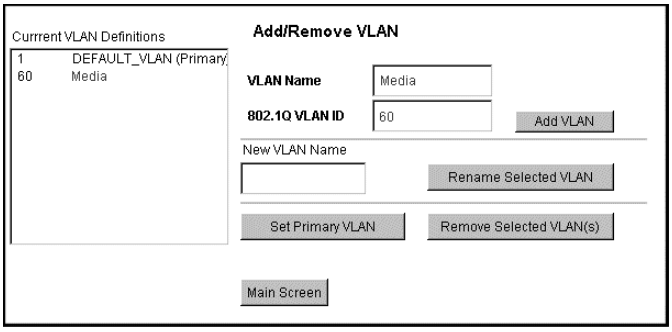
12. Click **Apply Settings**. Wait until settings are applied and the Web interface becomes active.

13. Choose **VLAN Configuration**. If prompted, log in with the switch's administrator username and password.



14. Create a new Media (iSCSI) VLAN as follows:

    a. Click **Add/Remove VLANs**.



    b. In the VLAN Name field enter `Media`.

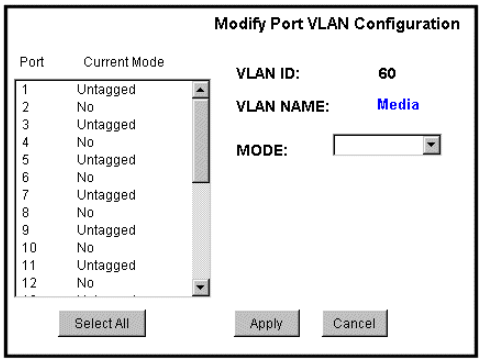
    c. In the VLAN ID field enter `60`.

    d. Click **Add VLAN**.

    e. Click **Main Screen** to return to VLAN Configuration.

15. Configure the Media VLAN as follows:

    a. In the Media VLAN row, click **Modify**.



b. Select all the odd numbered ports. (Tip: Use Ctrl + Click.)

c. In the Mode drop-down list, select **Untagged**, then click **Apply**. This removes the odd ports from the default (Control) VLAN.

   If you have a trunk, do not configure it as "Tagged". Media VLAN traffic (iSCSI) does not go over the trunk.

16. Click the **VLAN Configuration** tab.

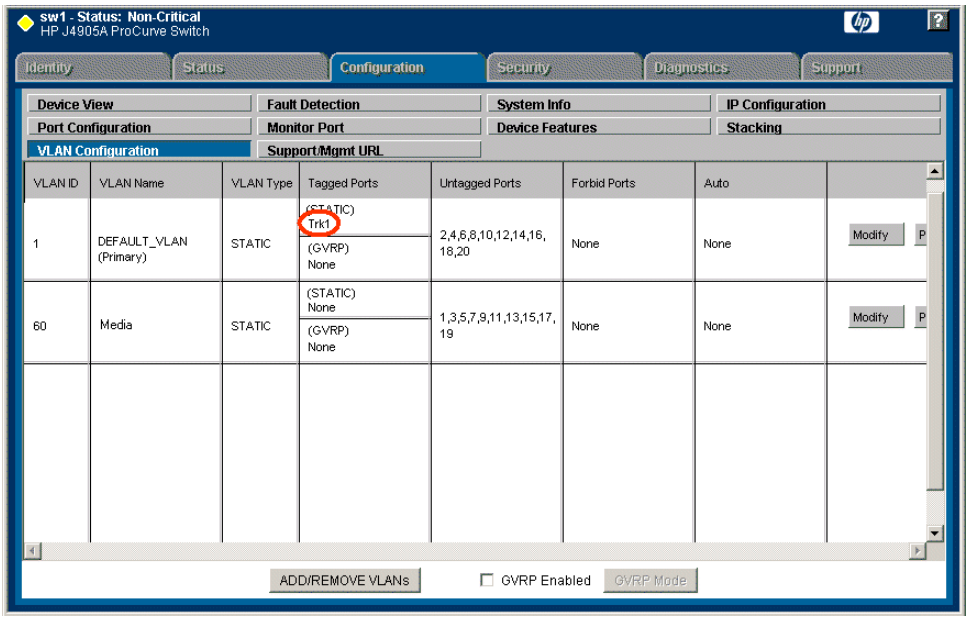
17. If you have a trunk, configure the default (Control) VLAN as follows:

    a. In the DEFAULT_VLAN row, click **Modify**.

    b. In the Current Mode list box, scroll down and select the trunk.

    c. In the Mode drop-down list, select **Tagged**, then click **Apply**. This allows default VLAN traffic (non-iSCSI) to go over the trunk.

18. Click the **VLAN Configuration** tab.



19. If you have a trunk, verify that for the default VLAN the trunk is displayed in the Tagged Ports column.
20. If you have two switches, repeat this procedure for the other switch.
21. Close the switch configuration application.

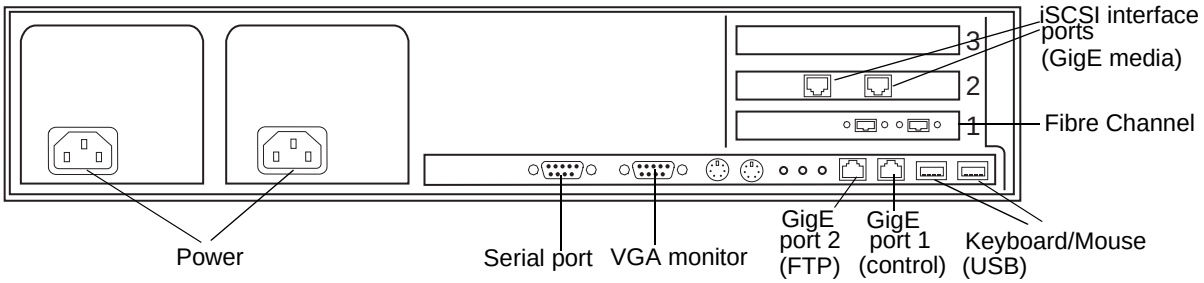
Setting up the K2 Media Server

Both the Dell PowerEdge 2850 and the Dell PowerEdge 2950 are qualified as platforms for the K2 Media Server. This section provides information on both platforms.

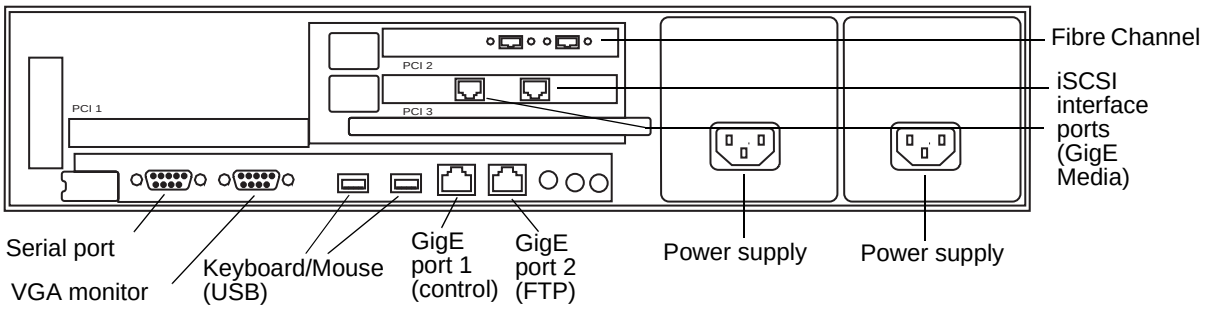
Do the following to prepare a K2 Media Server:

- Install the server in its permanent location. Refer to the rack mount instructions that you received with the server's product bundle.
- Provide power to the servers.
- Connect cables as follows:

Dell 2850 PowerEdge server



Dell 2950 PowerEdge server



Connect the two iSCSI interface ports to media ports on the GigE switch. Connect A servers to the A GigE switch. Connect B servers to the B GigE switch.

Connect the motherboard GigE port 1 and GigE port 2 to control ports on the GigE switch. Connect A servers to the A GigE switch. Connect B servers to the B GigE switch.

Connect one of the Fibre Channel ports to the RAID storage device.

Make a direct connection between the serial ports of redundant server pairs. Connect server 1A to server 1B, and connect server 2A to server 2B.

Take care to use the proper serial cable to interconnect redundant K2 Media Servers that take the role of file system/database servers. This cable supports the heartbeat mechanism whereby the servers monitor each other's health. It is a 9 pin serial cable, but it is not a standard RS-232 null modem cable. The heartbeat cable is supplied with your system (Grass Valley part number 174-8137-00) and has a pin configuration as follows:

1 – 4

2 – 3

3 – 2

4 – 1&6

5 – 5

6 – 4

7 – 8

8 – 7

9 – No Connect

- Assign a control network IP address to GigE port 1. Use standard Windows procedures. Refer to "Networking tips".
- Change the hostname. Use standard Windows procedures.
- Configure SNMP properties so the trap destination points to the NetCentral server PC. Use standard Windows procedures. If you are not using the SNMP community name "public", configure the community name and set permissions to RW. Also make sure that the Authentication trap is enabled.

Also refer to "K2 Media Server descriptions" on page 653.

Setting up the L3R RAID chassis

Do the following to prepare the L3R RAID storage devices:

- Install the chassis in its permanent location. Refer to the *L3R RAID Instruction Manual* for rack mount instructions.
- "Assign Fibre Channel address ID" on page 193.
- "Connect the L3R RAID chassis" on page 193
- "Assign chassis address on Expansion chassis" on page 195.
- "Power on the L3R RAID chassis" on page 197

In addition, you will configure network settings, SNMP settings, and bind LUNs. These tasks are part of the K2 System Configuration application and Storage Utility procedures later in this chapter. The process of binding LUNs can take a significant amount of time—as much as eight hours—so you might want to put priority on the tasks necessary to start the LUN binding process, then catch up with other tasks while the LUNs are binding.

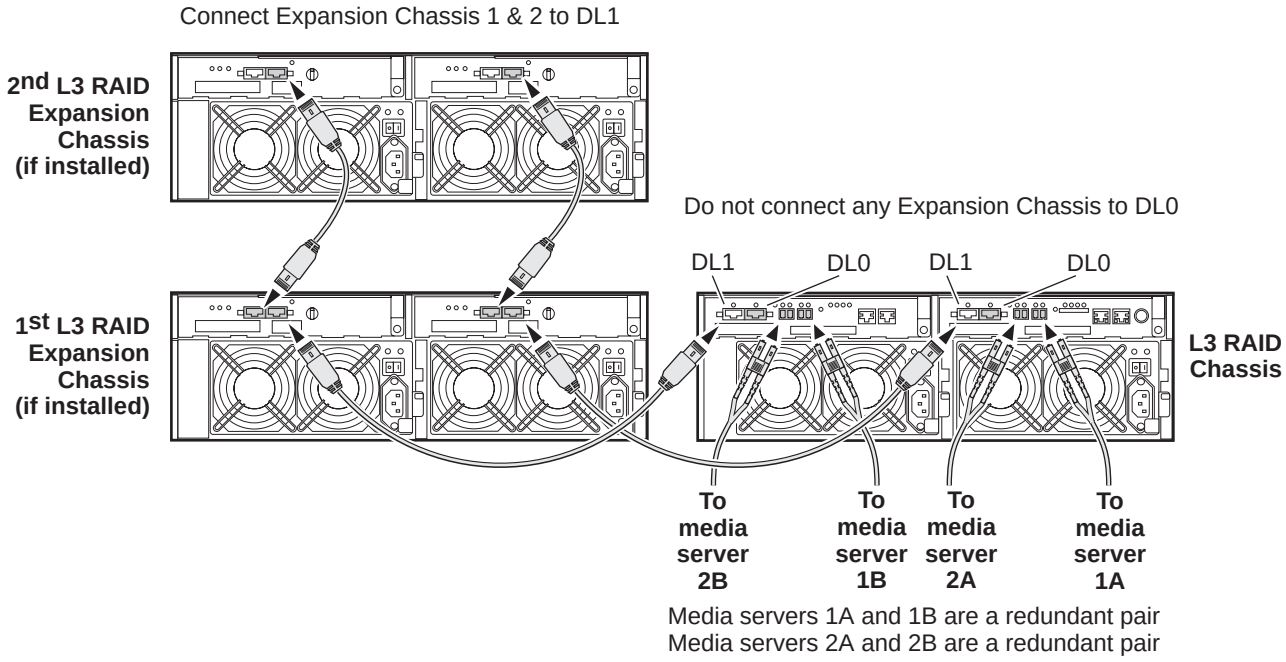
Assign Fibre Channel address ID

Every RAID controller must have a unique Fibre Channel address ID that identifies the controller on the Fibre Channel fabric. On the L3R RAID, you do not need to manually set the Fibre Channel address ID, as it is pre-set at the factory.

Connect the L3R RAID chassis

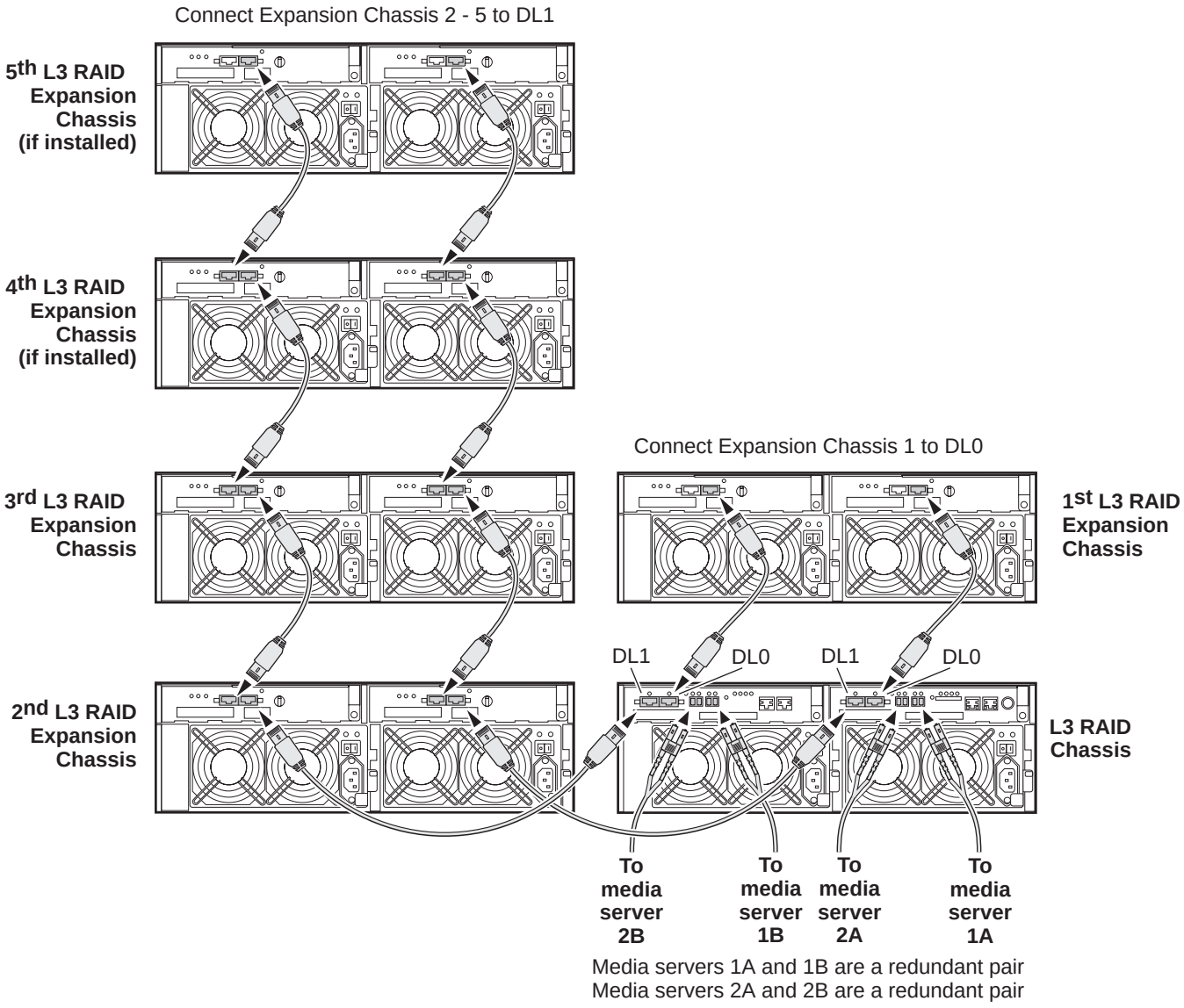
If you have one or two expansion chassis, connect RAID storage for a Level 3 redundant system as follows:

Connect Fibre Channel cabling.



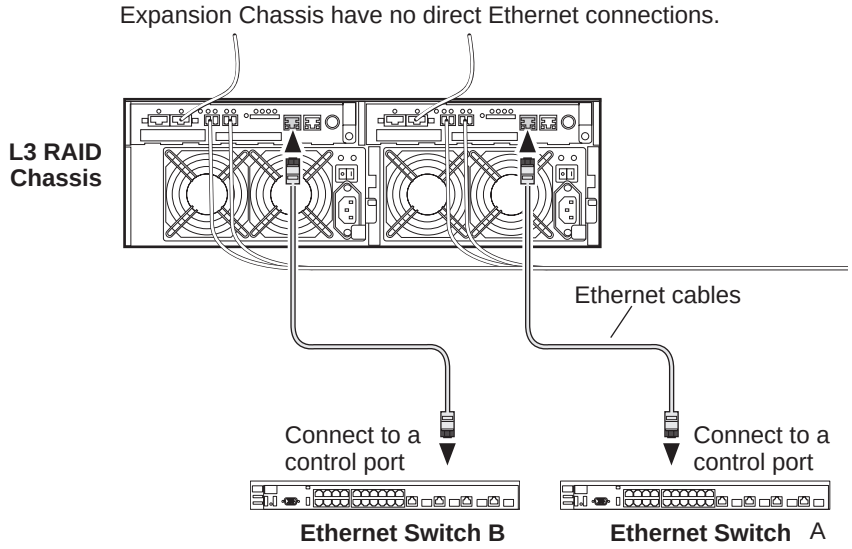
If you have three or more expansion chassis, connect RAID storage for a Level 3 redundant system as follows:

Connect Fibre Channel cabling.



Connect Ethernet cabling as shown in the following diagram.

Install L3 RAID Ethernet cabling as shown.

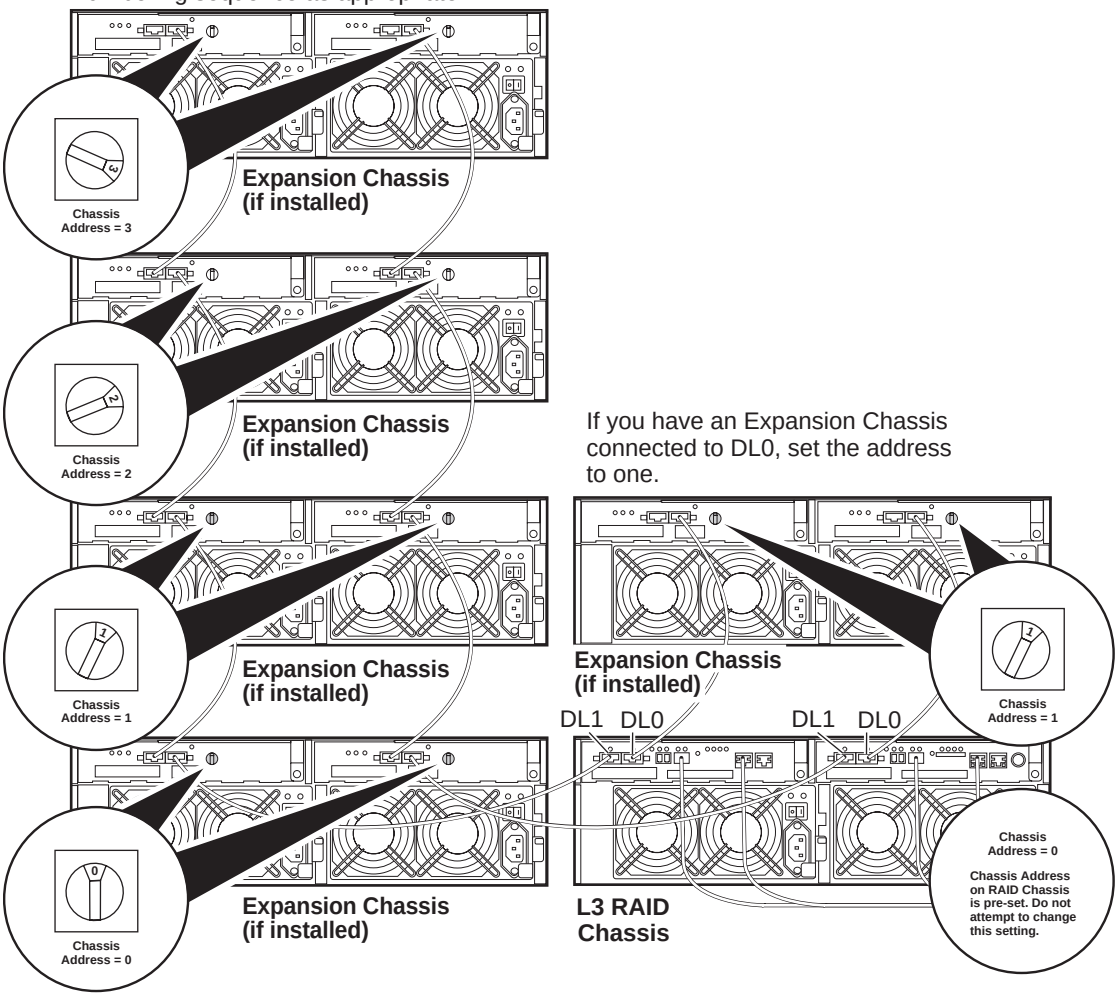


Assign chassis address on Expansion chassis

Every chassis must have a chassis address. The Level three RAID chassis address is fixed at 0, so no configuration is required. However, if you have any L3R RAID Expansion chassis you must set their chassis addresses as shown in the following illustration. One each Expansion Chassis, set the same address on both Expansion adapters, regardless of whether or not the second Expansion adapter is connected to a second RAID controller.

On each L3 RAID Expansion Chassis (if installed) set the same chassis address on both Expansion adapters.

The Expansion Chassis in this column are connected to DL1. If you have more chassis than shown here, continue the numbering sequence as appropriate.

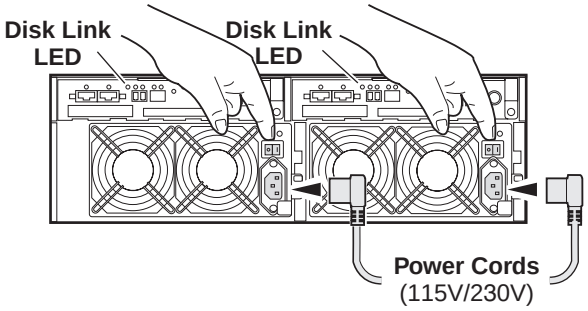


Regardless of how many Expansion Chassis you have or the DL0/DL1 connection pattern, for the first Expansion Chassis connected to DL1, set the Chassis Address to 0. Then on the remaining Expansion Chassis connected to DL1, set Chassis Addresses sequentially.

Do not swap Expansion chassis or otherwise reconfigure storage. If you connect a L3R RAID Expansion chassis to the wrong controller such that the Expansion chassis contains disk modules that were bound using a different controller you will lose your media file system.

Power on the L3R RAID chassis

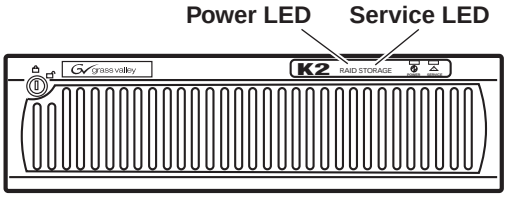
Connect power cords, and turn on power as shown. You must power-up any RAID Expansion chassis prior to, or at the same time as the RAID Controller chassis. Verify power-up as shown.



Power-up Verification

- DIR and SVP LEDs on the RAID controllers are blinking green
- Disk Link LED is steady ON green.
- FLT and BAT LEDs are OFF.
- The front Power LED is ON, Service LED is OFF after about 5 minutes.

  Refer to the *L3 RAID Instruction Manual* if there is a problem.



Your preparations for L3R RAID storage are now complete.

Preparing K2 Storage System clients

Any devices that function as iSCSI clients to the K2 Storage System must be prepared with the following requirements:

- One or more connections to the control network.
- A static IP address for the control network.

Additional steps that are required for Aurora Edits include the following:

- Implement Aurora Edit security features.
- Install SNFS software and K2 software.

For more information, refer to the *Aurora Edit Installation and Configuration Guide*.

Additional steps that are required for K2 Media Clients include the following:

- You must install Multi-path I/O software if the K2 Media Client connects to the K2 Storage System with a redundant Ethernet (iSCSI) fabric. For example, the following K2 Storage Systems have a redundant Ethernet fabric:
  - Level 2R
  - Level 3R
  - Level 10R
  - Level 20R
  - Level 30R

For more information refer to the *K2 Media Client System Guide*.

K2 configuration and NetCentral

Before you begin using the K2 System Configuration application to configure the storage system, you should set up the NetCentral system according to the following requirements:

- **NetCentral installed** — NetCentral server software must be installed on a NetCentral server PC. This can be the K2 configuration Control Point PC or another PC that has network communication with the K2 Storage System control network.
- **Device providers installed** — A device provider must be installed on the NetCentral server PC for each type of device in the K2 Storage System. For a Level 3R storage system, the following device providers must be installed:
  - Control point PC device provider — This is the Windows monitoring device provider.
  - K2 Media Server device provider
  - HP Gigabit Switch device provider or Cisco Gigabit Switch device provider
  - K2 Media Client device provider, if any K2 Media Clients are accessing the Level 3R storage system.
  - Device provider for iSCSI clients, if any iSCSI clients such as Aurora Edits are accessing the Level 3R storage system.
  - K2 Level 2/Level 3 RAID storage device provider. This device provider supports both Level 2 and Level 3 RAID devices.
- **Grass Valley PC Monitoring software installed** — This software must be installed on the K2 configuration Control Point PC. It includes Grass Valley SNMP agents and other WMI based components to perform process monitoring. This provides the information for some of the SNMP trap messages that must be sent to NetCentral.
- **Control Point PC monitored by NetCentral** — The K2 configuration Control Point PC should be added to the NetCentral system and fully monitored by NetCentral. This means that its SNMP trap destination is set to send SNMP traps to the NetCentral server PC. Whether the Control Point PC and the NetCentral server PC are the same PC or are different PCs, you should still add the Control Point PC to

NetCentral.

Refer to the *NetCentral User Guide* to set up the NetCentral system. After installing a device provider, you can find additional documentation about monitoring that type of device on the NetCentral Help menu.

Networking for Level 3R

Use the topics in this section to configure the Gigabit Ethernet (GigE) network for the Level 3R storage system.

- "Networking requirements" on page 200
- "Networking tips" on page 201
- "Setting up host tables" on page 202
- "Testing the control network" on page 204

Networking requirements

Required networking strategies for a Level 3R (a redundant K2 Storage System) are as follows:

- Four networks:
  - Media network A — Exclusively for iSCSI traffic. For failover purposes, this network restricts traffic between an "A" media port on a K2 Media Client and the "A" K2 Media Server with the role of media file system/database server.
  - Media network B — Exclusively for iSCSI traffic. For failover purposes, this network restricts traffic between a "B" media port on a K2 Media Client and the "B" K2 Media Server with the role of media file system/database server.
  - Streaming/FTP network — For media transfers and FTP traffic.
  - Control network — For all other non-streaming, non-iSCSI traffic.
- Networks must be on separate subnets.
- The real-time iSCSI traffic of the media networks (A and B) is kept separate from traffic that is not real-time, such as that of the streaming/FTP network and the control network. This separation is provided by dedicated Gigabit ports, cables, and by a dedicated VLAN on the HP GigE switch or by separate switches.
- K2 Media Servers have a dedicated FTP port. If the server takes the role of FTP server, make a dedicated FTP connection to the FTP port.
- While control and FTP traffic is each on its own subnet, it is not required that each type of traffic has its own VLAN on GigE switches. For example, you make both FTP and control connections to the "control" ports (DEFAULT_VLAN) on the HP GigE switch.
- Static IP addresses are required for the media networks on K2 Storage System iSCSI devices. This includes K2 Media Servers, generic iSCSI clients (such as Aurora Edits), and K2 Media Clients.
- Machine names (host names) assigned to each K2 device.
- Host tables (hosts files) provide name resolution on each K2 Media Client, iSCSI client, and K2 Media Server.
- IP addresses for FTP/streaming ports must have name resolution such that hostnames are appended with the "_he0" suffix. You can use host tables (as in "Setting up host tables" on page 202) or another mechanism to provide the name

resolution. This directs the streaming traffic to the correct port. Refer to the *K2 Media Client System Guide* for a complete explanation.

- K2 Media Servers in the role of FTP server must be on the streaming network, as they provide the FTP interface for shared storage streaming traffic. Shared storage K2 Media Clients do not need to be on the streaming network because they do not send or receive streaming traffic.
- On the shared storage K2 Media Client, the two control GigE ports are configured as a team. The control team shares a single IP address. Do not attempt to un-team the control ports. On the Level 3R K2 Storage System (a redundant K2 Storage System), both control ports are connected and the control team provides redundancy.
- On the shared storage K2 Media Client, the two media (iSCSI) GigE ports are not teamed. On the Level 3R K2 Storage System (a redundant K2 Storage System), both media ports are connected and each media port is assigned to a different media (iSCSI) network, which is required for redundancy.

Also refer to "About networks and FTP" on page 684 and "Design considerations for Ethernet switches" on page 759.

Use the following procedures as necessary to implement your networking strategies.

NOTE: It is recommended that you configure Media network (iSCSI) IP addresses and Streaming network IP addresses using the K2 System Configuration application, rather than doing so on the local machine using standard Windows procedures.

Networking tips

- Before beginning network configuration, determine the IP addresses and names needed for the machines in your K2 system. Work with the network administrator at your facility to have those IP addresses and names available for your use.
- Establish a consistent convention for machine names and IP addresses. It is recommended that you embed a root name or other unique identifier for this particular K2 Storage System in the computer name. Also, a common convention for IP addresses is to use a numerical pattern or sequence in the IP addresses to indicate device-types and/or ports, as in the following example:

NOTE: This example assumes a subnet mask of 255.255.255.0

Example of Level 3R names and IP addresses

Computer name	Device type	Streaming network addresses	Control network addresses	Media network addresses	Comments
root_server_1	K2 Media Server	192.168.101.11[a]	192.168.100.11	192.168.99.11	These two servers are a redundant pair. Roles include media file system server and database server.
				192.168.99.12	
root_server_2	K2 Media Server	192.168.101.21[b]	192.168.100.21	192.168.98.21	
				192.168.98.22	
root_server_3	K2 Media Server	192.168.101.31[c]	192.168.100.31	192.168.99.31	These two servers are a redundant pair. Roles include FTP server.
				192.168.99.32	
root_server_4	K2 Media Server	192.168.101.41[d]	192.168.100.41	192.168.98.41	
				192.168.98.42	
root_raid_1	RAID	—	192.168.100.51	—	Each RAID controller is on the control network for monitoring.
root_raid_2	RAID	—	192.168.100.52	—	
root_gige_1	GigE switch	—	192.168.100.61	—	—
root_gige_2	GigE switch	—	192.168.100.62	—	—
root_cppc_1	Control point PC	—	192.168.100.81	—	—
root_client_1	iSCSI client	—	192.168.100.111	192.168.99.111	For the control network, one IP address is shared between the two teamed ports. For media networks, subnet 99 is the "A" network and subnet 98 is the "B" network.
				192.168.98.112	
root_client_2	iSCSI client	—	192.168.100.121	192.168.99.121	
				192.168.98.122	
root_client_3	iSCSI client	—	192.168.100.131	192.168.99.131	
				192.168.98.132	
root_client_4	iSCSI client	—	192.168.100.141	192.168.99.141	
				192.168.98.142	

[a] This NIC is not used, since this server does not take the role of FTP server
[b] This NIC is not used, since this server does not take the role of FTP server
[c] This IP address must resolve to hostname root_server_3_he0
[d] This IP address must resolve to hostname root_server_4_he0

Setting up host tables

The *hosts* file is used by the control network and the streaming/FTP network to determine the IP address of devices on the network when only a the device name (hostname) is given. The steps that follow describe how to edit the *hosts* file located at *C:\Windows\system32\drivers\etc\hosts* on Windows XP and Windows 2003 Server operating system computers. If you include the names and addresses of all the devices on the network, then you can copy the same file onto all the other K2 devices instead of editing the *hosts* file on each K2 device.

For FTP transfers on a K2 Storage System, transfers go to/from K2 Media Servers that have the role of FTP server. No transfers go directly to/from the shared storage K2 Media Clients that are on the K2 Storage System. So in the hosts file, you must add the "he_0" extension to a K2 Media Server hostname and associate that hostname with the K2 Media Server's FTP/streaming network IP address.

Refer to the *K2 Media Client System Guide* for more information.

To edit the *hosts* file manually:

1. Open the following file using Notepad or some other text editing application:

   C:\Windows\system32\drivers\etc\hosts

2. Enter all IP addresses with machine names. The text format is simple. First type the Ethernet IP address, then use the TAB key or Space bar to insert a few spaces. Then type the machine name.

   Here is an example:

   ```
   192.168.100.11      root_server_1
   192.168.100.21      root_server_2
   192.168.100.31      root_server_3
   192.168.101.31      root_server_3_he0
   192.168.100.41      root_server_4
   192.168.101.41      root_server_4_he0
   192.168.100.51      root_raid_1
   192.168.100.61      root_gige_1
   ```

3. Save the file and exit the text editor.

4. Copy the new *hosts* file onto all the other machines. This is easier than editing the file on each machine.

Host table tips

- If transferring to or from a Profile XP or Open SAN system via UIM, the *hosts* file must also follow UIM naming conventions for those systems. Refer to the UIM Instruction Manual.

- Do not enter media (iSCSI) network IP addresses in the host table, as hostname resolution is not required for the media network.

- Use the following tip with care. While it can solve a problem, it also introduces a name resolution "anomaly" that might be confusing if not considered in future troubleshooting activities.

  For each SAN (shared storage) K2 Media Client, add the "_he0" suffix to the hostname but then associate that hostname with the K2 Media ***Server's*** FTP/streaming network IP address, ***not*** the K2 Media ***Client's*** IP address. Aliasing K2 Media Client hostnames in this way would not be required if the transfer source/destination was always correctly specified as the K2 Media Server. However, a common mistake is to attempt a transfer in which the source/destination is incorrectly specified as the K2 Media Client. The host file aliasing corrects this mistake and redirects to the K2 Media Server, which is the correct transfer source/

destination.

An example of a *hosts* file entry with this type of aliasing is as follows:

```
192.168.101.11     server_1_he0 client_1_he0 client_2_he0
```

Testing the control network

To test the control network use the *ping* command as follows:

1. On the control point PC, click **Start | Run**. The Run dialog box opens.
2. Type `cmd` and click **OK**. The command prompt window opens.
3. Type `ping`, then a space, then the name of one of your K2 Storage System devices, such as the Gigabit Ethernet switch, as in the following example:

   ```
   ping root_gige_1
   ```

4. Press **Enter**.

   The ping command should return the IP address of the device, as in the following example:

   ```
   Pinging root_gige_1.mycorp.com [192.168.100.61] with
   32 bytes of data:


   Reply from 192.168.100.61: bytes=32 time=10ms TTL=127
   Reply from 192.168.100.61: bytes=32 time<10ms TTL=127
   Reply from 192.168.100.61: bytes=32 time<10ms TTL=127
   Reply from 192.168.100.61: bytes=32 time<10ms TTL=127
   ```

   This verifies that the name of the device is being correctly resolved to the IP address, which indicates that on the Control Point PC the host table entry is correct.

5. Ping the other K2 Storage System devices to which you have assigned control network IP addresses.
6. Go to each Windows device in the K2 Storage System and repeat this procedure. This verifies that network communication is correct to and from all devices.

Configuring the Level 3R storage system

Use the topics in this section to do the initial configuration of the Level 3R storage system.

- "Prerequisites for initial configuration" on page 205
- "Defining a new K2 Storage System" on page 206
- "Configuring the server 1A - Part 1" on page 208
- "Configuring RAID" on page 211
- "Creating a new file system" on page 217
- "Configuring the server 1A - Part 2" on page 218
- "Configuring the redundant server 1B" on page 221
- "Configuring server 2A" on page 225
- "Configuring the redundant server 2B" on page 228

Prerequisites for initial configuration

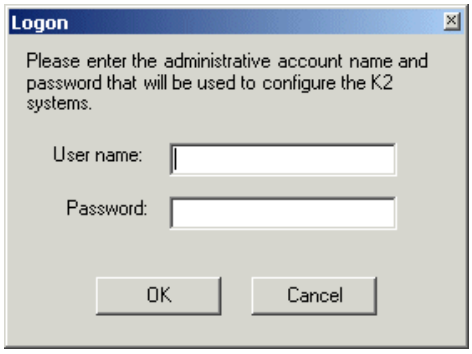
Before beginning your initial configuration, make sure the devices of the K2 Storage System meet the following prerequisites. Refer to sections earlier in this manual for detailed information. Also refer to Chapter 14, "Description of K2 Storage Devices".

Devices	Prerequisite for Level 3R configuration
Control point PC	Ethernet cable connected Control Point software installed Control network IP address assigned Network communication over the control network with all other K2 devices Power on
Ethernet switch	Ethernet cables connected Control network IP address assigned VLANs set up Trunks set up Power on
K2 Media Server	Ethernet cables connected Fibre Channel cable connected Redundant servers connected by serial cable Software installed, as from the factory, including QuickTime 7 Control network IP address assigned Power on for all servers
L3R RAID chassis	Fibre Channel address ID assigned to RAID controller(s) Fibre Channel cable(s) connected Ethernet cable(s) connected Power on
L3R RAID Expansion chassis (optional)	Chassis address assigned (for Fibre Channel) Fibre channel cable(s) connected Power on

Defining a new K2 Storage System

Define a Level 3R K2 Storage System as follows:

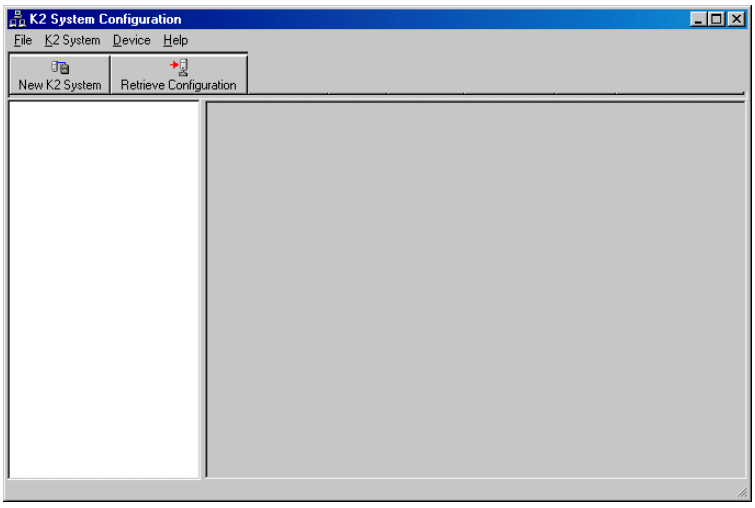
1. On the control point PC, open the K2 System Configuration application. A login dialog box opens.



2. Log in to the K2 System Configuration application with the Windows administrator account. By default this as follows:

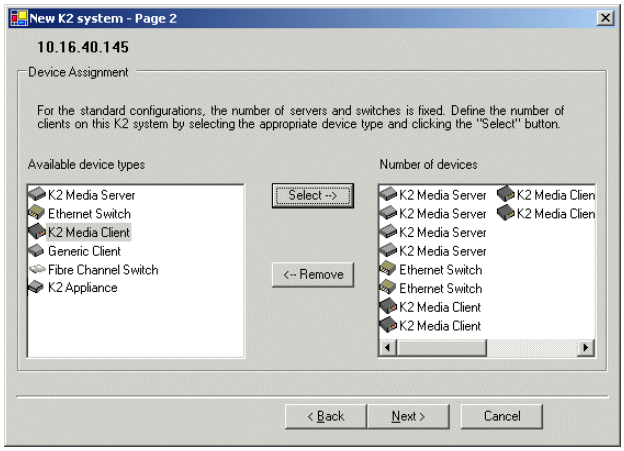
   - Username: administrator
   - Password: adminK2

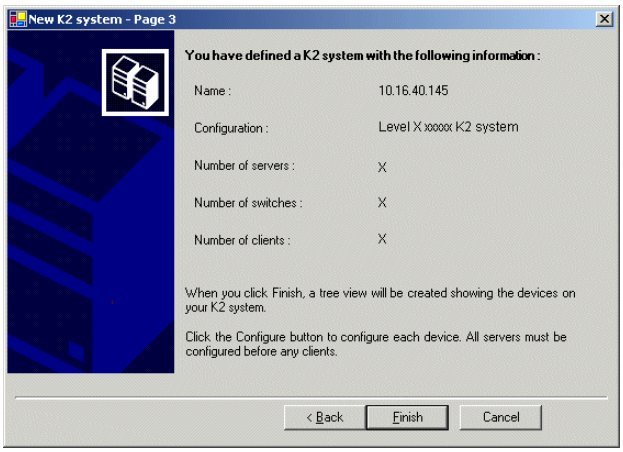
   Refer to "Setting up application security" on page 688 for more information about administrator accounts and logging in to applications.



3. Click **New K2 System**. The New K2 System wizard opens.

4. Follow the on-screen text to define your Level 3R K2 Storage System, as described in the following table.

On this page…	Do this…
Page 1	 Create a name for your Level 3R K2 Storage System and type it in the Name box. Select **Level 3**. Select the **Server redundancy** option. Click **Next**
Page 2	 Move clients into the Number of Devices box as appropriate for your system. You cannot change the number of K2 Media Servers or Ethernet Switches, as these are pre-configured based on the level you selected in the previous page. Click **Next**.

On this page...	Do this...
Page 3	 Review the information on this page and verify that you have correctly defined your K2 Storage System. For a Level 3R storage system you should have the following: • Two Gigabit Ethernet switches • Four K2 Media Servers • The number and type of clients appropriate for your system. Click **Finish**. The Define New K2 Storage System wizard closes.

Your K2 Storage System appears in the tree view of the K2 System Configuration application.

5. Continue with the next procedure.

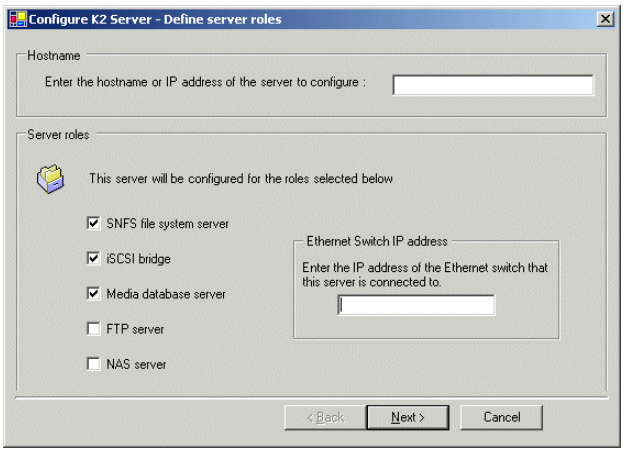
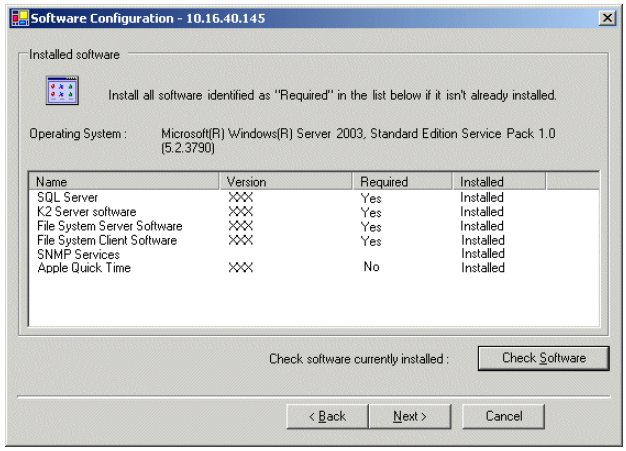
Configuring the server 1A - Part 1

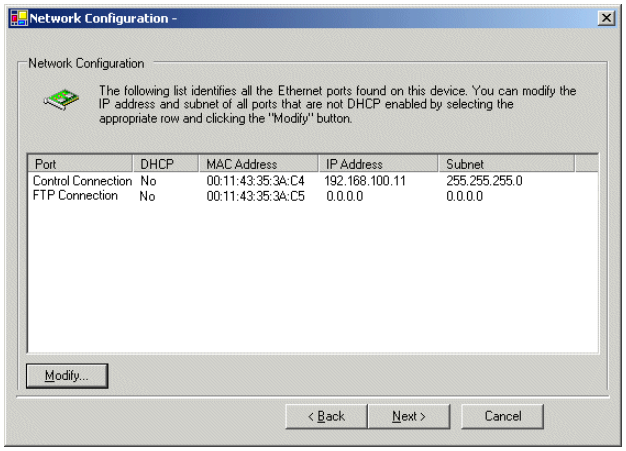
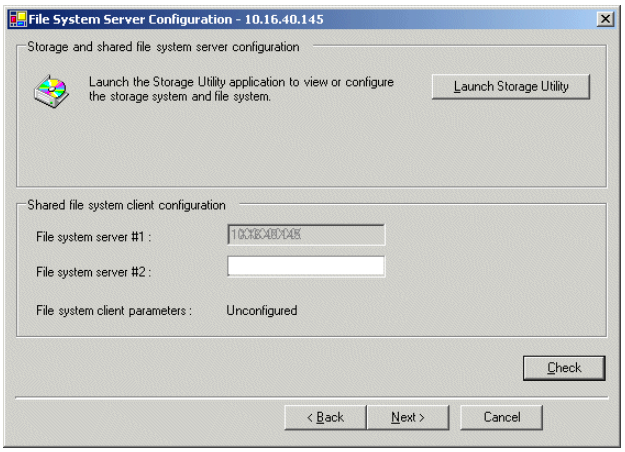
1. In the K2 System Configuration application tree view, select [**K2Server1]**.

2. Click the **Configure** button.

The Configure K2 Server wizard opens. Follow the on-screen text to configure theK2 Media Server for a Level 3R K2

Storage System, as described in the following table:

On this page…	Do this…
Define server roles	 Enter the name or IP address for the K2 Media Server, as currently configured on the machine. Enter the name or IP address of the Ethernet switch, as currently configured on the switch, to which the K2 Media Server is connected. For Level 3 redundant server roles, leave **SNFS file system server**, **iSCSI bridge**, and **Media database server** selected. Click **Next**
Software Configuration This page checks for the software required to support the roles you selected on the previous page. Software required on a Level 3R K2 Media Server 1A is as follows: • SQL Server • K2 Server • File System Server • File System Client • SNMP Services • QuickTime •	 If software with *Yes* in the Required column reports as *Not Installed*, you must first install it on the K2 Media Server before continuing. Refer to *Chapter 16, Managing K2 software*. After installing the software, click **Check Software**. When all required software reports as *Installed*, click **Next**.

On this page…	Do this…
Network Configuration This page displays the control network Ethernet port, and allows you to configure the FTP/ Streaming network Ethernet port. ***NOTE: This page does not configure the iSCSI interface (media network) ports.*** For Level 3R, since this server does not take the role of FTP server, configuring the second port here for the FTP/streaming network is not required.	 The top port is the port over which the K2 System Configuration application is communicating with the K2 Media Server. If correctly configured, it is already assigned the control network IP address, as displayed on this page. Select the other port and click **Modify**. A network configuration dialog box opens. Enter the FTP/Streaming IP address and the subnet mask and click **Apply**. Click **Next**.
File System Server Configuration	 Enter the name or IP address of the redundant K2 Media Server (server 1B). Do not yet click Next. Do not yet enter anything in the File System Server #2 box. Click **Launch Storage Manager**. Storage Utility opens.

3. Continue with the next procedure to use Storage Utility to configure the storage and file system.

   Leave the Configure K2 Server wizard open while you are using Storage Utility. When you are done with Storage Utility, you continue with the wizard.

Configuring RAID

Use Storage Utility to complete the configuration of the L3R RAID chassis, as explained in the following topics:

- "Configuring RAID network and SNMP settings"
- "Binding disk modules"

Refer to "Prerequisites for initial configuration" on page 205 to confirm that the RAID storage is ready for configuration.

Configuring RAID network and SNMP settings

Use the Storage Utility to configure the following settings for the Level 3R RAID controllers:

- IP address
- Subnet mask
- Gateway Address
- SNMP trap destinations

For L3R RAID, network and SNMP settings are set and stored on the RAID controller module. For the RAID chassis with two controllers, each controller has its own network settings and the RAID chassis exists as two entities on the control network.

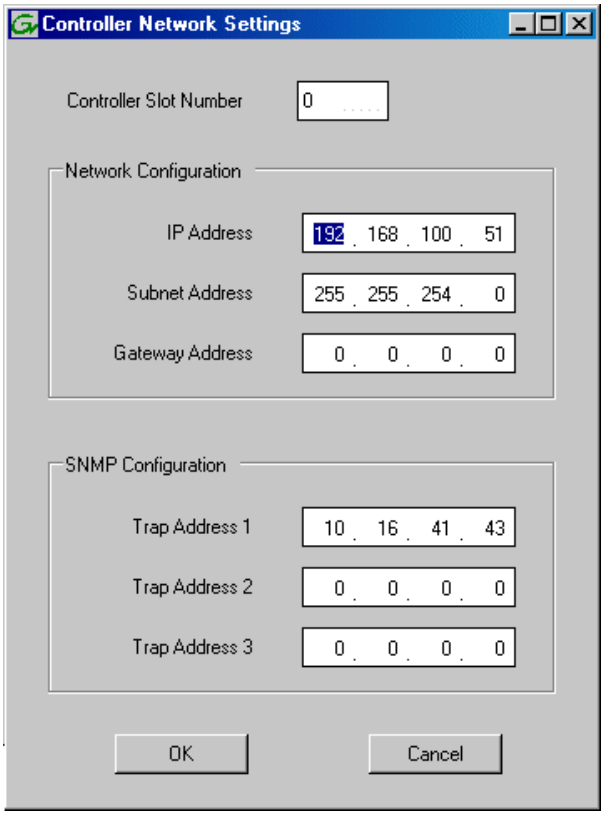
The RAID storage device is configured by default for the SNMP community name "public". If your site's policies require using a different SNMP community name, contact your Grass Valley representative.

To configure these settings, do the following:

1. Launch Storage Utility from the K2 System Configuration application as in the previous procedure.
2. As prompted, wait while Storage Utility gathers system information, then Storage Utility opens.
3. In Storage Utility tree view, expand the node for the L3R RAID, right-click the icon for a L3R RAID controller, and select **Configuration | Network Properties**.

   The Controller Network Settings dialog box opens.

   For a L3R RAID chassis with two controllers, you can make settings on both controllers using this dialog box.



4. In the Controller Slot Number field enter **0** and then press **Enter**. The settings from controller 0 are loaded into the Controller Network Settings dialog box and are available for you to modify.
5. Enter the control network IP address and other network settings.
6. You want SNMP trap messages go to the NetCentral server PC, so for SNMP Configuration enter the IP address of the NetCentral server PC. You can also enter IP addresses for other SNMP managers to which you want to send SNMP trap messages.
7. For the RAID chassis with two controllers, in the Controller Slot Number field enter **1** and then press **Enter**. The settings from controller 1 are loaded into the Controller Network Settings dialog box and are available for you to modify. Repeat the previous steps to configure controller 1.
8. Click **OK** to save settings and close.
9. In Storage Utility click **View | Refresh**. Continue with the next procedure "Binding disk modules".

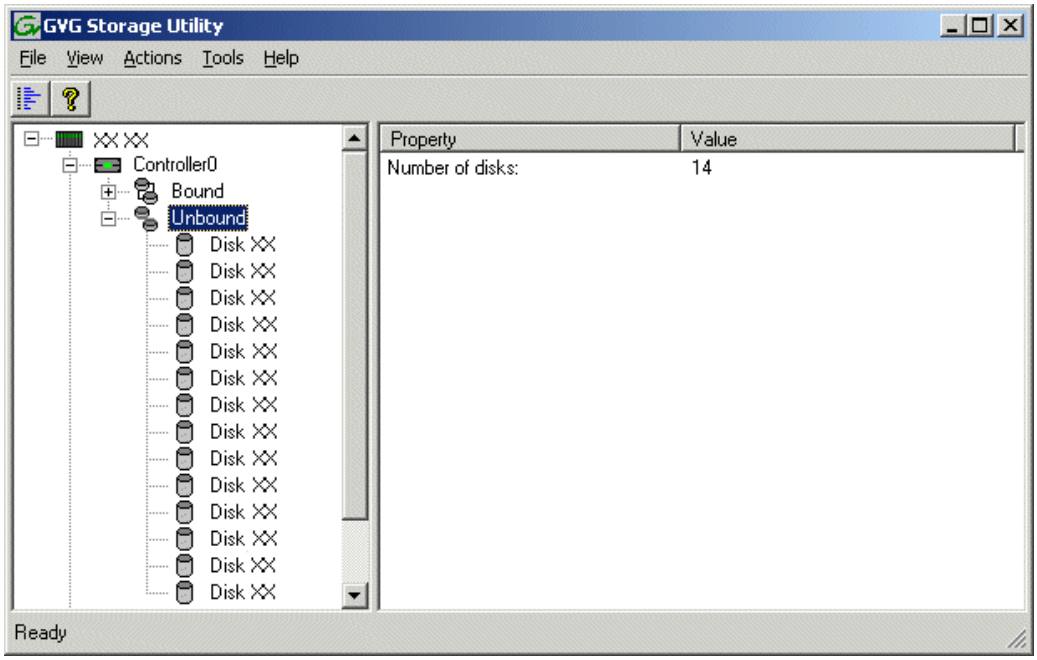
Binding disk modules

Use the following procedure to bind disk modules as required for the Level 3R storage system.

Also refer to "About RANKs and LUNs in Storage Utility" in Chapter 15, *Overview of K2 Storage Tools*.

NOTE: Binding destroys all user data on the disks.

1. In the Storage Utility main window, identify bound RANKs and unbound disks by their placement in the hierarchy of the tree view. In the following illustration, disk numbers are represented by "XX". Refer to "Identifying disks" on page 744 for an explanation of how disks are actually numbered in Storage Utility.



Redundant systems store metadata files and journal files on the primary RAID chassis, which requires a RAID 1 RANK (two disks) for metadata storage and a RAID 1 RANK (two disks) for journal storage. The RAID 1 RANKs must be bound from the first four disks (counting from left to right as you face the front of the RAID chassis) in the primary RAID chassis. These disks must be 15K rpm drives. In addition, the fifth disk in the primary RAID chassis (also a 15K drive) is bound as a Hot Spare. This fifth 15K disk then provides Hot Spare functionality for the other four 15K disks (the RAID 1 RANKs) only. Optionally, you can also use some of your other 10K disks (in groups of five) as Hot Spares for your media storage RANKs. Refer to "Binding Hot Spare drives" on page 751 for more information.

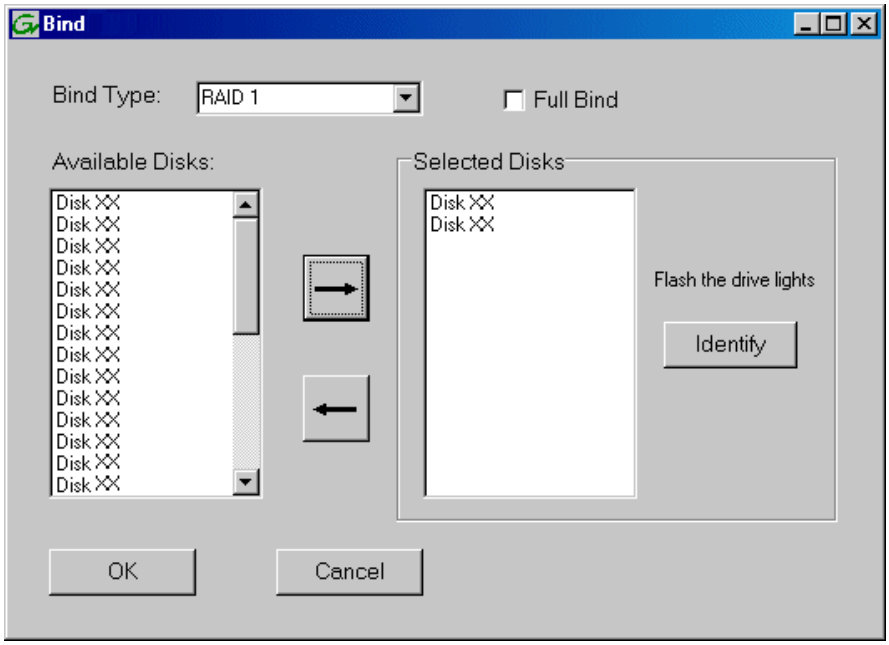
View disk properties and identify the four disks you will use for the RAID 1 RANKs, the one 15K Hot Spare disk, any other disks that you intend to use for media RANK Hot Spares, and the remainder of the disks that are available for media storage RANKs. Make sure you select disks appropriately as you bind RANKs in the remainder of this procedure.

View disk properties and identify the four disks you will use for the metadata/journal RAID 1 RANKs, the one metadata/journal Hot Spare disk, any other disks that you intend to use for Hot Spares, and the remainder of the disks that are available for media storage. Make sure you select disks appropriately as you bind disks in the remainder of this procedure.

2. For systems that use RAID 1 RANKs, you must now create the separate RAID 1 storage for metadata files and journal files. To bind unbound disks for metadata and journal storage, do the following:

   a. Right-click the **Unbound** node for the controller, then select **Bind** in the context menu. (If the RAID chassis has two controllers, both controllers are represented by the single "Controller" node)

      The Bind dialog box opens showing all unbound disks for the controller listed in the Available Disk list.



   b. Leave **Full Bind** unchecked. Refer to "About full/background bind" on page 748.

   c. In the **Bind Type** drop down box, select **RAID 1**.

   d. In the Available Disks box, select two contiguous disks at the top of the list. These should be the first two disks in the primary RAID chassis. (TIP: Use 'shift-click' or 'control-click' to select disks.) This creates a RAID 1 RANK for metadata storage.

   e. Click the add (arrow) button to add disks to the Selected Disks list.

NOTE: As an aid in identifying a disk module's physical location, select it in the Selected Disks list, then click* Identify Disks. *This causes the disk drive light to flash.

   f. Click **OK** to close the Bind dialog box and begin the binding process. The Progress Report dialog box opens, showing the status of the binding process.

   g. Close the Progress Report and repeat the previous steps, selecting two more contiguous disks to create another RAID 1 RANK for journal storage. These should be the next two disks in the primary RAID chassis.

   h. Make the fifth disk in the primary RAID chassis a Hot Spare. In the **Bind Type** drop down box, select **Hot Spare**.

i. In the Available Disks box, select the fifth disk in the primary RAID chassis.

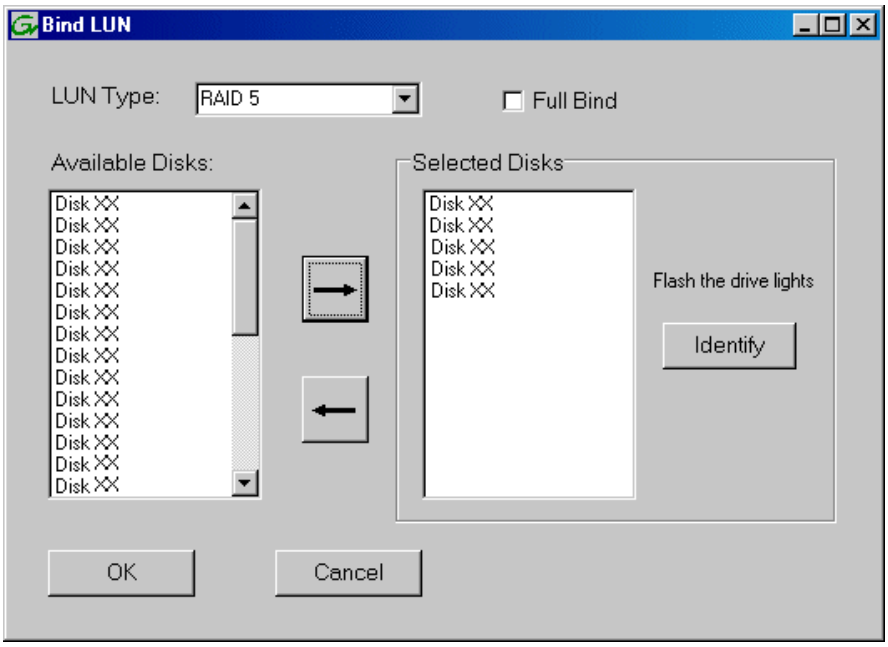
j. Click the add (arrow) button to add the disk to the Selected Disks list.

k. Click **OK** to close the dialog box and begin the binding process.

3. To bind unbound disks for media storage, do the following:

   a. Right-click the **Unbound** node for a controller, then select **Bind** in the context menu. (If the RAID chassis has two controllers, both controllers are represented by the single "Controller" node)

      The Bind dialog box opens showing all unbound disks for the controller listed in the Available Disk list.



   b. Leave Full Bind unchecked. Refer to "About full/background bind" on page 748.

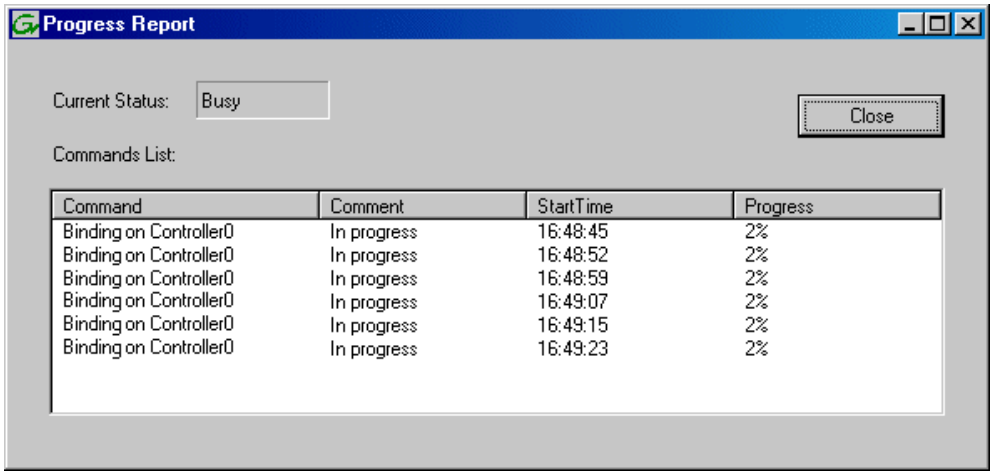
   c. In the **Bind Type** drop down box, select **RAID 5**. If specified by your system design, RAID 6 is also supported. Refer to the Nearline chapter for more information on RAID 6.

   d. In the Available Disks box, select five contiguous disks at the top of the list. (TIP: Use 'shift-click' or 'control-click' to select disks.).

   e. Click the add (arrow) button to add disks to the Selected Disks list.

NOTE: As an aid in identifying a disk module's physical location, select it in the Selected Disks list, then click* Identify Disks. *This causes the disk drive light to flash.

   f. Click **OK** to close the Bind dialog box and begin the binding process. The Progress Report dialog box opens, showing the status of the binding process.



g. Close the Progress Report and repeat these steps for other unbound disks. If specified by your system design, you can bind some disks as Hot Spares, as explained in "Binding Hot Spare drives" on page 751. When you are done, if you did not bind any extra Hot Spares, you should have the following results:

   For Level three redundant storage, on the primary RAID chassis you should have two RAID 1 RANKs of two disks each, one Hot Spare Disk, and two RAID 5 RANKs of five disks each. For each optional Expansion chassis, you would have an additional three RAID 5 RANKs of five disks each. If using RAID 6, RANKs are six disks each.

h. Click **Close** in Progress Report window.

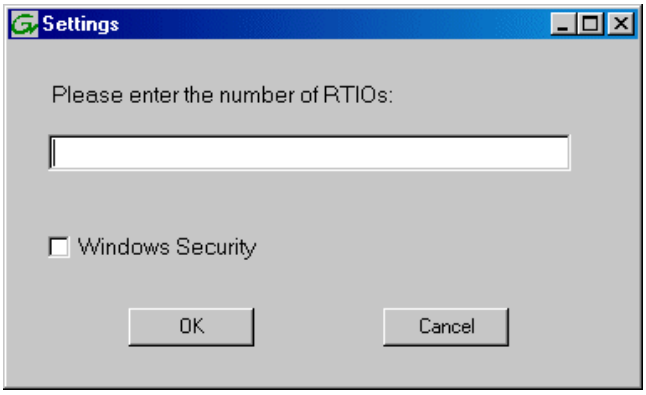
4. Restart the K2 Media Server.

NOTE: Make sure start up processes on the K2 Media Server are complete before proceeding.

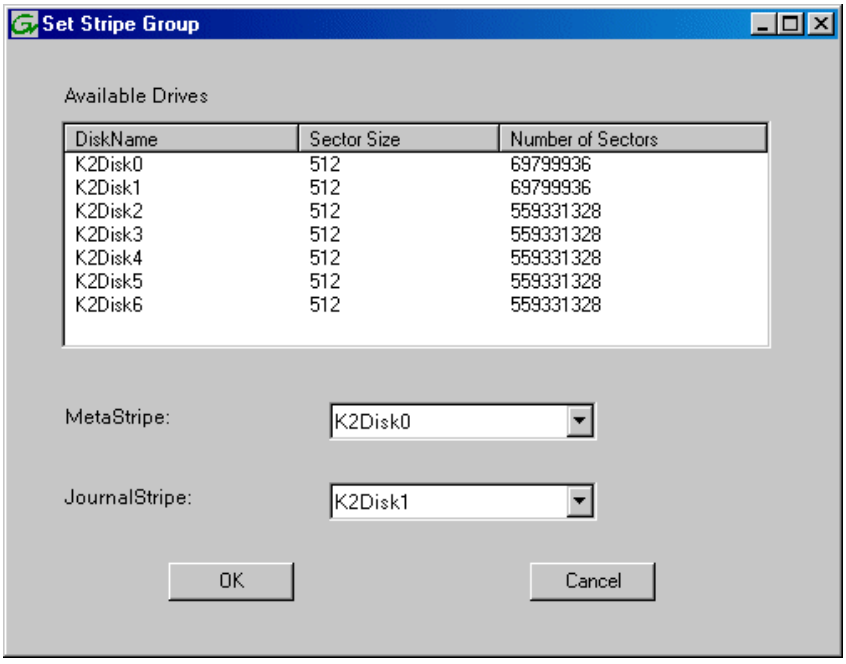
5. Continue with the next procedure "Creating a new file system".

Creating a new file system

1. In Storage Utility, click **Tools | Make New File System**. The Setting dialog box opens.



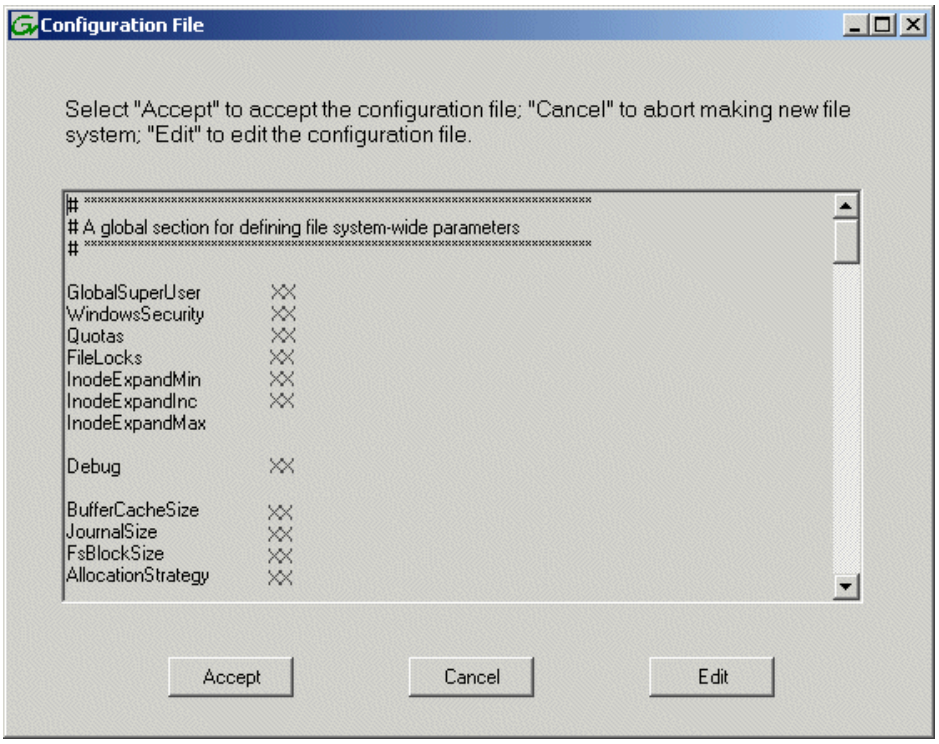
2. For the Real Time Input/Output (RTIO) rate, enter the value specified by your system design. If you do not know this value, contact your Grass Valley representative.
3. If the K2 Storage System is to be accessed by only K2 Media Clients you can leave Windows Security unchecked. If accessed by Aurora Edits, refer to the *Aurora Edit Installation and Configuration Guide* for instructions.
4. Click **OK**. The Set Stripe Group dialog box opens.



5. If you have RAID 1 RANKS, assign a RAID 1 RANK as a metadata stripe and

another RAID 1 RANK as a journal stripe. You can distinguish RAID 1 RANKs from media RANKs by the value in the Number of Sectors column.

6. Click **OK**. The Configuration File dialog box opens.



The configuration file for the media file system is displayed. You can verify media file system parameters by viewing this file. Do not edit this file. Click **Accept**.

A "…Please wait…" message box displays progress and a "…succeeded…" message confirms the process is complete.

7. A message informs you that you must restart the K2 Media Server, however the restart at the end of the Configure K2 Server wizard suffices, so you do not need to restart now.

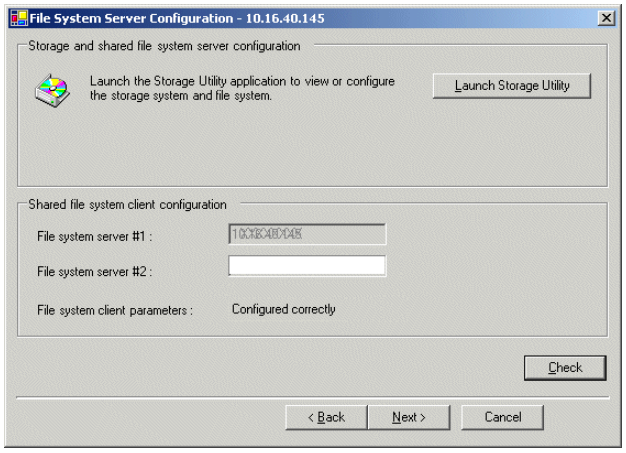
8. Close the Storage Utility.

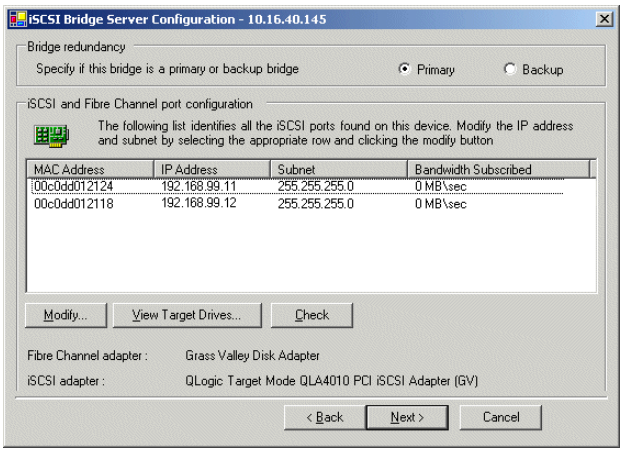
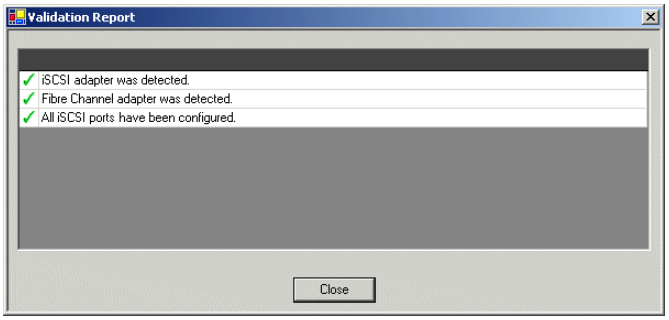
NOTE: Do not attempt to start K2 Media Clients or otherwise bring the K2 Storage System online until instructed to do so later in this chapter.

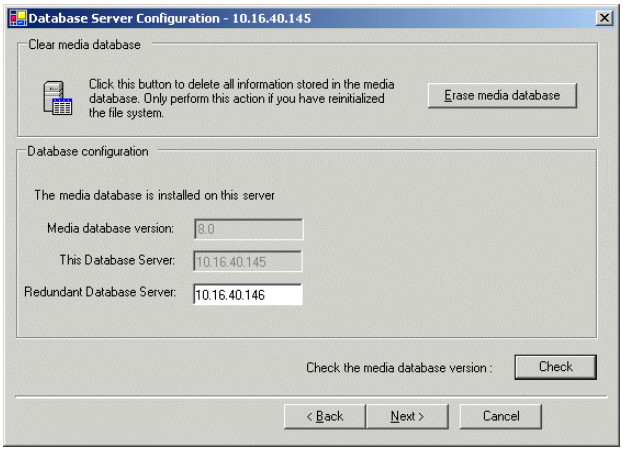
9. Continue with the next procedure.

Configuring the server 1A - Part 2

1. Return to the Configure K2 Server page from which you launched Storage Utility and proceed as described in the following table:

On this page…	Do this…
File System Server Configuration This page checks on the configuration of the K2 Media Server in one of its main roles as a file system server. The K2 Media Server also functions as a file system client, which is also checked from this page.	 If you have not already done so, enter the name or IP address of the redundant K2 Media Server (server 1B). Click **Check**. When the wizard reports that the configuration is correct, click **Next**. If you get a "The V: will not be available until this device is rebooted…" message, you can safely continue with this procedure and follow the instructions related to this message later in the procedure.

On this page…	Do this…
iSCSI Bridge Server Configuration This page manages the components that bridge between iSCSI (the GigE media network) and the Fibre Channel connection to the RAID storage. You configure network settings on the iSCSI adapters and the page validates that the Fibre Channel adapter is in place and that the media RANKs are visible as iSCSI targets.	 Select **Primary**. Select an iSCSI adapter and click **Modify**. A network configuration dialog box opens. Enter the media network IP address and the subnet mask and click **Apply**. Do the same for the other iSCSI adapter. Click **Check**. The Validation Report opens.  Confirm that the iSCSI configuration is successful. Close the Validation Report and then click **Next**.

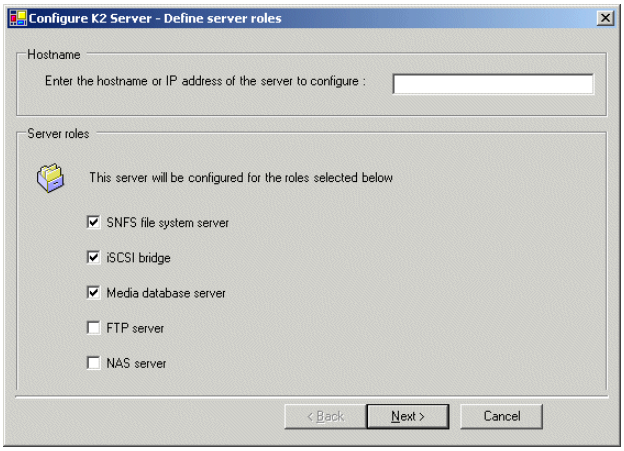
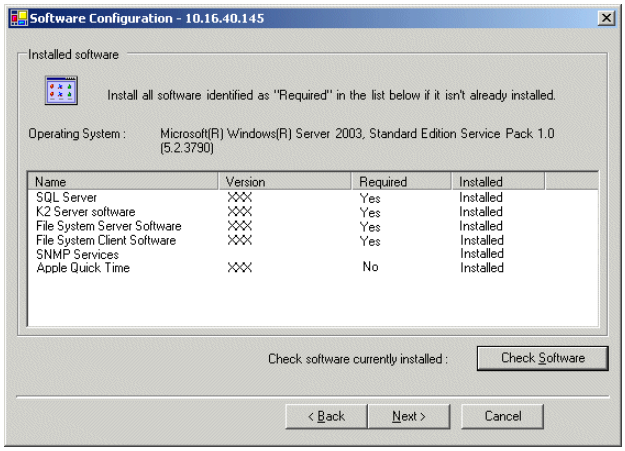
On this page…	Do this…
Database Server Configuration	 Enter the name or IP address of K2 Media server 1B. This is the redundant partner of the server you are now configuring. Click **Next**.
Completing the Configuration Wizard	Click **Finish**. The wizard closes. The server restarts. Wait until all startup processes have completed before continuing.

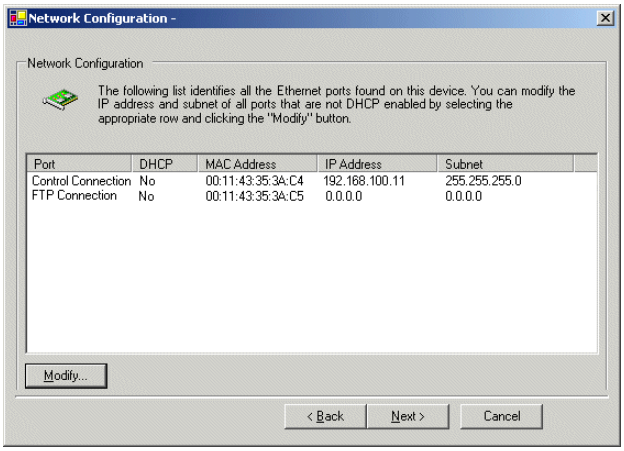
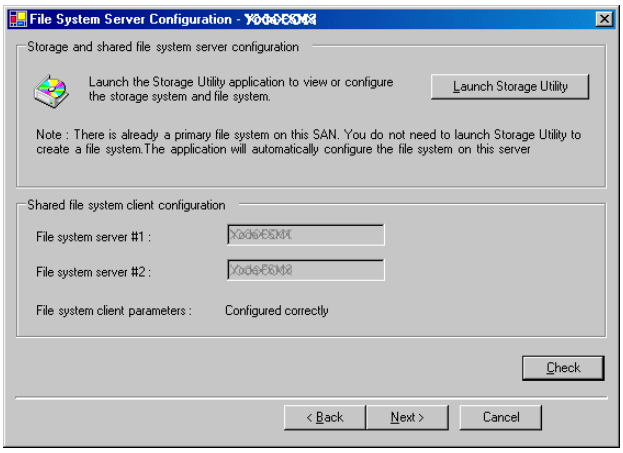
Configuring the redundant server 1B

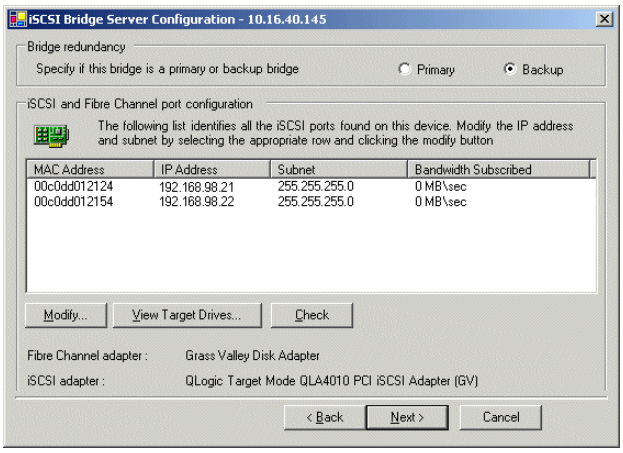
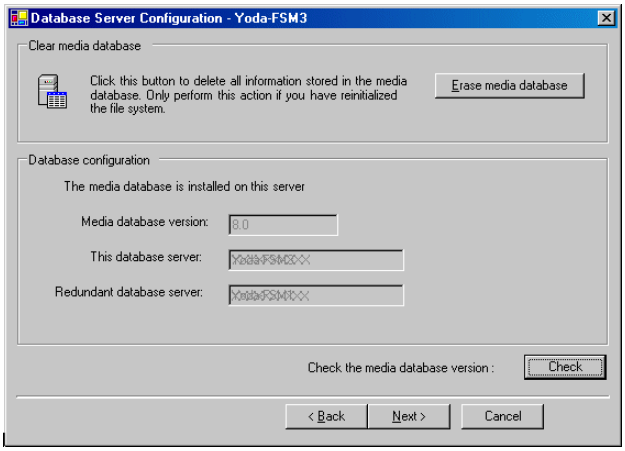
You must wait for the primary K2 Media Server to restart before continuing. To verify, from the control point PC open the MS-DOS command prompt and use the "ping" command.

For Level 3 redundant, after you have configured the first K2 Media Server (server 1A) you next configure its redundant partner K2 Media Server (server 1B).

1. In the K2 System Configuration application tree view, select the K2 Media Server you are configuring as server IB.
2. Click the **Configure** button. The Configure K2 Storage System Server wizard opens. Follow the on-screen text to configure the server for a Level 3R K2 Storage System, as described in the following table. Some screens require no input from you, as they are based on the configurations already completed on a previously configured K2 Media Server.

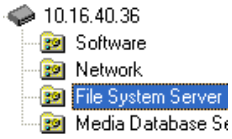
On this page…	Do this…
Define server roles	 Enter the name for the K2 Media Server. This should be the current network name of the machine. Enter the name or IP address of the Ethernet switch, as currently configured on the switch, to which the K2 Media Server is connected. For Level 3 redundant, select **SNFS file system server**, **iSCSI bridge**, and **Media database server**. Click **Next**
Software Configuration This page checks for the software required to support the roles you selected on the previous page. Software required on a Level 3R K2 Media Server 1B is as follows: • SQL Server • K2 Server • File System Server • File System Client • SNMP Services • QuickTime	 If software with *Yes* in the Required column reports as *Not Installed*, you must first install it on the K2 Media Server before continuing. Refer to *Chapter 16, Managing K2 software*. After installing the software, click **Check Software**. When all required software reports as *Installed*, click **Next**.

On this page…	Do this…
Network Configuration This page displays the control network Ethernet port, and allows you to configure the FTP/ Streaming network Ethernet port. ***NOTE: This page does not configure the iSCSI interface (media network) ports.*** For Level 3R, since this server does not take the role of FTP server, configuring the second port here for the FTP/streaming network is not required.	 The top port is the port over which the K2 System Configuration application is communicating with the K2 Media Server. If correctly configured, it is already assigned the control network IP address, as displayed on this page. Select the other port and click **Modify**. A network configuration dialog box opens. Enter the FTP/Streaming IP address and the subnet mask and click **Apply**. Click **Next**.
File System Server Configuration This page checks on the configuration of the K2 Media Server in one of its main roles as a file system server. The K2 Media Server also functions as a file system client, which is also checked from this page. It is not necessary to bind RANKs or create a file system, since this task was completed when you configured the previous K2 Media Server.	 Click **Next**. Confirm messages about copying *default.cfg* to the other server. If you get a "The V: will not be available until this device is rebooted…" message, you can safely continue with this procedure and follow the instructions related to this message later in the procedure.

On this page…	Do this…
iSCSI Bridge Server Configuration This page manages the components that bridge between iSCSI (the GigE media network) and the Fibre Channel connection to the RAID storage. You configure network settings on the iSCSI adapters and the page validates that the Fibre Channel adapter is in place and that the media RANKs are visible as iSCSI targets. ***NOTE: The iSCSI adapters on this server must be on a different subnet than those on its redundant server partner.***	 Select **Backup**. Select an iSCSI adapter and click **Modify**. A network configuration dialog box opens. Enter the media network IP address and subnet mask and click **Apply**. Do the same for the other iSCSI adapter. To verify drives, click **Check** then **View Target Drives**. You should see all your media drives listed. Click **Next**.
Database Server Configuration	 You do not need to enter or configure anything on this page. Click **Next**.
Completing the Configuration Wizard	Click **Finish**. The wizard closes. The K2 Media Server restarts. Do not proceed until restart processes are finished.

3. If you got a “The V: will not be available until this device is rebooted…” message on the File System Server Configuration page, after the K2 Media Server restarts, do the following:

   a. In the K2 System Configuration application tree view, under the K2 Media Server select the File System Server node.



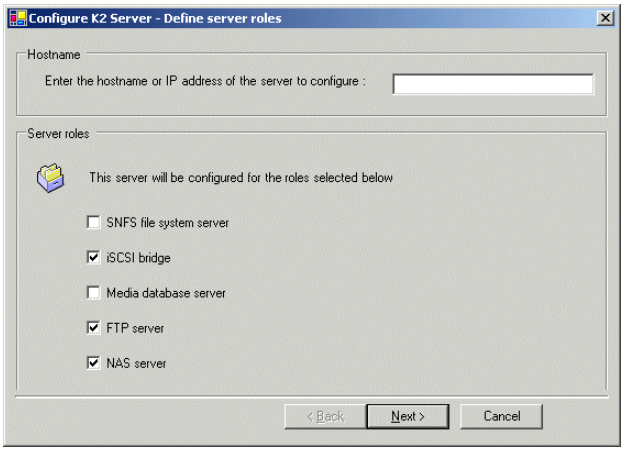
The File System Server Configuration page appears.

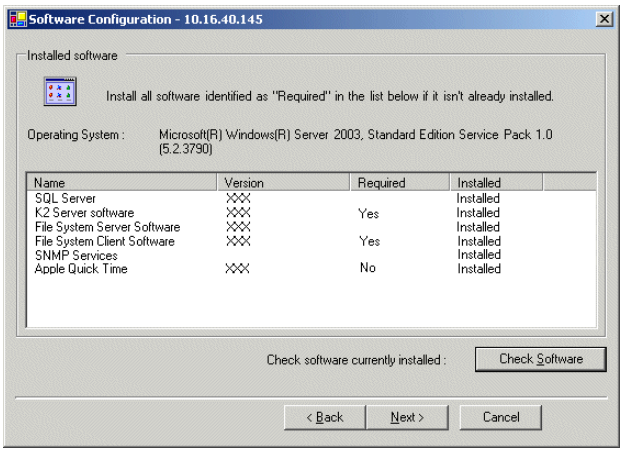
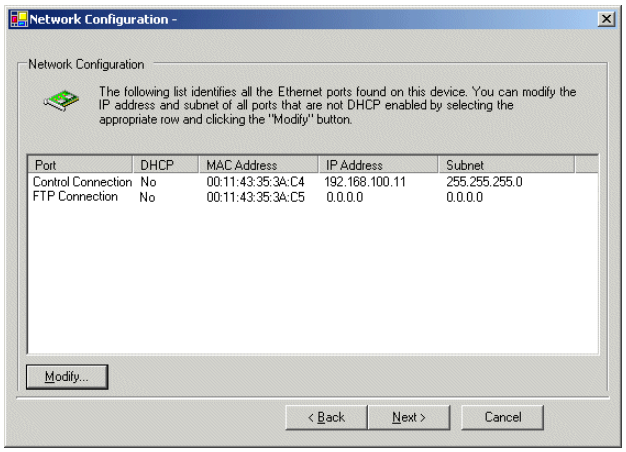
b. Click **Check** and verify that the V: drive is shared. This is required for NAS server functionality.

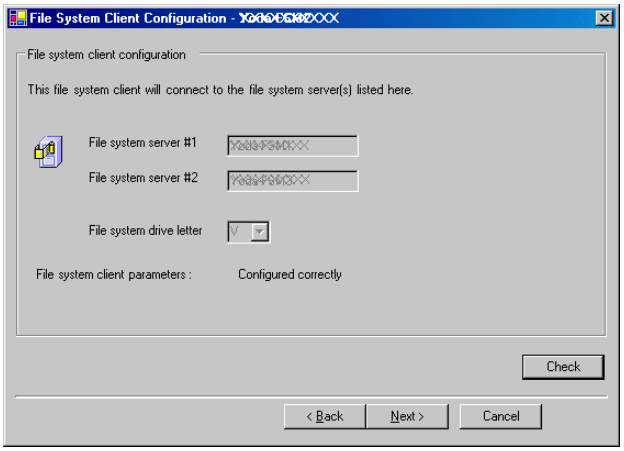
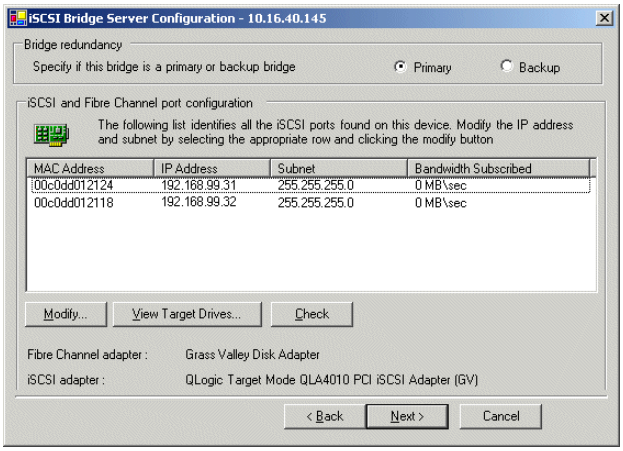
Configuring server 2A

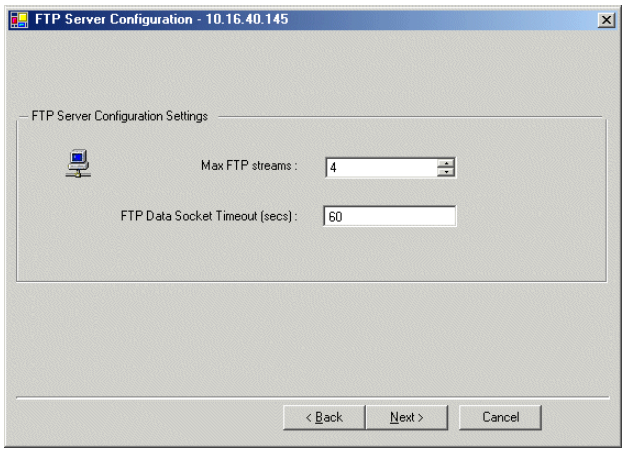
For Level 3 redundant, after you have configured the first K2 Media Server (server 1A) and its redundant partner server (server 1B) you next configure the other "A" K2 Media Server (server 2A).

1. In the K2 System Configuration application tree view, select the K2 Media Server you are configuring as server 2A.
2. Click the **Configure** button. The Configure K2 Server wizard opens. Follow the on-screen text to configure the server for a Level 3R K2 Storage System, as described in the following table. Some screens require no input from you, as they are based on the configurations already completed on a previously configured K2 Media Server.

On this page…	Do this…
Define server roles	 Enter the name for the K2 Media Server. This should be the current network name of the machine. For Level 3 redundant, select iSCSI bridge, FTP server, and NAS server. Click **Next**

On this page…	Do this…
Software Configuration This page checks for the software required to support the roles you selected on the previous page. Software required on a Level 3R K2 Media Server 2A is as follows: • K2 Server • File System Client • QuickTime	 If software with *Yes* in the Required column reports as *Not Installed*, you must first install it on the K2 Media Server before continuing. Refer to *Chapter 16, Managing K2 software*. After installing the software, click **Check Software**. When all required software reports as *Installed*, click **Next**.
Network Configuration This page displays the control network Ethernet port, and allows you to configure the FTP/ Streaming network Ethernet port.	 The top port is the port over which the K2 System Configuration application is communicating with the K2 Media Server. If correctly configured, it is already assigned the control network IP address, as displayed on this page. Select the other port and click **Modify**. A network configuration dialog box opens. Enter the FTP/Streaming IP address and the subnet mask and click **Apply**. Click **Next**.

On this page…	Do this…
File System Client Configuration This K2 Media Server does not function as a file system server. It does function as a file system client, which is validated from this page.	 Click **Check**. When the wizard reports that the configuration check is successful, click **Next**.
iSCSI Bridge Server Configuration This page manages the components that bridge between iSCSI (the GigE media network) and the RAID storage. You configure network settings on the iSCSI adapter and the page validates that the media RANKs are visible as iSCSI targets.	 Select **Primary**. Select an iSCSI adapter and click **Modify**. A network configuration dialog box opens. Enter the media network IP address and subnet mask and click **Apply**. Do the same for the other iSCSI adapter. To verify drives, click **Check** then **View Target Drives**. You should see all your media drives listed. Click **Next**.

On this page…	Do this…
FTP Server Configuration	 Do not modify these settings. Leave at default values of Max FTP streams = 4 and FTP Data Socket Timeout = 60. Only qualified Grass Valley personnel should specify other values, as these settings are intended for use only with custom systems designed by Grass Valley. Click **Next**
Completing the Configuration Wizard	Click **Finish**. The wizard closes. The K2 Media Server restarts. Do not proceed until restart processes are finished.

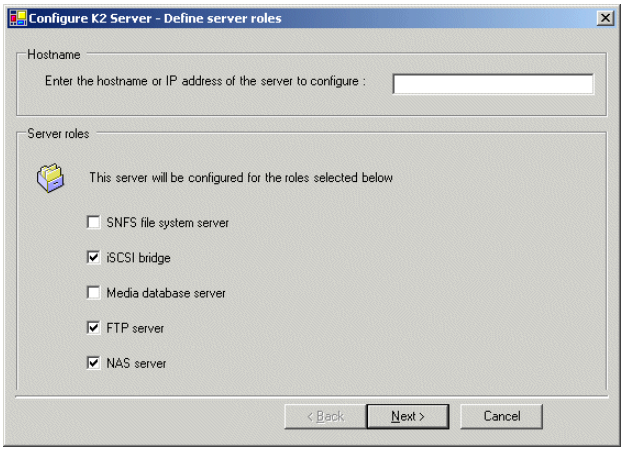
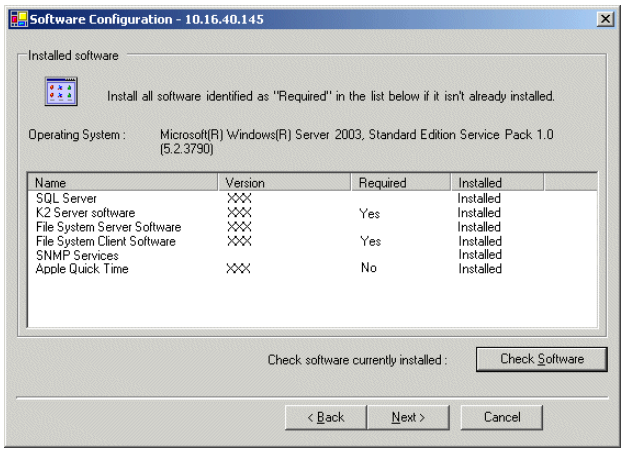
Configuring the redundant server 2B

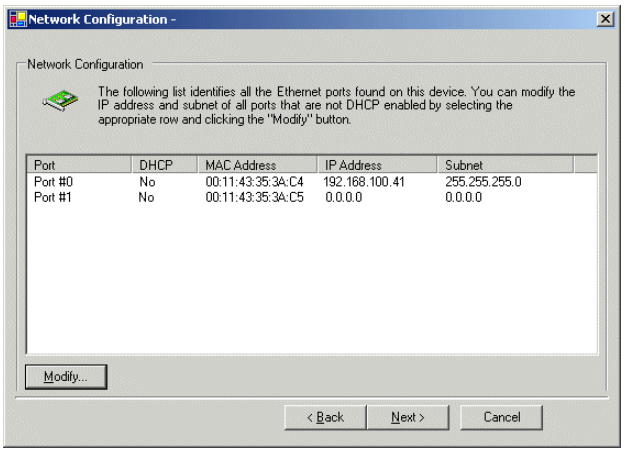
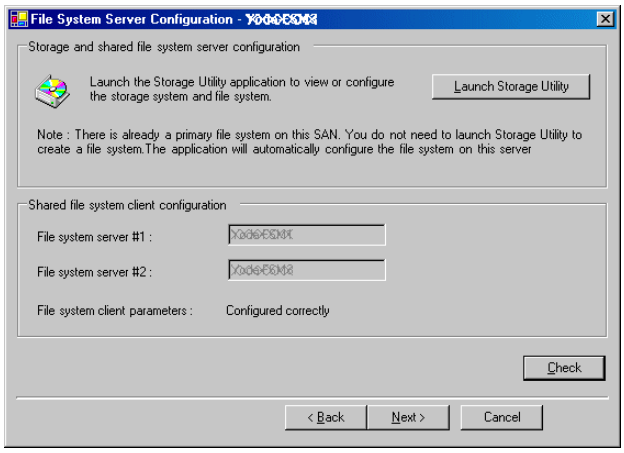
You must wait for server 2A to restart before continuing.

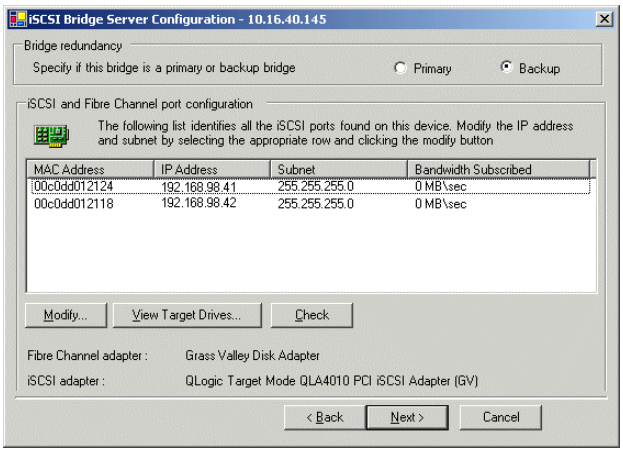
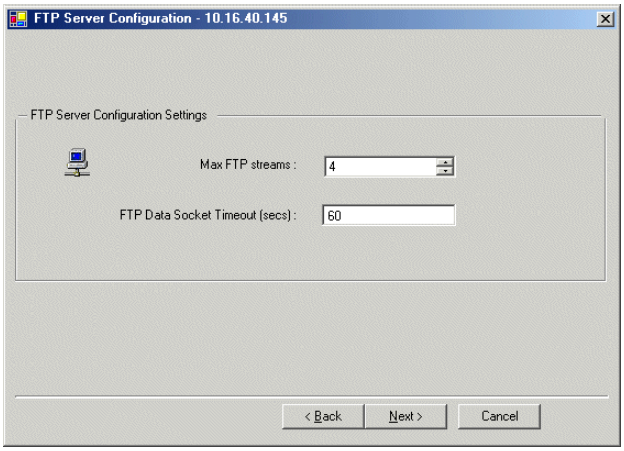
For Level 3 redundant, the last K2 Media Server to configure is server 2B. It is the redundant partner to server 2A.

1. In the K2 System Configuration application tree view, select the K2 Media Server you are configuring as server 2B.
2. Click the **Configure** button. The Configure K2 Server wizard opens. Follow the on-screen text to configure the server for a Level 3R K2 Storage System, as described in the following table. Some screens require no input from you, as they are based on the configurations already completed on a previously configured

server.

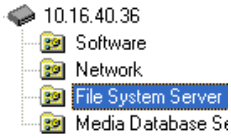
On this page…	Do this…
Define server roles	 Enter the name for the K2 Media Server. This should be the current network name of the machine. For Level 3 redundant, select iSCSI bridge, FTP server, and NAS server. Click **Next**
Software Configuration This page checks for the software required to support the roles you selected on the previous page. Software required on a Level 3R K2 Media Server 2B is as follows: • K2 Server • File System Client • QuickTime	 If software with *Yes* in the Required column reports as *Not Installed*, you must first install it on the K2 Media Server before continuing. Refer to *Chapter 16, Managing K2 software*. After installing the software, click **Check Software**. When all required software reports as *Installed*, click **Next**.

On this page…	Do this…
Network Configuration This page displays the control network Ethernet port, and allows you to configure the FTP/ Streaming network Ethernet port. ***NOTE: This page does not configure the iSCSI interface (media network) ports.***	 The top port is the port over which the K2 System Configuration application is communicating with the K2 Media Server. If correctly configured, it is already assigned the control network IP address, as displayed on this page. Select the other port and click **Modify**. A network configuration dialog box opens. Enter the FTP/Streaming IP address and the subnet mask and click **Apply**. Click **Next**.
File System Client Configuration This K2 Media Server does not function as a file system server. It does function as a file system client, which is validated from this page.	 Click **Check**. When the wizard reports that the configuration check is successful, click **Next**. If you get a “The V: will not be available until this device is rebooted…” message, you can safely continue with this procedure and follow the instructions related to this message later in the procedure.

On this page…	Do this…
SCSI Bridge Server Configuration This page manages the components that bridge between iSCSI (the GigE media network) and the RAID storage. You configure network settings on the iSCSI adapter and the page validates that the media RANKs are visible as iSCSI targets.	 For Level 3 redundant, select **Backup**. Select an iSCSI adapter and click **Modify**. A network configuration dialog box opens. Enter the media network IP address and subnet mask and click **Apply**. Do the same for the other iSCSI adapter. Click **Next**.
FTP Server Configuration	 Do not modify these settings. Leave at default values of Max FTP streams = 4 and FTP Data Socket Timeout = 60. Only qualified Grass Valley personnel should specify other values, as these settings are intended for use only with custom systems designed by Grass Valley. Click **Next**
Completing the Configuration Wizard	Click **Finish**. The wizard closes. The K2 Media Server restarts. Do not proceed until restart processes are finished.

3. If you got a “The V: will not be available until this device is rebooted…” message on the File System Server Configuration page, after the K2 Media Server restarts, do the following:

   a. In the K2 System Configuration application tree view, under the K2 Media Server select the File System Server node.



The File System Server Configuration page appears.

b. Click **Check** and verify that the V: drive is shared. This is required for NAS server functionality.

Your configurations for the Level 3R K2 Storage System are complete.

Adding K2 Storage System clients

You can add now clients, such as K2 Media Clients or Aurora Edits, to the K2 Storage System and configure them using the K2 System Configuration application.

- For Aurora Edits, refer to the *Aurora Edit Installation and Configuration Guide* for instructions.
- For K2 Media Clients, refer to *K2 Media Client System Guide* for instructions.

NOTE: You must install MPIO software on K2 Media Clients that access shared storage on a redundant K2 Storage System.

Basic operations for Level 3R storage

Use the following procedures as you work on your Level 3R storage system:

- "Level 3R system power-off procedure"
- "Level 3R system power-on procedure"

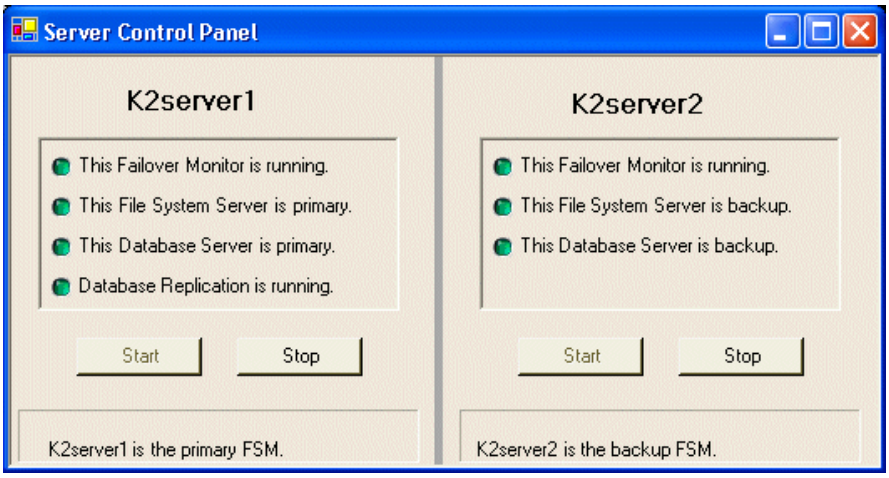
For other procedures refer to "Administering and maintaining the K2 Storage System" on page 687.

Level 3R system power-off procedure

Use the following sequence to power-off the Level 3R storage system.

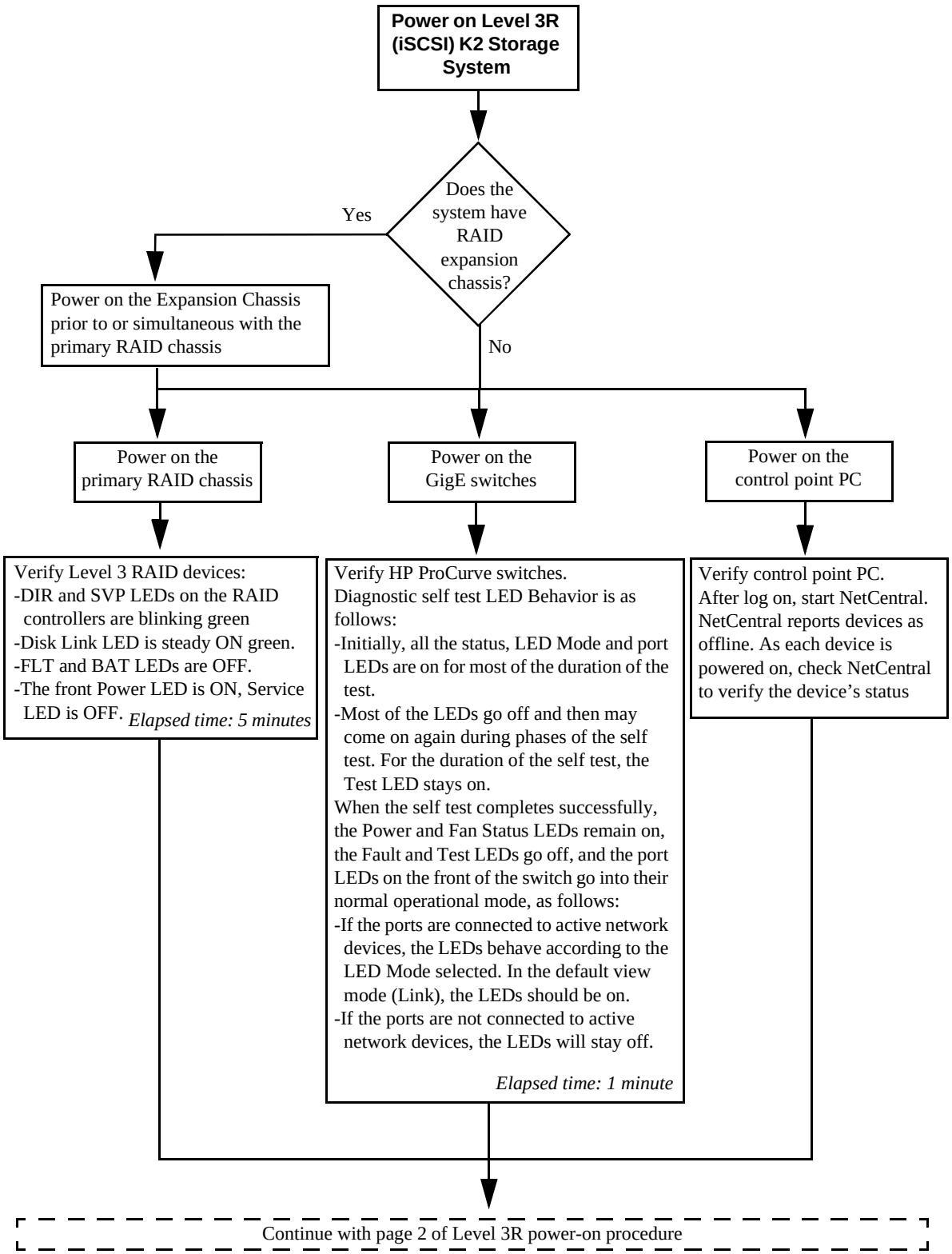
1. Power-off all K2 Media clients or other iSCSI clients.
2. From the K2 System Configuration application, in the tree view select the name of the K2 Storage System, which is the top node of the storage system tree. Then click the **Server Control Panel** button.

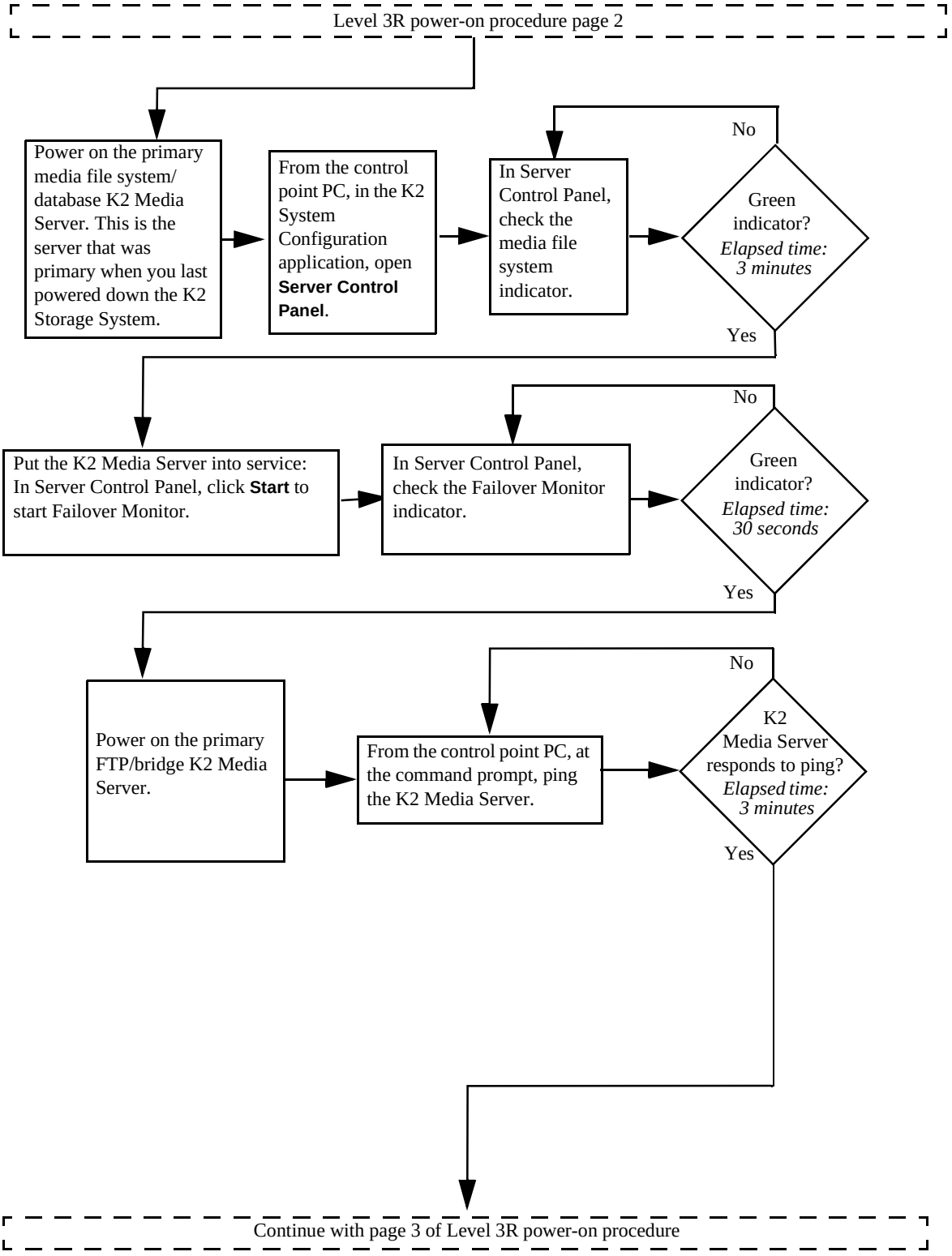
The Server Control Panel opens.

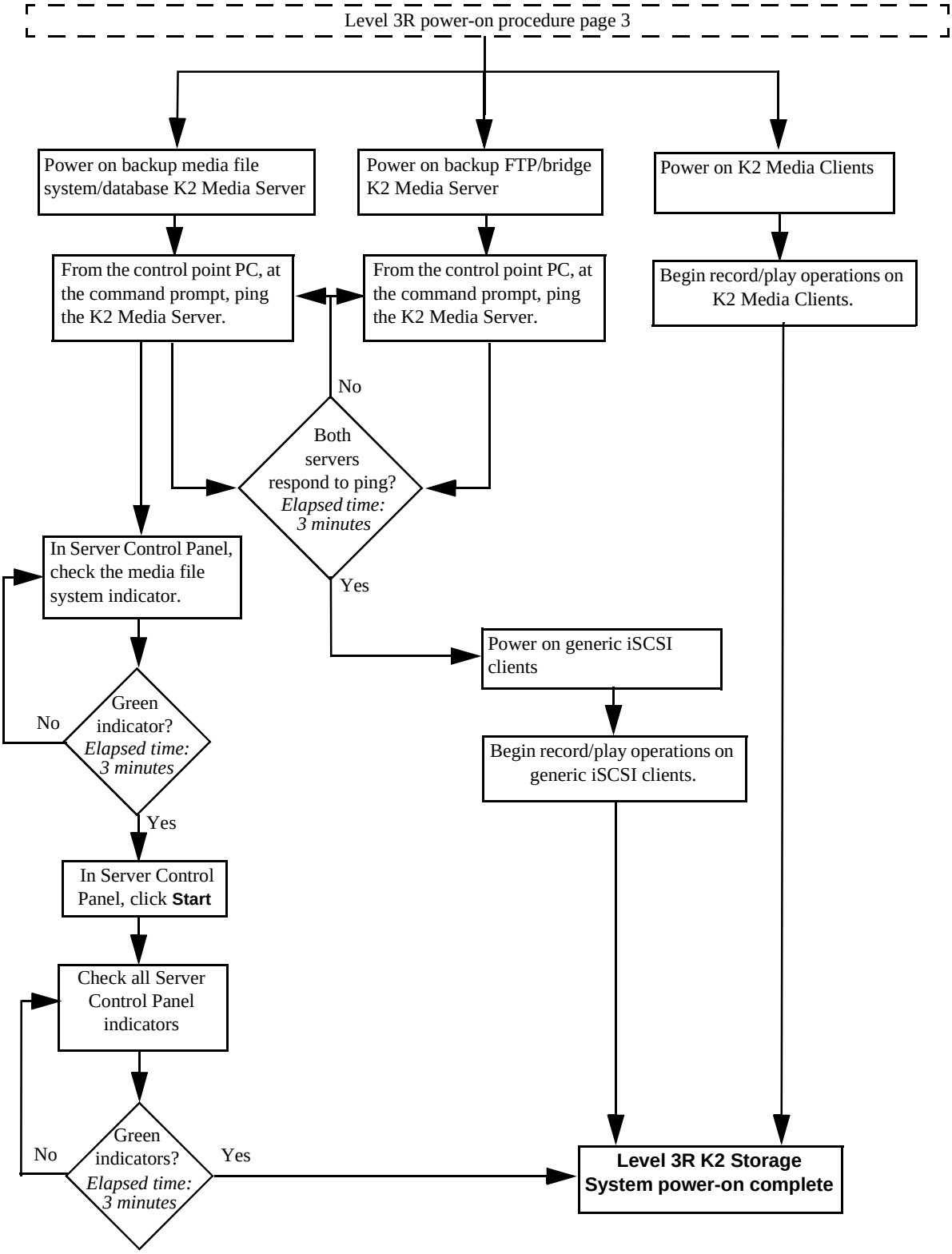


3. Take note of which is the primary K2 Media Server and which is the backup K2 Media Server. The order in which you put servers back into service when you power up the K2 Storage System is dependent on their primary/backup roles at the time when you power down the K2 Storage System.
4. For the backup K2 Media Server, click **Stop**. This takes the server out of service.
5. Shut down the backup K2 Media Server, if it does not shut down automatically.
6. For the primary K2 Media Server, click **Stop**. This takes the server out of service.
7. Shut down the primary K2 Media Server, if it does not shut down automatically.
8. For your other two K2 Media Servers that are the FTP servers, first shut down the backup, then the primary.
9. Power-off the primary RAID controller chassis. If expansion chassis are connected, make sure the power-off of the controller chassis is prior to or simultaneous with the power-off of its connected expansion chassis. Wait approximately 30 seconds for the disk drives to spin down before proceeding.
10. Power-off all Ethernet switches.
11. Power-off the control point PC and/or the NetCentral server PC, if necessary.

Level 3R system power-on procedure




Level 3R power-on procedure page 2
Power on the primary media file system/ database K2 Media Server. This is the server that was primary when you last powered down the K2 Storage System.
From the control point PC, in the K2 System Configuration application, open **Server Control Panel**.
In Server Control Panel, check the media file system indicator.
Green indicator?
Elapsed time: 3 minutes
No
Yes
Put the K2 Media Server into service: In Server Control Panel, click **Start** to start Failover Monitor.
In Server Control Panel, check the Failover Monitor indicator.
Green indicator?
Elapsed time: 30 seconds
No
Yes
Power on the primary FTP/bridge K2 Media Server.
From the control point PC, at the command prompt, ping the K2 Media Server.
K2 Media Server responds to ping?
Elapsed time: 3 minutes
No
Yes
Continue with page 3 of Level 3R power-on procedure

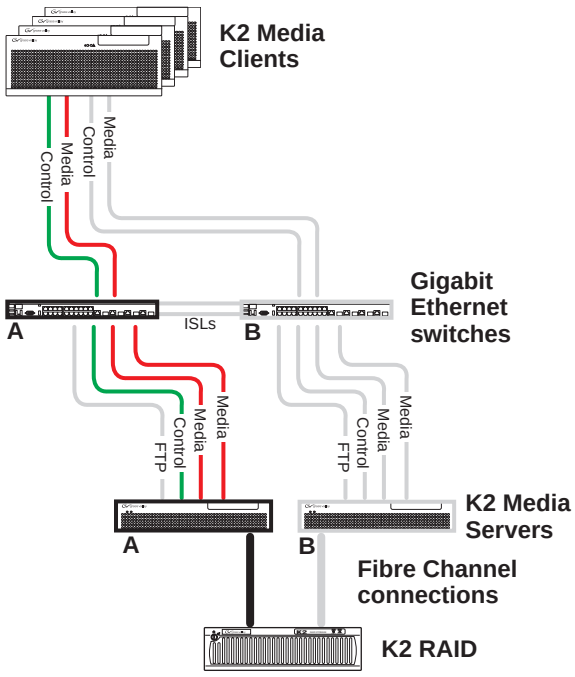

Level 3R power-on procedure page 3
Power on backup media file system/database K2 Media Server
Power on backup FTP/bridge K2 Media Server
Power on K2 Media Clients
From the control point PC, at the command prompt, ping the K2 Media Server.
From the control point PC, at the command prompt, ping the K2 Media Server.
Begin record/play operations on K2 Media Clients.
No
Both servers respond to ping? Elapsed time: 3 minutes
Yes
In Server Control Panel, check the media file system indicator.
Power on generic iSCSI clients
No
Green indicator? Elapsed time: 3 minutes
Begin record/play operations on generic iSCSI clients.
Yes
In Server Control Panel, click Start
Check all Server Control Panel indicators
No
Green indicators? Elapsed time: 3 minutes
Yes
Level 3R K2 Storage System power-on complete

Failover behaviors

If a fault occurs and one of the failover mechanisms is triggered, a redundant K2 Storage System behaves as explained in following sections.

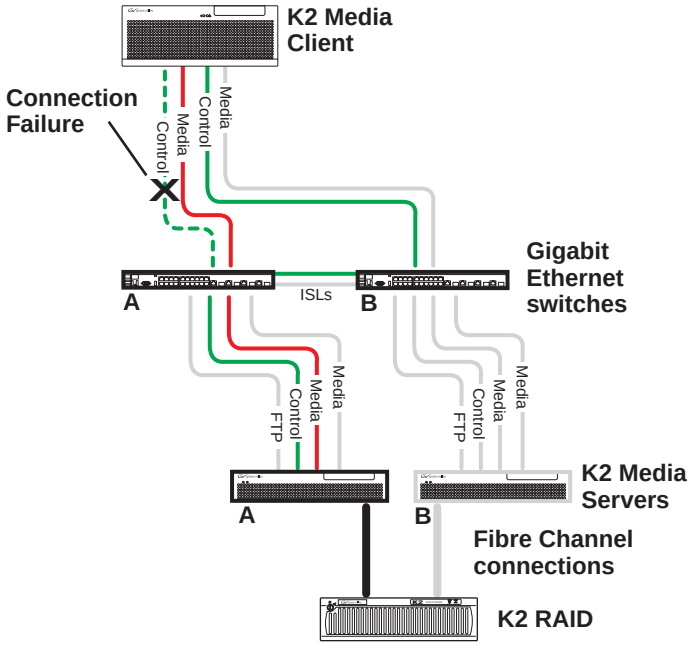
The diagrams that follow are representative of a generic redundant K2 Storage System. Some details, such as the number of media connections, might not be the same as your K2 Storage System. These diagrams illustrate the media (iSCSI) and control paths as they interact with the redundant K2 Media Servers in their role of media file system/database server and iSCSI bridge. Interactions of FTP traffic and/or paths involving K2 Media Servers with other roles are not illustrated.

Pre-failover behavior



The system operates initially with both media and control traffic on GigE switch “A” and K2 Media Server “A”. Media (iSCSI) traffic is using media network “A”. The iSCSI adapters (TOEs) on the “A” K2 Media Server provide access to the Fibre Channel connected RAID storage. K2 Media Server “A” is the media file system/database server.

Control team failover behavior



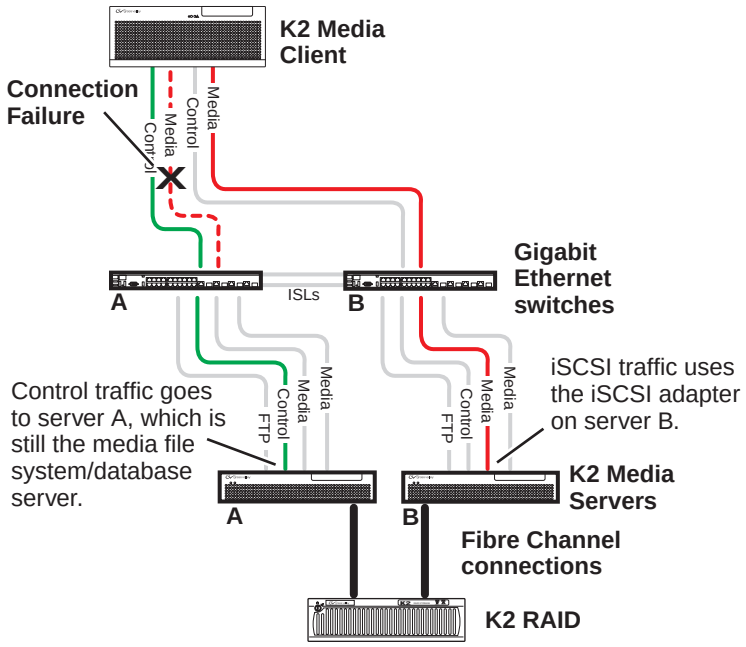
If the following system connection fails to respond to network communication:

- The control connection between a K2 Media Client and GigE switch “A”.

Then the following failover behavior occurs:

1. The control team on the K2 Media Client fails over and communication begins on the other control port.
2. The control communication finds a path through GigE “B” switch and across an ISL to GigE switch “A” to reach the same control port on the same K2 Media Server.
3. Media (iSCSI) traffic keeps using the same path.
4. K2 Media Server “A” is still the media file system/database server. The media file system (SNFS) and media database (SQL) do not fail over.
5. The other K2 Media Clients (not affected by the connection failure) keep using the same paths for media and control, as in the previous diagram “Pre-failover behavior”.

K2 Media Client media (iSCSI) connection failover behavior



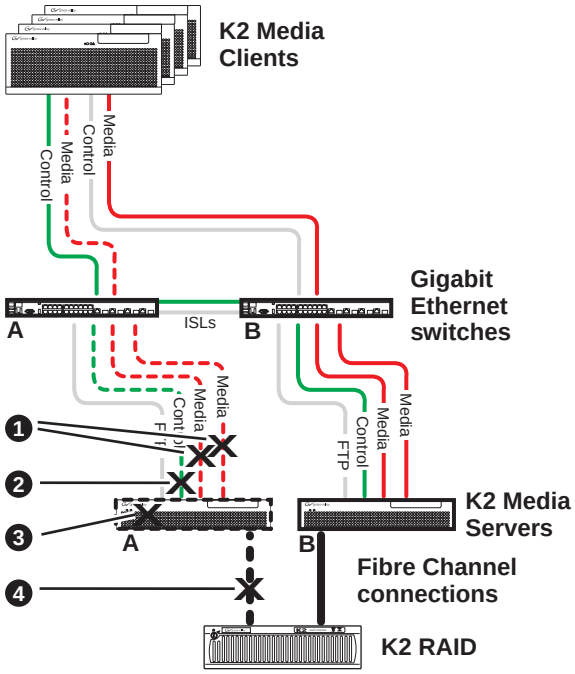
If the following system connection fails to respond to network communication:

- Media (iSCSI) network “A” connection between a K2 Media Client and the GigE switch.

Then the following failover behavior occurs:

1. The K2 Media Client drops communication on its “A” media port and begins using its “B” media port and the “B” media (iSCSI) network. The iSCSI adapter (TOE) on the “B” K2 Media Server provides access to the Fibre Channel connected RAID storage.
2. Control traffic keeps using the same path to K2 Media Server “A”.
3. K2 Media Server “A” is still the media file system/database server. The media file system (SNFS) and media database (SQL) do not fail over.
4. The other K2 Media Clients (not affected by the component failure) keep using the same paths for media and control, as in the previous diagram “Pre-failover behavior”. This means the K2 Media Clients unaffected by the failover are using the iSCSI adapter (TOE) on the “A” K2 Media Server to provide access to the Fibre Channel connected RAID storage, while at the same time the affected K2 Media Clients are using the iSCSI adapter (TOE) on the “B” K2 Media Server to provide access to the Fibre Channel connected RAID storage. In this case both RAID controller are simultaneously providing disk access.

K2 Media Server failover behavior



If the following system connection or component fails to respond to network communication:

❶ Either of the Media (iSCSI) network “A” connections between the GigE switch and the K2 Media Server

❷ The control connection between GigE switch “A” and K2 Media Server “A”

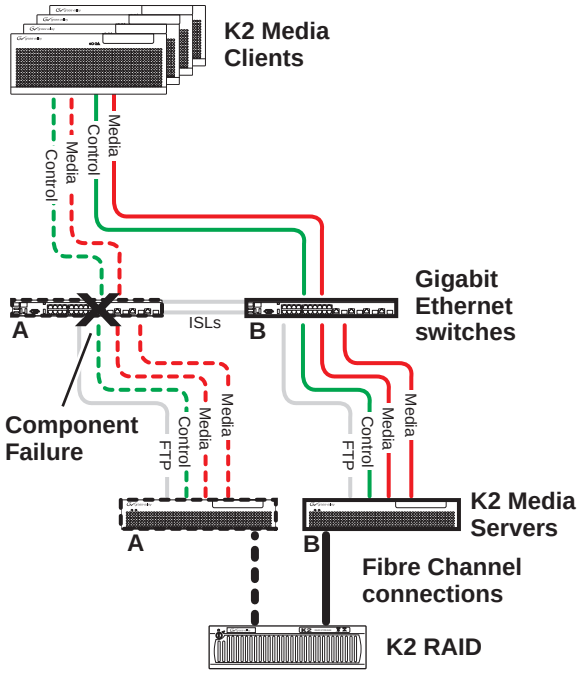
❸ K2 Media Server “A”

❹ The Fibre Channel connection between K2 Media Server “A” and RAID controller “A”

Then the following failover behavior occurs:

1. The media file system (SNFS) and media database (SQL) on K2 Media Server “A” fail over and K2 Media Server “B” becomes the active media file system/database server.
2. All K2 Media Clients drop communication on the “A” media port and begin using the “B” media port, finding a path through GigE switch “B” to K2 Media Server “B”. All K2 Media Clients use an iSCSI adapter (TOE) on the “B” K2 Media Server to provide access to the Fibre Channel connected RAID storage.
3. All K2 Media Clients keep communicating on the same control port, finding a new path through GigE switch “A” and across an ISL to GigE switch “B” to reach K2 Media Server “B”.

K2 Media Server failover with Control team failover behavior



If the following system component fails to respond to system communication:

- The “A” GigE switch

Then the following failover behavior occurs:

1. The media file system (SNFS) and media database (SQL) on K2 Media Server “A” fail over and K2 Media Server “B” becomes the active media file system/database server.
2. All K2 Media Clients drop communication on the “A” media port and begin using the “B” media port, finding a path through GigE switch “B” to K2 Media Server “B”. All K2 Media Clients use an iSCSI adapter (TOE) on the “B” K2 Media Server to provide access to the Fibre Channel connected RAID storage.
3. For all K2 Media Clients, communication fails on the control port, so the control team fails over and communication begins on the other control port.
4. For all K2 Media Clients, control communication finds a path through GigE switch “B” to K2 Media Server “B”.

Chapter 6

Installing the Nearline Storage System

The K2 Nearline storage system was initially released with K2 system software version 3.0 in December 2005.

Use this chapter to install the Nearline storage system.

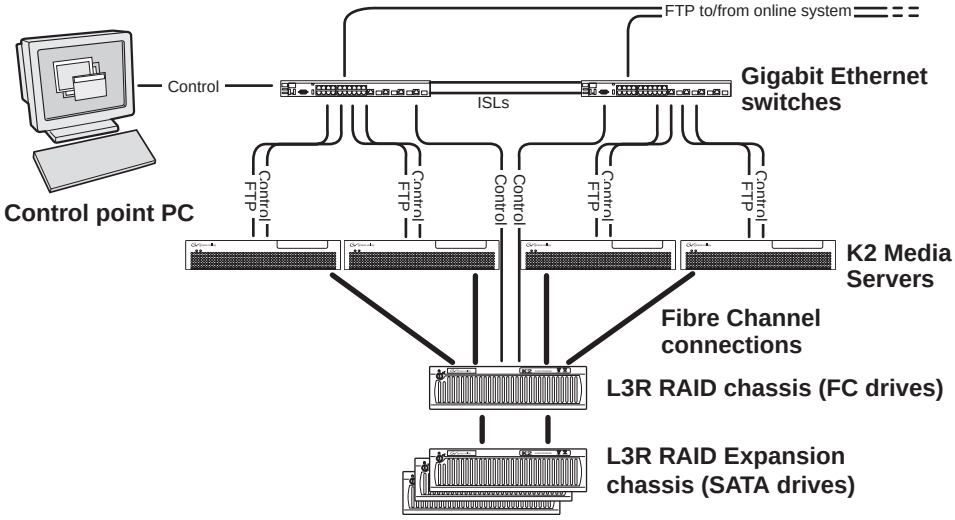
This chapter includes the following topics:

- "Nearline system description" on page 244
- "Preparing nearline devices" on page 245
- "Networking for nearline" on page 262
- "Configuring the nearline storage system" on page 266
- "Basic operations for nearline storage" on page 284

Work through these topics sequentially to install the storage system.

‘

Nearline system description



The purpose of the Nearline storage system is to provide a large pool of storage to which files can be saved. The Nearline system is considered an “offline” system, which means the system stores files only, such GXF files or MXF files, with no ability to record or play those files directly on the system. This is because the Nearline system has no media database to support “movies” or “clips”, such as there is on an “online” K2 Level 2, 3, or 4 storage system. However, the files on a Nearline system can be readily available to an online K2 system via FTP transfer.

Typically, SATA drives provide the primary storage on a Nearline system. While these drives do not provide the high bandwidth of the Fibre Channel drives required by an online K2 storage system, they offer larger capacity and lower cost. This makes SATA drives ideal for the Nearline storage system. However, if desired, Fibre Channel drives can be used throughout the Nearline system.

The Nearline storage system has one to four K2 Media Servers. The servers are identical in that they all take the same two roles, as follows:

- FTP server — In this role all servers are active simultaneously. To provide FTP redundancy in the event of a server failure, your facility’s FTP system must be able to access alternate FTP servers.
- Media file system server — In this role only one K2 Media Server is active at any one time, and the media file system itself provides redundancy. If a fault occurs on the active server, one of the other servers automatically takes over as the active media file system server.

In the Nearline system no K2 Media Servers take the role of iSCSI bridge or media database server.

No K2 Media Clients or any other generic client are part of the Nearline system.

Each K2 Media Server has one GigE connection for control, one GigE connection for FTP, and one Fibre Channel connection to the RAID storage. The two iSCSI GigE ports on the K2 Media Server are not used. Each server also runs the software components that allow it to function in its specific roles.

The Nearline storage system uses Level 3 RAID chassis and expansion chassis. The primary RAID chassis can have one controller (for a total of two K2 Media Servers connected) or two controllers (for a total of four K2 Media Servers connected). The primary RAID chassis is connected via a Fibre Channel connection to each server. These Fibre Channel connections access the disks simultaneously for increased bandwidth. Each controller in the Level 3 RAID chassis is also connected to the GigE control network, which is required for SNMP (NetCentral) monitoring.

The Nearline storage system has one primary RAID chassis, which contains five 15K rpm Fibre Channel drives. The Fibre Channel drives are required in the primary RAID chassis only. These drives store the metadata files and journal files for the media file system. Up to four Expansion chassis are connected to the primary RAID chassis. The Expansion chassis contain either SATA drives or Fibre Channel drives, which provide the main storage pool for the Nearline system.

Nearline systems have both RAID 1 and RAID 6 LUNs in the RAID storage. On the primary RAID chassis there are two RAID 1 LUNs for media file system metadata files and journal files. The Expansion chassis contain the remainder of the RAID storage, which is RAID 6 LUNs. SATA drives on the Nearline system must be bound as RAID 6 LUNs.

The K2 configuration control point PC is connected to the GigE control network. The K2 System Configuration application runs on this PC for configuring the storage system.

Refer to Chapter 14, *Description of K2 Storage Devices* for more information. Also refer to "Design considerations for Ethernet switches" on page 759.

Preparing nearline devices

Use the topics in this section to prepare each device so that it is ready to become part of the nearline storage system.

- "Setting up the Control Point PC" on page 245
- "Setting up the Nearline GigE switches" on page 246
- "Setting up the K2 Media Server" on page 254
- "Setting up the L3 RAID chassis" on page 256

Setting up the Control Point PC

To set up the K2 configuration Control Point PC, you have the following options:

- Use the Grass Valley Control Point PC that comes from the factory with software pre-installed. This includes the K2 System Configuration application, remote AppCenter, and NetCentral software. Refer to the *K2 Media Client System Guide* for rack mount instructions.
- Use a PC that you own and install the required software.

For either option, you must do the following for the Control Point PC that runs the K2 System Configuration application:

- Assign a control network IP address to the PC. Refer to "Networking tips".
- Connect the PC to the GigE control network.

To use your own PC, you must additionally do the following:

- Verify that the PC meets system requirements, then install the Control Point software and other supporting software, as specified in the *K2 Media Client System Guide*.
- Install and license NetCentral server software. You can install this on the NetCentral server PC, which can be the K2 configuration Control Point PC. Refer to the *NetCentral User Guide*.

Also refer to "Control point PC description" on page 650.

To fix the screen resolution problem seen with NetCentral on the Grass Valley Control Point PC, do the following:

1. Go to Display properties (right mouse selection of properties on the display area)
2. Select Settings tab
3. Select the Advanced button
4. In the General tab, set the DPI setting to Normal size (96 DPI)
5. Restart the PC

Setting up the Nearline GigE switches

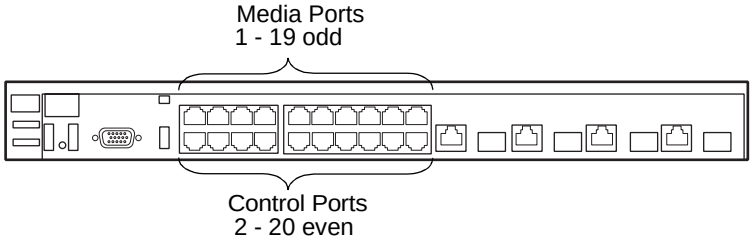
These procedures are for the HP ProCurve switch. Both the 3400cl series and 2900 series switches are qualified for Nearline systems, and both types are fully compatible and can coexist on the network.

If you are using a non-HP switch, apply the information in the following procedures accordingly. Refer to the documentation you received with the switch as necessary.

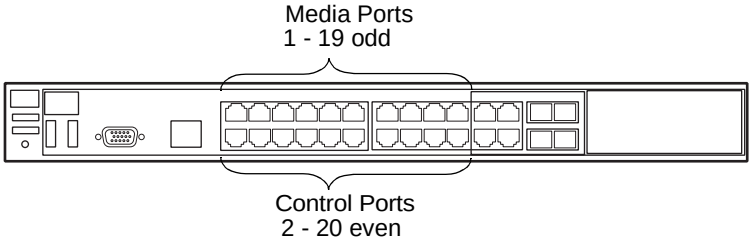
It is not required that a GigE switch be dedicated to the Nearline system. If enough "control" ports (non-iSCSI ports) are available on a switch or switches configured for an online K2 Storage System (Level 2, 3, or 4), the Nearline system can be connected to those control ports. If a separate GigE switch is necessary for the Nearline system, and the GigE switch is not used for "media" traffic (real-time iSCSI traffic) from an online K2 Storage System, you can use the following procedures to set up the GigE switch.

- Use CAT5e or CAT6 cables. The maximum cable length is 50 meters for CAT5e and 100 meters for CAT6.
- Assign an IP address and logon to each switch. Refer to "Configuring the GigE switch via serial connection" on page 248.
- Install the switches in their permanent location.
- Provide power to the switches.

3400cl series switch



2900 series switch



NOTE: If the switch is used for the Nearline system only and there is no K2 media (real-time iSCSI) traffic on the switch, there is no need for VLANs or dedicated "media" ports.

If you have one switch for the Nearline system, connect as follows:

- Make two connections (control and FTP) from each Nearline K2 Media Server, one connection from each RAID controller, and one connection from the control point PC.

If you have two switches for the Nearline system, connect as follows:

- To the ports on switch A, make a connection from RAID controller 0 and from the control point PC. Also make two connections (control and FTP) from half of the installed Nearline K2 Media Servers.
- To the ports on switch B, make a connection from RAID controller 1, if it is installed. Also make two connections (control and FTP) from the remaining Nearline K2 Media Servers.

Refer to "Nearline system description" on page 244 for a diagram of the complete system.

Refer to cabling procedures later in this chapter for the GigE connections at each of the devices of the K2 Storage System.

Also refer to "K2 Ethernet switch description" on page 651 and "Design considerations for Ethernet switches" on page 759.

Configuring the GigE switch via serial connection

NOTE: Make sure you check the switch firmware and upgrade if necessary, as instructed at the end of this procedure.

The following procedure is for the HP ProCurve switch 2900 series. Do not use this procedure on other switch models.

Use a direct console connection to the switch, start a console session, and access the Switch Setup screen to set the IP address.

1. Configure the PC terminal emulator on the control point PC or another PC as a DEC VT-100 (ANSI) terminal or use a VT-100 terminal, and configure either one to operate with these settings:
   - Baud rate 115200
   - 8 data bits, 1 stop bit, no parity, and flow control set to Xon/Xoff
   - Also disable (uncheck) the "Use Function, Arrow, and Ctrl Keys for Windows" option
2. Connect the PC to the switch's Console Port using the console cable included with the switch. (If your PC or terminal has a 25-pin serial connector, first attach a 9-pin to 25-pin straight-through adapter at one end of the console cable.)
3. Turn on the PC's power and start the PC terminal program.
4. Press **Enter** two or three times and you will see the copyright page and the message "Press any key to continue". Press a key, and you will then see the switch console command (CLI) prompt.

NOTE: If you press Enter too many times and get past the log in, enter the command EN to get into the command line.

5. Type the following, then press **Enter**:

   ```
   menu
   ```

   If prompted to save the current configuration, answer no (press the n key) to proceed. The main menu opens.
6. On the main menu, choose **Switch Configuration,** then press **Enter**.
7. Select **IP Configuration**, then press **Enter**.
8. Press the right-arrow key to choose **Edit**, then press **Enter**. Tab to fields and enter information as follows:
   a. Change **Gateway** to be the default router.
   b. Tab to the **IP Config (DHCP/Bootp)** field and use the Space bar to select the **Manual** option.
   c. Tab to the **IP Address** field and enter the switch's control network IP address. Refer to "Networking tips" on page 106.
   d. Tab to the **Subnet Mask** field and enter the subnet mask used for your network.
9. Press **Enter**, then right-arrow to **Save**. Press **Enter** and revert to previous menu.

10. Select **Return to Main Menu** and press **Enter**.
11. From the main menu, chose **Console Passwords** and press **Enter**. The Set Password Menu opens.
12. Chose **Set Manager Password** and press **Enter**.
13. When prompted for the password, type a password of up to 16 ASCII characters with no spaces and press **Enter**. The password can be one that is used on other K2 devices, such as “adminK2” or “K2admin”, or it can be your site's administrator password.
14. When prompted to enter the password again, retype the password and press **Enter**.
15. Select **Return to Main Menu** and press **Enter**.
16. From the main menu, tab to **Command Line (CLI)** and press **Enter**. The command prompt appears.
17. Type the following, then press **Enter**:

    ```
    configure
    ```

    You are now in configuration mode.
18. Configure an administrator username. The username can be one that is used on other K2 devices, such as “administrator” or “K2admin”, or it can be your site's administrator username. For example, to set the username to “administrator” type the following, then press **Enter**:

    ```
    password manager user-name administrator
    ```
19. When prompted, enter and re-enter the password.
20. Set spanning tree to RSTP. Type the following, then press **Enter**:

    ```
    spanning-tree force-version rstp-operation
    ```

    This configures spanning tree, but it does not turn spanning tree on. You must turn spanning tree on using the switch’s Web interface, as explained in the next procedure “Configuring the GigE switch via the Web interface”.
21. Decide your SNMP community name as explained in the following options, then proceed with the next step:
    - If you decide to use a unique SNMP community name (not “public”), add the community and set its RW permissions. For example, if the community name is “K2”, type the following, then press **Enter**:

      ```
      snmp-server community K2 unrestricted
      ```
    - If you decide to use the default SNMP community “public” for NetCentral monitoring, which already has RW permissions set as required by NetCentral, proceed to the next step.
22. Enter the SNMP community and IP address of the NetCentral server PC. For example, if the IP address is “192.168.40.11” and the community is “public”, you type the following, then press **Enter**:

    ```
    snmp-server host public 192.168.40.11
    ```
23. Enable Authentication traps. Type the following, then press **Enter**:

```
snmp-server enable traps authentication
```

This allows NetCentral to test the switch to verify that it can send its SNMP trap messages to NetCentral.

24. Type the following, then press **Enter**:

```
menu
```

When prompted, save the configuration by pressing the y key. The main menu opens.

25. If you need a trunk for ISLs to gang switches together, use the following steps. These steps illustrate trunking the last three 1 Gig ports for three 1 Gig ISLs, which is the recommended configuration for ISLs on all multi-switch K2 Storage Systems. Refer to "Design considerations for Ethernet switches" on page 759 and consult with your Grass Valley representative if your requirements deviate from the recommended policy:

    a. At the main menu, select **Switch Configuration** and press **Enter**.

    b. Choose selection **Port/Trunk Settings** and press **Enter**.

    c. Press the right-arrow key to choose **Edit**, then press **Enter**.

    d. Down arrow until at the bottom of the list of ports and select the last (highest port number) 1 Gig port in the list.

    e. Right-arrow over to the Group column.

    f. Use the Space bar and set the bottom 1 Gig port to **Trk1**.

    g. Set the next port up also to **Trk1**.

    h. Set the next port up also to **Trk1**.

    i. Press **Enter**, then right-arrow to **Save**. Press **Enter** and revert to previous menu.

26. Select **Return to Main Menu** and press **Enter**.

27. From the main menu, tab to **Command Line (CLI)** and press **Enter**. The command prompt appears.

28. Check the version of firmware currently installed on the switch. Type the following, then press **Enter**:

```
show flash
```

Information is displayed similar to the following example:

```
HP_iSCSI_switch1# show flash
Image            Size(Bytes)    Date    Version
-----            -----------  --------  -------
Primary Image    : 3287779    03/15/05 M.08.66
Secondary Image  : 3287779    03/15/05 M.08.66
Boot Rom Version: I.08.07
Current Boot     : Primary
```

29. Check the Primary Image Version and refer to your *K2 Storage System Release*

Notes for information about currently supported versions. Then proceed as follows:

- If *K2 Storage System Release Notes* instruct you to change the firmware on the switch, do so before continuing. Refer to the documentation you received with the switch for instructions to change the firmware. Then continue with the next procedure "Configuring the GigE switch via the Web interface".
- If *K2 Storage System Release Notes* confirm that the version on the switch is a currently supported version, continue with the next procedure.

30. Type the following, then press **Enter**:

    `menu`

    The main menu opens.

31. From the main menu, choose **Reboot Switch** and press **Enter**. When prompted "Continue Reboot…?', answer yes (press the y key) to proceed. The switch restarts.

32. You can now use the switch's web browser interface for further configuration, as instructed in the next procedure.

33. Close the PC terminal program and disconnect the console cable.

Continue with the next procedure "Configuring the GigE switch via the Web interface".

Configuring the GigE switch via the Web interface

The following procedure is for the HP ProCurve switch 2900 series. Do not use this procedure on other switch models.

1. From the control point PC or another PC, make sure that you have a direct Ethernet cable connection to the switch, with no switches, routers, proxies, or other networking devices in between.
2. On the PC, open Internet Explorer and type the switch's IP address in the Address field, as in the following example.

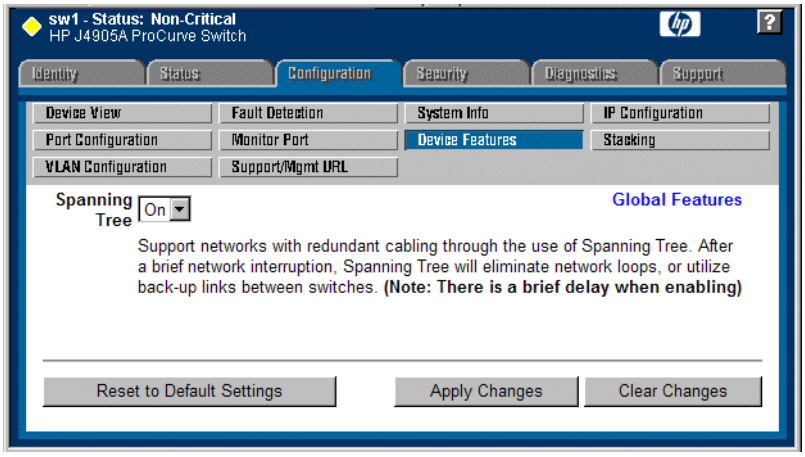
   `http://192.168.100.61`

   This should be the name or IP address as currently configured on the switch.
3. Press **Enter** to open the switch's configuration application.

NOTE: The configuration application for the HP ProCurve switch requires Java.

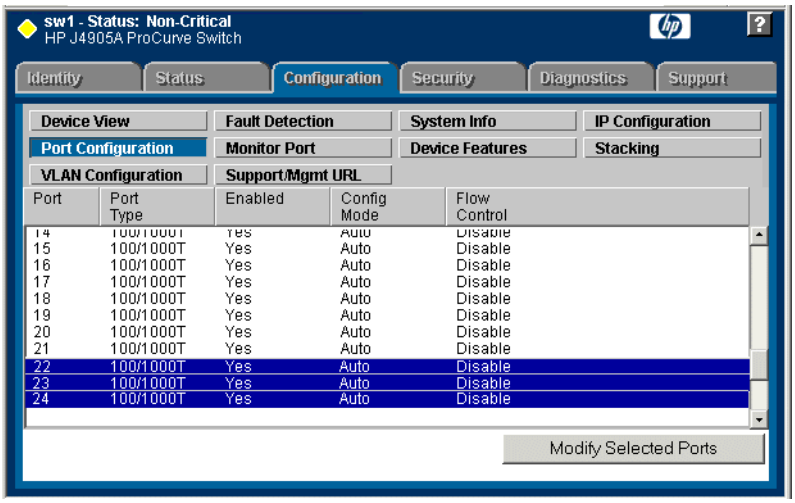
You can also access the switch's configuration application from the K2 System Configuration application.

4. In the switch's configuration application, choose **Configuration**, then **Device Features**.



5. Set Spanning Tree to **On** and click **Apply Changes**. If prompted, log in with the switch's administrator username and password.

6. Click **Port Configuration**.

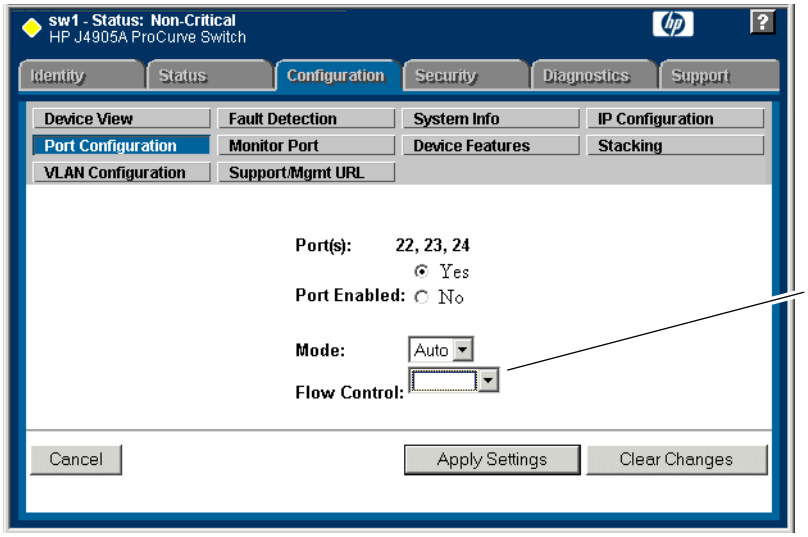


7. If you do not need trunks, such as on a one-switch system, skip to the next step in this procedure. If you need trunks, such as on a two-switch system with ISLs, do the following:

   a. Select (Ctrl + Click) the trunked ports. Typically the trunked ports are at the bottom of the list and are labeled Trk1.

   b. Click **Modify Selected Ports**.

      If prompted, log in as administrator.



c. For the trunked ports, set Port Enabled to **Yes**. On some switch models, some ports are disabled by default, so make sure you enable them. Leave Mode as default of **Auto**.

d. Set Flow Control as follows:

   - Set to **Enable**.

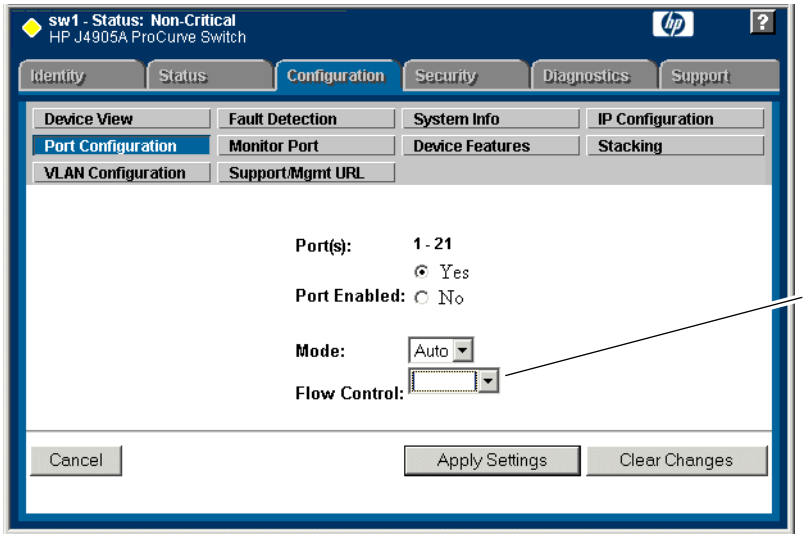
NOTE: This setting is for the 2900 series switch. Other switch models might require a different setting.

e. Click **Apply Settings**.

8. On the Port Configuration page, do one of the following:

   - If you do not have trunks, select all ports.
   - If you have trunks, select the remaining ports (the ports not trunked).

9. Click **Modify Selected Ports**.



10. Make sure Port Enabled is set to **Yes**, leave Mode as default of **Auto**.

11. Set Flow Control as follows:

- Set to **Enable**.

NOTE: This setting is for the 2900 series switch. Other switch models might require a different setting.

12. Click **Apply Settings**. Wait until settings are applied and the Web interface becomes active.

NOTE: If the switch is used for the Nearline system only and there is no K2 media (real-time iSCSI) traffic on the switch, there is no need to configure VLANs.

13. Close the switch configuration application.

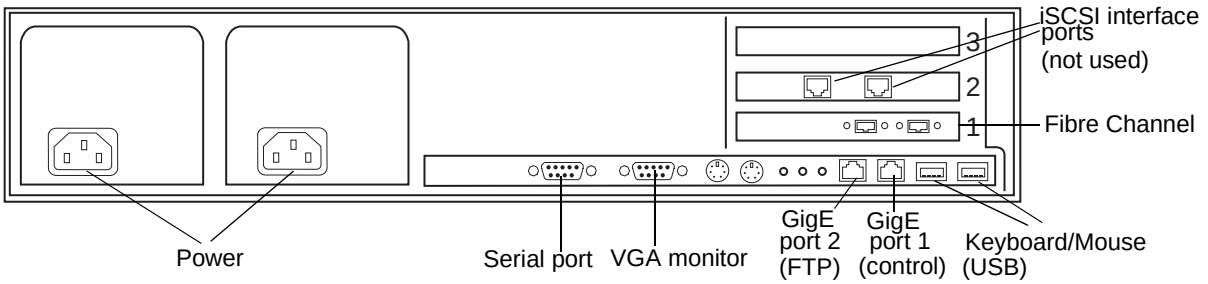
Setting up the K2 Media Server

Both the Dell PowerEdge 2850 and the Dell PowerEdge 2950 are qualified as platforms for the K2 Media Server. This section provides information on both platforms.

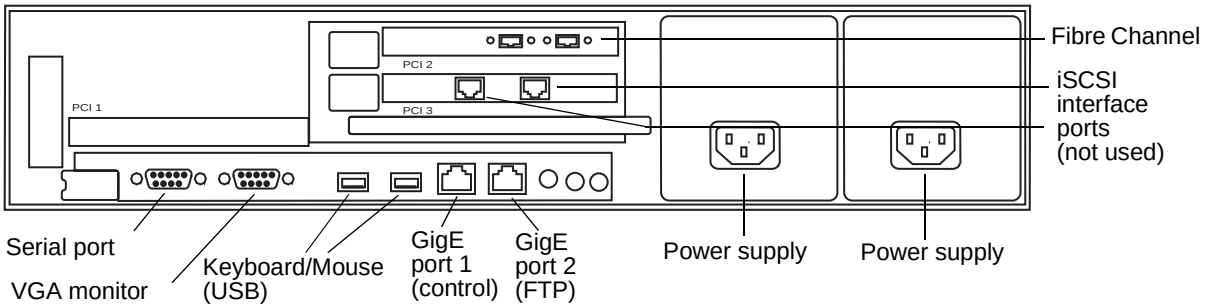
Do the following to prepare a K2 Media Server:

- Install the server in its permanent location. Refer to the rack mount instructions that you received with the server's product bundle.
- Provide power to the servers.
- Connect cables as follows:

Dell 2850 PowerEdge server



Dell 2950 PowerEdge server



Do not connect the iSCSI ports. They are not used for the Nearline storage system.

Connect the motherboard GigE port 1 and GigE port 2 to control ports on the GigE switch.

Connect one of the Fibre Channel ports to the RAID storage device.

- Assign a control network IP address to GigE port 1. Use standard Windows procedures. Refer to "Networking tips".
- Change the hostname. Use standard Windows procedures.
- Configure SNMP properties so the trap destination points to the NetCentral server PC. Use standard Windows procedures. If you are not using the SNMP community name "public", configure the community name and set permissions to RW. Also make sure that the Authentication trap is enabled.

Also refer to "K2 Media Server descriptions" on page 653.

Setting up the L3 RAID chassis

- Install the chassis in its permanent location. Refer to the for rack mount instructions.
- “Assign Fibre Channel address ID” on page 257.
- “Connect the L3 RAID chassis” on page 257
- “Assign chassis address on Expansion chassis” on page 258.

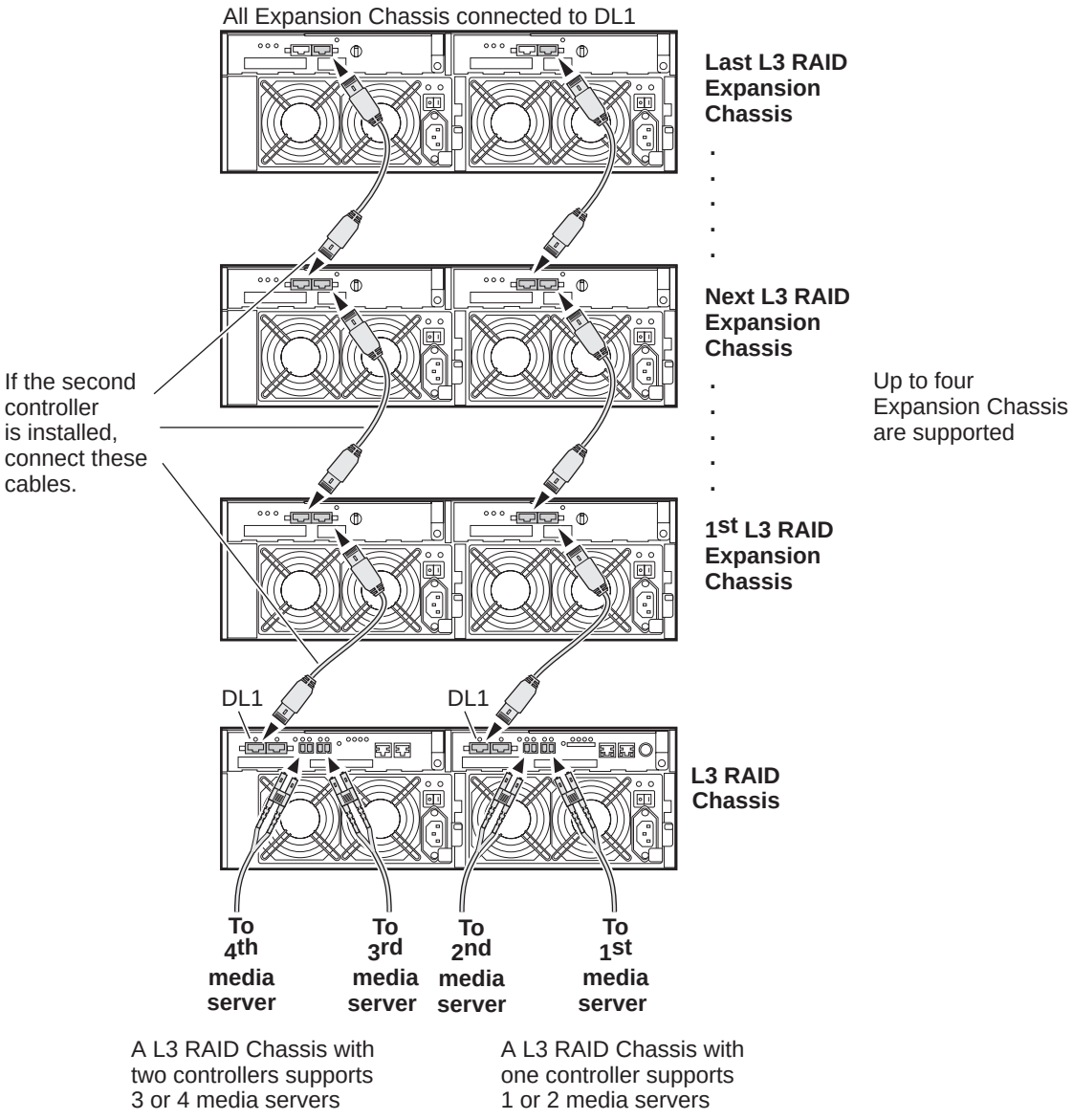
In addition, you will configure network settings, SNMP settings, and bind LUNs. These tasks are part of the K2 System Configuration application and Storage Utility procedures later in this chapter. The process of binding LUNs can take a significant amount of time—as much as eight hours—so you might want to put priority on the tasks necessary to start the LUN binding process, then catch up with other tasks while the LUNs are binding.

Assign Fibre Channel address ID

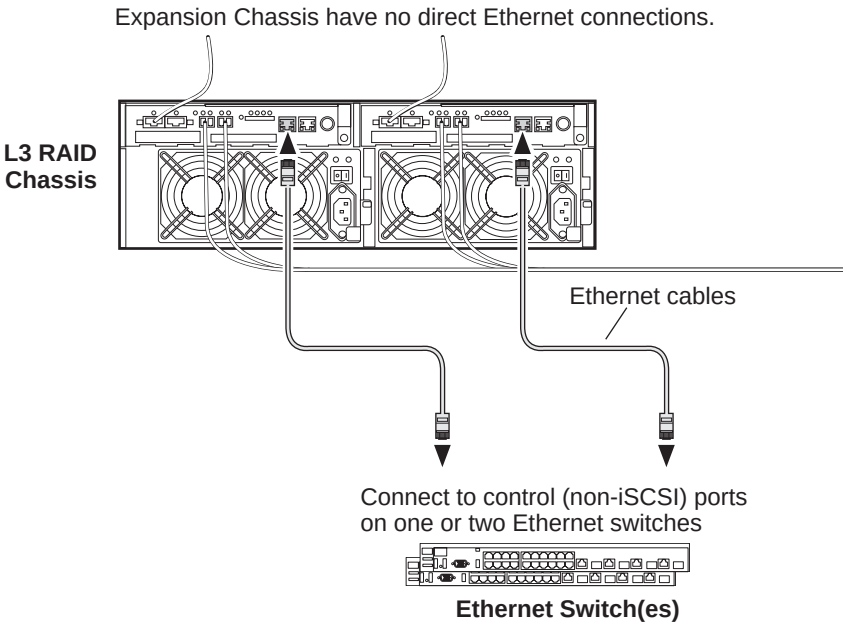
Every RAID controller must have a unique Fibre Channel address ID that identifies the controller on the Fibre Channel fabric. On the L3 RAID, you do not need to manually set the Fibre Channel address ID, as it is pre-set at the factory.

Connect the L3 RAID chassis

Connect Fibre Channel cabling.



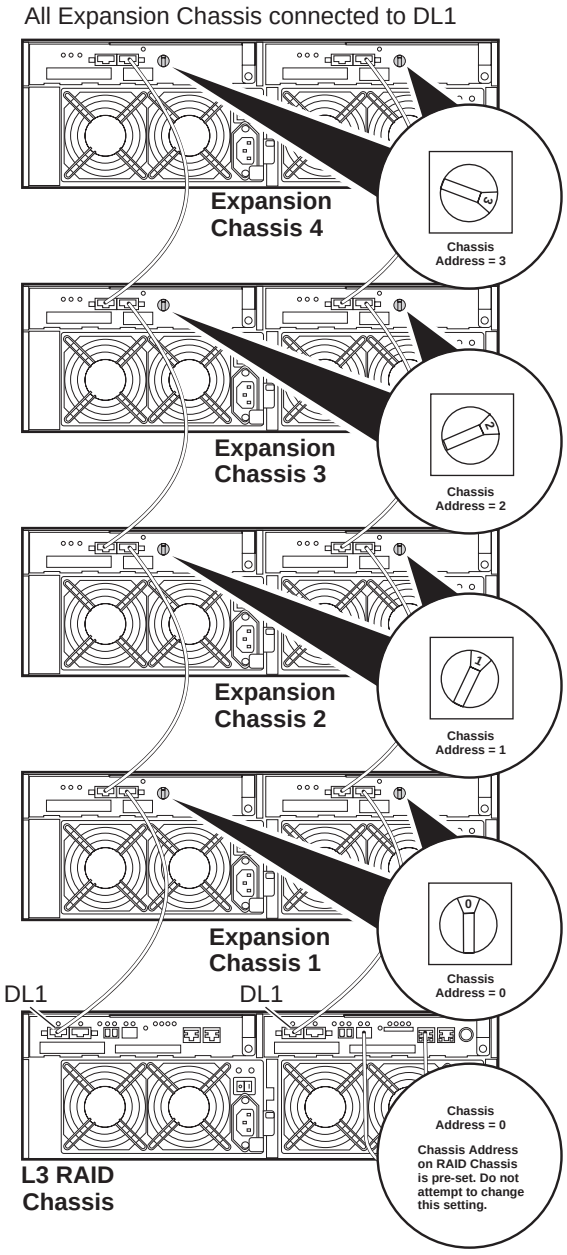
Install L3 RAID Ethernet cabling as shown.



Assign chassis address on Expansion chassis

Every chassis must have a chassis address. The Level three RAID chassis address is fixed at 0, so no configuration is required. However, if you have any L3 RAID Expansion chassis you must set their chassis addresses as shown in the following illustration. One each Expansion Chassis, set the same address on both Expansion adapters, regardless of whether or not the second Expansion adapter is connected to a second RAID controller.

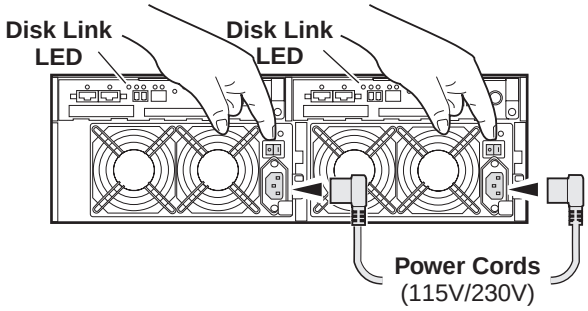
On each L3 RAID Expansion Chassis set the same chassis address on both Expansion adapters.



Do not swap Expansion chassis or otherwise reconfigure storage. If you connect a L3 RAID Expansion chassis to the wrong controller such that the Expansion chassis contains disk modules that were bound using a different controller you will lose your media file system.

Power on the L3 RAID chassis

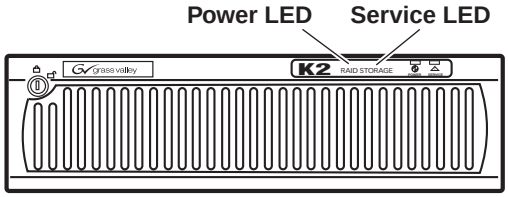
Connect power cords, and turn on power as shown. You must power-up any RAID Expansion chassis prior to, or at the same time as the RAID Controller chassis. Verify power-up as shown.



Power-up Verification

- DIR and SVP LEDs on the RAID controllers are blinking green
- Disk Link LED is steady ON green.
- FLT and BAT LEDs are OFF.
- The front Power LED is ON, Service LED is OFF after about 5 minutes.

  Refer to the *L3 RAID Instruction Manual* if there is a problem.



Your preparations for L3 RAID storage are now complete.

K2 configuration and NetCentral

Before you begin using the K2 System Configuration application to configure the storage system, you should set up the NetCentral system according to the following requirements:

- **NetCentral installed** — NetCentral server software must be installed on a NetCentral server PC. This can be the K2 configuration Control Point PC or another PC that has network communication with the K2 Storage System control network.
- **Device providers installed** — A device provider must be installed on the NetCentral server PC for each type of device in the K2 Storage System. For a nearline storage system, the following device providers must be installed:

  - Control point PC device provider — This is the Windows monitoring device provider.
  - K2 Media Server device provider
  - HP Gigabit Switch device provider or Cisco Gigabit Switch device provider
  - K2 L3 RAID storage device provider. This device provider supports RAID devices for Levels 10, 20, and 30.
- **Grass Valley PC Monitoring software installed** — This software must be installed on the K2 configuration Control Point PC. It includes Grass Valley SNMP agents and other WMI based components to perform process monitoring. This provides the information for some of the SNMP trap messages that must be sent to NetCentral.
- **Control Point PC monitored by NetCentral** — The K2 configuration Control Point PC should be added to the NetCentral system and fully monitored by NetCentral. This means that its SNMP trap destination is set to send SNMP traps to the NetCentral server PC. Whether the Control Point PC and the NetCentral server PC are the same PC or are different PCs, you should still add the Control Point PC to NetCentral.

Refer to the *NetCentral User Guide* to set up the NetCentral system. After installing a device provider, you can find additional documentation about monitoring that type of device on the NetCentral Help menu.

Networking for nearline

Use the topics in this section to configure the Gigabit Ethernet (GigE) network for the nearline storage system.

- "Networking requirements" on page 262
- "Networking tips" on page 262
- "Setting up host tables" on page 263
- "Testing the control network" on page 264

Networking requirements

Networking strategies for a Nearline Storage System are as follows:

- Two networks:

NOTE: The Nearline Storage System does not use the K2 media (iSCSI) network.

  - Streaming/FTP network — For media transfers and FTP traffic. This is the primary network for media moving to and from the Nearline storage system.
  - Control network — For all other non-streaming, non-iSCSI traffic.

- Networks must be on separate subnets.
- While control and FTP traffic is each on its own subnet, it is not required that each type of traffic has its own VLAN on GigE switches. For example, you make both FTP and control connections to the "control" ports (DEFAULT_VLAN) on the HP GigE switch.
- Machine names (host names) assigned to each K2 device.
- IP addresses for FTP/streaming ports must have name resolution such that hostnames are appended with the "_he0" suffix. You can use host tables (as in "Setting up host tables" on page 263) or another mechanism to provide the name resolution. This directs the streaming traffic to the correct port. Refer to the *K2 Media Client System Guide* for a complete explanation.
- Nearline K2 Media Servers must be on the streaming network, as they provide the FTP interface for shared storage streaming traffic.

Also refer to "About networks and FTP" on page 684 and "Design considerations for Ethernet switches" on page 759.

Use the following procedures as necessary to implement your networking strategies.

NOTE: It is recommended that you configure Streaming network IP addresses using the K2 System Configuration application, rather than doing so on the local machine using standard Windows procedures.

Networking tips

- Before beginning network configuration, determine the IP addresses and names needed for the machines in your K2 system. Work with the network administrator at your facility to have those IP addresses and names available for your use.

- Establish a consistent convention for machine names and IP addresses. It is recommended that you embed a root name or other unique identifier for this particular K2 Storage System in the computer name. Also, a common convention for IP addresses is to use a numerical pattern or sequence in the IP addresses to indicate device-types and/or ports, as in the following example:

NOTE: This example assumes a subnet mask of 255.255.255.0

Example of Nearline storage system names and IP addresses

Computer name	Device type	Streaming network addresses	Control network addresses	Comments
root_server_1	K2 Media Server	192.168.101.11[a]	192.168.100.11	All servers use the streaming network in their role of FTP server and the control network in their role as media file system server.
root_server_2	K2 Media Server	192.168.101.21[b]	192.168.100.21	
root_server_3	K2 Media Server	192.168.101.31[c]	192.168.100.31	
root_server_4	K2 Media Server	192.168.101.41[d]	192.168.100.41	
root_raid_1	RAID	—	192.168.100.51	Each RAID controller is on the control network for monitoring.
root_raid_2	RAID	—	192.168.100.52	
root_gige_1	GigE switch	—	192.168.100.61	—
root_cppc_1	Control point PC	—	192.168.100.81	—

[a.] This IP address must resolve to hostname root_server_1_he0
[b.] This IP address must resolve to hostname root_server_2_he0
[c.] This IP address must resolve to hostname root_server_3_he0
[d.] This IP address must resolve to hostname root_server_4_he0

Setting up host tables

The *hosts* file is used by the control network and the streaming/FTP network to determine the IP address of devices on the network when only a the device name (hostname) is given. The steps that follow describe how to edit the *hosts* file located at *C:\Windows\system32\drivers\etc\hosts* on Windows XP and Windows 2003 Server operating system computers. If you include the names and addresses of all the devices on the network, then you can copy the same file onto all the other K2 devices instead of editing the *hosts* file on each K2 device.

For FTP transfers on a K2 Storage System, transfers go to/from K2 Media Servers that have the role of FTP server. No transfers go directly to/from the shared storage K2 Media Clients that are on the K2 Storage System. So in the hosts file, you must add the “he_0” extension to a K2 Media Server hostname and associate that hostname with the K2 Media Server’s FTP/streaming network IP address.

Refer to the *K2 Media Client System Guide* for more information.

To edit the *hosts* file manually:

1. Open the following file using Notepad or some other text editing application:

   C:\Windows\system32\drivers\etc\hosts

2. Enter all IP addresses with machine names. The text format is simple. First type the Ethernet IP address, then use the TAB key or Space bar to insert a few spaces. Then type the machine name.

   Here is an example:

```
192.168.100.11     root_server_1
192.168.101.11     root_server_1_he0
192.168.100.21     root_server_2
192.168.101.21     root_server_2_he0
192.168.100.31     root_server_3
192.168.101.31     root_server_3_he0
192.168.100.41     root_server_4
192.168.101.41     root_server_4_he0
192.168.100.51     root_raid_1
192.168.100.61     root_gige_1
```

3. Save the file and exit the text editor.
4. Copy the new *hosts* file onto all the other machines. This is easier than editing the file on each machine.

Host table tips

- If transferring to or from a Profile XP or Open SAN system via UIM, the *hosts* file must also follow UIM naming conventions for those systems. Refer to the UIM Instruction Manual.
- Do not enter media (iSCSI) network IP addresses in the host table, as hostname resolution is not required for the media network.

Testing the control network

To test the control network use the *ping* command as follows:

1. On the control point PC, click **Start | Run**. The Run dialog box opens.
2. Type `cmd` and click **OK**. The command prompt window opens.
3. Type `ping`, then a space, then the name of one of your K2 Storage System devices, such as the Gigabit Ethernet switch, as in the following example:

```
ping root_gige_1
```

4. Press **Enter**.

   The ping command should return the IP address of the device, as in the following example:

```
Pinging root_gige_1.mycorp.com [192.168.100.61] with
```

```
32 bytes of data:

Reply from 192.168.100.61: bytes=32 time=10ms TTL=127
Reply from 192.168.100.61: bytes=32 time<10ms TTL=127
Reply from 192.168.100.61: bytes=32 time<10ms TTL=127
Reply from 192.168.100.61: bytes=32 time<10ms TTL=127
```

This verifies that the name of the device is being correctly resolved to the IP address, which indicates that on the Control Point PC the host table entry is correct.

5. Ping the other K2 Storage System devices to which you have assigned control network IP addresses.
6. Go to each Windows device in the K2 Storage System and repeat this procedure. This verifies that network communication is correct to and from all devices.

Configuring the nearline storage system

Use the topics in this section to do the initial configuration of the nearline storage system.

- "Prerequisites for initial configuration" on page 266
- "Defining a new K2 Storage System" on page 267
- "Configuring the server - Part 1" on page 269
- "Configuring RAID" on page 271
- "Creating a new file system" on page 278
- "Configuring the server - Part 2" on page 279
- "Configuring remaining servers" on page 281

Prerequisites for initial configuration

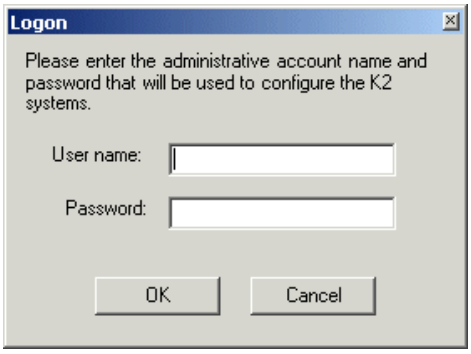
Before beginning your initial configuration, make sure the devices of the K2 Storage System meet the following prerequisites. Refer to sections earlier in this manual for detailed information. Also refer to Chapter 14, "Description of K2 Storage Devices".

Devices	Prerequisite for nearline configuration
Control point PC	Ethernet cable connected Control Point software installed Control network IP address assigned Network communication over the control network with all other K2 devices Power on
Ethernet switch	Ethernet cables connected Control network IP address assigned Power on
K2 Media Server	Ethernet cables connected Fibre Channel cable connected Software installed, as from the factory, including QuickTime 7 Control network IP address assigned Power on for all servers
L3 RAID chassis	Fibre Channel cable(s) connected Ethernet cable(s) connected Power on
L3 RAID Expansion chassis	Fibre channel cable(s) connected Power on

Defining a new K2 Storage System

Define a nearline K2 Storage System as follows:

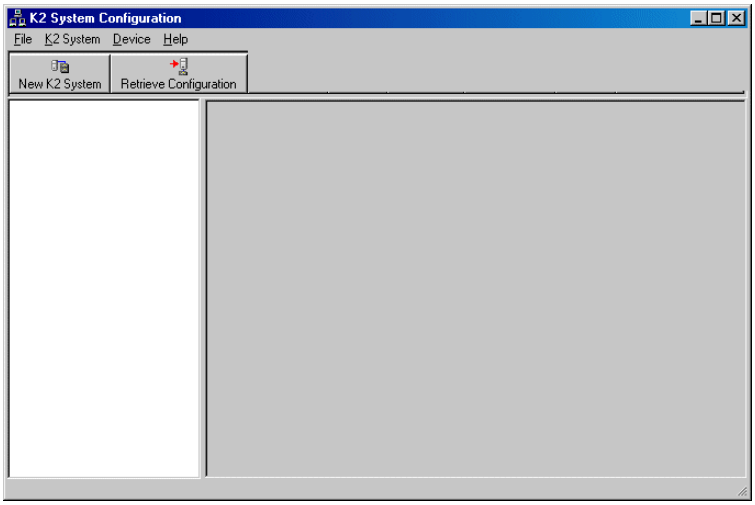
1. On the control point PC, open the K2 System Configuration application. A login dialog box opens.



2. Log in to the K2 System Configuration application with the Windows administrator account. By default this as follows:

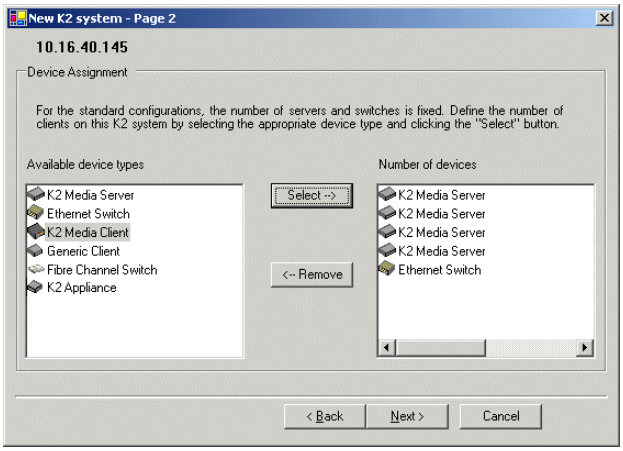
   - Username: administrator
   - Password: adminK2

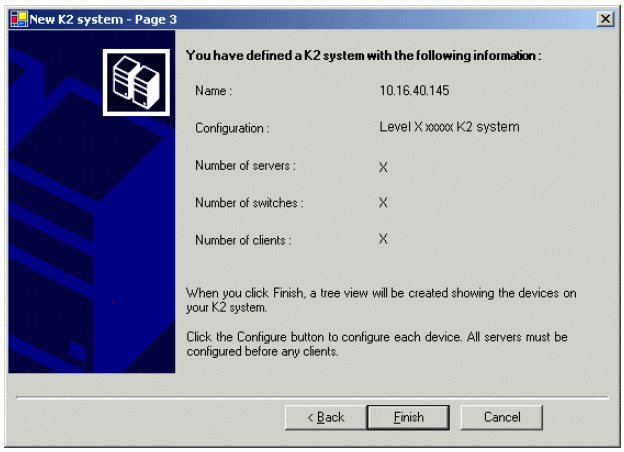
   Refer to "Setting up application security" on page 688 for more information about administrator accounts and logging in to applications.



3. Click **New K2 System**. The New K2 System wizard opens.

4. Follow the on-screen text to define your nearline K2 Storage System, as described in the following table.

On this page...	Do this...
Page 1	 Create a name for your Nearline K2 Storage System and type it in the Name box. Select **Nearline**. The Server redundancy option is not selected and is disabled. This option applies to media database redundancy. Since the Nearline system has no media database, this setting is correct for both redundant and non-redundant Nearline systems. Click **Next**
Page 2	 Move K2 Media Servers into the Number of Devices box, as appropriate for your system. Move one or more Ethernet switches into the Number of Devices box. If a switch is also part of another K2 Storage System, it is allowed to make it part of the Nearline system as well. The wizard does not allow you to move any clients into the Number of Devices box. There are no K2 Media Clients or generic clients on a Nearline system. Click **Next**.

On this page…	Do this…
Page 3	 Review the information on this page and verify that you have correctly defined your K2 Storage System. For a Nearline storage system you should have the following: • Up to four K2 Media Servers • One or more Ethernet switches Click **Finish**. The Define New K2 Storage System wizard closes.

Your K2 Storage System appears in the tree view of the K2 System Configuration application.

5. Continue with the next procedure.

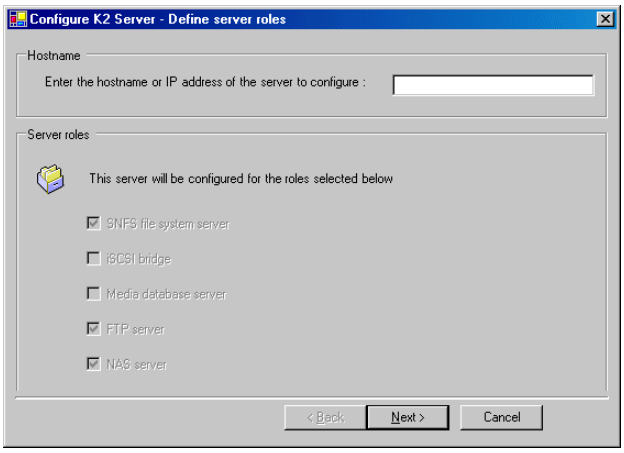
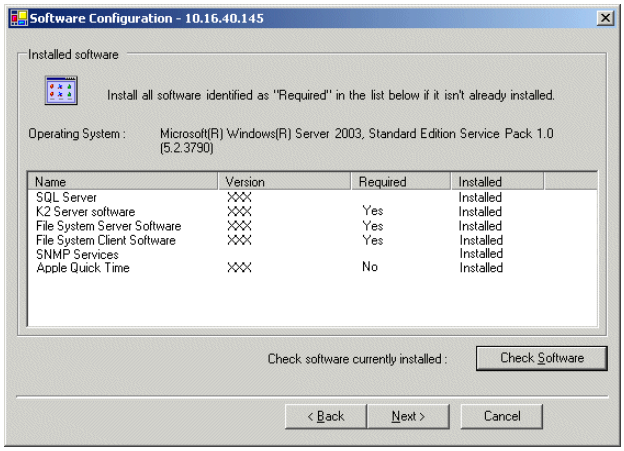
Configuring the server - Part 1

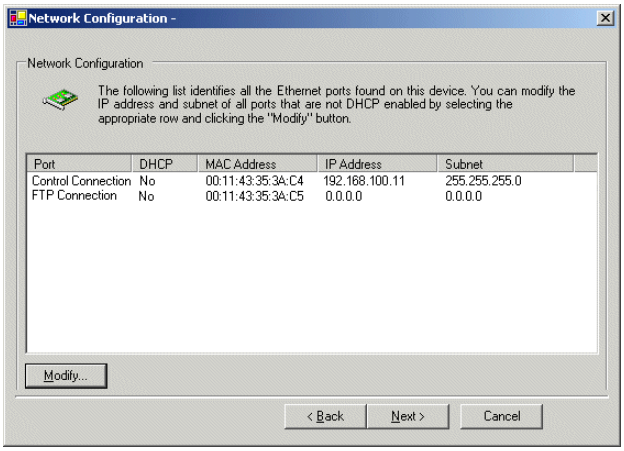
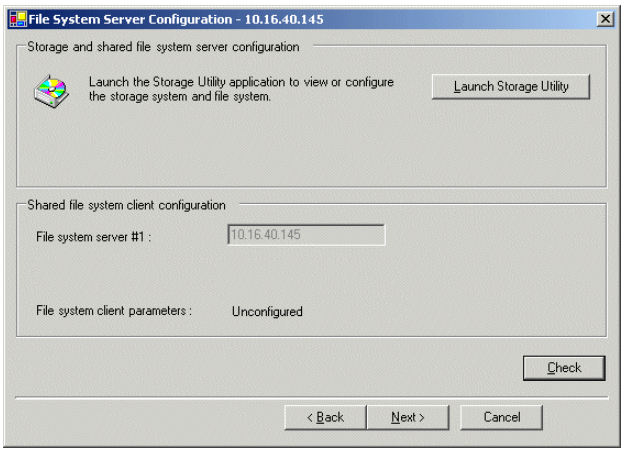
1. In the K2 System Configuration application tree view, select [**K2Server1]**.

2. Click the **Configure** button.

The Configure K2 Server wizard opens. Follow the on-screen text to configure theK2 Media Server for a Nearline K2

Storage System, as described in the following table:

On this page...	Do this...
Define server roles	 Enter the name or IP address for the K2 Media Server, as currently configured on the machine. For Nearline server roles, selections are disabled. Leave **SNFS file system server**, **FTP server**, and **NAS server** selected. The wizard does not allow you to select Media Database Server. There is no Media Database Server in a nearline system. Click **Next**
Software Configuration This page checks for the software required to support the roles you selected on the previous page. Software required on a Nearline K2 Media Server is as follows: • K2 Server • File System Server • File System Client • QuickTime ***NOTE:***	 If software with *Yes* in the Required column reports as *Not Installed*, you must first install it on the K2 Media Server before continuing. Refer to *Chapter 16, Managing K2 software*. After installing the software, click **Check Software**. When all required software reports as *Installed*, click **Next**.

On this page…	Do this…
Network Configuration This page displays the control network Ethernet port, and allows you to configure the FTP/ Streaming network Ethernet port. ***NOTE: This page does not configure the iSCSI interface (media network) ports.***	 The top port is the port over which the K2 System Configuration application is communicating with the K2 Media Server. If correctly configured, it is already assigned the control network IP address, as displayed on this page. Select the other port and click **Modify**. A network configuration dialog box opens. Enter the FTP/Streaming IP address and the subnet mask and click **Apply**. Click **Next**.
File System Server Configuration	 Click **Launch Storage Manager**. Storage Utility opens.

3. Continue with the next procedure to use Storage Utility to configure the file system.

   Leave the Configure K2 Server wizard open while you are using Storage Utility. When you are done with Storage Utility, you continue with the wizard.

Configuring RAID

Use Storage Utility to complete the configuration of the L3 RAID chassis, as explained in the following topics:

- "Verifying controller microcode"

- "Configuring RAID network and SNMP settings"
- "Binding disk modules"

Refer to "Prerequisites for initial configuration" on page 266 to confirm that the RAID storage is ready for configuration.

Verifying controller microcode

Nearline systems require that the RAID controller or controllers be loaded with nearline microcode. At the time of this writing, this is specified as 05ND microcode. Refer to *K2 Storage System Release Notes* for the most recent version specification.

To check the controller microcode version, in Storage Utility select the controller in the tree view and the microcode version is displayed in the right-hand panel of the Storage Utility window. If the microcode is not correct for a Nearline system, load the correct microcode version before continuing. Refer to "Loading RAID controller microcode" on page 751 for procedures.

Configuring RAID network and SNMP settings

Use the Storage Utility to configure the following settings for the Level 3 RAID controller or controllers:

- IP address
- Subnet mask
- Gateway Address
- SNMP trap destinations

For L3 RAID, network and SNMP settings are set and stored on the RAID controller module. For the RAID chassis with two controllers, each controller has its own network settings and the RAID chassis exists as two entities on the control network.

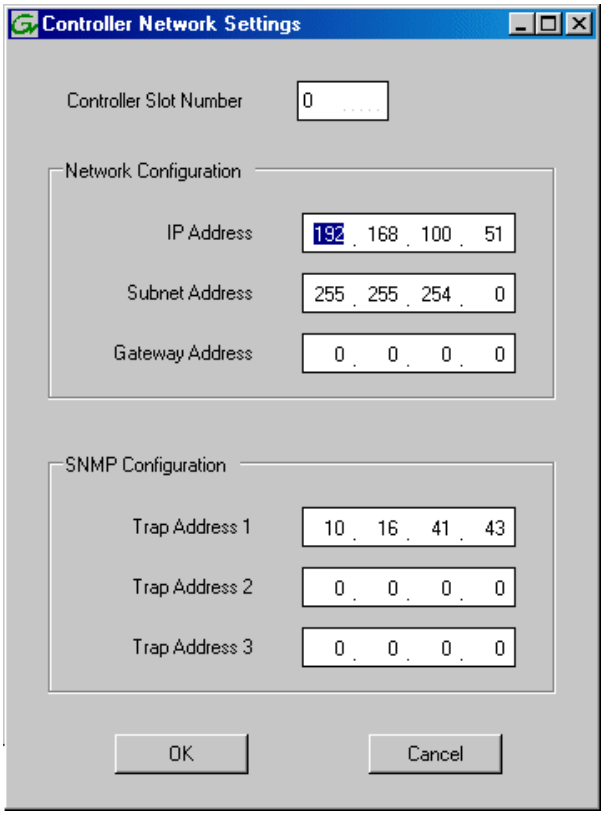
The RAID storage device is configured by default for the SNMP community name "public". If your site's policies require using a different SNMP community name, contact your Grass Valley representative.

To configure these settings, do the following:

1. Launch Storage Utility from the K2 System Configuration application as in the previous procedure.
2. As prompted, wait while Storage Utility gathers system information, then Storage Utility opens.
3. In Storage Utility tree view, expand the node for the L3 RAID, right-click the icon for a L3 RAID controller, and select **Configuration | Network Properties**.

   The Controller Network Settings dialog box opens.

   For a L3 RAID chassis with two controllers, you can make settings on both controllers using this dialog box.



4. In the Controller Slot Number field enter **0** and then press **Enter**. The settings from controller 0 are loaded into the Controller Network Settings dialog box and are available for you to modify.
5. Enter the control network IP address and other network settings.
6. You want SNMP trap messages go to the NetCentral server PC, so for SNMP Configuration enter the IP address of the NetCentral server PC. You can also enter IP addresses for other SNMP managers to which you want to send SNMP trap messages.
7. For the RAID chassis with two controllers, in the Controller Slot Number field enter **1** and then press **Enter**. The settings from controller 1 are loaded into the Controller Network Settings dialog box and are available for you to modify. Repeat the previous steps to configure controller 1.
8. Click **OK** to save settings and close.
9. In Storage Utility click **View | Refresh**. Continue with the next procedure "Binding disk modules".

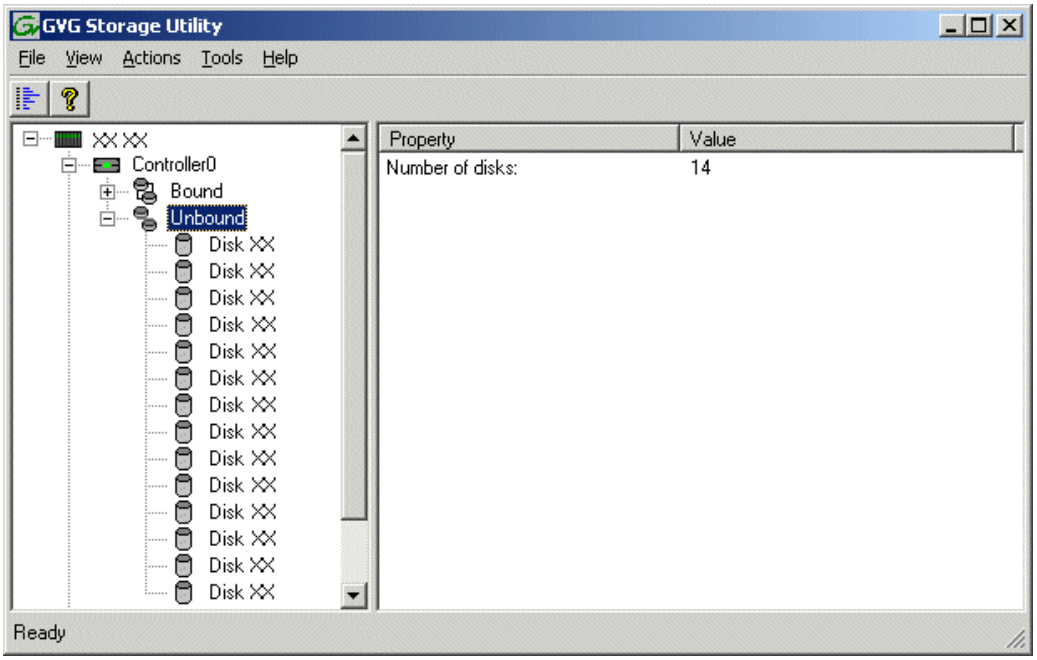
Binding disk modules

Use the following procedure to bind disk modules as required for the nearline storage system.

Also refer to "About RANKs and LUNs in Storage Utility" in Chapter 15, *Overview of K2 Storage Tools*.

NOTE: Binding destroys all user data on the disks.

1. In the Storage Utility main window, identify bound RANKs and unbound disks by their placement in the hierarchy of the tree view. In the following illustration, disk numbers are represented by “XX”. Refer to “Identifying disks” on page 744 for an explanation of how disks are actually numbered in Storage Utility.



Nearline systems store metadata files and journal files on the primary RAID chassis, which requires a RAID 1 RANK (two disks) for metadata storage and a RAID 1 RANK (two disks) for journal storage. On a Nearline system, these disks must be Fibre Channel disks. The RAID 1 RANKs must be bound from the first four disks (counting from left to right as you face the front of the RAID chassis) in the primary RAID chassis. These disks must be 15K rpm drives. In addition, the fifth disk in the primary RAID chassis (also a 15K drive) is bound as a Hot Spare. This fifth 15K disk then provides Hot Spare functionality for the other four 15K disks (the RAID 1 RANKs) only. Refer to “Binding Hot Spare drives” on page 751 for more information.

View disk properties and identify the four disks you will use for the RAID 1 RANKs, the one 15K Hot Spare disk, and the remainder of the disks that are available for media storage RANKs. Make sure you select disks appropriately as you bind RANKs in the remainder of this procedure.

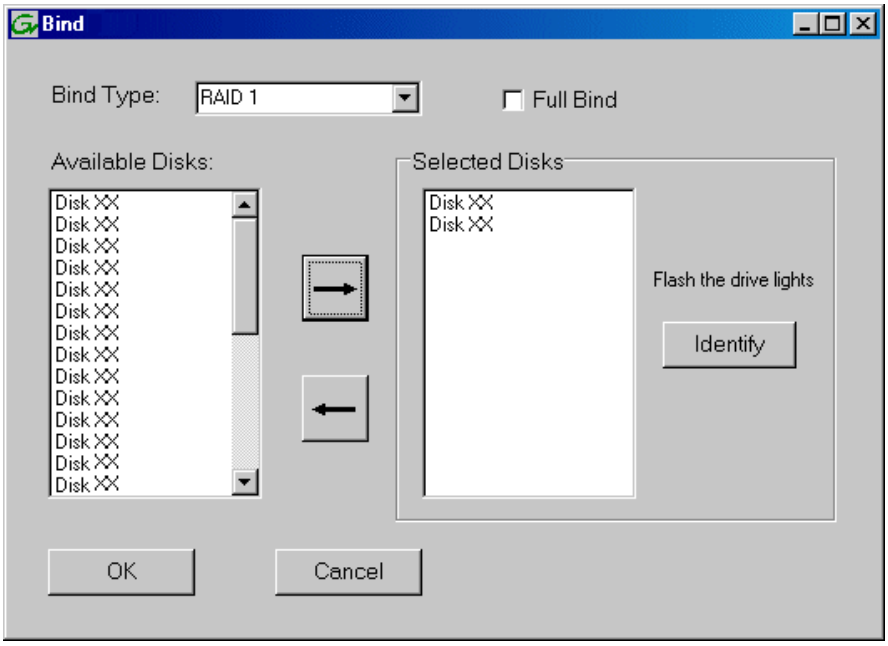
View disk properties and identify the four disks you will use for the metadata/journal RAID 1 RANKs, the one metadata/journal Hot Spare disk, any other disks that you intend to use for Hot Spares, and the remainder of the disks that are available for media storage. Make sure you select disks appropriately as you bind disks in the remainder of this procedure.

2. For systems that use RAID 1 RANKs, you must now create the separate RAID 1 storage for metadata files and journal files. To bind unbound disks for metadata and

journal storage, do the following:

a. Right-click the **Unbound** node for the controller, then select **Bind** in the context menu. (If the RAID chassis has two controllers, both controllers are represented by the single “Controller” node)

   The Bind dialog box opens showing all unbound disks for the controller listed in the Available Disk list.



b. Leave **Full Bind** unchecked. Refer to “About full/background bind” on page 748.

c. In the **Bind Type** drop down box, select **RAID 1**.

d. In the Available Disks box, select two contiguous disks at the top of the list. These should be the first two disks in the primary RAID chassis. (TIP: Use ‘shift-click’ or ‘control-click’ to select disks.) This creates a RAID 1 RANK for metadata storage.

e. Click the add (arrow) button to add disks to the Selected Disks list.

NOTE: As an aid in identifying a disk module’s physical location, select it in the Selected Disks list, then click* Identify Disks. *This causes the disk drive light to flash.

f. Click **OK** to close the Bind dialog box and begin the binding process. The Progress Report dialog box opens, showing the status of the binding process.

g. Close the Progress Report and repeat the previous steps, selecting two more contiguous disks to create another RAID 1 RANK for journal storage. These should be the next two disks in the primary RAID chassis.

h. Make the fifth disk in the primary RAID chassis a Hot Spare. In the **Bind Type** drop down box, select **Hot Spare**.

i. In the Available Disks box, select the fifth disk in the primary RAID chassis.

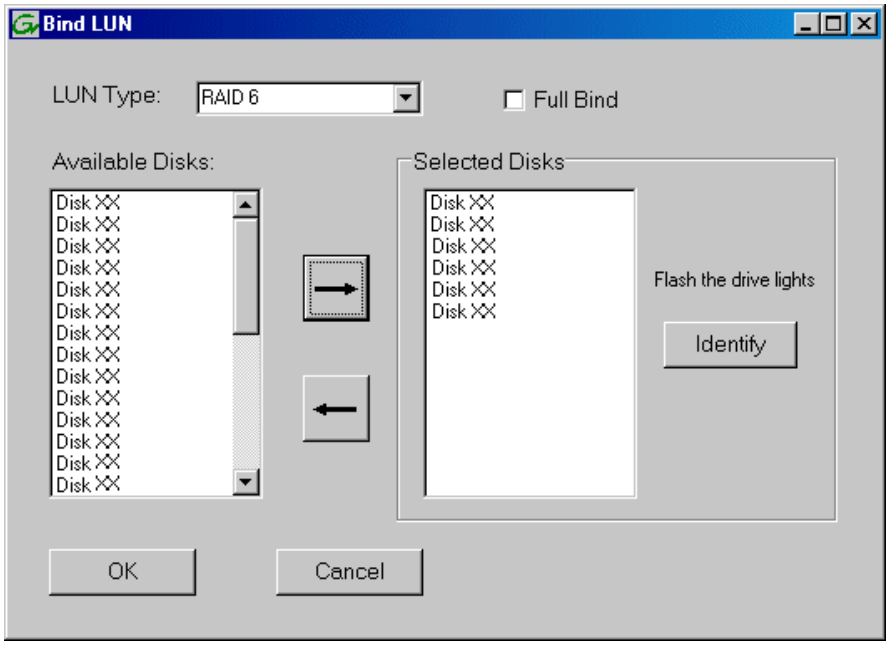
j. Click the add (arrow) button to add the disk to the Selected Disks list.

k. Click **OK** to close the dialog box and begin the binding process.

3. To bind unbound disks for media storage, do the following:

   a. Right-click the **Unbound** node for a controller, then select **Bind** in the context menu. (If the RAID chassis has two controllers, both controllers are represented by the single "Controller" node)

      The Bind dialog box opens showing all unbound disks for the controller listed in the Available Disk list.



   b. Leave Full Bind unchecked. Refer to "About full/background bind" on page 748.

   c. In the **Bind Type** drop down box, select **RAID 6**. (SATA drives on a Nearline system must be bound as RAID 6 RANKs.)

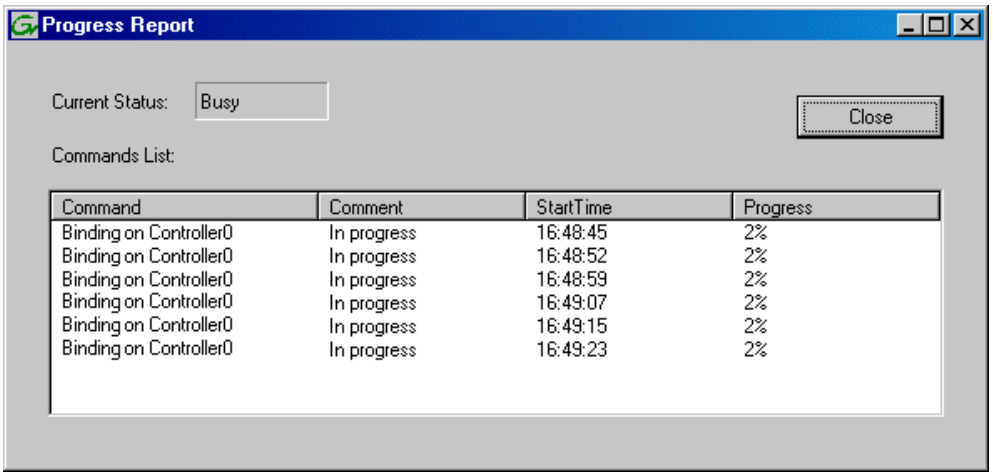
   d. In the Available Disks box, select six contiguous disks at the top of the list. (TIP: Use 'shift-click' or 'control-click' to select disks.).

NOTE: It is allowed to combine disks from different chassis to make up a RANK. This is necessary for RAID 6, since the chassis contains fifteen disks.

   e. Click the add (arrow) button to add disks to the Selected Disks list.

NOTE: As an aid in identifying a disk module's physical location, select it in the Selected Disks list, then click* Identify Disks. *This causes the disk drive light to flash.

   f. Click **OK** to close the Bind dialog box and begin the binding process. The Progress Report dialog box opens, showing the status of the binding process.



g. Close the Progress Report and repeat these steps for other unbound disks. If specified by your system design, you can bind some disks as Hot Spares, as explained in "Binding Hot Spare drives" on page 751. When you are done, if you did not bind any extra Hot Spares, you should have the following results:

   For nearline storage, on the primary RAID chassis you should have two RAID 1 RANKs of two disks each and one Hot Spare Disk. The remainder of the disks (in one or more Expansion chassis) should be bound as RAID 6 RANKs, with six disks to a RANK. If have an even number of Expansion chassis (either two chassis or four chassis), you should have five RAID 6 RANKs across every two chassis. If you have an uneven number of chassis, you will have three drives left over that do not fit in one the six drive RANKs. You can bind these extra drives as Hot Spares if desired.

h. Click **Close** in Progress Report window.

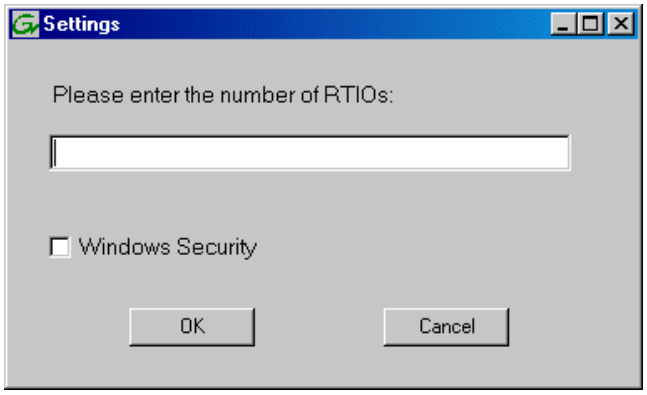
4. Restart the K2 Media Server.

NOTE: Make sure start up processes on the K2 Media Server are complete before proceeding.

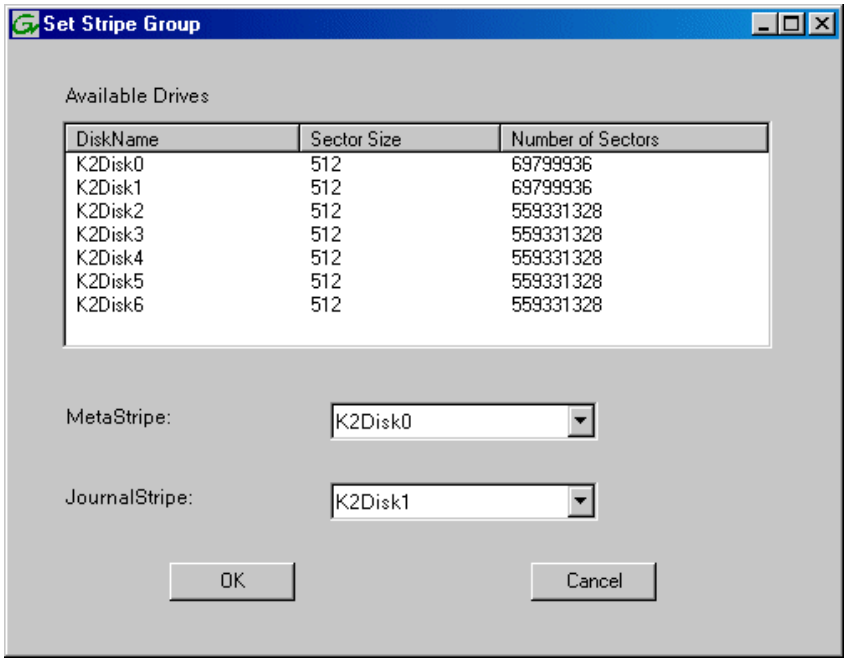
5. Continue with the next procedure "Creating a new file system".

Creating a new file system

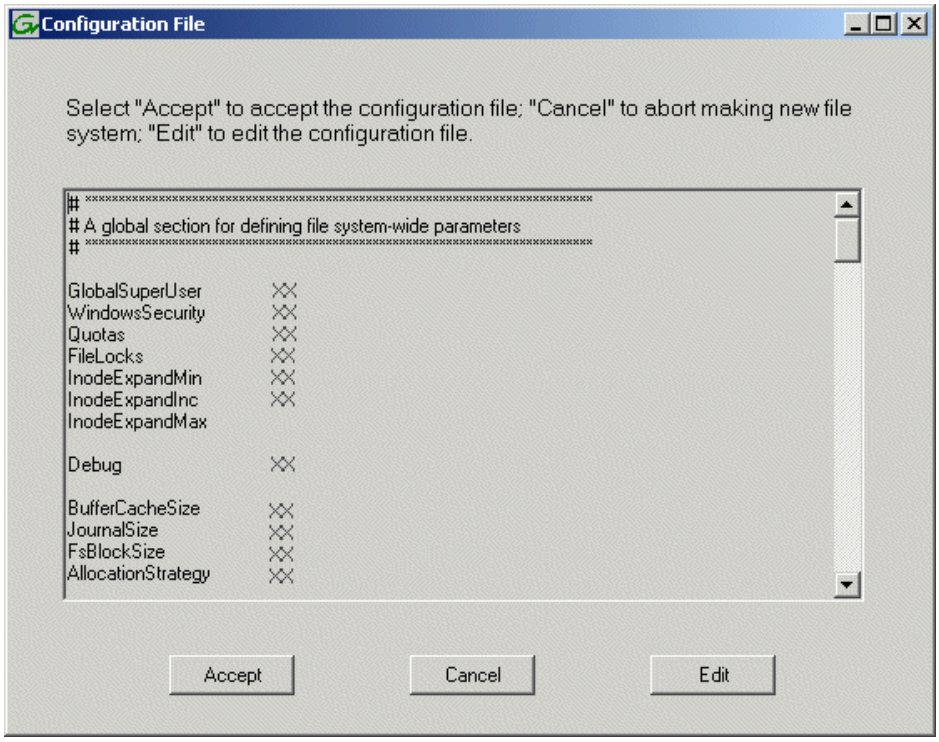
1. In Storage Utility, click **Tools | Make New File System**. The Setting dialog box opens.



2. For a Nearline system, enter zero as the Real Time Input/Output (RTIO) rate.
3. Leave Windows Security unchecked.
4. Click **OK**. The Set Stripe Group dialog box opens.



5. If you have RAID 1 RANKS, assign a RAID 1 RANK as a metadata stripe and another RAID 1 RANK as a journal stripe. You can distinguish RAID 1 RANKs from media RANKs by the value in the Number of Sectors column.
6. Click **OK**. The Configuration File dialog box opens.



The configuration file for the media file system is displayed. You can verify media file system parameters by viewing this file. Do not edit this file. Click **Accept**.

A "…Please wait…" message box displays progress and a "…succeeded…" message confirms the process is complete.

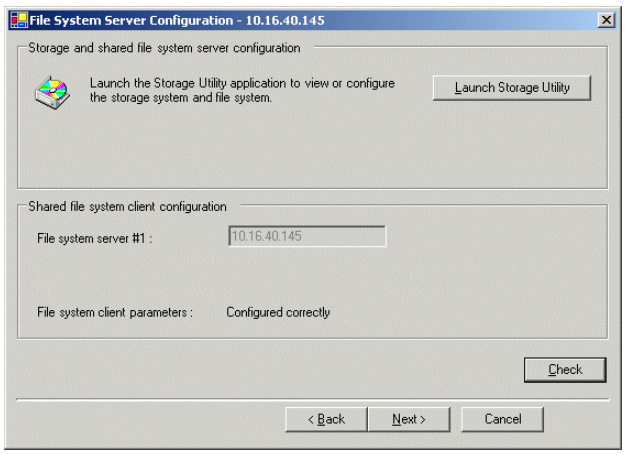
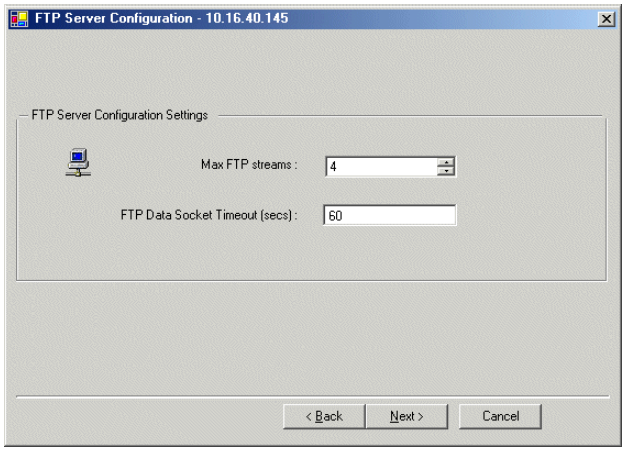
7. A message informs you that you must restart the K2 Media Server, however the restart at the end of the Configure K2 Server wizard suffices, so you do not need to restart now.
8. Close the Storage Utility.

NOTE: Do not attempt to bring the K2 Storage System online until instructed to do so later in this chapter.

9. Continue with the next procedure.

Configuring the server - Part 2

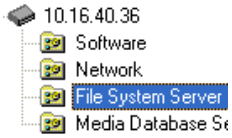
1. Return to the Configure K2 Server page from which you launched Storage Utility and proceed as described in the following table:

On this page…	Do this…
File System Server Configuration This page checks on the configuration of the server in one of its main roles as a file system server. The server also functions as a file system client, which is also checked from this page.	 Click **Check**. When the wizard reports that the configuration is correct, click **Next**. If you get a "The V: will not be available until this device is rebooted…" message, you can safely continue with this procedure and follow the instructions related to this message later in the procedure.
FTP Server Configuration	 Do not modify these settings. Leave at default values of Max FTP streams = 4 and FTP Data Socket Timeout = 60. Only qualified Grass Valley personnel should specify other values, as these settings are intended for use only with custom systems designed by Grass Valley. Click **Next**
Completing the Configuration Wizard	Click **Finish**. The wizard closes. The server restarts. Wait until all startup processes have completed before continuing.

2. If you got a "The V: will not be available until this device is rebooted…" message on the File System Server Configuration page, after the K2 Media Server restarts, do the following:

   a. In the K2 System Configuration application tree view, under the K2 Media

Server select the File System Server node.



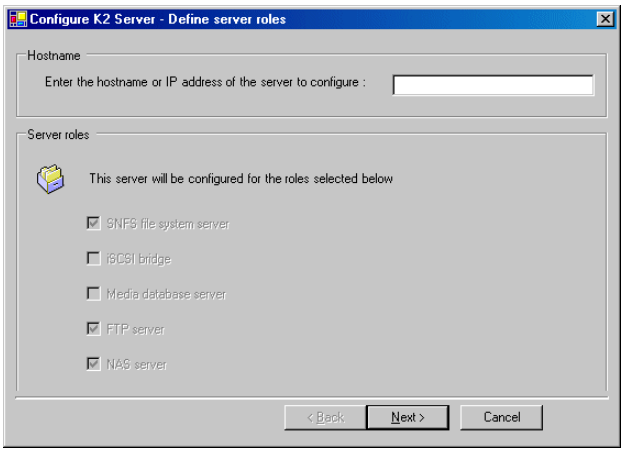
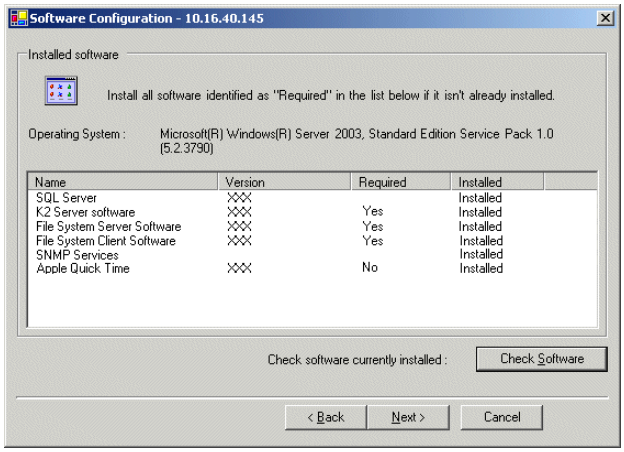
The File System Server Configuration page appears.

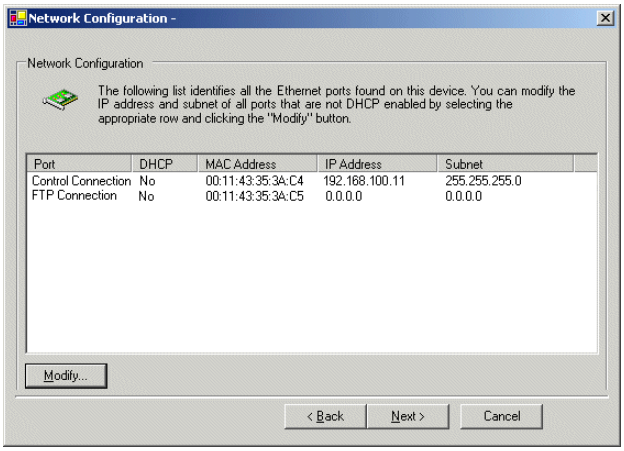
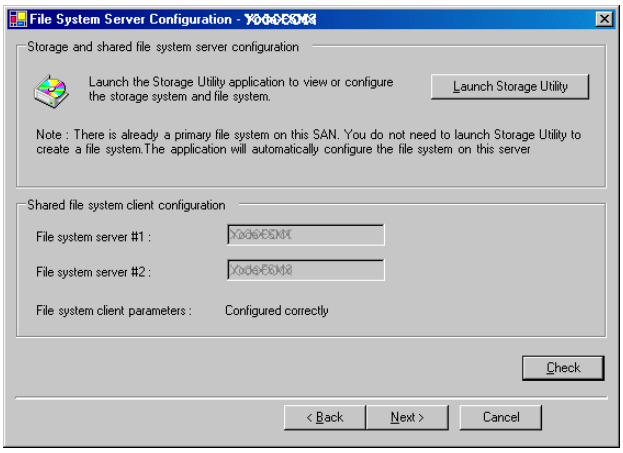
b. Click **Check** and verify that the V: drive is shared. This is required for NAS server functionality.

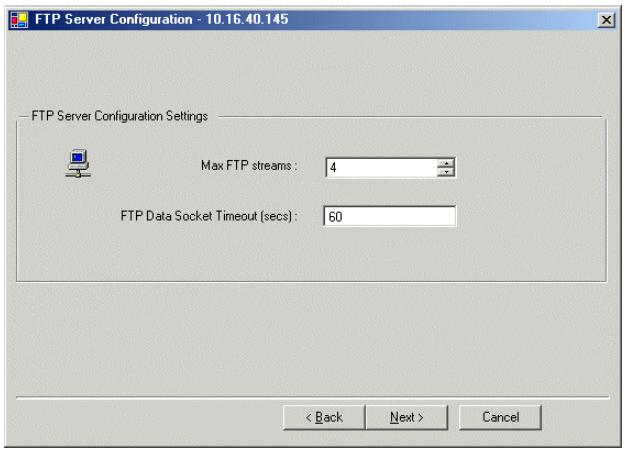
Configuring remaining servers

On Nearline systems, all K2 Media Servers are identical, with the exception that only one server can be the active media file system server at any time. For this reason the K2 System Configuration application embeds the configuration and start of the media file system into the wizard when you configure the first K2 Media Server, as in the previous procedure. That server is now the acting media file system server. If you have more than one K2 Media Server, you can now configure the remaining servers using the following procedure.

1. In the K2 System Configuration application tree view, select the K2 Media Server you are configuring.
2. Click the **Configure** button. The Configure K2 Server wizard opens. Follow the on-screen text to configure the server for a nearline K2 Storage System, as described in the following table. Some screens require no input from you, as they are based on the configurations already completed on a previously configured K2 Media Server.

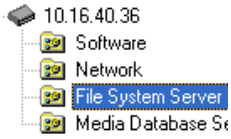
On this page…	Do this…
Define server roles	 Enter the name or IP address for theK2 Media Server, as currently configured on the machine. For Nearline server roles, selections are disabled. Leave **SNFS file system server**, **FTP server**, and **NAS server** selected. Click **Next**
Software Configuration This page checks for the software required to support the roles you selected on the previous page. Software required on a Nearline K2 Media Server is as follows: • K2 Server • File System Server • File System Client • QuickTime ***NOTE:***	 If software with *Yes* in the Required column reports as *Not Installed*, you must first install it on the K2 Media Server before continuing. Refer to *Chapter 16, Managing K2 software*. After installing the software, click **Check Software**. When all required software reports as *Installed*, click **Next**.

On this page…	Do this…
Network Configuration This page displays the control network Ethernet port, and allows you to configure the FTP/ Streaming network Ethernet port.	 The top port is the port over which the K2 System Configuration application is communicating with the K2 Media Server. If correctly configured, it is already assigned the control network IP address, as displayed on this page. Select the other port and click **Modify**. A network configuration dialog box opens. Enter the FTP/Streaming IP address and the subnet mask and click **Apply**. Click **Next**.
File System Server Configuration This page checks on the configuration of the K2 Media Server in one of its main roles as a file system server. The K2 Media Server also functions as a file system client, which is also checked from this page. It is not necessary to bind RANKs or create a file system, since those tasks were completed when you configured the first K2 Media Server.	 Click **Check**. Confirm a "… default.cfg file copied…" message. When the wizard reports that the configuration check is successful, click **Next**. and **Yes** to confirm copying *default.cfg* to the server. If you get a "The V: will not be available until this device is rebooted…" message, you can safely continue with this procedure and follow the instructions related to this message later in the procedure.

On this page…	Do this…
FTP Server Configuration	 Do not modify these settings. Leave at default values of Max FTP streams = 4 and FTP Data Socket Timeout = 60. Only qualified Grass Valley personnel should specify other values, as these settings are intended for use only with custom systems designed by Grass Valley. Click **Next**
Completing the Configuration Wizard	Click **Finish**. The wizard closes. The K2 Media Server restarts. Do not proceed until restart processes are finished.

3. If you got a "The V: will not be available until this device is rebooted…" message on the File System Server Configuration page, after the K2 Media Server restarts, do the following:

   a. In the K2 System Configuration application tree view, under the K2 Media Server select the File System Server node.



   The File System Server Configuration page appears.

   b. Click **Check** and verify that the V: drive is shared. This is required for NAS server functionality.

4. Repeat this procedure for remaining Nearline K2 Media Servers, if any.

Your configurations for the nearline K2 Storage System are complete.

Basic operations for nearline storage

Use the following procedures as you work on your Nearline storage system:

- "Nearline system power-off procedure"
- "Nearline system power-on procedure"
- "Using FTP for file transfer"

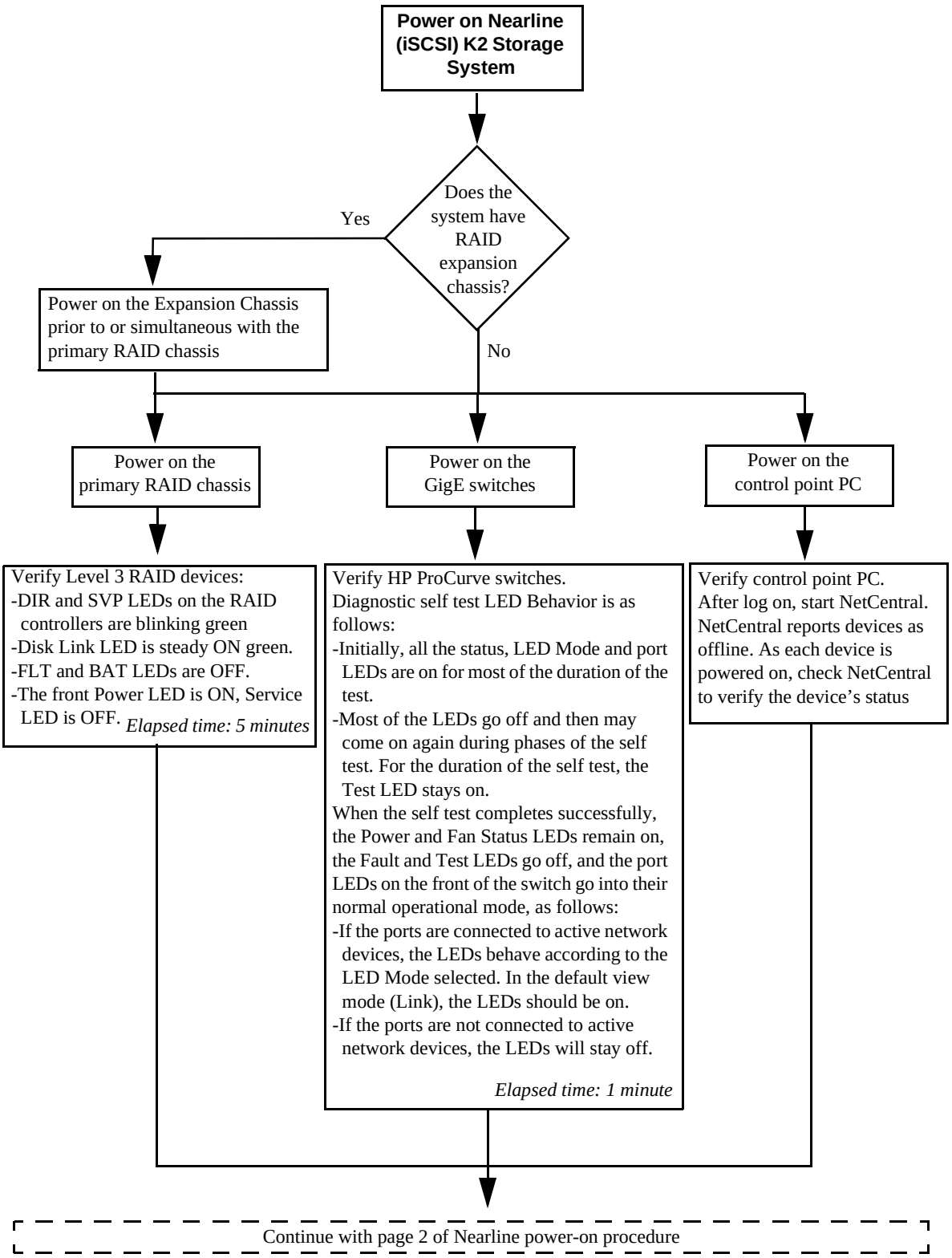
For other procedures refer to "Administering and maintaining the K2 Storage System" on page 687.

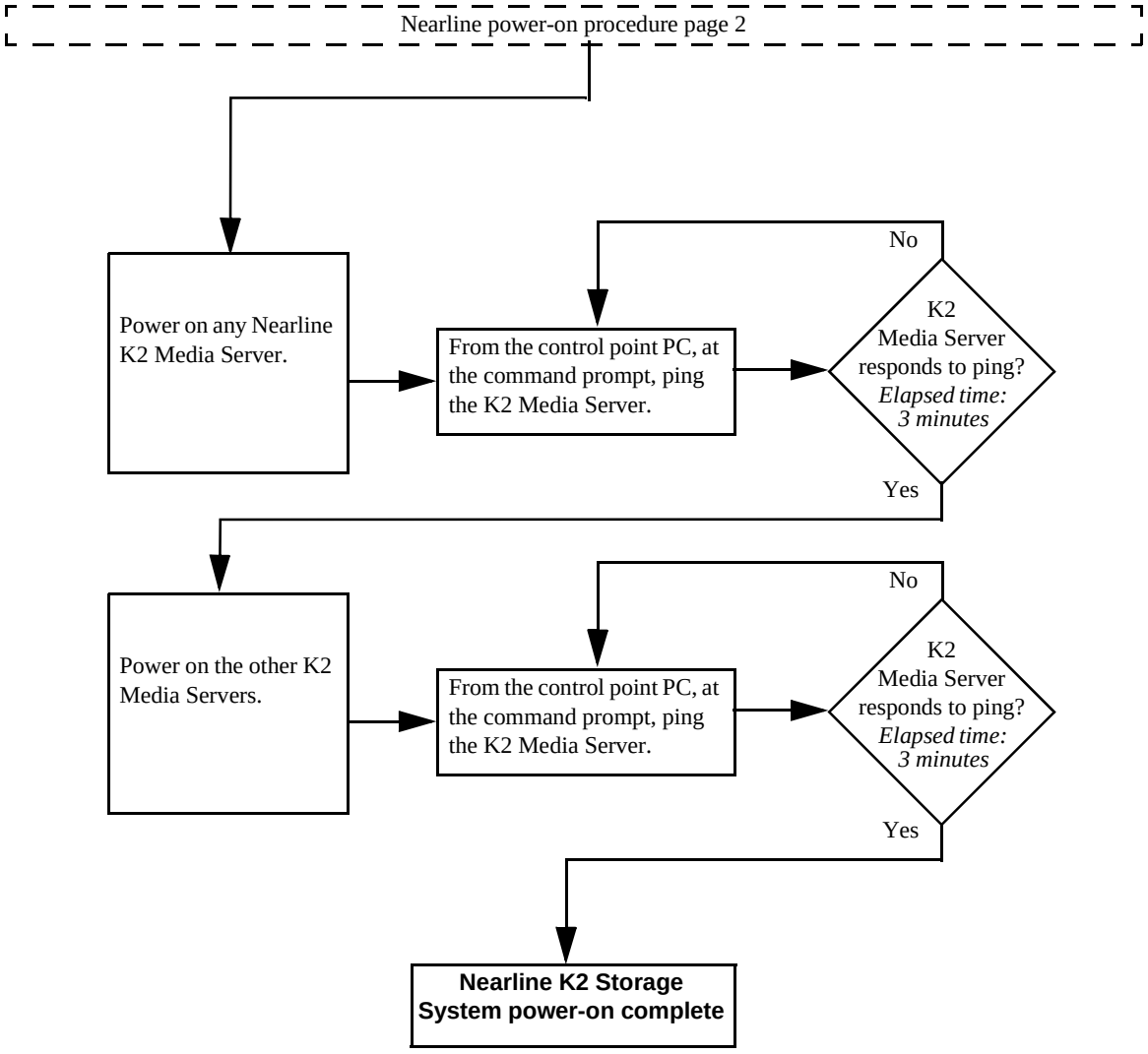
Nearline system power-off procedure

Use the following sequence to power-off the Nearline storage system.

1. Stop all FTP streams or other media operations on the nearline storage system.
2. Shut down the K2 Media Servers.
3. Power-off the primary RAID controller chassis. If expansion chassis are connected, make sure the power-off of the controller chassis is prior to or simultaneous with the power-off of its connected expansion chassis. Wait approximately 30 seconds for the disk drives to spin down before proceeding.
4. Power-off all Ethernet switches.
5. Power-off the control point PC and/or the NetCentral server PC, if necessary.

Nearline system power-on procedure




Nearline power-on procedure page 2
Power on any Nearline K2 Media Server.
From the control point PC, at the command prompt, ping the K2 Media Server.
K2 Media Server responds to ping? Elapsed time: 3 minutes
No
Yes
Power on the other K2 Media Servers.
From the control point PC, at the command prompt, ping the K2 Media Server.
K2 Media Server responds to ping? Elapsed time: 3 minutes
No
Yes
Nearline K2 Storage System power-on complete

Using FTP for file transfer

Since the Nearline system has no media database, procedures that apply to “online” K2 storage systems (Levels 10, 20, and 30) do not globally apply to the Nearline storage system. This includes procedures for streaming, import, export, and FTP.

The rules for transferring to/from a K2 Nearline storage system are as follows:

- Transfer files only. Streaming media, as in AppCenter’s **Import/Send to | Stream** feature, is not supported.
- K2 media must be transferred to/from the Nearline system as a GXF or MXF file.
- Passive FTP mode is supported. You must use this mode for FTP transfers.
- For the list of FTP commands supported, refer to “FTP commands supported” on page 684.
- In addition to FTP transfers, you can also map shared drives and use basic Windows networking to move files to/from a Nearline storage system.

You should use the dedicated K2 FTP/streaming network. The rules for this network are summarized as follows:

- The network must be on a separate subnet.
- Dedicated GigE cables must be connected to the FTP GigE port on K2 Media Servers.
- For network hostname resolution, hostnames mapped to FTP IP addresses must have a “_he0” suffix appended to the name.

For more information about the FTP/streaming network, refer to “About networks and FTP” on page 684

Additional information about Nearline FTP is as follows:

- K2 FTP protocol supports clip and bin names in non-English locales (international languages) using UTF-8 character encoding. Refer to specifications for internationalization in the *K2 Media Client System Guide*.
- The Nearline FTP interface does not have GXF and MXF folders to support format-specific functionality, as does the K2 FTP interface for “online” K2 systems. This means the Nearline FTP interface treats all files, including GXF and MXF, as generic files with no particular consideration for any file format.

Chapter 7

Installing the Level 10 Storage System

The K2 Level 10 (L10) storage system was initially released with K2 system software version 3.2 in September 2007.

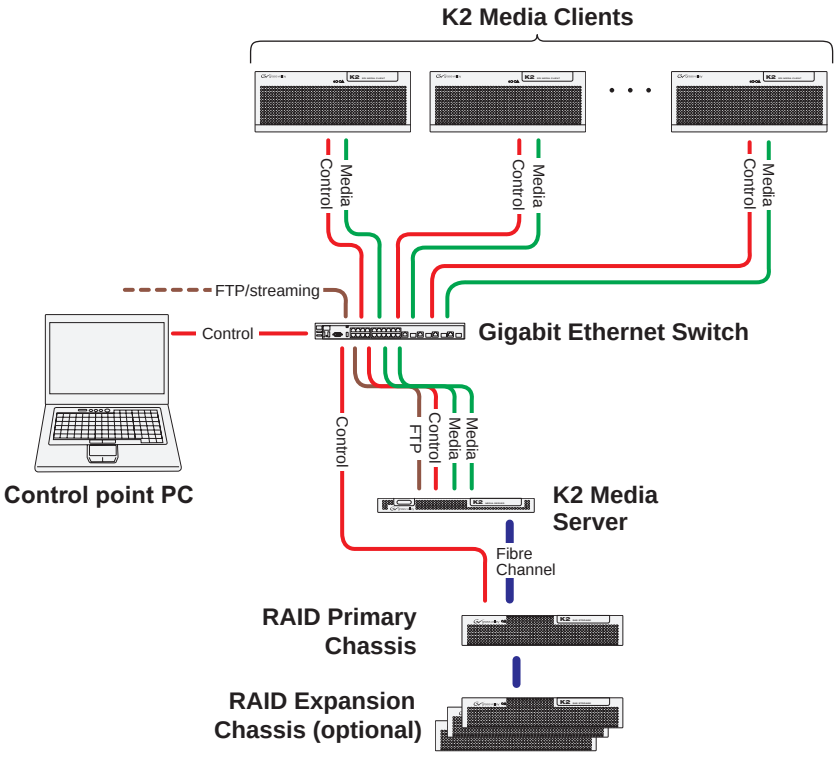
Use this chapter to install the K2 Level 10 storage system.

This chapter includes the following topics:

- "Level 10 system description" on page 290
- "Preparing Level 10 devices" on page 291
- "Networking for Level 10" on page 306
- "Configuring the Level 10 storage system" on page 311
- "Adding K2 Storage System clients" on page 325
- "Basic operations for Level 10 storage" on page 325

Work through these topics sequentially to install the storage system.

Level 10 system description



The Level 10 (L10) storage system has one Gigabit Ethernet switch, one Level 10 K2 Media Server, and one L10 RAID chassis. Up to four RAID Expansion chassis are optional for increased storage capacity.

K2 Media Clients and other iSCSI clients, such as Aurora Edits, are connected to the GigE switch. Each K2 Media Client has one GigE connection for media (iSCSI) and one GigE connection for control. The GigE switch is configured with V-LANs to keep the control/FTP traffic and the media (iSCSI) traffic separate.

The Level 10 K2 Media Server has one GigE connection for media (iSCSI), one GigE connection for control, one GigE connection for FTP, and one Fibre Channel connection to the RAID storage. The server hosts an iSCSI interface card for the GigE media connection and a Fibre Channel card for the RAID storage connection. The iSCSI interface card provides a bridge between GigE iSCSI and Fibre Channel SCSI. The server also hosts software components that allow it to function in various roles, including media file system manager, media database server, and FTP server. The Level 10 K2 Media Server has one power supply (non-redundant).

The L10 RAID chassis is connected via a single Fibre Channel connection to the K2 Media Server. It is also connected to the GigE control network, which is required for SNMP (NetCentral) monitoring.

The K2 configuration control point PC is connected to the GigE control network. The K2 System Configuration application runs on this PC for configuring the storage system.

FTP/streaming traffic accesses the K2 Storage System via the FTP GigE port on K2 Media Servers. FTP/streaming traffic does not go to K2 Media Clients.

Refer to Chapter 14, *Description of K2 Storage Devices* for more information. Also refer to "Design considerations for Ethernet switches" on page 759.

Preparing Level 10 devices

Use the topics in this section to prepare each device so that it is ready to become part of the Level 10 storage system.

- "Setting up the Control Point PC" on page 291
- "Setting up the Level 10 GigE switch" on page 292
- "Setting up the L10 K2 Media Server" on page 302
- "Setting up the L10 RAID chassis" on page 303
- "Preparing K2 Storage System clients" on page 304

Setting up the Control Point PC

To set up the K2 configuration Control Point PC, you have the following options:

- Use the Grass Valley Control Point PC that comes from the factory with software pre-installed. This includes the K2 System Configuration application, remote AppCenter, and NetCentral software. Refer to the *K2 Media Client System Guide* for rack mount instructions.
- Use a PC that you own and install the required software.

For either option, you must do the following for the Control Point PC that runs the K2 System Configuration application:

- Assign a control network IP address to the PC. Refer to "Networking tips".
- Connect the PC to the GigE control network.

To use your own PC, you must additionally do the following:

- Verify that the PC meets system requirements, then install the Control Point software and other supporting software, as specified in the *K2 Media Client System Guide*.
- Install and license NetCentral server software. You can install this on the NetCentral server PC, which can be the K2 configuration Control Point PC. Refer to the *NetCentral User Guide*.

Also refer to "Control point PC description" on page 650.

To fix the screen resolution problem seen with NetCentral on the Grass Valley Control Point PC, do the following:

1. Go to Display properties (right mouse selection of properties on the display area)
2. Select Settings tab
3. Select the Advanced button

4. In the General tab, set the DPI setting to Normal size (96 DPI)
5. Restart the PC

Setting up the Level 10 GigE switch

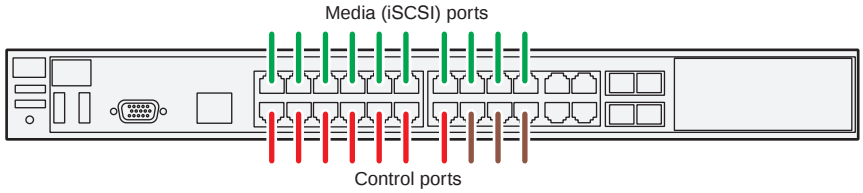
These procedures are for the HP ProCurve switch 2900 series. You must use this switch for iSCSI traffic on Level 10.

For control and FTP/streaming traffic, it is allowed to use a different brand of switch, such as a Cisco Catalyst switch, if required by your site. If you are using a non-HP switch, apply the information in the following procedures accordingly. Refer to the documentation you received with the switch as necessary.

Also refer to "Design considerations for Ethernet switches" on page 759.

- Use CAT5e or CAT6 cables. The maximum cable length is 50 meters for CAT5e and 100 meters for CAT6.
- Assign an IP address and logon to the switch. Refer to "Configuring the GigE switch via serial connection" on page 293.
- Set up VLANs on the switch. Refer to "Configuring the GigE switch via the Web interface" on page 296.
- Install the switch in its permanent location.
- Provide power to the switch.
- Connect cables as follows:

2900 series switch



To the media ports make one iSCSI connection from each K2 Media Client or other iSCSI client, and one iSCSI connection from the K2 Media Server.

To the control ports make a connection from each K2 Media Client or other iSCSI client, from the RAID storage chassis, and from the control point PC. Also make the FTP network connection and the control network connection from the K2 Media Server.

Refer to "Level 10 system description" on page 290 for a diagram of the complete system.

Refer to cabling procedures later in this chapter for the GigE connections at each of the devices of the K2 Storage System.

Also refer to "K2 Ethernet switch description" on page 651 and "Design considerations for Ethernet switches" on page 759.

Configuring the GigE switch via serial connection

NOTE: Make sure you check the switch firmware and upgrade if necessary, as instructed at the end of this procedure.

The following procedure is for the HP ProCurve switch 2900 series. Do not use this procedure on other switch models.

Use a direct console connection to the switch, start a console session, and access the Switch Setup screen to set the IP address.

1. Configure the PC terminal emulator on the control point PC or another PC as a DEC VT-100 (ANSI) terminal or use a VT-100 terminal, and configure either one to operate with these settings:
   - Baud rate 115200
   - 8 data bits, 1 stop bit, no parity, and flow control set to Xon/Xoff
   - Also disable (uncheck) the "Use Function, Arrow, and Ctrl Keys for Windows" option
2. Connect the PC to the switch's Console Port using the console cable included with the switch. (If your PC or terminal has a 25-pin serial connector, first attach a 9-pin to 25-pin straight-through adapter at one end of the console cable.)
3. Turn on the PC's power and start the PC terminal program.
4. Press **Enter** two or three times and you will see the copyright page and the message "Press any key to continue". Press a key, and you will then see the switch console command (CLI) prompt.

NOTE: If you press Enter too many times and get past the log in, enter the command EN to get into the command line.

5. Type the following, then press **Enter**:

   ```
   menu
   ```

   If prompted to save the current configuration, answer no (press the n key) to proceed. The main menu opens.
6. On the main menu, choose **Switch Configuration,** then press **Enter**.
7. Select **IP Configuration**, then press **Enter**.
8. Press the right-arrow key to choose **Edit**, then press **Enter**. Tab to fields and enter information as follows:
   a. Change **Gateway** to be the default router.
   b. Tab to the **IP Config (DHCP/Bootp)** field and use the Space bar to select the **Manual** option.
   c. Tab to the **IP Address** field and enter the switch's control network IP address. Refer to "Networking tips" on page 106.
   d. Tab to the **Subnet Mask** field and enter the subnet mask used for your network.
9. Press **Enter**, then right-arrow to **Save**. Press **Enter** and revert to previous menu.

10. Select **Return to Main Menu** and press **Enter**.
11. From the main menu, chose **Console Passwords** and press **Enter**. The Set Password Menu opens.
12. Chose **Set Manager Password** and press **Enter**.
13. When prompted for the password, type a password of up to 16 ASCII characters with no spaces and press **Enter**. The password can be one that is used on other K2 devices, such as “adminK2” or “K2admin”, or it can be your site's administrator password.
14. When prompted to enter the password again, retype the password and press **Enter**.
15. Select **Return to Main Menu** and press **Enter**.
16. From the main menu, tab to **Command Line (CLI)** and press **Enter**. The command prompt appears.
17. Type the following, then press **Enter**:

    ```
    configure
    ```

    You are now in configuration mode.
18. Configure an administrator username. The username can be one that is used on other K2 devices, such as “administrator” or “K2admin”, or it can be your site's administrator username. For example, to set the username to “administrator” type the following, then press **Enter**:

    ```
    password manager user-name administrator
    ```
19. When prompted, enter and re-enter the password.
20. Set spanning tree to RSTP. Type the following, then press **Enter**:

    ```
    spanning-tree force-version rstp-operation
    ```

    This configures spanning tree, but it does not turn spanning tree on. You must turn spanning tree on using the switch’s Web interface, as explained in the next procedure “Configuring the GigE switch via the Web interface”.
21. Decide your SNMP community name as explained in the following options, then proceed with the next step:
    - If you decide to use a unique SNMP community name (not “public”), add the community and set its RW permissions. For example, if the community name is “K2”, type the following, then press **Enter**:

      ```
      snmp-server community K2 unrestricted
      ```
    - If you decide to use the default SNMP community “public” for NetCentral monitoring, which already has RW permissions set as required by NetCentral, proceed to the next step.
22. Enter the SNMP community and IP address of the NetCentral server PC. For example, if the IP address is “192.168.40.11” and the community is “public”, you type the following, then press **Enter**:

    ```
    snmp-server host public 192.168.40.11
    ```
23. Enable Authentication traps. Type the following, then press **Enter**:

```
snmp-server enable traps authentication
```

This allows NetCentral to test the switch to verify that it can send its SNMP trap messages to NetCentral.

24. Type the following, then press **Enter**:

```
menu
```

When prompted, save the configuration by pressing the y key. The main menu opens.

25. If you need a trunk for ISLs to gang switches together, use the following steps. These steps illustrate trunking the last three 1 Gig ports for three 1 Gig ISLs, which is the recommended configuration for ISLs on all multi-switch K2 Storage Systems. Refer to "Design considerations for Ethernet switches" on page 759 and consult with your Grass Valley representative if your requirements deviate from the recommended policy:

    a. At the main menu, select **Switch Configuration** and press **Enter**.

    b. Choose selection **Port/Trunk Settings** and press **Enter**.

    c. Press the right-arrow key to choose **Edit**, then press **Enter**.

    d. Down arrow until at the bottom of the list of ports and select the last (highest port number) 1 Gig port in the list.

    e. Right-arrow over to the Group column.

    f. Use the Space bar and set the bottom 1 Gig port to **Trk1**.

    g. Set the next port up also to **Trk1**.

    h. Set the next port up also to **Trk1**.

    i. Press **Enter**, then right-arrow to **Save**. Press **Enter** and revert to previous menu.

26. Select **Return to Main Menu** and press **Enter**.

27. From the main menu, tab to **Command Line (CLI)** and press **Enter**. The command prompt appears.

28. Check the version of firmware currently installed on the switch. Type the following, then press **Enter**:

```
show flash
```

Information is displayed similar to the following example:

```
HP_iSCSI_switch1# show flash
Image            Size(Bytes)    Date    Version
-----            ----------   -------- -------
Primary Image    : 3287779    03/15/05 M.08.66
Secondary Image  : 3287779    03/15/05 M.08.66
Boot Rom Version: I.08.07
Current Boot     : Primary
```

29. Check the Primary Image Version and refer to your *K2 Storage System Release*

Notes for information about currently supported versions. Then proceed as follows:

- If *K2 Storage System Release Notes* instruct you to change the firmware on the switch, do so before continuing. Refer to the documentation you received with the switch for instructions to change the firmware. Then continue with the next procedure "Configuring the GigE switch via the Web interface".
- If *K2 Storage System Release Notes* confirm that the version on the switch is a currently supported version, continue with the next procedure.

30. Type the following, then press **Enter**:

    ```
    menu
    ```

    The main menu opens.

31. From the main menu, choose **Reboot Switch** and press **Enter**. When prompted "Continue Reboot…?', answer yes (press the y key) to proceed. The switch restarts.

32. You can now use the switch's web browser interface for further configuration, as instructed in the next procedure.

33. Close the PC terminal program and disconnect the console cable.

Continue with the next procedure "Configuring the GigE switch via the Web interface".

Configuring the GigE switch via the Web interface

The following procedure is for the HP ProCurve switch 2900 series. Do not use this procedure on other switch models.

1. From the control point PC or another PC, make sure that you have a direct Ethernet cable connection to the switch, with no switches, routers, proxies, or other networking devices in between.
2. On the PC, open Internet Explorer and type the switch's IP address in the Address field, as in the following example.

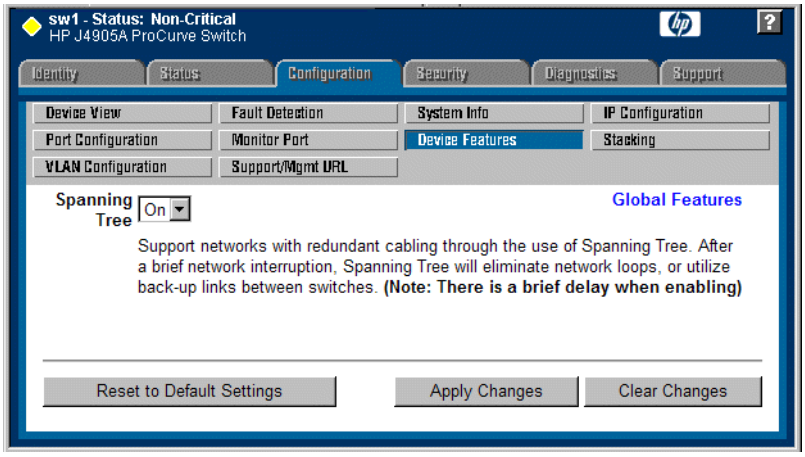
   ```
   http://192.168.100.61
   ```

   This should be the name or IP address as currently configured on the switch.
3. Press **Enter** to open the switch's configuration application.

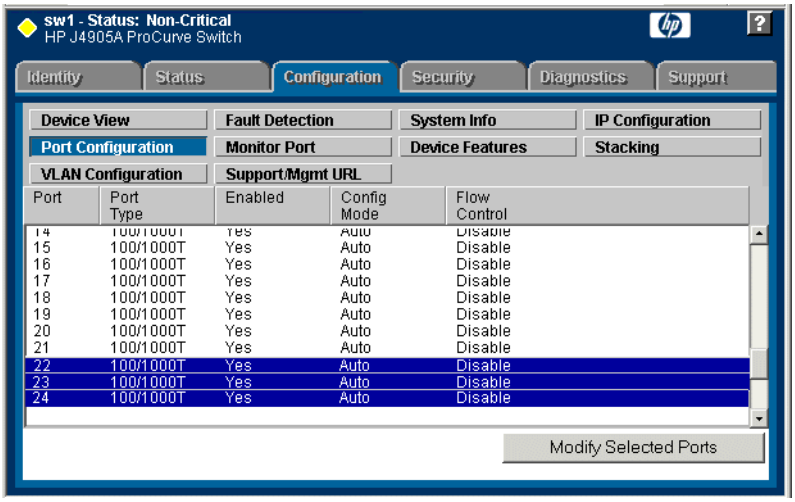
NOTE: The configuration application for the HP ProCurve switch requires Java.

You can also access the switch's configuration application from the K2 System Configuration application.

4. In the switch's configuration application, choose **Configuration**, then **Device Features**.



5. Set Spanning Tree to **On** and click **Apply Changes**. If prompted, log in with the switch's administrator username and password.
6. Click **Port Configuration**.

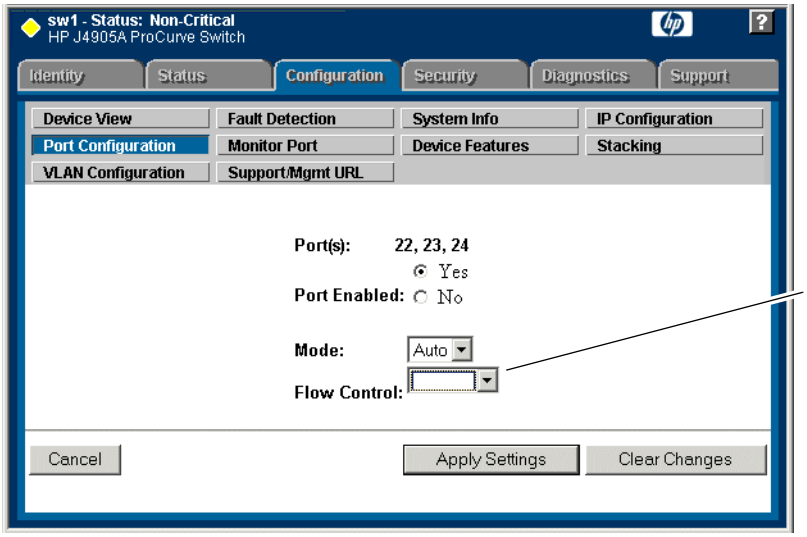


7. If you do not need trunks, such as on a one-switch system, skip to the next step in this procedure. If you need trunks, such as on a two-switch system with ISLs, do the following:

   a. Select (Ctrl + Click) the trunked ports. Typically the trunked ports are at the bottom of the list and are labeled Trk1.

   b. Click **Modify Selected Ports**.

      If prompted, log in as administrator.



c. For the trunked ports, set Port Enabled to **Yes**. On some switch models, some ports are disabled by default, so make sure you enable them. Leave Mode as default of **Auto**.

d. Set Flow Control as follows:

   - Set to **Enable**.

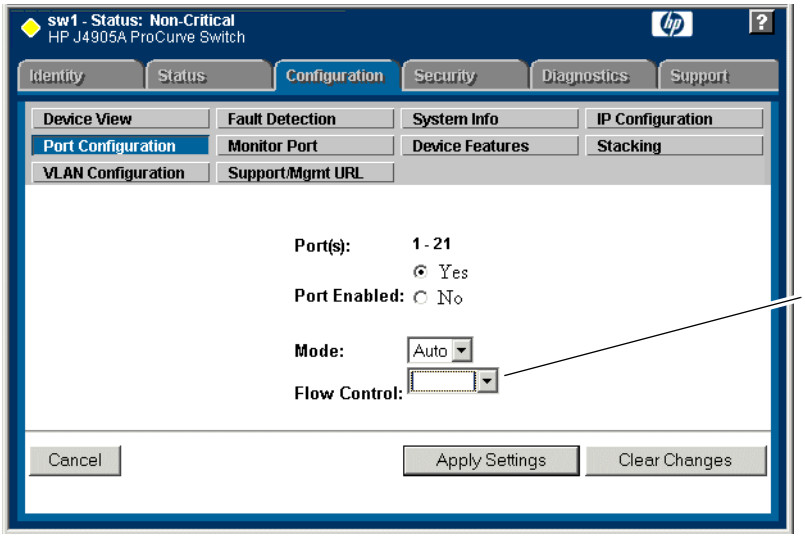
NOTE: This setting is for the 2900 series switch. Other switch models might require a different setting.

e. Click **Apply Settings**.

8. On the Port Configuration page, do one of the following:

   - If you do not have trunks, select all ports.
   - If you have trunks, select the remaining ports (the ports not trunked).

9. Click **Modify Selected Ports.**



10. Make sure Port Enabled is set to **Yes**, leave Mode as default of **Auto**.

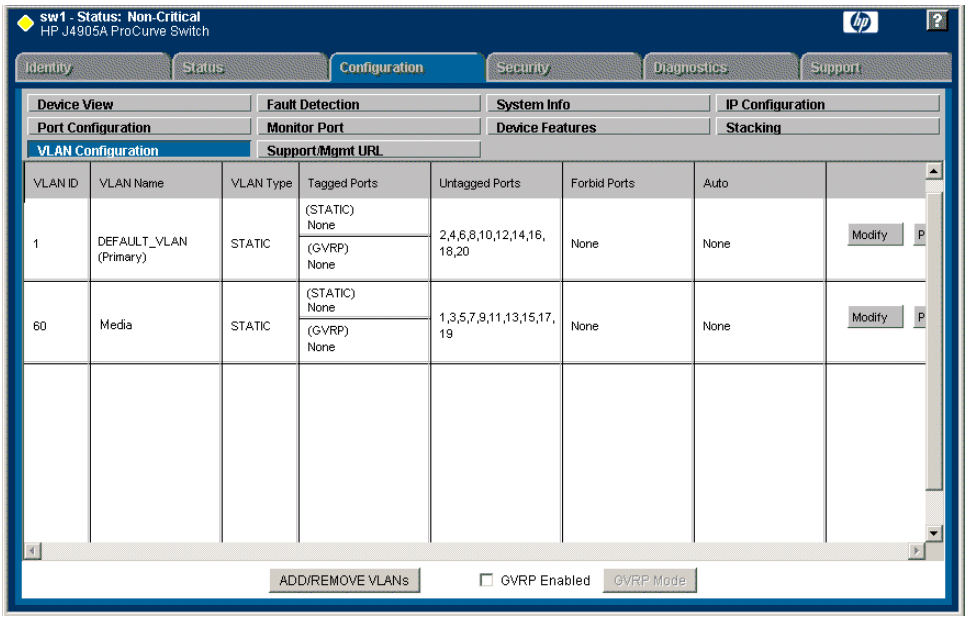
11. Set Flow Control as follows:

- Set to **Enable**.

NOTE: This setting is for the 2900 series switch. Other switch models might require a different setting.

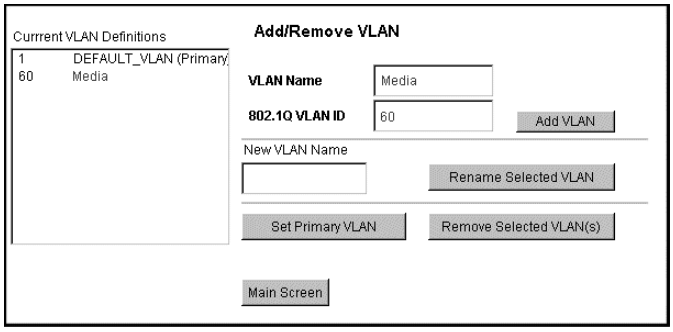
12. Click **Apply Settings**. Wait until settings are applied and the Web interface becomes active.

13. Choose **VLAN Configuration**. If prompted, log in with the switch's administrator username and password.



14. Create a new Media (iSCSI) VLAN as follows:

    a. Click **Add/Remove VLANs**.



    b. In the VLAN Name field enter `Media`.

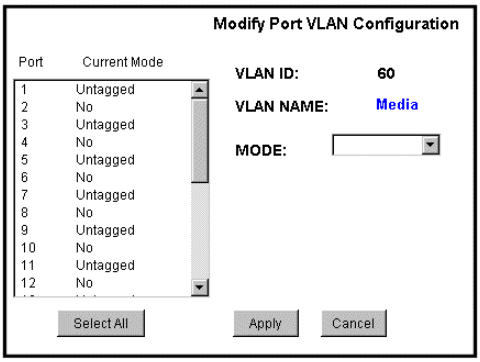
    c. In the VLAN ID field enter `60`.

    d. Click **Add VLAN**.

    e. Click **Main Screen** to return to VLAN Configuration.

15. Configure the Media VLAN as follows:

    a. In the Media VLAN row, click **Modify**.



b. Select all the odd numbered ports. (Tip: Use Ctrl + Click.)

c. In the Mode drop-down list, select **Untagged**, then click **Apply**. This removes the odd ports from the default (Control) VLAN.

   If you have a trunk, do not configure it as "Tagged". Media VLAN traffic (iSCSI) does not go over the trunk.

16. Click the **VLAN Configuration** tab.

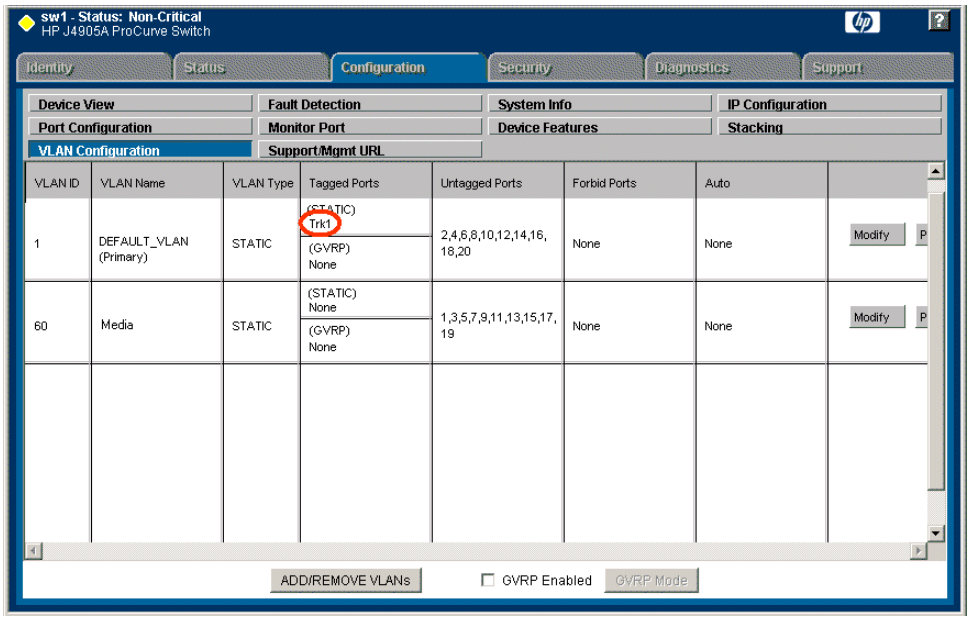
17. If you have a trunk, configure the default (Control) VLAN as follows:

    a. In the DEFAULT_VLAN row, click **Modify**.

    b. In the Current Mode list box, scroll down and select the trunk.

    c. In the Mode drop-down list, select **Tagged**, then click **Apply**. This allows default VLAN traffic (non-iSCSI) to go over the trunk.

18. Click the **VLAN Configuration** tab.



19. If you have a trunk, verify that for the default VLAN the trunk is displayed in the Tagged Ports column.
20. If you have two switches, repeat this procedure for the other switch.
21. Close the switch configuration application.

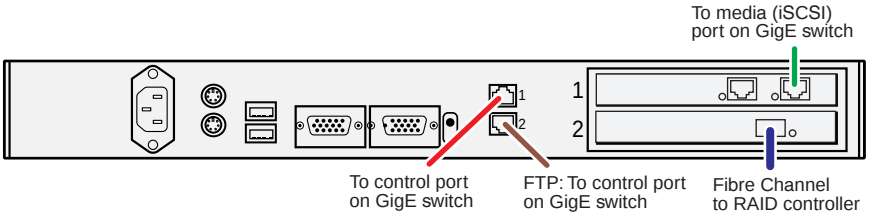
Setting up the L10 K2 Media Server

The Dell PowerEdge 860 is qualified as the platform for the L10 K2 Media Server.

Do the following to prepare the L10 K2 Media Server:

- Install the server in its permanent location. Refer to the rack mount instructions that you received with the server's product bundle.
- Provide power to the servers.
- Connect cables as follows:

Dell 860 PowerEdge server



Connect the iSCSI interface port to a media port on the GigE switch. Connect the motherboard GigE port 1 and GigE port 2 to control ports on the GigE switch.

Connect the Fibre Channel port to the RAID storage device.

- Assign a control network IP address to GigE port 1. Use standard Windows procedures. Refer to "Networking tips".
- Change the hostname. Use standard Windows procedures.
- Configure SNMP properties so the trap destination points to the NetCentral server PC. Use standard Windows procedures. If you are not using the SNMP community name "public", configure the community name and set permissions to RW. Also make sure that the Authentication trap is enabled.

Also refer to "K2 Media Server descriptions" on page 653.

Setting up the L10 RAID chassis

Do the following to prepare the L10 RAID storage devices:

- Install the chassis in its permanent location. After mounting the chassis in the rack, you must secure brackets to the front rail to support the Grass Valley bezel. Refer to the *K2 Lx0 RAID Instruction Manual* for rack mount instructions.
- "Connect the L10 RAID Primary and Expansion chassis" on page 303
- "Power on the L10 RAID chassis" on page 304

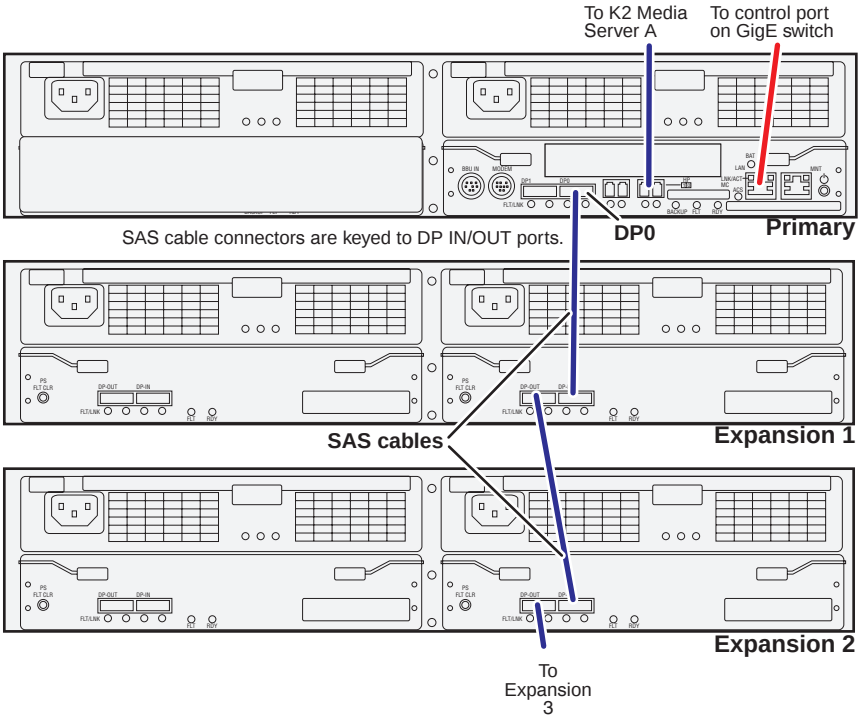
In addition, you will configure network settings, SNMP settings, and bind RAID disks. These tasks are part of the K2 System Configuration application and Storage Utility procedures later in this chapter.

On the L10 RAID, you do not need to manually set a Fibre Channel address ID on controllers or a chassis address on Expansion chassis.

Also refer to "K2 RAID storage description" on page 659.

Connect the L10 RAID Primary and Expansion chassis

Connect Ethernet, Fibre Channel, and SAS cabling as shown.



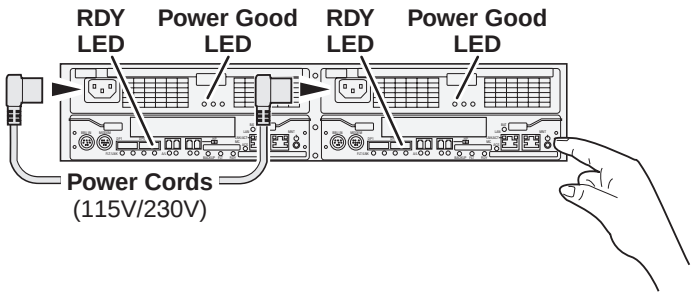
If you have more Expansion chassis than those illustrated, continue the indicated cabling pattern, connecting additional chassis to DP0.

Once the RAID storage is connected and configured, do not swap Expansion chassis or otherwise reconfigure storage. If you connect an Expansion chassis in a different order or to the wrong controller, the controller will see a configuration mismatch and fault.

Power on the L10 RAID chassis

Connect power cords and power up RAID storage devices as follows:

1. Verify power and cabling.
2. Press and hold down the power button on the controller, as shown.



   If the RAID chassis has two controllers, you can press the power button on either controller. You do not need to press both power buttons.

   Pressing the power button on a controller also powers on any connected Expansion chassis. There are no power buttons on Expansion chassis.

3. Release the power button when the Power Good LED on the power supply is illuminated. This takes 1-3 seconds.
4. Wait while the primary RAID chassis performs self-test and initialization. This takes about four minutes. While this is taking place, the RDY LED is illuminated with a steady on light.
5. Watch for the RDY LED to begin blinking at one second intervals. The LED might turn off and back on two times before starting the one second blink pattern. When the RDY LED is blinking at one second intervals, the self-test and initialization is complete and the chassis is ready for use.

Your preparations for L10 RAID storage are now complete.

Preparing K2 Storage System clients

Any devices that function as iSCSI clients to the K2 Storage System must be prepared with the following requirements:

- One or more connections to the control network.
- A static IP address for the control network.
- For a non-redundant K2 Storage System, one connection to the media (iSCSI) network.

Additional steps that are required for Aurora Edits include the following:

- Implement Aurora Edit security features.
- Install SNFS software and K2 software.

For more information, refer to the *Aurora Edit Installation and Configuration Guide*.

For more information refer to the *K2 Media Client System Guide*.

K2 configuration and NetCentral

Before you begin using the K2 System Configuration application to configure the storage system, you should set up the NetCentral system according to the following requirements:

- **NetCentral installed** — NetCentral server software must be installed on a NetCentral server PC. This can be the K2 configuration Control Point PC or another PC that has network communication with the K2 Storage System control network.
- **Device providers installed** — A device provider must be installed on the NetCentral server PC for each type of device in the K2 Storage System. For a Level 10 storage system, the following device providers must be installed:
  - Control point PC device provider — This is the Windows monitoring device provider.
  - K2 Media Server device provider
  - HP Gigabit Switch device provider or Cisco Gigabit Switch device provider
  - K2 Media Client device provider, if any K2 Media Clients are accessing the Level 10 storage system.
  - Device provider for iSCSI clients, if any iSCSI clients such as Aurora Edits are accessing the Level 10 storage system.
  - K2 L10 RAID storage device provider. This device provider supports RAID devices for Levels 10, 20, and 30.
- **Grass Valley PC Monitoring software installed** — This software must be installed on the K2 configuration Control Point PC. It includes Grass Valley SNMP agents and other WMI based components to perform process monitoring. This provides the information for some of the SNMP trap messages that must be sent to NetCentral.
- **Control Point PC monitored by NetCentral** — The K2 configuration Control Point PC should be added to the NetCentral system and fully monitored by NetCentral. This means that its SNMP trap destination is set to send SNMP traps to the NetCentral server PC. Whether the Control Point PC and the NetCentral server PC are the same PC or are different PCs, you should still add the Control Point PC to NetCentral.

Refer to the *NetCentral User Guide* to set up the NetCentral system. After installing a device provider, you can find additional documentation about monitoring that type of device on the NetCentral Help menu.

Networking for Level 10

Use the topics in this section to configure the Gigabit Ethernet (GigE) network for the Level 10 storage system.

- "Networking requirements" on page 306
- "Networking tips" on page 307
- "Setting up host tables" on page 308
- "Testing the control network" on page 309

Networking requirements

Required networking strategies for a Level 10 K2 Storage System (a non-redundant K2 Storage System) are as follows:

- Three networks:
  - Media network — Exclusively for iSCSI traffic.
  - Streaming/FTP network — For media transfers and FTP traffic.
  - Control network — For all other non-streaming, non-iSCSI traffic.
- Networks must be on separate subnets.
- The Media (iSCSI) network traffic is kept separate from any other traffic. This separation is provided by dedicated Gigabit ports, cables, and by a dedicated VLAN on the HP GigE switch or by separate switches.
- K2 Media Servers have a dedicated FTP port. Make a dedicated FTP connection to the FTP port.
- While control and FTP traffic is each on its own subnet, it is not required that each type of traffic has its own VLAN on GigE switches. For example, you make both FTP and control connections to the "control" ports (DEFAULT_VLAN) on the HP GigE switch.
- While the Level 10 K2 Media Server (both redundant and non-redundant) has two media (iSCSI) ports, only one is used.
- Static IP addresses are required for the media network on K2 Storage System iSCSI devices. This includes K2 Media Servers, generic iSCSI clients (such as Aurora Edits), and K2 Media Clients.
- Machine names (host names) assigned to each K2 device.
- Host tables (hosts files) provide name resolution on each K2 Media Client, iSCSI client, and K2 Media Server.
- IP addresses for FTP/streaming ports must have name resolution such that hostnames are appended with the "_he0" suffix. You can use host tables (as in "Setting up host tables" on page 308) or another mechanism to provide the name resolution. This directs the streaming traffic to the correct port. Refer to the *K2 Media Client System Guide* for a complete explanation.
- K2 Media Servers (including optional NH servers) must be on the streaming network, as they provide the FTP interface for shared storage streaming traffic.

Shared storage K2 Media Clients do not need to be on the streaming network because they do not send or receive streaming traffic.

- On the shared storage K2 Media Client, the two control GigE ports are configured as a team. The control team shares a single IP address. Do not attempt to un-team the control ports. On the Level 10 K2 Storage System, only one control port is connected, as control team redundancy is not supported.
- On the shared storage K2 Media Client, the two media (iSCSI) GigE ports are not teamed. On the Level 10 K2 Storage System, only one media port is connected, as iSCSI redundancy is not supported.

Also refer to "About networks and FTP" on page 684 and "Design considerations for Ethernet switches" on page 759.

Use the following procedures as necessary to implement your networking strategies.

NOTE: It is recommended that you configure Media network (iSCSI) IP addresses and Streaming network IP addresses using the K2 System Configuration application, rather than doing so on the local machine using standard Windows procedures.

Networking tips

- Before beginning network configuration, determine the IP addresses and names needed for the machines in your K2 system. Work with the network administrator at your facility to have those IP addresses and names available for your use.
- Establish a consistent convention for machine names and IP addresses. It is recommended that you embed a root name or other unique identifier for this particular K2 Storage System in the computer name. Also, a common convention for IP addresses is to use a numerical pattern or sequence in the IP addresses to indicate device-types and/or ports, as in the following example:

NOTE: This example assumes a subnet mask of 255.255.255.0

Example of Level 10 names and IP addresses

Computer name	Device type	Streaming network addresses	Control network addresses	Media network addresses	Comments
root_server_1	K2 Media Server	192.168.101.11[a]	192.168.100.11	192.168.99.11	—
				—	The second media port is not used.
root_raid_1	RAID	—	192.168.100.51	—	—
root_gige_1	GigE switch	—	192.168.100.61	—	—
root_cppc_1	Control point PC	—	192.168.100.81	—	—
root_client_1	iSCSI client	—	192.168.100.111	192.168.99.111	—
root_client_2	iSCSI client	—	192.168.100.121	192.168.99.121	
root_client_3	iSCSI client	—	192.168.100.131	192.168.99.131	
root_client_4	iSCSI client	—	192.168.100.141	192.168.99.141	

[a]. This IP address must resolve to hostname root_server_1_he0

Setting up host tables

The *hosts* file is used by the control network and the streaming/FTP network to determine the IP address of devices on the network when only a the device name (hostname) is given. The steps that follow describe how to edit the *hosts* file located at *C:\Windows\system32\drivers\etc\hosts* on Windows XP and Windows 2003 Server operating system computers. If you include the names and addresses of all the devices on the network, then you can copy the same file onto all the other K2 devices instead of editing the *hosts* file on each K2 device.

For FTP transfers on a K2 Storage System, transfers go to/from K2 Media Servers that have the role of FTP server. No transfers go directly to/from the shared storage K2 Media Clients that are on the K2 Storage System. So in the hosts file, you must add the "he_0" extension to a K2 Media Server hostname and associate that hostname with the K2 Media Server's FTP/streaming network IP address.

Refer to the *K2 Media Client System Guide* for more information.

To edit the *hosts* file manually:

1. Open the following file using Notepad or some other text editing application:

   C:\Windows\system32\drivers\etc\hosts

2. Enter all IP addresses with machine names. The text format is simple. First type the Ethernet IP address, then use the TAB key or Space bar to insert a few spaces. Then type the machine name.

   Here is an example:

```
192.168.100.11      root_server_1
192.168.101.11      root_server_1_he0
192.168.100.51      root_raid_1
```

```
192.168.100.61      root_gige_1
```

3. Save the file and exit the text editor.
4. Copy the new *hosts* file onto all the other machines. This is easier than editing the file on each machine.

Host table tips

- If transferring to or from a Profile XP or Open SAN system via UIM, the *hosts* file must also follow UIM naming conventions for those systems. Refer to the UIM Instruction Manual.
- Do not enter media (iSCSI) network IP addresses in the host table, as hostname resolution is not required for the media network.
- Use the following tip with care. While it can solve a problem, it also introduces a name resolution "anomaly" that might be confusing if not considered in future troubleshooting activities.

  For each SAN (shared storage) K2 Media Client, add the "_he0" suffix to the hostname but then associate that hostname with the K2 Media ***Server's*** FTP/ streaming network IP address, ***not*** the K2 Media ***Client's*** IP address. Aliasing K2 Media Client hostnames in this way would not be required if the transfer source/ destination was always correctly specified as the K2 Media Server. However, a common mistake is to attempt a transfer in which the source/destination is incorrectly specified as the K2 Media Client. The host file aliasing corrects this mistake and redirects to the K2 Media Server, which is the correct transfer source/ destination.

  An example of a *hosts* file entry with this type of aliasing is as follows:

```
192.168.101.11      server_1_he0 client_1_he0 client_2_he0
```

Testing the control network

To test the control network use the *ping* command as follows:

1. On the control point PC, click **Start | Run**. The Run dialog box opens.
2. Type `cmd` and click **OK**. The command prompt window opens.
3. Type `ping`, then a space, then the name of one of your K2 Storage System devices, such as the Gigabit Ethernet switch, as in the following example:

   ```
   ping root_gige_1
   ```

4. Press **Enter**.

   The ping command should return the IP address of the device, as in the following example:

   ```
   Pinging root_gige_1.mycorp.com [192.168.100.61] with
   32 bytes of data:


   Reply from 192.168.100.61: bytes=32 time=10ms TTL=127
   Reply from 192.168.100.61: bytes=32 time<10ms TTL=127
   Reply from 192.168.100.61: bytes=32 time<10ms TTL=127
   ```

```
Reply from 192.168.100.61: bytes=32 time<10ms TTL=127
```

This verifies that the name of the device is being correctly resolved to the IP address, which indicates that on the Control Point PC the host table entry is correct.

5. Ping the other K2 Storage System devices to which you have assigned control network IP addresses.
6. Go to each Windows device in the K2 Storage System and repeat this procedure. This verifies that network communication is correct to and from all devices.

Configuring the Level 10 storage system

Use the topics in this section to do the initial configuration of the Level 10 storage system.

- "Prerequisites for initial configuration" on page 311
- "Defining a new K2 Storage System" on page 312
- "Configuring the server - Part 1" on page 314
- "Configuring RAID" on page 316
- "Creating a new file system" on page 321
- "Configuring the server - Part 2" on page 323

Prerequisites for initial configuration

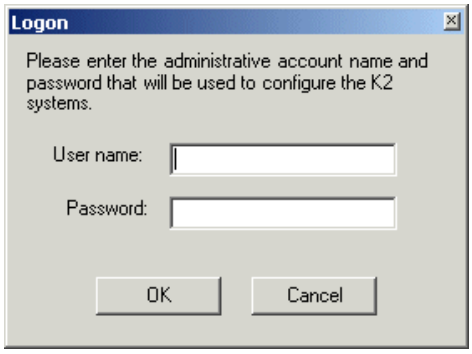
Before beginning your initial configuration, make sure the devices of the K2 Storage System meet the following prerequisites. Refer to sections earlier in this manual for detailed information. Also refer to Chapter 14, "Description of K2 Storage Devices".

Devices	Prerequisite for Level 10 configuration
Control point PC	Ethernet cable connected Control Point software installed Control network IP address assigned Network communication over the control network with all other K2 devices Power on
Ethernet switch	Ethernet cables connected Control network IP address assigned VLANs set up Trunks set up Power on
K2 Media Server	Ethernet cables connected Fibre Channel cable connected Software installed, as from the factory, including QuickTime 7 Control network IP address assigned Power on

Defining a new K2 Storage System

Define a Level 10 K2 Storage System as follows:

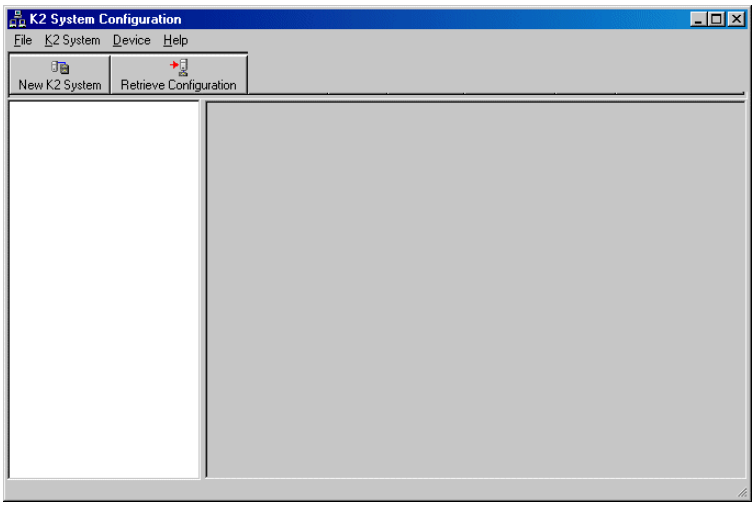
1. On the control point PC, open the K2 System Configuration application. A login dialog box opens.



2. Log in to the K2 System Configuration application with the Windows administrator account. By default this as follows:

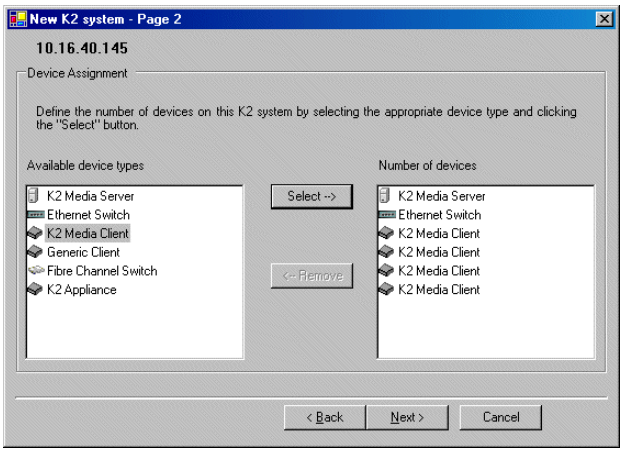
   - Username: administrator
   - Password: adminK2

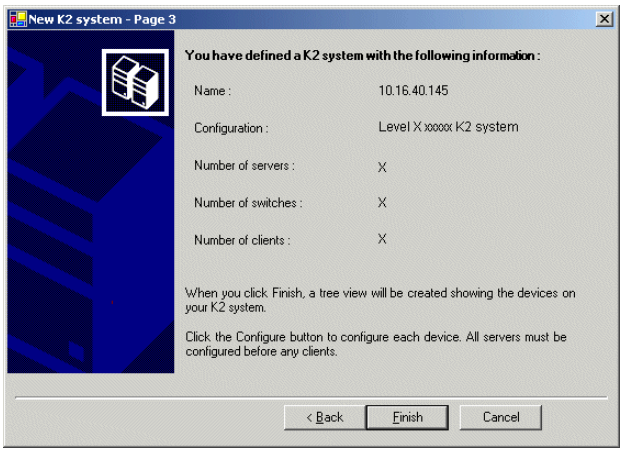
   Refer to "Setting up application security" on page 688 for more information about administrator accounts and logging in to applications.



3. Click **New K2 System**. The New K2 System wizard opens.

4. Follow the on-screen text to define your Level 10 K2 Storage System, as described in the following table.

On this page…	Do this…
Page 1	 Create a name for your Level 10 K2 Storage System and type it in the Name box. Select **Level 10**. Do not select the Server redundancy option. Click **Next**
Page 2	 Move the following into the Number of Devices Box: • One K2 Media Server • One Ethernet switch • K2 Media Clients as appropriate for your system. • (Optional) Other devices as appropriate for your system. Click **Next**.

On this page...	Do this...
Page 3	 Review the information on this page and verify that you have correctly defined your K2 Storage System. For a Level 10 storage system you should have the following: • One Gigabit Ethernet switch • One K2 Media Server • The number and type of clients appropriate for your system. Click **Finish**. The Define New K2 Storage System wizard closes.

Your K2 Storage System appears in the tree view of the K2 System Configuration application.

5. Continue with the next procedure.

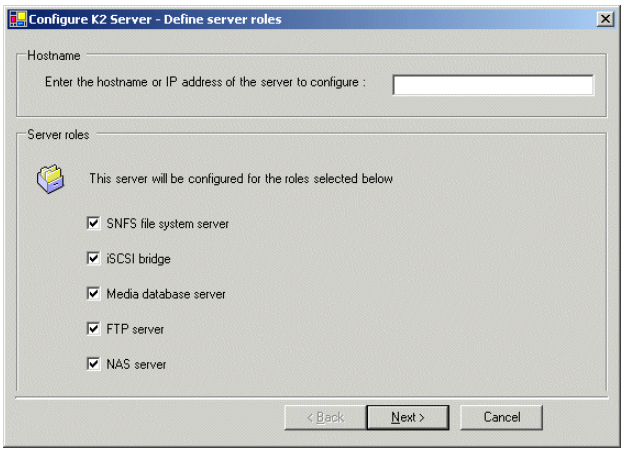
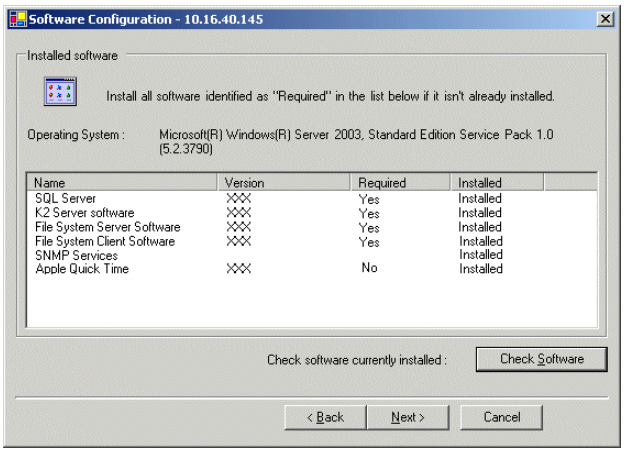
Configuring the server - Part 1

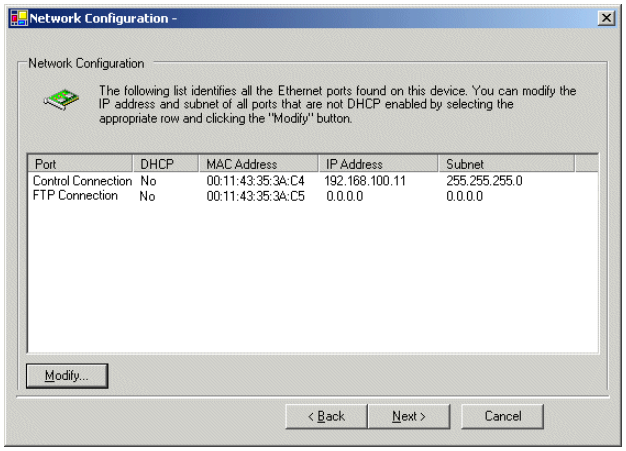
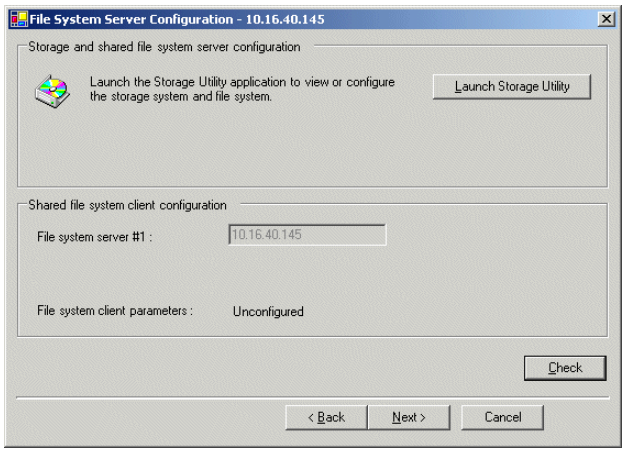
1. In the K2 System Configuration application tree view, select [**K2Server1]**.

2. Click the **Configure** button.

The Configure K2 Server wizard opens. Follow the on-screen text to configure the for a Level 10 K2 Storage System, as

described in the following table:

On this page…	Do this…
Define server roles	 Enter the name or IP address for the K2 Media Server, as currently configured on the machine. For Level 10, select all roles. Click **Next**
Software Configuration This page checks for the software required to support the roles you selected on the previous page. Software required on the Level 10 K2 Media Server is as follows: • SQL Server • K2 Server • File System Server • File System Client • SNMP Services • QuickTime	 If software with *Yes* in the Required column reports as *Not Installed*, you must first install it on the before continuing. Refer to *Chapter 16, Managing K2 software*. After installing the software, click **Check Software**. When all required software reports as *Installed*, click **Next**.

On this page…	Do this…
Network Configuration This page displays the control network Ethernet port, and allows you to configure the FTP/ Streaming network Ethernet port. ***NOTE: This page does not configure the iSCSI interface (media network) ports.***	 The top port is the port over which the K2 System Configuration application is communicating with the. If correctly configured, it is already assigned the control network IP address, as displayed on this page. Select the other port and click **Modify**. A network configuration dialog box opens. Enter the FTP/Streaming IP address and the subnet mask and click **Apply**. Click **Next**.
File System Server Configuration	 Click **Launch Storage Manager**. Storage Utility opens.

3. Continue with the next procedure to use Storage Utility to configure the storage and file system.

   Leave the Configure K2 Server wizard open while you are using Storage Utility. When you are done with Storage Utility, you continue with the wizard.

Configuring RAID

Use Storage Utility to complete the configuration of the L10 RAID chassis, as explained in the following topics:

- "Configuring RAID network and SNMP settings"

- "Binding disk modules"

Refer to "Prerequisites for initial configuration" on page 311 to confirm that the RAID storage is ready for configuration.

Configuring RAID network and SNMP settings

Use the Storage Utility to configure the following settings for the Level 10 RAID controller:

- IP address
- Subnet mask
- Gateway Address
- SNMP trap destinations

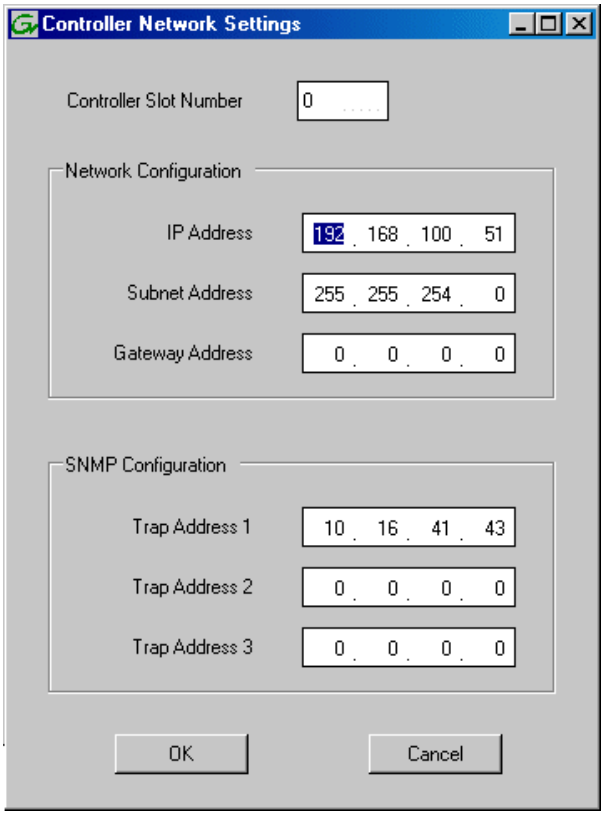
For L10 RAID, network and SNMP settings are set and stored on the RAID controller module, so the combined RAID storage devices, including the optional Expansion chassis, exist as a single entity on the control network.

The RAID storage device is configured by default for the SNMP community name "public". If your site's policies require using a different SNMP community name, contact your Grass Valley representative.

To configure these settings, do the following:

1. Launch Storage Utility from the K2 System Configuration application as in the previous procedure.
2. As prompted, wait while Storage Utility gathers system information, then Storage Utility opens.
3. In Storage Utility tree view, expand the node for the L10 RAID, right-click the icon for a L10 RAID controller, and select **Configuration | Network Properties**.

   The Controller Network Settings dialog box opens.



4. In the Controller Slot Number field enter **0** and then press **Enter**. The settings from controller 0 are loaded into the Controller Network Settings dialog box and are available for you to modify.
5. Enter the control network IP address and other network settings.
6. You want SNMP trap messages go to the NetCentral server PC, so for SNMP Configuration enter the IP address of the NetCentral server PC. You can also enter IP addresses for other SNMP managers to which you want to send SNMP trap messages.
7. Click **OK** to save settings and close.
8. In Storage Utility click **View | Refresh**. Continue with the next procedure "Binding disk modules".

Binding disk modules

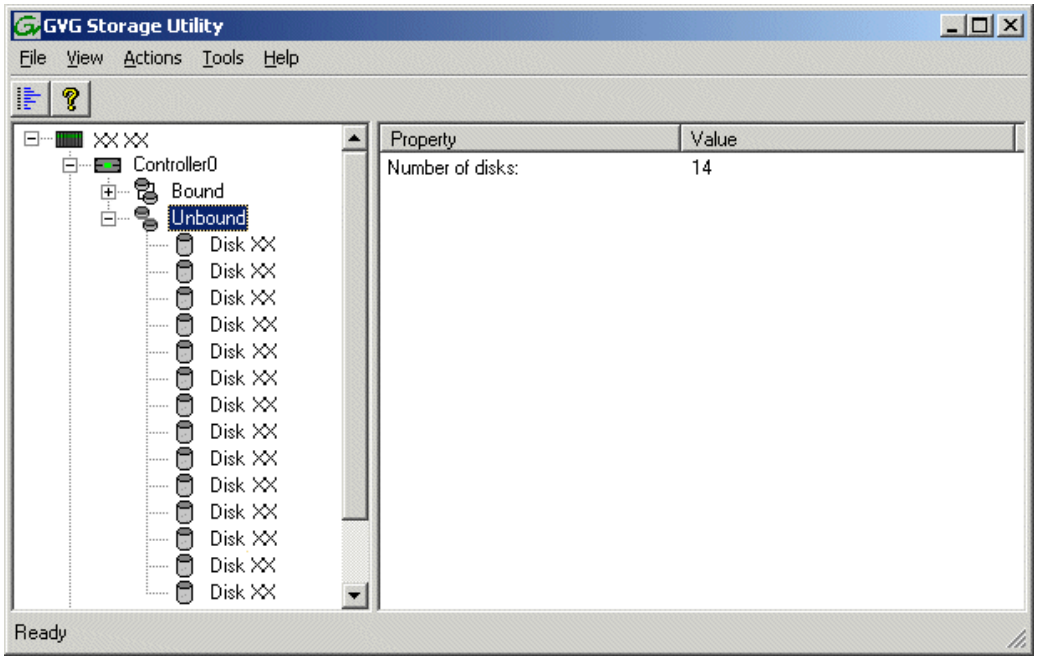
Use the following procedure to bind disk modules as required for the Level 10 storage system.

Also refer to "About RANKs and LUNs in Storage Utility" in Chapter 15, *Overview of K2 Storage Tools*.

NOTE: Binding destroys all user data on the disks.

1. In the Storage Utility main window, identify bound RANKs and unbound disks by

their placement in the hierarchy of the tree view. In the following illustration, disk numbers are represented by “XX”. Refer to “Identifying disks” on page 744 for an explanation of how disks are actually numbered in Storage Utility.

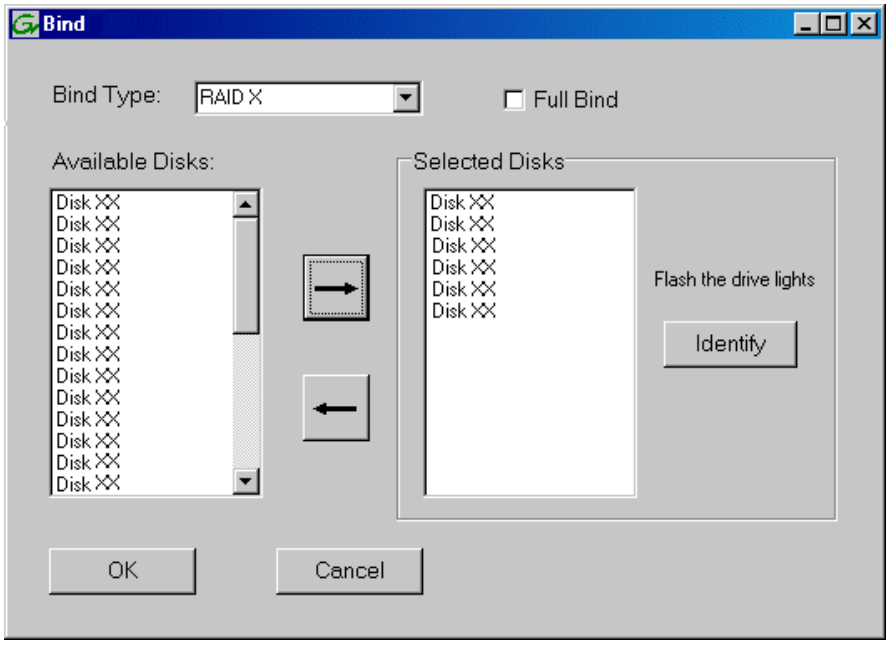


View disk properties and identify the four disks you will use for the metadata/journal RAID 1 RANKs, the one metadata/journal Hot Spare disk, any other disks that you intend to use for Hot Spares, and the remainder of the disks that are available for media storage. Make sure you select disks appropriately as you bind disks in the remainder of this procedure.

2. To bind unbound disks for media storage, do the following:

   a. Right-click the **Unbound** node for a controller, then select **Bind** in the context menu. (If the RAID chassis has two controllers, both controllers are represented by the single “Controller” node)

      The Bind dialog box opens showing all unbound disks for the controller listed in the Available Disk list.



b. Leave Full Bind unchecked. Refer to "About full/background bind" on page 748.

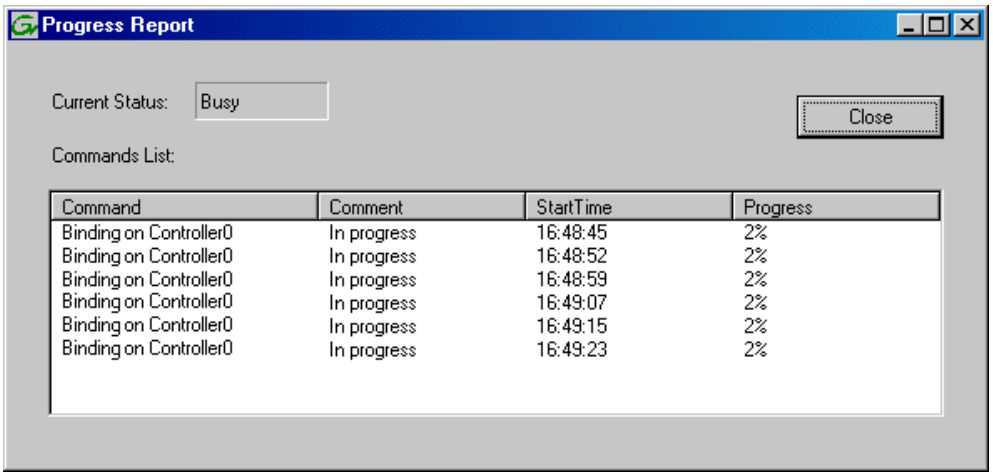
c. In the **Bind Type** drop down box, select **RAID 5** or **RAID 6**, as specified by your system design.

d. In the Available Disks box, select six contiguous disks at the top of the list. (TIP: Use 'shift-click' or 'control-click' to select disks.).

e. Click the add (arrow) button to add disks to the Selected Disks list.

NOTE: As an aid in identifying a disk module's physical location, select it in the Selected Disks list, then click* Identify Disks. *This causes the disk drive light to flash.

f. Click **OK** to close the Bind dialog box and begin the binding process. The Progress Report dialog box opens, showing the status of the binding process.



g. Close the Progress Report and repeat these steps for other unbound disks. If specified by your system design, you can bind some disks as Hot Spares, as explained in "Binding Hot Spare drives" on page 751. When you are done, if you did not bind any extra Hot Spares, you should have the following results:

   For L10 storage you should have two RAID 5 or RAID 6 RANKs of six disks each on the primary RAID storage device. For each optional Expansion chassis, you would have an additional one or two RAID 5 or RAID 6 RANKs of six disks each.

h. Click **Close** in Progress Report window.

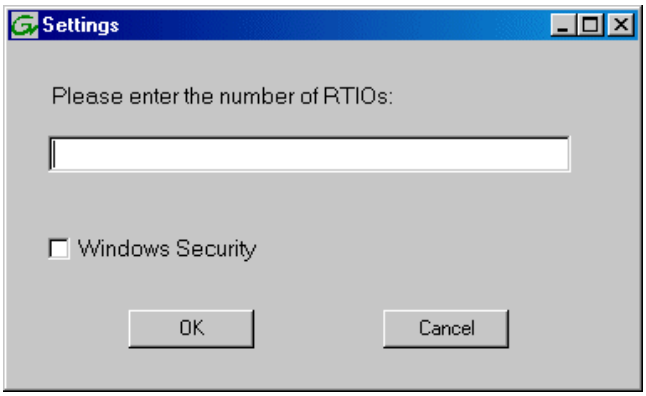
3. Restart the K2 Media Server.

NOTE: Make sure start up processes on the K2 Media Server are complete before proceeding.

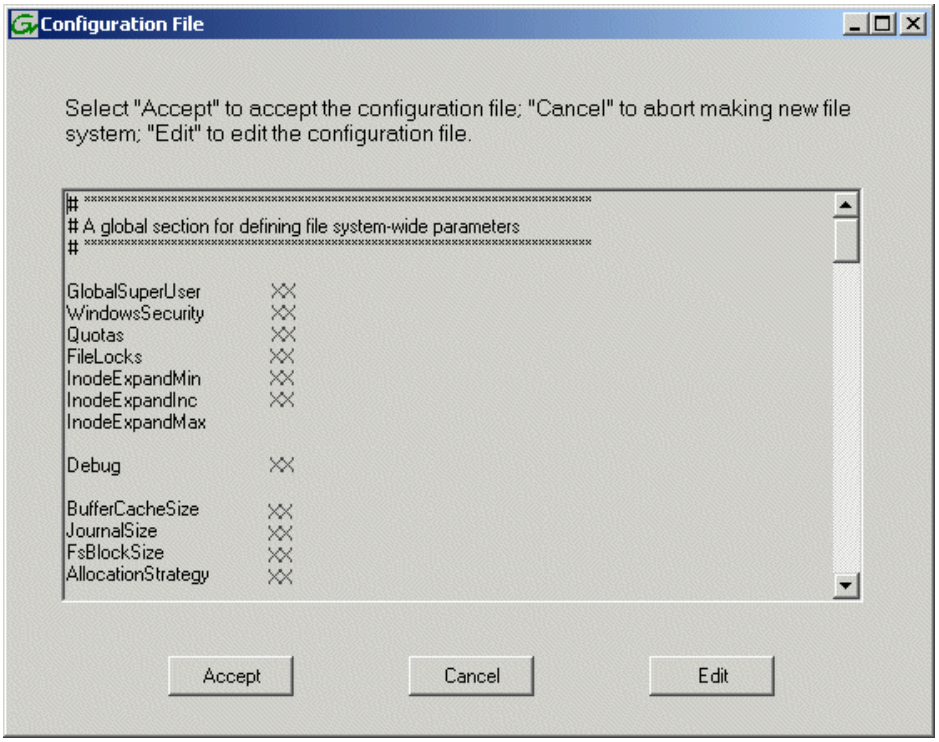
4. Continue with the next procedure "Creating a new file system".

Creating a new file system

1. In Storage Utility, click **Tools | Make New File System**. The Setting dialog box opens.



2. For the Real Time Input/Output (RTIO) rate, enter the value specified by your system design. If you do not know this value, contact your Grass Valley representative.
3. If the K2 Storage System is to be accessed by only K2 Media Clients you can leave Windows Security unchecked. If accessed by Aurora Edits, refer to the *Aurora Edit Installation and Configuration Guide* for instructions.
4. Click **OK**. The Configuration File dialog box opens.



The configuration file for the media file system is displayed. You can verify media file system parameters by viewing this file. Do not edit this file. Click **Accept**.

A "…Please wait…" message box displays progress and a "…succeeded…" message confirms the process is complete.

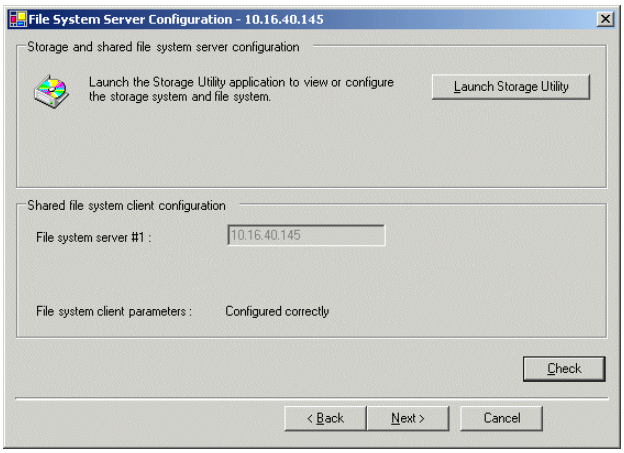
5. A message informs you that you must restart the K2 Media Server, however the restart at the end of the Configure K2 Server wizard suffices, so you do not need to restart now.
6. Close the Storage Utility.

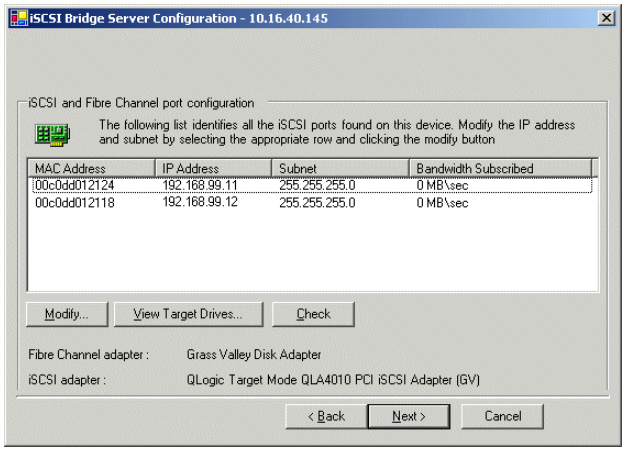
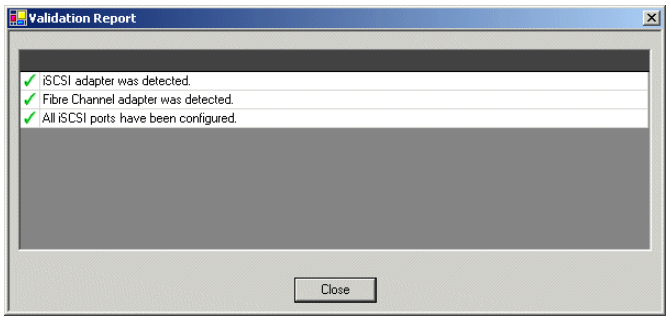
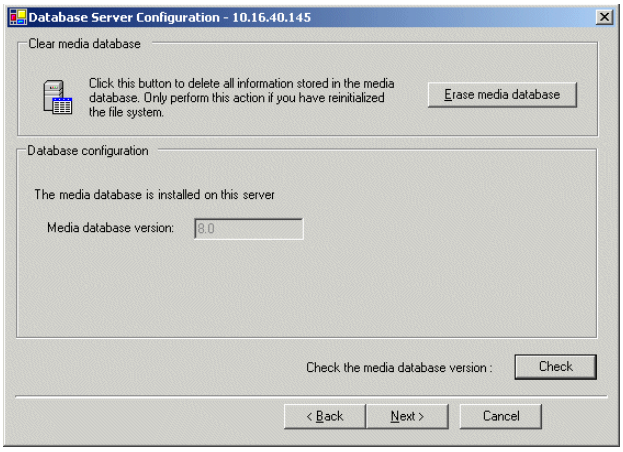
NOTE: Do not attempt to start K2 Media Clients or otherwise bring the K2 Storage System online until instructed to do so later in this chapter.

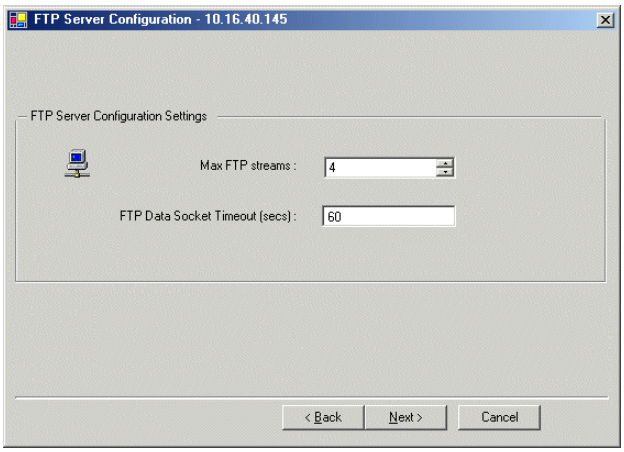
7. Continue with the next procedure.

Configuring the server - Part 2

1. Return to the Configure K2 Server page from which you launched Storage Utility and proceed as described in the following table:

On this page…	Do this…
File System Server Configuration This page checks on the configuration of the server in one of its main roles as a file system server. The server also functions as a file system client, which is also checked from this page.	 Click **Check**. When the wizard reports that the configuration is correct, click **Next**. If you get a "The V: will not be available until this device is rebooted…" message, you can safely continue with this procedure and follow the instructions related to this message later in the procedure.

On this page…	Do this…
iSCSI Bridge Server Configuration This page manages the components that bridge between iSCSI (the GigE media network) and the Fibre Channel connection to the RAID storage. You configure network settings on the iSCSI adapters and the page validates that the Fibre Channel adapter is in place and that the media RANKs are visible as iSCSI targets.	 Select an iSCSI adapter and click **Modify**. A network configuration dialog box opens. Enter the media network IP address and the subnet mask and click **Apply**. Do not configure the second iSCSI adapter. It is not used on a L10 system. Click **Check**. The Validation Report opens.  Confirm that the iSCSI configuration is successful. Close the Validation Report and then click **Next**.
Database Server Configuration	 You do not need to enter or configure anything on this page. Click **Next**.

On this page…	Do this…
FTP Server Configuration	 Do not modify these settings. Leave at default values of Max FTP streams = 4 and FTP Data Socket Timeout = 60. Only qualified Grass Valley personnel should specify other values, as these settings are intended for use only with custom systems designed by Grass Valley. Click **Next**
Completing the Configuration Wizard	Click **Finish**. The wizard closes. The server restarts. Wait until all startup processes have completed before continuing.

Your configurations for the Level 10 K2 Storage System are complete.

Adding K2 Storage System clients

You can add now clients, such as K2 Media Clients or Aurora Edits, to the K2 Storage System and configure them using the K2 System Configuration application.

- For Aurora Edits, refer to the *Aurora Edit Installation and Configuration Guide* for instructions.
- For K2 Media Clients, refer to *K2 Media Client System Guide* for instructions.

Basic operations for Level 10 storage

Use the following procedures as you work on your Level 10 storage system:

- "Level 10 system power-off procedure"
- "Level 10 system power-on procedure"

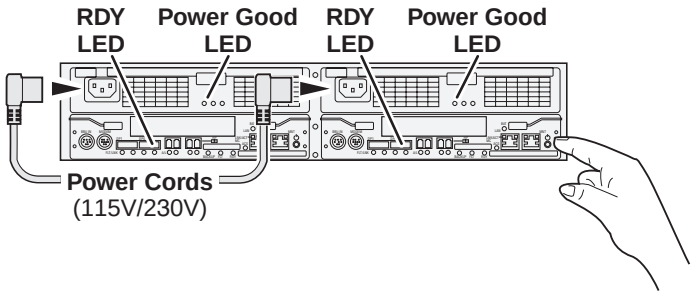
For other procedures refer to "Administering and maintaining the K2 Storage System" on page 687.

Level 10 system power-off procedure

Use the following sequence to power-off the Level 10 storage system.

1. Power-off all K2 Media clients or other iSCSI clients.
2. Shut down the K2 Media Server.

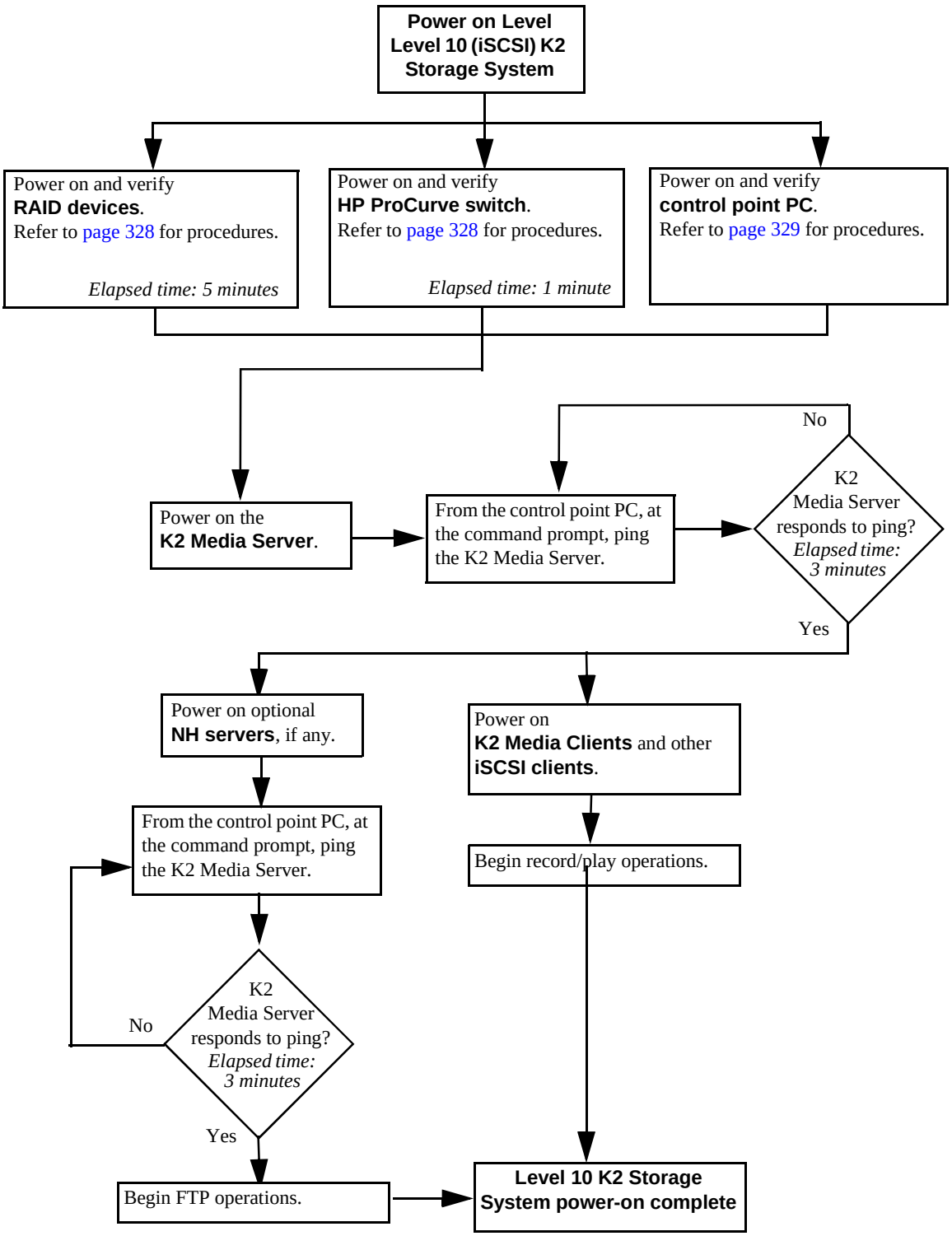
3. Shut down optional NH K2 Media Servers, if any.
4. On the primary RAID chassis controller, identify the RDY LED. It blinks at a rate of 1 blink per second during normal operation.



5. Press and hold down the power button on the RAID controller.
6. Release the power button in about 5 seconds, when the RDY LED blinks more quickly, at a rate of about 2 blinks per second. Do not hold down the power button for longer than 15 seconds.

   The power button on the RAID controller turns off power for the primary RAID chassis and any connected Expansion chassis. Power-off normally occurs within 20 seconds and is indicated when LEDs other than those on the power supplies go off and the fans stop rotating.
7. Wait for RAID power-off to complete before proceeding.
8. Power-off all Ethernet switches.
9. Power-off the control point PC and/or the NetCentral server PC, if necessary.

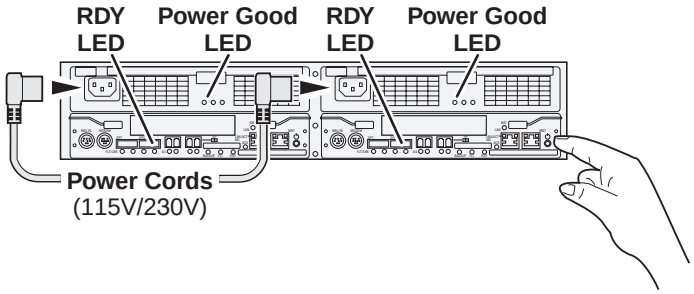
Level 10 system power-on procedure



Powering on Level 10, 20, 30, and Nearline 10 RAID storage devices

Use the following procedure to power on and verify proper operation of RAID storage devices.

1. Verify power and cabling.
2. Press and hold down the power button on the controller, as shown.



   If the RAID chassis has two controllers, you can press the power button on either controller. You do not need to press both power buttons.

   Pressing the power button on a controller also powers on any connected Expansion chassis. There are no power buttons on Expansion chassis.

3. Release the power button when the Power Good LED on the power supply is illuminated. This takes 1-3 seconds.
4. Wait while the primary RAID chassis performs self-test and initialization. This takes about four minutes. While this is taking place, the RDY LED is illuminated with a steady on light.
5. Watch for the RDY LED to begin blinking at one second intervals. The LED might turn off and back on two times before starting the one second blink pattern. When the RDY LED is blinking at one second intervals, the self-test and initialization is complete and the chassis is ready for use.

Powering on the HP ProCurve switch

Use the following procedure to power on and verify proper operation of the HP ProCurve switch.

1. Power up the switch.
2. Watch LEDs to verify proper operation. The diagnostic self test LED Behavior is as follows:
   - Initially, all the status, LED Mode and port LEDs are on for most of the duration of the test.
   - Most of the LEDs go off and then may come on again during phases of the self test. For the duration of the self test, the Test LED stays on.

   If the ports are connected to active network devices, the LEDs behave according to the LED Mode selected. In the default view mode (Link), the LEDs should be on.

- If the ports are connected to active network devices, the LEDs behave according to the LED Mode selected. In the default view mode (Link), the LEDs should be on.
- If the ports are not connected to active network devices, the LEDs will stay off.

Powering on the control point PC

Use the following procedure to power on K2 Storage System's control point PC and verify proper operation during power up of the system.

1. Power up and log on to the PC using standard Windows procedures.
2. Start and log on to NetCentral.
3. NetCentral reports devices as offline. As each device of the K2 Storage System is powered on, check NetCentral to verify the device's status

Chapter 8

Installing the Level 10R Storage System

The K2 Level 10 Redundant (L10R) storage system was initially released with K2 system software version 3.2 in September 2007.

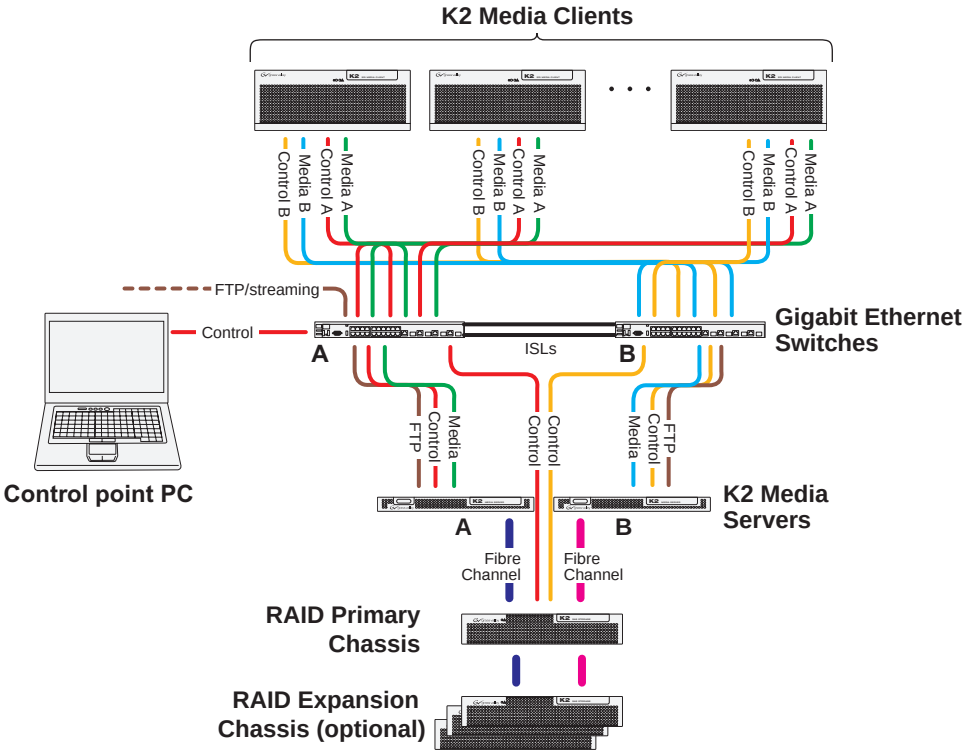
Use this chapter to install the K2 Level 10R storage system.

This chapter includes the following topics:

- "Level 10R system description" on page 332
- "Preparing Level 10R devices" on page 333
- "Networking for Level 10R" on page 350
- "Configuring the Level 10R storage system" on page 355
- "Adding K2 Storage System clients" on page 375
- "Basic operations for Level 10R storage" on page 376

Work through these topics sequentially to install the storage system.

Level 10R system description



The Level 10 redundant (L10R) storage system has two Gigabit Ethernet switches connected by Inter-Switch Links (ISLs) to support a redundant Ethernet fabric. The storage system also has redundant Level 10 K2 Media Servers. The servers are configured to have identical roles. This provides redundancy for database, file system, iSCSI bridge, and FTP roles. One L10R RAID supports redundant Fibre Channel connections. Up to four Expansion chassis are optional for increased storage capacity.

K2 Media Clients have a pair of redundant (teamed) Gigabit Ethernet ports for control and two Gigabit Ethernet ports (A and B) for media (iSCSI). Each port of the control team is connected to a different switch. The A media port goes to the A GigE switch and the B media port goes to the B GigE switch. The GigE switches are configured with V-LANs to keep the control/FTP and media (iSCSI) traffic separate.

Each Level 10 K2 Media Server has one GigE connection for media (iSCSI), one GigE connection for control, one GigE connection for FTP, and one Fibre Channel connection to the RAID storage. All GigE connections on a server go to the same GigE switch. The server hosts an iSCSI interface card for the GigE media connection and a Fibre Channel card for the RAID storage connection. The iSCSI interface card provides a bridge between GigE iSCSI and Fibre Channel SCSI. The server also hosts software components that allow it to function in its roles, including media file system manager, media database server, and FTP server. Redundant K2 Media Servers are connected by a serial cable which supports the heartbeat signal required for automatic system recovery (failover) features. Each Level 10 K2 Media Server has one power supply (non-redundant).

The L10R RAID chassis has redundant RAID controllers to support the Fibre Channel connections from the K2 Media Servers. The L10R RAID chassis is also connected to the GigE control network, which is required for SNMP (NetCentral) monitoring.

On the L10R RAID chassis there are two RAID 1 RANKs (also know as LUNs) for media file system metadata files and journal files. The remainder of the RAID storage is RAID 5 or RAID 6 for media.

The K2 configuration control point PC is connected to the GigE control network. The K2 System Configuration application runs on this PC for configuring the storage system.

FTP/streaming traffic accesses the K2 Storage System via the FTP GigE port on K2 Media Servers. FTP/streaming traffic does not go to K2 Media Clients.

Refer to Chapter 14, *Description of K2 Storage Devices* for more information. Also refer to "Design considerations for Ethernet switches" on page 759.

Preparing Level 10R devices

Use the topics in this section to prepare each device so that it is ready to become part of the Level 10R storage system.

- "Setting up the Control Point PC" on page 333
- "Setting up the Level 10R redundant GigE switches" on page 334
- "Setting up the L10R K2 Media Servers" on page 345
- "Setting up the L10R RAID chassis" on page 346
- "Preparing K2 Storage System clients" on page 348

Setting up the Control Point PC

To set up the K2 configuration Control Point PC, you have the following options:

- Use the Grass Valley Control Point PC that comes from the factory with software pre-installed. This includes the K2 System Configuration application, remote AppCenter, and NetCentral software. Refer to the *K2 Media Client System Guide* for rack mount instructions.
- Use a PC that you own and install the required software.

For either option, you must do the following for the Control Point PC that runs the K2 System Configuration application:

- Assign a control network IP address to the PC. Refer to "Networking tips".
- Connect the PC to the GigE control network.

To use your own PC, you must additionally do the following:

- Verify that the PC meets system requirements, then install the Control Point software and other supporting software, as specified in the *K2 Media Client System Guide*.
- Install and license NetCentral server software. You can install this on the

NetCentral server PC, which can be the K2 configuration Control Point PC. Refer to the *NetCentral User Guide*.

Also refer to "Control point PC description" on page 650.

To fix the screen resolution problem seen with NetCentral on the Grass Valley Control Point PC, do the following:

1. Go to Display properties (right mouse selection of properties on the display area)
2. Select Settings tab
3. Select the Advanced button
4. In the General tab, set the DPI setting to Normal size (96 DPI)
5. Restart the PC

Setting up the Level 10R redundant GigE switches

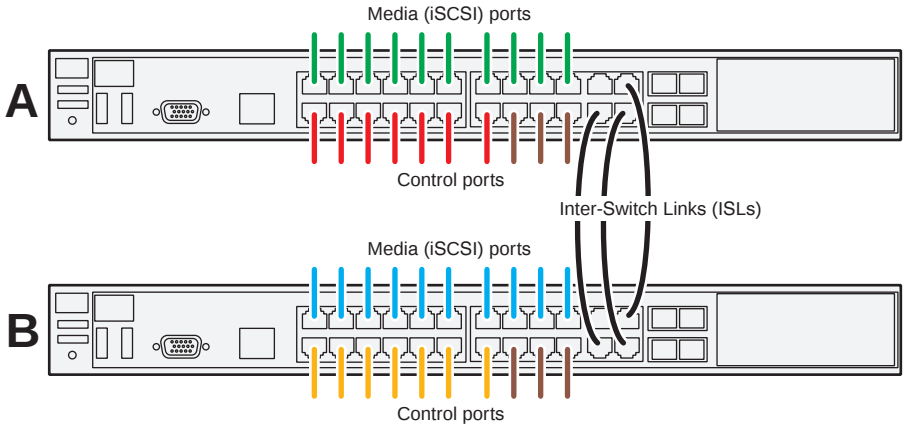
These procedures are for the HP ProCurve switch 2900 series. You must use this switch for iSCSI traffic on Level 10R.

For control and FTP/streaming traffic, it is allowed to use a different brand of switch, such as a Cisco Catalyst switch, if required by your site. If you are using a non-HP switch, apply the information in the following procedures accordingly. Refer to the documentation you received with the switch as necessary.

Also refer to "Design considerations for Ethernet switches" on page 759.

- You need at least two switches, so that the "A" media (iSCSI) network and the "B" media (iSCSI) network each have their own switch.
- Use CAT5e or CAT6 cables. The maximum cable length is 50 meters for CAT5e and 100 meters for CAT6.
- Assign an IP address and logon to each switch. Refer to "Configuring the GigE switch via serial connection" on page 336.
- Set up VLANs on each switch. Refer to "Configuring the GigE switch via the Web interface" on page 339.
- Install the switches in their permanent location.
- Provide power to the switches.
- Connect cables as follows:

2900 series switch



To the media ports on switch A, make the “A” media (iSCSI) network connection from each K2 Media Client. Also make the media (iSCSI) connection from K2 Media Server A.

To the media ports on switch B, make the “B” media (iSCSI) network connection from each K2 Media Client. Also make the media (iSCSI) connection from K2 Media Server B.

To the control ports on switch A, make one connection from each K2 Media Client, from RAID controller 0, and from the control point PC. Also make the control network connection and the FTP network connection from K2 Media Server A.

To the control ports on switch B, make the second control connection from each K2 Media Client, and from RAID controller 1. Also make the control network connection and the FTP network connection from K2 Media Server B.

If you have other iSCSI clients, such as Aurora Edits, that have just one iSCSI connection and one control connection, approximately half of the clients should be connected to switch A and half of the clients should be connected to switch B. In a failover event, only the clients connected to one of the switches will remain operational, so make connections accordingly. Connect the client’s iSCSI connection to one of the media ports on a switch and the client’s control connection to one of the control ports on the same switch.

Interconnect switch A and switch B with three 1 Gig ISLs.

Refer to “Level 10R system description” on page 332 for a diagram of the complete system.

Refer to cabling procedures later in this chapter for the GigE connections at each of the devices of the K2 Storage System.

Also refer to “K2 Ethernet switch description” on page 651 and “Design considerations for Ethernet switches” on page 759.

Configuring the GigE switch via serial connection

NOTE: Make sure you check the switch firmware and upgrade if necessary, as instructed at the end of this procedure.

The following procedure is for the HP ProCurve switch 2900 series. Do not use this procedure on other switch models.

For Level 10R with two switches, do the following on each switch.

Use a direct console connection to the switch, start a console session, and access the Switch Setup screen to set the IP address.

1. Configure the PC terminal emulator on the control point PC or another PC as a DEC VT-100 (ANSI) terminal or use a VT-100 terminal, and configure either one to operate with these settings:
   - Baud rate 115200
   - 8 data bits, 1 stop bit, no parity, and flow control set to Xon/Xoff
   - Also disable (uncheck) the "Use Function, Arrow, and Ctrl Keys for Windows" option
2. Connect the PC to the switch's Console Port using the console cable included with the switch. (If your PC or terminal has a 25-pin serial connector, first attach a 9-pin to 25-pin straight-through adapter at one end of the console cable.)
3. Turn on the PC's power and start the PC terminal program.
4. Press **Enter** two or three times and you will see the copyright page and the message "Press any key to continue". Press a key, and you will then see the switch console command (CLI) prompt.

NOTE: If you press Enter too many times and get past the log in, enter the command EN to get into the command line.

5. Type the following, then press **Enter**:

   ```
   menu
   ```

   If prompted to save the current configuration, answer no (press the n key) to proceed. The main menu opens.
6. On the main menu, choose **Switch Configuration,** then press **Enter**.
7. Select **IP Configuration**, then press **Enter**.
8. Press the right-arrow key to choose **Edit**, then press **Enter**. Tab to fields and enter information as follows:
   a. Change **Gateway** to be the default router.
   b. Tab to the **IP Config (DHCP/Bootp)** field and use the Space bar to select the **Manual** option.
   c. Tab to the **IP Address** field and enter the switch's control network IP address. Refer to "Networking tips" on page 106.
   d. Tab to the **Subnet Mask** field and enter the subnet mask used for your network.

9. Press **Enter**, then right-arrow to **Save**. Press **Enter** and revert to previous menu.
10. Select **Return to Main Menu** and press **Enter**.
11. From the main menu, chose **Console Passwords** and press **Enter**. The Set Password Menu opens.
12. Chose **Set Manager Password** and press **Enter**.
13. When prompted for the password, type a password of up to 16 ASCII characters with no spaces and press **Enter**. The password can be one that is used on other K2 devices, such as “adminK2” or “K2admin”, or it can be your site's administrator password.
14. When prompted to enter the password again, retype the password and press **Enter**.
15. Select **Return to Main Menu** and press **Enter**.
16. From the main menu, tab to **Command Line (CLI)** and press **Enter**. The command prompt appears.
17. Type the following, then press **Enter**:

    ```
    configure
    ```

    You are now in configuration mode.
18. Configure an administrator username. The username can be one that is used on other K2 devices, such as “administrator” or “K2admin”, or it can be your site's administrator username. For example, to set the username to “administrator” type the following, then press **Enter**:

    ```
    password manager user-name administrator
    ```
19. When prompted, enter and re-enter the password.
20. Set spanning tree to RSTP. Type the following, then press **Enter**:

    ```
    spanning-tree force-version rstp-operation
    ```

    This configures spanning tree, but it does not turn spanning tree on. You must turn spanning tree on using the switch’s Web interface, as explained in the next procedure “Configuring the GigE switch via the Web interface”.
21. Decide your SNMP community name as explained in the following options, then proceed with the next step:
    - If you decide to use a unique SNMP community name (not “public”), add the community and set its RW permissions. For example, if the community name is “K2”, type the following, then press **Enter**:

      ```
      snmp-server community K2 unrestricted
      ```
    - If you decide to use the default SNMP community “public” for NetCentral monitoring, which already has RW permissions set as required by NetCentral, proceed to the next step.
22. Enter the SNMP community and IP address of the NetCentral server PC. For example, if the IP address is “192.168.40.11” and the community is “public”, you type the following, then press **Enter**:

    ```
    snmp-server host public 192.168.40.11
    ```

23. Enable Authentication traps. Type the following, then press **Enter**:

```
snmp-server enable traps authentication
```

This allows NetCentral to test the switch to verify that it can send its SNMP trap messages to NetCentral.

24. Type the following, then press **Enter**:

```
menu
```

When prompted, save the configuration by pressing the y key. The main menu opens.

25. If you need a trunk for ISLs to gang switches together, use the following steps. These steps illustrate trunking the last three 1 Gig ports for three 1 Gig ISLs, which is the recommended configuration for ISLs on all multi-switch K2 Storage Systems. Refer to "Design considerations for Ethernet switches" on page 759 and consult with your Grass Valley representative if your requirements deviate from the recommended policy:

    a. At the main menu, select **Switch Configuration** and press **Enter**.

    b. Choose selection **Port/Trunk Settings** and press **Enter**.

    c. Press the right-arrow key to choose **Edit**, then press **Enter**.

    d. Down arrow until at the bottom of the list of ports and select the last (highest port number) 1 Gig port in the list.

    e. Right-arrow over to the Group column.

    f. Use the Space bar and set the bottom 1 Gig port to **Trk1**.

    g. Set the next port up also to **Trk1**.

    h. Set the next port up also to **Trk1**.

    i. Press **Enter**, then right-arrow to **Save**. Press **Enter** and revert to previous menu.

26. Select **Return to Main Menu** and press **Enter**.

27. From the main menu, tab to **Command Line (CLI)** and press **Enter**. The command prompt appears.

28. Check the version of firmware currently installed on the switch. Type the following, then press **Enter**:

```
show flash
```

Information is displayed similar to the following example:

```
HP_iSCSI_switch1# show flash
Image            Size(Bytes)   Date   Version
-----            ----------  -------- -------
Primary Image    : 3287779   03/15/05 M.08.66
Secondary Image  : 3287779   03/15/05 M.08.66
Boot Rom Version: I.08.07
Current Boot     : Primary
```

29. Check the Primary Image Version and refer to your *K2 Storage System Release Notes* for information about currently supported versions. Then proceed as follows:
    - If *K2 Storage System Release Notes* instruct you to change the firmware on the switch, do so before continuing. Refer to the documentation you received with the switch for instructions to change the firmware. Then continue with the next procedure "Configuring the GigE switch via the Web interface".
    - If *K2 Storage System Release Notes* confirm that the version on the switch is a currently supported version, continue with the next procedure.
30. Type the following, then press **Enter**:

    ```
    menu
    ```

    The main menu opens.
31. From the main menu, choose **Reboot Switch** and press **Enter**. When prompted "Continue Reboot…?', answer yes (press the y key) to proceed. The switch restarts.
32. You can now use the switch's web browser interface for further configuration, as instructed in the next procedure.
33. Close the PC terminal program and disconnect the console cable.
34. Repeat this procedure on the other switch.

Continue with the next procedure "Configuring the GigE switch via the Web interface".

Configuring the GigE switch via the Web interface

The following procedure is for the HP ProCurve switch 2900 series. Do not use this procedure on other switch models.

For Level 10R with two switches, do the following on each switch.

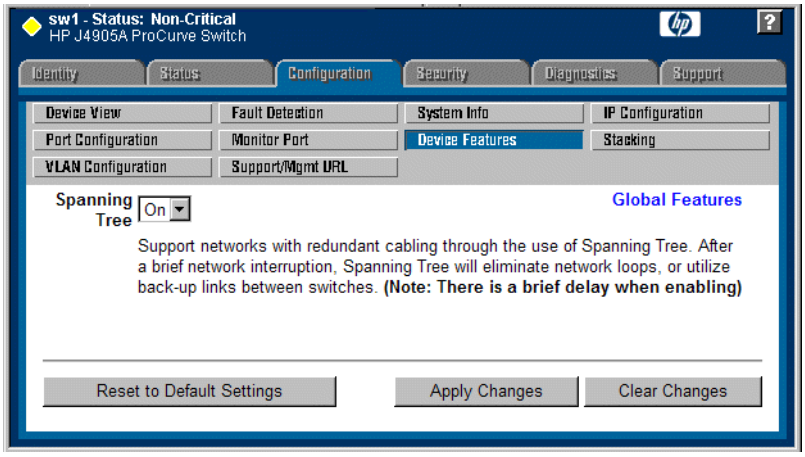
1. From the control point PC or another PC, make sure that you have a direct Ethernet cable connection to the switch, with no switches, routers, proxies, or other networking devices in between.
2. On the PC, open Internet Explorer and type the switch's IP address in the Address field, as in the following example.

   ```
   http://192.168.100.61
   ```

   This should be the name or IP address as currently configured on the switch.
3. Press **Enter** to open the switch's configuration application.

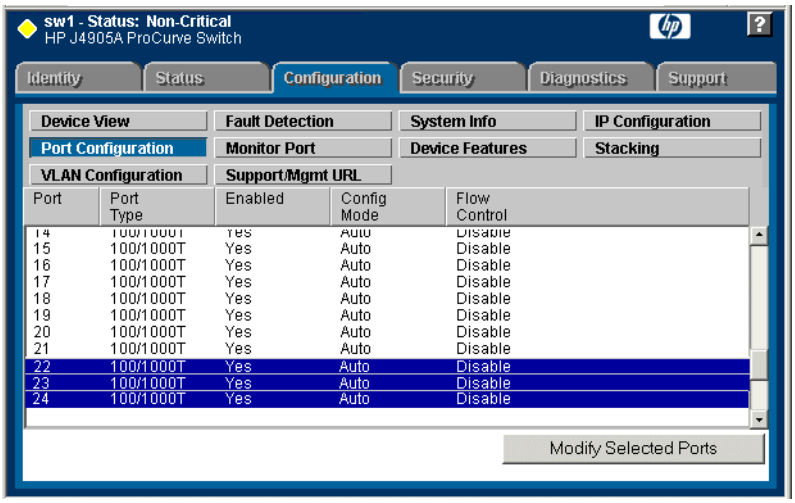
   NOTE: The configuration application for the HP ProCurve switch requires Java.

   You can also access the switch's configuration application from the K2 System Configuration application.
4. In the switch's configuration application, choose **Configuration**, then **Device Features**.



5. Set Spanning Tree to **On** and click **Apply Changes**. If prompted, log in with the switch's administrator username and password.

6. Click **Port Configuration**.

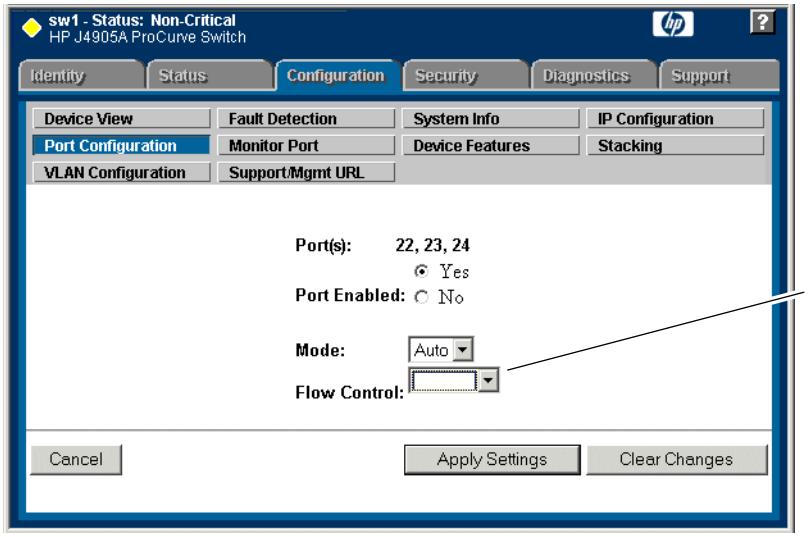


7. If you do not need trunks, such as on a one-switch system, skip to the next step in this procedure. If you need trunks, such as on a two-switch system with ISLs, do the following:

   a. Select (Ctrl + Click) the trunked ports. Typically the trunked ports are at the bottom of the list and are labeled Trk1.

   b. Click **Modify Selected Ports**.

      If prompted, log in as administrator.



c. For the trunked ports, set Port Enabled to **Yes**. On some switch models, some ports are disabled by default, so make sure you enable them. Leave Mode as default of **Auto**.

d. Set Flow Control as follows:

   - Set to **Enable**.

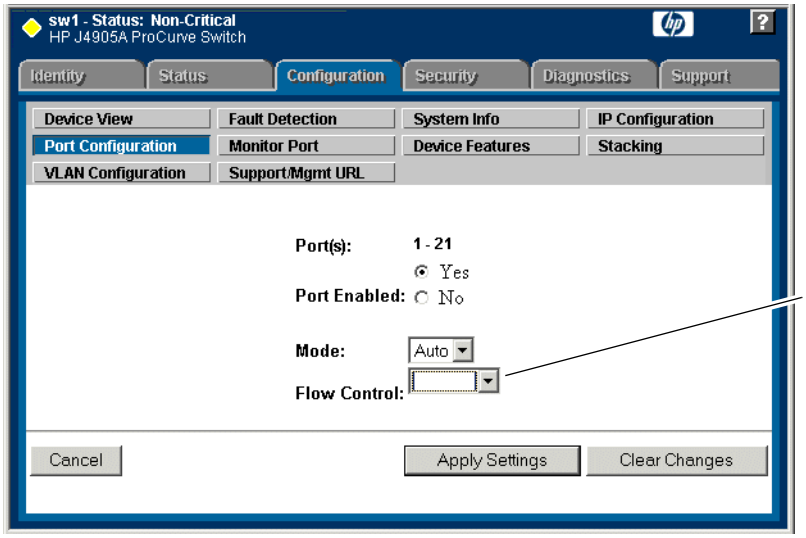
NOTE: This setting is for the 2900 series switch. Other switch models might require a different setting.

e. Click **Apply Settings**.

8. On the Port Configuration page, do one of the following:

   - If you do not have trunks, select all ports.
   - If you have trunks, select the remaining ports (the ports not trunked).

9. Click **Modify Selected Ports**.



10. Make sure Port Enabled is set to **Yes**, leave Mode as default of **Auto**.

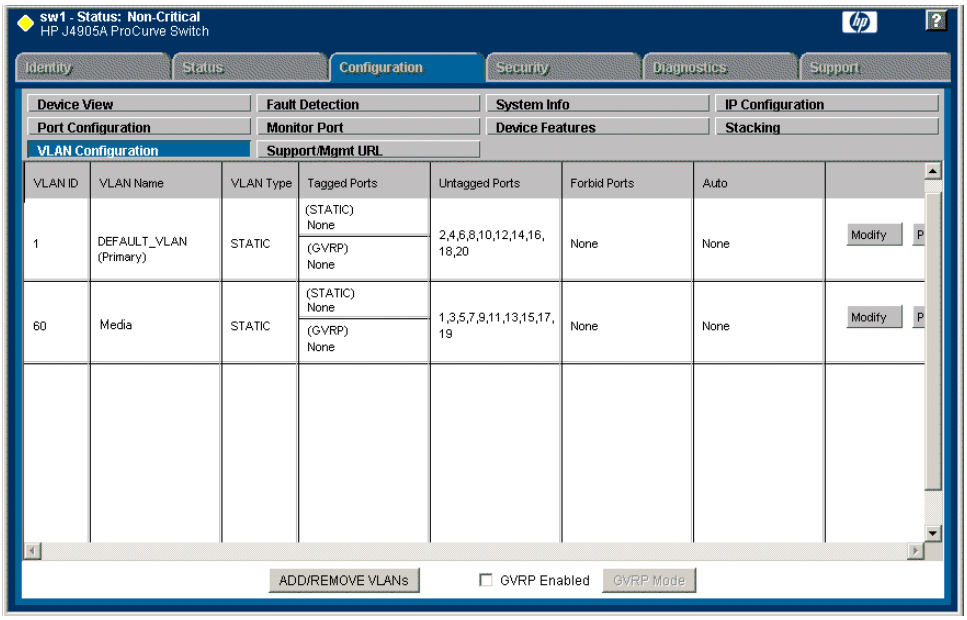
11. Set Flow Control as follows:

- Set to **Enable**.

NOTE: This setting is for the 2900 series switch. Other switch models might require a different setting.

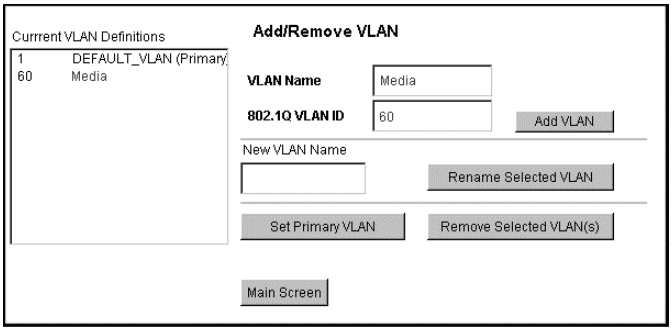
12. Click **Apply Settings**. Wait until settings are applied and the Web interface becomes active.

13. Choose **VLAN Configuration**. If prompted, log in with the switch's administrator username and password.



14. Create a new Media (iSCSI) VLAN as follows:

    a. Click **Add/Remove VLANs**.



    b. In the VLAN Name field enter `Media`.

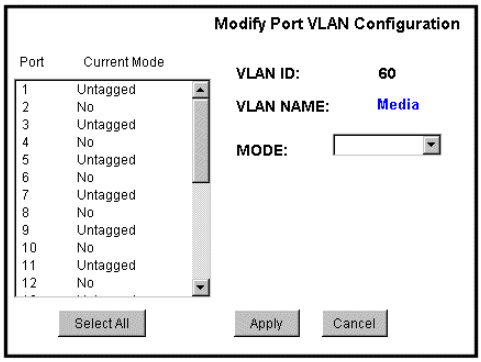
    c. In the VLAN ID field enter `60`.

    d. Click **Add VLAN**.

    e. Click **Main Screen** to return to VLAN Configuration.

15. Configure the Media VLAN as follows:

    a. In the Media VLAN row, click **Modify**.



b. Select all the odd numbered ports. (Tip: Use Ctrl + Click.)

c. In the Mode drop-down list, select **Untagged**, then click **Apply**. This removes the odd ports from the default (Control) VLAN.

   If you have a trunk, do not configure it as "Tagged". Media VLAN traffic (iSCSI) does not go over the trunk.

16. Click the **VLAN Configuration** tab.

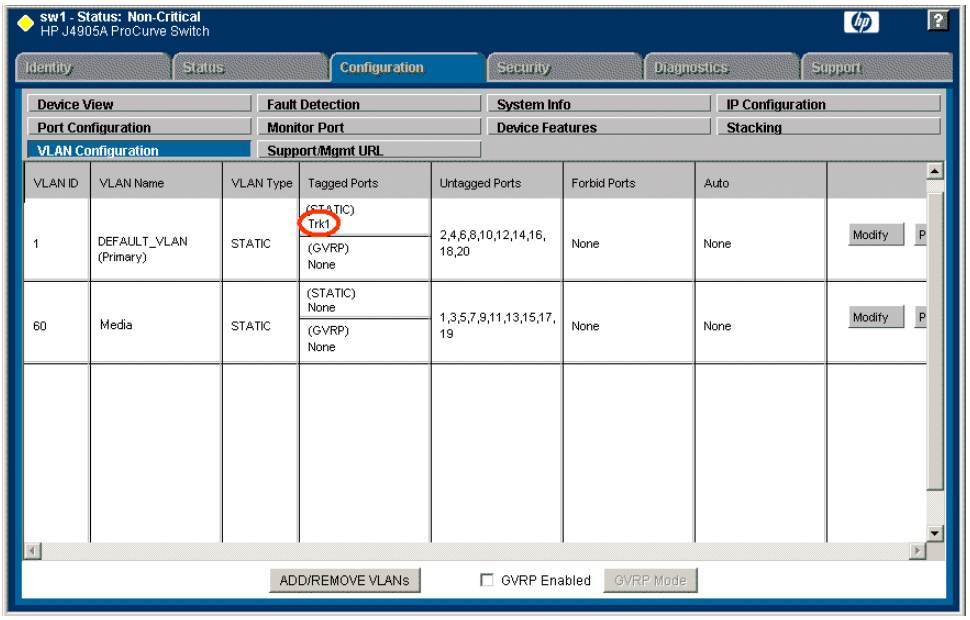
17. If you have a trunk, configure the default (Control) VLAN as follows:

    a. In the DEFAULT_VLAN row, click **Modify**.

    b. In the Current Mode list box, scroll down and select the trunk.

    c. In the Mode drop-down list, select **Tagged**, then click **Apply**. This allows default VLAN traffic (non-iSCSI) to go over the trunk.

18. Click the **VLAN Configuration** tab.



19. If you have a trunk, verify that for the default VLAN the trunk is displayed in the Tagged Ports column.
20. If you have two switches, repeat this procedure for the other switch.
21. Close the switch configuration application.

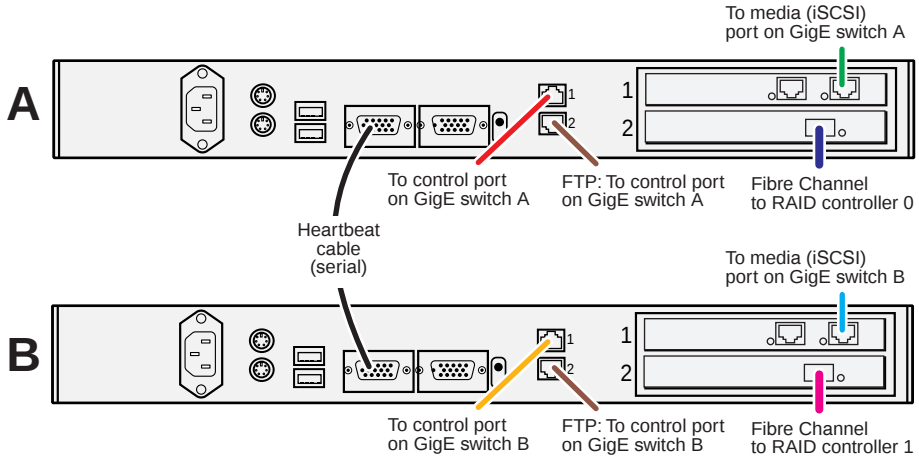
Setting up the L10R K2 Media Servers

The Dell PowerEdge 860 is qualified as the platform for the L10R K2 Media Server.

Do the following to prepare L10R K2 Media Servers:

- Install the server in its permanent location. Refer to the rack mount instructions that you received with the server's product bundle.
- Provide power to the servers.
- Connect cables as follows:

Dell 860 PowerEdge server



Connect the iSCSI interface port to a media port on the GigE switch. Connect the A server to the A GigE switch. Connect the B server to the B GigE switch.

Connect the motherboard GigE port 1 and GigE port 2 to control ports on the GigE switch. Connect the A server to the A GigE switch. Connect the B server to the B GigE switch.

Connect the Fibre Channel port to the RAID storage device. Connect the A server to controller 0 and the B server to controller 1.

Make a direct connection between the serial ports of the two servers.

Take care to use the proper serial cable to interconnect redundant K2 Media Servers. This cable supports the heartbeat mechanism whereby the servers monitor each other's health. It is a 9 pin serial cable, but it is not a standard RS-232 null modem cable. The heartbeat cable is supplied with your system (Grass Valley part number 174-8137-00). Refer to the *K2 Media Client System Guide* for pinout details.

- Assign a control network IP address to GigE port 1. Use standard Windows procedures. Refer to "Networking tips" on page 106.

- Change the hostname. Use standard Windows procedures.
- Configure SNMP properties so the trap destination points to the NetCentral server PC. Use standard Windows procedures. If you are not using the SNMP community name “public”, configure the community name and set permissions to RW. Also make sure that the Authentication trap is enabled.

Also refer to “K2 Media Server descriptions” on page 653.

Setting up the L10R RAID chassis

Do the following to prepare the L10R RAID storage devices:

- Install the chassis in its permanent location. After mounting the chassis in the rack, you must secure brackets to the front rail to support the Grass Valley bezel. Refer to the *K2 Lx0 RAID Instruction Manual* for rack mount instructions.
- “Connect the L10R RAID Primary and Expansion chassis” on page 346
- “Power on the L10R RAID chassis” on page 347

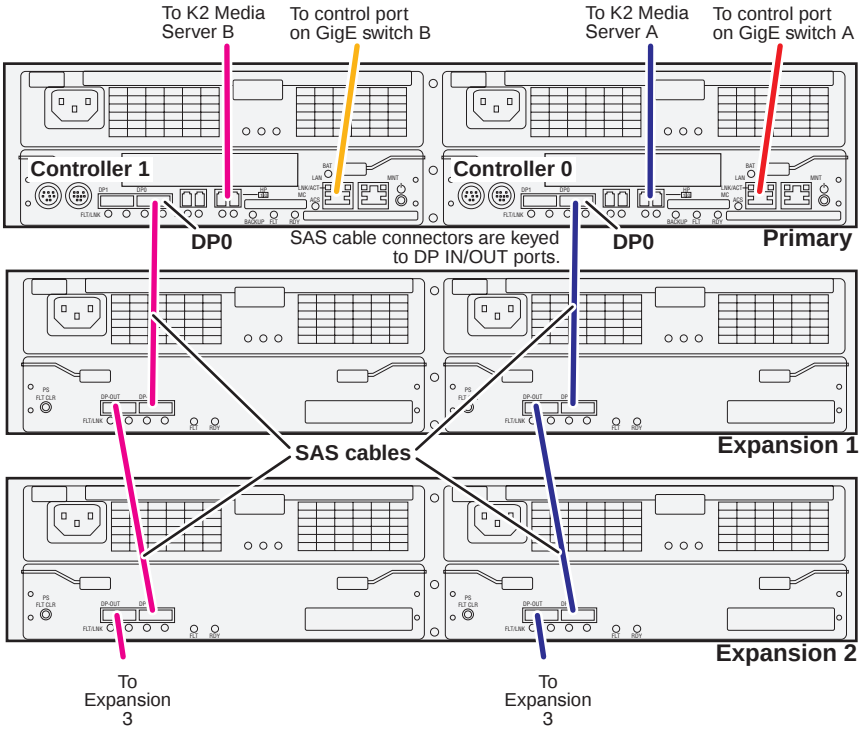
In addition, you will configure network settings, SNMP settings, and bind RAID disks. These tasks are part of the K2 System Configuration application and Storage Utility procedures later in this chapter.

On the L10R RAID, you do not need to manually set a Fibre Channel address ID on controllers or a chassis address on Expansion chassis.

Also refer to “K2 RAID storage description” on page 659.

Connect the L10R RAID Primary and Expansion chassis

Connect Ethernet, Fibre Channel, and SAS cabling as shown.



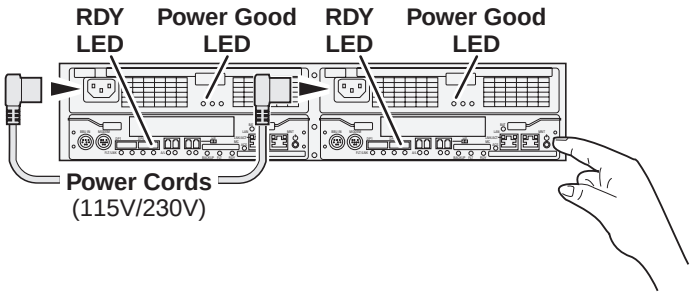
If you have more Expansion chassis than those illustrated, continue the indicated cabling pattern, connecting additional chassis to DP0.

Once the RAID storage is connected and configured, do not swap Expansion chassis or otherwise reconfigure storage. If you connect an Expansion chassis in a different order or to the wrong controller, the controller will see a configuration mismatch and fault.

Power on the L10R RAID chassis

Connect power cords and power up RAID storage devices as follows:

1. Verify power and cabling.
2. Press and hold down the power button on the controller, as shown.



If the RAID chassis has two controllers, you can press the power button on either controller. You do not need to press both power buttons.

Pressing the power button on a controller also powers on any connected Expansion chassis. There are no power buttons on Expansion chassis.

3. Release the power button when the Power Good LED on the power supply is illuminated. This takes 1-3 seconds.
4. Wait while the primary RAID chassis performs self-test and initialization. This takes about four minutes. While this is taking place, the RDY LED is illuminated with a steady on light.
5. Watch for the RDY LED to begin blinking at one second intervals. The LED might turn off and back on two times before starting the one second blink pattern. When the RDY LED is blinking at one second intervals, the self-test and initialization is complete and the chassis is ready for use.

Your preparations for L10R RAID storage are now complete.

Preparing K2 Storage System clients

Any devices that function as iSCSI clients to the K2 Storage System must be prepared with the following requirements:

- One or more connections to the control network.
- A static IP address for the control network.
- For a redundant K2 Storage System, K2 Media Clients have one connection to the A media (iSCSI) network and one connection to the B media (iSCSI) network. Other iSCSI clients with just one media port connect to either the A or the B network.

Additional steps that are required for Aurora Edits include the following:

- Implement Aurora Edit security features.
- Install SNFS software and K2 software.

For more information, refer to the *Aurora Edit Installation and Configuration Guide*.

Additional steps that are required for K2 Media Clients include the following:

- You must install Multi-path I/O software if the K2 Media Client connects to the K2 Storage System with a redundant Ethernet (iSCSI) fabric. For example, the following K2 Storage Systems have a redundant Ethernet fabric:
  - Level 2R
  - Level 3R
  - Level 10R
  - Level 20R
  - Level 30R

For more information refer to the *K2 Media Client System Guide*.

K2 configuration and NetCentral

Before you begin using the K2 System Configuration application to configure the storage system, you should set up the NetCentral system according to the following requirements:

- **NetCentral installed** — NetCentral server software must be installed on a NetCentral server PC. This can be the K2 configuration Control Point PC or another PC that has network communication with the K2 Storage System control network.
- **Device providers installed** — A device provider must be installed on the NetCentral server PC for each type of device in the K2 Storage System. For a Level 10R storage system, the following device providers must be installed:
  - Control point PC device provider — This is the Windows monitoring device provider.
  - K2 Media Server device provider
  - HP Gigabit Switch device provider or Cisco Gigabit Switch device provider
  - K2 Media Client device provider, if any K2 Media Clients are accessing the Level 10R storage system.
  - Device provider for iSCSI clients, if any iSCSI clients such as Aurora Edits are accessing the Level 10R storage system.
  - K2 L10R RAID storage device provider. This device provider supports RAID devices for Levels 10, 20, and 30.
- **Grass Valley PC Monitoring software installed** — This software must be installed on the K2 configuration Control Point PC. It includes Grass Valley SNMP agents and other WMI based components to perform process monitoring. This provides the information for some of the SNMP trap messages that must be sent to NetCentral.
- **Control Point PC monitored by NetCentral** — The K2 configuration Control Point PC should be added to the NetCentral system and fully monitored by NetCentral. This means that its SNMP trap destination is set to send SNMP traps to the NetCentral server PC. Whether the Control Point PC and the NetCentral server PC are the same PC or are different PCs, you should still add the Control Point PC to NetCentral.

Refer to the *NetCentral User Guide* to set up the NetCentral system. After installing a device provider, you can find additional documentation about monitoring that type of device on the NetCentral Help menu.

Networking for Level 10R

Use the topics in this section to configure the Gigabit Ethernet (GigE) network for the Level 10R storage system.

- "Networking requirements" on page 350
- "Networking tips" on page 351
- "Setting up host tables" on page 352
- "Testing the control network" on page 353

Networking requirements

Required networking strategies for a Level 10R (a redundant K2 Storage System) are as follows:

- Four networks:
  - Media network A — Exclusively for iSCSI traffic. For failover purposes, this network restricts traffic between an "A" media port on a K2 Media Client and the "A" K2 Media Server with the role of media file system/database server.
  - Media network B — Exclusively for iSCSI traffic. For failover purposes, this network restricts traffic between a "B" media port on a K2 Media Client and the "B" K2 Media Server with the role of media file system/database server.
  - Streaming/FTP network — For media transfers and FTP traffic.
  - Control network — For all other non-streaming, non-iSCSI traffic.
- Networks must be on separate subnets.
- The real-time iSCSI traffic of the media networks (A and B) is kept separate from traffic that is not real-time, such as that of the streaming/FTP network and the control network. This separation is provided by dedicated Gigabit ports, cables, and by a dedicated VLAN on the HP GigE switch or by separate switches.
- K2 Media Servers have a dedicated FTP port. Make a dedicated FTP connection to the FTP port.
- While control and FTP traffic is each on its own subnet, it is not required that each type of traffic has its own VLAN on GigE switches. For example, you make both FTP and control connections to the "control" ports (DEFAULT_VLAN) on the HP GigE switch.
- While the Level 10 K2 Media Server (both redundant and non-redundant) has two media (iSCSI) ports, only one is used.
- Static IP addresses are required for the media networks on K2 Storage System iSCSI devices. This includes K2 Media Servers, generic iSCSI clients (such as Aurora Edits), and K2 Media Clients.
- Machine names (host names) assigned to each K2 device.
- Host tables (hosts files) provide name resolution on each K2 Media Client, iSCSI client, and K2 Media Server.
- IP addresses for FTP/streaming ports must have name resolution such that

hostnames are appended with the "_he0" suffix. You can use host tables (as in "Setting up host tables" on page 352) or another mechanism to provide the name resolution. This directs the streaming traffic to the correct port. Refer to the *K2 Media Client System Guide* for a complete explanation.

- K2 Media Servers (including optional NH servers) must be on the streaming network, as they provide the FTP interface for shared storage streaming traffic. Shared storage K2 Media Clients do not need to be on the streaming network because they do not send or receive streaming traffic.
- On the shared storage K2 Media Client, the two control GigE ports are configured as a team. The control team shares a single IP address. Do not attempt to un-team the control ports. On the Level 10R K2 Storage System (a redundant K2 Storage System), both control ports are connected and the control team provides redundancy.
- On the shared storage K2 Media Client, the two media (iSCSI) GigE ports are not teamed. On the Level 10R K2 Storage System (a redundant K2 Storage System), both media ports are connected and each media port is assigned to a different media (iSCSI) network, which is required for redundancy.

Also refer to "About networks and FTP" on page 684 and "Design considerations for Ethernet switches" on page 759.

Use the following procedures as necessary to implement your networking strategies.

NOTE: It is recommended that you configure Media network (iSCSI) IP addresses and Streaming network IP addresses using the K2 System Configuration application, rather than doing so on the local machine using standard Windows procedures.

Networking tips

- Before beginning network configuration, determine the IP addresses and names needed for the machines in your K2 system. Work with the network administrator at your facility to have those IP addresses and names available for your use.
- Establish a consistent convention for machine names and IP addresses. It is recommended that you embed a root name or other unique identifier for this particular K2 Storage System in the computer name. Also, a common convention for IP addresses is to use a numerical pattern or sequence in the IP addresses to indicate device-types and/or ports, as in the following example:

NOTE: This example assumes a subnet mask of 255.255.255.0

Example of Level 10R names and IP addresses

Computer name	Device type	Streaming network addresses	Control network addresses	Media network addresses	Comments
root_server_1	K2 Media Server	192.168.101.11[a]	192.168.100.11	192.168.99.11	These two servers are a redundant pair. On each server, the second media port is not used.
				—	
root_server_2	K2 Media Server	192.168.101.21[b]	192.168.100.21	192.168.98.21	
				—	
root_raid_1	RAID	—	192.168.100.51	—	Each RAID controller is on the control network for monitoring.
root_raid_2	RAID	—	192.168.100.52	—	
root_gige_1	GigE switch	—	192.168.100.61	—	—
root_gige_2	GigE switch	—	192.168.100.62	—	—
root_cppc_1	Control point PC	—	192.168.100.81	—	—
root_client_1	iSCSI client	—	192.168.100.111	192.168.99.111	For the control network, one IP address is shared between the two teamed ports. For media networks, subnet 99 is the "A" network and subnet 98 is the "B" network.
				192.168.98.112	
root_client_2	iSCSI client	—	192.168.100.121	192.168.99.121	
				192.168.98.122	
root_client_3	iSCSI client	—	192.168.100.131	192.168.99.131	
				192.168.98.132	
root_client_4	iSCSI client	—	192.168.100.141	192.168.99.141	
				192.168.98.142	

[a] This IP address must resolve to hostname root_server_1_he0
[b] This IP address must resolve to hostname root_server_2_he0

Setting up host tables

The *hosts* file is used by the control network and the streaming/FTP network to determine the IP address of devices on the network when only a the device name (hostname) is given. The steps that follow describe how to edit the *hosts* file located at *C:\Windows\system32\drivers\etc\hosts* on Windows XP and Windows 2003 Server operating system computers. If you include the names and addresses of all the devices on the network, then you can copy the same file onto all the other K2 devices instead of editing the *hosts* file on each K2 device.

For FTP transfers on a K2 Storage System, transfers go to/from K2 Media Servers that have the role of FTP server. No transfers go directly to/from the shared storage K2 Media Clients that are on the K2 Storage System. So in the hosts file, you must add the "he_0" extension to a K2 Media Server hostname and associate that hostname with the K2 Media Server's FTP/streaming network IP address.

Refer to the *K2 Media Client System Guide* for more information.

To edit the *hosts* file manually:

1. Open the following file using Notepad or some other text editing application:

   C:\Windows\system32\drivers\etc\hosts

2. Enter all IP addresses with machine names. The text format is simple. First type the Ethernet IP address, then use the TAB key or Space bar to insert a few spaces. Then type the machine name.

   Here is an example:

```
192.168.100.11     root_server_1
192.168.101.11     root_server_1_he0
192.168.100.21     root_server_2
192.168.101.21     root_server_2_he0
192.168.100.51     root_raid_1
192.168.100.61     root_gige_1
```

3. Save the file and exit the text editor.

4. Copy the new *hosts* file onto all the other machines. This is easier than editing the file on each machine.

Host table tips

- If transferring to or from a Profile XP or Open SAN system via UIM, the *hosts* file must also follow UIM naming conventions for those systems. Refer to the UIM Instruction Manual.
- Do not enter media (iSCSI) network IP addresses in the host table, as hostname resolution is not required for the media network.
- Use the following tip with care. While it can solve a problem, it also introduces a name resolution "anomaly" that might be confusing if not considered in future troubleshooting activities.

  For each SAN (shared storage) K2 Media Client, add the "_he0" suffix to the hostname but then associate that hostname with the K2 Media ***Server's*** FTP/ streaming network IP address, ***not*** the K2 Media ***Client's*** IP address. Aliasing K2 Media Client hostnames in this way would not be required if the transfer source/ destination was always correctly specified as the K2 Media Server. However, a common mistake is to attempt a transfer in which the source/destination is incorrectly specified as the K2 Media Client. The host file aliasing corrects this mistake and redirects to the K2 Media Server, which is the correct transfer source/ destination.

  An example of a *hosts* file entry with this type of aliasing is as follows:

```
192.168.101.11     server_1_he0 client_1_he0 client_2_he0
```

Testing the control network

To test the control network use the *ping* command as follows:

1. On the control point PC, click **Start | Run**. The Run dialog box opens.

2. Type `cmd` and click **OK**. The command prompt window opens.
3. Type `ping`, then a space, then the name of one of your K2 Storage System devices, such as the Gigabit Ethernet switch, as in the following example:

   ```
   ping root_gige_1
   ```

4. Press **Enter**.

   The ping command should return the IP address of the device, as in the following example:

   ```
   Pinging root_gige_1.mycorp.com [192.168.100.61] with
   32 bytes of data:


   Reply from 192.168.100.61: bytes=32 time=10ms TTL=127
   Reply from 192.168.100.61: bytes=32 time<10ms TTL=127
   Reply from 192.168.100.61: bytes=32 time<10ms TTL=127
   Reply from 192.168.100.61: bytes=32 time<10ms TTL=127
   ```

   This verifies that the name of the device is being correctly resolved to the IP address, which indicates that on the Control Point PC the host table entry is correct.

5. Ping the other K2 Storage System devices to which you have assigned control network IP addresses.
6. Go to each Windows device in the K2 Storage System and repeat this procedure. This verifies that network communication is correct to and from all devices.

Configuring the Level 10R storage system

Use the topics in this section to do the initial configuration of the Level 10R storage system.

- "Prerequisites for initial configuration" on page 355
- "Defining a new K2 Storage System" on page 356
- "Configuring server A - Part 1" on page 358
- "Configuring RAID" on page 360
- "Creating a new file system" on page 366
- "Configuring server A - Part 2" on page 368
- "Configuring the redundant server" on page 371

Prerequisites for initial configuration

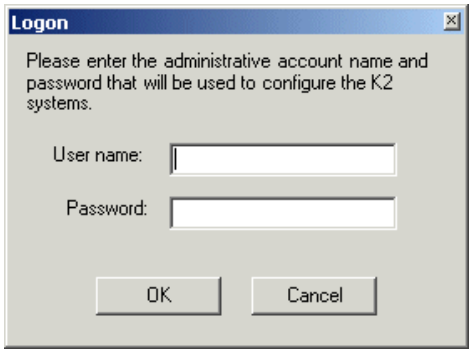
Before beginning your initial configuration, make sure the devices of the K2 Storage System meet the following prerequisites. Refer to sections earlier in this manual for detailed information. Also refer to Chapter 14, "Description of K2 Storage Devices".

Devices	Prerequisite for Level 10R configuration
Control point PC	Ethernet cable connected Control Point software installed Control network IP address assigned Network communication over the control network with all other K2 devices Power on
Ethernet switch	Ethernet cables connected Control network IP address assigned VLANs set up Trunks set up Power on
K2 Media Server	Ethernet cables connected Fibre Channel cable connected Redundant servers connected by serial cable Software installed, as from the factory, including QuickTime 7 Control network IP address assigned Power on for all servers

Defining a new K2 Storage System

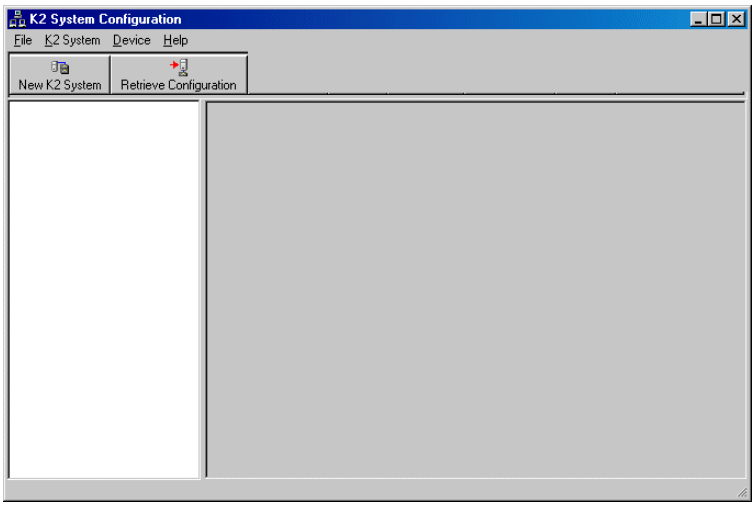
Define a Level 10R K2 Storage System as follows:

1. On the control point PC, open the K2 System Configuration application. A login dialog box opens.



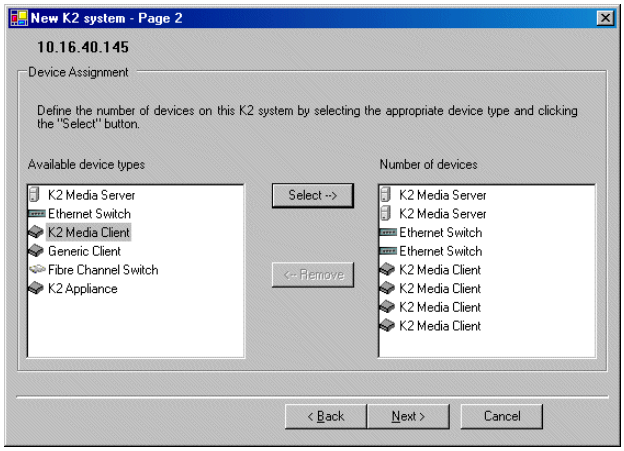
2. Log in to the K2 System Configuration application with the Windows administrator account. By default this as follows:
   - Username: administrator
   - Password: adminK2

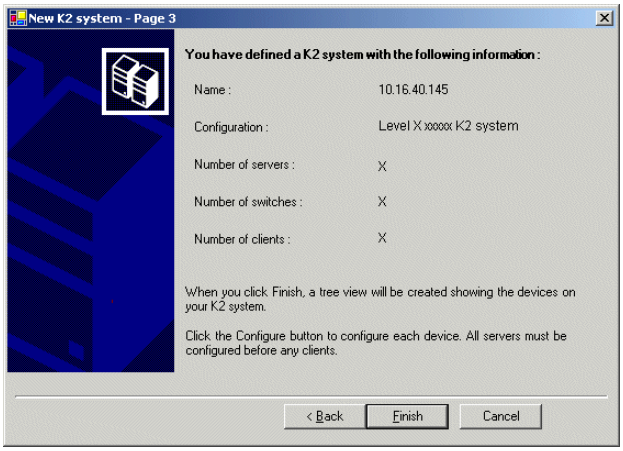
   Refer to "Setting up application security" on page 688 for more information about administrator accounts and logging in to applications.



3. Click **New K2 System**. The New K2 System wizard opens.

4. Follow the on-screen text to define your Level 10R K2 Storage System, as described in the following table.

On this page…	Do this…
Page 1	 Create a name for your Level 10R K2 Storage System and type it in the Name box. Select **Level 10**. Select the **Server redundancy** option. Click **Next**
Page 2	 Move the following into the Number of Devices Box: • Two K2 Media Servers • Two Ethernet switches • K2 Media Clients as appropriate for your system. • (Optional) Other devices as appropriate for your system. Click **Next**.

On this page...	Do this...
Page 3	 Review the information on this page and verify that you have correctly defined your K2 Storage System. For a Level 20 storage system you should have the following: For a Level 10R storage system you should have the following: • Two Gigabit Ethernet switches • Two K2 Media Servers • The number and type of clients appropriate for your system. Click **Finish**. The Define New K2 Storage System wizard closes.

Your K2 Storage System appears in the tree view of the K2 System Configuration application.

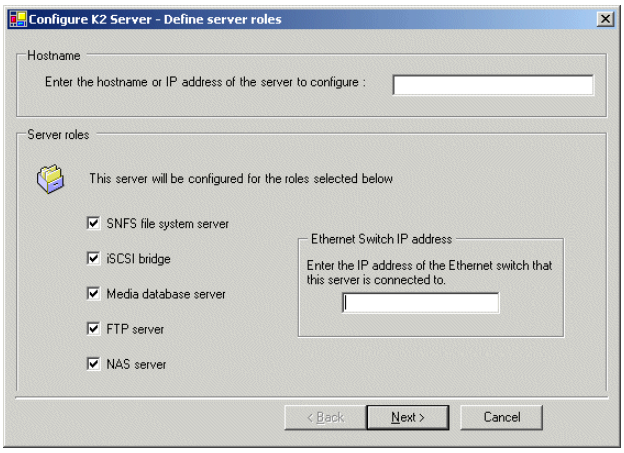
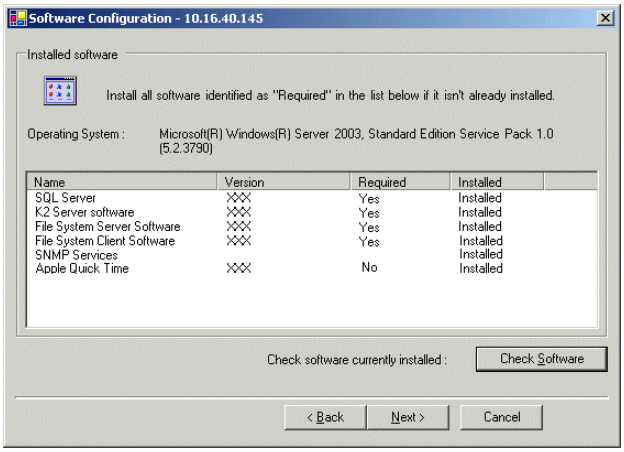
5. Continue with the next procedure.

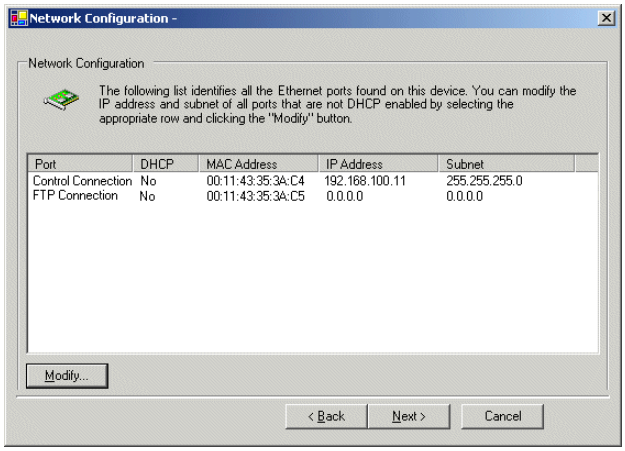
Configuring server A - Part 1

1. In the K2 System Configuration application tree view, select [**K2Server1]**.

2. Click the **Configure** button. The Configure K2 Server wizard opens. Follow the on-screen text to configure the for a Level 10R K2 Storage System, as

described in the following table:

On this page…	Do this…
Define server roles	 Enter the name or IP address for the K2 Media Server, as currently configured on the machine. Enter the name or IP address of the Ethernet switch, as currently configured on the switch, to which the K2 Media Server is connected. For Level 10R redundant, select all roles. Click **Next**
Software Configuration This page checks for the software required to support the roles you selected on the previous page. Software required on the Level 10R K2 Media Server A is as follows: • SQL Server • K2 Server • File System Server • File System Client • SNMP Services • QuickTime	 If software with *Yes* in the Required column reports as *Not Installed*, you must first install it on the before continuing. Refer to *Chapter 16, Managing K2 software*. After installing the software, click **Check Software**. When all required software reports as *Installed*, click **Next**.

On this page…	Do this…
Network Configuration This page displays the control network Ethernet port, and allows you to configure the FTP/ Streaming network Ethernet port. ***NOTE: This page does not configure the iSCSI interface (media network) ports.***	 The top port is the port over which the K2 System Configuration application is communicating with the. If correctly configured, it is already assigned the control network IP address, as displayed on this page. Select the other port and click **Modify**. A network configuration dialog box opens. Enter the FTP/Streaming IP address and the subnet mask and click **Apply**. Click **Next**.
File System Server Configuration	Enter the name or IP address of the redundant K2 Media Server (server B). Do not yet click Next. Do not yet enter anything in the File System Server #2 box. Click **Launch Storage Manager**. Storage Utility opens.

3. Continue with the next procedure to use Storage Utility to configure the storage and file system.

   Leave the Configure K2 Server wizard open while you are using Storage Utility. When you are done with Storage Utility, you continue with the wizard.

Configuring RAID

Use Storage Utility to complete the configuration of the L10R RAID chassis, as explained in the following topics:

- "Configuring RAID network and SNMP settings"
- "Binding disk modules"

Refer to "Prerequisites for initial configuration" on page 355 to confirm that the RAID storage is ready for configuration.

Configuring RAID network and SNMP settings

Use the Storage Utility to configure the following settings for the Level 10R RAID controllers:

- IP address
- Subnet mask

- Gateway Address
- SNMP trap destinations

For L10R RAID, network and SNMP settings are set and stored on the RAID controller module. For the RAID chassis with two controllers, each controller has its own network settings and the RAID chassis exists as two entities on the control network.

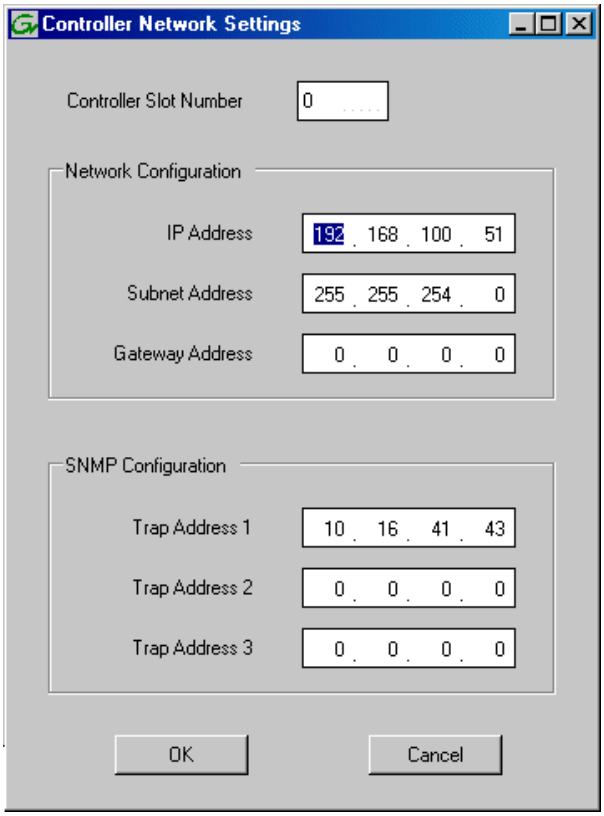
The RAID storage device is configured by default for the SNMP community name “public”. If your site’s policies require using a different SNMP community name, contact your Grass Valley representative.

To configure these settings, do the following:

1. Launch Storage Utility from the K2 System Configuration application as in the previous procedure.
2. As prompted, wait while Storage Utility gathers system information, then Storage Utility opens.
3. In Storage Utility tree view, expand the node for the L10R RAID, right-click the icon for a L10R RAID controller, and select **Configuration | Network Properties**.

   The Controller Network Settings dialog box opens.

   For a L10R RAID chassis with two controllers, you can make settings on both controllers using this dialog box.



4. In the Controller Slot Number field enter **0** and then press **Enter**. The settings from controller 0 are loaded into the Controller Network Settings dialog box and are available for you to modify.
5. Enter the control network IP address and other network settings.
6. You want SNMP trap messages go to the NetCentral server PC, so for SNMP Configuration enter the IP address of the NetCentral server PC. You can also enter IP addresses for other SNMP managers to which you want to send SNMP trap messages.
7. For the RAID chassis with two controllers, in the Controller Slot Number field enter **1** and then press **Enter**. The settings from controller 1 are loaded into the Controller Network Settings dialog box and are available for you to modify. Repeat the previous steps to configure controller 1.
8. Click **OK** to save settings and close.
9. In Storage Utility click **View | Refresh**. Continue with the next procedure "Binding disk modules".

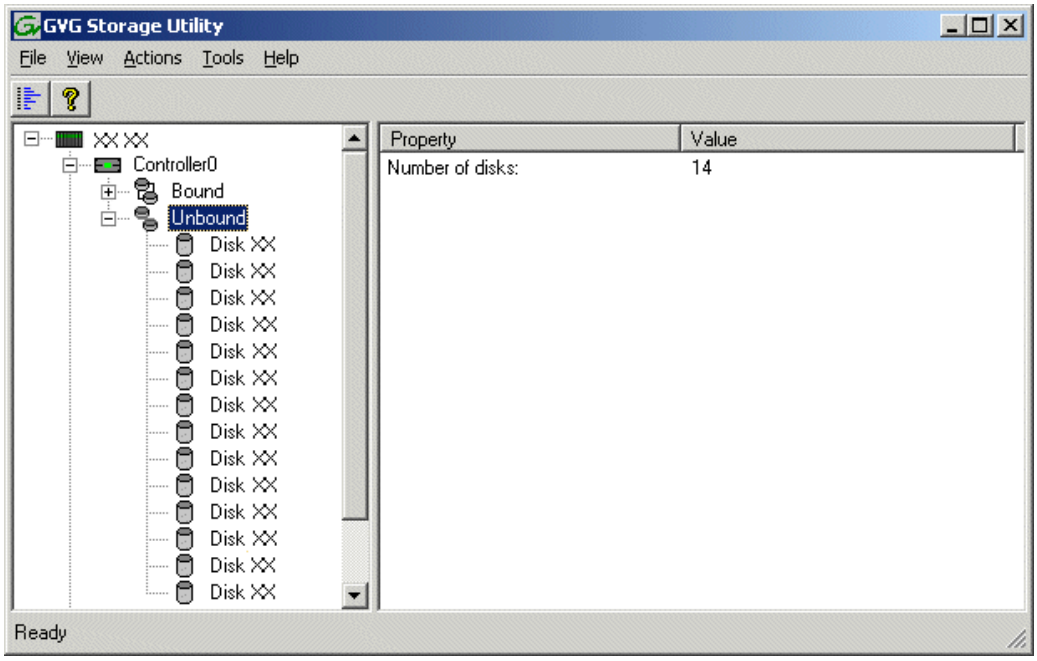
Binding disk modules

Use the following procedure to bind disk modules as required for the Level 10R storage system.

Also refer to "About RANKs and LUNs in Storage Utility" in Chapter 15, *Overview of K2 Storage Tools*.

NOTE: Binding destroys all user data on the disks.

1. In the Storage Utility main window, identify bound RANKs and unbound disks by their placement in the hierarchy of the tree view. In the following illustration, disk numbers are represented by "XX". Refer to "Identifying disks" on page 744 for an explanation of how disks are actually numbered in Storage Utility.



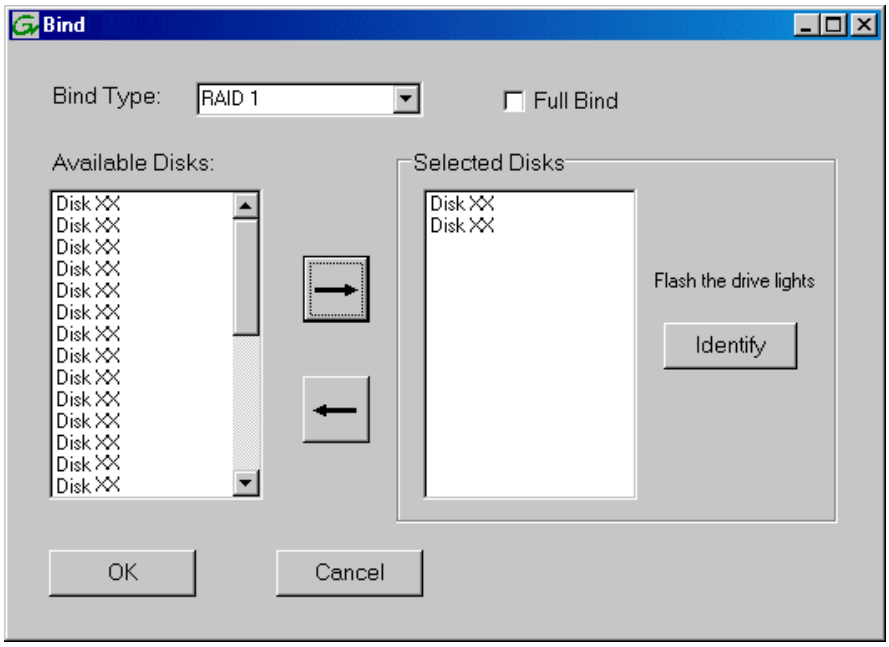
Redundant systems store metadata files and journal files on the primary RAID chassis. The first six disk slots in the chassis are dedicated for metadata/journal files. In the first five slots are five metadata/journal disks. The sixth slot is filled with a blank. Two disks are bound as a RAID 1 RANK for metadata storage and two disks are bound as a RAID 1 RANK for journal storage. The fifth disk is bound as a Hot Spare for the other four metadata/journal disks. The remaining six disks in the primary RAID chassis and all disks in Expansion chassis are for media storage. Media storage disks are bound as RAID 5 or RAID 6 in RANKs consisting of six disks each.

View disk properties and identify the four disks you will use for the metadata/journal RAID 1 RANKs, the one metadata/journal Hot Spare disk, any other disks that you intend to use for Hot Spares, and the remainder of the disks that are available for media storage. Make sure you select disks appropriately as you bind disks in the remainder of this procedure.

2. For systems that use RAID 1 RANKs, you must now create the separate RAID 1 storage for metadata files and journal files. To bind unbound disks for metadata and journal storage, do the following:

   a. Right-click the **Unbound** node for the controller, then select **Bind** in the context menu. (If the RAID chassis has two controllers, both controllers are represented by the single “Controller” node)

      The Bind dialog box opens showing all unbound disks for the controller listed in the Available Disk list.



b. Leave **Full Bind** unchecked. Refer to "About full/background bind" on page 748.

c. In the **Bind Type** drop down box, select **RAID 1**.

d. In the Available Disks box, select two contiguous disks at the top of the list. These should be the first two disks in the primary RAID chassis. (TIP: Use 'shift-click' or 'control-click' to select disks.) This creates a RAID 1 RANK for metadata storage.

e. Click the add (arrow) button to add disks to the Selected Disks list.

NOTE: As an aid in identifying a disk module's physical location, select it in the Selected Disks list, then click* Identify Disks. *This causes the disk drive light to flash.

f. Click **OK** to close the Bind dialog box and begin the binding process. The Progress Report dialog box opens, showing the status of the binding process.

g. Close the Progress Report and repeat the previous steps, selecting two more contiguous disks to create another RAID 1 RANK for journal storage. These should be the next two disks in the primary RAID chassis.

h. Make the fifth disk in the primary RAID chassis a Hot Spare. In the **Bind Type** drop down box, select **Hot Spare**.

i. In the Available Disks box, select the fifth disk in the primary RAID chassis.

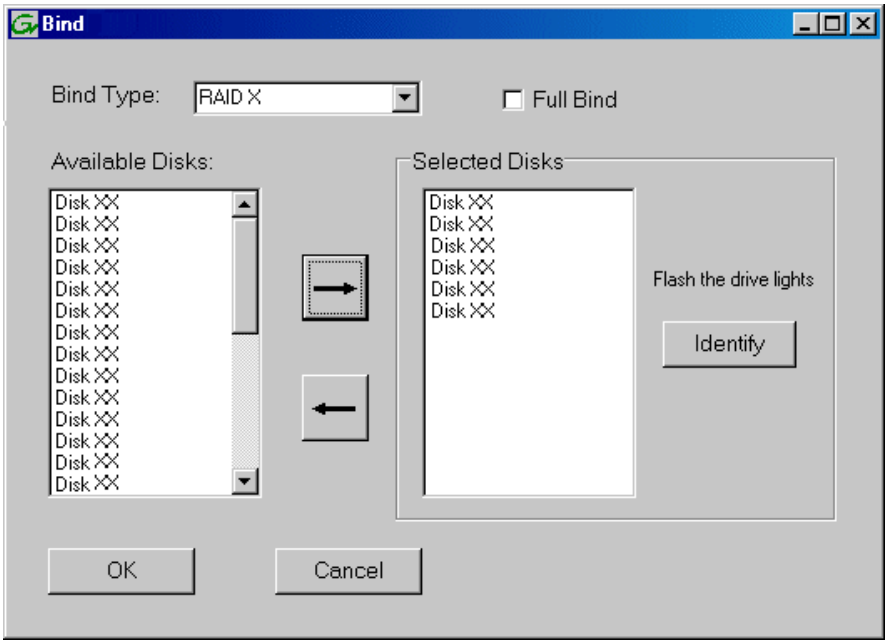
j. Click the add (arrow) button to add the disk to the Selected Disks list.

k. Click **OK** to close the dialog box and begin the binding process.

3. To bind unbound disks for media storage, do the following:

a. Right-click the **Unbound** node for a controller, then select **Bind** in the context menu. (If the RAID chassis has two controllers, both controllers are represented by the single "Controller" node)

The Bind dialog box opens showing all unbound disks for the controller listed in the Available Disk list.



b. Leave Full Bind unchecked. Refer to "About full/background bind" on page 748.

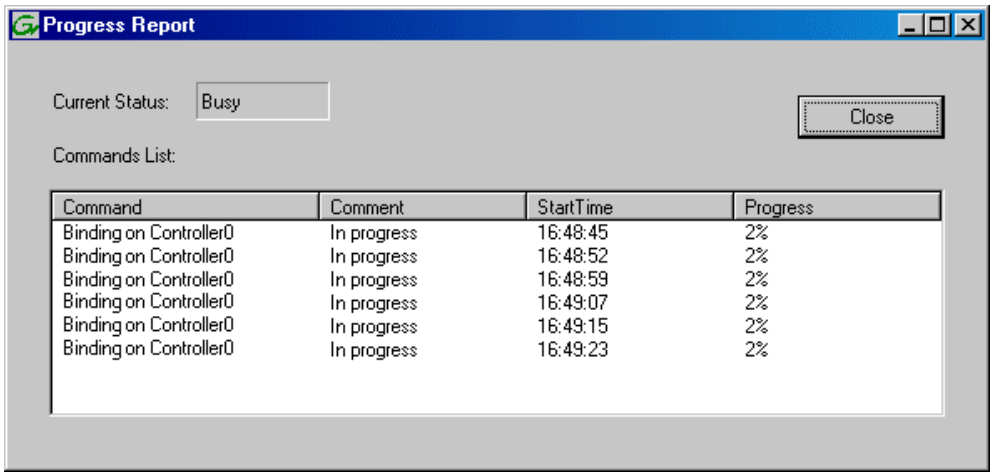
c. In the **Bind Type** drop down box, select **RAID 5** or **RAID 6**, as specified by your system design.

d. In the Available Disks box, select six contiguous disks at the top of the list. (TIP: Use 'shift-click' or 'control-click' to select disks.).

e. Click the add (arrow) button to add disks to the Selected Disks list.

NOTE: As an aid in identifying a disk module's physical location, select it in the Selected Disks list, then click* Identify Disks. *This causes the disk drive light to flash.

f. Click **OK** to close the Bind dialog box and begin the binding process. The Progress Report dialog box opens, showing the status of the binding process.



g. Close the Progress Report and repeat these steps for other unbound disks. If specified by your system design, you can bind some disks as Hot Spares, as explained in "Binding Hot Spare drives" on page 751. When you are done, if you did not bind any extra Hot Spares, you should have the following results:

   For L10R storage, on the primary RAID chassis you should have two RAID 1 RANKs of two disks each, one Hot Spare Disk, and one RAID 5 or RAID 6 RANK of six disks. For each optional Expansion chassis, you would have an additional one or two RAID 5 or RAID 6 RANKs of six disks each.

h. Click **Close** in Progress Report window.

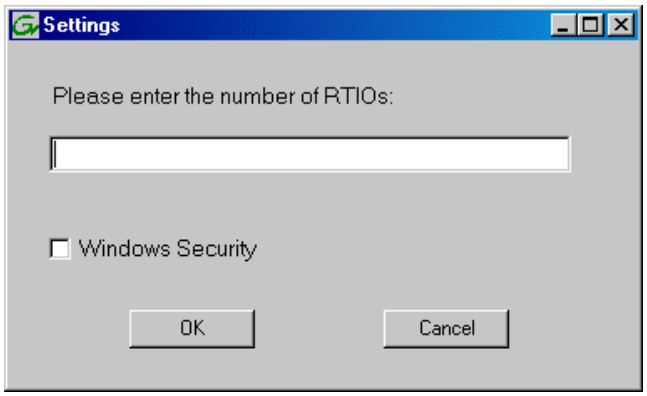
4. Restart the K2 Media Server.

NOTE: Make sure start up processes on the K2 Media Server are complete before proceeding.

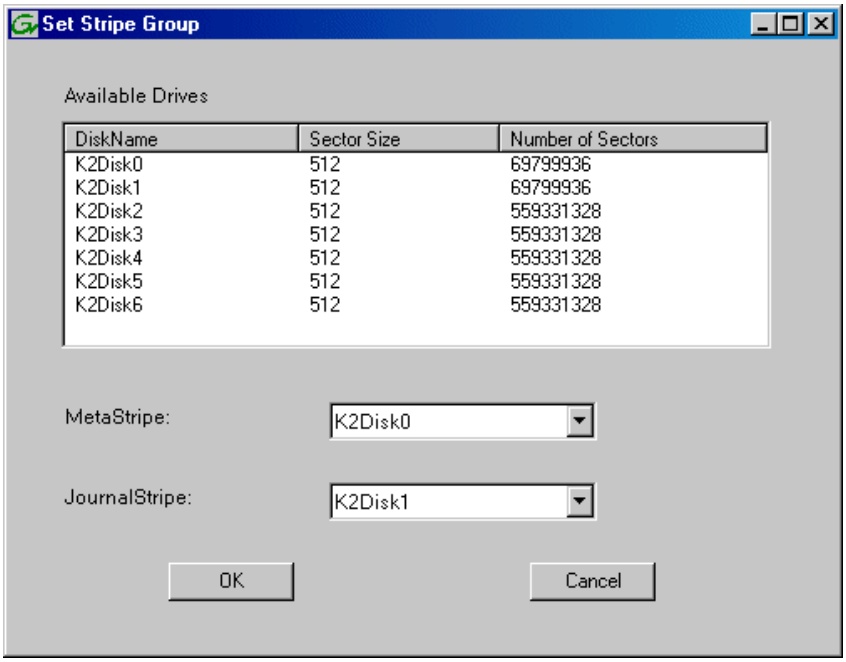
5. Continue with the next procedure "Creating a new file system".

Creating a new file system

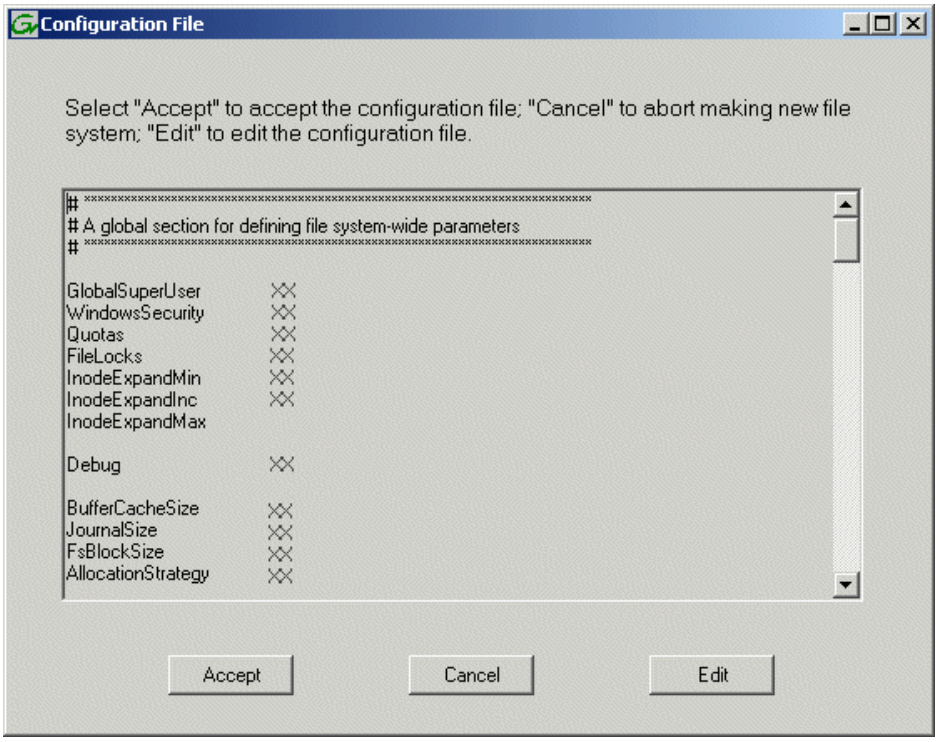
1. In Storage Utility, click **Tools | Make New File System**. The Setting dialog box opens.



2. For the Real Time Input/Output (RTIO) rate, enter the value specified by your system design. If you do not know this value, contact your Grass Valley representative.
3. If the K2 Storage System is to be accessed by only K2 Media Clients you can leave Windows Security unchecked. If accessed by Aurora Edits, refer to the *Aurora Edit Installation and Configuration Guide* for instructions.
4. Click **OK**. The Set Stripe Group dialog box opens.



5. If you have RAID 1 RANKS, assign a RAID 1 RANK as a metadata stripe and another RAID 1 RANK as a journal stripe. You can distinguish RAID 1 RANKs from media RANKs by the value in the Number of Sectors column.
6. Click **OK**. The Configuration File dialog box opens.



The configuration file for the media file system is displayed. You can verify media file system parameters by viewing this file. Do not edit this file. Click **Accept**.

A "…Please wait…" message box displays progress and a "…succeeded…" message confirms the process is complete.

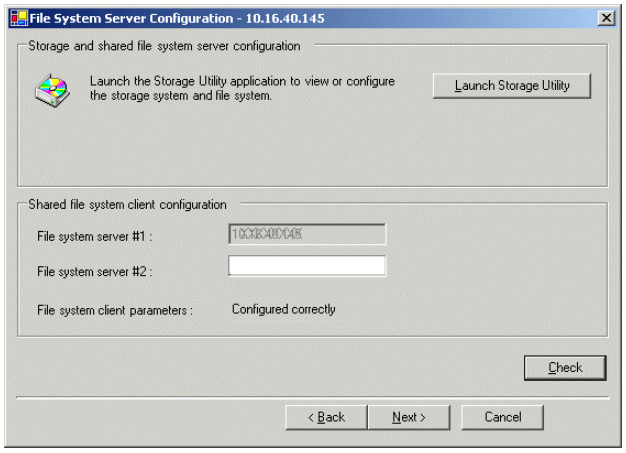
7. A message informs you that you must restart the K2 Media Server, however the restart at the end of the Configure K2 Server wizard suffices, so you do not need to restart now.
8. Close the Storage Utility.

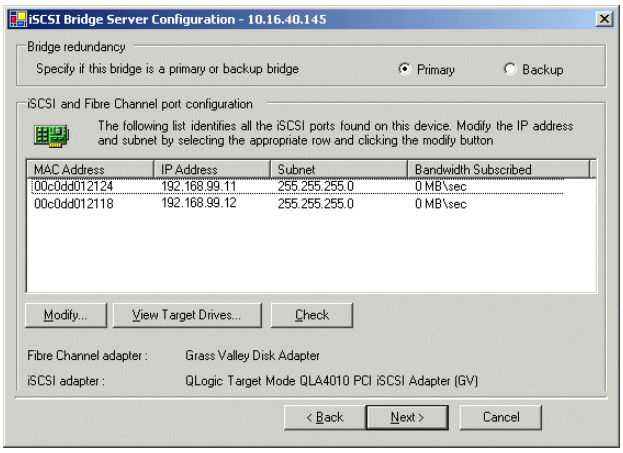
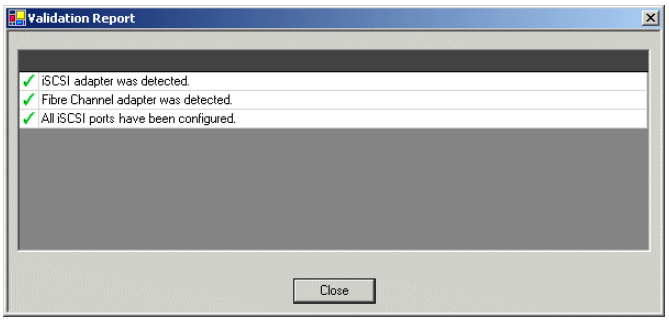
NOTE: Do not attempt to start K2 Media Clients or otherwise bring the K2 Storage System online until instructed to do so later in this chapter.

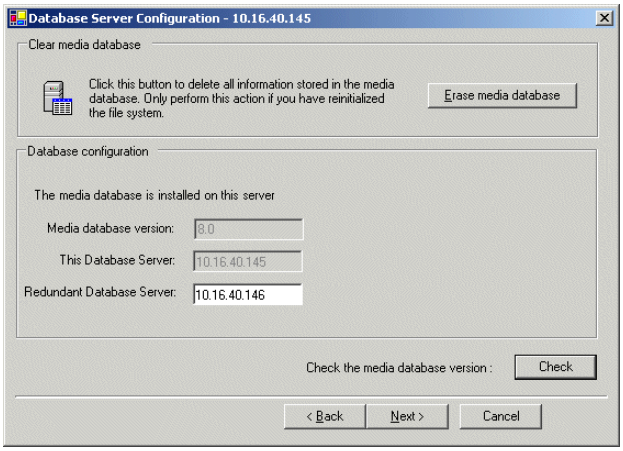
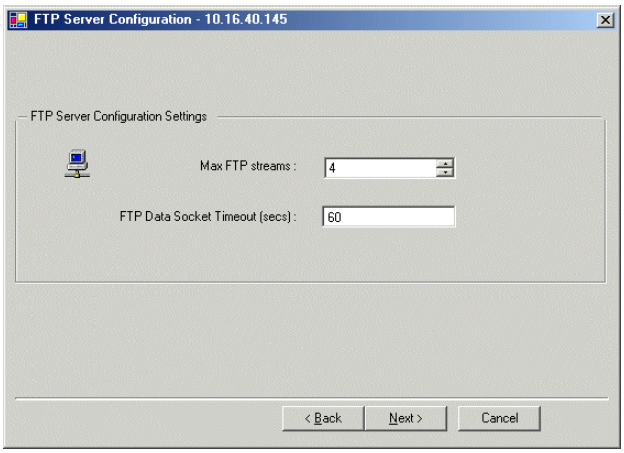
9. Continue with the next procedure.

Configuring server A - Part 2

1. Return to the Configure K2 Server page from which you launched Storage Utility and proceed as described in the following table:

On this page…	Do this…
File System Server Configuration This page checks on the configuration of the K2 Media Server in one of its main roles as a file system server. The K2 Media Server also functions as a file system client, which is also checked from this page.	 If you have not already done so, enter the name or IP address of the redundant K2 Media Server (server B). Click **Check**. When the wizard reports that the configuration is correct, click **Next**. If you get a "The V: will not be available until this device is rebooted…" message, you can safely continue with this procedure and follow the instructions related to this message later in the procedure.

On this page…	Do this…
iSCSI Bridge Server Configuration This page manages the components that bridge between iSCSI (the GigE media network) and the Fibre Channel connection to the RAID storage. You configure network settings on the iSCSI adapters and the page validates that the Fibre Channel adapter is in place and that the media RANKs are visible as iSCSI targets.	 Select **Primary**. Select an iSCSI adapter and click **Modify**. A network configuration dialog box opens. Enter the media network IP address and the subnet mask and click **Apply**. Do not configure the second iSCSI adapter. It is not used on a L10R system. Click **Check**. The Validation Report opens.  Confirm that the iSCSI configuration is successful. Close the Validation Report and then click **Next**.

On this page…	Do this…
Database Server Configuration	 Enter the name or IP address of K2 Media server B. This is the redundant partner of the server you are now configuring. Click **Next**.
FTP Server Configuration	 Do not modify these settings. Leave at default values of Max FTP streams = 4 and FTP Data Socket Timeout = 60. Only qualified Grass Valley personnel should specify other values, as these settings are intended for use only with custom systems designed by Grass Valley. Click **Next**
Completing the Configuration Wizard	Click **Finish**. The wizard closes. The server restarts. Wait until all startup processes have completed before continuing.

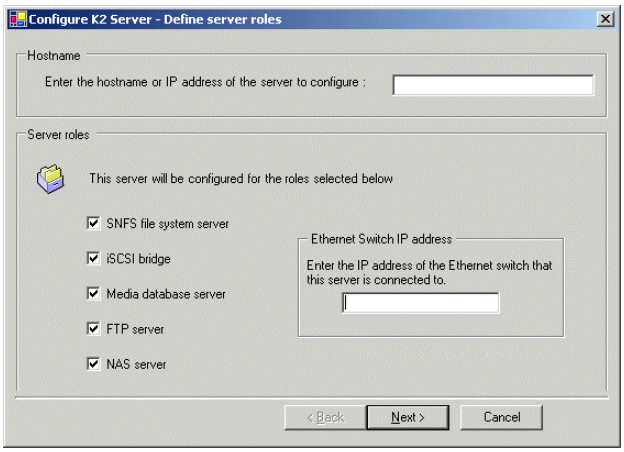
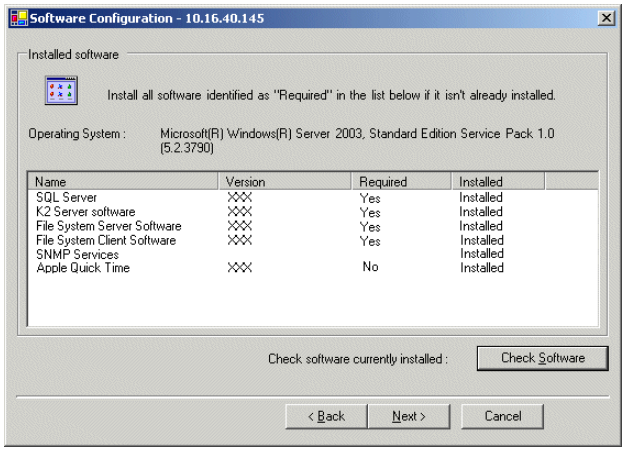
Configuring the redundant server

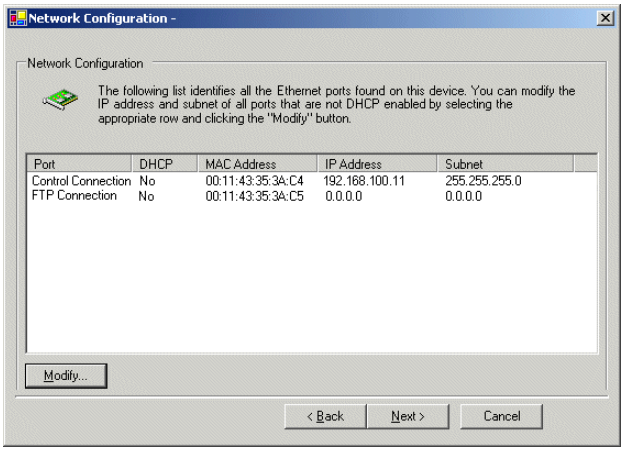
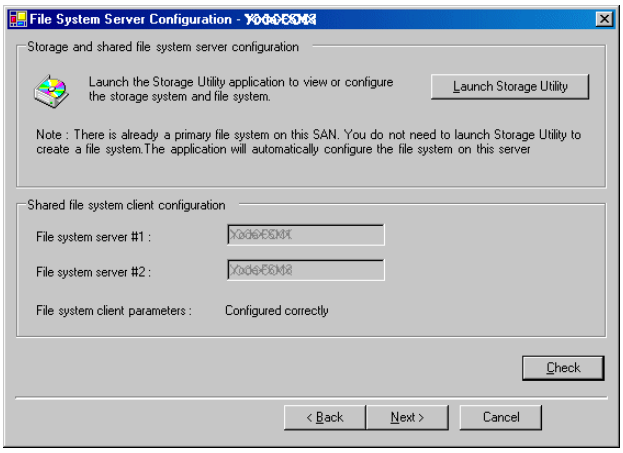
You must wait for the primary K2 Media Server to restart before continuing. To verify, from the control point PC open the MS-DOS command prompt and use the “ping” command.

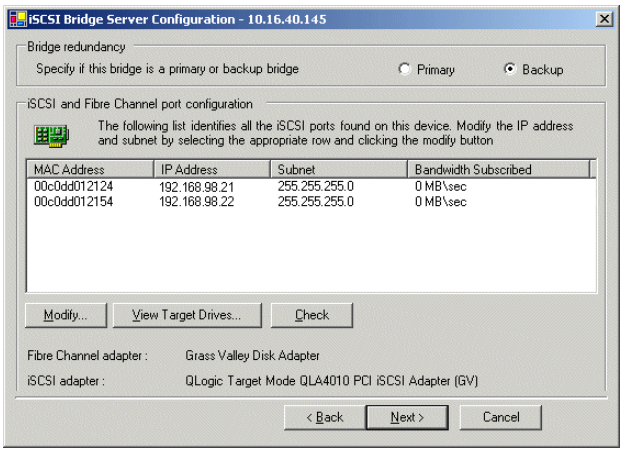
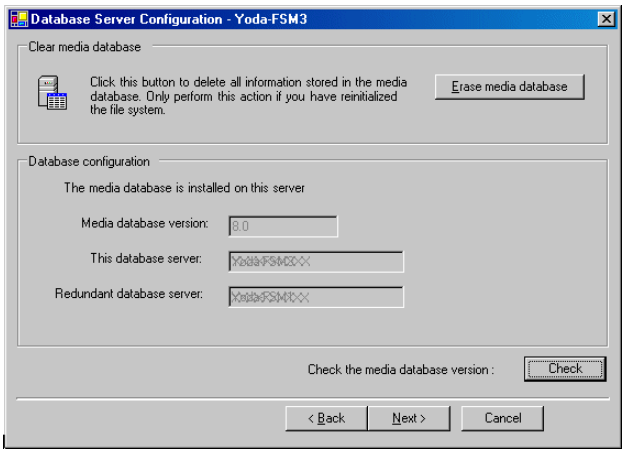
After you have configured the first K2 Media Server (server A) you next configure the redundant K2 Media Serer (server B).

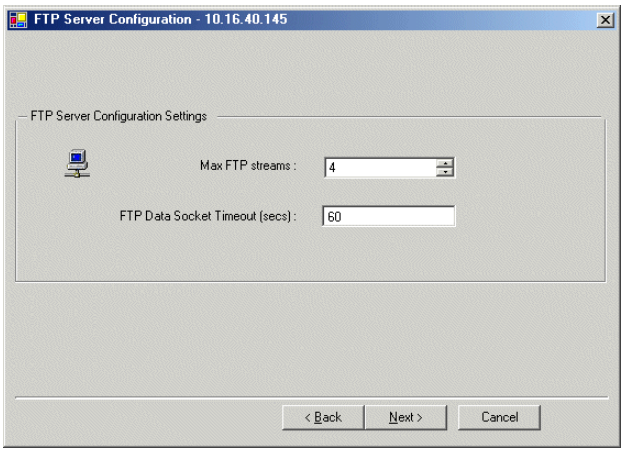
1. In the K2 System Configuration application tree view, select the K2 Media Server you are configuring as server B.

2. Click the **Configure** button. The Configure K2 Storage System Server wizard opens. Follow the on-screen text to configure the server for a Level 10R K2 Storage System, as described in the following table. Some screens require no input from you, as they are based on the configurations already completed on a previously configured K2 Media Server.

On this page...	Do this...
Define server roles	 Enter the name for the K2 Media Server. This should be the current network name of the machine. Enter the name or IP address of the Ethernet switch, as currently configured on the switch, to which the K2 Media Server is connected. Select all roles. Click **Next**
Software Configuration This page checks for the software required to support the roles you selected on the previous page. Software required on K2 Media Server B is as follows: • SQL Server • K2 Server • File System Server • File System Client • SNMP Services • QuickTime	 If software with *Yes* in the Required column reports as *Not Installed*, you must first install it on the K2 Media Server before continuing. Refer to *Chapter 16, Managing K2 software*. After installing the software, click **Check Software**. When all required software reports as *Installed*, click **Next**.

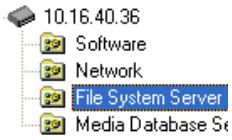
On this page…	Do this…
Network Configuration This page displays the control network Ethernet port, and allows you to configure the FTP/ Streaming network Ethernet port. ***NOTE: This page does not configure the iSCSI interface (media network) ports.***	 The top port is the port over which the K2 System Configuration application is communicating with the K2 Media Server. If correctly configured, it is already assigned the control network IP address, as displayed on this page. Select the other port and click **Modify**. A network configuration dialog box opens. Enter the FTP/Streaming IP address and the subnet mask and click **Apply**. Click **Next**.
File System Server Configuration This page checks on the configuration of the K2 Media Server in one of its main roles as a file system server. The K2 Media Server also functions as a file system client, which is also checked from this page. It is not necessary to bind RANKs or create a file system, since this task was completed when you configured the previous K2 Media Server.	 Click **Next**. Confirm messages about copying *default.cfg* to the other server. If you get a "The V: will not be available until this device is rebooted…" message, you can safely continue with this procedure and follow the instructions related to this message later in the procedure.

On this page…	Do this…
iSCSI Bridge Server Configuration This page manages the components that bridge between iSCSI (the GigE media network) and the Fibre Channel connection to the RAID storage. You configure network settings on the iSCSI adapters and the page validates that the Fibre Channel adapter is in place and that the media RANKs are visible as iSCSI targets. ***NOTE: The iSCSI adapters on this server must be on a different subnet than those on its redundant server partner.***	 Select **Backup**. Select an iSCSI adapter and click **Modify**. A network configuration dialog box opens. Enter the media network IP address and subnet mask and click **Apply**. Do not configure the second iSCSI adapter. It is not used on a L10R system. To verify drives, click **Check** then **View Target Drives**. You should see all your media drives listed. Click **Next**.
Database Server Configuration	 You do not need to enter or configure anything on this page. Click **Next**.

On this page…	Do this…
FTP Server Configuration	 Do not modify these settings. Leave at default values of Max FTP streams = 4 and FTP Data Socket Timeout = 60. Only qualified Grass Valley personnel should specify other values, as these settings are intended for use only with custom systems designed by Grass Valley. Click **Next**
Completing the Configuration Wizard	Click **Finish**. The wizard closes. The K2 Media Server restarts. Do not proceed until restart processes are finished.

3. If you got a “The V: will not be available until this device is rebooted…” message on the File System Server Configuration page, after the K2 Media Server restarts, do the following:

   a. In the K2 System Configuration application tree view, under the K2 Media Server select the File System Server node.



   The File System Server Configuration page appears.

   b. Click **Check** and verify that the V: drive is shared. This is required for NAS server functionality.

Your configurations for the Level 10R K2 Storage System are complete.

Adding K2 Storage System clients

You can add now clients, such as K2 Media Clients or Aurora Edits, to the K2 Storage System and configure them using the K2 System Configuration application.

- For Aurora Edits, refer to the *Aurora Edit Installation and Configuration Guide* for instructions.

- For K2 Media Clients, refer to *K2 Media Client System Guide* for instructions.

NOTE: You must install MPIO software on K2 Media Clients that access shared storage on a redundant K2 Storage System.

Basic operations for Level 10R storage

Use the following procedures as you work on your Level 10R storage system:

- "Level 10R system power-off procedure"
- "Level 10R system power-on procedure"

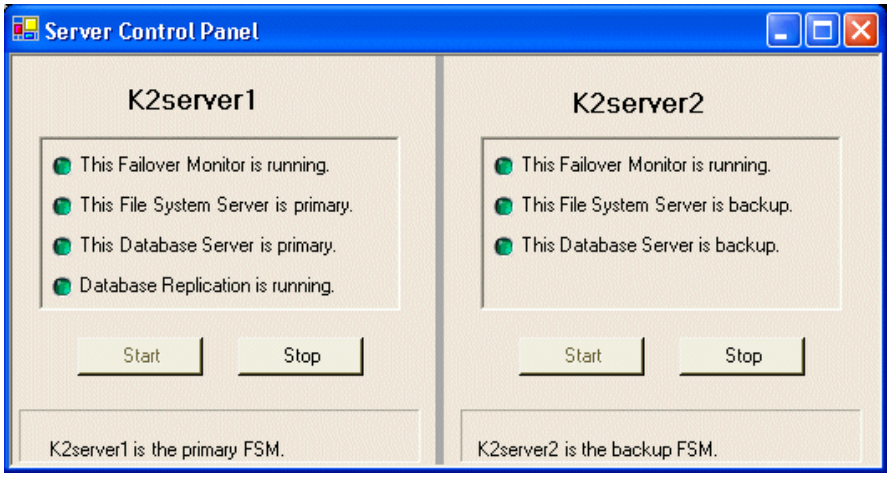
For other procedures refer to "Administering and maintaining the K2 Storage System" on page 687.

Level 10R system power-off procedure

Use the following sequence to power-off the Level 10R storage system.

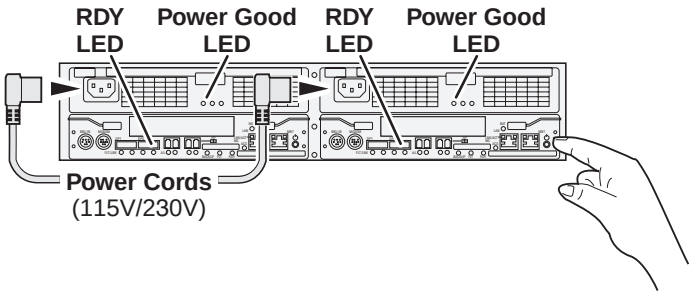
1. Power-off all K2 Media clients or other iSCSI clients.
2. From the K2 System Configuration application, in the tree view select the name of the K2 Storage System, which is the top node of the storage system tree. Then click the **Server Control Panel** button.

The Server Control Panel opens.



3. Take note of which is the primary K2 Media Server and which is the backup K2 Media Server. The order in which you put servers back into service when you power up the K2 Storage System is dependent on their primary/backup roles at the time when you power down the K2 Storage System.
4. For the backup K2 Media Server, click **Stop**. This takes the server out of service.
5. Shut down the backup K2 Media Server, if it does not shut down automatically.
6. For the primary K2 Media Server, click **Stop**. This takes the server out of service.
7. Shut down the primary K2 Media Server, if it does not shut down automatically.

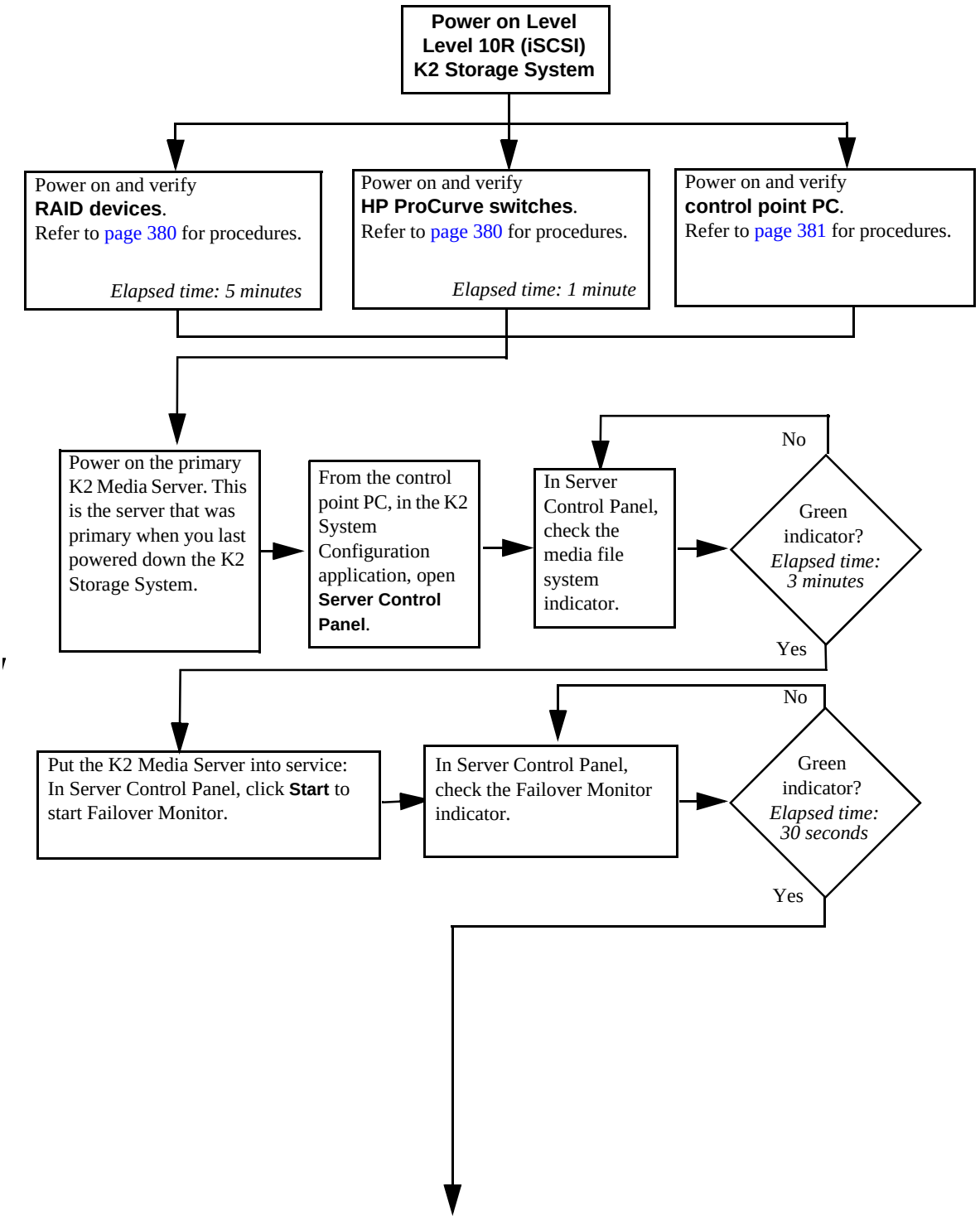
8. Shut down optional NH K2 Media Servers, if any.
9. On the primary RAID chassis controller, identify the RDY LED. It blinks at a rate of 1 blink per second during normal operation.

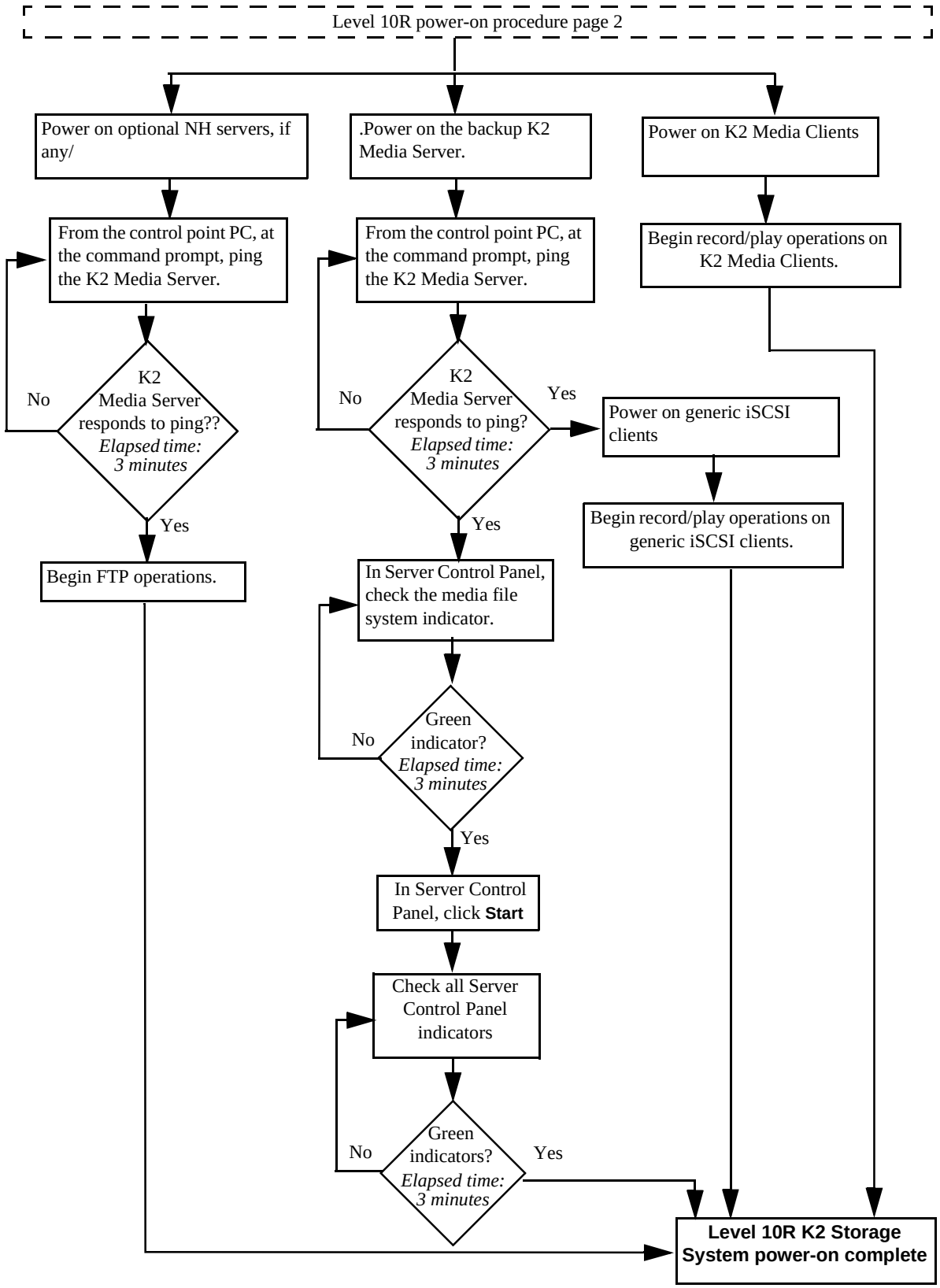


10. Press and hold down the power button on a RAID controller. You can press the power button on either RAID controller 0 or RAID controller 1.
11. Release the power button in about 5 seconds, when the RDY LED blinks more quickly, at a rate of about 2 blinks per second. Do not hold down the power button for longer than 15 seconds.

    The power button on the RAID controller turns off power for the primary RAID chassis and any connected Expansion chassis. Power-off normally occurs within 20 seconds and is indicated when LEDs other than those on the power supplies go off and the fans stop rotating.
12. Wait for RAID power-off to complete before proceeding.
13. Power-off all Ethernet switches.
14. Power-off the control point PC and/or the NetCentral server PC, if necessary.

Level 10R system power-on procedure

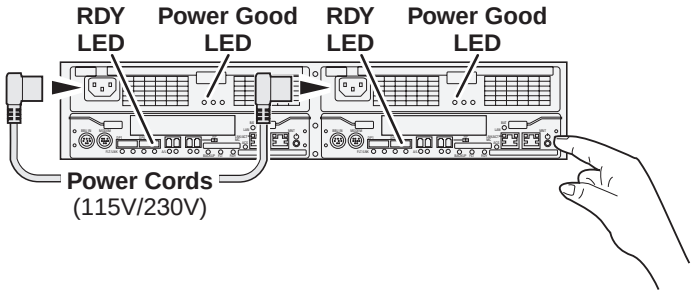



Level 10R power-on procedure page 2
Power on optional NH servers, if any/
.Power on the backup K2 Media Server.
Power on K2 Media Clients
From the control point PC, at the command prompt, ping the K2 Media Server.
From the control point PC, at the command prompt, ping the K2 Media Server.
Begin record/play operations on K2 Media Clients.
K2 Media Server responds to ping?? *Elapsed time: 3 minutes*
No
Yes
K2 Media Server responds to ping? *Elapsed time: 3 minutes*
No
Yes
Power on generic iSCSI clients
Begin FTP operations.
Begin record/play operations on generic iSCSI clients.
In Server Control Panel, check the media file system indicator.
Green indicator? *Elapsed time: 3 minutes*
No
Yes
In Server Control Panel, click **Start**
Check all Server Control Panel indicators
Green indicators? *Elapsed time: 3 minutes*
No
Yes
Level 10R K2 Storage System power-on complete

Powering on Level 10, 20, 30, and Nearline 10 RAID storage devices

Use the following procedure to power on and verify proper operation of RAID storage devices.

1. Verify power and cabling.
2. Press and hold down the power button on the controller, as shown.



   If the RAID chassis has two controllers, you can press the power button on either controller. You do not need to press both power buttons.

   Pressing the power button on a controller also powers on any connected Expansion chassis. There are no power buttons on Expansion chassis.

3. Release the power button when the Power Good LED on the power supply is illuminated. This takes 1-3 seconds.
4. Wait while the primary RAID chassis performs self-test and initialization. This takes about four minutes. While this is taking place, the RDY LED is illuminated with a steady on light.
5. Watch for the RDY LED to begin blinking at one second intervals. The LED might turn off and back on two times before starting the one second blink pattern. When the RDY LED is blinking at one second intervals, the self-test and initialization is complete and the chassis is ready for use.

Powering on the HP ProCurve switch

Use the following procedure to power on and verify proper operation of the HP ProCurve switch.

1. Power up the switch.
2. Watch LEDs to verify proper operation. The diagnostic self test LED Behavior is as follows:
   - Initially, all the status, LED Mode and port LEDs are on for most of the duration of the test.
   - Most of the LEDs go off and then may come on again during phases of the self test. For the duration of the self test, the Test LED stays on.

   If the ports are connected to active network devices, the LEDs behave according to the LED Mode selected. In the default view mode (Link), the LEDs should be on.

- If the ports are connected to active network devices, the LEDs behave according to the LED Mode selected. In the default view mode (Link), the LEDs should be on.
- If the ports are not connected to active network devices, the LEDs will stay off.

Powering on the control point PC

Use the following procedure to power on K2 Storage System's control point PC and verify proper operation during power up of the system.

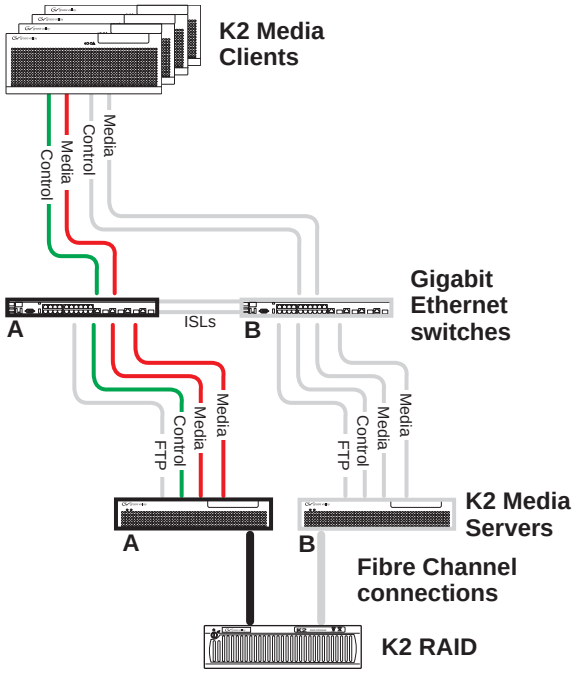
1. Power up and log on to the PC using standard Windows procedures.
2. Start and log on to NetCentral.
3. NetCentral reports devices as offline. As each device of the K2 Storage System is powered on, check NetCentral to verify the device's status

Failover behaviors

If a fault occurs and one of the failover mechanisms is triggered, a redundant K2 Storage System behaves as explained in following sections.

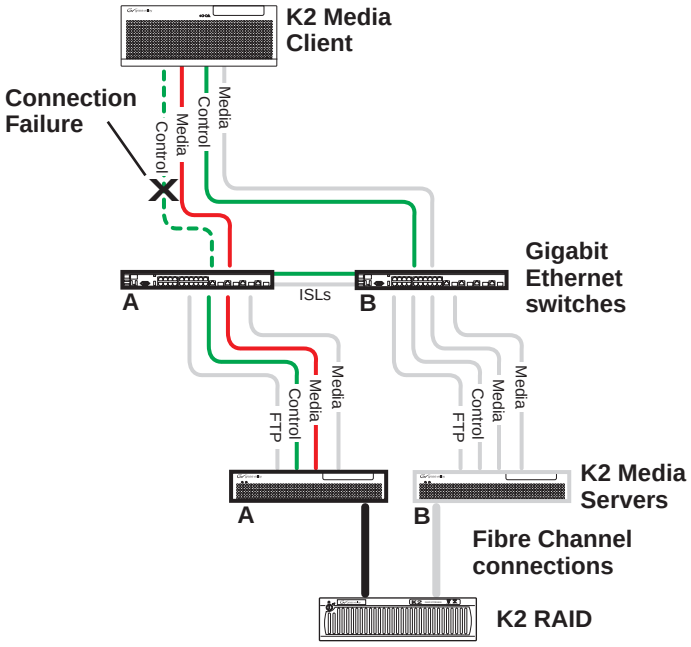
The diagrams that follow are representative of a generic redundant K2 Storage System. Some details, such as the number of media connections, might not be the same as your K2 Storage System. These diagrams illustrate the media (iSCSI) and control paths as they interact with the redundant K2 Media Servers in their role of media file system/database server and iSCSI bridge. Interactions of FTP traffic and/or paths involving K2 Media Servers with other roles are not illustrated.

Pre-failover behavior



The system operates initially with both media and control traffic on GigE switch “A” and K2 Media Server “A”. Media (iSCSI) traffic is using media network “A”. The iSCSI adapters (TOEs) on the “A” K2 Media Server provide access to the Fibre Channel connected RAID storage. K2 Media Server “A” is the media file system/database server.

Control team failover behavior



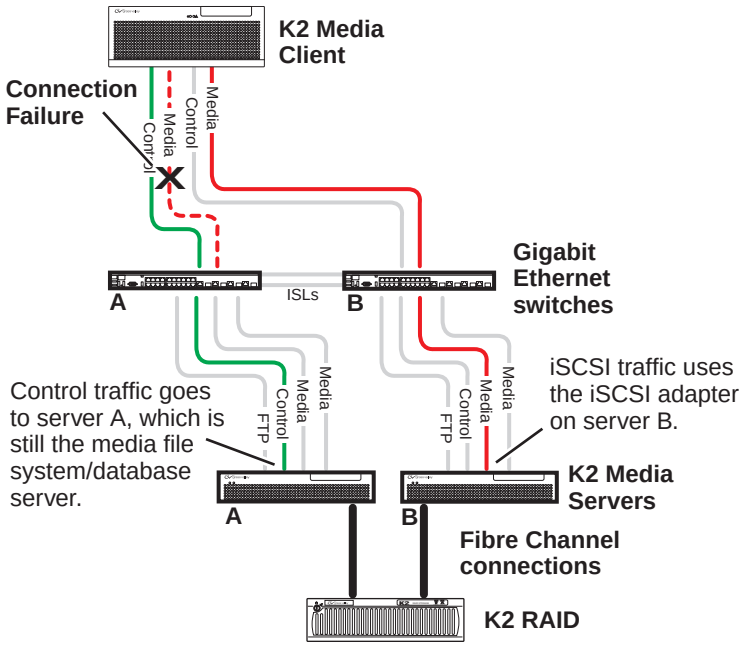
If the following system connection fails to respond to network communication:

- The control connection between a K2 Media Client and GigE switch “A”.

Then the following failover behavior occurs:

1. The control team on the K2 Media Client fails over and communication begins on the other control port.
2. The control communication finds a path through GigE “B” switch and across an ISL to GigE switch “A” to reach the same control port on the same K2 Media Server.
3. Media (iSCSI) traffic keeps using the same path.
4. K2 Media Server “A” is still the media file system/database server. The media file system (SNFS) and media database (SQL) do not fail over.
5. The other K2 Media Clients (not affected by the connection failure) keep using the same paths for media and control, as in the previous diagram “Pre-failover behavior”.

K2 Media Client media (iSCSI) connection failover behavior



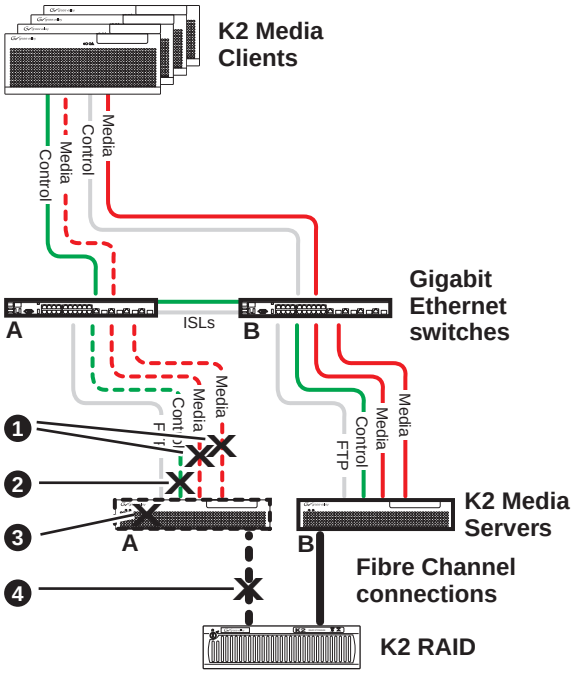
If the following system connection fails to respond to network communication:

- Media (iSCSI) network “A” connection between a K2 Media Client and the GigE switch.

Then the following failover behavior occurs:

1. The K2 Media Client drops communication on its “A” media port and begins using its “B” media port and the “B” media (iSCSI) network. The iSCSI adapter (TOE) on the “B” K2 Media Server provides access to the Fibre Channel connected RAID storage.
2. Control traffic keeps using the same path to K2 Media Server “A”.
3. K2 Media Server “A” is still the media file system/database server. The media file system (SNFS) and media database (SQL) do not fail over.
4. The other K2 Media Clients (not affected by the component failure) keep using the same paths for media and control, as in the previous diagram “Pre-failover behavior”. This means the K2 Media Clients unaffected by the failover are using the iSCSI adapter (TOE) on the “A” K2 Media Server to provide access to the Fibre Channel connected RAID storage, while at the same time the affected K2 Media Clients are using the iSCSI adapter (TOE) on the “B” K2 Media Server to provide access to the Fibre Channel connected RAID storage. In this case both RAID controller are simultaneously providing disk access.

K2 Media Server failover behavior

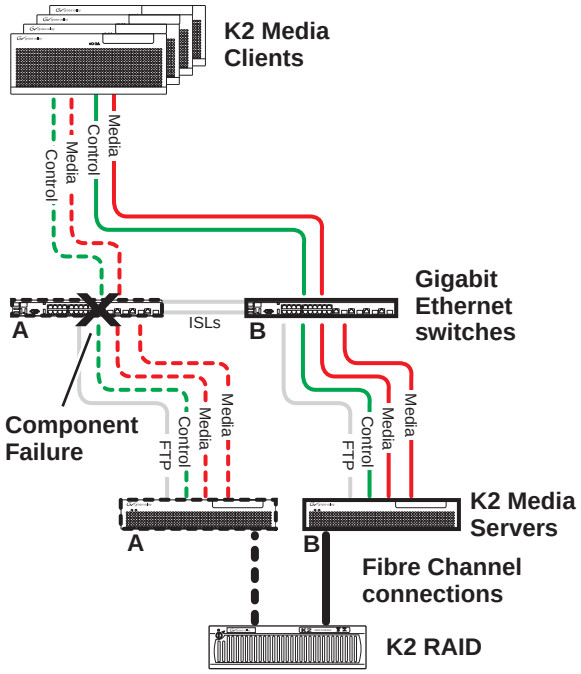


If the following system connection or component fails to respond to network communication:

Then the following failover behavior occurs:

1. The media file system (SNFS) and media database (SQL) on K2 Media Server “A” fail over and K2 Media Server “B” becomes the active media file system/database server.
2. All K2 Media Clients drop communication on the “A” media port and begin using the “B” media port, finding a path through GigE switch “B” to K2 Media Server “B”. All K2 Media Clients use an iSCSI adapter (TOE) on the “B” K2 Media Server to provide access to the Fibre Channel connected RAID storage.
3. All K2 Media Clients keep communicating on the same control port, finding a new path through GigE switch “A” and across an ISL to GigE switch “B” to reach K2 Media Server “B”.

K2 Media Server failover with Control team failover behavior



If the following system component fails to respond to system communication:

- The “A” GigE switch

Then the following failover behavior occurs:

1. The media file system (SNFS) and media database (SQL) on K2 Media Server “A” fail over and K2 Media Server “B” becomes the active media file system/database server.
2. All K2 Media Clients drop communication on the “A” media port and begin using the “B” media port, finding a path through GigE switch “B” to K2 Media Server “B”. All K2 Media Clients use an iSCSI adapter (TOE) on the “B” K2 Media Server to provide access to the Fibre Channel connected RAID storage.
3. For all K2 Media Clients, communication fails on the control port, so the control team fails over and communication begins on the other control port.
4. For all K2 Media Clients, control communication finds a path through GigE switch “B” to K2 Media Server “B”.

Chapter 9

Installing the Level 20 Storage System

The K2 Level 20 (L20) storage system was initially released with K2 system software version 3.2 in September 2007.

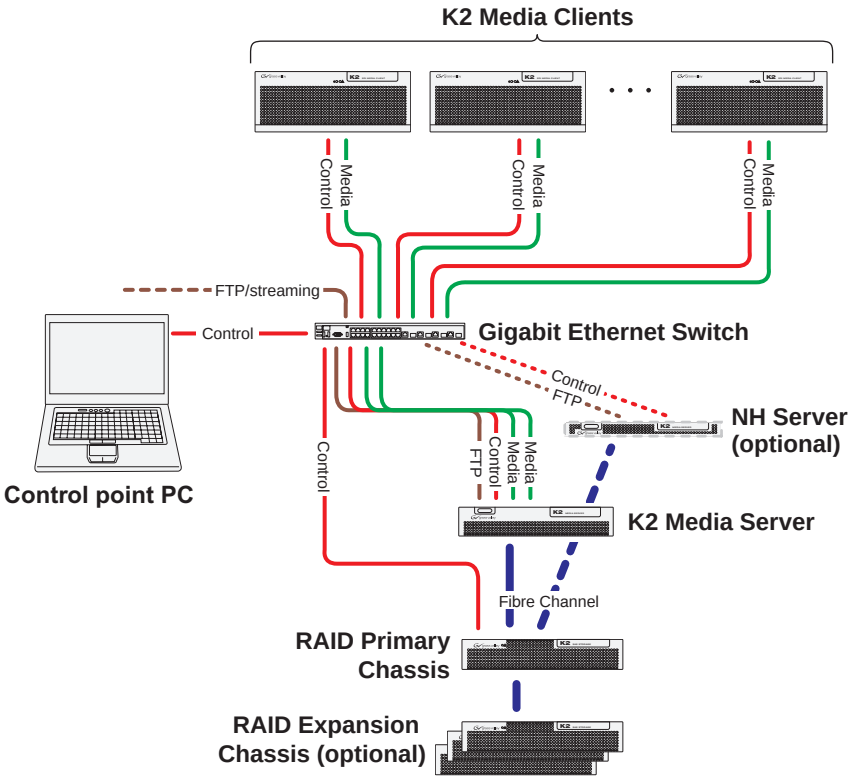
Use this chapter to install the K2 Level 20 storage system.

This chapter includes the following topics:

- "Level 20 system description" on page 388
- "Preparing Level 20 devices" on page 389
- "Networking for Level 20" on page 406
- "Configuring the Level 20 storage system" on page 411
- "Adding K2 Storage System clients" on page 428
- "Basic operations for Level 20 storage" on page 428

Work through these topics sequentially to install the storage system.

Level 20 system description



The Level 20 (L20) storage system has one Gigabit Ethernet switch, one GS K2 Media Server, and one L20 RAID chassis. Up to seven RAID Expansion chassis are optional for increased storage capacity.

K2 Media Clients and other iSCSI clients, such as Aurora Edits, are connected to the GigE switch. Each K2 Media Client has one GigE connection for media (iSCSI) and one GigE connection for control. The GigE switch is configured with V-LANs to keep the control/FTP traffic and the media (iSCSI) traffic separate.

The GS K2 Media Server has two GigE connections for media (iSCSI), one GigE connection for control, one GigE connection for FTP, and one Fibre Channel connection to the RAID storage. The server hosts a dual-port iSCSI interface card for the GigE media connections and a Fibre Channel card for the RAID storage connection. The iSCSI interface card provides a bridge between GigE iSCSI and Fibre Channel SCSI. The server also hosts software components that allow it to function in various roles, including media file system manager, media database server, and FTP server.

The L20 RAID chassis is connected via a single Fibre Channel connection to the K2 Media Server. It is also connected to the GigE control network, which is required for SNMP (NetCentral) monitoring.

Optional NH K2 Media Servers are available to provide additional FTP bandwidth. These servers are available with either a one Gigabit connection or a ten Gigabit connection. If you have multiple NH K2 Media Servers on a K2 Storage System, they must all be of the same connection speed. They must be all one Gigabit servers or all ten Gigabit servers.

The K2 configuration control point PC is connected to the GigE control network. The K2 System Configuration application runs on this PC for configuring the storage system.

FTP/streaming traffic accesses the K2 Storage System via the FTP GigE port on K2 Media Servers. FTP/streaming traffic does not go to K2 Media Clients.

Refer to Chapter 14, *Description of K2 Storage Devices* for more information. Also refer to "Design considerations for Ethernet switches" on page 759.

Preparing Level 20 devices

Use the topics in this section to prepare each device so that it is ready to become part of the Level 20 storage system.

- "Setting up the Control Point PC" on page 389
- "Setting up the Level 20 GigE switch" on page 390
- "Setting up the GS K2 Media Server for Level 20" on page 400
- "Setting up the NH1 K2 Media Server" on page 400
- "Setting up the NH1-10GE K2 Media Server" on page 401
- "Setting up the L20 RAID chassis" on page 402
- "Preparing K2 Storage System clients" on page 404

Setting up the Control Point PC

To set up the K2 configuration Control Point PC, you have the following options:

- Use the Grass Valley Control Point PC that comes from the factory with software pre-installed. This includes the K2 System Configuration application, remote AppCenter, and NetCentral software. Refer to the *K2 Media Client System Guide* for rack mount instructions.
- Use a PC that you own and install the required software.

For either option, you must do the following for the Control Point PC that runs the K2 System Configuration application:

- Assign a control network IP address to the PC. Refer to "Networking tips" on page 106.
- Connect the PC to the GigE control network.

To use your own PC, you must additionally do the following:

- Verify that the PC meets system requirements, then install the Control Point software and other supporting software, as specified in the *K2 Media Client System Guide*.

- Install and license NetCentral server software. You can install this on the NetCentral server PC, which can be the K2 configuration Control Point PC. Refer to the *NetCentral User Guide*.

Also refer to "Control point PC description" on page 650.

To fix the screen resolution problem seen with NetCentral on the Grass Valley Control Point PC, do the following:

1. Go to Display properties (right mouse selection of properties on the display area)
2. Select Settings tab
3. Select the Advanced button
4. In the General tab, set the DPI setting to Normal size (96 DPI)
5. Restart the PC

Setting up the Level 20 GigE switch

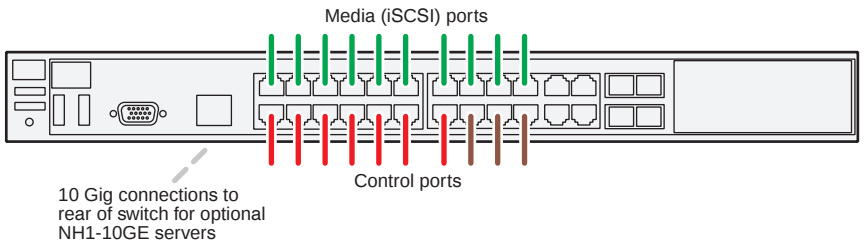
These procedures are for the HP ProCurve switch 2900 series. You must use this switch for iSCSI traffic on Level 20.

For control and FTP/streaming traffic, it is allowed to use a different brand of switch, such as a Cisco Catalyst switch, if required by your site. If you are using a non-HP switch, apply the information in the following procedures accordingly. Refer to the documentation you received with the switch as necessary.

Also refer to "Design considerations for Ethernet switches" on page 759.

- Use CAT5e or CAT6 cables. The maximum cable length is 50 meters for CAT5e and 100 meters for CAT6.
- Assign an IP address and logon to the switch. Refer to "Configuring the GigE switch via serial connection" on page 391.
- Set up VLANs on the switch. Refer to "Configuring the GigE switch via the Web interface" on page 394.
- Install the switch in its permanent location.
- Provide power to the switch.
- Connect cables as follows:

2900 series switch



To the media ports make one iSCSI connection from each K2 Media Client or other iSCSI client, and two iSCSI connections from the K2 Media Server.

To the control ports make a connection from each K2 Media Client or other iSCSI

client, from the RAID storage chassis, and from the control point PC. Also make the FTP network connection and the control network connection from the K2 Media Server.

If you optional have NH1 K2 Media Servers, connect their FTP network connections and control network connections to control ports on the switch.

If you have optional NH1-10GE K2 Media Servers, connect their 10 Gig FTP network connections to 10 Gig ports on the rear of the switch and connect their control network connections to control ports on the switch. Switches have two 10 Gig connectors standard and two 10 Gig connectors optional, so to connect three or four severs to a switch, you must first install the optional 10 Gig connectors in the switch.

Refer to "Level 20 system description" on page 388 for a diagram of the complete system.

Refer to cabling procedures later in this chapter for the GigE connections at each of the devices of the K2 Storage System.

Also refer to "K2 Ethernet switch description" on page 651 and "Design considerations for Ethernet switches" on page 759.

Configuring the GigE switch via serial connection

NOTE: Make sure you check the switch firmware and upgrade if necessary, as instructed at the end of this procedure.

The following procedure is for the HP ProCurve switch 2900 series. Do not use this procedure on other switch models.

Use a direct console connection to the switch, start a console session, and access the Switch Setup screen to set the IP address.

1. Configure the PC terminal emulator on the control point PC or another PC as a DEC VT-100 (ANSI) terminal or use a VT-100 terminal, and configure either one to operate with these settings:
   - Baud rate 115200
   - 8 data bits, 1 stop bit, no parity, and flow control set to Xon/Xoff
   - Also disable (uncheck) the "Use Function, Arrow, and Ctrl Keys for Windows" option
2. Connect the PC to the switch's Console Port using the console cable included with the switch. (If your PC or terminal has a 25-pin serial connector, first attach a 9-pin to 25-pin straight-through adapter at one end of the console cable.)
3. Turn on the PC's power and start the PC terminal program.
4. Press **Enter** two or three times and you will see the copyright page and the message "Press any key to continue". Press a key, and you will then see the switch console command (CLI) prompt.

NOTE: If you press Enter too many times and get past the log in, enter the command EN to get into the command line.

5. Type the following, then press **Enter**:

   ```
   menu
   ```

   If prompted to save the current configuration, answer no (press the n key) to proceed. The main menu opens.

6. On the main menu, choose **Switch Configuration,** then press **Enter**.

7. Select **IP Configuration**, then press **Enter**.

8. Press the right-arrow key to choose **Edit**, then press **Enter**. Tab to fields and enter information as follows:

   a. Change **Gateway** to be the default router.

   b. Tab to the **IP Config (DHCP/Bootp)** field and use the Space bar to select the **Manual** option.

   c. Tab to the **IP Address** field and enter the switch's control network IP address. Refer to "Networking tips" on page 106.

   d. Tab to the **Subnet Mask** field and enter the subnet mask used for your network.

9. Press **Enter**, then right-arrow to **Save**. Press **Enter** and revert to previous menu.

10. Select **Return to Main Menu** and press **Enter**.

11. From the main menu, chose **Console Passwords** and press **Enter**. The Set Password Menu opens.

12. Chose **Set Manager Password** and press **Enter**.

13. When prompted for the password, type a password of up to 16 ASCII characters with no spaces and press **Enter**. The password can be one that is used on other K2 devices, such as "adminK2" or "K2admin", or it can be your site's administrator password.

14. When prompted to enter the password again, retype the password and press **Enter**.

15. Select **Return to Main Menu** and press **Enter**.

16. From the main menu, tab to **Command Line (CLI)** and press **Enter**. The command prompt appears.

17. Type the following, then press **Enter**:

    ```
    configure
    ```

    You are now in configuration mode.

18. Configure an administrator username. The username can be one that is used on other K2 devices, such as "administrator" or "K2admin", or it can be your site's administrator username. For example, to set the username to "administrator" type the following, then press **Enter**:

    ```
    password manager user-name administrator
    ```

19. When prompted, enter and re-enter the password.

20. Set spanning tree to RSTP. Type the following, then press **Enter**:

    ```
    spanning-tree force-version rstp-operation
    ```

This configures spanning tree, but it does not turn spanning tree on. You must turn spanning tree on using the switch's Web interface, as explained in the next procedure "Configuring the GigE switch via the Web interface".

21. Decide your SNMP community name as explained in the following options, then proceed with the next step:

    - If you decide to use a unique SNMP community name (not "public"), add the community and set its RW permissions. For example, if the community name is "K2", type the following, then press **Enter**:

      ```
      snmp-server community K2 unrestricted
      ```

    - If you decide to use the default SNMP community "public" for NetCentral monitoring, which already has RW permissions set as required by NetCentral, proceed to the next step.

22. Enter the SNMP community and IP address of the NetCentral server PC. For example, if the IP address is "192.168.40.11" and the community is "public", you type the following, then press **Enter**:

    ```
    snmp-server host public 192.168.40.11
    ```

23. Enable Authentication traps. Type the following, then press **Enter**:

    ```
    snmp-server enable traps authentication
    ```

    This allows NetCentral to test the switch to verify that it can send its SNMP trap messages to NetCentral.

24. Type the following, then press **Enter**:

    ```
    menu
    ```

    When prompted, save the configuration by pressing the y key. The main menu opens.

25. If you need a trunk for ISLs to gang switches together, use the following steps. These steps illustrate trunking the last three 1 Gig ports for three 1 Gig ISLs, which is the recommended configuration for ISLs on all multi-switch K2 Storage Systems. Refer to "Design considerations for Ethernet switches" on page 759 and consult with your Grass Valley representative if your requirements deviate from the recommended policy:

    a. At the main menu, select **Switch Configuration** and press **Enter**.

    b. Choose selection **Port/Trunk Settings** and press **Enter**.

    c. Press the right-arrow key to choose **Edit**, then press **Enter**.

    d. Down arrow until at the bottom of the list of ports and select the last (highest port number) 1 Gig port in the list.

    e. Right-arrow over to the Group column.

    f. Use the Space bar and set the bottom 1 Gig port to **Trk1**.

    g. Set the next port up also to **Trk1**.

    h. Set the next port up also to **Trk1**.

    i. Press **Enter**, then right-arrow to **Save**. Press **Enter** and revert to previous menu.

26. Select **Return to Main Menu** and press **Enter**.

27. From the main menu, tab to **Command Line (CLI)** and press **Enter**. The command prompt appears.

28. Check the version of firmware currently installed on the switch. Type the following, then press **Enter**:

```
show flash
```

Information is displayed similar to the following example:

```
HP_iSCSI_switch1# show flash
Image            Size(Bytes)    Date    Version
-----            -----------  --------  -------
Primary Image    : 3287779    03/15/05  M.08.66
Secondary Image  : 3287779    03/15/05  M.08.66
Boot Rom Version: I.08.07
Current Boot     : Primary
```

29. Check the Primary Image Version and refer to your *K2 Storage System Release Notes* for information about currently supported versions. Then proceed as follows:

- If *K2 Storage System Release Notes* instruct you to change the firmware on the switch, do so before continuing. Refer to the documentation you received with the switch for instructions to change the firmware. Then continue with the next procedure "Configuring the GigE switch via the Web interface".
- If *K2 Storage System Release Notes* confirm that the version on the switch is a currently supported version, continue with the next procedure.

30. Type the following, then press **Enter**:

```
menu
```

The main menu opens.

31. From the main menu, choose **Reboot Switch** and press **Enter**. When prompted "Continue Reboot…?', answer yes (press the y key) to proceed. The switch restarts.

32. You can now use the switch's web browser interface for further configuration, as instructed in the next procedure.

33. Close the PC terminal program and disconnect the console cable.

Continue with the next procedure "Configuring the GigE switch via the Web interface".

Configuring the GigE switch via the Web interface

The following procedure is for the HP ProCurve switch 2900 series. Do not use this procedure on other switch models.

1. From the control point PC or another PC, make sure that you have a direct Ethernet cable connection to the switch, with no switches, routers, proxies, or other networking devices in between.

2. On the PC, open Internet Explorer and type the switch's IP address in the Address

field, as in the following example.

```
http://192.168.100.61
```

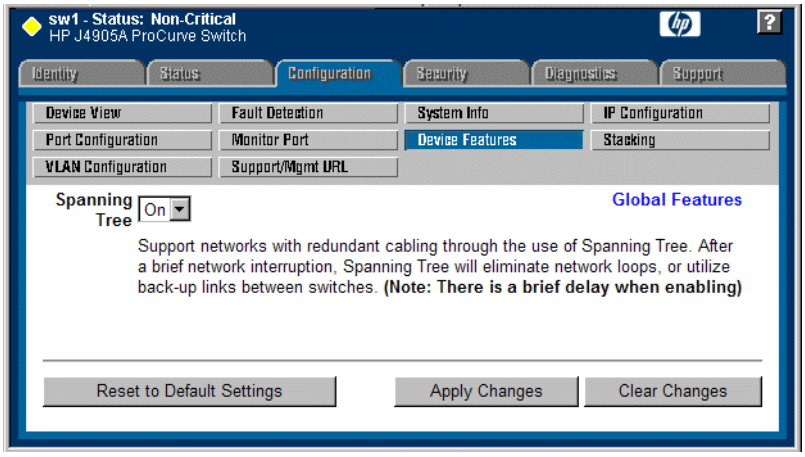
This should be the name or IP address as currently configured on the switch.

3. Press **Enter** to open the switch's configuration application.

NOTE: The configuration application for the HP ProCurve switch requires Java.

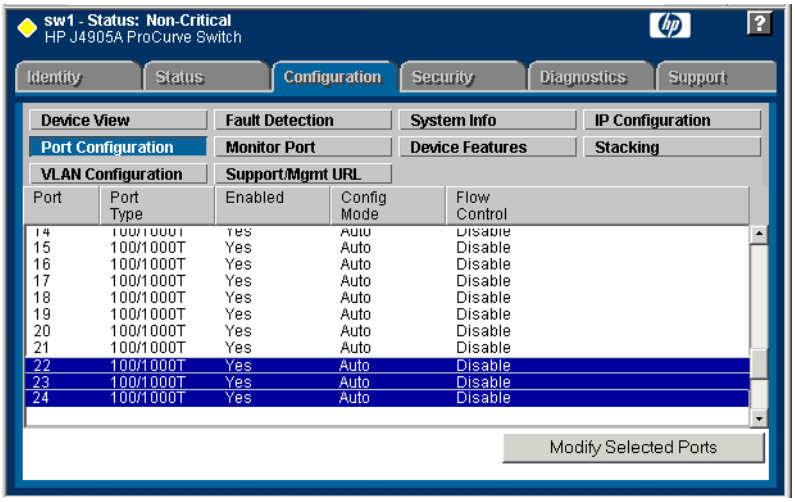
You can also access the switch's configuration application from the K2 System Configuration application.

4. In the switch's configuration application, choose **Configuration**, then **Device Features**.



5. Set Spanning Tree to **On** and click **Apply Changes**. If prompted, log in with the switch's administrator username and password.

6. Click **Port Configuration**.

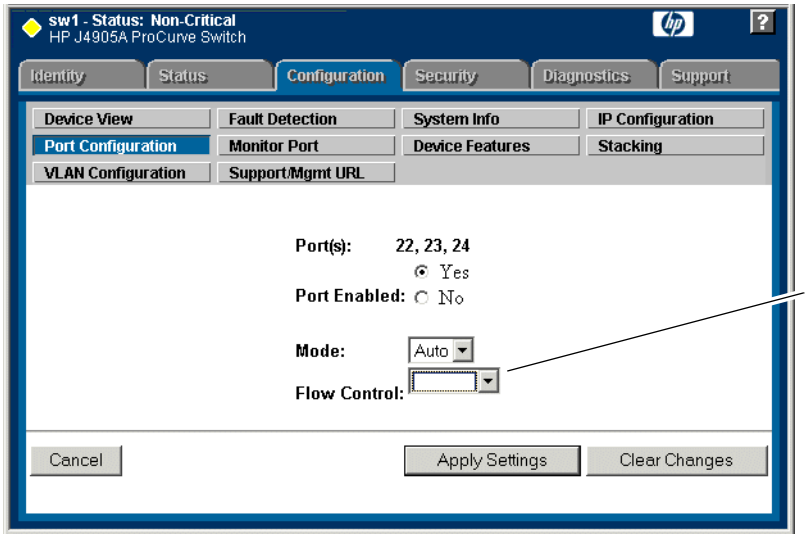


7. If you do not need trunks, such as on a one-switch system, skip to the next step in this procedure. If you need trunks, such as on a two-switch system with ISLs, do the following:

   a. Select (Ctrl + Click) the trunked ports. Typically the trunked ports are at the bottom of the list and are labeled Trk1.

   b. Click **Modify Selected Ports**.

      If prompted, log in as administrator.



   c. For the trunked ports, set Port Enabled to **Yes**. On some switch models, some ports are disabled by default, so make sure you enable them. Leave Mode as default of **Auto**.

   d. Set Flow Control as follows:

      - Set to **Enable**.

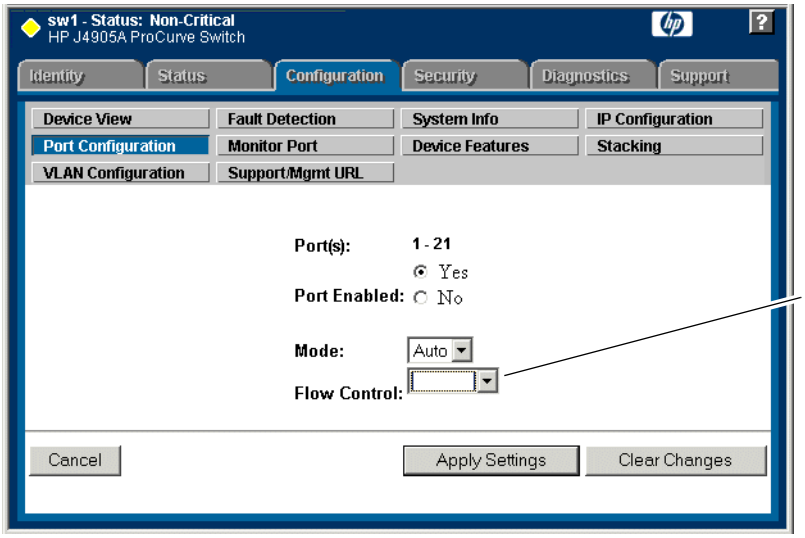
NOTE: This setting is for the 2900 series switch. Other switch models might require a different setting.

   e. Click **Apply Settings**.

8. On the Port Configuration page, do one of the following:

   - If you do not have trunks, select all ports.
   - If you have trunks, select the remaining ports (the ports not trunked).

9. Click **Modify Selected Ports.**



10. Make sure Port Enabled is set to **Yes**, leave Mode as default of **Auto**.

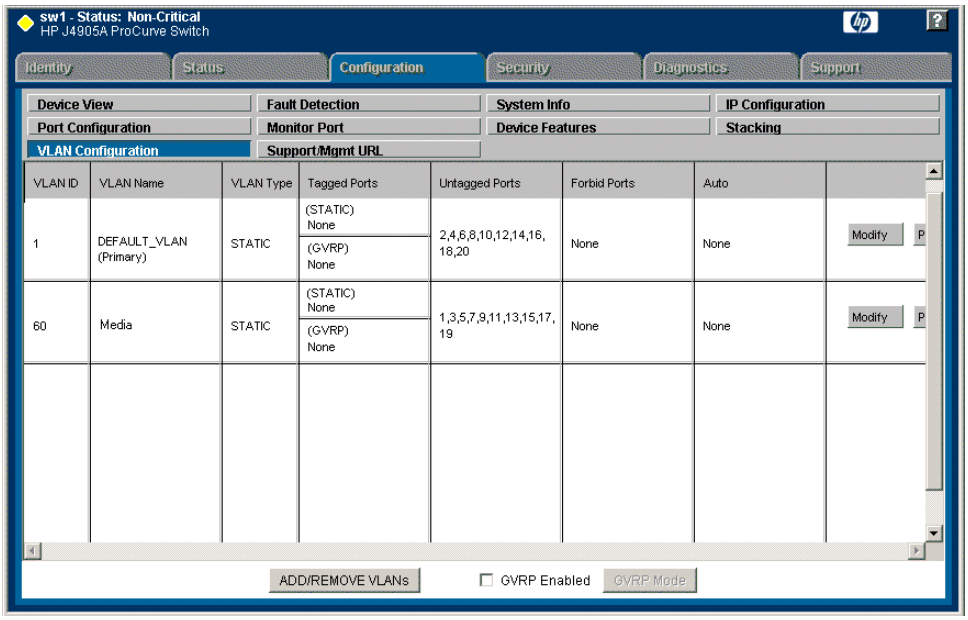
11. Set Flow Control as follows:

- Set to **Enable**.

NOTE: This setting is for the 2900 series switch. Other switch models might require a different setting.

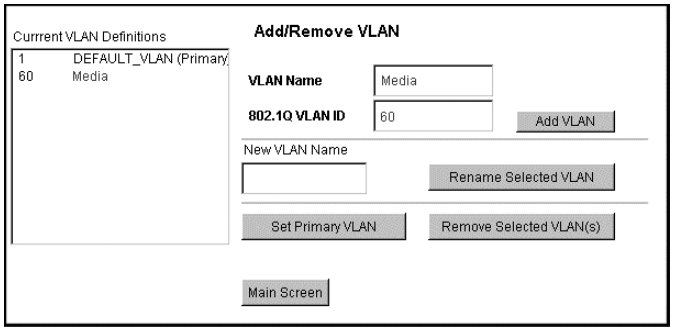
12. Click **Apply Settings**. Wait until settings are applied and the Web interface becomes active.

13. Choose **VLAN Configuration**. If prompted, log in with the switch's administrator username and password.



14. Create a new Media (iSCSI) VLAN as follows:

    a. Click **Add/Remove VLANs**.



    b. In the VLAN Name field enter `Media`.

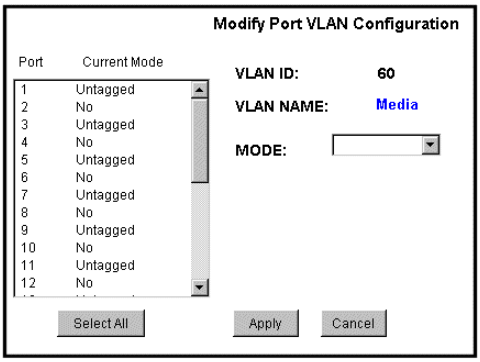
    c. In the VLAN ID field enter `60`.

    d. Click **Add VLAN**.

    e. Click **Main Screen** to return to VLAN Configuration.

15. Configure the Media VLAN as follows:

    a. In the Media VLAN row, click **Modify**.



b. Select all the odd numbered ports. (Tip: Use Ctrl + Click.)

c. In the Mode drop-down list, select **Untagged**, then click **Apply**. This removes the odd ports from the default (Control) VLAN.

   If you have a trunk, do not configure it as "Tagged". Media VLAN traffic (iSCSI) does not go over the trunk.

16. Click the **VLAN Configuration** tab.

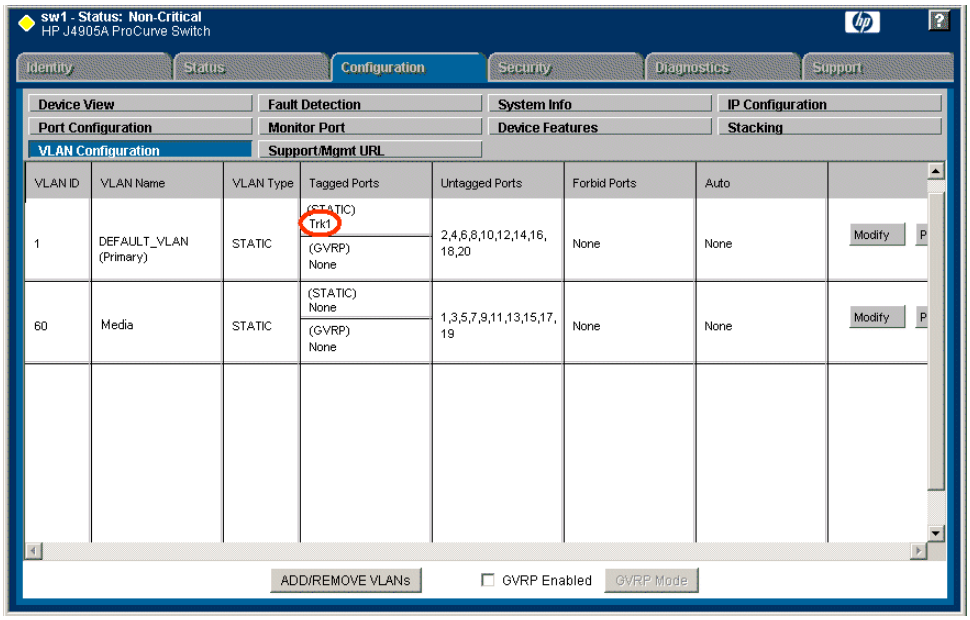
17. If you have a trunk, configure the default (Control) VLAN as follows:

    a. In the DEFAULT_VLAN row, click **Modify**.

    b. In the Current Mode list box, scroll down and select the trunk.

    c. In the Mode drop-down list, select **Tagged**, then click **Apply**. This allows default VLAN traffic (non-iSCSI) to go over the trunk.

18. Click the **VLAN Configuration** tab.



19. If you have a trunk, verify that for the default VLAN the trunk is displayed in the Tagged Ports column.
20. If you have two switches, repeat this procedure for the other switch.
21. Close the switch configuration application.

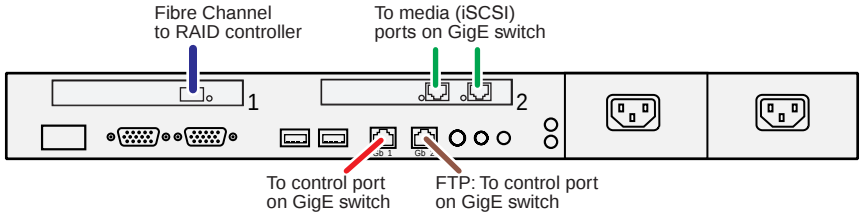
Setting up the GS K2 Media Server for Level 20

The Dell PowerEdge 1950 is qualified as the platform for the GS K2 Media Server.

Do the following to prepare the GS K2 Media Server for Level 20:

- Install the server in its permanent location. Refer to the rack mount instructions that you received with the server's product bundle.
- Provide power to the servers.
- Connect cables as follows:

Dell 1950 PowerEdge server



Connect the two iSCSI interface ports to media ports on the GigE switch. Connect the motherboard GigE port 1 and GigE port 2 to control ports on the GigE switch.

Connect the Fibre Channel port to the RAID storage device.

- Assign a control network IP address to GigE port 1. Use standard Windows procedures. Refer to "Networking tips" on page 106.
- Change the hostname. Use standard Windows procedures.
- Configure SNMP properties so the trap destination points to the NetCentral server PC. Use standard Windows procedures. If you are not using the SNMP community name "public", configure the community name and set permissions to RW. Also make sure that the Authentication trap is enabled.

Also refer to "K2 Media Server descriptions" on page 653.

Setting up the NH1 K2 Media Server

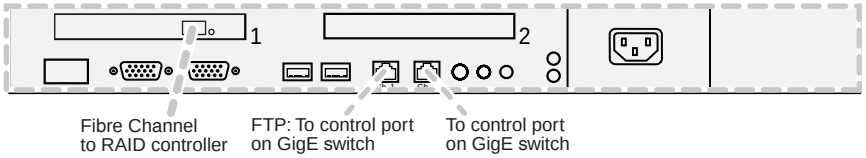
If your system has one or more NH1 K2 Media Servers, prepare the servers using this section.

The Dell PowerEdge 1950 is qualified as the platform for the NH1 K2 Media Server.

Do the following to prepare a NH1 K2 Media Server:

- Install the server in its permanent location. Refer to the rack mount instructions that you received with the server's product bundle.

- Provide power to the server.
- Connect cables as follows:



  Connect the motherboard GigE port 1 (control) and GigE port 2 (FTP) to control ports on the GigE switch.

  Connect the Fibre Channel port to the RAID storage device.

- Assign a control network IP address to GigE port 1. Use standard Windows procedures. Refer to "Networking tips" on page 106.
- Change the hostname. Use standard Windows procedures.
- Configure SNMP properties so the trap destination points to the NetCentral server PC. Use standard Windows procedures. If you are not using the SNMP community name "public", configure the community name and set permissions to RW. Also make sure that the Authentication trap is enabled.

Also refer to "K2 Media Server descriptions" on page 653.

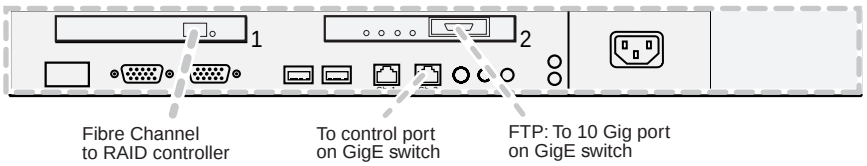
Setting up the NH1-10GE K2 Media Server

If your system has one or more NH1-10GE K2 Media Servers, prepare the servers using this section.

The Dell PowerEdge 1950 is qualified as the platform for the NH1-10GE K2 Media Server.

Do the following to prepare a NH1-10GE K2 Media Server:

- Install the server in its permanent location. Refer to the rack mount instructions that you received with the server's product bundle.
- Provide power to the server.
- Connect cables as follows:



  Connect the motherboard GigE port 1 (control) to a control port on the GigE switch.

  Connect the 10 Gig FTP port to the 10 Gig port on the rear of the GigE switch.

  Connect the Fibre Channel port to the RAID storage device.

- Assign a control network IP address to GigE port 1. Use standard Windows procedures. Refer to "Networking tips" on page 106.

- Change the hostname. Use standard Windows procedures.
- Configure SNMP properties so the trap destination points to the NetCentral server PC. Use standard Windows procedures. If you are not using the SNMP community name “public”, configure the community name and set permissions to RW. Also make sure that the Authentication trap is enabled.

Also refer to “K2 Media Server descriptions” on page 653.

Setting up the L20 RAID chassis

Do the following to prepare the L20 RAID storage devices:

- Install the chassis in its permanent location. After mounting the chassis in the rack, you must secure brackets to the front rail to support the Grass Valley bezel. Refer to the *K2 Lx0 RAID Instruction Manual* for rack mount instructions.
- “Connect the L20 RAID Primary and Expansion chassis” on page 402
- “Power on the L20 RAID chassis” on page 403

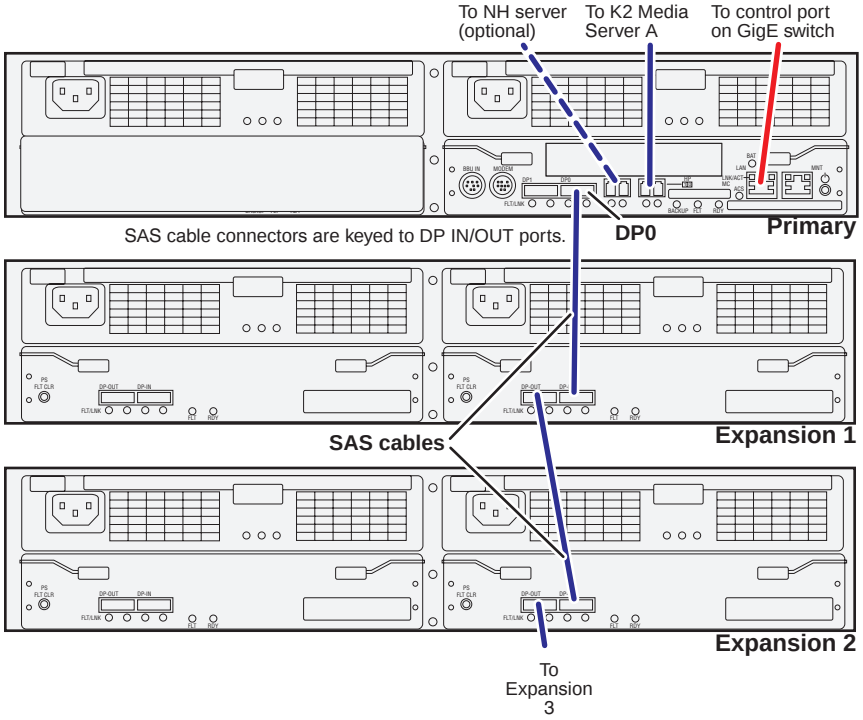
In addition, you will configure network settings, SNMP settings, and bind RAID disks. These tasks are part of the K2 System Configuration application and Storage Utility procedures later in this chapter.

On the L20 RAID, you do not need to manually set a Fibre Channel address ID on controllers or a chassis address on Expansion chassis.

Also refer to “K2 RAID storage description” on page 659.

Connect the L20 RAID Primary and Expansion chassis

Connect Ethernet, Fibre Channel, and SAS cabling as shown.



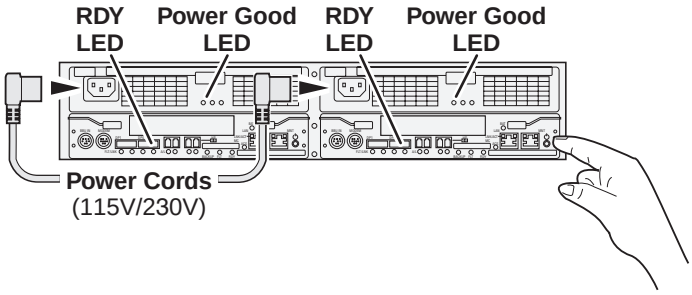
If you have more Expansion chassis than those illustrated, continue the indicated cabling pattern, connecting additional chassis to DP0.

Once the RAID storage is connected and configured, do not swap Expansion chassis or otherwise reconfigure storage. If you connect an Expansion chassis in a different order or to the wrong controller, the controller will see a configuration mismatch and fault.

Power on the L20 RAID chassis

Connect power cords and power up RAID storage devices as follows:

1. Verify power and cabling.
2. Press and hold down the power button on the controller, as shown.



If the RAID chassis has two controllers, you can press the power button on either controller. You do not need to press both power buttons.

Pressing the power button on a controller also powers on any connected Expansion chassis. There are no power buttons on Expansion chassis.

3. Release the power button when the Power Good LED on the power supply is illuminated. This takes 1-3 seconds.
4. Wait while the primary RAID chassis performs self-test and initialization. This takes about four minutes. While this is taking place, the RDY LED is illuminated with a steady on light.
5. Watch for the RDY LED to begin blinking at one second intervals. The LED might turn off and back on two times before starting the one second blink pattern. When the RDY LED is blinking at one second intervals, the self-test and initialization is complete and the chassis is ready for use.

Your preparations for L20 RAID storage are now complete.

Preparing K2 Storage System clients

Any devices that function as iSCSI clients to the K2 Storage System must be prepared with the following requirements:

- One or more connections to the control network.
- A static IP address for the control network.
- For a non-redundant K2 Storage System, one connection to the media (iSCSI) network.

Additional steps that are required for Aurora Edits include the following:

- Implement Aurora Edit security features.
- Install SNFS software and K2 software.

For more information, refer to the *Aurora Edit Installation and Configuration Guide*.

For more information refer to the *K2 Media Client System Guide*.

K2 configuration and NetCentral

Before you begin using the K2 System Configuration application to configure the storage system, you should set up the NetCentral system according to the following requirements:

- **NetCentral installed** — NetCentral server software must be installed on a NetCentral server PC. This can be the K2 configuration Control Point PC or another PC that has network communication with the K2 Storage System control network.
- **Device providers installed** — A device provider must be installed on the NetCentral server PC for each type of device in the K2 Storage System. For a Level 20 storage system, the following device providers must be installed:
  - Control point PC device provider — This is the Windows monitoring device provider.

  - K2 Media Server device provider
  - HP Gigabit Switch device provider or Cisco Gigabit Switch device provider
  - K2 Media Client device provider, if any K2 Media Clients are accessing the Level 20 storage system.
  - Device provider for iSCSI clients, if any iSCSI clients such as Aurora Edits are accessing the Level 20 storage system.
  - K2 L20 RAID storage device provider. This device provider supports RAID devices for Levels 10, 20, and 30.

- **Grass Valley PC Monitoring software installed** — This software must be installed on the K2 configuration Control Point PC. It includes Grass Valley SNMP agents and other WMI based components to perform process monitoring. This provides the information for some of the SNMP trap messages that must be sent to NetCentral.
- **Control Point PC monitored by NetCentral** — The K2 configuration Control Point PC should be added to the NetCentral system and fully monitored by NetCentral. This means that its SNMP trap destination is set to send SNMP traps to the NetCentral server PC. Whether the Control Point PC and the NetCentral server PC are the same PC or are different PCs, you should still add the Control Point PC to NetCentral.

Refer to the *NetCentral User Guide* to set up the NetCentral system. After installing a device provider, you can find additional documentation about monitoring that type of device on the NetCentral Help menu.

Networking for Level 20

Use the topics in this section to configure the Gigabit Ethernet (GigE) network for the Level 20 storage system.

- "Networking requirements" on page 406
- "Networking tips" on page 407
- "Setting up host tables" on page 408
- "Testing the control network" on page 409

Networking requirements

Required networking strategies for a Level 20 K2 Storage System (a non-redundant K2 Storage System) are as follows:

- Three networks:
  - Media network — Exclusively for iSCSI traffic.
  - Streaming/FTP network — For media transfers and FTP traffic.
  - Control network — For all other non-streaming, non-iSCSI traffic.
- Networks must be on separate subnets.
- The Media (iSCSI) network traffic is kept separate from any other traffic. This separation is provided by dedicated Gigabit ports, cables, and by a dedicated VLAN on the HP GigE switch or by separate switches.
- K2 Media Servers have a dedicated FTP port. Make a dedicated FTP connection to the FTP port.
- While control and FTP traffic is each on its own subnet, it is not required that each type of traffic has its own VLAN on GigE switches. For example, you make both FTP and control connections to the "control" ports (DEFAULT_VLAN) on the HP GigE switch.
- Static IP addresses are required for the media network on K2 Storage System iSCSI devices. This includes K2 Media Servers, generic iSCSI clients (such as Aurora Edits), and K2 Media Clients.
- Machine names (host names) assigned to each K2 device.
- Host tables (hosts files) provide name resolution on each K2 Media Client, iSCSI client, and K2 Media Server.
- IP addresses for FTP/streaming ports must have name resolution such that hostnames are appended with the "_he0" suffix. You can use host tables (as in "Setting up host tables" on page 408) or another mechanism to provide the name resolution. This directs the streaming traffic to the correct port. Refer to the *K2 Media Client System Guide* for a complete explanation.
- K2 Media Servers (including optional NH servers) must be on the streaming network, as they provide the FTP interface for shared storage streaming traffic. Shared storage K2 Media Clients do not need to be on the streaming network because they do not send or receive streaming traffic.

- On the shared storage K2 Media Client, the two control GigE ports are configured as a team. The control team shares a single IP address. Do not attempt to un-team the control ports. On the Level 20 K2 Storage System, only one control port is connected, as control team redundancy is not supported.
- On the shared storage K2 Media Client, the two media (iSCSI) GigE ports are not teamed. On the Level 20 K2 Storage System, only one media port is connected, as iSCSI redundancy is not supported.

Also refer to "About networks and FTP" on page 684 and "Design considerations for Ethernet switches" on page 759.

Use the following procedures as necessary to implement your networking strategies.

NOTE: It is recommended that you configure Media network (iSCSI) IP addresses and Streaming network IP addresses using the K2 System Configuration application, rather than doing so on the local machine using standard Windows procedures.

Networking tips

- Before beginning network configuration, determine the IP addresses and names needed for the machines in your K2 system. Work with the network administrator at your facility to have those IP addresses and names available for your use.
- Establish a consistent convention for machine names and IP addresses. It is recommended that you embed a root name or other unique identifier for this particular K2 Storage System in the computer name. Also, a common convention for IP addresses is to use a numerical pattern or sequence in the IP addresses to indicate device-types and/or ports, as in the following example:

NOTE: This example assumes a subnet mask of 255.255.255.0

Example of Level 20 names and IP addresses

Computer name	Device type	Streaming network addresses	Control network addresses	Media network addresses	Comments
root_server_1	K2 Media Server	192.168.101.11[a]	192.168.100.11	192.168.99.11	—
				192.168.99.12	—
root_server_2 (optional)	NH K2 Media Server	192.168.101.21[b]	192.168.100.21	—	This server has roles of FTP server and NAS server only.
root_raid_1	RAID	—	192.168.100.51	—	—
root_gige_1	GigE switch	—	192.168.100.61	—	—
root_cppc_1	Control point PC	—	192.168.100.81	—	—
root_client_1	iSCSI client	—	192.168.100.111	192.168.99.111	—
root_client_2	iSCSI client	—	192.168.100.121	192.168.99.121	
root_client_3	iSCSI client	—	192.168.100.131	192.168.99.131	
root_client_4	iSCSI client	—	192.168.100.141	192.168.99.141	

[a] This IP address must resolve to hostname root_server_1_he0
[b] This IP address must resolve to hostname root_server_2_he0

Setting up host tables

The *hosts* file is used by the control network and the streaming/FTP network to determine the IP address of devices on the network when only a the device name (hostname) is given. The steps that follow describe how to edit the *hosts* file located at *C:\Windows\system32\drivers\etc\hosts* on Windows XP and Windows 2003 Server operating system computers. If you include the names and addresses of all the devices on the network, then you can copy the same file onto all the other K2 devices instead of editing the *hosts* file on each K2 device.

For FTP transfers on a K2 Storage System, transfers go to/from K2 Media Servers that have the role of FTP server. No transfers go directly to/from the shared storage K2 Media Clients that are on the K2 Storage System. So in the hosts file, you must add the “he_0” extension to a K2 Media Server hostname and associate that hostname with the K2 Media Server’s FTP/streaming network IP address.

Refer to the *K2 Media Client System Guide* for more information.

To edit the *hosts* file manually:

1. Open the following file using Notepad or some other text editing application:

   C:\Windows\system32\drivers\etc\hosts

2. Enter all IP addresses with machine names. The text format is simple. First type the Ethernet IP address, then use the TAB key or Space bar to insert a few spaces. Then type the machine name.

   Here is an example:

```
192.168.100.11     root_server_1
192.168.101.11     root_server_1_he0
192.168.100.21     root_server_2
192.168.101.21     root_server_2_he0
192.168.100.51     root_raid_1
192.168.100.61     root_gige_1
```

3. Save the file and exit the text editor.
4. Copy the new *hosts* file onto all the other machines. This is easier than editing the file on each machine.

Host table tips

- If transferring to or from a Profile XP or Open SAN system via UIM, the *hosts* file must also follow UIM naming conventions for those systems. Refer to the UIM Instruction Manual.
- Do not enter media (iSCSI) network IP addresses in the host table, as hostname resolution is not required for the media network.
- Use the following tip with care. While it can solve a problem, it also introduces a name resolution "anomaly" that might be confusing if not considered in future troubleshooting activities.

  For each SAN (shared storage) K2 Media Client, add the "_he0" suffix to the hostname but then associate that hostname with the K2 Media ***Server's*** FTP/ streaming network IP address, ***not*** the K2 Media ***Client's*** IP address. Aliasing K2 Media Client hostnames in this way would not be required if the transfer source/ destination was always correctly specified as the K2 Media Server. However, a common mistake is to attempt a transfer in which the source/destination is incorrectly specified as the K2 Media Client. The host file aliasing corrects this mistake and redirects to the K2 Media Server, which is the correct transfer source/ destination.

  An example of a *hosts* file entry with this type of aliasing is as follows:

```
192.168.101.11     server_1_he0 client_1_he0 client_2_he0
```

Testing the control network

To test the control network use the *ping* command as follows:

1. On the control point PC, click **Start | Run**. The Run dialog box opens.
2. Type `cmd` and click **OK**. The command prompt window opens.
3. Type `ping`, then a space, then the name of one of your K2 Storage System devices, such as the Gigabit Ethernet switch, as in the following example:

   ```
   ping root_gige_1
   ```

4. Press **Enter**.

   The ping command should return the IP address of the device, as in the following example:

   ```
   Pinging root_gige_1.mycorp.com [192.168.100.61] with
   ```

```
32 bytes of data:

Reply from 192.168.100.61: bytes=32 time=10ms TTL=127
Reply from 192.168.100.61: bytes=32 time<10ms TTL=127
Reply from 192.168.100.61: bytes=32 time<10ms TTL=127
Reply from 192.168.100.61: bytes=32 time<10ms TTL=127
```

This verifies that the name of the device is being correctly resolved to the IP address, which indicates that on the Control Point PC the host table entry is correct.

5. Ping the other K2 Storage System devices to which you have assigned control network IP addresses.
6. Go to each Windows device in the K2 Storage System and repeat this procedure. This verifies that network communication is correct to and from all devices.

Configuring the Level 20 storage system

Use the topics in this section to do the initial configuration of the Level 20 storage system.

- "Prerequisites for initial configuration" on page 411
- "Defining a new K2 Storage System" on page 412
- "Configuring the server - Part 1" on page 414
- "Configuring RAID" on page 416
- "Creating a new file system" on page 421
- "Configuring the server - Part 2" on page 423
- "Configuring optional NH servers" on page 425

Prerequisites for initial configuration

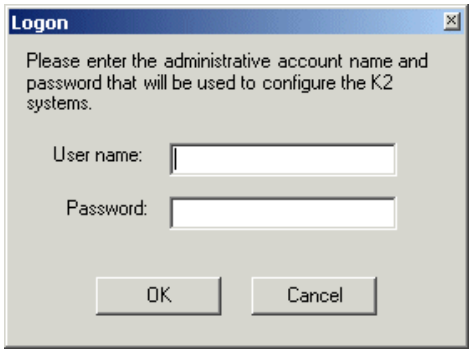
Before beginning your initial configuration, make sure the devices of the K2 Storage System meet the following prerequisites. Refer to sections earlier in this manual for detailed information. Also refer to Chapter 14, "Description of K2 Storage Devices".

Devices	Prerequisite for Level 20 configuration
Control point PC	Ethernet cable connected Control Point software installed Control network IP address assigned Network communication over the control network with all other K2 devices Power on
Ethernet switch	Ethernet cables connected Control network IP address assigned VLANs set up Trunks set up Power on
K2 Media Server	Ethernet cables connected Fibre Channel cable connected Software installed, as from the factory, including QuickTime 7 Control network IP address assigned Power on for all servers

Defining a new K2 Storage System

Define a Level 20 K2 Storage System as follows:

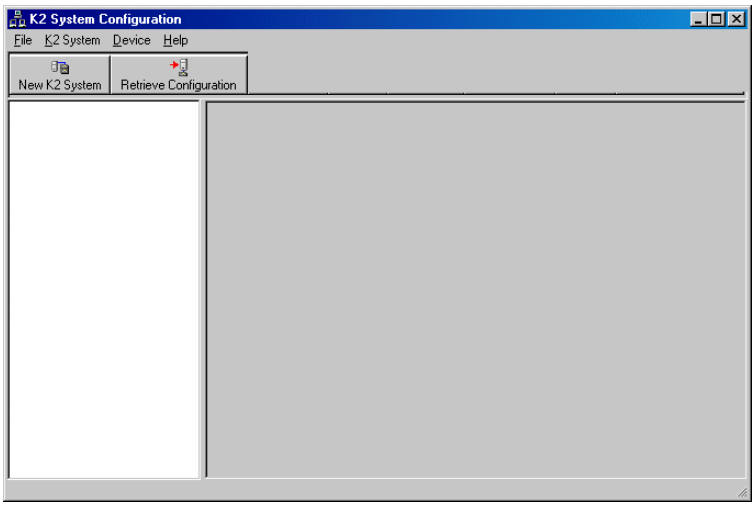
1. On the control point PC, open the K2 System Configuration application. A login dialog box opens.



2. Log in to the K2 System Configuration application with the Windows administrator account. By default this as follows:

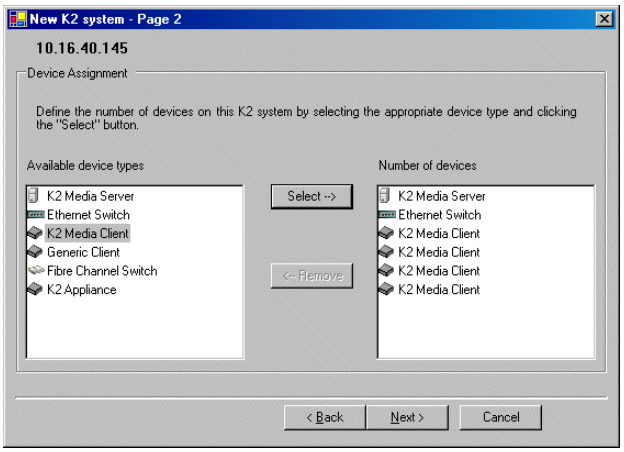
   - Username: administrator
   - Password: adminK2

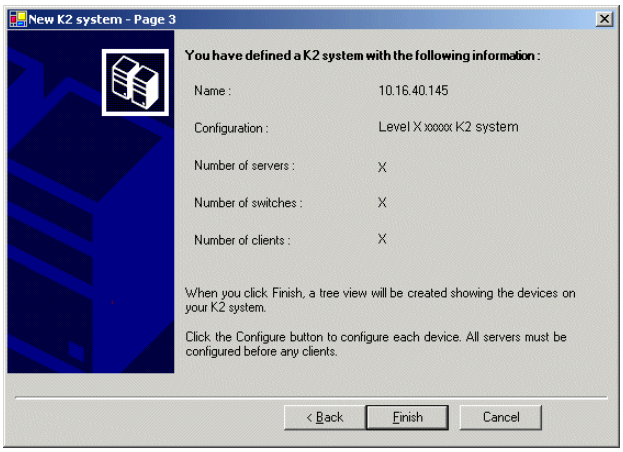
   Refer to "Setting up application security" on page 688 for more information about administrator accounts and logging in to applications.



3. Click **New K2 System**. The New K2 System wizard opens.

4. Follow the on-screen text to define your Level 20 K2 Storage System, as described in the following table.

On this page…	Do this…
Page 1	 Create a name for your Level 20 K2 Storage System and type it in the Name box. Select **Level 20**. Do not select the Server redundancy option. Click **Next**
Page 2	 Move the following into the Number of Devices Box: • One K2 Media Server • One Ethernet switch • K2 Media Clients as appropriate for your system. • (Optional) One or more K2 Media Servers to represent each NH K2 Media Server on your system. • (Optional) Other devices as appropriate for your system. Click **Next**.

On this page...	Do this...
Page 3	 Review the information on this page and verify that you have correctly defined your K2 Storage System. • One Gigabit Ethernet switch • One K2 Media Server • Optionally, one or more NH K2 Media Servers • The number and type of clients appropriate for your system. Click **Finish**. The Define New K2 Storage System wizard closes.

Your K2 Storage System appears in the tree view of the K2 System Configuration application.

5. Continue with the next procedure.

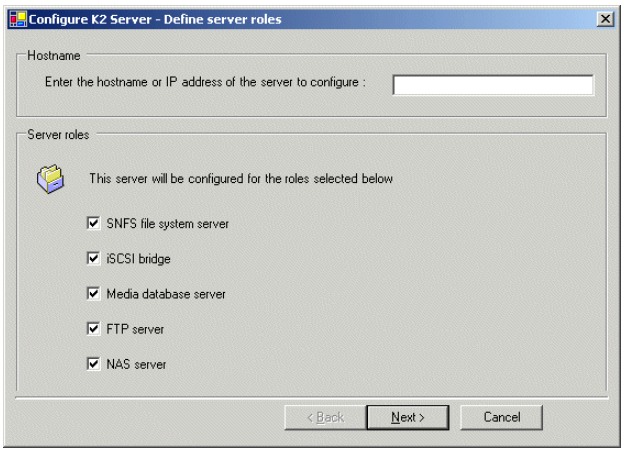
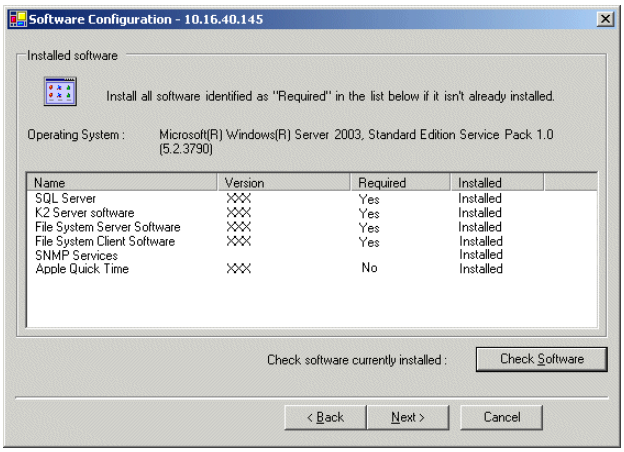
Configuring the server - Part 1

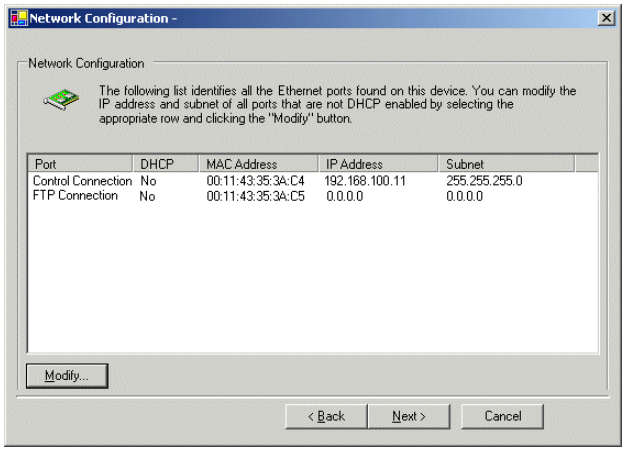
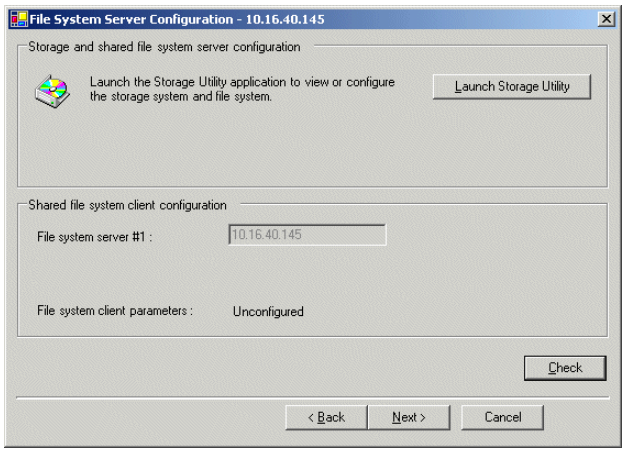
1. In the K2 System Configuration application tree view, select [**K2Server1]**.

2. Click the **Configure** button.

The Configure K2 Server wizard opens. Follow the on-screen text to configure the for a Level 20 K2 Storage System, as

described in the following table:

On this page…	Do this…
Define server roles	 Enter the name or IP address for the K2 Media Server, as currently configured on the machine. For Level 20, select all roles. Click **Next**
Software Configuration This page checks for the software required to support the roles you selected on the previous page. Software required on the Level 20 K2 Media Server is as follows: • SQL Server • K2 Server • File System Server • File System Client • SNMP Services • QuickTime	 If software with *Yes* in the Required column reports as *Not Installed*, you must first install it on the before continuing. Refer to *Chapter 16, Managing K2 software*. After installing the software, click **Check Software**. When all required software reports as *Installed*, click **Next**.

On this page…	Do this…
Network Configuration This page displays the control network Ethernet port, and allows you to configure the FTP/ Streaming network Ethernet port. ***NOTE: This page does not configure the iSCSI interface (media network) ports.***	 The top port is the port over which the K2 System Configuration application is communicating with the. If correctly configured, it is already assigned the control network IP address, as displayed on this page. Select the other port and click **Modify**. A network configuration dialog box opens. Enter the FTP/Streaming IP address and the subnet mask and click **Apply**. Click **Next**.
File System Server Configuration	 Click **Launch Storage Manager**. Storage Utility opens.

3. Continue with the next procedure to use Storage Utility to configure the storage and file system.

   Leave the Configure K2 Server wizard open while you are using Storage Utility. When you are done with Storage Utility, you continue with the wizard.

Configuring RAID

Use Storage Utility to complete the configuration of the L20 RAID chassis, as explained in the following topics:

- "Configuring RAID network and SNMP settings"

- "Binding disk modules"

Refer to "Prerequisites for initial configuration" on page 411 to confirm that the RAID storage is ready for configuration.

Configuring RAID network and SNMP settings

Use the Storage Utility to configure the following settings for the Level 20 RAID controller:

- IP address
- Subnet mask
- Gateway Address
- SNMP trap destinations

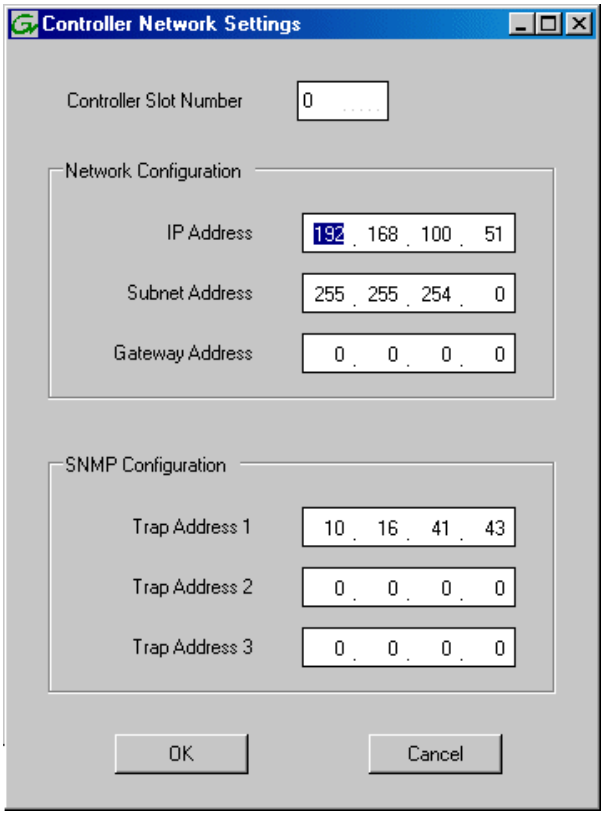
For L20 RAID, network and SNMP settings are set and stored on the RAID controller module, so the combined RAID storage devices, including the optional Expansion chassis, exist as a single entity on the control network.

The RAID storage device is configured by default for the SNMP community name "public". If your site's policies require using a different SNMP community name, contact your Grass Valley representative.

To configure these settings, do the following:

1. Launch Storage Utility from the K2 System Configuration application as in the previous procedure.
2. As prompted, wait while Storage Utility gathers system information, then Storage Utility opens.
3. In Storage Utility tree view, expand the node for the L20 RAID, right-click the icon for a L20 RAID controller, and select **Configuration | Network Properties**.

   The Controller Network Settings dialog box opens.



4. In the Controller Slot Number field enter **0** and then press **Enter**. The settings from controller 0 are loaded into the Controller Network Settings dialog box and are available for you to modify.
5. Enter the control network IP address and other network settings.
6. You want SNMP trap messages go to the NetCentral server PC, so for SNMP Configuration enter the IP address of the NetCentral server PC. You can also enter IP addresses for other SNMP managers to which you want to send SNMP trap messages.
7. Click **OK** to save settings and close.
8. In Storage Utility click **View | Refresh**. Continue with the next procedure "Binding disk modules".

Binding disk modules

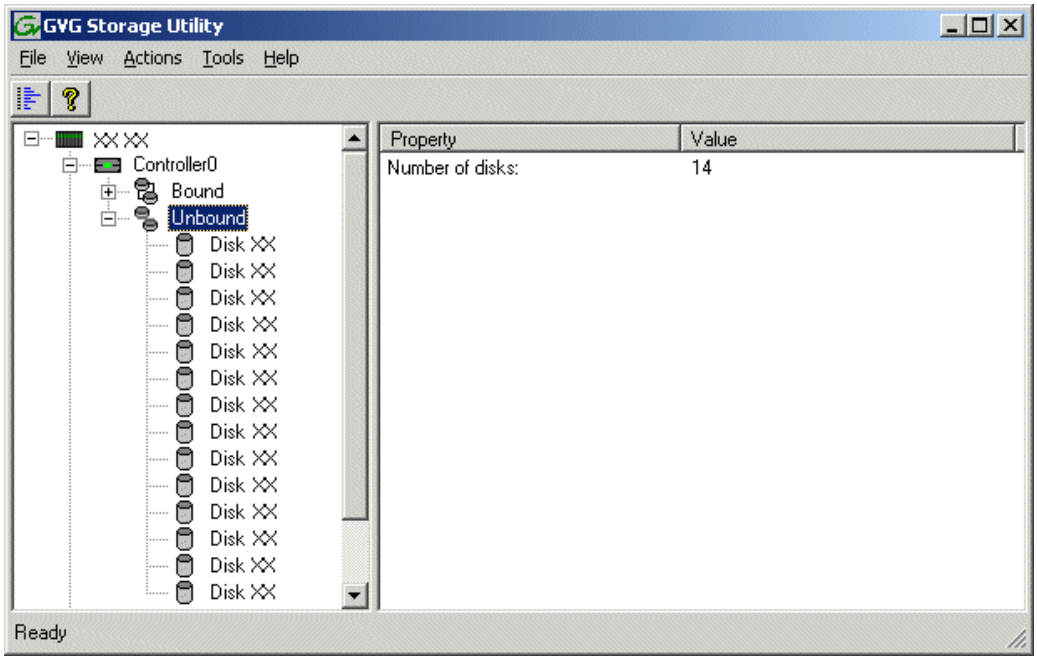
Use the following procedure to bind disk modules as required for the Level 20 storage system.

Also refer to "About RANKs and LUNs in Storage Utility" in Chapter 15, *Overview of K2 Storage Tools*.

NOTE: Binding destroys all user data on the disks.

1. In the Storage Utility main window, identify bound RANKs and unbound disks by

their placement in the hierarchy of the tree view. In the following illustration, disk numbers are represented by “XX”. Refer to “Identifying disks” on page 744 for an explanation of how disks are actually numbered in Storage Utility.

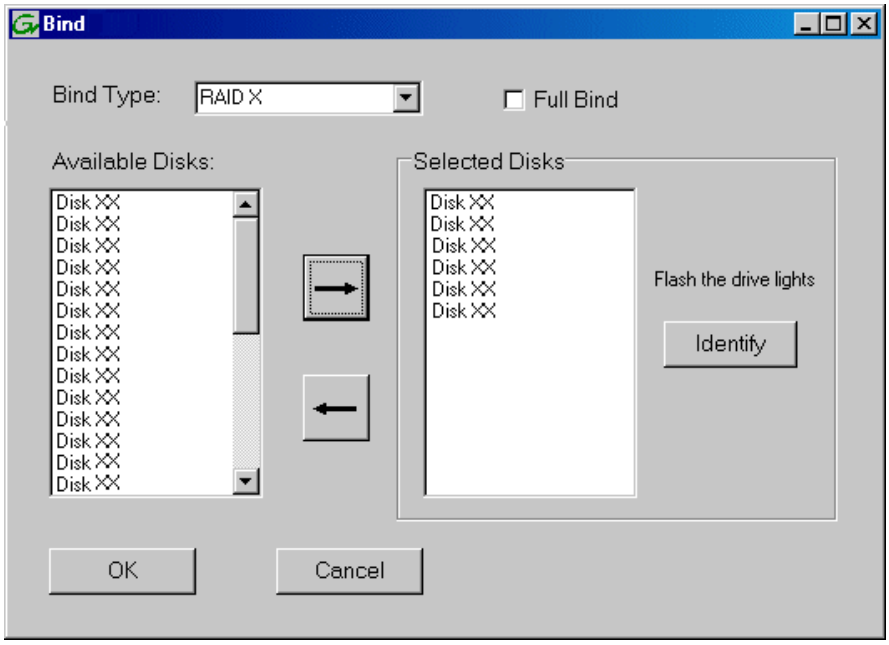


View disk properties and identify the four disks you will use for the metadata/journal RAID 1 RANKs, the one metadata/journal Hot Spare disk, any other disks that you intend to use for Hot Spares, and the remainder of the disks that are available for media storage. Make sure you select disks appropriately as you bind disks in the remainder of this procedure.

2. To bind unbound disks for media storage, do the following:

   a. Right-click the **Unbound** node for a controller, then select **Bind** in the context menu. (If the RAID chassis has two controllers, both controllers are represented by the single “Controller” node)

      The Bind dialog box opens showing all unbound disks for the controller listed in the Available Disk list.



b. Leave Full Bind unchecked. Refer to "About full/background bind" on page 748.

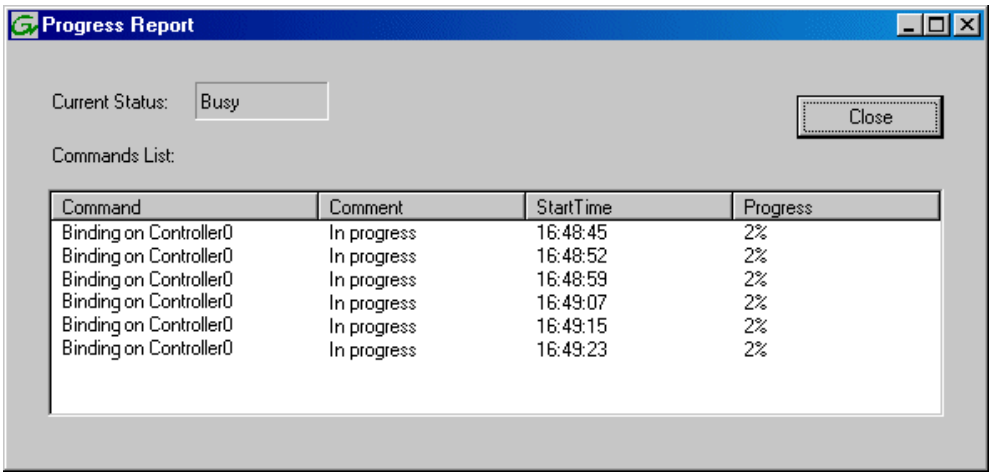
c. In the **Bind Type** drop down box, select **RAID 5** or **RAID 6**, as specified by your system design.

d. In the Available Disks box, select six contiguous disks at the top of the list. (TIP: Use 'shift-click' or 'control-click' to select disks.).

e. Click the add (arrow) button to add disks to the Selected Disks list.

NOTE: As an aid in identifying a disk module's physical location, select it in the Selected Disks list, then click* Identify Disks. *This causes the disk drive light to flash.

f. Click **OK** to close the Bind dialog box and begin the binding process. The Progress Report dialog box opens, showing the status of the binding process.



g. Close the Progress Report and repeat these steps for other unbound disks. If specified by your system design, you can bind some disks as Hot Spares, as explained in "Binding Hot Spare drives" on page 751. When you are done, if you did not bind any extra Hot Spares, you should have the following results:

   For L20 storage you should have two RAID 5 or RAID 6 RANKs of six disks each on the primary RAID storage device. For each optional Expansion chassis, you would have an additional one or two RAID 5 or RAID 6 RANKs of six disks each.

h. Click **Close** in Progress Report window.

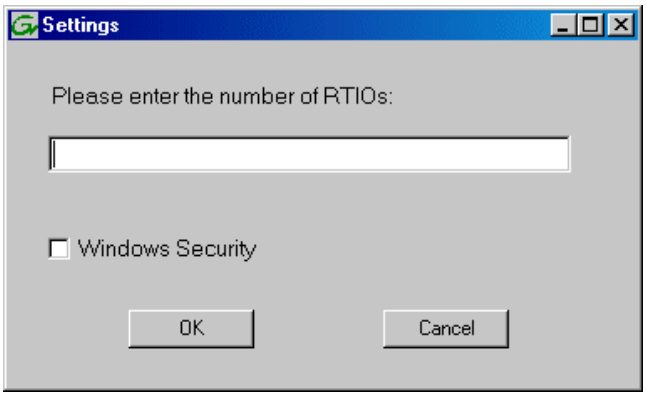
3. Restart the K2 Media Server.

NOTE: Make sure start up processes on the K2 Media Server are complete before proceeding.

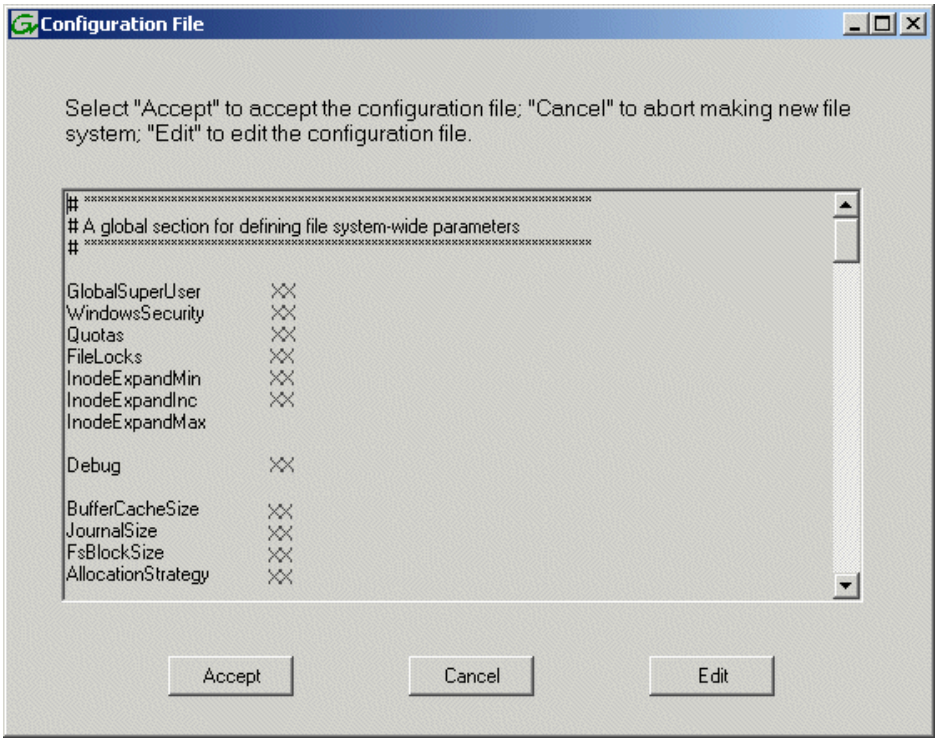
4. Continue with the next procedure "Creating a new file system".

Creating a new file system

1. In Storage Utility, click **Tools | Make New File System**. The Setting dialog box opens.



2. For the Real Time Input/Output (RTIO) rate, enter the value specified by your system design. If you do not know this value, contact your Grass Valley representative.
3. If the K2 Storage System is to be accessed by only K2 Media Clients you can leave Windows Security unchecked. If accessed by Aurora Edits, refer to the *Aurora Edit Installation and Configuration Guide* for instructions.
4. Click **OK**. The Configuration File dialog box opens.



The configuration file for the media file system is displayed. You can verify media file system parameters by viewing this file. Do not edit this file. Click **Accept**.

A "…Please wait…" message box displays progress and a "…succeeded…" message confirms the process is complete.

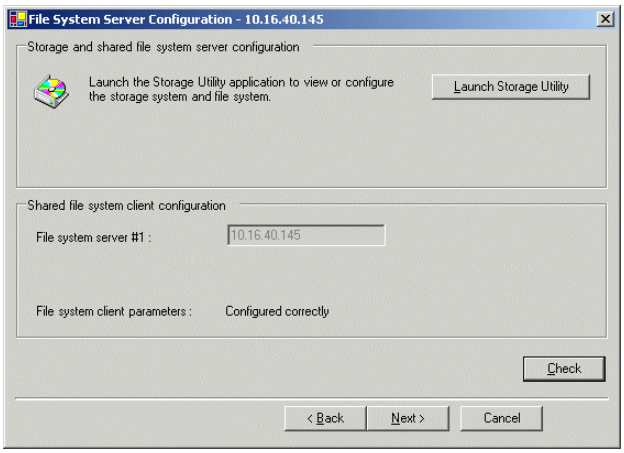
5. A message informs you that you must restart the K2 Media Server, however the restart at the end of the Configure K2 Server wizard suffices, so you do not need to restart now.
6. Close the Storage Utility.

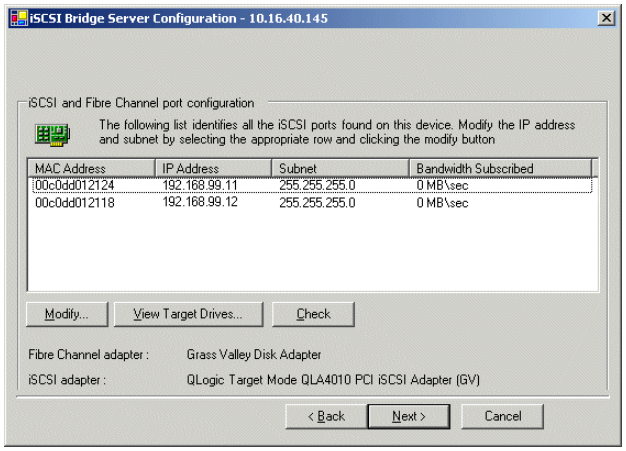
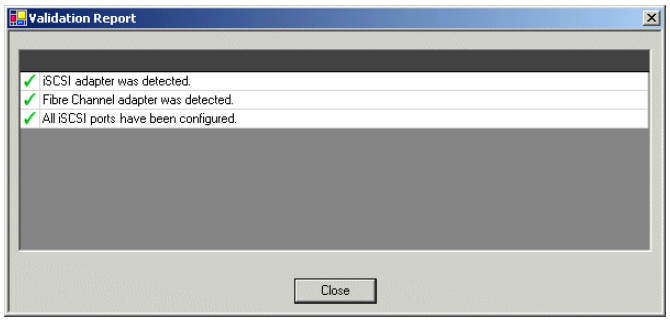
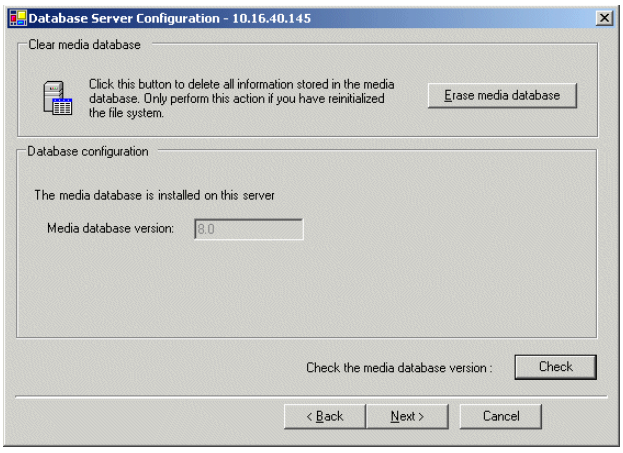
NOTE: Do not attempt to start K2 Media Clients or otherwise bring the K2 Storage System online until instructed to do so later in this chapter.

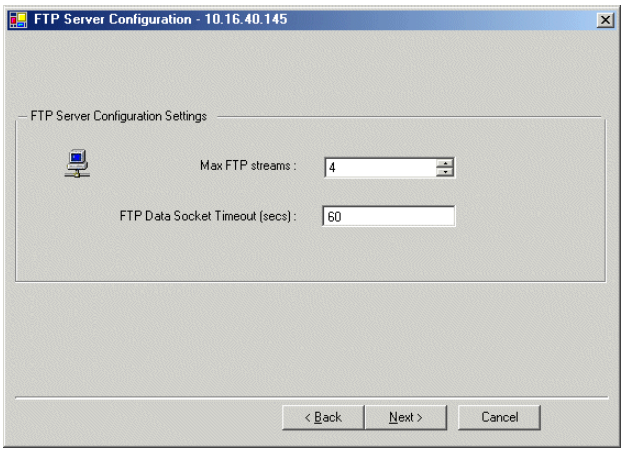
7. Continue with the next procedure.

Configuring the server - Part 2

1. Return to the Configure K2 Server page from which you launched Storage Utility and proceed as described in the following table:

On this page…	Do this…
File System Server Configuration This page checks on the configuration of the server in one of its main roles as a file system server. The server also functions as a file system client, which is also checked from this page.	 Click **Check**. When the wizard reports that the configuration is correct, click **Next**. If you get a "The V: will not be available until this device is rebooted…" message, you can safely continue with this procedure and follow the instructions related to this message later in the procedure.

On this page…	Do this…
iSCSI Bridge Server Configuration This page manages the components that bridge between iSCSI (the GigE media network) and the Fibre Channel connection to the RAID storage. You configure network settings on the iSCSI adapters and the page validates that the Fibre Channel adapter is in place and that the media RANKs are visible as iSCSI targets.	 Select an iSCSI adapter and click **Modify**. A network configuration dialog box opens. Enter the media network IP address and the subnet mask and click **Apply**. Do the same for the other iSCSI adapter. Click **Check**. The Validation Report opens.  Confirm that the iSCSI configuration is successful. Close the Validation Report and then click **Next**.
Database Server Configuration	 You do not need to enter or configure anything on this page. Click **Next**.

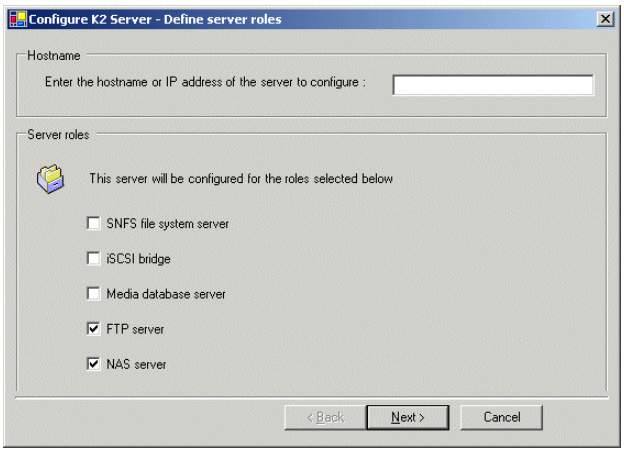
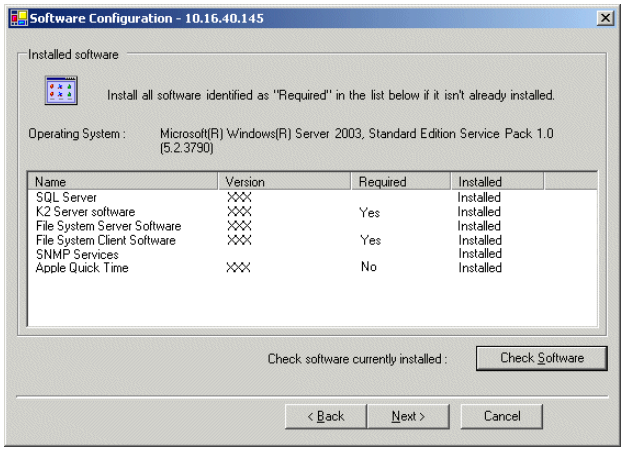
On this page…	Do this…
FTP Server Configuration	 Do not modify these settings. Leave at default values of Max FTP streams = 4 and FTP Data Socket Timeout = 60. Only qualified Grass Valley personnel should specify other values, as these settings are intended for use only with custom systems designed by Grass Valley. Click **Next**
Completing the Configuration Wizard	Click **Finish**. The wizard closes. The server restarts. Wait until all startup processes have completed before continuing.

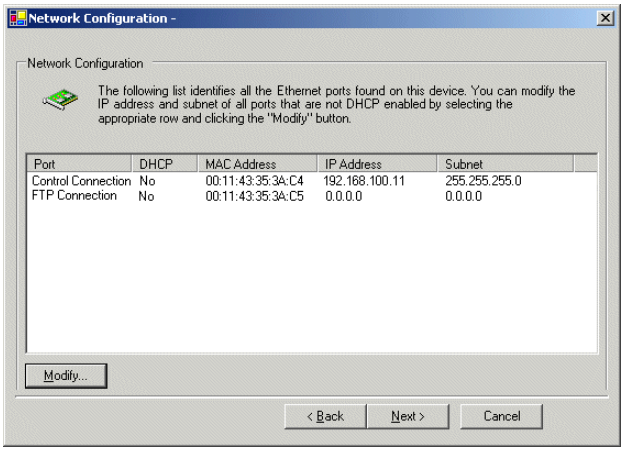
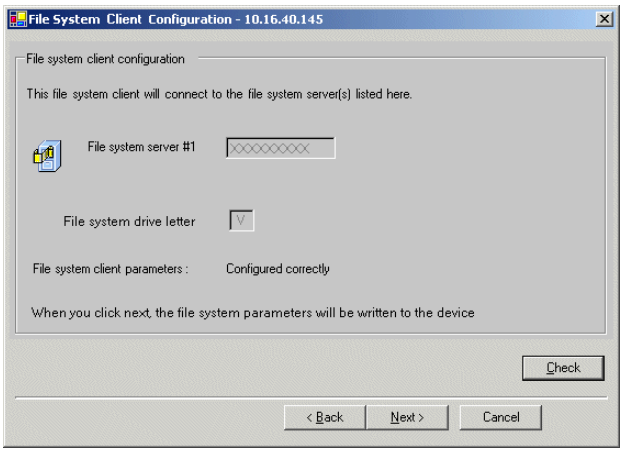
Configuring optional NH servers

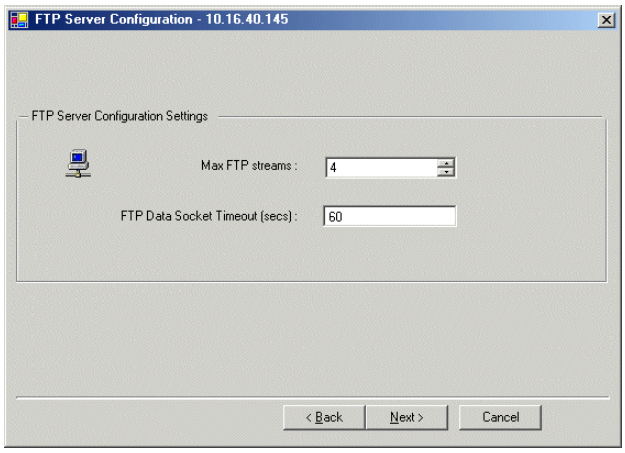
If you have one or more optional NH K2 Media Servers, you next configure those servers. This section applies to both NH1 (1 Gig FTP) servers and NH1-10GE (10 Gig FTP) servers.

NOTE: Multiple NH servers on a K2 Storage System must be of the same type, either all NH1 or all NH1-10GE.

1. In the K2 System Configuration application tree view, select the K2 Media Server you are configuring.
2. Click the **Configure** button. The Configure K2 Server wizard opens. Follow the on-screen text to configure the server for a Level 20 K2 Storage System, as described in the following table. Some screens require no input from you, as they are based on the configurations already completed on a previously configured K2 Media Server.

On this page…	Do this…
Define server roles	 Enter the name for the K2 Media Server. This should be the current network name of the machine. Select FTP server and NAS server. Click **Next**
Software Configuration This page checks for the software required to support the roles you selected on the previous page. Software required on a NH K2 Media Server is as follows: • K2 Server • File System Client • QuickTime	 If software with *Yes* in the Required column reports as *Not Installed*, you must first install it on the K2 Media Server before continuing. Refer to *Chapter 16, Managing K2 software*. After installing the software, click **Check Software**. When all required software reports as *Installed*, click **Next**.

On this page…	Do this…
Network Configuration This page displays the control network Ethernet port, and allows you to configure the FTP/ Streaming network Ethernet port.	 The top port is the port over which the K2 System Configuration application is communicating with the K2 Media Server. If correctly configured, it is already assigned the control network IP address, as displayed on this page. Select the other port and click **Modify**. A network configuration dialog box opens. Enter the FTP/Streaming IP address and the subnet mask and click **Apply**. Click **Next**.
File System Client Configuration This K2 Media Server does not function as a file system server. It does function as a file system client, which is validated from this page.	 Click **Check**. When the wizard reports that the configuration check is successful, click **Next**.

On this page…	Do this…
FTP Server Configuration	 Do not modify these settings. Leave at default values of Max FTP streams = 4 and FTP Data Socket Timeout = 60. Only qualified Grass Valley personnel should specify other values, as these settings are intended for use only with custom systems designed by Grass Valley. Click **Next**
Completing the Configuration Wizard	Click **Finish**. The wizard closes. The K2 Media Server restarts. Do not proceed until restart processes are finished.

3. Repeat this procedure for remaining NH K2 Media Servers, if any.

Your configurations for the Level 20 K2 Storage System are complete.

Adding K2 Storage System clients

You can add now clients, such as K2 Media Clients or Aurora Edits, to the K2 Storage System and configure them using the K2 System Configuration application.

- For Aurora Edits, refer to the *Aurora Edit Installation and Configuration Guide* for instructions.
- For K2 Media Clients, refer to *K2 Media Client System Guide* for instructions.

Basic operations for Level 20 storage

Use the following procedures as you work on your Level 20 storage system:

- “Level 20 system power-off procedure”
- “Level 20 system power-on procedure”

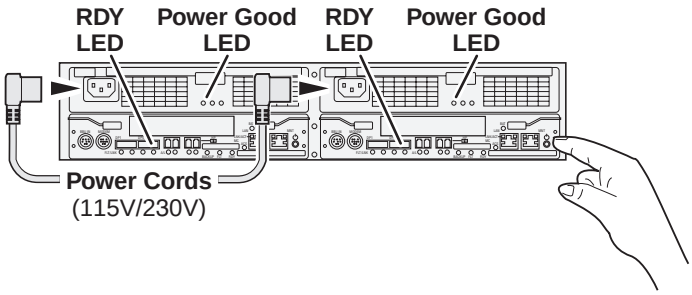
For other procedures refer to “Administering and maintaining the K2 Storage System” on page 687.

Level 20 system power-off procedure

Use the following sequence to power-off the Level 20 storage system.

1. Power-off all K2 Media clients or other iSCSI clients.

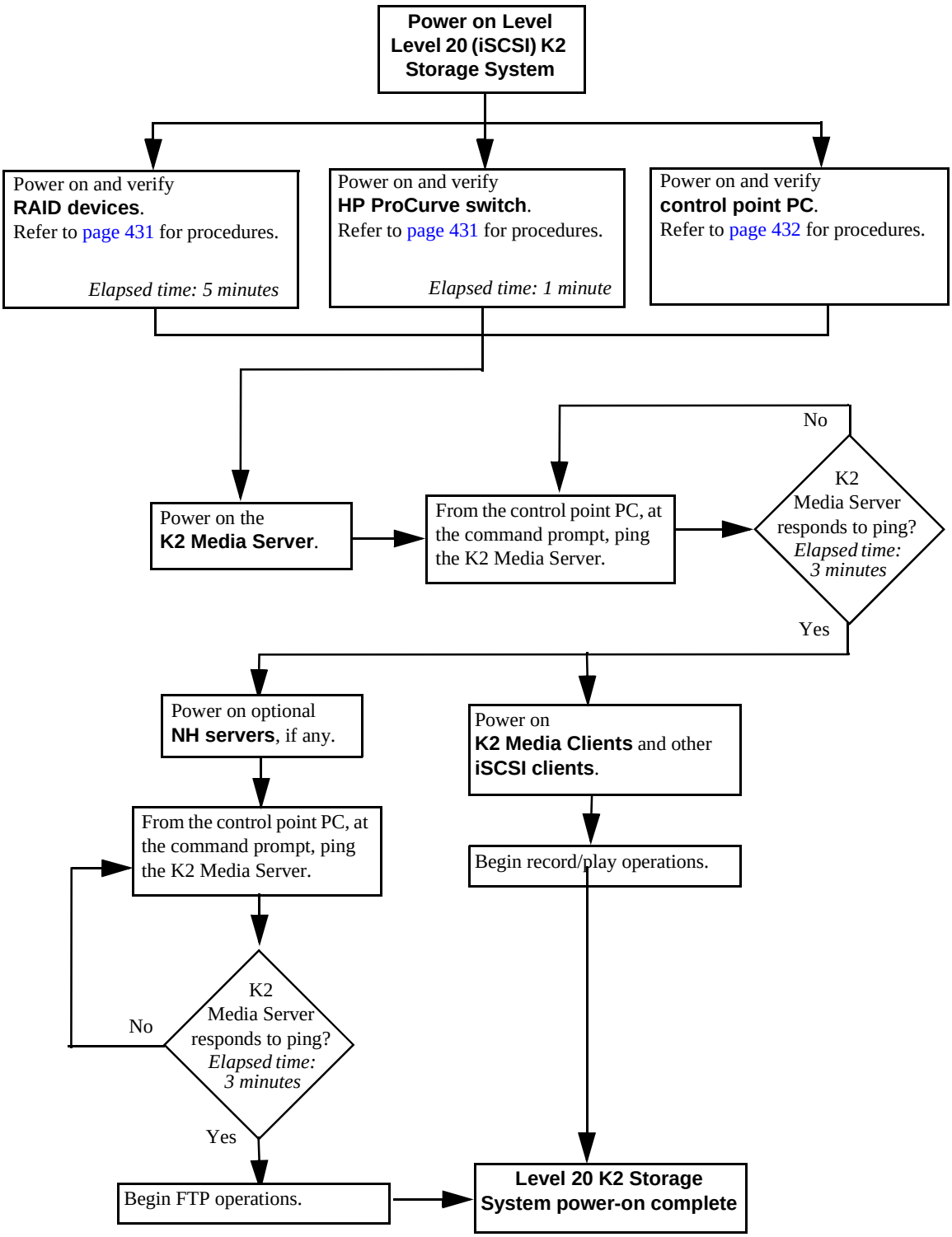
2. Shut down the K2 Media Server.
3. Shut down optional NH K2 Media Servers, if any.
4. On the primary RAID chassis controller, identify the RDY LED. It blinks at a rate of 1 blink per second during normal operation.



5. Press and hold down the power button on the RAID controller.
6. Release the power button in about 5 seconds, when the RDY LED blinks more quickly, at a rate of about 2 blinks per second. Do not hold down the power button for longer than 15 seconds.

   The power button on the RAID controller turns off power for the primary RAID chassis and any connected Expansion chassis. Power-off normally occurs within 20 seconds and is indicated when LEDs other than those on the power supplies go off and the fans stop rotating.
7. Wait for RAID power-off to complete before proceeding.
8. Power-off all Ethernet switches.
9. Power-off the control point PC and/or the NetCentral server PC, if necessary.

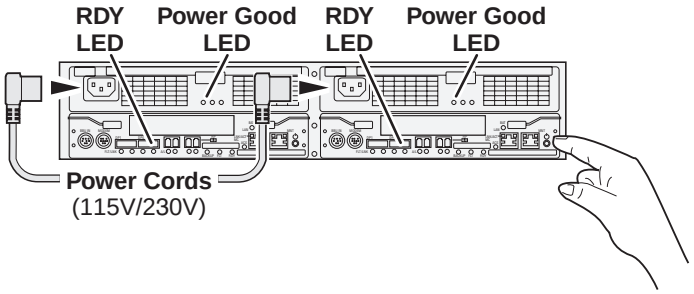
Level 20 system power-on procedure



Powering on Level 10, 20, 30, and Nearline 10 RAID storage devices

Use the following procedure to power on and verify proper operation of RAID storage devices.

1. Verify power and cabling.
2. Press and hold down the power button on the controller, as shown.



   If the RAID chassis has two controllers, you can press the power button on either controller. You do not need to press both power buttons.

   Pressing the power button on a controller also powers on any connected Expansion chassis. There are no power buttons on Expansion chassis.

3. Release the power button when the Power Good LED on the power supply is illuminated. This takes 1-3 seconds.
4. Wait while the primary RAID chassis performs self-test and initialization. This takes about four minutes. While this is taking place, the RDY LED is illuminated with a steady on light.
5. Watch for the RDY LED to begin blinking at one second intervals. The LED might turn off and back on two times before starting the one second blink pattern. When the RDY LED is blinking at one second intervals, the self-test and initialization is complete and the chassis is ready for use.

Powering on the HP ProCurve switch

Use the following procedure to power on and verify proper operation of the HP ProCurve switch.

1. Power up the switch.
2. Watch LEDs to verify proper operation. The diagnostic self test LED Behavior is as follows:
   - Initially, all the status, LED Mode and port LEDs are on for most of the duration of the test.
   - Most of the LEDs go off and then may come on again during phases of the self test. For the duration of the self test, the Test LED stays on.

   If the ports are connected to active network devices, the LEDs behave according to the LED Mode selected. In the default view mode (Link), the LEDs should be on.

- If the ports are connected to active network devices, the LEDs behave according to the LED Mode selected. In the default view mode (Link), the LEDs should be on.
- If the ports are not connected to active network devices, the LEDs will stay off.

Powering on the control point PC

Use the following procedure to power on K2 Storage System's control point PC and verify proper operation during power up of the system.

1. Power up and log on to the PC using standard Windows procedures.
2. Start and log on to NetCentral.
3. NetCentral reports devices as offline. As each device of the K2 Storage System is powered on, check NetCentral to verify the device's status

Chapter 10

Installing the Level 20R Storage System

The K2 Level 20 Redundant (L20R) storage system was initially released with K2 system software version 3.2 in September 2007.

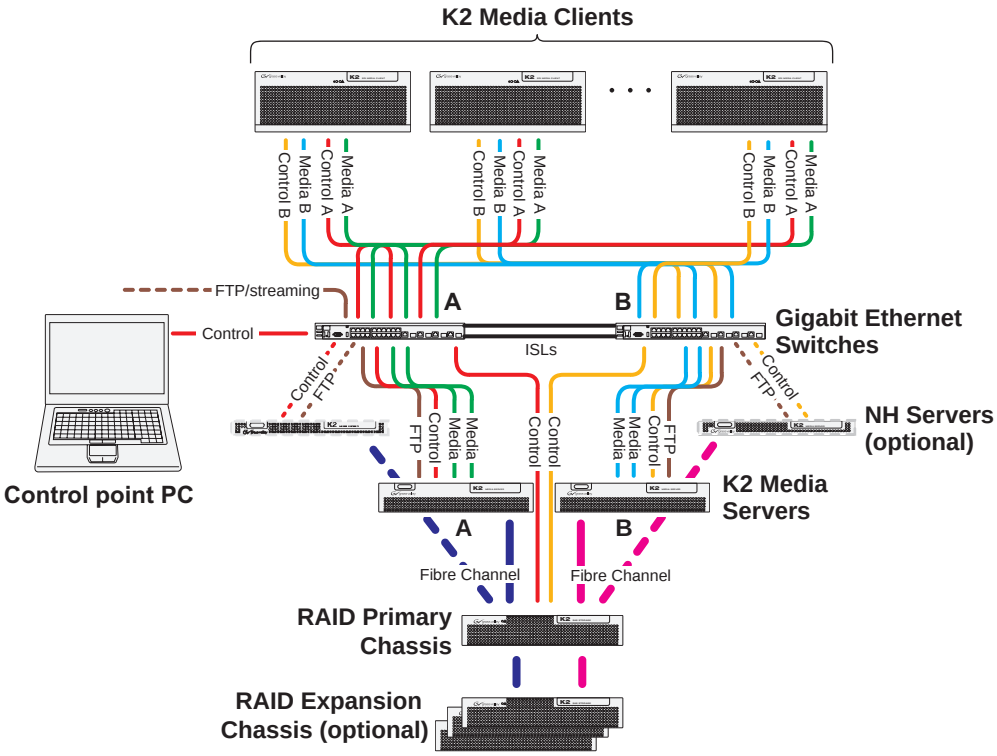
Use this chapter to install the K2 Level 20R storage system.

This chapter includes the following topics:

- "Level 20R system description" on page 434
- "Preparing Level 20R devices" on page 435
- "Networking for Level 20R" on page 454
- "Configuring the Level 20R storage system" on page 459
- "Adding K2 Storage System clients" on page 482
- "Basic operations for Level 20R storage" on page 483

Work through these topics sequentially to install the storage system.

Level 20R system description



The Level 20 redundant (L20R) storage system has two Gigabit Ethernet switches connected by Inter-Switch Links (ISLs) to support a redundant Ethernet fabric. The storage system also has redundant GS K2 Media Servers. The servers are configured to have identical roles. This provides redundancy for database, file system, iSCSI bridge, and FTP roles. One L20R RAID supports redundant Fibre Channel connections. Up to seven Expansion chassis are optional for increased storage capacity.

K2 Media Clients have a pair of redundant (teamed) Gigabit Ethernet ports for control and two Gigabit Ethernet ports (A and B) for media (iSCSI). Each port of the control team is connected to a different switch. The A media port goes to the A GigE switch and the B media port goes to the B GigE switch. The GigE switches are configured with V-LANs to keep the control/FTP and media (iSCSI) traffic separate.

Each GS K2 Media Server has two GigE connections for media (iSCSI), one GigE connection for control, one GigE connection for FTP, and one Fibre Channel connection to the RAID storage. All GigE connections on a server go to the same GigE switch. The server hosts a dual-port iSCSI interface card for the GigE media connections and a Fibre Channel card for the RAID storage connection. The iSCSI interface card provides a bridge between GigE iSCSI and Fibre Channel SCSI. The server also hosts software components that allow it to function in its roles, including media file system manager, media database server, and FTP server. Redundant K2 Media Servers are connected by a serial cable which supports the heartbeat signal required for automatic system recovery (failover) features.

The L20R RAID chassis has redundant RAID controllers to support the Fibre Channel connections from the K2 Media Servers. The L20R RAID chassis is also connected to the GigE control network, which is required for SNMP (NetCentral) monitoring.

On the L20R RAID chassis there are two RAID 1 RANKs (also know as LUNs) for media file system metadata files and journal files. The remainder of the RAID storage is RAID 5 or RAID 6 for media.

Optional NH K2 Media Servers are available to provide additional FTP bandwidth. These servers are available with either a one Gigabit connection or a ten Gigabit connection. If you have multiple NH K2 Media Servers on a K2 Storage System, they must all be of the same connection speed. They must be all one Gigabit servers or all ten Gigabit servers.

The K2 configuration control point PC is connected to the GigE control network. The K2 System Configuration application runs on this PC for configuring the storage system.

FTP/streaming traffic accesses the K2 Storage System via the FTP GigE port on K2 Media Servers. FTP/streaming traffic does not go to K2 Media Clients.

Refer to Chapter 14, *Description of K2 Storage Devices* for more information. Also refer to "Design considerations for Ethernet switches" on page 759.

Preparing Level 20R devices

Use the topics in this section to prepare each device so that it is ready to become part of the Level 20R storage system.

- "Setting up the Control Point PC" on page 435
- "Setting up the Level 20R redundant GigE switches" on page 436
- "Setting up the GS K2 Media Servers for Level 20R" on page 447
- "Setting up the NH1 K2 Media Server" on page 448
- "Setting up the NH1-10GE K2 Media Server" on page 449
- "Setting up the L20R RAID chassis" on page 450
- "Preparing K2 Storage System clients" on page 451

Setting up the Control Point PC

To set up the K2 configuration Control Point PC, you have the following options:

- Use the Grass Valley Control Point PC that comes from the factory with software pre-installed. This includes the K2 System Configuration application, remote AppCenter, and NetCentral software. Refer to the *K2 Media Client System Guide* for rack mount instructions.
- Use a PC that you own and install the required software.

For either option, you must do the following for the Control Point PC that runs the K2 System Configuration application:

- Assign a control network IP address to the PC. Refer to "Networking tips" on page 106.

- Connect the PC to the GigE control network.

To use your own PC, you must additionally do the following:

- Verify that the PC meets system requirements, then install the Control Point software and other supporting software, as specified in the *K2 Media Client System Guide*.
- Install and license NetCentral server software. You can install this on the NetCentral server PC, which can be the K2 configuration Control Point PC. Refer to the *NetCentral User Guide*.

Also refer to "Control point PC description" on page 650.

To fix the screen resolution problem seen with NetCentral on the Grass Valley Control Point PC, do the following:

1. Go to Display properties (right mouse selection of properties on the display area)
2. Select Settings tab
3. Select the Advanced button
4. In the General tab, set the DPI setting to Normal size (96 DPI)
5. Restart the PC

Setting up the Level 20R redundant GigE switches

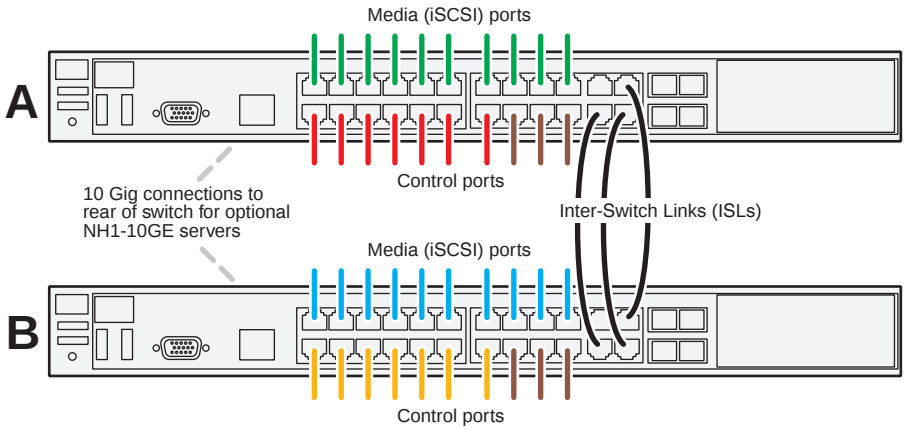
These procedures are for the HP ProCurve switch 2900 series. You must use this switch for iSCSI traffic on Level 20R.

For control and FTP/streaming traffic, it is allowed to use a different brand of switch, such as a Cisco Catalyst switch, if required by your site. If you are using a non-HP switch, apply the information in the following procedures accordingly. Refer to the documentation you received with the switch as necessary.

Also refer to "Design considerations for Ethernet switches" on page 759.

- You need at least two switches, so that the "A" media (iSCSI) network and the "B" media (iSCSI) network each have their own switch.
- Use CAT5e or CAT6 cables. The maximum cable length is 50 meters for CAT5e and 100 meters for CAT6.
- Assign an IP address and logon to each switch. Refer to "Configuring the GigE switch via serial connection" on page 438.
- Set up VLANs on each switch. Refer to "Configuring the GigE switch via the Web interface" on page 441.
- Install the switches in their permanent location.
- Provide power to the switches.
- Connect cables as follows:

2900 series switch



To the media ports on switch A, make the “A” media (iSCSI) network connection from each K2 Media Client. Also make two media (iSCSI) connections from K2 Media Server A.

To the media ports on switch B, make the “B” media (iSCSI) network connection from each K2 Media Client. Also make two media (iSCSI) connections from K2 Media Server B.

To the control ports on switch A, make one connection from each K2 Media Client, from RAID controller 0, and from the control point PC. Also make the control network connection and the FTP network connection from K2 Media Server A.

To the control ports on switch B, make the second control connection from each K2 Media Client, and from RAID controller 1. Also make the control network connection and the FTP network connection from K2 Media Server B.

If you have other iSCSI clients, such as Aurora Edits, that have just one iSCSI connection and one control connection, approximately half of the clients should be connected to switch A and half of the clients should be connected to switch B. In a failover event, only the clients connected to one of the switches will remain operational, so make connections accordingly. Connect the client’s iSCSI connection to one of the media ports on a switch and the client’s control connection to one of the control ports on the same switch.

Interconnect switch A and switch B with three 1 Gig ISLs.

If you have optional NH1 K2 Media Servers, for each server connect its FTP network connection and its control network connection to the control ports on the same switch. Balance servers between switch A and switch B.

If you have optional NH1-10GE K2 Media Servers, for each server connect its 10 Gig FTP network connection to a 10 Gig port on the rear of the switch and connect its control network connection to a control port on the same switch. Balance servers between switch A and switch B. Switches have two 10 Gig connectors standard and two 10 Gig connectors optional, so to connect three or four severs to a switch, you must first install the optional 10 Gig connectors in the switch.

Refer to “Level 20R system description” on page 434 for a diagram of the complete system.

Refer to cabling procedures later in this chapter for the GigE connections at each of the devices of the K2 Storage System.

Also refer to "K2 Ethernet switch description" on page 651 and "Design considerations for Ethernet switches" on page 759.

Configuring the GigE switch via serial connection

NOTE: Make sure you check the switch firmware and upgrade if necessary, as instructed at the end of this procedure.

The following procedure is for the HP ProCurve switch 2900 series. Do not use this procedure on other switch models.

For Level 20R with two switches, do the following on each switch.

Use a direct console connection to the switch, start a console session, and access the Switch Setup screen to set the IP address.

1. Configure the PC terminal emulator on the control point PC or another PC as a DEC VT-100 (ANSI) terminal or use a VT-100 terminal, and configure either one to operate with these settings:
   - Baud rate 115200
   - 8 data bits, 1 stop bit, no parity, and flow control set to Xon/Xoff
   - Also disable (uncheck) the "Use Function, Arrow, and Ctrl Keys for Windows" option
2. Connect the PC to the switch's Console Port using the console cable included with the switch. (If your PC or terminal has a 25-pin serial connector, first attach a 9-pin to 25-pin straight-through adapter at one end of the console cable.)
3. Turn on the PC's power and start the PC terminal program.
4. Press **Enter** two or three times and you will see the copyright page and the message "Press any key to continue". Press a key, and you will then see the switch console command (CLI) prompt.

NOTE: If you press Enter too many times and get past the log in, enter the command EN to get into the command line.

5. Type the following, then press **Enter**:

   `menu`

   If prompted to save the current configuration, answer no (press the n key) to proceed. The main menu opens.
6. On the main menu, choose **Switch Configuration,** then press **Enter**.
7. Select **IP Configuration**, then press **Enter**.
8. Press the right-arrow key to choose **Edit**, then press **Enter**. Tab to fields and enter information as follows:
   a. Change **Gateway** to be the default router.
   b. Tab to the **IP Config (DHCP/Bootp)** field and use the Space bar to select the **Manual** option.
   c. Tab to the **IP Address** field and enter the switch's control network IP address.

Refer to "Networking tips" on page 106.

d. Tab to the **Subnet Mask** field and enter the subnet mask used for your network.

9. Press **Enter**, then right-arrow to **Save**. Press **Enter** and revert to previous menu.

10. Select **Return to Main Menu** and press **Enter**.

11. From the main menu, chose **Console Passwords** and press **Enter**. The Set Password Menu opens.

12. Chose **Set Manager Password** and press **Enter**.

13. When prompted for the password, type a password of up to 16 ASCII characters with no spaces and press **Enter**. The password can be one that is used on other K2 devices, such as "adminK2" or "K2admin", or it can be your site's administrator password.

14. When prompted to enter the password again, retype the password and press **Enter**.

15. Select **Return to Main Menu** and press **Enter**.

16. From the main menu, tab to **Command Line (CLI)** and press **Enter**. The command prompt appears.

17. Type the following, then press **Enter**:

```
configure
```

You are now in configuration mode.

18. Configure an administrator username. The username can be one that is used on other K2 devices, such as "administrator" or "K2admin", or it can be your site's administrator username. For example, to set the username to "administrator" type the following, then press **Enter**:

```
password manager user-name administrator
```

19. When prompted, enter and re-enter the password.

20. Set spanning tree to RSTP. Type the following, then press **Enter**:

```
spanning-tree force-version rstp-operation
```

This configures spanning tree, but it does not turn spanning tree on. You must turn spanning tree on using the switch's Web interface, as explained in the next procedure "Configuring the GigE switch via the Web interface".

21. Decide your SNMP community name as explained in the following options, then proceed with the next step:

- If you decide to use a unique SNMP community name (not "public"), add the community and set its RW permissions. For example, if the community name is "K2", type the following, then press **Enter**:

```
snmp-server community K2 unrestricted
```

- If you decide to use the default SNMP community "public" for NetCentral monitoring, which already has RW permissions set as required by NetCentral, proceed to the next step.

22. Enter the SNMP community and IP address of the NetCentral server PC. For example, if the IP address is "192.168.40.11" and the community is "public", you

type the following, then press **Enter**:

```
snmp-server host public 192.168.40.11
```

23. Enable Authentication traps. Type the following, then press **Enter**:

```
snmp-server enable traps authentication
```

This allows NetCentral to test the switch to verify that it can send its SNMP trap messages to NetCentral.

24. Type the following, then press **Enter**:

```
menu
```

When prompted, save the configuration by pressing the y key. The main menu opens.

25. If you need a trunk for ISLs to gang switches together, use the following steps. These steps illustrate trunking the last three 1 Gig ports for three 1 Gig ISLs, which is the recommended configuration for ISLs on all multi-switch K2 Storage Systems. Refer to "Design considerations for Ethernet switches" on page 759 and consult with your Grass Valley representative if your requirements deviate from the recommended policy:

    a. At the main menu, select **Switch Configuration** and press **Enter**.

    b. Choose selection **Port/Trunk Settings** and press **Enter**.

    c. Press the right-arrow key to choose **Edit**, then press **Enter**.

    d. Down arrow until at the bottom of the list of ports and select the last (highest port number) 1 Gig port in the list.

    e. Right-arrow over to the Group column.

    f. Use the Space bar and set the bottom 1 Gig port to **Trk1**.

    g. Set the next port up also to **Trk1**.

    h. Set the next port up also to **Trk1**.

    i. Press **Enter**, then right-arrow to **Save**. Press **Enter** and revert to previous menu.

26. Select **Return to Main Menu** and press **Enter**.

27. From the main menu, tab to **Command Line (CLI)** and press **Enter**. The command prompt appears.

28. Check the version of firmware currently installed on the switch. Type the following, then press **Enter**:

```
show flash
```

Information is displayed similar to the following example:

```
HP_iSCSI_switch1# show flash
Image            Size(Bytes)    Date    Version
-----            -----------  --------  -------
Primary Image    : 3287779    03/15/05 M.08.66
Secondary Image  : 3287779    03/15/05 M.08.66
```

```
Boot Rom Version: I.08.07
Current Boot    : Primary
```

29. Check the Primary Image Version and refer to your *K2 Storage System Release Notes* for information about currently supported versions. Then proceed as follows:
    - If *K2 Storage System Release Notes* instruct you to change the firmware on the switch, do so before continuing. Refer to the documentation you received with the switch for instructions to change the firmware. Then continue with the next procedure "Configuring the GigE switch via the Web interface".
    - If *K2 Storage System Release Notes* confirm that the version on the switch is a currently supported version, continue with the next procedure.
30. Type the following, then press **Enter**:

    ```
    menu
    ```

    The main menu opens.
31. From the main menu, choose **Reboot Switch** and press **Enter**. When prompted "Continue Reboot…?', answer yes (press the y key) to proceed. The switch restarts.
32. You can now use the switch's web browser interface for further configuration, as instructed in the next procedure.
33. Close the PC terminal program and disconnect the console cable.
34. Repeat this procedure on the other switch.

Continue with the next procedure "Configuring the GigE switch via the Web interface".

Configuring the GigE switch via the Web interface

The following procedure is for the HP ProCurve switch 2900 series. Do not use this procedure on other switch models.

For Level 20R with two switches, do the following on each switch.

1. From the control point PC or another PC, make sure that you have a direct Ethernet cable connection to the switch, with no switches, routers, proxies, or other networking devices in between.
2. On the PC, open Internet Explorer and type the switch's IP address in the Address field, as in the following example.

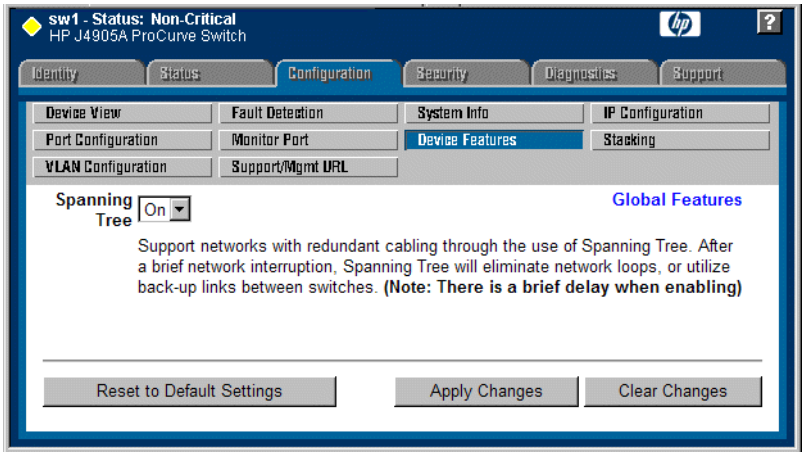
   ```
   http://192.168.100.61
   ```

   This should be the name or IP address as currently configured on the switch.
3. Press **Enter** to open the switch's configuration application.

NOTE: The configuration application for the HP ProCurve switch requires Java.

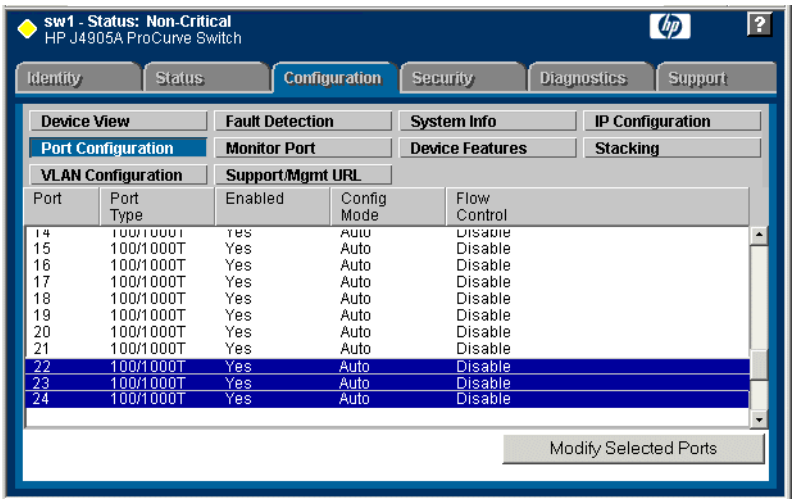
You can also access the switch's configuration application from the K2 System Configuration application.

4. In the switch's configuration application, choose **Configuration**, then **Device Features**.



5. Set Spanning Tree to **On** and click **Apply Changes**. If prompted, log in with the switch's administrator username and password.

6. Click **Port Configuration**.

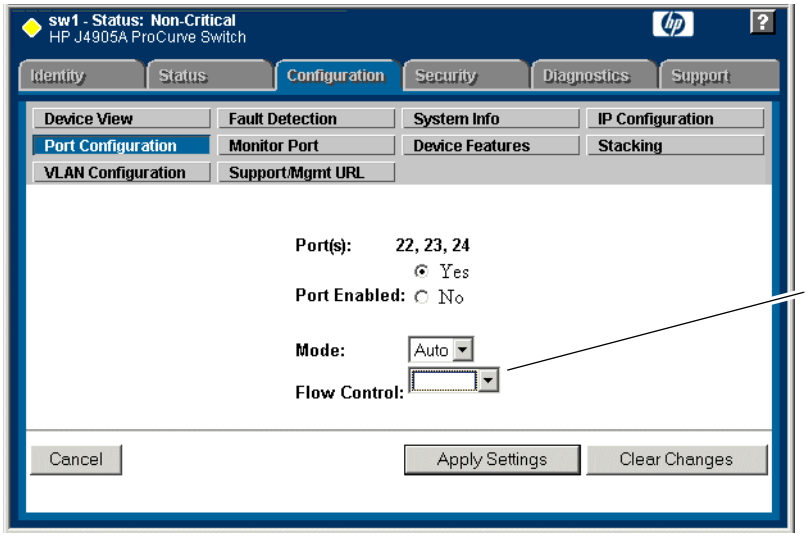


7. If you do not need trunks, such as on a one-switch system, skip to the next step in this procedure. If you need trunks, such as on a two-switch system with ISLs, do the following:

   a. Select (Ctrl + Click) the trunked ports. Typically the trunked ports are at the bottom of the list and are labeled Trk1.

   b. Click **Modify Selected Ports**.

      If prompted, log in as administrator.



c. For the trunked ports, set Port Enabled to **Yes**. On some switch models, some ports are disabled by default, so make sure you enable them. Leave Mode as default of **Auto**.

d. Set Flow Control as follows:

   - Set to **Enable**.

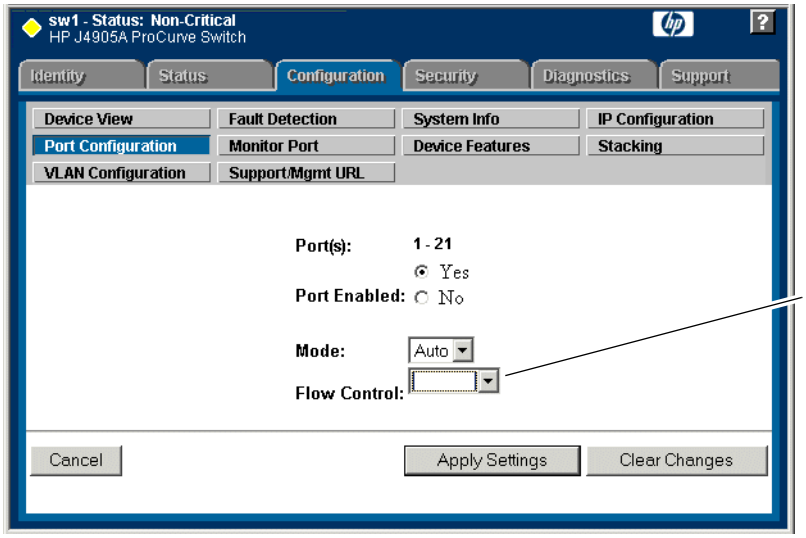
NOTE: This setting is for the 2900 series switch. Other switch models might require a different setting.

e. Click **Apply Settings**.

8. On the Port Configuration page, do one of the following:

   - If you do not have trunks, select all ports.
   - If you have trunks, select the remaining ports (the ports not trunked).

9. Click **Modify Selected Ports**.



10. Make sure Port Enabled is set to **Yes**, leave Mode as default of **Auto**.

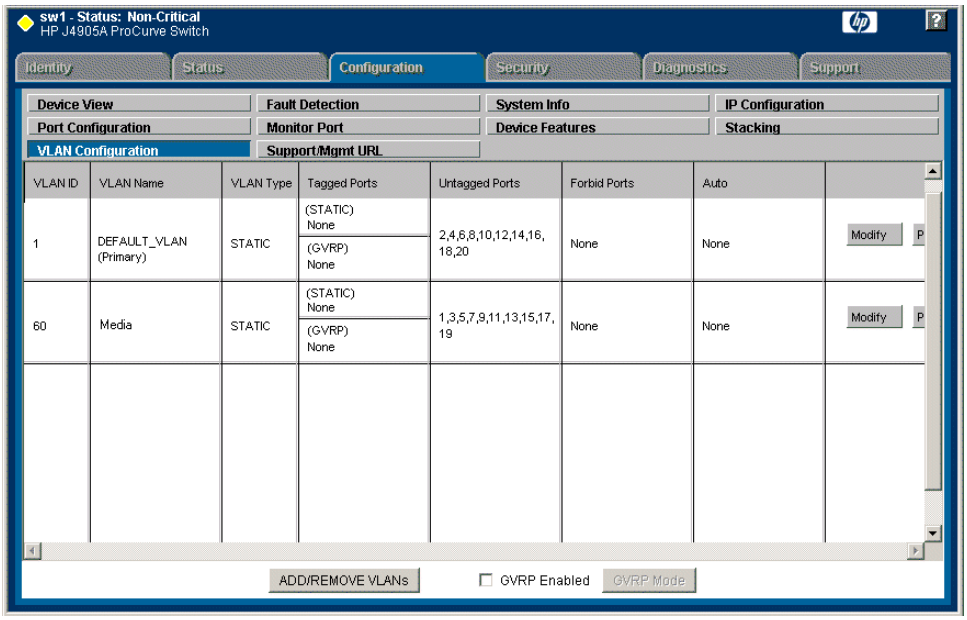
11. Set Flow Control as follows:

- Set to **Enable**.

NOTE: This setting is for the 2900 series switch. Other switch models might require a different setting.

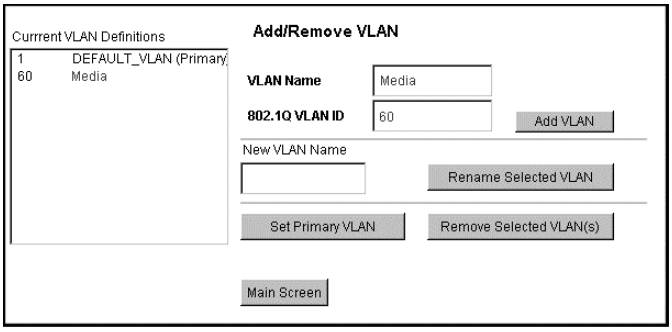
12. Click **Apply Settings**. Wait until settings are applied and the Web interface becomes active.

13. Choose **VLAN Configuration**. If prompted, log in with the switch's administrator username and password.



14. Create a new Media (iSCSI) VLAN as follows:

    a. Click **Add/Remove VLANs**.



    b. In the VLAN Name field enter `Media`.

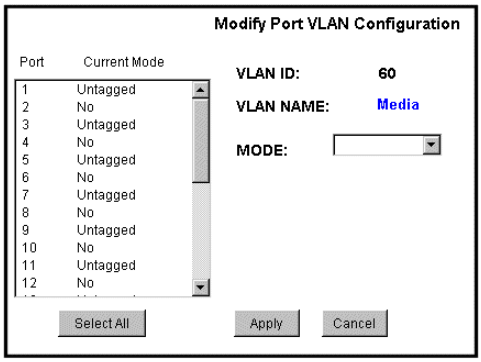
    c. In the VLAN ID field enter `60`.

    d. Click **Add VLAN**.

    e. Click **Main Screen** to return to VLAN Configuration.

15. Configure the Media VLAN as follows:

    a. In the Media VLAN row, click **Modify**.



b. Select all the odd numbered ports. (Tip: Use Ctrl + Click.)

c. In the Mode drop-down list, select **Untagged**, then click **Apply**. This removes the odd ports from the default (Control) VLAN.

   If you have a trunk, do not configure it as "Tagged". Media VLAN traffic (iSCSI) does not go over the trunk.

16. Click the **VLAN Configuration** tab.

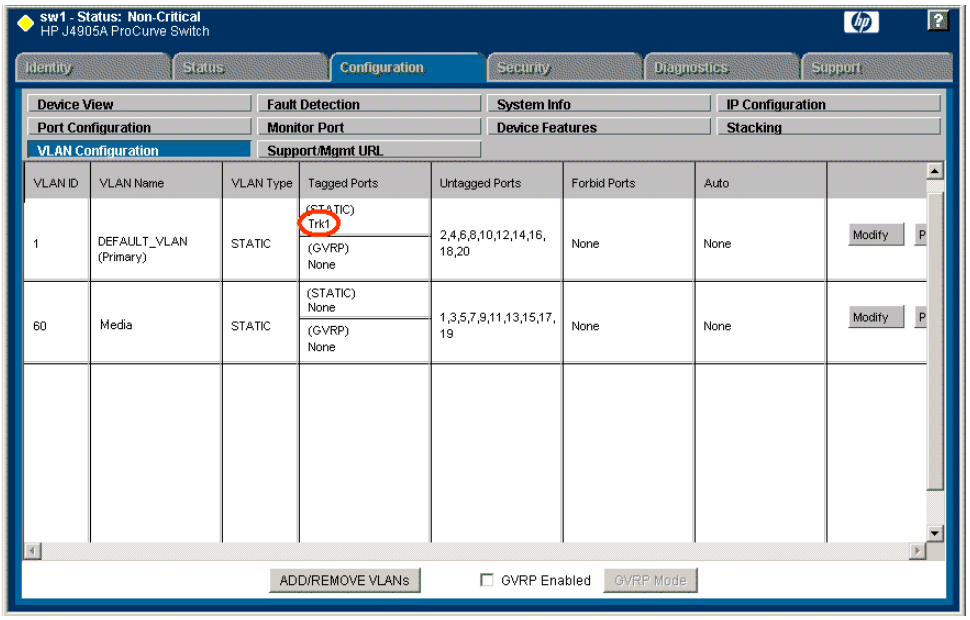
17. If you have a trunk, configure the default (Control) VLAN as follows:

    a. In the DEFAULT_VLAN row, click **Modify**.

    b. In the Current Mode list box, scroll down and select the trunk.

    c. In the Mode drop-down list, select **Tagged**, then click **Apply**. This allows default VLAN traffic (non-iSCSI) to go over the trunk.

18. Click the **VLAN Configuration** tab.



19. If you have a trunk, verify that for the default VLAN the trunk is displayed in the Tagged Ports column.
20. If you have two switches, repeat this procedure for the other switch.
21. Close the switch configuration application.

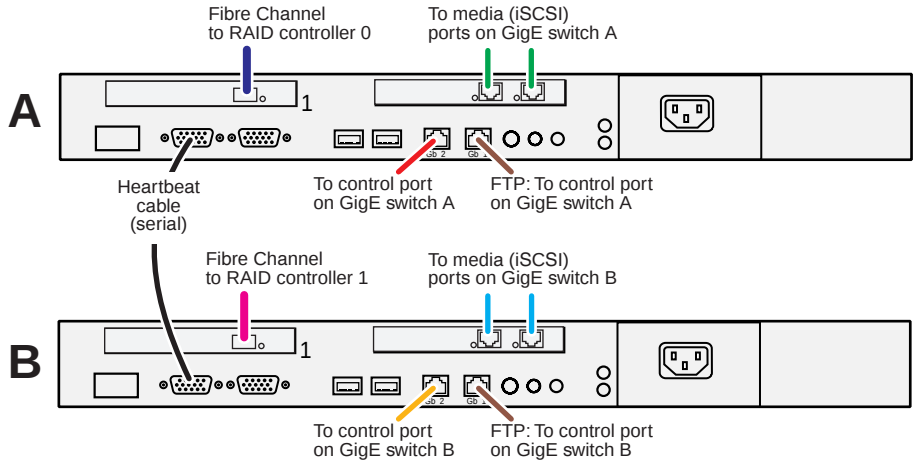
Setting up the GS K2 Media Servers for Level 20R

The Dell PowerEdge 1950 is qualified as the platform for the GS K2 Media Server.

Do the following to prepare GS K2 Media Servers for Level 20R:

- Install the server in its permanent location. Refer to the rack mount instructions that you received with the server's product bundle.
- Provide power to the servers.
- Connect cables as follows:

Dell 1950 PowerEdge server



Connect the two iSCSI interface ports to media ports on the GigE switch. Connect the A server to the A GigE switch. Connect the B server to the B GigE switch.

Connect the motherboard GigE port 1 and GigE port 2 to control ports on the GigE switch. Connect the A server to the A GigE switch. Connect the B server to the B GigE switch.

Connect the Fibre Channel port to the RAID storage device. Connect the A server to controller 0 and the B server to controller 1.

Make a direct connection between the serial ports of the two servers.

Take care to use the proper serial cable to interconnect redundant K2 Media Servers. This cable supports the heartbeat mechanism whereby the servers monitor each other's health. It is a 9 pin serial cable, but it is not a standard RS-232 null modem cable. The heartbeat cable is supplied with your system (Grass Valley part number 174-8137-00). Refer to the *K2 Media Client System Guide* for pinout details.

- Assign a control network IP address to GigE port 1. Use standard Windows

procedures. Refer to “Networking tips” on page 106.

- Change the hostname. Use standard Windows procedures.
- Configure SNMP properties so the trap destination points to the NetCentral server PC. Use standard Windows procedures. If you are not using the SNMP community name “public”, configure the community name and set permissions to RW. Also make sure that the Authentication trap is enabled.

Also refer to “K2 Media Server descriptions” on page 653.

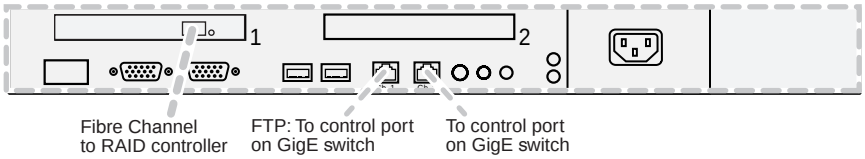
Setting up the NH1 K2 Media Server

If your system has one or more NH1 K2 Media Servers, prepare the servers using this section.

The Dell PowerEdge 1950 is qualified as the platform for the NH1 K2 Media Server.

Do the following to prepare a NH1 K2 Media Server:

- Install the server in its permanent location. Refer to the rack mount instructions that you received with the server’s product bundle.
- Provide power to the server.
- Connect cables as follows:



  Connect the motherboard GigE port 1 (control) and GigE port 2 (FTP) to control ports on the GigE switch. If you have more than one NH1 server, balance servers between the A GigE switch and the B GigE switch.

  Connect the Fibre Channel port to the RAID storage device. If you have more than one NH1 server, balance servers between controller 0 and controller 1.

- Assign a control network IP address to GigE port 1. Use standard Windows procedures. Refer to “Networking tips” on page 106.
- Change the hostname. Use standard Windows procedures.
- Configure SNMP properties so the trap destination points to the NetCentral server PC. Use standard Windows procedures. If you are not using the SNMP community name “public”, configure the community name and set permissions to RW. Also make sure that the Authentication trap is enabled.

Also refer to “K2 Media Server descriptions” on page 653.

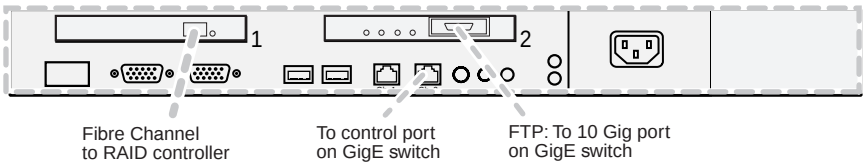
Setting up the NH1-10GE K2 Media Server

If your system has one or more NH1-10GE K2 Media Servers, prepare the servers using this section.

The Dell PowerEdge 1950 is qualified as the platform for the NH1-10GE K2 Media Server.

Do the following to prepare a NH1-10GE K2 Media Server:

- Install the server in its permanent location. Refer to the rack mount instructions that you received with the server's product bundle.
- Provide power to the server.
- Connect cables as follows:



  Connect the motherboard GigE port 1 (control) to a control port on the GigE switch. If you have more than one NH1-10GE server, balance servers between the A GigE switch and the B GigE switch.

  Connect the 10 Gig FTP port to the 10 Gig port on the rear of the GigE switch. If you have more than one NH1-10GE server, balance servers between the A GigE switch and the B GigE switch.

  Connect the Fibre Channel port to the RAID storage device. If you have more than one NH1-10GE server, balance servers between controller 0 and controller 1.

- Assign a control network IP address to GigE port 1. Use standard Windows procedures. Refer to "Networking tips" on page 106.
- Change the hostname. Use standard Windows procedures.
- Configure SNMP properties so the trap destination points to the NetCentral server PC. Use standard Windows procedures. If you are not using the SNMP community name "public", configure the community name and set permissions to RW. Also make sure that the Authentication trap is enabled.

Also refer to "K2 Media Server descriptions" on page 653.

Setting up the L20R RAID chassis

Do the following to prepare the L20R RAID storage devices:

- Install the chassis in its permanent location. After mounting the chassis in the rack, you must secure brackets to the front rail to support the Grass Valley bezel. Refer to the *K2 Lx0 RAID Instruction Manual* for rack mount instructions.
- "Connect the L20R RAID Primary and Expansion chassis" on page 450
- "Power on the L20R RAID chassis" on page 451

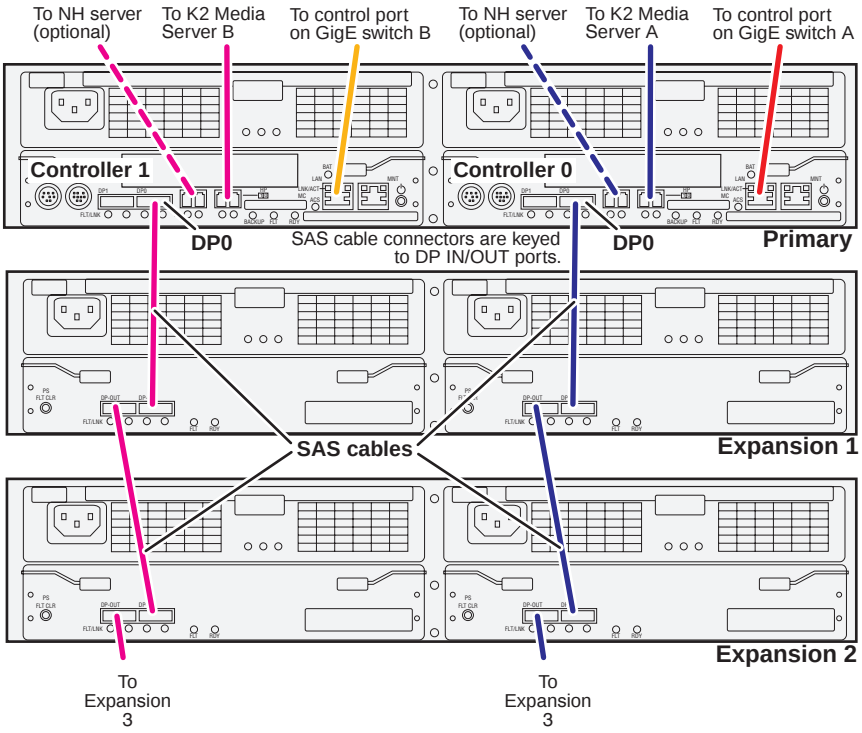
In addition, you will configure network settings, SNMP settings, and bind RAID disks. These tasks are part of the K2 System Configuration application and Storage Utility procedures later in this chapter.

On the L20R RAID, you do not need to manually set a Fibre Channel address ID on controllers or a chassis address on Expansion chassis.

Also refer to "K2 RAID storage description" on page 659.

Connect the L20R RAID Primary and Expansion chassis

Connect Ethernet, Fibre Channel, and SAS cabling as shown.



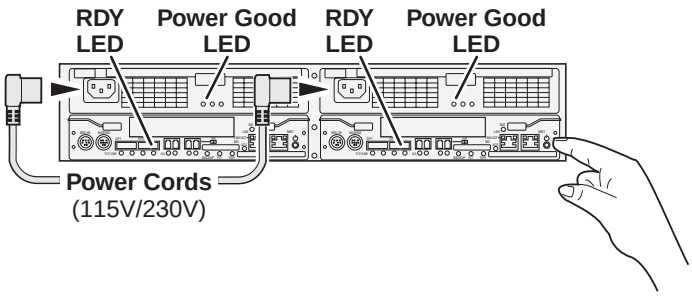
If you have more Expansion chassis than those illustrated, continue the indicated cabling pattern, connecting additional chassis to DP0.

Once the RAID storage is connected and configured, do not swap Expansion chassis or otherwise reconfigure storage. If you connect an Expansion chassis in a different order or to the wrong controller, the controller will see a configuration mismatch and fault.

Power on the L20R RAID chassis

Connect power cords and power up RAID storage devices as follows:

1. Verify power and cabling.
2. Press and hold down the power button on the controller, as shown.



   If the RAID chassis has two controllers, you can press the power button on either controller. You do not need to press both power buttons.

   Pressing the power button on a controller also powers on any connected Expansion chassis. There are no power buttons on Expansion chassis.

3. Release the power button when the Power Good LED on the power supply is illuminated. This takes 1-3 seconds.
4. Wait while the primary RAID chassis performs self-test and initialization. This takes about four minutes. While this is taking place, the RDY LED is illuminated with a steady on light.
5. Watch for the RDY LED to begin blinking at one second intervals. The LED might turn off and back on two times before starting the one second blink pattern. When the RDY LED is blinking at one second intervals, the self-test and initialization is complete and the chassis is ready for use.

Your preparations for L20R RAID storage are now complete.

Preparing K2 Storage System clients

Any devices that function as iSCSI clients to the K2 Storage System must be prepared with the following requirements:

- One or more connections to the control network.
- A static IP address for the control network.
- For a redundant K2 Storage System, K2 Media Clients have one connection to the A media (iSCSI) network and one connection to the B media (iSCSI) network. Other iSCSI clients with just one media port connect to either the A or the B network.

Additional steps that are required for Aurora Edits include the following:

- Implement Aurora Edit security features.
- Install SNFS software and K2 software.

For more information, refer to the *Aurora Edit Installation and Configuration Guide*.

Additional steps that are required for K2 Media Clients include the following:

- You must install Multi-path I/O software if the K2 Media Client connects to the K2 Storage System with a redundant Ethernet (iSCSI) fabric. For example, the following K2 Storage Systems have a redundant Ethernet fabric:
  - Level 2R
  - Level 3R
  - Level 10R
  - Level 20R
  - Level 30R

For more information refer to the *K2 Media Client System Guide*.

K2 configuration and NetCentral

Before you begin using the K2 System Configuration application to configure the storage system, you should set up the NetCentral system according to the following requirements:

- **NetCentral installed** — NetCentral server software must be installed on a NetCentral server PC. This can be the K2 configuration Control Point PC or another PC that has network communication with the K2 Storage System control network.
- **Device providers installed** — A device provider must be installed on the NetCentral server PC for each type of device in the K2 Storage System. For a Level 20R storage system, the following device providers must be installed:
  - Control point PC device provider — This is the Windows monitoring device provider.
  - K2 Media Server device provider
  - HP Gigabit Switch device provider or Cisco Gigabit Switch device provider
  - K2 Media Client device provider, if any K2 Media Clients are accessing the Level 20R storage system.
  - Device provider for iSCSI clients, if any iSCSI clients such as Aurora Edits are accessing the Level 20R storage system.
  - K2 L20R RAID storage device provider. This device provider supports RAID devices for Levels 10, 20, and 30.
- **Grass Valley PC Monitoring software installed** — This software must be installed on the K2 configuration Control Point PC. It includes Grass Valley SNMP agents and other WMI based components to perform process monitoring. This provides the

information for some of the SNMP trap messages that must be sent to NetCentral.

- **Control Point PC monitored by NetCentral** — The K2 configuration Control Point PC should be added to the NetCentral system and fully monitored by NetCentral. This means that its SNMP trap destination is set to send SNMP traps to the NetCentral server PC. Whether the Control Point PC and the NetCentral server PC are the same PC or are different PCs, you should still add the Control Point PC to NetCentral.

Refer to the *NetCentral User Guide* to set up the NetCentral system. After installing a device provider, you can find additional documentation about monitoring that type of device on the NetCentral Help menu.

Networking for Level 20R

Use the topics in this section to configure the Gigabit Ethernet (GigE) network for the Level 20R storage system.

- "Networking requirements" on page 454
- "Networking tips" on page 455
- "Setting up host tables" on page 456
- "Testing the control network" on page 458

Networking requirements

Required networking strategies for a Level 20R (a redundant K2 Storage System) are as follows:

- Four networks:
  - Media network A — Exclusively for iSCSI traffic. For failover purposes, this network restricts traffic between an "A" media port on a K2 Media Client and the "A" K2 Media Server with the role of media file system/database server.
  - Media network B — Exclusively for iSCSI traffic. For failover purposes, this network restricts traffic between a "B" media port on a K2 Media Client and the "B" K2 Media Server with the role of media file system/database server.
  - Streaming/FTP network — For media transfers and FTP traffic.
  - Control network — For all other non-streaming, non-iSCSI traffic.
- Networks must be on separate subnets.
- The real-time iSCSI traffic of the media networks (A and B) is kept separate from traffic that is not real-time, such as that of the streaming/FTP network and the control network. This separation is provided by dedicated Gigabit ports, cables, and by a dedicated VLAN on the HP GigE switch or by separate switches.
- K2 Media Servers have a dedicated FTP port. Make a dedicated FTP connection to the FTP port.
- While control and FTP traffic is each on its own subnet, it is not required that each type of traffic has its own VLAN on GigE switches. For example, you make both FTP and control connections to the "control" ports (DEFAULT_VLAN) on the HP GigE switch.
- Static IP addresses are required for the media networks on K2 Storage System iSCSI devices. This includes K2 Media Servers, generic iSCSI clients (such as Aurora Edits), and K2 Media Clients.
- Machine names (host names) assigned to each K2 device.
- Host tables (hosts files) provide name resolution on each K2 Media Client, iSCSI client, and K2 Media Server.
- IP addresses for FTP/streaming ports must have name resolution such that hostnames are appended with the "_he0" suffix. You can use host tables (as in "Setting up host tables" on page 456) or another mechanism to provide the name

resolution. This directs the streaming traffic to the correct port. Refer to the *K2 Media Client System Guide* for a complete explanation.

- K2 Media Servers (including optional NH servers) must be on the streaming network, as they provide the FTP interface for shared storage streaming traffic. Shared storage K2 Media Clients do not need to be on the streaming network because they do not send or receive streaming traffic.
- On the shared storage K2 Media Client, the two control GigE ports are configured as a team. The control team shares a single IP address. Do not attempt to un-team the control ports. On the Level 20R K2 Storage System (a redundant K2 Storage System), both control ports are connected and the control team provides redundancy.
- On the shared storage K2 Media Client, the two media (iSCSI) GigE ports are not teamed. On the Level 20R K2 Storage System (a redundant K2 Storage System), both media ports are connected and each media port is assigned to a different media (iSCSI) network, which is required for redundancy.

Also refer to "About networks and FTP" on page 684 and "Design considerations for Ethernet switches" on page 759.

Use the following procedures as necessary to implement your networking strategies.

NOTE: It is recommended that you configure Media network (iSCSI) IP addresses and Streaming network IP addresses using the K2 System Configuration application, rather than doing so on the local machine using standard Windows procedures.

Networking tips

- Before beginning network configuration, determine the IP addresses and names needed for the machines in your K2 system. Work with the network administrator at your facility to have those IP addresses and names available for your use.
- Establish a consistent convention for machine names and IP addresses. It is recommended that you embed a root name or other unique identifier for this particular K2 Storage System in the computer name. Also, a common convention for IP addresses is to use a numerical pattern or sequence in the IP addresses to indicate device-types and/or ports, as in the following example:

NOTE: This example assumes a subnet mask of 255.255.255.0

Example of Level 20R names and IP addresses

Computer name	Device type	Streaming network addresses	Control network addresses	Media network addresses	Comments
root_server_1	K2 Media Server	192.168.101.11[a]	192.168.100.11	192.168.99.11	These two servers are a redundant pair.
				192.168.99.12	
root_server_2	K2 Media Server	192.168.101.21[b]	192.168.100.21	192.168.98.21	
				192.168.98.22	
root_server_3 (optional)	NH K2 Media Server	192.168.101.31[c]	192.168.100.31	—	This server has roles of FTP server and NAS server only.
root_raid_1	RAID	—	192.168.100.51	—	Each RAID controller is on the control network for monitoring.
root_raid_2	RAID	—	192.168.100.52	—	
root_gige_1	GigE switch	—	192.168.100.61	—	—
root_gige_2	GigE switch	—	192.168.100.62	—	—
root_cppc_1	Control point PC	—	192.168.100.81	—	—
root_client_1	iSCSI client	—	192.168.100.111	192.168.99.111	For the control network, one IP address is shared between the two teamed ports. For media networks, subnet 99 is the "A" network and subnet 98 is the "B" network.
				192.168.98.112	
root_client_2	iSCSI client	—	192.168.100.121	192.168.99.121	
				192.168.98.122	
root_client_3	iSCSI client	—	192.168.100.131	192.168.99.131	
				192.168.98.132	
root_client_4	iSCSI client	—	192.168.100.141	192.168.99.141	
				192.168.98.142	

[a] This IP address must resolve to hostname root_server_1_he0
[b] This IP address must resolve to hostname root_server_2_he0
[c] This IP address must resolve to hostname root_server_3_he0

Setting up host tables

The *hosts* file is used by the control network and the streaming/FTP network to determine the IP address of devices on the network when only a the device name (hostname) is given. The steps that follow describe how to edit the *hosts* file located at *C:\Windows\system32\drivers\etc\hosts* on Windows XP and Windows 2003 Server operating system computers. If you include the names and addresses of all the devices on the network, then you can copy the same file onto all the other K2 devices instead of editing the *hosts* file on each K2 device.

For FTP transfers on a K2 Storage System, transfers go to/from K2 Media Servers that have the role of FTP server. No transfers go directly to/from the shared storage K2 Media Clients that are on the K2 Storage System. So in the hosts file, you must add the "he_0" extension to a K2 Media Server hostname and associate that hostname with the K2 Media Server's FTP/streaming network IP address.

Refer to the *K2 Media Client System Guide* for more information.

To edit the *hosts* file manually:

1. Open the following file using Notepad or some other text editing application:

   C:\Windows\system32\drivers\etc\hosts

2. Enter all IP addresses with machine names. The text format is simple. First type the Ethernet IP address, then use the TAB key or Space bar to insert a few spaces. Then type the machine name.

   Here is an example:

   ```
   192.168.100.11      root_server_1
   192.168.101.11      root_server_1_he0
   192.168.100.21      root_server_2
   192.168.101.21      root_server_2_he0
   192.168.100.31      root_server_3
   192.168.101.31      root_server_3_he0
   192.168.100.51      root_raid_1
   192.168.100.61      root_gige_1
   ```

3. Save the file and exit the text editor.

4. Copy the new *hosts* file onto all the other machines. This is easier than editing the file on each machine.

Host table tips

- If transferring to or from a Profile XP or Open SAN system via UIM, the *hosts* file must also follow UIM naming conventions for those systems. Refer to the UIM Instruction Manual.
- Do not enter media (iSCSI) network IP addresses in the host table, as hostname resolution is not required for the media network.
- Use the following tip with care. While it can solve a problem, it also introduces a name resolution "anomaly" that might be confusing if not considered in future troubleshooting activities.

  For each SAN (shared storage) K2 Media Client, add the "_he0" suffix to the hostname but then associate that hostname with the K2 Media ***Server's*** FTP/streaming network IP address, ***not*** the K2 Media ***Client's*** IP address. Aliasing K2 Media Client hostnames in this way would not be required if the transfer source/destination was always correctly specified as the K2 Media Server. However, a common mistake is to attempt a transfer in which the source/destination is incorrectly specified as the K2 Media Client. The host file aliasing corrects this mistake and redirects to the K2 Media Server, which is the correct transfer source/

destination.

An example of a *hosts* file entry with this type of aliasing is as follows:

```
192.168.101.11     server_1_he0 client_1_he0 client_2_he0
```

Testing the control network

To test the control network use the *ping* command as follows:

1. On the control point PC, click **Start | Run**. The Run dialog box opens.
2. Type `cmd` and click **OK**. The command prompt window opens.
3. Type `ping`, then a space, then the name of one of your K2 Storage System devices, such as the Gigabit Ethernet switch, as in the following example:

   ```
   ping root_gige_1
   ```

4. Press **Enter**.

   The ping command should return the IP address of the device, as in the following example:

   ```
   Pinging root_gige_1.mycorp.com [192.168.100.61] with
   32 bytes of data:


   Reply from 192.168.100.61: bytes=32 time=10ms TTL=127
   Reply from 192.168.100.61: bytes=32 time<10ms TTL=127
   Reply from 192.168.100.61: bytes=32 time<10ms TTL=127
   Reply from 192.168.100.61: bytes=32 time<10ms TTL=127
   ```

   This verifies that the name of the device is being correctly resolved to the IP address, which indicates that on the Control Point PC the host table entry is correct.

5. Ping the other K2 Storage System devices to which you have assigned control network IP addresses.
6. Go to each Windows device in the K2 Storage System and repeat this procedure. This verifies that network communication is correct to and from all devices.

Configuring the Level 20R storage system

Use the topics in this section to do the initial configuration of the Level 20R storage system.

- "Prerequisites for initial configuration" on page 459
- "Defining a new K2 Storage System" on page 460
- "Configuring server A - Part 1" on page 462
- "Configuring RAID" on page 464
- "Creating a new file system" on page 470
- "Configuring server A - Part 2" on page 472
- "Configuring the redundant server" on page 475
- "Configuring optional NH servers" on page 479

Prerequisites for initial configuration

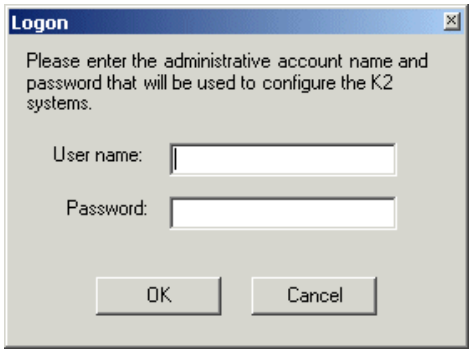
Before beginning your initial configuration, make sure the devices of the K2 Storage System meet the following prerequisites. Refer to sections earlier in this manual for detailed information. Also refer to Chapter 14, "Description of K2 Storage Devices".

Devices	Prerequisite for Level 20R configuration
Control point PC	Ethernet cable connected Control Point software installed Control network IP address assigned Network communication over the control network with all other K2 devices Power on
Ethernet switch	Ethernet cables connected Control network IP address assigned VLANs set up Trunks set up Power on
K2 Media Server	Ethernet cables connected Fibre Channel cable connected Redundant servers connected by serial cable Software installed, as from the factory, including QuickTime 7 Control network IP address assigned Power on for all servers

Defining a new K2 Storage System

Define a Level 20R K2 Storage System as follows:

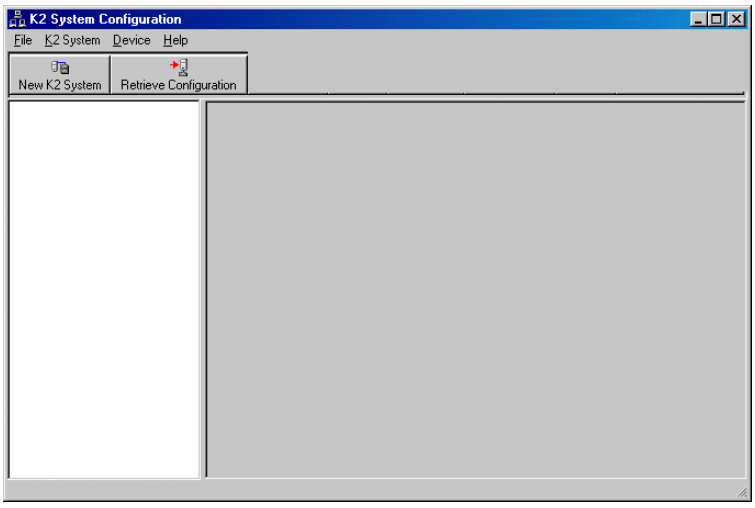
1. On the control point PC, open the K2 System Configuration application. A login dialog box opens.



2. Log in to the K2 System Configuration application with the Windows administrator account. By default this as follows:

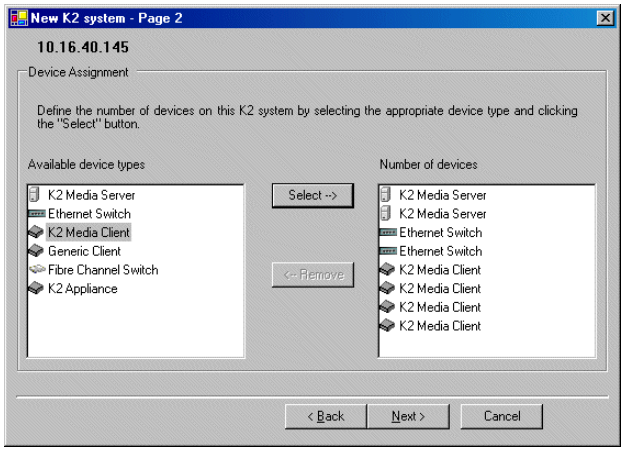
   - Username: administrator
   - Password: adminK2

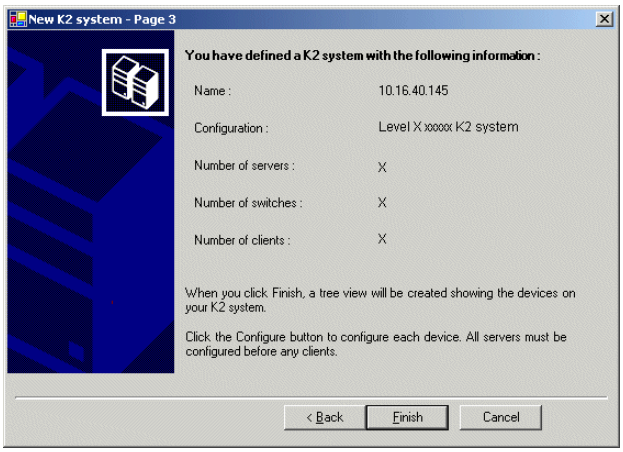
   Refer to "Setting up application security" on page 688 for more information about administrator accounts and logging in to applications.



3. Click **New K2 System**. The New K2 System wizard opens.

4. Follow the on-screen text to define your Level 20R K2 Storage System, as described in the following table.

On this page…	Do this…
Page 1	 Create a name for your Level 20R K2 Storage System and type it in the Name box. Select **Level 20**. Select the **Server redundancy** option. Click **Next**
Page 2	 Move the following into the Number of Devices Box: • Two K2 Media Servers • Two Ethernet switches • K2 Media Clients as appropriate for your system. • (Optional) One or more K2 Media Servers to represent each NH K2 Media Server on your system. • (Optional) Other devices as appropriate for your system. Click **Next**.

On this page...	Do this...
Page 3	 Review the information on this page and verify that you have correctly defined your K2 Storage System. For a Level 20R storage system you should have the following: • Two Gigabit Ethernet switches • Two K2 Media Servers • Optionally, one or more NH K2 Media Servers • The number and type of clients appropriate for your system. Click **Finish**. The Define New K2 Storage System wizard closes.

Your K2 Storage System appears in the tree view of the K2 System Configuration application.

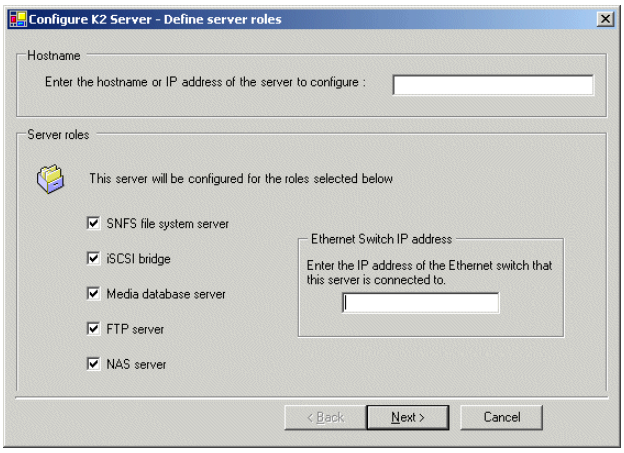
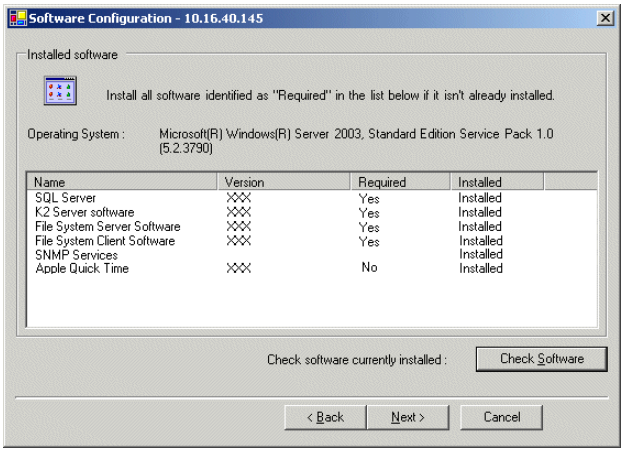
5. Continue with the next procedure.

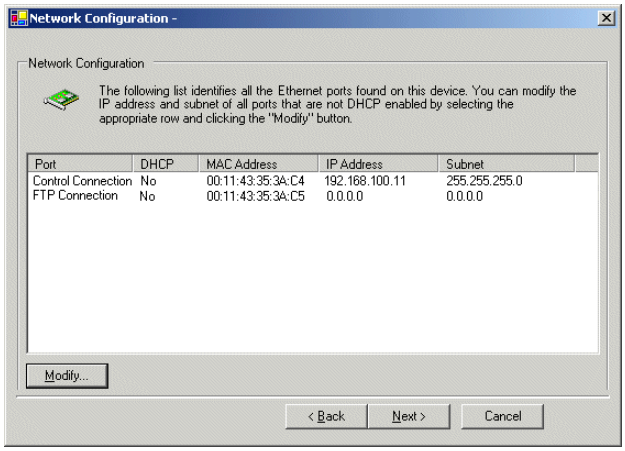
Configuring server A - Part 1

1. In the K2 System Configuration application tree view, select [**K2Server1]**.

2. Click the **Configure** button. The Configure K2 Server wizard opens. Follow the on-screen text to configure the for a Level 20R K2 Storage System, as

described in the following table:

On this page…	Do this…
Define server roles	 Enter the name or IP address for the K2 Media Server, as currently configured on the machine. Enter the name or IP address of the Ethernet switch, as currently configured on the switch, to which the K2 Media Server is connected. For Level 20R redundant, select all roles. Click **Next**
Software Configuration This page checks for the software required to support the roles you selected on the previous page. Software required on the Level 20R K2 Media Server A is as follows: • SQL Server • K2 Server • File System Server • File System Client • SNMP Services • QuickTime	 If software with *Yes* in the Required column reports as *Not Installed*, you must first install it on the before continuing. Refer to *Chapter 16, Managing K2 software*. After installing the software, click **Check Software**. When all required software reports as *Installed*, click **Next**.

On this page…	Do this…
Network Configuration This page displays the control network Ethernet port, and allows you to configure the FTP/ Streaming network Ethernet port. ***NOTE: This page does not configure the iSCSI interface (media network) ports.***	 The top port is the port over which the K2 System Configuration application is communicating with the. If correctly configured, it is already assigned the control network IP address, as displayed on this page. Select the other port and click **Modify**. A network configuration dialog box opens. Enter the FTP/Streaming IP address and the subnet mask and click **Apply**. Click **Next**.
File System Server Configuration	Enter the name or IP address of the redundant K2 Media Server (server B). Do not yet click Next. Do not yet enter anything in the File System Server #2 box. Click **Launch Storage Manager**. Storage Utility opens.

3. Continue with the next procedure to use Storage Utility to configure the storage and file system.

   Leave the Configure K2 Server wizard open while you are using Storage Utility. When you are done with Storage Utility, you continue with the wizard.

Configuring RAID

Use Storage Utility to complete the configuration of the L20R RAID chassis, as explained in the following topics:

- "Configuring RAID network and SNMP settings"
- "Binding disk modules"

Refer to "Prerequisites for initial configuration" on page 459 to confirm that the RAID storage is ready for configuration.

Configuring RAID network and SNMP settings

Use the Storage Utility to configure the following settings for the Level 20R RAID controllers:

- IP address
- Subnet mask

- Gateway Address
- SNMP trap destinations

For L20R RAID, network and SNMP settings are set and stored on the RAID controller module. For the RAID chassis with two controllers, each controller has its own network settings and the RAID chassis exists as two entities on the control network.

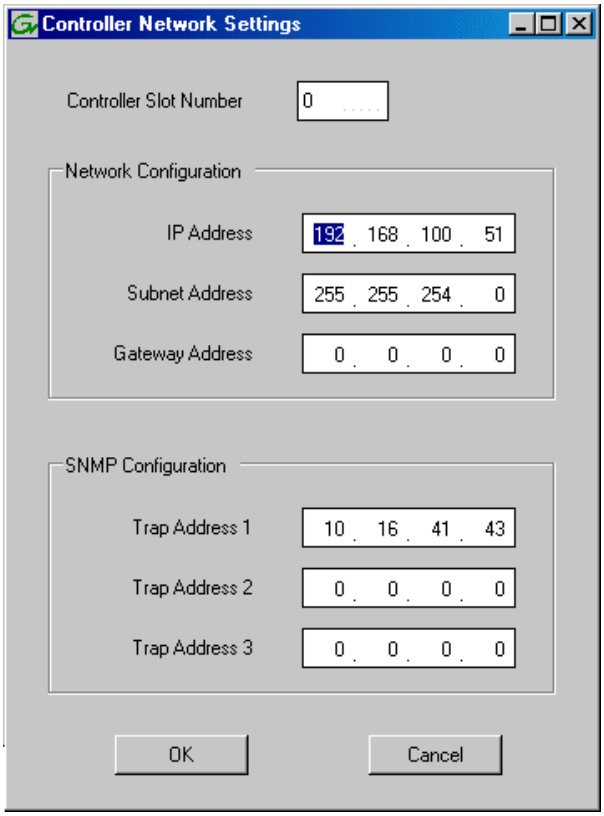
The RAID storage device is configured by default for the SNMP community name “public”. If your site’s policies require using a different SNMP community name, contact your Grass Valley representative.

To configure these settings, do the following:

1. Launch Storage Utility from the K2 System Configuration application as in the previous procedure.
2. As prompted, wait while Storage Utility gathers system information, then Storage Utility opens.
3. In Storage Utility tree view, expand the node for the L20R RAID, right-click the icon for a L20R RAID controller, and select **Configuration | Network Properties**.

   The Controller Network Settings dialog box opens.

   For a L20R RAID chassis with two controllers, you can make settings on both controllers using this dialog box.



4. In the Controller Slot Number field enter **0** and then press **Enter**. The settings from controller 0 are loaded into the Controller Network Settings dialog box and are available for you to modify.
5. Enter the control network IP address and other network settings.
6. You want SNMP trap messages go to the NetCentral server PC, so for SNMP Configuration enter the IP address of the NetCentral server PC. You can also enter IP addresses for other SNMP managers to which you want to send SNMP trap messages.
7. For the RAID chassis with two controllers, in the Controller Slot Number field enter **1** and then press **Enter**. The settings from controller 1 are loaded into the Controller Network Settings dialog box and are available for you to modify. Repeat the previous steps to configure controller 1.
8. Click **OK** to save settings and close.
9. In Storage Utility click **View | Refresh**. Continue with the next procedure "Binding disk modules".

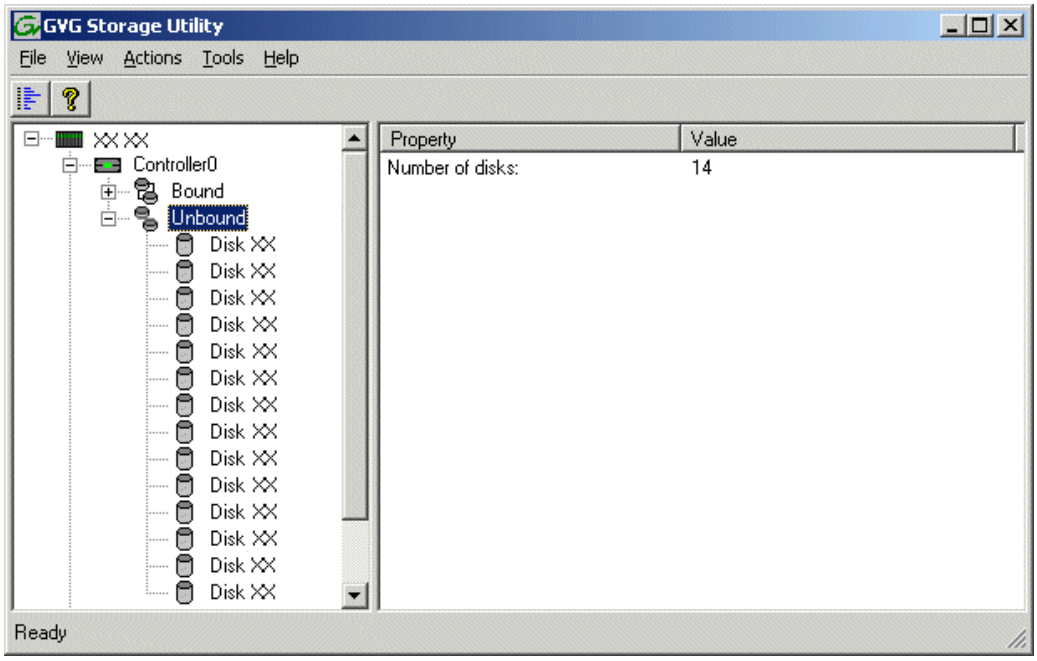
Binding disk modules

Use the following procedure to bind disk modules as required for the Level 20R storage system.

Also refer to "About RANKs and LUNs in Storage Utility" in Chapter 15, *Overview of K2 Storage Tools*.

NOTE: Binding destroys all user data on the disks.

1. In the Storage Utility main window, identify bound RANKs and unbound disks by their placement in the hierarchy of the tree view. In the following illustration, disk numbers are represented by "XX". Refer to "Identifying disks" on page 744 for an explanation of how disks are actually numbered in Storage Utility.



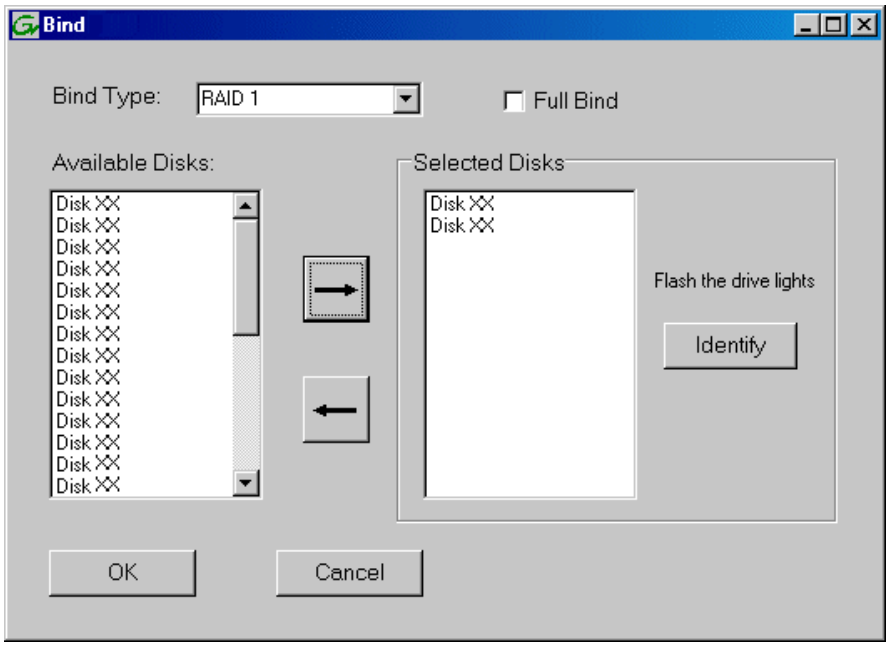
Redundant systems store metadata files and journal files on the primary RAID chassis. The first six disk slots in the chassis are dedicated for metadata/journal files. In the first five slots are five metadata/journal disks. The sixth slot is filled with a blank. Two disks are bound as a RAID 1 RANK for metadata storage and two disks are bound as a RAID 1 RANK for journal storage. The fifth disk is bound as a Hot Spare for the other four metadata/journal disks. The remaining six disks in the primary RAID chassis and all disks in Expansion chassis are for media storage. Media storage disks are bound as RAID 5 or RAID 6 in RANKs consisting of six disks each.

View disk properties and identify the four disks you will use for the metadata/journal RAID 1 RANKs, the one metadata/journal Hot Spare disk, any other disks that you intend to use for Hot Spares, and the remainder of the disks that are available for media storage. Make sure you select disks appropriately as you bind disks in the remainder of this procedure.

2. For systems that use RAID 1 RANKs, you must now create the separate RAID 1 storage for metadata files and journal files. To bind unbound disks for metadata and journal storage, do the following:

   a. Right-click the **Unbound** node for the controller, then select **Bind** in the context menu. (If the RAID chassis has two controllers, both controllers are represented by the single “Controller” node)

      The Bind dialog box opens showing all unbound disks for the controller listed in the Available Disk list.



b. Leave **Full Bind** unchecked. Refer to "About full/background bind" on page 748.

c. In the **Bind Type** drop down box, select **RAID 1**.

d. In the Available Disks box, select two contiguous disks at the top of the list. These should be the first two disks in the primary RAID chassis. (TIP: Use 'shift-click' or 'control-click' to select disks.) This creates a RAID 1 RANK for metadata storage.

e. Click the add (arrow) button to add disks to the Selected Disks list.

NOTE: As an aid in identifying a disk module's physical location, select it in the Selected Disks list, then click* Identify Disks. *This causes the disk drive light to flash.

f. Click **OK** to close the Bind dialog box and begin the binding process. The Progress Report dialog box opens, showing the status of the binding process.

g. Close the Progress Report and repeat the previous steps, selecting two more contiguous disks to create another RAID 1 RANK for journal storage. These should be the next two disks in the primary RAID chassis.

h. Make the fifth disk in the primary RAID chassis a Hot Spare. In the **Bind Type** drop down box, select **Hot Spare**.

i. In the Available Disks box, select the fifth disk in the primary RAID chassis.

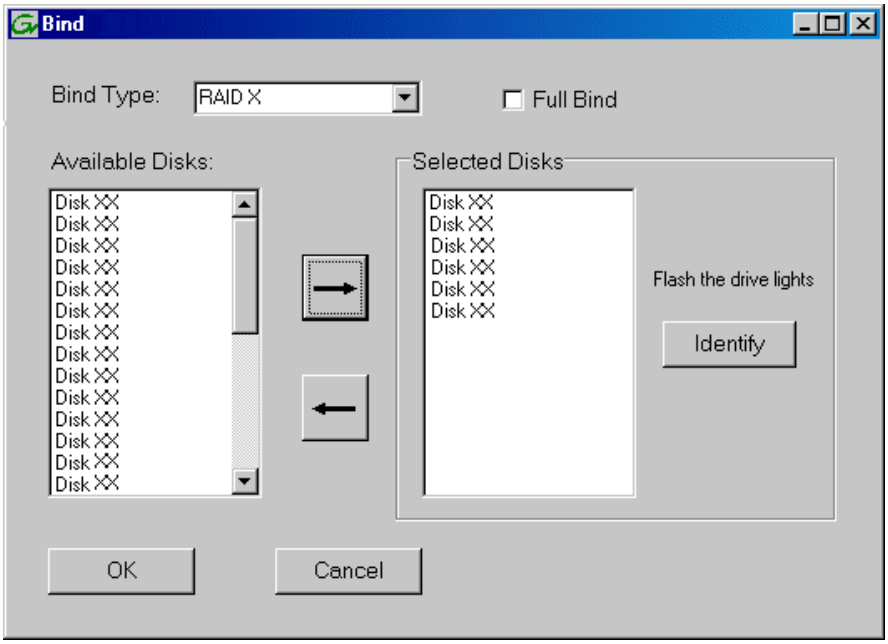
j. Click the add (arrow) button to add the disk to the Selected Disks list.

k. Click **OK** to close the dialog box and begin the binding process.

3. To bind unbound disks for media storage, do the following:

a. Right-click the **Unbound** node for a controller, then select **Bind** in the context menu. (If the RAID chassis has two controllers, both controllers are represented by the single "Controller" node)

The Bind dialog box opens showing all unbound disks for the controller listed in the Available Disk list.



b. Leave Full Bind unchecked. Refer to "About full/background bind" on page 748.

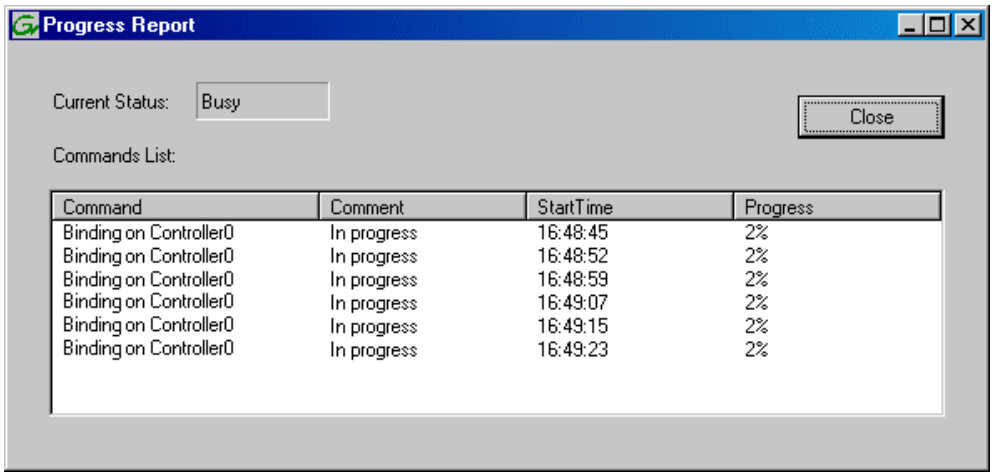
c. In the **Bind Type** drop down box, select **RAID 5** or **RAID 6**, as specified by your system design.

d. In the Available Disks box, select six contiguous disks at the top of the list. (TIP: Use 'shift-click' or 'control-click' to select disks.).

e. Click the add (arrow) button to add disks to the Selected Disks list.

NOTE: As an aid in identifying a disk module's physical location, select it in the Selected Disks list, then click* Identify Disks. *This causes the disk drive light to flash.

f. Click **OK** to close the Bind dialog box and begin the binding process. The Progress Report dialog box opens, showing the status of the binding process.



g. Close the Progress Report and repeat these steps for other unbound disks. If specified by your system design, you can bind some disks as Hot Spares, as explained in "Binding Hot Spare drives" on page 751. When you are done, if you did not bind any extra Hot Spares, you should have the following results:

   For L20R storage, on the primary RAID chassis you should have two RAID 1 RANKs of two disks each, one Hot Spare Disk, and one RAID 5 or RAID 6 RANK of six disks. For each optional Expansion chassis, you would have an additional one or two RAID 5 or RAID 6 RANKs of six disks each.

h. Click **Close** in Progress Report window.

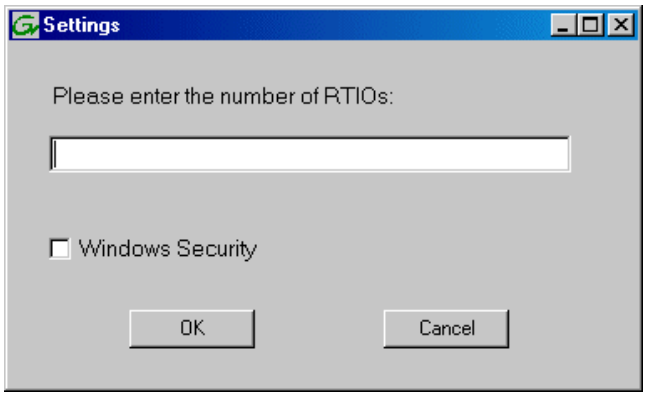
4. Restart the K2 Media Server.

NOTE: Make sure start up processes on the K2 Media Server are complete before proceeding.

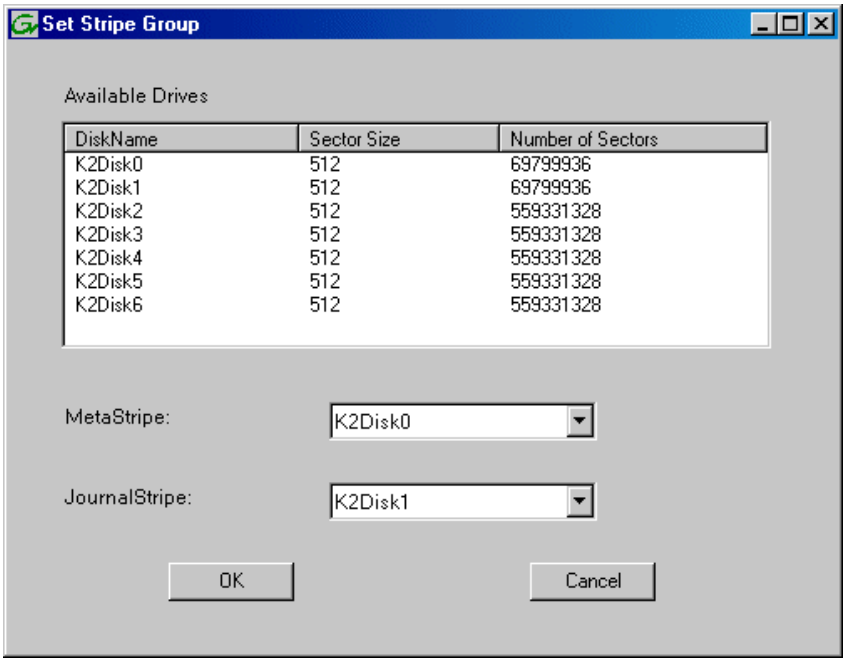
5. Continue with the next procedure "Creating a new file system".

Creating a new file system

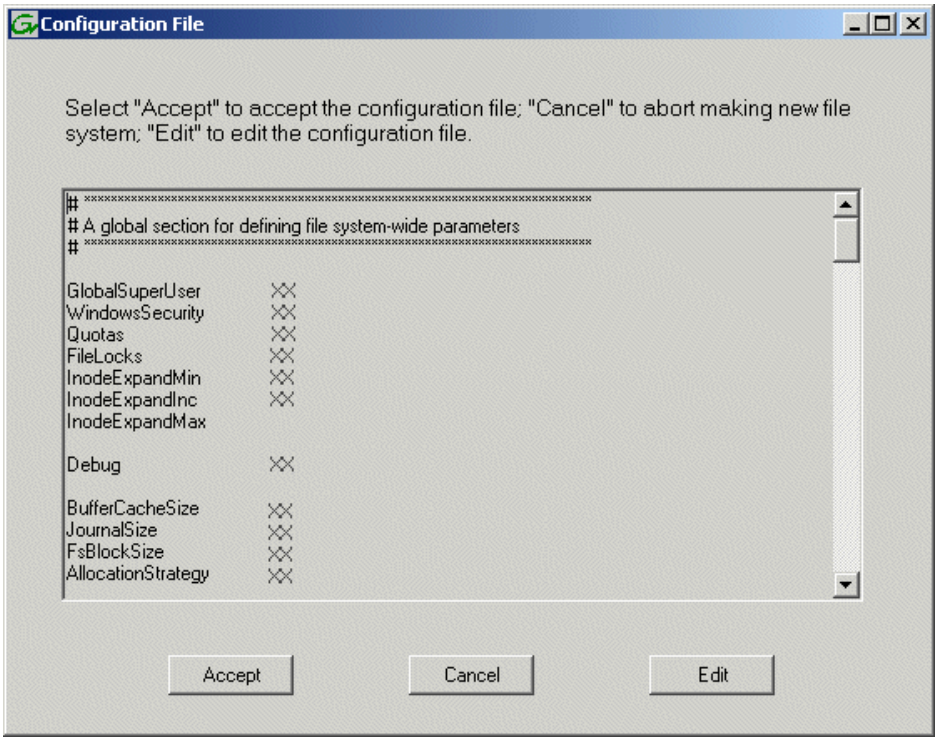
1. In Storage Utility, click **Tools | Make New File System**. The Setting dialog box opens.



2. For the Real Time Input/Output (RTIO) rate, enter the value specified by your system design. If you do not know this value, contact your Grass Valley representative.
3. If the K2 Storage System is to be accessed by only K2 Media Clients you can leave Windows Security unchecked. If accessed by Aurora Edits, refer to the *Aurora Edit Installation and Configuration Guide* for instructions.
4. Click **OK**. The Set Stripe Group dialog box opens.



5. If you have RAID 1 RANKS, assign a RAID 1 RANK as a metadata stripe and another RAID 1 RANK as a journal stripe. You can distinguish RAID 1 RANKs from media RANKs by the value in the Number of Sectors column.
6. Click **OK**. The Configuration File dialog box opens.



The configuration file for the media file system is displayed. You can verify media file system parameters by viewing this file. Do not edit this file. Click **Accept**.

A "…Please wait…" message box displays progress and a "…succeeded…" message confirms the process is complete.

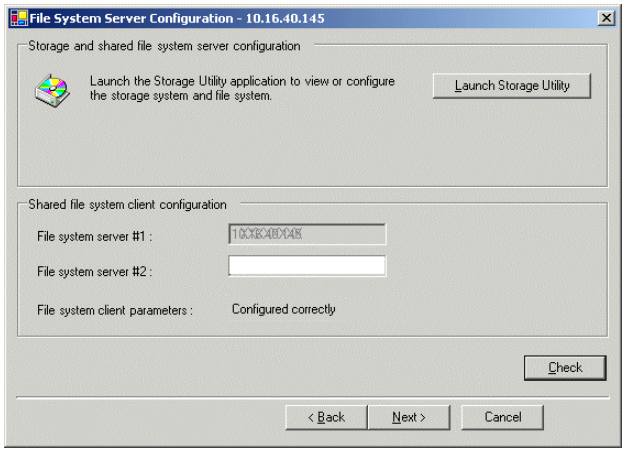
7. A message informs you that you must restart the K2 Media Server, however the restart at the end of the Configure K2 Server wizard suffices, so you do not need to restart now.
8. Close the Storage Utility.

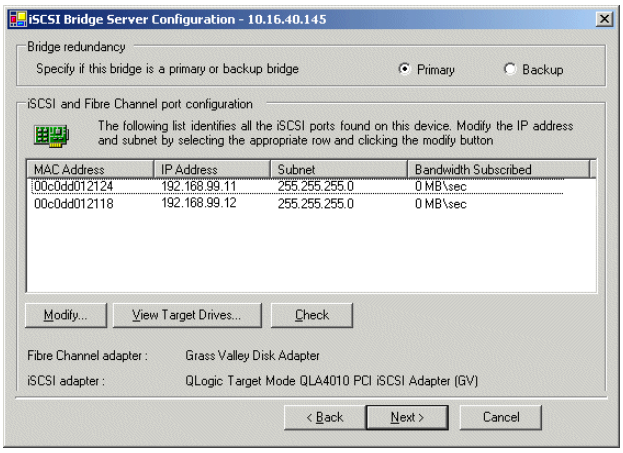
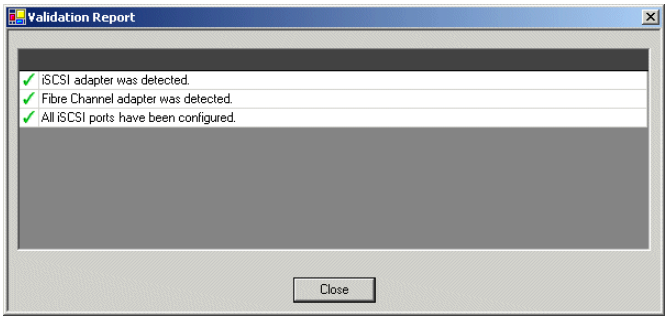
NOTE: Do not attempt to start K2 Media Clients or otherwise bring the K2 Storage System online until instructed to do so later in this chapter.

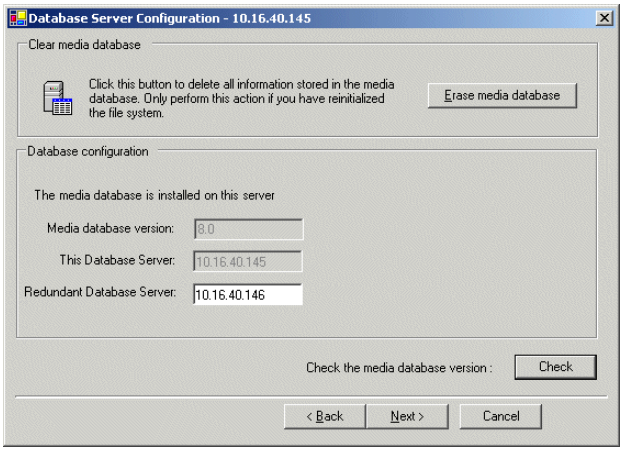
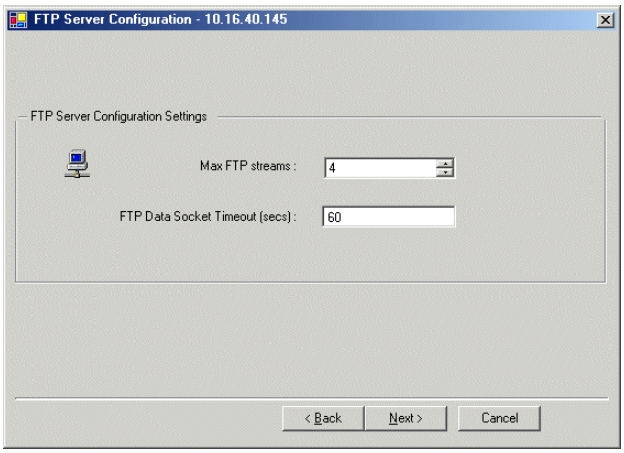
9. Continue with the next procedure.

Configuring server A - Part 2

1. Return to the Configure K2 Server page from which you launched Storage Utility and proceed as described in the following table:

On this page…	Do this…
File System Server Configuration This page checks on the configuration of the K2 Media Server in one of its main roles as a file system server. The K2 Media Server also functions as a file system client, which is also checked from this page.	 If you have not already done so, enter the name or IP address of the redundant K2 Media Server (server B). Click **Check**. When the wizard reports that the configuration is correct, click **Next**. If you get a "The V: will not be available until this device is rebooted…" message, you can safely continue with this procedure and follow the instructions related to this message later in the procedure.

On this page…	Do this…
iSCSI Bridge Server Configuration This page manages the components that bridge between iSCSI (the GigE media network) and the Fibre Channel connection to the RAID storage. You configure network settings on the iSCSI adapters and the page validates that the Fibre Channel adapter is in place and that the media RANKs are visible as iSCSI targets.	 Select **Primary**. Select an iSCSI adapter and click **Modify**. A network configuration dialog box opens. Enter the media network IP address and the subnet mask and click **Apply**. Do the same for the other iSCSI adapter. Click **Check**. The Validation Report opens.  Confirm that the iSCSI configuration is successful. Close the Validation Report and then click **Next**.

On this page…	Do this…
Database Server Configuration	 Enter the name or IP address of K2 Media server B. This is the redundant partner of the server you are now configuring. Click **Next**.
FTP Server Configuration	 Do not modify these settings. Leave at default values of Max FTP streams = 4 and FTP Data Socket Timeout = 60. Only qualified Grass Valley personnel should specify other values, as these settings are intended for use only with custom systems designed by Grass Valley. Click **Next**
Completing the Configuration Wizard	Click **Finish**. The wizard closes. The server restarts. Wait until all startup processes have completed before continuing.

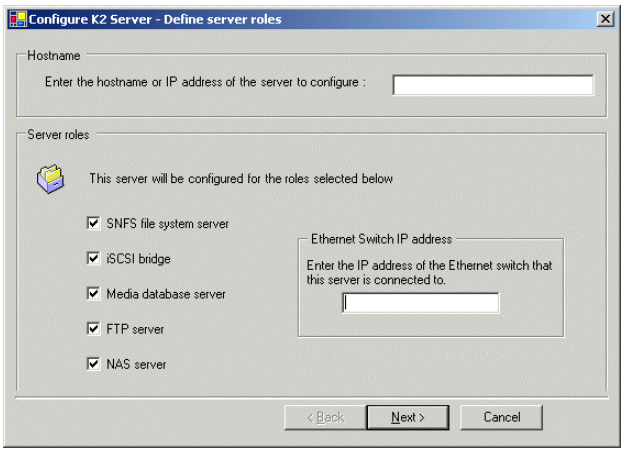
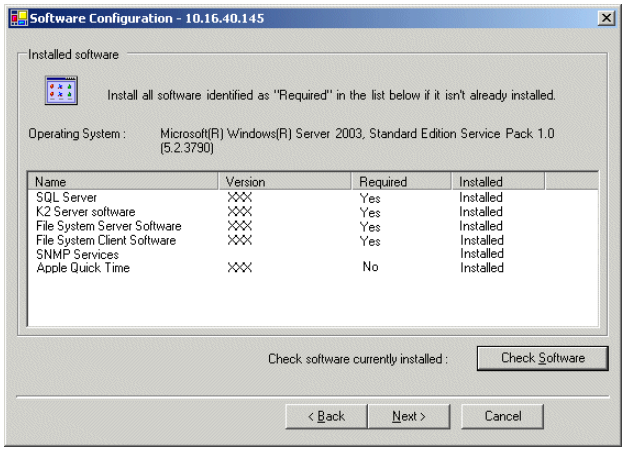
Configuring the redundant server

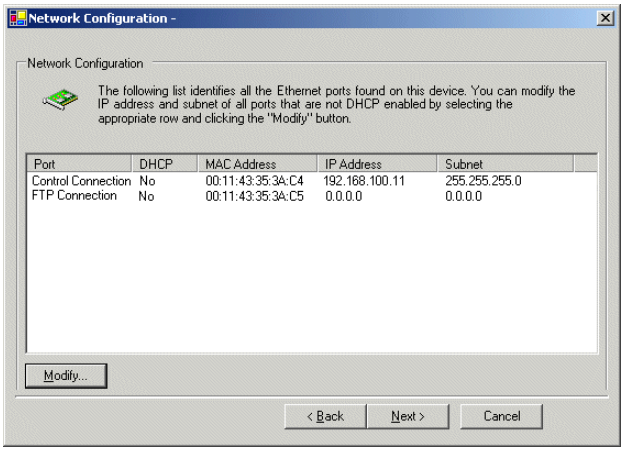
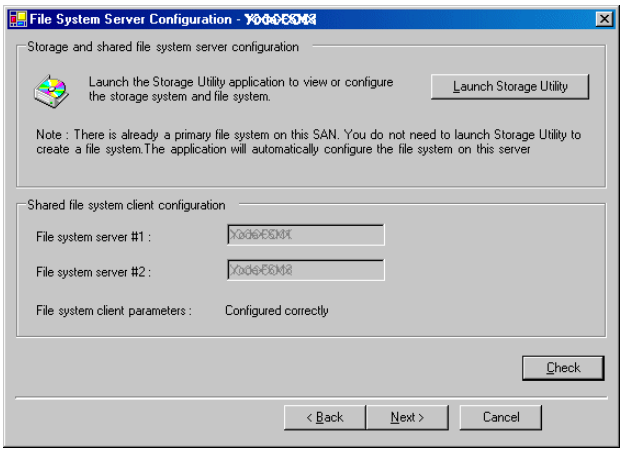
You must wait for the primary K2 Media Server to restart before continuing. To verify, from the control point PC open the MS-DOS command prompt and use the “ping” command.

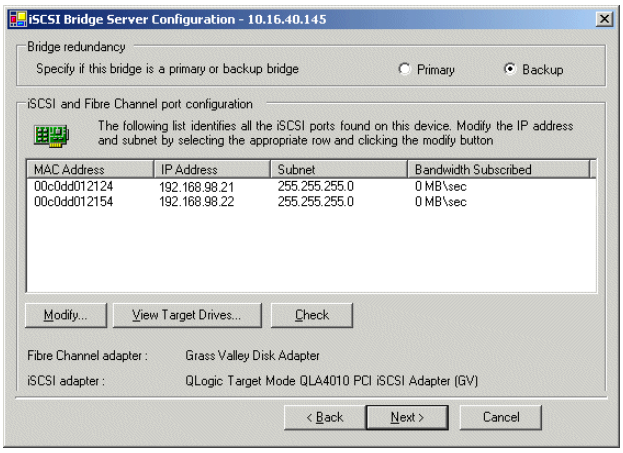
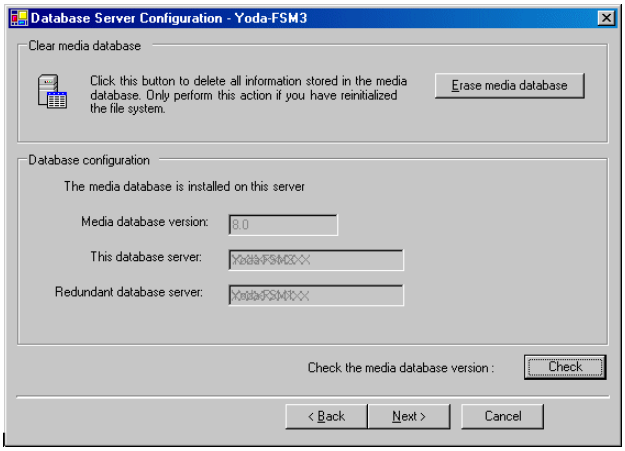
After you have configured the first K2 Media Server (server A) you next configure the redundant K2 Media Serer (server B).

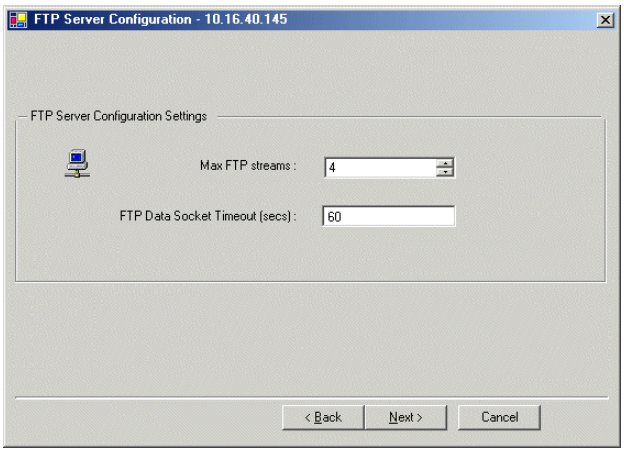
1. In the K2 System Configuration application tree view, select the K2 Media Server you are configuring as server B.

2. Click the **Configure** button. The Configure K2 Storage System Server wizard opens. Follow the on-screen text to configure the server for a Level 20R K2 Storage System, as described in the following table. Some screens require no input from you, as they are based on the configurations already completed on a previously configured K2 Media Server.

On this page...	Do this...
Define server roles	 Enter the name for the K2 Media Server. This should be the current network name of the machine. Enter the name or IP address of the Ethernet switch, as currently configured on the switch, to which the K2 Media Server is connected. Select all roles. Click **Next**
Software Configuration This page checks for the software required to support the roles you selected on the previous page. Software required on K2 Media Server B is as follows: • SQL Server • K2 Server • File System Server • File System Client • SNMP Services • QuickTime	 If software with *Yes* in the Required column reports as *Not Installed*, you must first install it on the K2 Media Server before continuing. Refer to *Chapter 16, Managing K2 software*. After installing the software, click **Check Software**. When all required software reports as *Installed*, click **Next**.

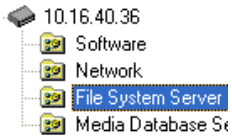
On this page…	Do this…
Network Configuration This page displays the control network Ethernet port, and allows you to configure the FTP/ Streaming network Ethernet port. ***NOTE: This page does not configure the iSCSI interface (media network) ports.***	 The top port is the port over which the K2 System Configuration application is communicating with the K2 Media Server. If correctly configured, it is already assigned the control network IP address, as displayed on this page. Select the other port and click **Modify**. A network configuration dialog box opens. Enter the FTP/Streaming IP address and the subnet mask and click **Apply**. Click **Next**.
File System Server Configuration This page checks on the configuration of the K2 Media Server in one of its main roles as a file system server. The K2 Media Server also functions as a file system client, which is also checked from this page. It is not necessary to bind RANKs or create a file system, since this task was completed when you configured the previous K2 Media Server.	 Click **Next**. Confirm messages about copying *default.cfg* to the other server. If you get a "The V: will not be available until this device is rebooted…" message, you can safely continue with this procedure and follow the instructions related to this message later in the procedure.

On this page…	Do this…
iSCSI Bridge Server Configuration This page manages the components that bridge between iSCSI (the GigE media network) and the Fibre Channel connection to the RAID storage. You configure network settings on the iSCSI adapters and the page validates that the Fibre Channel adapter is in place and that the media RANKs are visible as iSCSI targets. ***NOTE: The iSCSI adapters on this server must be on a different subnet than those on its redundant server partner.***	 Select **Backup**. Select an iSCSI adapter and click **Modify**. A network configuration dialog box opens. Enter the media network IP address and subnet mask and click **Apply**. Do the same for the other iSCSI adapter. To verify drives, click **Check** then **View Target Drives**. You should see all your media drives listed. Click **Next**.
Database Server Configuration	 You do not need to enter or configure anything on this page. Click **Next**.

On this page…	Do this…
FTP Server Configuration	 Do not modify these settings. Leave at default values of Max FTP streams = 4 and FTP Data Socket Timeout = 60. Only qualified Grass Valley personnel should specify other values, as these settings are intended for use only with custom systems designed by Grass Valley. Click **Next**
Completing the Configuration Wizard	Click **Finish**. The wizard closes. The K2 Media Server restarts. Do not proceed until restart processes are finished.

3. If you got a “The V: will not be available until this device is rebooted…” message on the File System Server Configuration page, after the K2 Media Server restarts, do the following:

   a. In the K2 System Configuration application tree view, under the K2 Media Server select the File System Server node.



   The File System Server Configuration page appears.

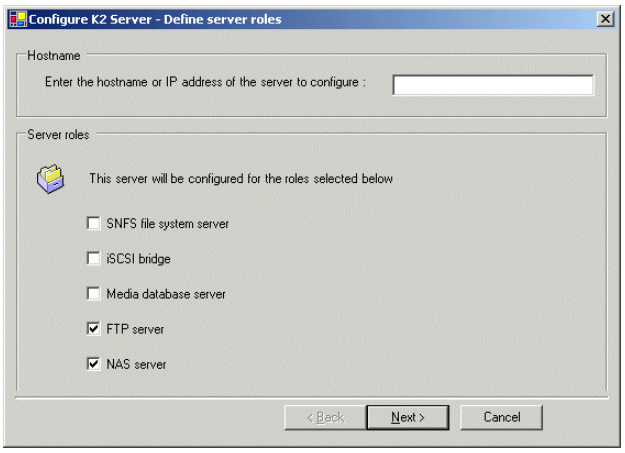
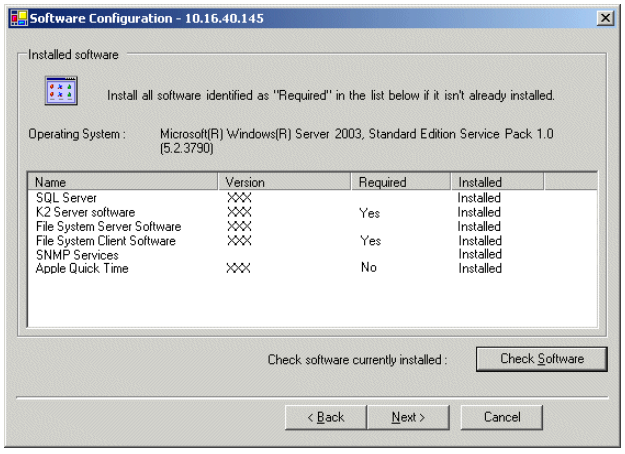
   b. Click **Check** and verify that the V: drive is shared. This is required for NAS server functionality.

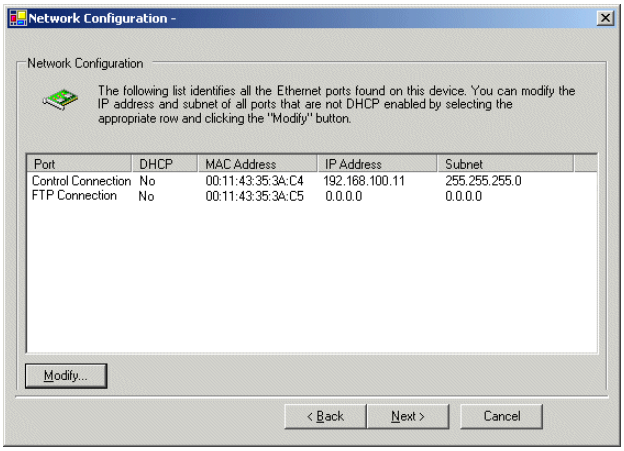
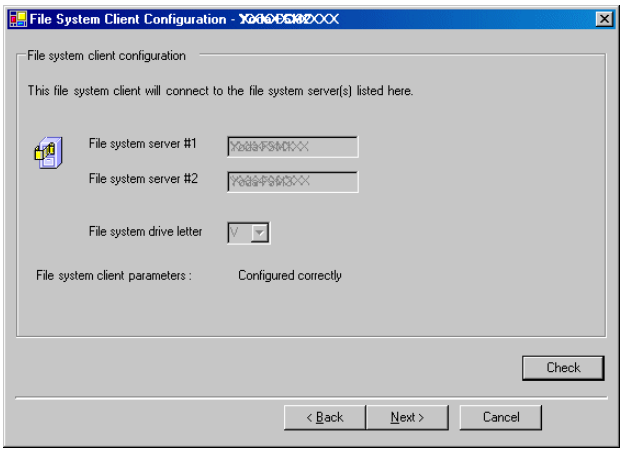
Configuring optional NH servers

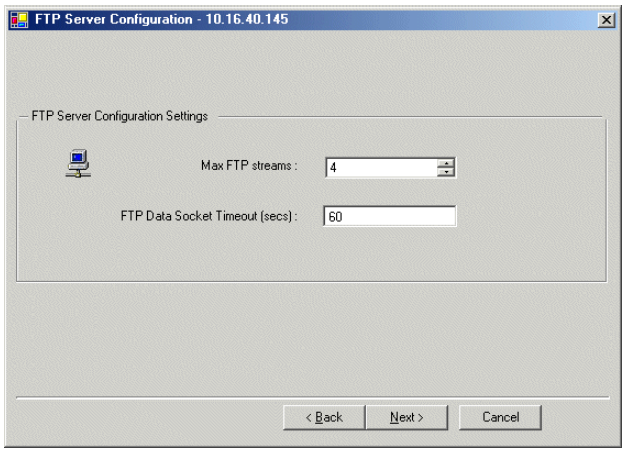
If you have one or more optional NH K2 Media Servers, you next configure those servers. This section applies to both NH1 (1 Gig FTP) servers and NH1-10GE (10 Gig FTP) servers.

NOTE: Multiple NH servers on a K2 Storage System must be of the same type, either all NH1 or all NH1-10GE.

1. In the K2 System Configuration application tree view, select the K2 Media Server you are configuring.
2. Click the **Configure** button. The Configure K2 Server wizard opens. Follow the on-screen text to configure the server for a Level 20R K2 Storage System, as described in the following table. Some screens require no input from you, as they are based on the configurations already completed on a previously configured K2 Media Server.

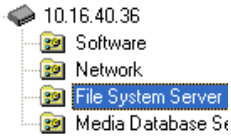
On this page...	Do this...
Define server roles	 Enter the name for the K2 Media Server. This should be the current network name of the machine. Select FTP server and NAS server. Click **Next**
Software Configuration This page checks for the software required to support the roles you selected on the previous page. Software required on a NH K2 Media Server is as follows: • K2 Server • File System Client • QuickTime	 If software with *Yes* in the Required column reports as *Not Installed*, you must first install it on the K2 Media Server before continuing. Refer to *Chapter 16, Managing K2 software*. After installing the software, click **Check Software**. When all required software reports as *Installed*, click **Next**.

On this page…	Do this…
Network Configuration This page displays the control network Ethernet port, and allows you to configure the FTP/ Streaming network Ethernet port.	 The top port is the port over which the K2 System Configuration application is communicating with the K2 Media Server. If correctly configured, it is already assigned the control network IP address, as displayed on this page. Select the other port and click **Modify**. A network configuration dialog box opens. Enter the FTP/Streaming IP address and the subnet mask and click **Apply**. Click **Next**.
File System Client Configuration This K2 Media Server does not function as a file system server. It does function as a file system client, which is validated from this page.	 Click **Check**. When the wizard reports that the configuration check is successful, click **Next**.

On this page…	Do this…
FTP Server Configuration	 Do not modify these settings. Leave at default values of Max FTP streams = 4 and FTP Data Socket Timeout = 60. Only qualified Grass Valley personnel should specify other values, as these settings are intended for use only with custom systems designed by Grass Valley. Click **Next**
Completing the Configuration Wizard	Click **Finish**. The wizard closes. The K2 Media Server restarts. Do not proceed until restart processes are finished.

3. If you got a "The V: will not be available until this device is rebooted…" message on the File System Server Configuration page, after the K2 Media Server restarts, do the following:

   a. In the K2 System Configuration application tree view, under the K2 Media Server select the File System Server node.



   The File System Server Configuration page appears.

   b. Click **Check** and verify that the V: drive is shared. This is required for NAS server functionality.

4. Repeat this procedure for remaining NH K2 Media Servers, if any.

Your configurations for the Level 20R K2 Storage System are complete.

Adding K2 Storage System clients

You can add now clients, such as K2 Media Clients or Aurora Edits, to the K2 Storage System and configure them using the K2 System Configuration application.

- For Aurora Edits, refer to the *Aurora Edit Installation and Configuration Guide* for instructions.
- For K2 Media Clients, refer to *K2 Media Client System Guide* for instructions.

NOTE: You must install MPIO software on K2 Media Clients that access shared storage on a redundant K2 Storage System.

Basic operations for Level 20R storage

Use the following procedures as you work on your Level 20R storage system:

- "Level 20R system power-off procedure"
- "Level 20R system power-on procedure"

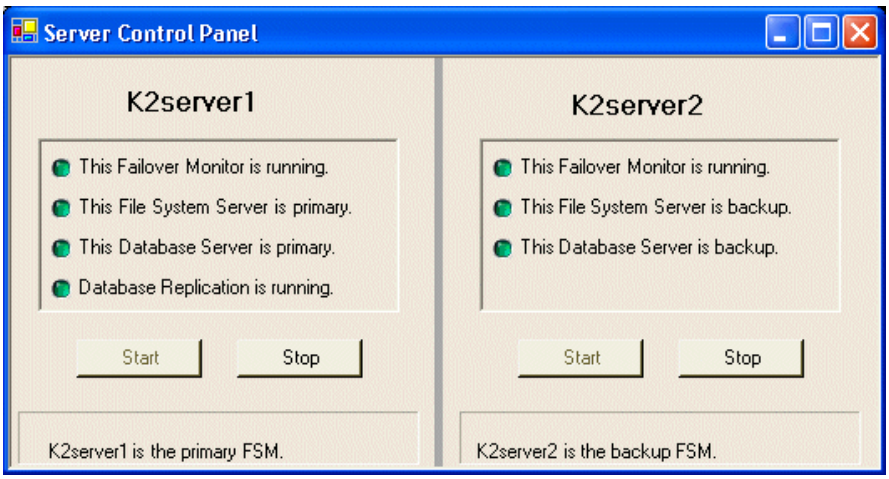
For other procedures refer to "Administering and maintaining the K2 Storage System" on page 687.

Level 20R system power-off procedure

Use the following sequence to power-off the Level 20R storage system.

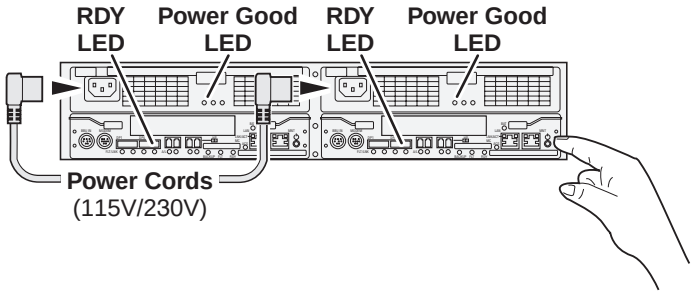
1. Power-off all K2 Media clients or other iSCSI clients.
2. From the K2 System Configuration application, in the tree view select the name of the K2 Storage System, which is the top node of the storage system tree. Then click the **Server Control Panel** button.

The Server Control Panel opens.



3. Take note of which is the primary K2 Media Server and which is the backup K2 Media Server. The order in which you put servers back into service when you power up the K2 Storage System is dependent on their primary/backup roles at the time when you power down the K2 Storage System.
4. For the backup K2 Media Server, click **Stop**. This takes the server out of service.
5. Shut down the backup K2 Media Server, if it does not shut down automatically.
6. For the primary K2 Media Server, click **Stop**. This takes the server out of service.
7. Shut down the primary K2 Media Server, if it does not shut down automatically.
8. Shut down optional NH K2 Media Servers, if any.

9. On the primary RAID chassis controller, identify the RDY LED. It blinks at a rate of 1 blink per second during normal operation.



10. Press and hold down the power button on a RAID controller. You can press the power button on either RAID controller 0 or RAID controller 1.

11. Release the power button in about 5 seconds, when the RDY LED blinks more quickly, at a rate of about 2 blinks per second. Do not hold down the power button for longer than 15 seconds.

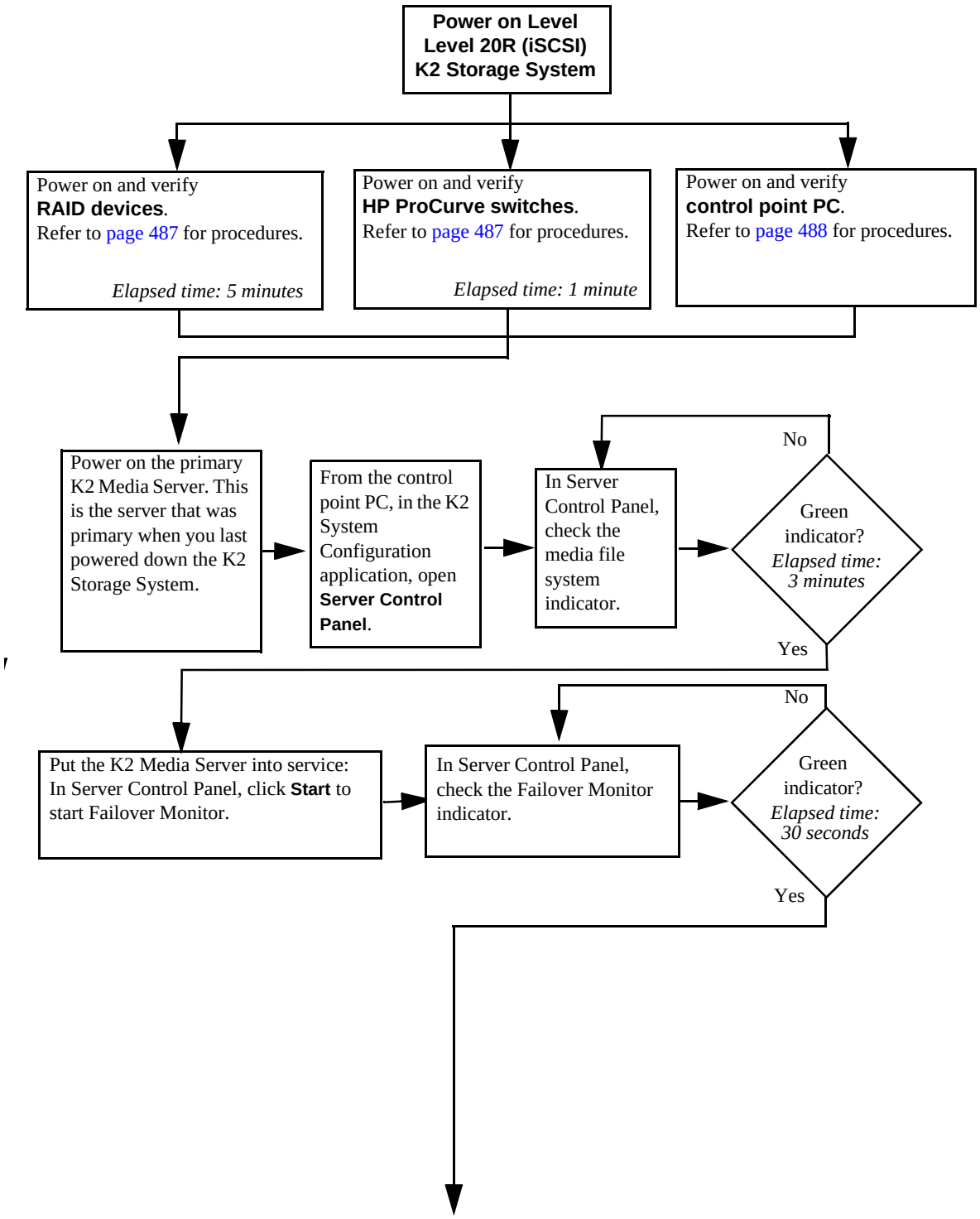
    The power button on the RAID controller turns off power for the primary RAID chassis and any connected Expansion chassis. Power-off normally occurs within 20 seconds and is indicated when LEDs other than those on the power supplies go off and the fans stop rotating.

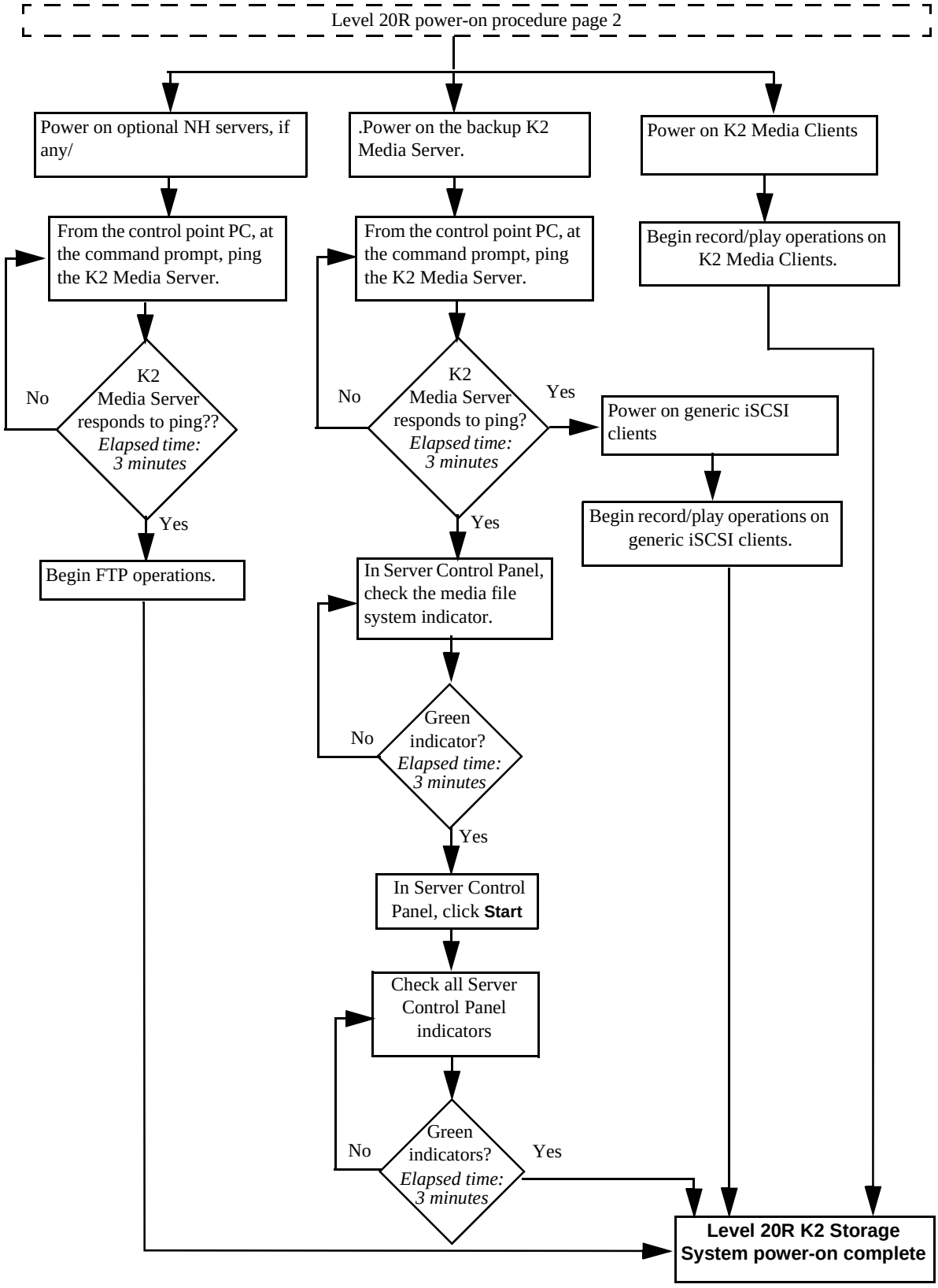
12. Wait for RAID power-off to complete before proceeding.

13. Power-off all Ethernet switches.

14. Power-off the control point PC and/or the NetCentral server PC, if necessary.

Level 20R system power-on procedure

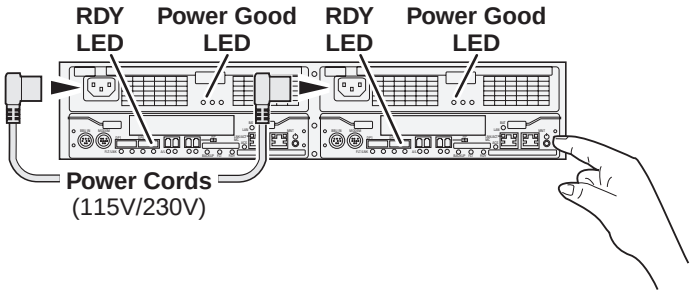



Level 20R power-on procedure page 2
Power on optional NH servers, if any/
.Power on the backup K2 Media Server.
Power on K2 Media Clients
From the control point PC, at the command prompt, ping the K2 Media Server.
From the control point PC, at the command prompt, ping the K2 Media Server.
Begin record/play operations on K2 Media Clients.
K2 Media Server responds to ping??
Elapsed time: 3 minutes
No
Yes
K2 Media Server responds to ping?
Elapsed time: 3 minutes
No
Yes
Power on generic iSCSI clients
Begin record/play operations on generic iSCSI clients.
Begin FTP operations.
In Server Control Panel, check the media file system indicator.
Green indicator?
Elapsed time: 3 minutes
No
Yes
In Server Control Panel, click Start
Check all Server Control Panel indicators
Green indicators?
Elapsed time: 3 minutes
No
Yes
Level 20R K2 Storage System power-on complete

Powering on Level 10, 20, 30, and Nearline 10 RAID storage devices

Use the following procedure to power on and verify proper operation of RAID storage devices.

1. Verify power and cabling.
2. Press and hold down the power button on the controller, as shown.



   If the RAID chassis has two controllers, you can press the power button on either controller. You do not need to press both power buttons.

   Pressing the power button on a controller also powers on any connected Expansion chassis. There are no power buttons on Expansion chassis.

3. Release the power button when the Power Good LED on the power supply is illuminated. This takes 1-3 seconds.
4. Wait while the primary RAID chassis performs self-test and initialization. This takes about four minutes. While this is taking place, the RDY LED is illuminated with a steady on light.
5. Watch for the RDY LED to begin blinking at one second intervals. The LED might turn off and back on two times before starting the one second blink pattern. When the RDY LED is blinking at one second intervals, the self-test and initialization is complete and the chassis is ready for use.

Powering on the HP ProCurve switch

Use the following procedure to power on and verify proper operation of the HP ProCurve switch.

1. Power up the switch.
2. Watch LEDs to verify proper operation. The diagnostic self test LED Behavior is as follows:
   - Initially, all the status, LED Mode and port LEDs are on for most of the duration of the test.
   - Most of the LEDs go off and then may come on again during phases of the self test. For the duration of the self test, the Test LED stays on.

   If the ports are connected to active network devices, the LEDs behave according to the LED Mode selected. In the default view mode (Link), the LEDs should be on.

- If the ports are connected to active network devices, the LEDs behave according to the LED Mode selected. In the default view mode (Link), the LEDs should be on.
- If the ports are not connected to active network devices, the LEDs will stay off.

Powering on the control point PC

Use the following procedure to power on K2 Storage System's control point PC and verify proper operation during power up of the system.

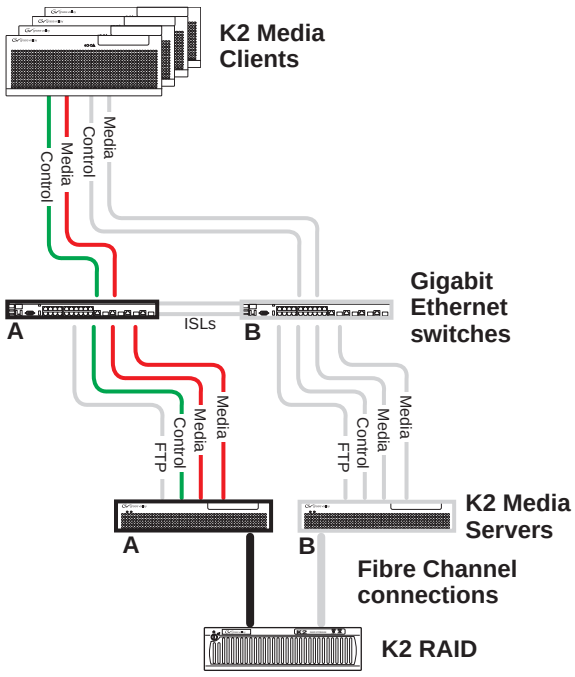
1. Power up and log on to the PC using standard Windows procedures.
2. Start and log on to NetCentral.
3. NetCentral reports devices as offline. As each device of the K2 Storage System is powered on, check NetCentral to verify the device's status

Failover behaviors

If a fault occurs and one of the failover mechanisms is triggered, a redundant K2 Storage System behaves as explained in following sections.

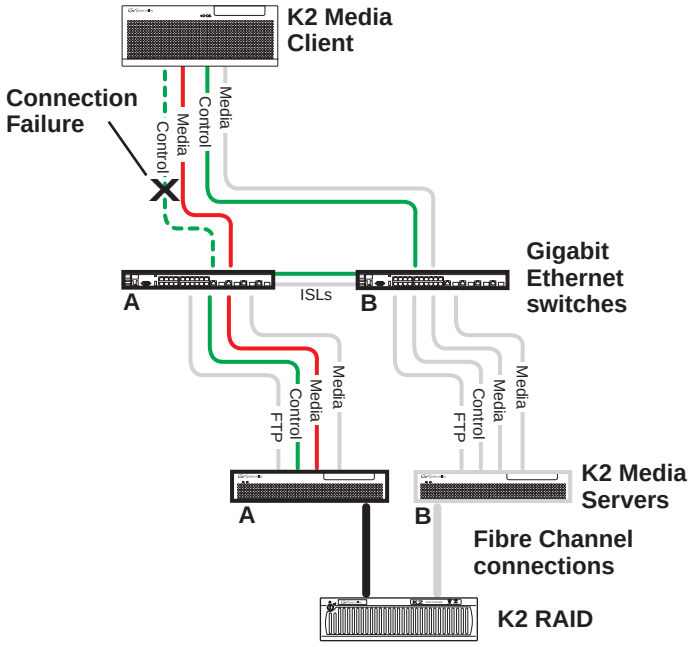
The diagrams that follow are representative of a generic redundant K2 Storage System. Some details, such as the number of media connections, might not be the same as your K2 Storage System. These diagrams illustrate the media (iSCSI) and control paths as they interact with the redundant K2 Media Servers in their role of media file system/database server and iSCSI bridge. Interactions of FTP traffic and/or paths involving K2 Media Servers with other roles are not illustrated.

Pre-failover behavior



The system operates initially with both media and control traffic on GigE switch “A” and K2 Media Server “A”. Media (iSCSI) traffic is using media network “A”. The iSCSI adapters (TOEs) on the “A” K2 Media Server provide access to the Fibre Channel connected RAID storage. K2 Media Server “A” is the media file system/database server.

Control team failover behavior



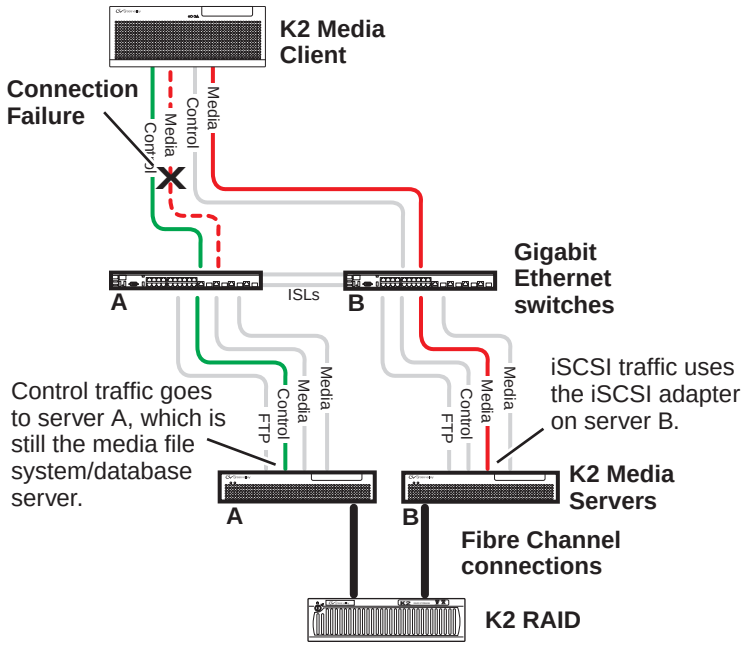
If the following system connection fails to respond to network communication:

- The control connection between a K2 Media Client and GigE switch “A”.

Then the following failover behavior occurs:

1. The control team on the K2 Media Client fails over and communication begins on the other control port.
2. The control communication finds a path through GigE “B” switch and across an ISL to GigE switch “A” to reach the same control port on the same K2 Media Server.
3. Media (iSCSI) traffic keeps using the same path.
4. K2 Media Server “A” is still the media file system/database server. The media file system (SNFS) and media database (SQL) do not fail over.
5. The other K2 Media Clients (not affected by the connection failure) keep using the same paths for media and control, as in the previous diagram “Pre-failover behavior”.

K2 Media Client media (iSCSI) connection failover behavior



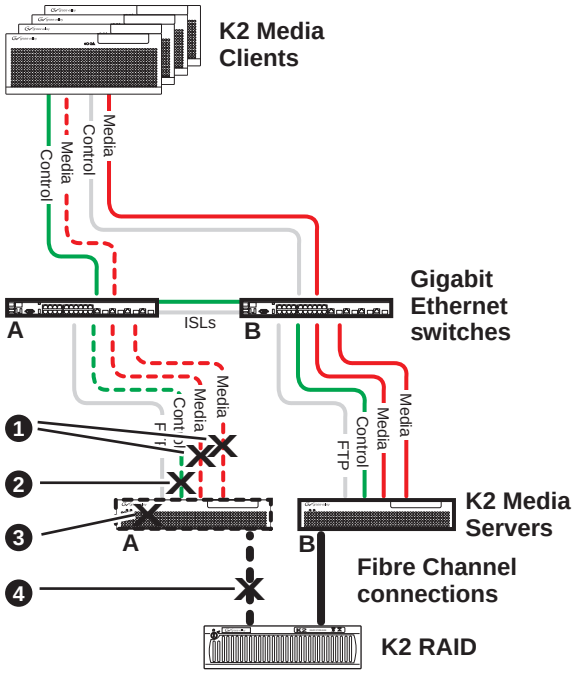
If the following system connection fails to respond to network communication:

- Media (iSCSI) network “A” connection between a K2 Media Client and the GigE switch.

Then the following failover behavior occurs:

1. The K2 Media Client drops communication on its “A” media port and begins using its “B” media port and the “B” media (iSCSI) network. The iSCSI adapter (TOE) on the “B” K2 Media Server provides access to the Fibre Channel connected RAID storage.
2. Control traffic keeps using the same path to K2 Media Server “A”.
3. K2 Media Server “A” is still the media file system/database server. The media file system (SNFS) and media database (SQL) do not fail over.
4. The other K2 Media Clients (not affected by the component failure) keep using the same paths for media and control, as in the previous diagram “Pre-failover behavior”. This means the K2 Media Clients unaffected by the failover are using the iSCSI adapter (TOE) on the “A” K2 Media Server to provide access to the Fibre Channel connected RAID storage, while at the same time the affected K2 Media Clients are using the iSCSI adapter (TOE) on the “B” K2 Media Server to provide access to the Fibre Channel connected RAID storage. In this case both RAID controller are simultaneously providing disk access.

K2 Media Server failover behavior

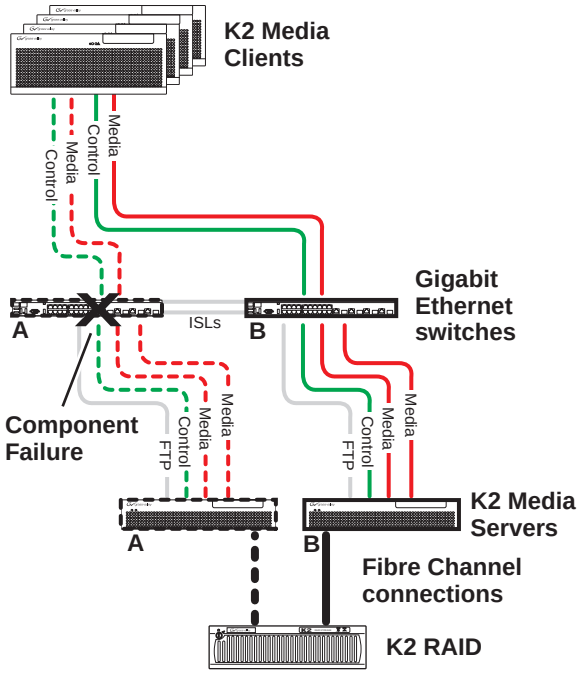


If the following system connection or component fails to respond to network communication:

Then the following failover behavior occurs:

1. The media file system (SNFS) and media database (SQL) on K2 Media Server “A” fail over and K2 Media Server “B” becomes the active media file system/database server.
2. All K2 Media Clients drop communication on the “A” media port and begin using the “B” media port, finding a path through GigE switch “B” to K2 Media Server “B”. All K2 Media Clients use an iSCSI adapter (TOE) on the “B” K2 Media Server to provide access to the Fibre Channel connected RAID storage.
3. All K2 Media Clients keep communicating on the same control port, finding a new path through GigE switch “A” and across an ISL to GigE switch “B” to reach K2 Media Server “B”.

K2 Media Server failover with Control team failover behavior



If the following system component fails to respond to system communication:

- The “A” GigE switch

Then the following failover behavior occurs:

1. The media file system (SNFS) and media database (SQL) on K2 Media Server “A” fail over and K2 Media Server “B” becomes the active media file system/database server.
2. All K2 Media Clients drop communication on the “A” media port and begin using the “B” media port, finding a path through GigE switch “B” to K2 Media Server “B”. All K2 Media Clients use an iSCSI adapter (TOE) on the “B” K2 Media Server to provide access to the Fibre Channel connected RAID storage.
3. For all K2 Media Clients, communication fails on the control port, so the control team fails over and communication begins on the other control port.
4. For all K2 Media Clients, control communication finds a path through GigE switch “B” to K2 Media Server “B”.

Chapter 11

Installing the Level 30 Storage System

The K2 Level 30 (L30) storage system was initially released with K2 system software version 3.2 in September 2007.

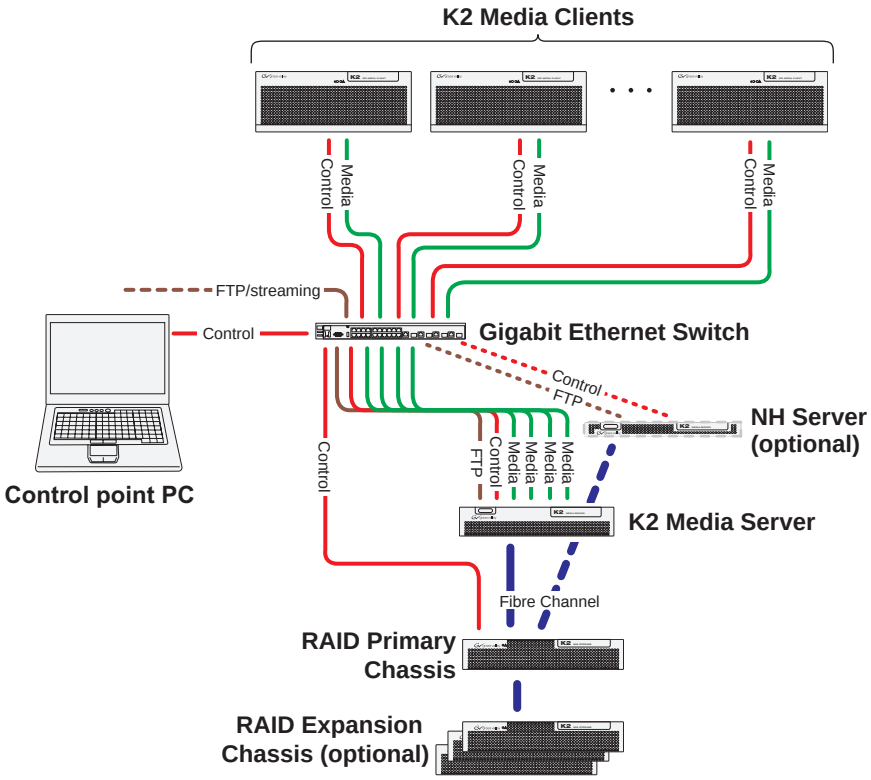
Use this chapter to install the K2 Level 30 storage system.

This chapter includes the following topics:

- "Level 30 system description" on page 496
- "Preparing Level 30 devices" on page 497
- "Networking for Level 30" on page 514
- "Configuring the Level 30 storage system" on page 519
- "Adding K2 Storage System clients" on page 536
- "Basic operations for Level 30 storage" on page 536

Work through these topics sequentially to install the storage system.

Level 30 system description



The Level 30 (L30) storage system has one Gigabit Ethernet switch, one LS K2 Media Server, and one L30 RAID chassis. Up to ten RAID Expansion chassis are optional for increased storage capacity.

K2 Media Clients and other iSCSI clients, such as Aurora Edits, are connected to the GigE switch. Each K2 Media Client has one GigE connection for media and one GigE connection for control. The GigE switch is configured with V-LANs to keep the control/FTP traffic and the media (iSCSI) traffic separate.

The LS K2 Media Server has four GigE connections for media (iSCSI), one GigE connection for control, one GigE connection for FTP, and one Fibre Channel connection to the RAID storage. The server hosts iSCSI interface cards for the GigE media connections and a Fibre Channel card for the RAID storage connection. The iSCSI interface card provides a bridge between GigE iSCSI and Fibre Channel SCSI. The server also hosts software components that allow it to function in various roles, including media file system manager, media database server, and FTP server.

The L30 RAID chassis is connected via a single Fibre Channel connection to the K2 Media Server. It is also connected to the GigE control network, which is required for SNMP (NetCentral) monitoring.

Optional NH K2 Media Servers are available to provide additional FTP bandwidth. These servers are available with either a one Gigabit connection or a ten Gigabit connection. If you have multiple NH K2 Media Servers on a K2 Storage System, they must all be of the same connection speed. They must be all one Gigabit servers or all ten Gigabit servers.

The K2 configuration control point PC is connected to the GigE control network. The K2 System Configuration application runs on this PC for configuring the storage system.

FTP/streaming traffic accesses the K2 Storage System via the FTP GigE port on K2 Media Servers. FTP/streaming traffic does not go to K2 Media Clients.

Refer to Chapter 14, *Description of K2 Storage Devices* for more information. Also refer to "Design considerations for Ethernet switches" on page 759.

Preparing Level 30 devices

Use the topics in this section to prepare each device so that it is ready to become part of the Level 30 storage system.

- "Setting up the Control Point PC" on page 497
- "Setting up the Level 30 GigE switch" on page 498
- "Setting up the LS K2 Media Server for Level 30" on page 508
- "Setting up the NH1 K2 Media Server" on page 508
- "Setting up the NH1-10GE K2 Media Server" on page 509
- "Setting up the L30 RAID chassis" on page 510
- "Preparing K2 Storage System clients" on page 512

Setting up the Control Point PC

To set up the K2 configuration Control Point PC, you have the following options:

- Use the Grass Valley Control Point PC that comes from the factory with software pre-installed. This includes the K2 System Configuration application, remote AppCenter, and NetCentral software. Refer to the *K2 Media Client System Guide* for rack mount instructions.
- Use a PC that you own and install the required software.

For either option, you must do the following for the Control Point PC that runs the K2 System Configuration application:

- Assign a control network IP address to the PC. Refer to "Networking tips" on page 106.
- Connect the PC to the GigE control network.

To use your own PC, you must additionally do the following:

- Verify that the PC meets system requirements, then install the Control Point software and other supporting software, as specified in the *K2 Media Client System Guide*.

- Install and license NetCentral server software. You can install this on the NetCentral server PC, which can be the K2 configuration Control Point PC. Refer to the *NetCentral User Guide*.

Also refer to "Control point PC description" on page 650.

To fix the screen resolution problem seen with NetCentral on the Grass Valley Control Point PC, do the following:

1. Go to Display properties (right mouse selection of properties on the display area)
2. Select Settings tab
3. Select the Advanced button
4. In the General tab, set the DPI setting to Normal size (96 DPI)
5. Restart the PC

Setting up the Level 30 GigE switch

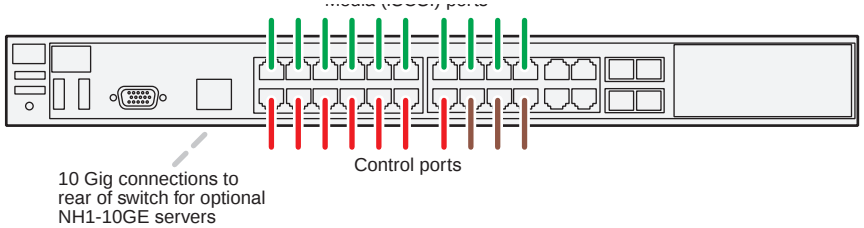
These procedures are for the HP ProCurve switch 2900 series. You must use this switch for iSCSI traffic on Level 30.

For control and FTP/streaming traffic, it is allowed to use a different brand of switch, such as a Cisco Catalyst switch, if required by your site. If you are using a non-HP switch, apply the information in the following procedures accordingly. Refer to the documentation you received with the switch as necessary.

Also refer to "Design considerations for Ethernet switches" on page 759.

- Use CAT5e or CAT6 cables. The maximum cable length is 50 meters for CAT5e and 100 meters for CAT6.
- Assign an IP address and logon to the switch. Refer to "Configuring the GigE switch via serial connection" on page 499.
- Set up VLANs on the switch. Refer to "Configuring the GigE switch via the Web interface" on page 502.
- Install the switch in its permanent location.
- Provide power to the switch.
- Connect cables as follows:

2900 series switch



To the media ports make one iSCSI connection from each K2 Media Client or other iSCSI client, and two iSCSI connections from the K2 Media Server.

To the control ports make a connection from each K2 Media Client or other iSCSI client, from the RAID storage chassis, and from the control point PC. Also make

the FTP network connection and the control network connection from the K2 Media Server.

If you optional have NH1 K2 Media Servers, connect their FTP network connections and control network connections to control ports on the switch.

If you have optional NH1-10GE K2 Media Servers, connect their 10 Gig FTP network connections to 10 Gig ports on the rear of the switch and connect their control network connections to control ports on the switch. Switches have two 10 Gig connectors standard and two 10 Gig connectors optional, so to connect three or four severs to a switch, you must first install the optional 10 Gig connectors in the switch.

Refer to "Level 30 system description" on page 496 for a diagram of the complete system.

Refer to cabling procedures later in this chapter for the GigE connections at each of the devices of the K2 Storage System.

Also refer to "K2 Ethernet switch description" on page 651 and "Design considerations for Ethernet switches" on page 759.

Configuring the GigE switch via serial connection

NOTE: Make sure you check the switch firmware and upgrade if necessary, as instructed at the end of this procedure.

The following procedure is for the HP ProCurve switch 2900 series. Do not use this procedure on other switch models.

Use a direct console connection to the switch, start a console session, and access the Switch Setup screen to set the IP address.

1. Configure the PC terminal emulator on the control point PC or another PC as a DEC VT-100 (ANSI) terminal or use a VT-100 terminal, and configure either one to operate with these settings:
   - Baud rate 115200
   - 8 data bits, 1 stop bit, no parity, and flow control set to Xon/Xoff
   - Also disable (uncheck) the "Use Function, Arrow, and Ctrl Keys for Windows" option
2. Connect the PC to the switch's Console Port using the console cable included with the switch. (If your PC or terminal has a 25-pin serial connector, first attach a 9-pin to 25-pin straight-through adapter at one end of the console cable.)
3. Turn on the PC's power and start the PC terminal program.
4. Press **Enter** two or three times and you will see the copyright page and the message "Press any key to continue". Press a key, and you will then see the switch console command (CLI) prompt.

NOTE: If you press Enter too many times and get past the log in, enter the command EN to get into the command line.

5. Type the following, then press **Enter**:

```
menu
```

If prompted to save the current configuration, answer no (press the n key) to proceed. The main menu opens.

6. On the main menu, choose **Switch Configuration,** then press **Enter**.
7. Select **IP Configuration**, then press **Enter**.
8. Press the right-arrow key to choose **Edit**, then press **Enter**. Tab to fields and enter information as follows:
   a. Change **Gateway** to be the default router.
   b. Tab to the **IP Config (DHCP/Bootp)** field and use the Space bar to select the **Manual** option.
   c. Tab to the **IP Address** field and enter the switch's control network IP address. Refer to "Networking tips" on page 106.
   d. Tab to the **Subnet Mask** field and enter the subnet mask used for your network.
9. Press **Enter**, then right-arrow to **Save**. Press **Enter** and revert to previous menu.
10. Select **Return to Main Menu** and press **Enter**.
11. From the main menu, chose **Console Passwords** and press **Enter**. The Set Password Menu opens.
12. Chose **Set Manager Password** and press **Enter**.
13. When prompted for the password, type a password of up to 16 ASCII characters with no spaces and press **Enter**. The password can be one that is used on other K2 devices, such as "adminK2" or "K2admin", or it can be your site's administrator password.
14. When prompted to enter the password again, retype the password and press **Enter**.
15. Select **Return to Main Menu** and press **Enter**.
16. From the main menu, tab to **Command Line (CLI)** and press **Enter**. The command prompt appears.
17. Type the following, then press **Enter**:

    ```
    configure
    ```

    You are now in configuration mode.
18. Configure an administrator username. The username can be one that is used on other K2 devices, such as "administrator" or "K2admin", or it can be your site's administrator username. For example, to set the username to "administrator" type the following, then press **Enter**:

    ```
    password manager user-name administrator
    ```
19. When prompted, enter and re-enter the password.
20. Set spanning tree to RSTP. Type the following, then press **Enter**:

    ```
    spanning-tree force-version rstp-operation
    ```

    This configures spanning tree, but it does not turn spanning tree on. You must turn spanning tree on using the switch's Web interface, as explained in the next

procedure "Configuring the GigE switch via the Web interface".

21. Decide your SNMP community name as explained in the following options, then proceed with the next step:

    - If you decide to use a unique SNMP community name (not "public"), add the community and set its RW permissions. For example, if the community name is "K2", type the following, then press **Enter**:

      ```
      snmp-server community K2 unrestricted
      ```

    - If you decide to use the default SNMP community "public" for NetCentral monitoring, which already has RW permissions set as required by NetCentral, proceed to the next step.

22. Enter the SNMP community and IP address of the NetCentral server PC. For example, if the IP address is "192.168.40.11" and the community is "public", you type the following, then press **Enter**:

    ```
    snmp-server host public 192.168.40.11
    ```

23. Enable Authentication traps. Type the following, then press **Enter**:

    ```
    snmp-server enable traps authentication
    ```

    This allows NetCentral to test the switch to verify that it can send its SNMP trap messages to NetCentral.

24. Type the following, then press **Enter**:

    ```
    menu
    ```

    When prompted, save the configuration by pressing the y key. The main menu opens.

25. If you need a trunk for ISLs to gang switches together, use the following steps. These steps illustrate trunking the last three 1 Gig ports for three 1 Gig ISLs, which is the recommended configuration for ISLs on all multi-switch K2 Storage Systems. Refer to "Design considerations for Ethernet switches" on page 759 and consult with your Grass Valley representative if your requirements deviate from the recommended policy:

    a. At the main menu, select **Switch Configuration** and press **Enter**.

    b. Choose selection **Port/Trunk Settings** and press **Enter**.

    c. Press the right-arrow key to choose **Edit**, then press **Enter**.

    d. Down arrow until at the bottom of the list of ports and select the last (highest port number) 1 Gig port in the list.

    e. Right-arrow over to the Group column.

    f. Use the Space bar and set the bottom 1 Gig port to **Trk1**.

    g. Set the next port up also to **Trk1**.

    h. Set the next port up also to **Trk1**.

    i. Press **Enter**, then right-arrow to **Save**. Press **Enter** and revert to previous menu.

26. Select **Return to Main Menu** and press **Enter**.

27. From the main menu, tab to **Command Line (CLI)** and press **Enter**. The command prompt appears.

28. Check the version of firmware currently installed on the switch. Type the following, then press **Enter**:

```
show flash
```

Information is displayed similar to the following example:

```
HP_iSCSI_switch1# show flash
Image            Size(Bytes)    Date    Version
-----            ----------   -------- -------
Primary Image    : 3287779    03/15/05 M.08.66
Secondary Image  : 3287779    03/15/05 M.08.66
Boot Rom Version: I.08.07
Current Boot     : Primary
```

29. Check the Primary Image Version and refer to your *K2 Storage System Release Notes* for information about currently supported versions. Then proceed as follows:

- If *K2 Storage System Release Notes* instruct you to change the firmware on the switch, do so before continuing. Refer to the documentation you received with the switch for instructions to change the firmware. Then continue with the next procedure "Configuring the GigE switch via the Web interface".
- If *K2 Storage System Release Notes* confirm that the version on the switch is a currently supported version, continue with the next procedure.

30. Type the following, then press **Enter**:

```
menu
```

The main menu opens.

31. From the main menu, choose **Reboot Switch** and press **Enter**. When prompted "Continue Reboot…?', answer yes (press the y key) to proceed. The switch restarts.

32. You can now use the switch's web browser interface for further configuration, as instructed in the next procedure.

33. Close the PC terminal program and disconnect the console cable.

Continue with the next procedure "Configuring the GigE switch via the Web interface".

Configuring the GigE switch via the Web interface

The following procedure is for the HP ProCurve switch 2900 series. Do not use this procedure on other switch models.

1. From the control point PC or another PC, make sure that you have a direct Ethernet cable connection to the switch, with no switches, routers, proxies, or other networking devices in between.

2. On the PC, open Internet Explorer and type the switch's IP address in the Address field, as in the following example.

```
http://192.168.100.61
```

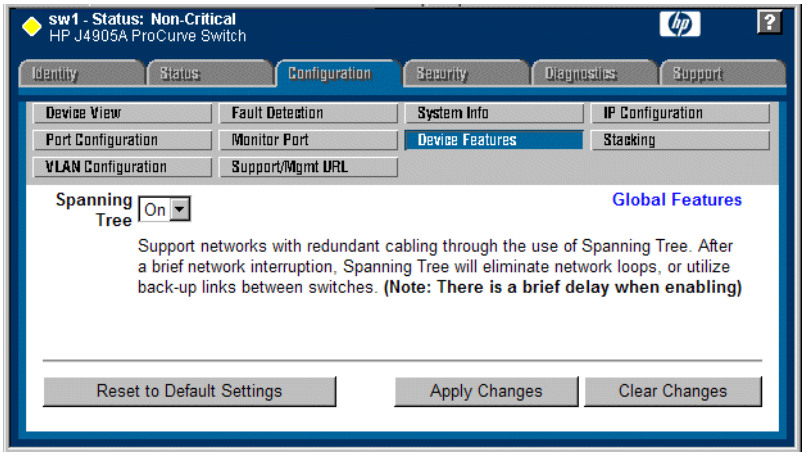
This should be the name or IP address as currently configured on the switch.

3. Press **Enter** to open the switch's configuration application.

NOTE: The configuration application for the HP ProCurve switch requires Java.

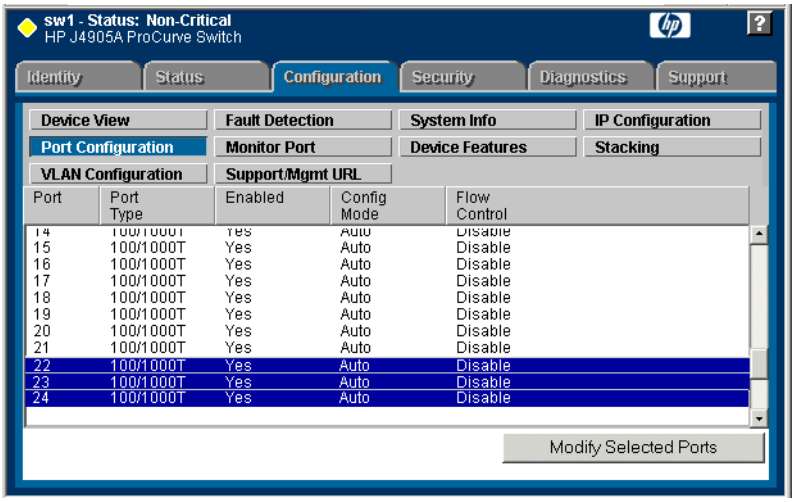
You can also access the switch's configuration application from the K2 System Configuration application.

4. In the switch's configuration application, choose **Configuration**, then **Device Features**.



5. Set Spanning Tree to **On** and click **Apply Changes**. If prompted, log in with the switch's administrator username and password.

6. Click **Port Configuration**.



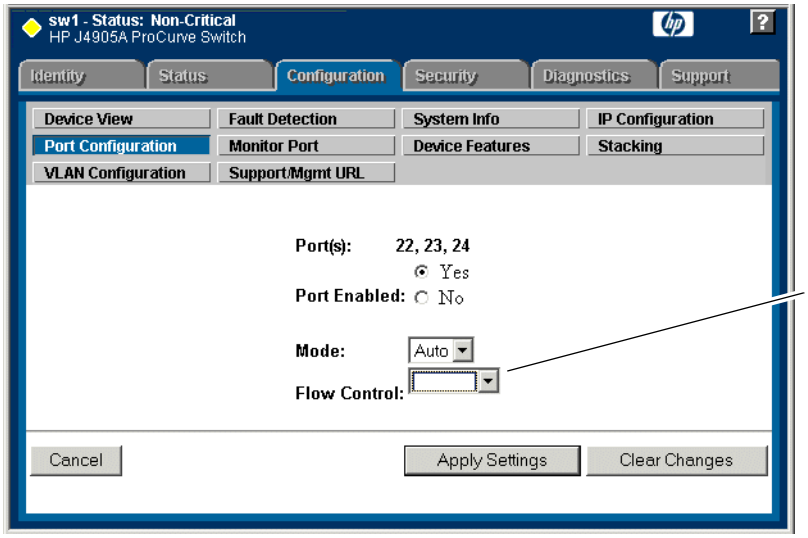
7. If you do not need trunks, such as on a one-switch system, skip to the next step in

this procedure. If you need trunks, such as on a two-switch system with ISLs, do the following:

a. Select (Ctrl + Click) the trunked ports. Typically the trunked ports are at the bottom of the list and are labeled Trk1.

b. Click **Modify Selected Ports**.

If prompted, log in as administrator.



c. For the trunked ports, set Port Enabled to **Yes**. On some switch models, some ports are disabled by default, so make sure you enable them. Leave Mode as default of **Auto**.

d. Set Flow Control as follows:

- Set to **Enable**.

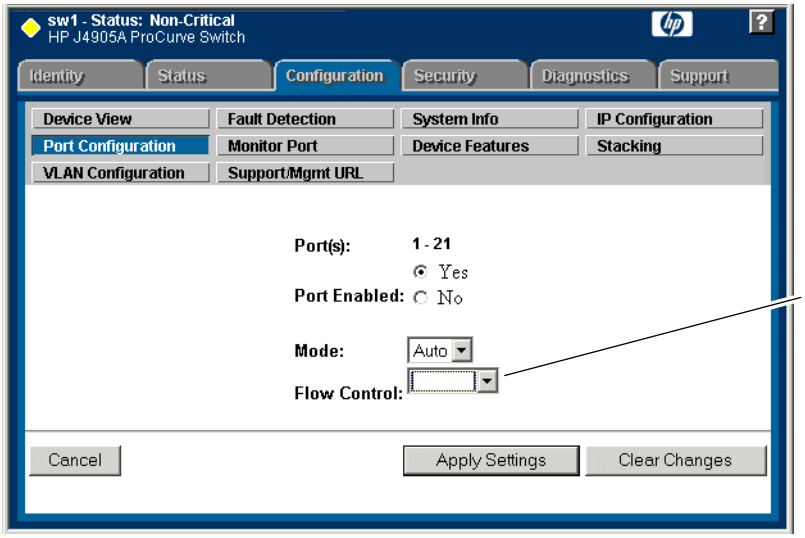
NOTE: This setting is for the 2900 series switch. Other switch models might require a different setting.

e. Click **Apply Settings**.

8. On the Port Configuration page, do one of the following:

- If you do not have trunks, select all ports.
- If you have trunks, select the remaining ports (the ports not trunked).

9. Click **Modify Selected Ports.**



10. Make sure Port Enabled is set to **Yes**, leave Mode as default of **Auto**.

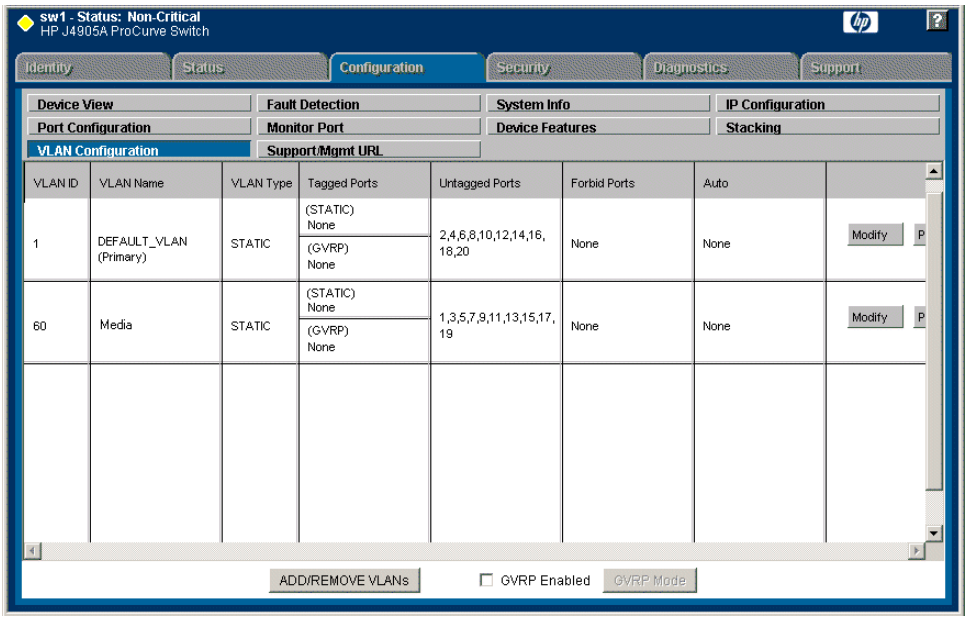
11. Set Flow Control as follows:

- Set to **Enable**.

NOTE: This setting is for the 2900 series switch. Other switch models might require a different setting.

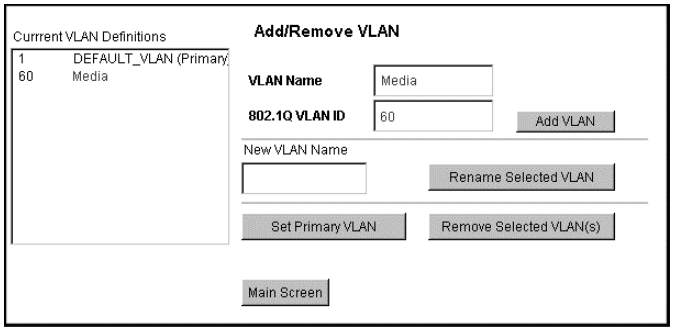
12. Click **Apply Settings**. Wait until settings are applied and the Web interface becomes active.

13. Choose **VLAN Configuration**. If prompted, log in with the switch's administrator username and password.



14. Create a new Media (iSCSI) VLAN as follows:

    a. Click **Add/Remove VLANs**.



    b. In the VLAN Name field enter `Media`.

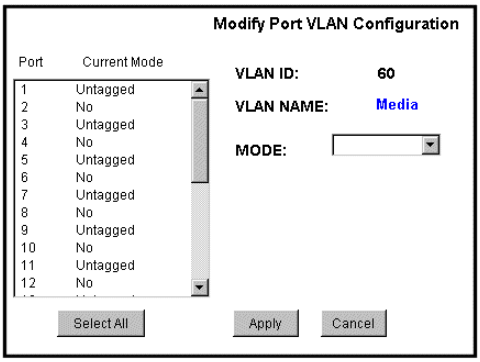
    c. In the VLAN ID field enter `60`.

    d. Click **Add VLAN**.

    e. Click **Main Screen** to return to VLAN Configuration.

15. Configure the Media VLAN as follows:

    a. In the Media VLAN row, click **Modify**.



b. Select all the odd numbered ports. (Tip: Use Ctrl + Click.)

c. In the Mode drop-down list, select **Untagged**, then click **Apply**. This removes the odd ports from the default (Control) VLAN.

   If you have a trunk, do not configure it as "Tagged". Media VLAN traffic (iSCSI) does not go over the trunk.

16. Click the **VLAN Configuration** tab.

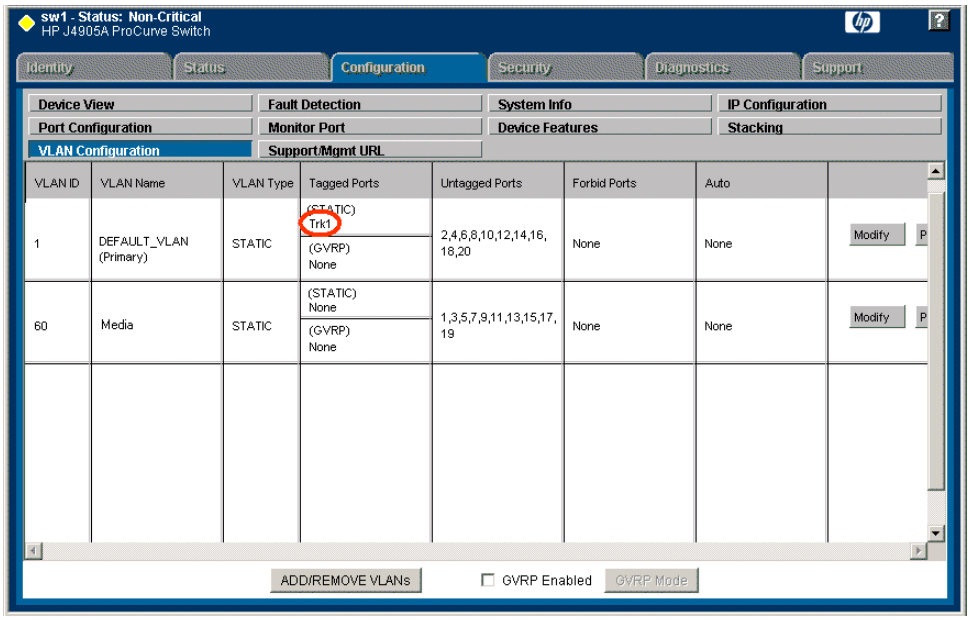
17. If you have a trunk, configure the default (Control) VLAN as follows:

    a. In the DEFAULT_VLAN row, click **Modify**.

    b. In the Current Mode list box, scroll down and select the trunk.

    c. In the Mode drop-down list, select **Tagged**, then click **Apply**. This allows default VLAN traffic (non-iSCSI) to go over the trunk.

18. Click the **VLAN Configuration** tab.



19. If you have a trunk, verify that for the default VLAN the trunk is displayed in the Tagged Ports column.
20. If you have two switches, repeat this procedure for the other switch.
21. Close the switch configuration application.

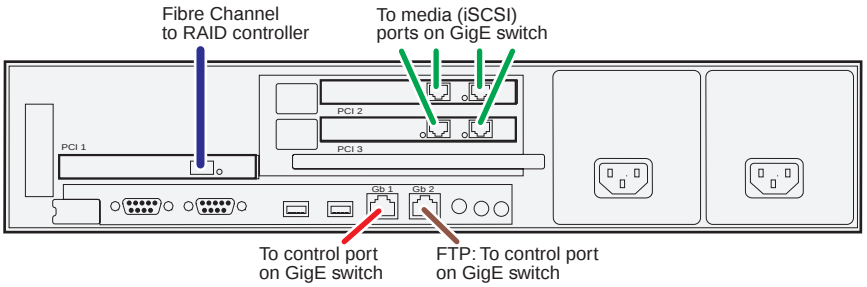
Setting up the LS K2 Media Server for Level 30

The Dell PowerEdge 2950 is qualified as the platform for the LS K2 Media Server.

Do the following to prepare the LS K2 Media Server for Level 30:

- Install the server in its permanent location. Refer to the rack mount instructions that you received with the server's product bundle.
- Provide power to the servers.
- Connect cables as follows:

Dell 2950 PowerEdge server



Connect the four iSCSI interface ports to media ports on the GigE switch. Connect the motherboard GigE port 1 and GigE port 2 to control ports on the GigE switch.

Connect the Fibre Channel port to the RAID storage device.

- Assign a control network IP address to GigE port 1. Use standard Windows procedures. Refer to "Networking tips" on page 106.
- Change the hostname. Use standard Windows procedures.
- Configure SNMP properties so the trap destination points to the NetCentral server PC. Use standard Windows procedures. If you are not using the SNMP community name "public", configure the community name and set permissions to RW. Also make sure that the Authentication trap is enabled.

Also refer to "K2 Media Server descriptions" on page 653.

Setting up the NH1 K2 Media Server

If your system has one or more NH1 K2 Media Servers, prepare the servers using this section.

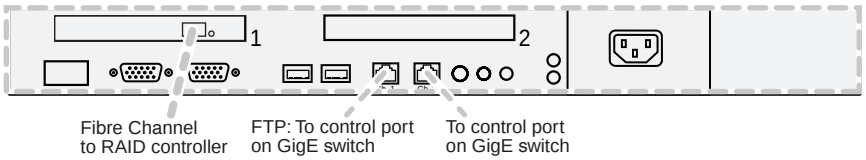
The Dell PowerEdge 1950 is qualified as the platform for the NH1 K2 Media Server.

Do the following to prepare a NH1 K2 Media Server:

- Install the server in its permanent location. Refer to the rack mount instructions that

you received with the server's product bundle.

- Provide power to the server.
- Connect cables as follows:



  Connect the motherboard GigE port 1 (control) and GigE port 2 (FTP) to control ports on the GigE switch.

  Connect the Fibre Channel port to the RAID storage device.

- Assign a control network IP address to GigE port 1. Use standard Windows procedures. Refer to "Networking tips" on page 106.
- Change the hostname. Use standard Windows procedures.
- Configure SNMP properties so the trap destination points to the NetCentral server PC. Use standard Windows procedures. If you are not using the SNMP community name "public", configure the community name and set permissions to RW. Also make sure that the Authentication trap is enabled.

Also refer to "K2 Media Server descriptions" on page 653.

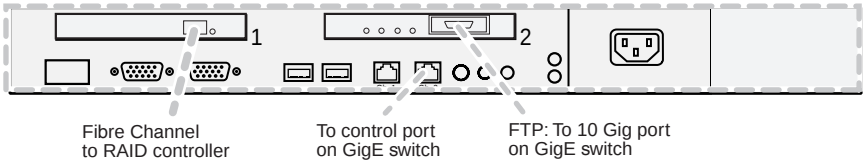
Setting up the NH1-10GE K2 Media Server

If your system has one or more NH1-10GE K2 Media Servers, prepare the servers using this section.

The Dell PowerEdge 1950 is qualified as the platform for the NH1-10GE K2 Media Server.

Do the following to prepare a NH1-10GE K2 Media Server:

- Install the server in its permanent location. Refer to the rack mount instructions that you received with the server's product bundle.
- Provide power to the server.
- Connect cables as follows:



  Connect the motherboard GigE port 1 (control) to a control port on the GigE switch.

  Connect the 10 Gig FTP port to the 10 Gig port on the rear of the GigE switch.

  Connect the Fibre Channel port to the RAID storage device.

- Assign a control network IP address to GigE port 1. Use standard Windows

procedures. Refer to “Networking tips” on page 106.

- Change the hostname. Use standard Windows procedures.
- Configure SNMP properties so the trap destination points to the NetCentral server PC. Use standard Windows procedures. If you are not using the SNMP community name “public”, configure the community name and set permissions to RW. Also make sure that the Authentication trap is enabled.

Also refer to “K2 Media Server descriptions” on page 653.

Setting up the L30 RAID chassis

Do the following to prepare the L30 RAID storage devices:

- Install the chassis in its permanent location. After mounting the chassis in the rack, you must secure brackets to the front rail to support the Grass Valley bezel. Refer to the *K2 Lx0 RAID Instruction Manual* for rack mount instructions.
- “Connect the L30 RAID Primary and Expansion chassis” on page 510
- “Power on the L30 RAID chassis” on page 511

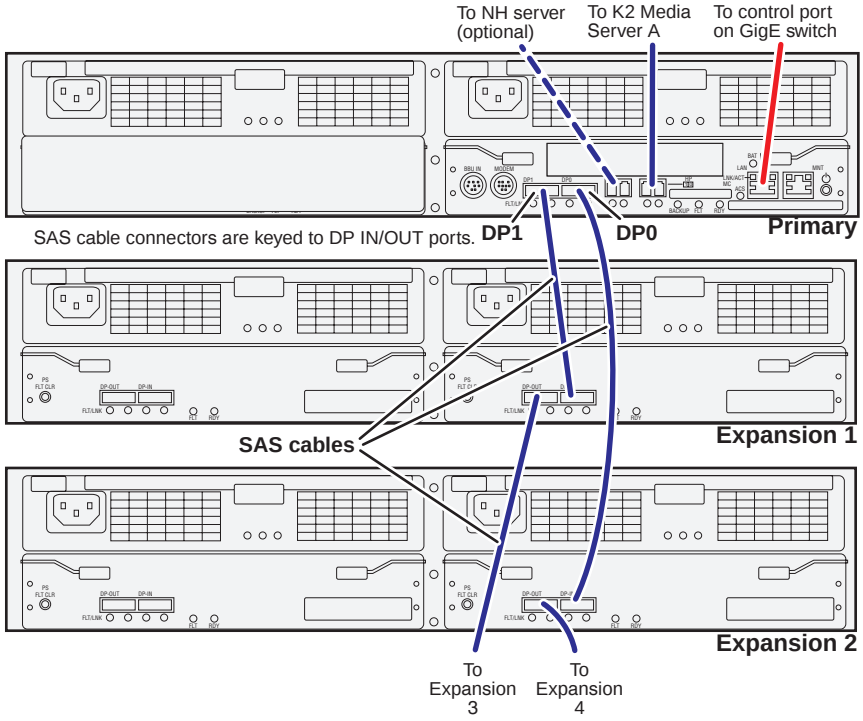
In addition, you will configure network settings, SNMP settings, and bind RAID disks. These tasks are part of the K2 System Configuration application and Storage Utility procedures later in this chapter.

On the L30 RAID, you do not need to manually set a Fibre Channel address ID on controllers or a chassis address on Expansion chassis.

Also refer to “K2 RAID storage description” on page 659.

Connect the L30 RAID Primary and Expansion chassis

Connect Ethernet, Fibre Channel, and SAS cabling as shown.



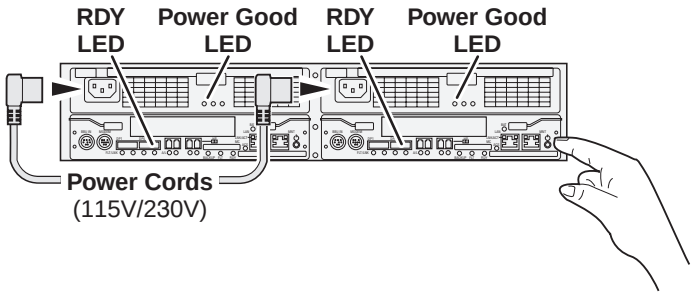
If you have more Expansion chassis than those illustrated, continue the indicated cabling pattern, alternating connections for additional Expansion chassis between DP1 and DP0. Expansion chassis 1, 3, 5, 7, and 9 connect to DP1. Expansion chassis 2, 4, 6, 8, and 10 connect to DP0.

Once the RAID storage is connected and configured, do not swap Expansion chassis or otherwise reconfigure storage. If you connect an Expansion chassis in a different order or to the wrong controller, the controller will see a configuration mismatch and fault.

Power on the L30 RAID chassis

Connect power cords and power up RAID storage devices as follows:

1. Verify power and cabling.
2. Press and hold down the power button on the controller, as shown.



If the RAID chassis has two controllers, you can press the power button on either controller. You do not need to press both power buttons.

Pressing the power button on a controller also powers on any connected Expansion chassis. There are no power buttons on Expansion chassis.

3. Release the power button when the Power Good LED on the power supply is illuminated. This takes 1-3 seconds.
4. Wait while the primary RAID chassis performs self-test and initialization. This takes about four minutes. While this is taking place, the RDY LED is illuminated with a steady on light.
5. Watch for the RDY LED to begin blinking at one second intervals. The LED might turn off and back on two times before starting the one second blink pattern. When the RDY LED is blinking at one second intervals, the self-test and initialization is complete and the chassis is ready for use.

Your preparations for L30 RAID storage are now complete.

Preparing K2 Storage System clients

Any devices that function as iSCSI clients to the K2 Storage System must be prepared with the following requirements:

- One or more connections to the control network.
- A static IP address for the control network.
- For a non-redundant K2 Storage System, one connection to the media (iSCSI) network.

Additional steps that are required for Aurora Edits include the following:

- Implement Aurora Edit security features.
- Install SNFS software and K2 software.

For more information, refer to the *Aurora Edit Installation and Configuration Guide*.

For more information refer to the *K2 Media Client System Guide*.

K2 configuration and NetCentral

Before you begin using the K2 System Configuration application to configure the storage system, you should set up the NetCentral system according to the following requirements:

- **NetCentral installed** — NetCentral server software must be installed on a NetCentral server PC. This can be the K2 configuration Control Point PC or another PC that has network communication with the K2 Storage System control network.
- **Device providers installed** — A device provider must be installed on the NetCentral server PC for each type of device in the K2 Storage System. For a Level 30 storage system, the following device providers must be installed:
  - Control point PC device provider — This is the Windows monitoring device provider.
  - K2 Media Server device provider
  - HP Gigabit Switch device provider or Cisco Gigabit Switch device provider
  - K2 Media Client device provider, if any K2 Media Clients are accessing the Level 30 storage system.
  - Device provider for iSCSI clients, if any iSCSI clients such as Aurora Edits are accessing the Level 30 storage system.
  - K2 L30 RAID storage device provider. This device provider supports RAID devices for Levels 10, 20, and 30.
- **Grass Valley PC Monitoring software installed** — This software must be installed on the K2 configuration Control Point PC. It includes Grass Valley SNMP agents and other WMI based components to perform process monitoring. This provides the information for some of the SNMP trap messages that must be sent to NetCentral.
- **Control Point PC monitored by NetCentral** — The K2 configuration Control Point PC should be added to the NetCentral system and fully monitored by NetCentral. This means that its SNMP trap destination is set to send SNMP traps to the NetCentral server PC. Whether the Control Point PC and the NetCentral server PC are the same PC or are different PCs, you should still add the Control Point PC to NetCentral.

Refer to the *NetCentral User Guide* to set up the NetCentral system. After installing a device provider, you can find additional documentation about monitoring that type of device on the NetCentral Help menu.

Networking for Level 30

Use the topics in this section to configure the Gigabit Ethernet (GigE) network for the Level 30 storage system.

- "Networking requirements" on page 514
- "Networking tips" on page 515
- "Setting up host tables" on page 516
- "Testing the control network" on page 517

Networking requirements

Required networking strategies for a Level 30 K2 Storage System (a non-redundant K2 Storage System) are as follows:

- Three networks:
  - Media network — Exclusively for iSCSI traffic.
  - Streaming/FTP network — For media transfers and FTP traffic.
  - Control network — For all other non-streaming, non-iSCSI traffic.
- Networks must be on separate subnets.
- The Media (iSCSI) network traffic is kept separate from any other traffic. This separation is provided by dedicated Gigabit ports, cables, and by a dedicated VLAN on the HP GigE switch or by separate switches.
- K2 Media Servers have a dedicated FTP port. Make a dedicated FTP connection to the FTP port.
- While control and FTP traffic is each on its own subnet, it is not required that each type of traffic has its own VLAN on GigE switches. For example, you make both FTP and control connections to the "control" ports (DEFAULT_VLAN) on the HP GigE switch.
- Static IP addresses are required for the media network on K2 Storage System iSCSI devices. This includes K2 Media Servers, generic iSCSI clients (such as Aurora Edits), and K2 Media Clients.
- Machine names (host names) assigned to each K2 device.
- Host tables (hosts files) provide name resolution on each K2 Media Client, iSCSI client, and K2 Media Server.
- IP addresses for FTP/streaming ports must have name resolution such that hostnames are appended with the "_he0" suffix. You can use host tables (as in "Setting up host tables" on page 516) or another mechanism to provide the name resolution. This directs the streaming traffic to the correct port. Refer to the *K2 Media Client System Guide* for a complete explanation.
- K2 Media Servers (including optional NH servers) must be on the streaming network, as they provide the FTP interface for shared storage streaming traffic. Shared storage K2 Media Clients do not need to be on the streaming network because they do not send or receive streaming traffic.

- On the shared storage K2 Media Client, the two control GigE ports are configured as a team. The control team shares a single IP address. Do not attempt to un-team the control ports. On the Level 30 K2 Storage System, only one control port is connected, as control team redundancy is not supported.
- On the shared storage K2 Media Client, the two media (iSCSI) GigE ports are not teamed. On the Level 30 K2 Storage System, only one media port is connected, as iSCSI redundancy is not supported.

Also refer to "About networks and FTP" on page 684 and "Design considerations for Ethernet switches" on page 759.

Use the following procedures as necessary to implement your networking strategies.

NOTE: It is recommended that you configure Media network (iSCSI) IP addresses and Streaming network IP addresses using the K2 System Configuration application, rather than doing so on the local machine using standard Windows procedures.

Networking tips

- Before beginning network configuration, determine the IP addresses and names needed for the machines in your K2 system. Work with the network administrator at your facility to have those IP addresses and names available for your use.
- Establish a consistent convention for machine names and IP addresses. It is recommended that you embed a root name or other unique identifier for this particular K2 Storage System in the computer name. Also, a common convention for IP addresses is to use a numerical pattern or sequence in the IP addresses to indicate device-types and/or ports, as in the following example:

NOTE: This example assumes a subnet mask of 255.255.255.0

Example of Level 30 names and IP addresses

Computer name	Device type	Streaming network addresses	Control network addresses	Media network addresses	Comments
root_server_1	K2 Media Server	192.168.101.11[a]	192.168.100.11	192.168.99.11	—
				192.168.99.12	
				192.168.99.13	
				192.168.99.14	
root_server_2 (optional)	NH K2 Media Server	192.168.101.21[b]	192.168.100.21	—	This server has roles of FTP server and NAS server only.
root_raid_1	RAID	—	192.168.100.51	—	—
root_gige_1	GigE switch	—	192.168.100.61	—	—
root_cppc_1	Control point PC	—	192.168.100.81	—	—
root_client_1	iSCSI client	—	192.168.100.111	192.168.99.111	—
root_client_2	iSCSI client	—	192.168.100.121	192.168.99.121	
root_client_3	iSCSI client	—	192.168.100.131	192.168.99.131	
root_client_4	iSCSI client	—	192.168.100.141	192.168.99.141	

[a] This IP address must resolve to hostname root_server_1_he0
[b] This IP address must resolve to hostname root_server_2_he0

Setting up host tables

The *hosts* file is used by the control network and the streaming/FTP network to determine the IP address of devices on the network when only a the device name (hostname) is given. The steps that follow describe how to edit the *hosts* file located at *C:\Windows\system32\drivers\etc\hosts* on Windows XP and Windows 2003 Server operating system computers. If you include the names and addresses of all the devices on the network, then you can copy the same file onto all the other K2 devices instead of editing the *hosts* file on each K2 device.

For FTP transfers on a K2 Storage System, transfers go to/from K2 Media Servers that have the role of FTP server. No transfers go directly to/from the shared storage K2 Media Clients that are on the K2 Storage System. So in the hosts file, you must add the “he_0” extension to a K2 Media Server hostname and associate that hostname with the K2 Media Server’s FTP/streaming network IP address.

Refer to the *K2 Media Client System Guide* for more information.

To edit the *hosts* file manually:

1. Open the following file using Notepad or some other text editing application:

   C:\Windows\system32\drivers\etc\hosts

2. Enter all IP addresses with machine names. The text format is simple. First type the Ethernet IP address, then use the TAB key or Space bar to insert a few spaces. Then

type the machine name.

Here is an example:

```
192.168.100.11     root_server_1
192.168.101.11     root_server_1_he0
192.168.100.21     root_server_2
192.168.101.21     root_server_2_he0
192.168.100.51     root_raid_1
192.168.100.61     root_gige_1
```

3. Save the file and exit the text editor.
4. Copy the new *hosts* file onto all the other machines. This is easier than editing the file on each machine.

Host table tips

- If transferring to or from a Profile XP or Open SAN system via UIM, the *hosts* file must also follow UIM naming conventions for those systems. Refer to the UIM Instruction Manual.
- Do not enter media (iSCSI) network IP addresses in the host table, as hostname resolution is not required for the media network.
- Use the following tip with care. While it can solve a problem, it also introduces a name resolution "anomaly" that might be confusing if not considered in future troubleshooting activities.

  For each SAN (shared storage) K2 Media Client, add the "_he0" suffix to the hostname but then associate that hostname with the K2 Media ***Server's*** FTP/ streaming network IP address, ***not*** the K2 Media ***Client's*** IP address. Aliasing K2 Media Client hostnames in this way would not be required if the transfer source/ destination was always correctly specified as the K2 Media Server. However, a common mistake is to attempt a transfer in which the source/destination is incorrectly specified as the K2 Media Client. The host file aliasing corrects this mistake and redirects to the K2 Media Server, which is the correct transfer source/ destination.

  An example of a *hosts* file entry with this type of aliasing is as follows:

```
192.168.101.11     server_1_he0 client_1_he0 client_2_he0
```

Testing the control network

To test the control network use the *ping* command as follows:

1. On the control point PC, click **Start | Run**. The Run dialog box opens.
2. Type `cmd` and click **OK**. The command prompt window opens.
3. Type `ping`, then a space, then the name of one of your K2 Storage System devices, such as the Gigabit Ethernet switch, as in the following example:

   ```
   ping root_gige_1
   ```

4. Press **Enter**.

The ping command should return the IP address of the device, as in the following example:

```
Pinging root_gige_1.mycorp.com [192.168.100.61] with
32 bytes of data:


Reply from 192.168.100.61: bytes=32 time=10ms TTL=127
Reply from 192.168.100.61: bytes=32 time<10ms TTL=127
Reply from 192.168.100.61: bytes=32 time<10ms TTL=127
Reply from 192.168.100.61: bytes=32 time<10ms TTL=127
```

This verifies that the name of the device is being correctly resolved to the IP address, which indicates that on the Control Point PC the host table entry is correct.

5. Ping the other K2 Storage System devices to which you have assigned control network IP addresses.
6. Go to each Windows device in the K2 Storage System and repeat this procedure. This verifies that network communication is correct to and from all devices.

Configuring the Level 30 storage system

Use the topics in this section to do the initial configuration of the Level 30 storage system.

- "Prerequisites for initial configuration" on page 519
- "Defining a new K2 Storage System" on page 520
- "Configuring the server - Part 1" on page 522
- "Configuring RAID" on page 524
- "Creating a new file system" on page 529
- "Configuring the server - Part 2" on page 531
- "Configuring optional NH servers" on page 533

Prerequisites for initial configuration

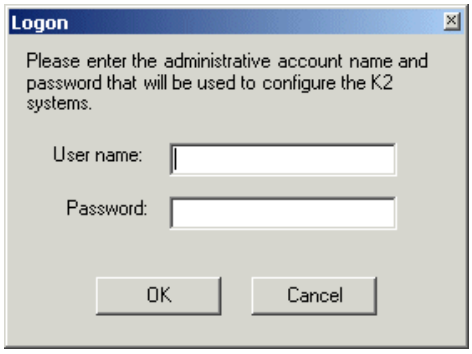
Before beginning your initial configuration, make sure the devices of the K2 Storage System meet the following prerequisites. Refer to sections earlier in this manual for detailed information. Also refer to Chapter 14, "Description of K2 Storage Devices".

Devices	Prerequisite for Level 30 configuration
Control point PC	Ethernet cable connected Control Point software installed Control network IP address assigned Network communication over the control network with all other K2 devices Power on
Ethernet switch	Ethernet cables connected Control network IP address assigned VLANs set up Trunks set up Power on
K2 Media Server	Ethernet cables connected Fibre Channel cable connected Software installed, as from the factory, including QuickTime 7 Control network IP address assigned Power on for all servers

Defining a new K2 Storage System

Define a Level 30 K2 Storage System as follows:

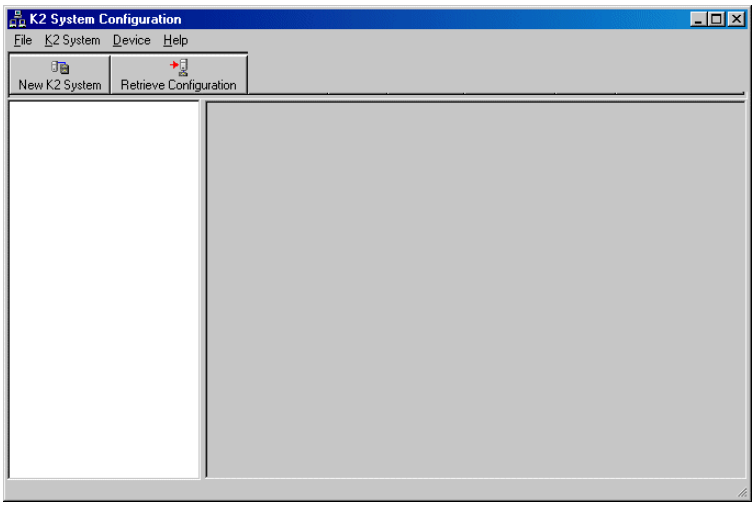
1. On the control point PC, open the K2 System Configuration application. A login dialog box opens.



2. Log in to the K2 System Configuration application with the Windows administrator account. By default this as follows:

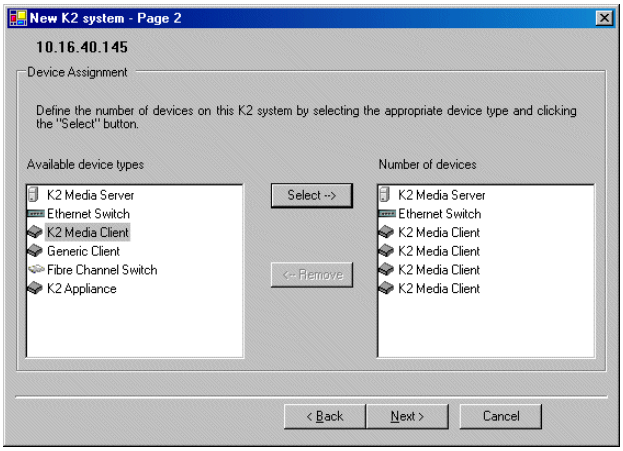
   - Username: administrator
   - Password: adminK2

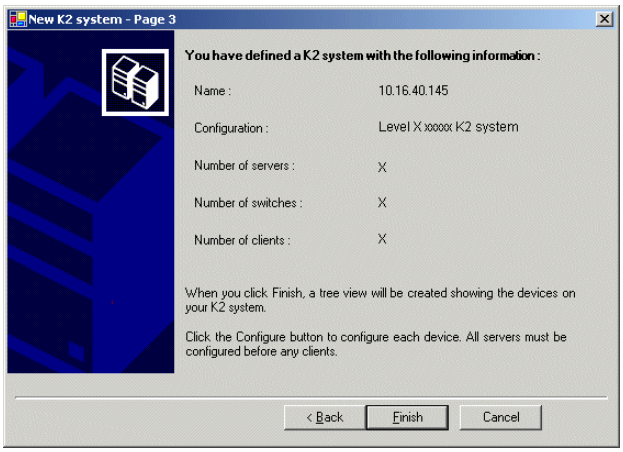
   Refer to "Setting up application security" on page 688 for more information about administrator accounts and logging in to applications.



3. Click **New K2 System**. The New K2 System wizard opens.

4. Follow the on-screen text to define your Level 30 K2 Storage System, as described in the following table.

On this page…	Do this…
Page 1	 Create a name for your Level 30 K2 Storage System and type it in the Name box. Select **Level 30**. Do not select the Server redundancy option. Click **Next**
Page 2	 Move the following into the Number of Devices Box: • One K2 Media Server • One Ethernet switch • K2 Media Clients as appropriate for your system. • (Optional) One or more K2 Media Servers to represent each NH K2 Media Server on your system. • (Optional) Other devices as appropriate for your system. Click **Next**.

On this page...	Do this...
Page 3	 Review the information on this page and verify that you have correctly defined your K2 Storage System. For a Level 30 storage system you should have the following: • One Gigabit Ethernet switch • One K2 Media Server • Optionally, one or more NH K2 Media Servers • The number and type of clients appropriate for your system. Click **Finish**. The Define New K2 Storage System wizard closes.

Your K2 Storage System appears in the tree view of the K2 System Configuration application.

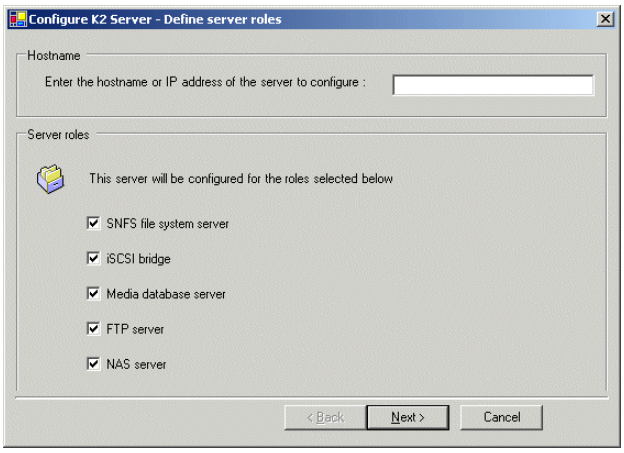
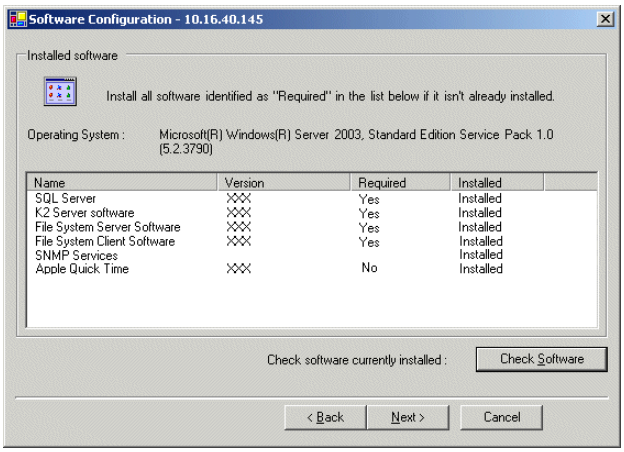
5. Continue with the next procedure.

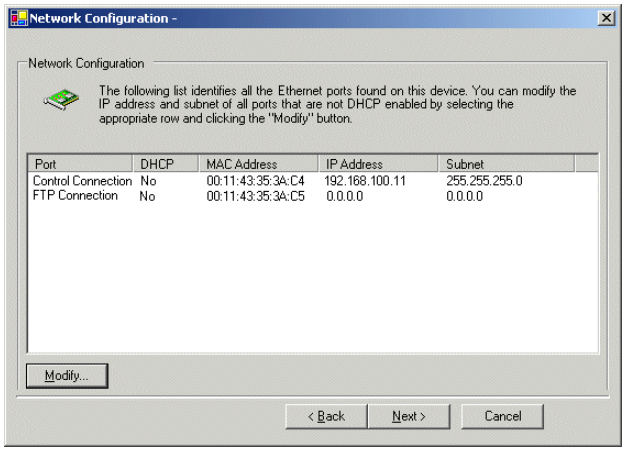
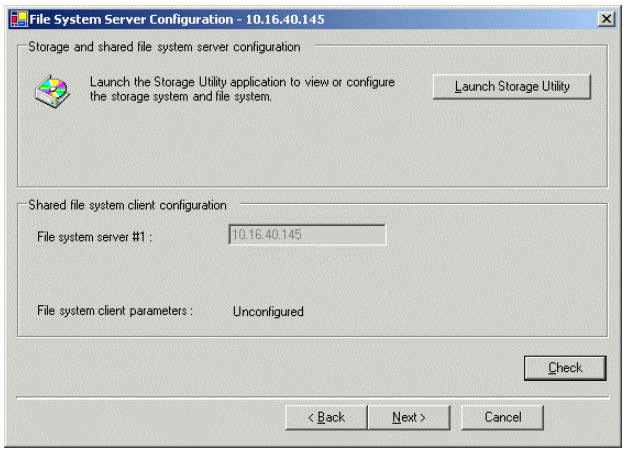
Configuring the server - Part 1

1. In the K2 System Configuration application tree view, select [**K2Server1]**.

2. Click the **Configure** button. The Configure K2 Server wizard opens. Follow the on-screen text to configure the for a Level 30 K2 Storage System, as

described in the following table:

On this page…	Do this…
Define server roles	 Enter the name or IP address for the K2 Media Server, as currently configured on the machine. For Level 30, select all roles. Click **Next**
Software Configuration This page checks for the software required to support the roles you selected on the previous page. Software required on the Level 30 K2 Media Server is as follows: • SQL Server • K2 Server • File System Server • File System Client • SNMP Services • QuickTime	 If software with *Yes* in the Required column reports as *Not Installed*, you must first install it on the before continuing. Refer to *Chapter 16, Managing K2 software*. After installing the software, click **Check Software**. When all required software reports as *Installed*, click **Next**.

On this page…	Do this…
Network Configuration This page displays the control network Ethernet port, and allows you to configure the FTP/ Streaming network Ethernet port. ***NOTE: This page does not configure the iSCSI interface (media network) ports.***	 The top port is the port over which the K2 System Configuration application is communicating with the. If correctly configured, it is already assigned the control network IP address, as displayed on this page. Select the other port and click **Modify**. A network configuration dialog box opens. Enter the FTP/Streaming IP address and the subnet mask and click **Apply**. Click **Next**.
File System Server Configuration	 Click **Launch Storage Manager**. Storage Utility opens.

3. Continue with the next procedure to use Storage Utility to configure the storage and file system.

   Leave the Configure K2 Server wizard open while you are using Storage Utility. When you are done with Storage Utility, you continue with the wizard.

Configuring RAID

Use Storage Utility to complete the configuration of the L30 RAID chassis, as explained in the following topics:

- "Configuring RAID network and SNMP settings"

- "Binding disk modules"

Refer to "Prerequisites for initial configuration" on page 519 to confirm that the RAID storage is ready for configuration.

Configuring RAID network and SNMP settings

Use the Storage Utility to configure the following settings for the Level 30 RAID controller:

- IP address
- Subnet mask
- Gateway Address
- SNMP trap destinations

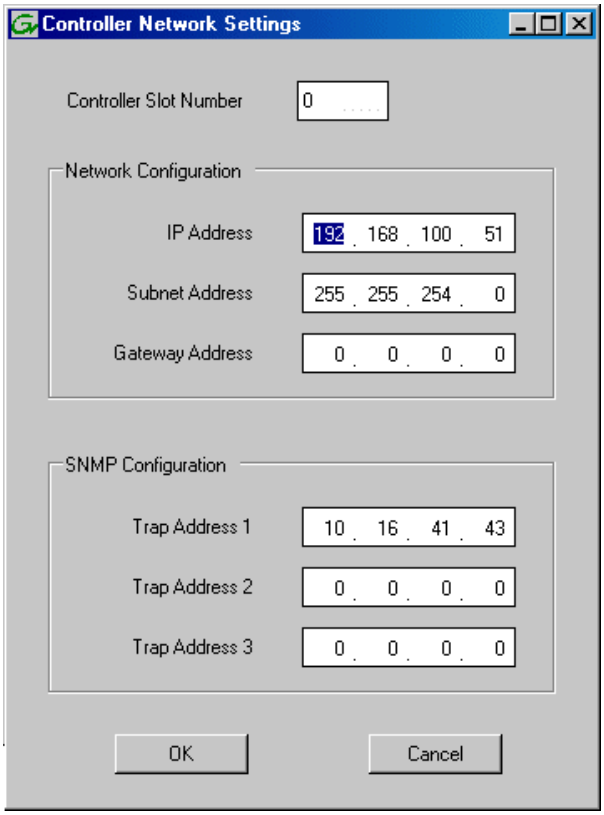
For L30 RAID, network and SNMP settings are set and stored on the RAID controller module, so the combined RAID storage devices, including the optional Expansion chassis, exist as a single entity on the control network.

The RAID storage device is configured by default for the SNMP community name "public". If your site's policies require using a different SNMP community name, contact your Grass Valley representative.

To configure these settings, do the following:

1. Launch Storage Utility from the K2 System Configuration application as in the previous procedure.
2. As prompted, wait while Storage Utility gathers system information, then Storage Utility opens.
3. In Storage Utility tree view, expand the node for the L30 RAID, right-click the icon for a L30 RAID controller, and select **Configuration | Network Properties**.

   The Controller Network Settings dialog box opens.



4. In the Controller Slot Number field enter **0** and then press **Enter**. The settings from controller 0 are loaded into the Controller Network Settings dialog box and are available for you to modify.
5. Enter the control network IP address and other network settings.
6. You want SNMP trap messages go to the NetCentral server PC, so for SNMP Configuration enter the IP address of the NetCentral server PC. You can also enter IP addresses for other SNMP managers to which you want to send SNMP trap messages.
7. Click **OK** to save settings and close.
8. In Storage Utility click **View | Refresh**. Continue with the next procedure "Binding disk modules".

Binding disk modules

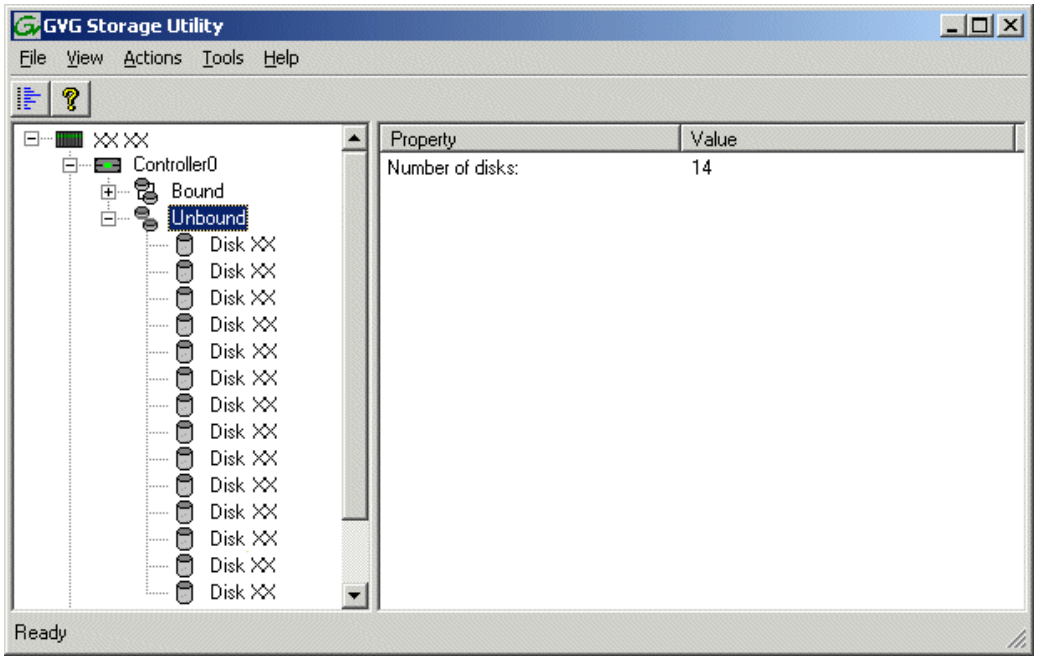
Use the following procedure to bind disk modules as required for the Level 30 storage system.

Also refer to "About RANKs and LUNs in Storage Utility" in Chapter 15, *Overview of K2 Storage Tools*.

NOTE: Binding destroys all user data on the disks.

1. In the Storage Utility main window, identify bound RANKs and unbound disks by

their placement in the hierarchy of the tree view. In the following illustration, disk numbers are represented by “XX”. Refer to “Identifying disks” on page 744 for an explanation of how disks are actually numbered in Storage Utility.

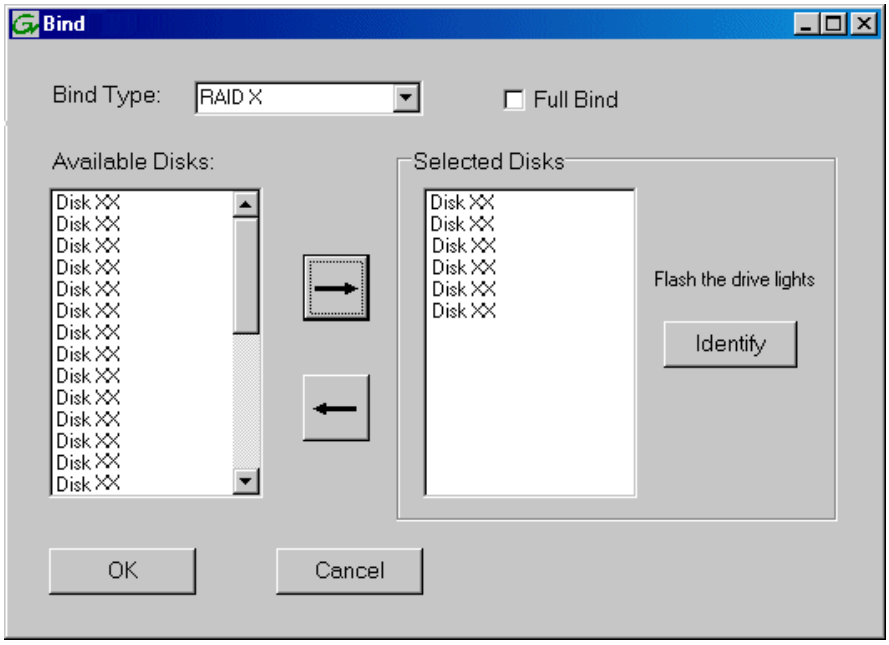


View disk properties and identify the four disks you will use for the metadata/journal RAID 1 RANKs, the one metadata/journal Hot Spare disk, any other disks that you intend to use for Hot Spares, and the remainder of the disks that are available for media storage. Make sure you select disks appropriately as you bind disks in the remainder of this procedure.

2. To bind unbound disks for media storage, do the following:

   a. Right-click the **Unbound** node for a controller, then select **Bind** in the context menu. (If the RAID chassis has two controllers, both controllers are represented by the single “Controller” node)

      The Bind dialog box opens showing all unbound disks for the controller listed in the Available Disk list.



b. Leave Full Bind unchecked. Refer to "About full/background bind" on page 748.

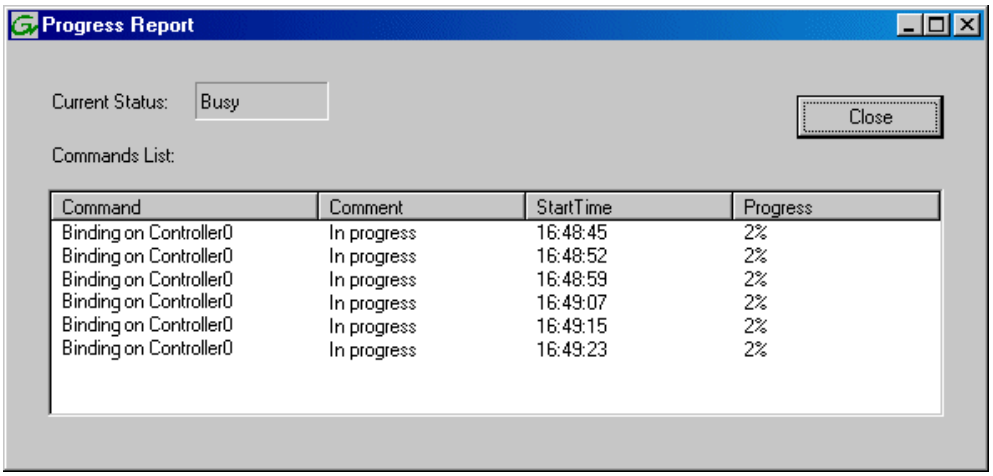
c. In the **Bind Type** drop down box, select **RAID 5** or **RAID 6**, as specified by your system design.

d. In the Available Disks box, select six contiguous disks at the top of the list. (TIP: Use 'shift-click' or 'control-click' to select disks.).

e. Click the add (arrow) button to add disks to the Selected Disks list.

NOTE: As an aid in identifying a disk module's physical location, select it in the Selected Disks list, then click* Identify Disks. *This causes the disk drive light to flash.

f. Click **OK** to close the Bind dialog box and begin the binding process. The Progress Report dialog box opens, showing the status of the binding process.



g. Close the Progress Report and repeat these steps for other unbound disks. If specified by your system design, you can bind some disks as Hot Spares, as explained in "Binding Hot Spare drives" on page 751. When you are done, if you did not bind any extra Hot Spares, you should have the following results:

   For L30 storage you should have two RAID 5 or RAID 6 RANKs of six disks each on the primary RAID storage device. For each optional Expansion chassis, you would have an additional one or two RAID 5 or RAID 6 RANKs of six disks each.

h. Click **Close** in Progress Report window.

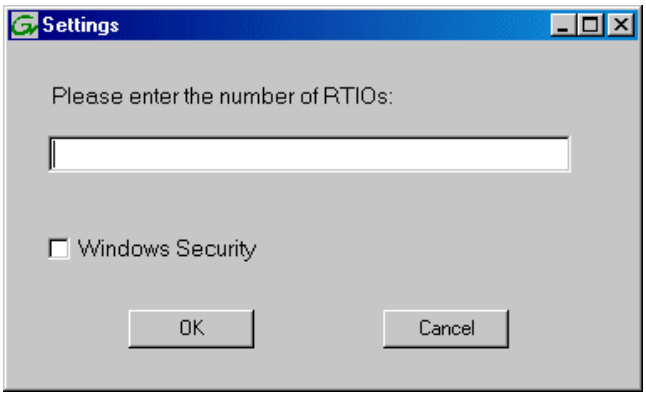
3. Restart the K2 Media Server.

NOTE: Make sure start up processes on the K2 Media Server are complete before proceeding.

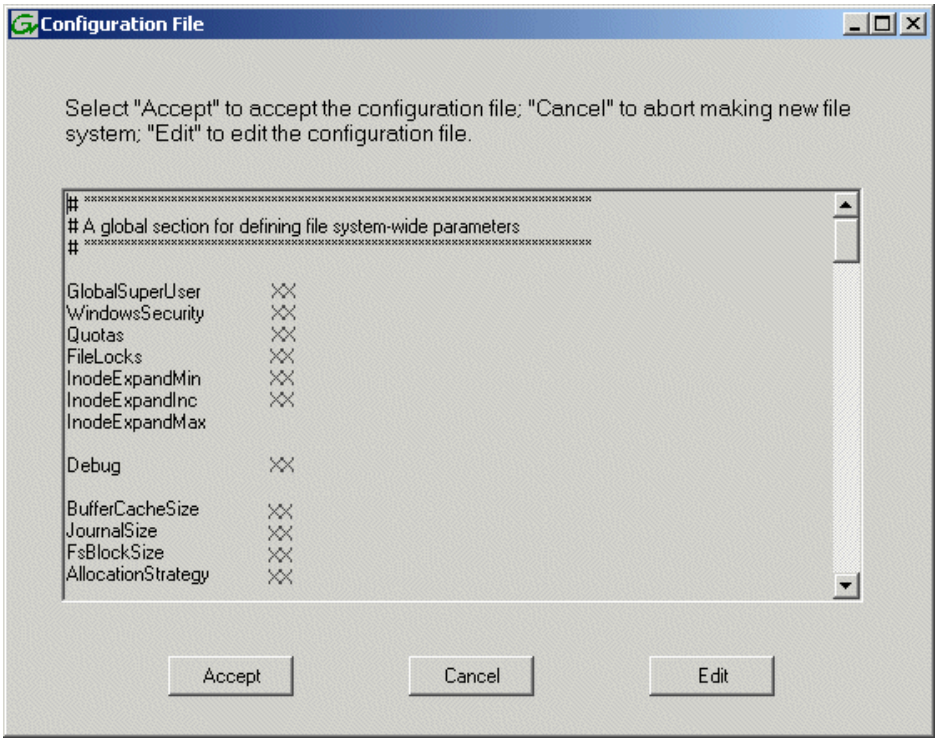
4. Continue with the next procedure "Creating a new file system".

Creating a new file system

1. In Storage Utility, click **Tools | Make New File System**. The Setting dialog box opens.



2. For the Real Time Input/Output (RTIO) rate, enter the value specified by your system design. If you do not know this value, contact your Grass Valley representative.
3. If the K2 Storage System is to be accessed by only K2 Media Clients you can leave Windows Security unchecked. If accessed by Aurora Edits, refer to the *Aurora Edit Installation and Configuration Guide* for instructions.
4. Click **OK**. The Configuration File dialog box opens.



The configuration file for the media file system is displayed. You can verify media file system parameters by viewing this file. Do not edit this file. Click **Accept**.

A "…Please wait…" message box displays progress and a "…succeeded…" message confirms the process is complete.

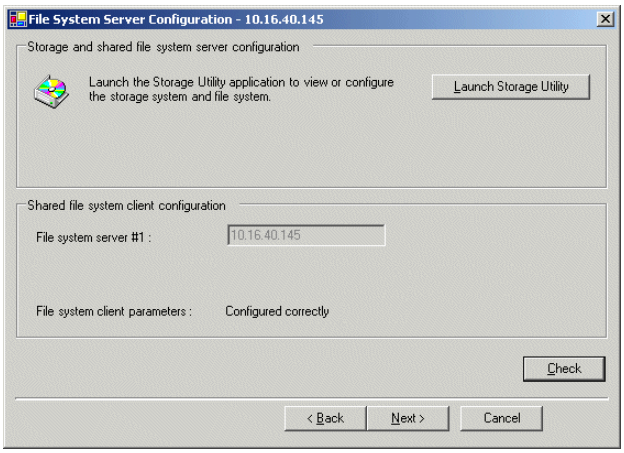
5. A message informs you that you must restart the K2 Media Server, however the restart at the end of the Configure K2 Server wizard suffices, so you do not need to restart now.
6. Close the Storage Utility.

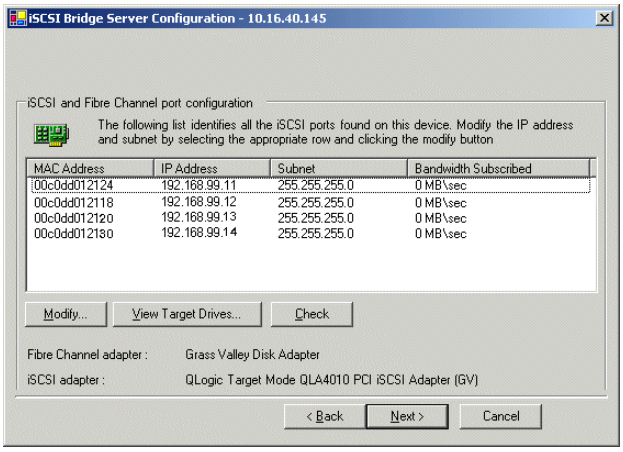
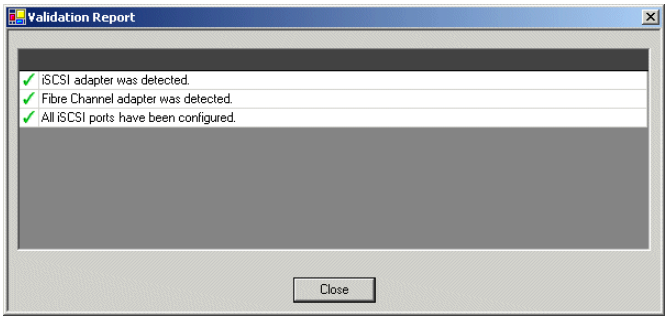
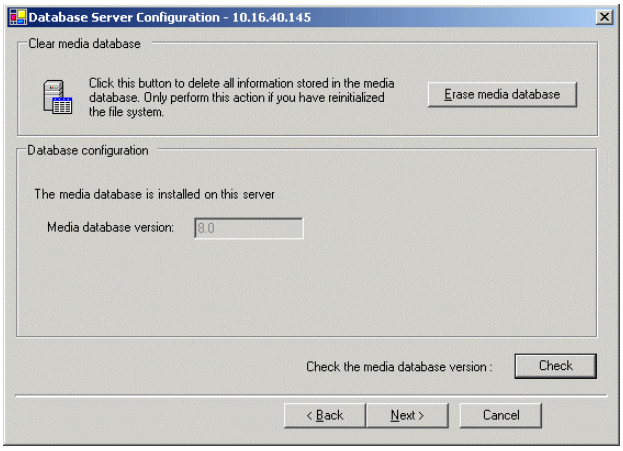
NOTE: Do not attempt to start K2 Media Clients or otherwise bring the K2 Storage System online until instructed to do so later in this chapter.

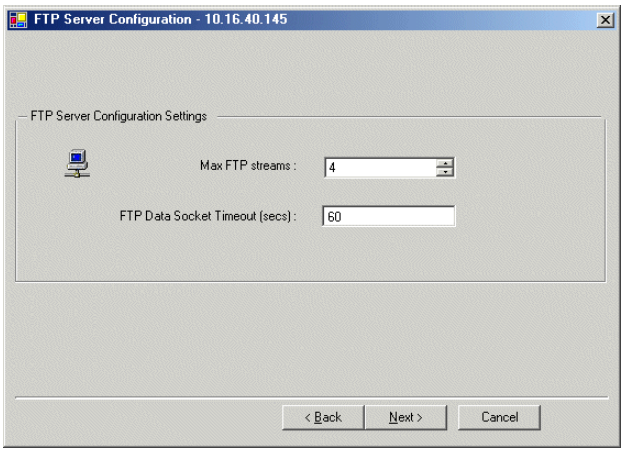
7. Continue with the next procedure.

Configuring the server - Part 2

1. Return to the Configure K2 Server page from which you launched Storage Utility and proceed as described in the following table:

On this page…	Do this…
File System Server Configuration This page checks on the configuration of the server in one of its main roles as a file system server. The server also functions as a file system client, which is also checked from this page.	 Click **Check**. When the wizard reports that the configuration is correct, click **Next**. If you get a "The V: will not be available until this device is rebooted…" message, you can safely continue with this procedure and follow the instructions related to this message later in the procedure.

On this page…	Do this…
iSCSI Bridge Server Configuration This page manages the components that bridge between iSCSI (the GigE media network) and the Fibre Channel connection to the RAID storage. You configure network settings on the iSCSI adapters and the page validates that the Fibre Channel adapter is in place and that the media RANKs are visible as iSCSI targets.	 Select an iSCSI adapter and click **Modify**. A network configuration dialog box opens. Enter the media network IP address and the subnet mask and click **Apply**. Do the same for the other iSCSI adapters. Click **Check**. The Validation Report opens.  Confirm that the iSCSI configuration is successful. Close the Validation Report and then click **Next**.
Database Server Configuration	 You do not need to enter or configure anything on this page. Click **Next**.

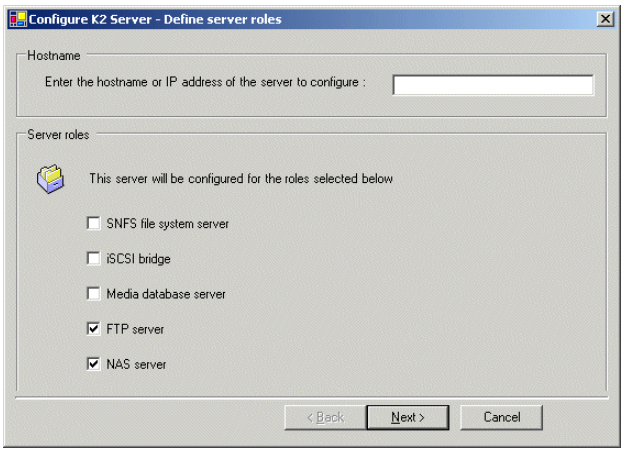
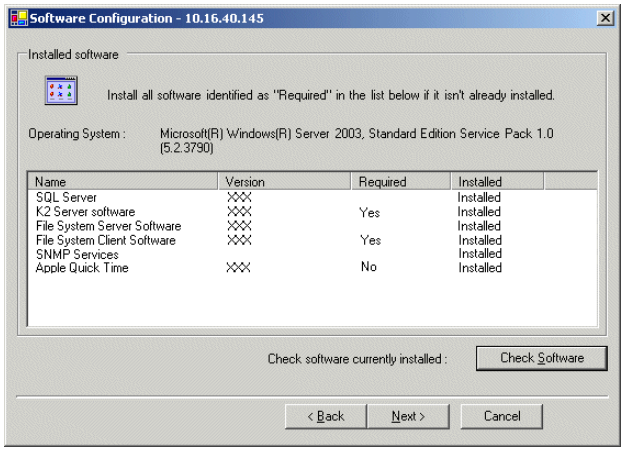
On this page…	Do this…
FTP Server Configuration	 Do not modify these settings. Leave at default values of Max FTP streams = 4 and FTP Data Socket Timeout = 60. Only qualified Grass Valley personnel should specify other values, as these settings are intended for use only with custom systems designed by Grass Valley. Click **Next**
Completing the Configuration Wizard	Click **Finish**. The wizard closes. The server restarts. Wait until all startup processes have completed before continuing.

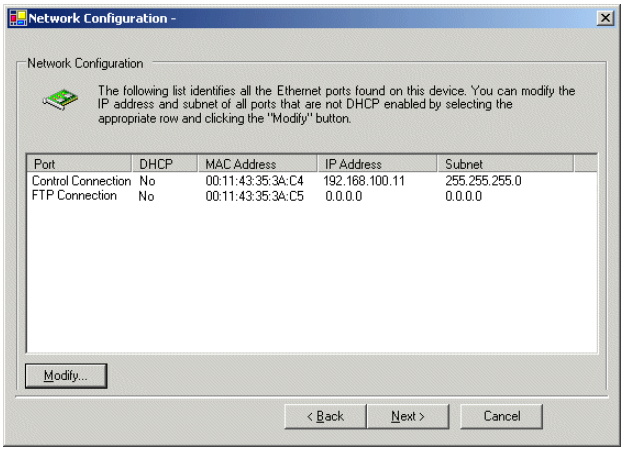
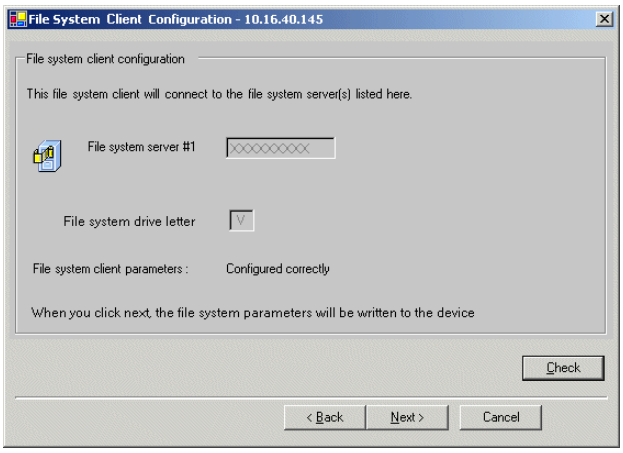
Configuring optional NH servers

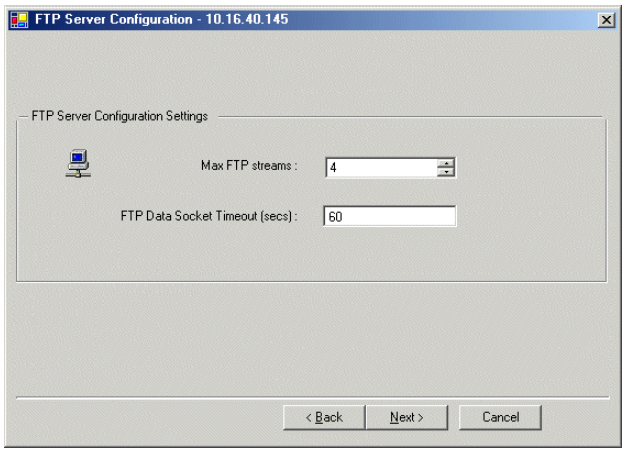
If you have one or more optional NH K2 Media Servers, you next configure those servers. This section applies to both NH1 (1 Gig FTP) servers and NH1-10GE (10 Gig FTP) servers.

NOTE: Multiple NH servers on a K2 Storage System must be of the same type, either all NH1 or all NH1-10GE.

1. In the K2 System Configuration application tree view, select the K2 Media Server you are configuring.
2. Click the **Configure** button. The Configure K2 Server wizard opens. Follow the on-screen text to configure the server for a Level 30 K2 Storage System, as described in the following table. Some screens require no input from you, as they are based on the configurations already completed on a previously configured K2 Media Server.

On this page…	Do this…
Define server roles	 Enter the name for the K2 Media Server. This should be the current network name of the machine. Select FTP server and NAS server. Click **Next**
Software Configuration This page checks for the software required to support the roles you selected on the previous page. Software required on a NH K2 Media Server is as follows: • K2 Server • File System Client • QuickTime	 If software with *Yes* in the Required column reports as *Not Installed*, you must first install it on the K2 Media Server before continuing. Refer to *Chapter 16, Managing K2 software*. After installing the software, click **Check Software**. When all required software reports as *Installed*, click **Next**.

On this page…	Do this…
Network Configuration This page displays the control network Ethernet port, and allows you to configure the FTP/ Streaming network Ethernet port.	 The top port is the port over which the K2 System Configuration application is communicating with the K2 Media Server. If correctly configured, it is already assigned the control network IP address, as displayed on this page. Select the other port and click **Modify**. A network configuration dialog box opens. Enter the FTP/Streaming IP address and the subnet mask and click **Apply**. Click **Next**.
File System Client Configuration This K2 Media Server does not function as a file system server. It does function as a file system client, which is validated from this page.	 Click **Check**. When the wizard reports that the configuration check is successful, click **Next**.

On this page…	Do this…
FTP Server Configuration	 Do not modify these settings. Leave at default values of Max FTP streams = 4 and FTP Data Socket Timeout = 60. Only qualified Grass Valley personnel should specify other values, as these settings are intended for use only with custom systems designed by Grass Valley. Click **Next**
Completing the Configuration Wizard	Click **Finish**. The wizard closes. The K2 Media Server restarts. Do not proceed until restart processes are finished.

3. Repeat this procedure for remaining NH K2 Media Servers, if any.

Your configurations for the Level 30 K2 Storage System are complete.

Adding K2 Storage System clients

You can add now clients, such as K2 Media Clients or Aurora Edits, to the K2 Storage System and configure them using the K2 System Configuration application.

- For Aurora Edits, refer to the *Aurora Edit Installation and Configuration Guide* for instructions.
- For K2 Media Clients, refer to *K2 Media Client System Guide* for instructions.

Basic operations for Level 30 storage

Use the following procedures as you work on your Level 30 storage system:

- “Level 30 system power-off procedure”
- “Level 30 system power-on procedure”

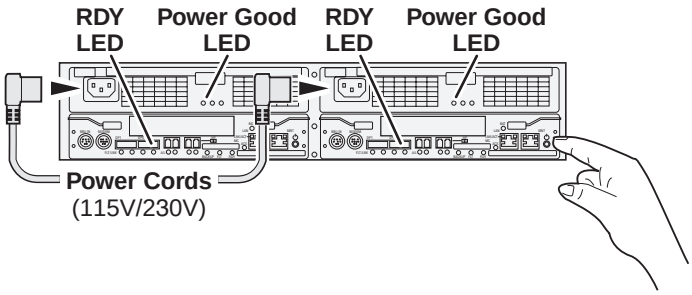
For other procedures refer to “Administering and maintaining the K2 Storage System” on page 687.

Level 30 system power-off procedure

Use the following sequence to power-off the Level 30 storage system.

1. Power-off all K2 Media clients or other iSCSI clients.

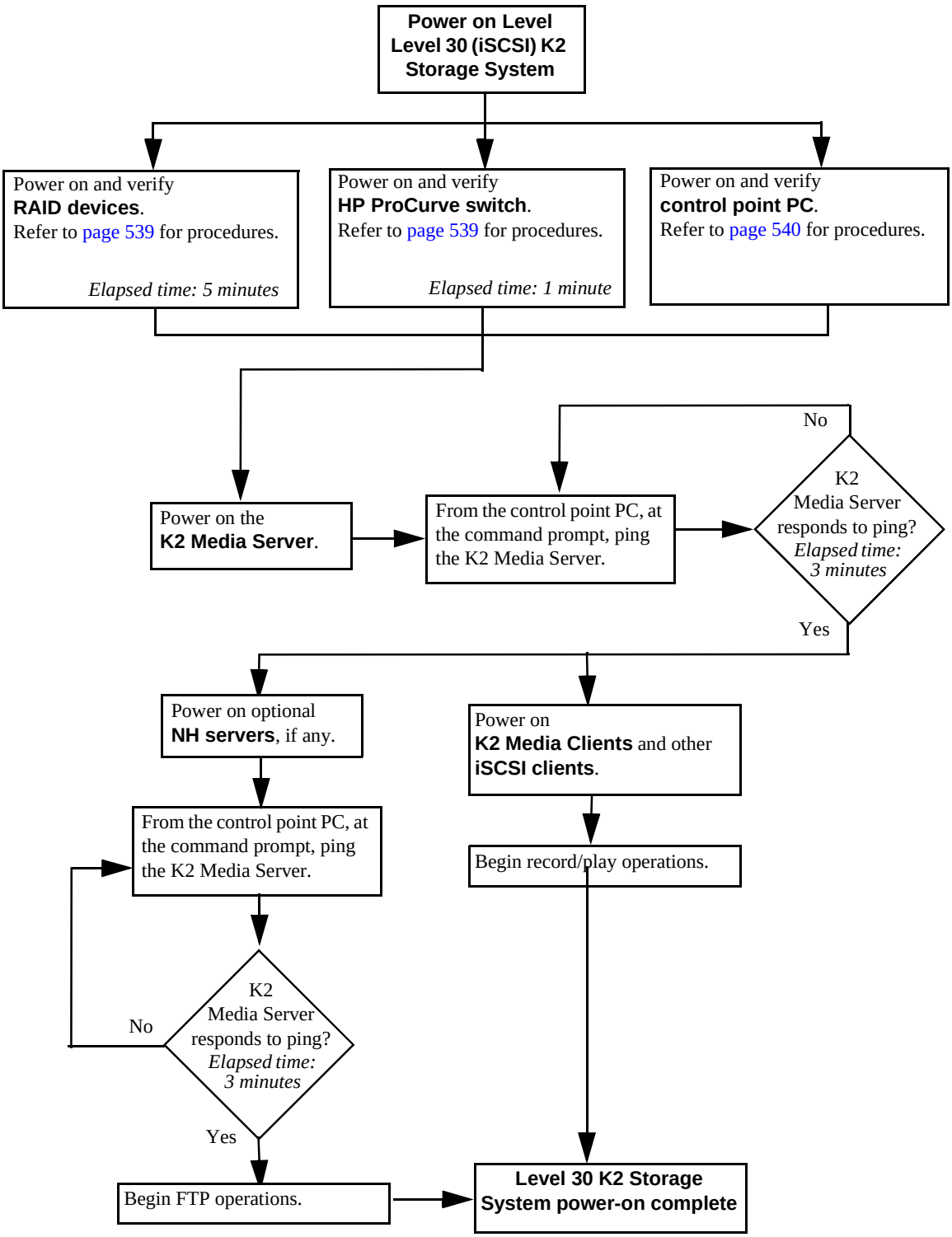
2. Shut down the K2 Media Server.
3. Shut down optional NH K2 Media Servers, if any.
4. On the primary RAID chassis controller, identify the RDY LED. It blinks at a rate of 1 blink per second during normal operation.



5. Press and hold down the power button on the RAID controller.
6. Release the power button in about 5 seconds, when the RDY LED blinks more quickly, at a rate of about 2 blinks per second. Do not hold down the power button for longer than 15 seconds.

   The power button on the RAID controller turns off power for the primary RAID chassis and any connected Expansion chassis. Power-off normally occurs within 20 seconds and is indicated when LEDs other than those on the power supplies go off and the fans stop rotating.
7. Wait for RAID power-off to complete before proceeding.
8. Power-off all Ethernet switches.
9. Power-off the control point PC and/or the NetCentral server PC, if necessary.

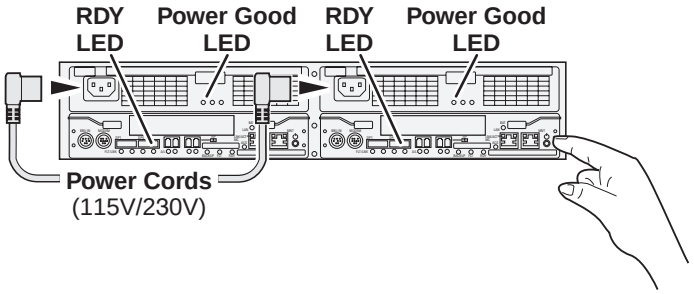
Level 30 system power-on procedure



Powering on Level 10, 20, 30, and Nearline 10 RAID storage devices

Use the following procedure to power on and verify proper operation of RAID storage devices.

1. Verify power and cabling.
2. Press and hold down the power button on the controller, as shown.



   If the RAID chassis has two controllers, you can press the power button on either controller. You do not need to press both power buttons.

   Pressing the power button on a controller also powers on any connected Expansion chassis. There are no power buttons on Expansion chassis.

3. Release the power button when the Power Good LED on the power supply is illuminated. This takes 1-3 seconds.
4. Wait while the primary RAID chassis performs self-test and initialization. This takes about four minutes. While this is taking place, the RDY LED is illuminated with a steady on light.
5. Watch for the RDY LED to begin blinking at one second intervals. The LED might turn off and back on two times before starting the one second blink pattern. When the RDY LED is blinking at one second intervals, the self-test and initialization is complete and the chassis is ready for use.

Powering on the HP ProCurve switch

Use the following procedure to power on and verify proper operation of the HP ProCurve switch.

1. Power up the switch.
2. Watch LEDs to verify proper operation. The diagnostic self test LED Behavior is as follows:
   - Initially, all the status, LED Mode and port LEDs are on for most of the duration of the test.
   - Most of the LEDs go off and then may come on again during phases of the self test. For the duration of the self test, the Test LED stays on.

   If the ports are connected to active network devices, the LEDs behave according to the LED Mode selected. In the default view mode (Link), the LEDs should be on.

- If the ports are connected to active network devices, the LEDs behave according to the LED Mode selected. In the default view mode (Link), the LEDs should be on.
- If the ports are not connected to active network devices, the LEDs will stay off.

Powering on the control point PC

Use the following procedure to power on K2 Storage System's control point PC and verify proper operation during power up of the system.

1. Power up and log on to the PC using standard Windows procedures.
2. Start and log on to NetCentral.
3. NetCentral reports devices as offline. As each device of the K2 Storage System is powered on, check NetCentral to verify the device's status

Chapter 12

Installing the Level 30R Storage System

The K2 Level 30 Redundant (L30R) storage system was initially released with K2 system software version 3.2 in September 2007.

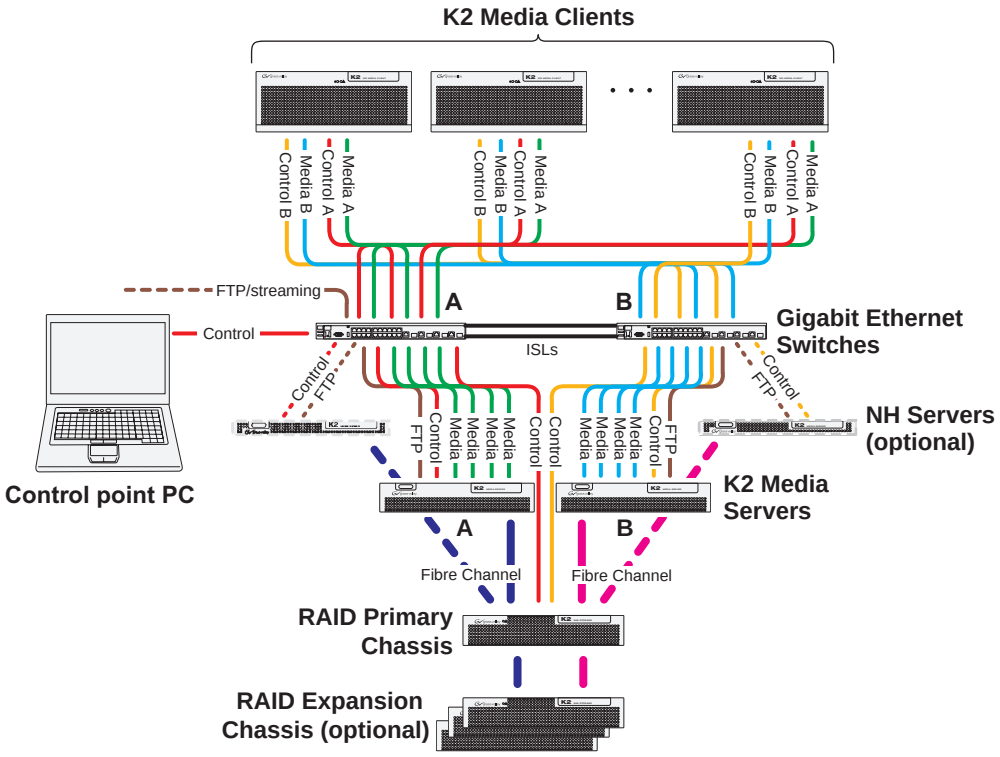
Use this chapter to install the K2 Level 30R storage system.

This chapter includes the following topics:

- "Level 30R system description" on page 542
- "Preparing Level 30R devices" on page 543
- "Networking for Level 30R" on page 562
- "Configuring the Level 30R storage system" on page 567
- "Adding K2 Storage System clients" on page 590
- "Basic operations for Level 30R storage" on page 591

Work through these topics sequentially to install the storage system.

Level 30R system description



The Level 30 redundant (L30R) storage system has two Gigabit Ethernet switches connected by Inter-Switch Links (ISLs) to support a redundant Ethernet fabric. The storage system also has redundant LS K2 Media Servers. The servers are configured to have identical roles. This provides redundancy for database, file system, iSCSI bridge, and FTP roles. One L30R RAID supports redundant Fibre Channel connections. Up to ten Expansion chassis are optional for increased storage capacity.

K2 Media Clients have a pair of redundant (teamed) Gigabit Ethernet ports for control and two Gigabit Ethernet ports (A and B) for media (iSCSI). Each port of the control team is connected to a different switch. The A media port goes to the A GigE switch and the B media port goes to the B GigE switch. The GigE switches are configured with V-LANs to keep the control/FTP and media (iSCSI) traffic separate.

Each LS K2 Media Server has four GigE connections for media (iSCSI), one GigE connection for control, one GigE connection for FTP, and one Fibre Channel connection to the RAID storage. All GigE connections on a server go to the same GigE switch. The server hosts iSCSI interface cards for the GigE media connections and a Fibre Channel card for the RAID storage connection. The iSCSI interface cards provide a bridge between GigE iSCSI and Fibre Channel SCSI. The server also hosts software components that allow it to function in its roles, including media file system manager, media database server, and FTP server. Redundant K2 Media Servers are connected by a serial cable which supports the heartbeat signal required for automatic system recovery (failover) features.

The L30R RAID chassis has redundant RAID controllers to support the Fibre Channel connections from the K2 Media Servers. The L30R RAID chassis is also connected to the GigE control network, which is required for SNMP (NetCentral) monitoring.

On the L30R RAID chassis there are two RAID 1 RANKs (also know as LUNs) for media file system metadata files and journal files. The remainder of the RAID storage is RAID 5 or RAID 6 for media.

Optional NH K2 Media Servers are available to provide additional FTP bandwidth. These servers are available with either a one Gigabit connection or a ten Gigabit connection. If you have multiple NH K2 Media Servers on a K2 Storage System, they must all be of the same connection speed. They must be all one Gigabit servers or all ten Gigabit servers.

The K2 configuration control point PC is connected to the GigE control network. The K2 System Configuration application runs on this PC for configuring the storage system.

FTP/streaming traffic accesses the K2 Storage System via the FTP GigE port on K2 Media Servers. FTP/streaming traffic does not go to K2 Media Clients.

Refer to Chapter 14, *Description of K2 Storage Devices* for more information. Also refer to "Design considerations for Ethernet switches" on page 759.

Preparing Level 30R devices

Use the topics in this section to prepare each device so that it is ready to become part of the Level 30R storage system.

- "Setting up the Control Point PC" on page 543
- "Setting up the Level 30R redundant GigE switches" on page 544
- "Setting up the LS K2 Media Servers for Level 30R" on page 555
- "Setting up the NH1 K2 Media Server" on page 556
- "Setting up the NH1-10GE K2 Media Server" on page 557
- "Setting up the L30R RAID chassis" on page 558
- "Preparing K2 Storage System clients" on page 559

Setting up the Control Point PC

To set up the K2 configuration Control Point PC, you have the following options:

- Use the Grass Valley Control Point PC that comes from the factory with software pre-installed. This includes the K2 System Configuration application, remote AppCenter, and NetCentral software. Refer to the *K2 Media Client System Guide* for rack mount instructions.
- Use a PC that you own and install the required software.

For either option, you must do the following for the Control Point PC that runs the K2 System Configuration application:

- Assign a control network IP address to the PC. Refer to "Networking tips".

- Connect the PC to the GigE control network.

To use your own PC, you must additionally do the following:

- Verify that the PC meets system requirements, then install the Control Point software and other supporting software, as specified in the *K2 Media Client System Guide*.
- Install and license NetCentral server software. You can install this on the NetCentral server PC, which can be the K2 configuration Control Point PC. Refer to the *NetCentral User Guide*.

Also refer to "Control point PC description" on page 650.

To fix the screen resolution problem seen with NetCentral on the Grass Valley Control Point PC, do the following:

1. Go to Display properties (right mouse selection of properties on the display area)
2. Select Settings tab
3. Select the Advanced button
4. In the General tab, set the DPI setting to Normal size (96 DPI)
5. Restart the PC

Setting up the Level 30R redundant GigE switches

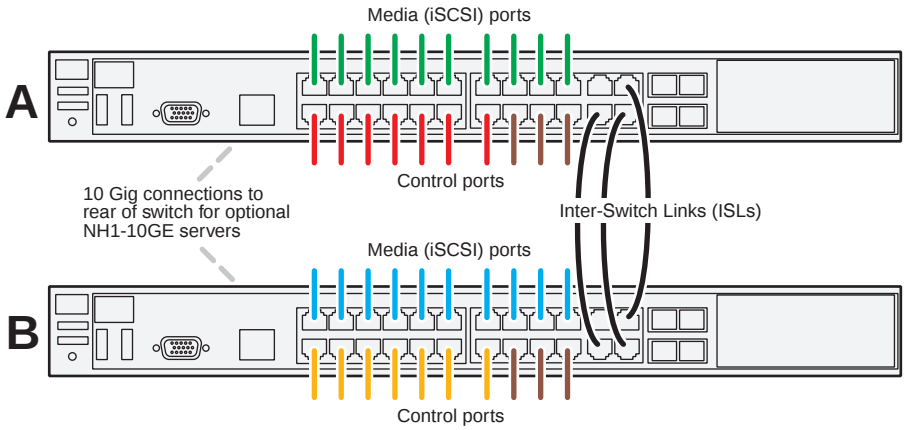
These procedures are for the HP ProCurve switch 2900 series. You must use this switch for iSCSI traffic on Level 30R.

For control and FTP/streaming traffic, it is allowed to use a different brand of switch, such as a Cisco Catalyst switch, if required by your site. If you are using a non-HP switch, apply the information in the following procedures accordingly. Refer to the documentation you received with the switch as necessary.

Also refer to "Design considerations for Ethernet switches" on page 759.

- You need at least two switches, so that the "A" media (iSCSI) network and the "B" media (iSCSI) network each have their own switch.
- Use CAT5e or CAT6 cables. The maximum cable length is 50 meters for CAT5e and 100 meters for CAT6.
- Assign an IP address and logon to each switch. Refer to "Configuring the GigE switch via serial connection" on page 546.
- Set up VLANs on each switch. Refer to "Configuring the GigE switch via the Web interface" on page 549.
- Install the switches in their permanent location.
- Provide power to the switches.
- Connect cables as follows:

2900 series switch



To the media ports on switch A, make the “A” media (iSCSI) network connection from each K2 Media Client. Also make four media (iSCSI) connections from K2 Media Server A.

To the media ports on switch B, make the “B” media (iSCSI) network connection from each K2 Media Client. Also make four media (iSCSI) connections from K2 Media Server B.

To the control ports on switch A, make one connection from each K2 Media Client, from RAID controller 0, and from the control point PC. Also make the control network connection and the FTP network connection from K2 Media Server A.

To the control ports on switch B, make the second control connection from each K2 Media Client, and from RAID controller 1. Also make the control network connection and the FTP network connection from K2 Media Server B.

If you have other iSCSI clients, such as Aurora Edits, that have just one iSCSI connection and one control connection, approximately half of the clients should be connected to switch A and half of the clients should be connected to switch B. In a failover event, only the clients connected to one of the switches will remain operational, so make connections accordingly. Connect the client’s iSCSI connection to one of the media ports on a switch and the client’s control connection to one of the control ports on the same switch.

Interconnect switch A and switch B with three 1 Gig ISLs.

If you have optional NH1 K2 Media Servers, for each server connect its FTP network connection and its control network connection to the control ports on the same switch. Balance servers between switch A and switch B.

If you have optional NH1-10GE K2 Media Servers, for each server connect its 10 Gig FTP network connection to a 10 Gig port on the rear of the switch and connect its control network connection to a control port on the same switch. Balance servers between switch A and switch B. Switches have two 10 Gig connectors standard and two 10 Gig connectors optional, so to connect three or four severs to a switch, you must first install the optional 10 Gig connectors in the switch.

Refer to “Level 30R system description” on page 542 for a diagram of the complete system.

Refer to cabling procedures later in this chapter for the GigE connections at each of the devices of the K2 Storage System.

Also refer to "K2 Ethernet switch description" on page 651 and "Design considerations for Ethernet switches" on page 759.

Configuring the GigE switch via serial connection

NOTE: Make sure you check the switch firmware and upgrade if necessary, as instructed at the end of this procedure.

The following procedure is for the HP ProCurve switch 2900 series. Do not use this procedure on other switch models.

For Level 30R with two switches, do the following on each switch.

Use a direct console connection to the switch, start a console session, and access the Switch Setup screen to set the IP address.

1. Configure the PC terminal emulator on the control point PC or another PC as a DEC VT-100 (ANSI) terminal or use a VT-100 terminal, and configure either one to operate with these settings:
   - Baud rate 115200
   - 8 data bits, 1 stop bit, no parity, and flow control set to Xon/Xoff
   - Also disable (uncheck) the "Use Function, Arrow, and Ctrl Keys for Windows" option
2. Connect the PC to the switch's Console Port using the console cable included with the switch. (If your PC or terminal has a 25-pin serial connector, first attach a 9-pin to 25-pin straight-through adapter at one end of the console cable.)
3. Turn on the PC's power and start the PC terminal program.
4. Press **Enter** two or three times and you will see the copyright page and the message "Press any key to continue". Press a key, and you will then see the switch console command (CLI) prompt.

NOTE: If you press Enter too many times and get past the log in, enter the command EN to get into the command line.

5. Type the following, then press **Enter**:

   `menu`

   If prompted to save the current configuration, answer no (press the n key) to proceed. The main menu opens.
6. On the main menu, choose **Switch Configuration,** then press **Enter**.
7. Select **IP Configuration**, then press **Enter**.
8. Press the right-arrow key to choose **Edit**, then press **Enter**. Tab to fields and enter information as follows:
   a. Change **Gateway** to be the default router.
   b. Tab to the **IP Config (DHCP/Bootp)** field and use the Space bar to select the **Manual** option.
   c. Tab to the **IP Address** field and enter the switch's control network IP address.

Refer to "Networking tips" on page 106.

d. Tab to the **Subnet Mask** field and enter the subnet mask used for your network.

9. Press **Enter**, then right-arrow to **Save**. Press **Enter** and revert to previous menu.

10. Select **Return to Main Menu** and press **Enter**.

11. From the main menu, chose **Console Passwords** and press **Enter**. The Set Password Menu opens.

12. Chose **Set Manager Password** and press **Enter**.

13. When prompted for the password, type a password of up to 16 ASCII characters with no spaces and press **Enter**. The password can be one that is used on other K2 devices, such as "adminK2" or "K2admin", or it can be your site's administrator password.

14. When prompted to enter the password again, retype the password and press **Enter**.

15. Select **Return to Main Menu** and press **Enter**.

16. From the main menu, tab to **Command Line (CLI)** and press **Enter**. The command prompt appears.

17. Type the following, then press **Enter**:

```
configure
```

You are now in configuration mode.

18. Configure an administrator username. The username can be one that is used on other K2 devices, such as "administrator" or "K2admin", or it can be your site's administrator username. For example, to set the username to "administrator" type the following, then press **Enter**:

```
password manager user-name administrator
```

19. When prompted, enter and re-enter the password.

20. Set spanning tree to RSTP. Type the following, then press **Enter**:

```
spanning-tree force-version rstp-operation
```

This configures spanning tree, but it does not turn spanning tree on. You must turn spanning tree on using the switch's Web interface, as explained in the next procedure "Configuring the GigE switch via the Web interface".

21. Decide your SNMP community name as explained in the following options, then proceed with the next step:

- If you decide to use a unique SNMP community name (not "public"), add the community and set its RW permissions. For example, if the community name is "K2", type the following, then press **Enter**:

```
snmp-server community K2 unrestricted
```

- If you decide to use the default SNMP community "public" for NetCentral monitoring, which already has RW permissions set as required by NetCentral, proceed to the next step.

22. Enter the SNMP community and IP address of the NetCentral server PC. For example, if the IP address is "192.168.40.11" and the community is "public", you

type the following, then press **Enter**:

```
snmp-server host public 192.168.40.11
```

23. Enable Authentication traps. Type the following, then press **Enter**:

    ```
    snmp-server enable traps authentication
    ```

    This allows NetCentral to test the switch to verify that it can send its SNMP trap messages to NetCentral.

24. Type the following, then press **Enter**:

    ```
    menu
    ```

    When prompted, save the configuration by pressing the y key. The main menu opens.

25. If you need a trunk for ISLs to gang switches together, use the following steps. These steps illustrate trunking the last three 1 Gig ports for three 1 Gig ISLs, which is the recommended configuration for ISLs on all multi-switch K2 Storage Systems. Refer to "Design considerations for Ethernet switches" on page 759 and consult with your Grass Valley representative if your requirements deviate from the recommended policy:

    a. At the main menu, select **Switch Configuration** and press **Enter**.

    b. Choose selection **Port/Trunk Settings** and press **Enter**.

    c. Press the right-arrow key to choose **Edit**, then press **Enter**.

    d. Down arrow until at the bottom of the list of ports and select the last (highest port number) 1 Gig port in the list.

    e. Right-arrow over to the Group column.

    f. Use the Space bar and set the bottom 1 Gig port to **Trk1**.

    g. Set the next port up also to **Trk1**.

    h. Set the next port up also to **Trk1**.

    i. Press **Enter**, then right-arrow to **Save**. Press **Enter** and revert to previous menu.

26. Select **Return to Main Menu** and press **Enter**.

27. From the main menu, tab to **Command Line (CLI)** and press **Enter**. The command prompt appears.

28. Check the version of firmware currently installed on the switch. Type the following, then press **Enter**:

    ```
    show flash
    ```

    Information is displayed similar to the following example:

    ```
    HP_iSCSI_switch1# show flash
    Image            Size(Bytes)    Date    Version
    -----            -----------  --------  -------
    Primary Image    : 3287779    03/15/05 M.08.66
    Secondary Image  : 3287779    03/15/05 M.08.66
    ```

```
Boot Rom Version: I.08.07
Current Boot    : Primary
```

29. Check the Primary Image Version and refer to your *K2 Storage System Release Notes* for information about currently supported versions. Then proceed as follows:
    - If *K2 Storage System Release Notes* instruct you to change the firmware on the switch, do so before continuing. Refer to the documentation you received with the switch for instructions to change the firmware. Then continue with the next procedure "Configuring the GigE switch via the Web interface".
    - If *K2 Storage System Release Notes* confirm that the version on the switch is a currently supported version, continue with the next procedure.
30. Type the following, then press **Enter**:

    ```
    menu
    ```

    The main menu opens.
31. From the main menu, choose **Reboot Switch** and press **Enter**. When prompted "Continue Reboot…?', answer yes (press the y key) to proceed. The switch restarts.
32. You can now use the switch's web browser interface for further configuration, as instructed in the next procedure.
33. Close the PC terminal program and disconnect the console cable.
34. Repeat this procedure on the other switch.

Continue with the next procedure "Configuring the GigE switch via the Web interface".

Configuring the GigE switch via the Web interface

The following procedure is for the HP ProCurve switch 2900 series. Do not use this procedure on other switch models.

For Level 30R with two switches, do the following on each switch.

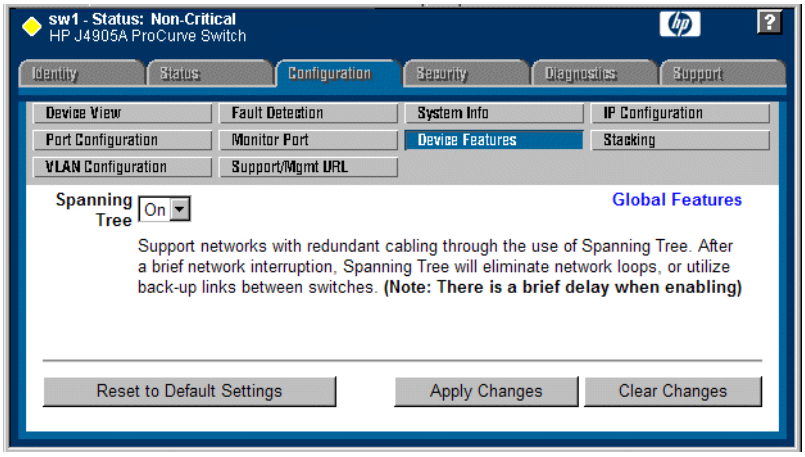
1. From the control point PC or another PC, make sure that you have a direct Ethernet cable connection to the switch, with no switches, routers, proxies, or other networking devices in between.
2. On the PC, open Internet Explorer and type the switch's IP address in the Address field, as in the following example.

   ```
   http://192.168.100.61
   ```

   This should be the name or IP address as currently configured on the switch.
3. Press **Enter** to open the switch's configuration application.

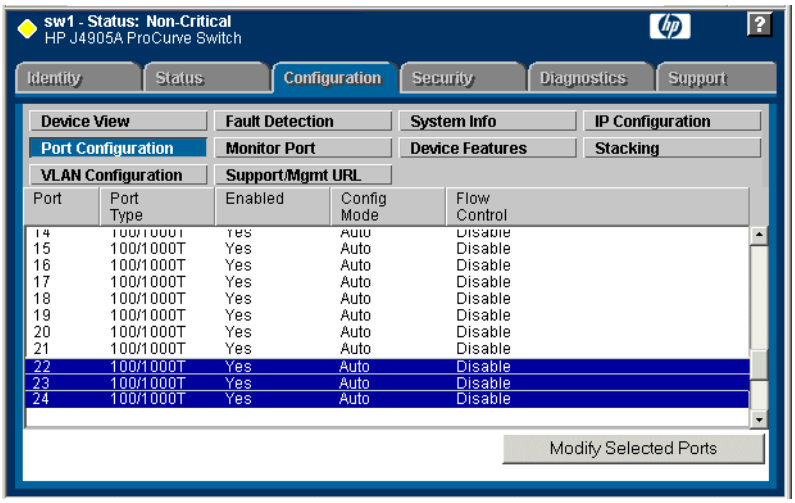
   NOTE: The configuration application for the HP ProCurve switch requires Java.

   You can also access the switch's configuration application from the K2 System Configuration application.
4. In the switch's configuration application, choose **Configuration**, then **Device Features**.



5. Set Spanning Tree to **On** and click **Apply Changes**. If prompted, log in with the switch's administrator username and password.

6. Click **Port Configuration**.

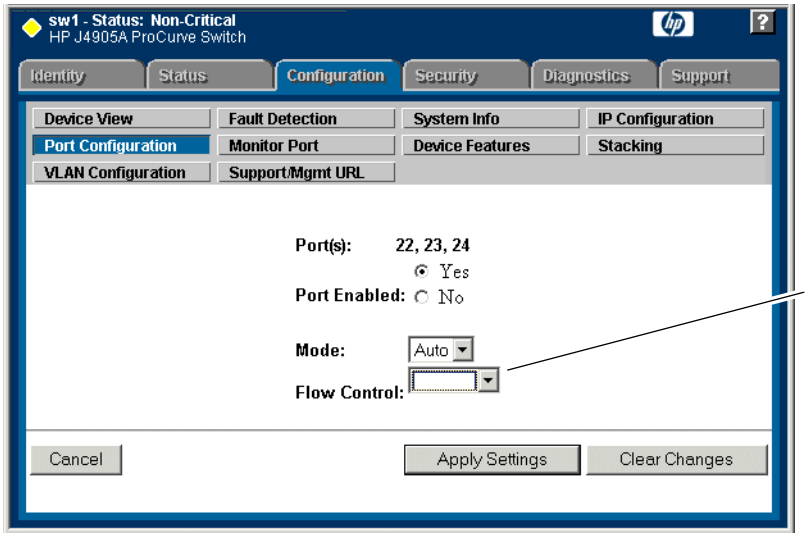


7. If you do not need trunks, such as on a one-switch system, skip to the next step in this procedure. If you need trunks, such as on a two-switch system with ISLs, do the following:

   a. Select (Ctrl + Click) the trunked ports. Typically the trunked ports are at the bottom of the list and are labeled Trk1.

   b. Click **Modify Selected Ports**.

      If prompted, log in as administrator.



c. For the trunked ports, set Port Enabled to **Yes**. On some switch models, some ports are disabled by default, so make sure you enable them. Leave Mode as default of **Auto**.

d. Set Flow Control as follows:

   - Set to **Enable**.

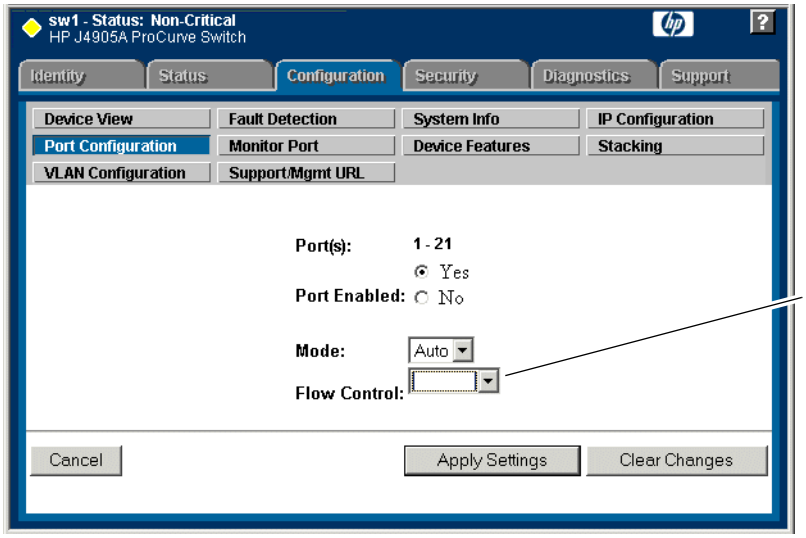
NOTE: This setting is for the 2900 series switch. Other switch models might require a different setting.

e. Click **Apply Settings**.

8. On the Port Configuration page, do one of the following:

   - If you do not have trunks, select all ports.
   - If you have trunks, select the remaining ports (the ports not trunked).

9. Click **Modify Selected Ports**.



10. Make sure Port Enabled is set to **Yes**, leave Mode as default of **Auto**.

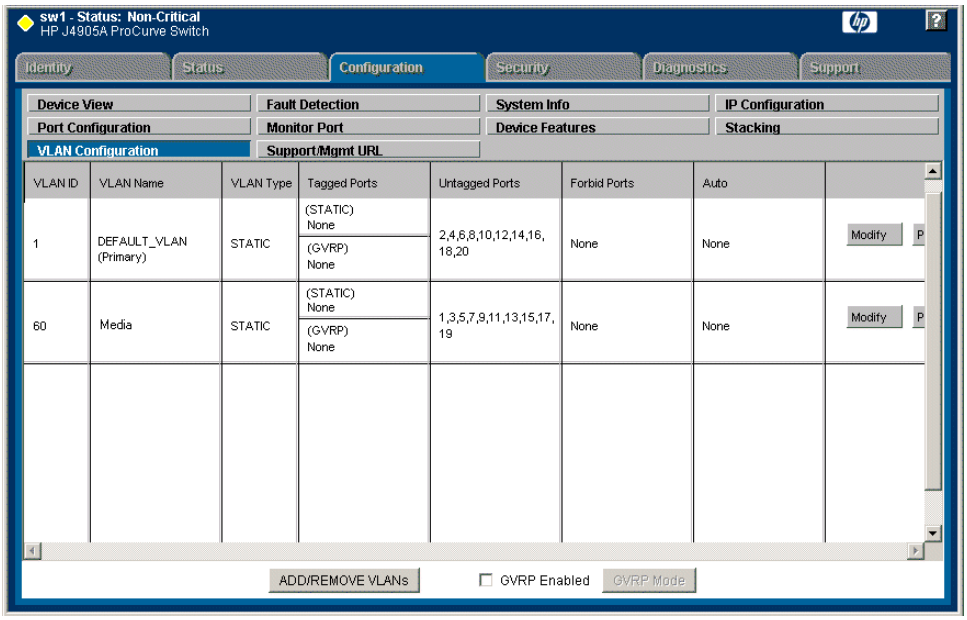
11. Set Flow Control as follows:

- Set to **Enable**.

NOTE: This setting is for the 2900 series switch. Other switch models might require a different setting.

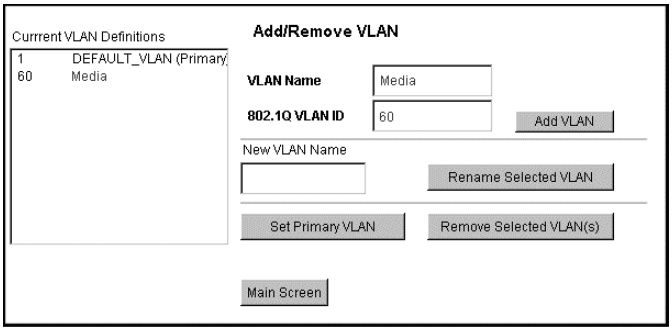
12. Click **Apply Settings**. Wait until settings are applied and the Web interface becomes active.

13. Choose **VLAN Configuration**. If prompted, log in with the switch's administrator username and password.



14. Create a new Media (iSCSI) VLAN as follows:

    a. Click **Add/Remove VLANs**.



    b. In the VLAN Name field enter `Media`.

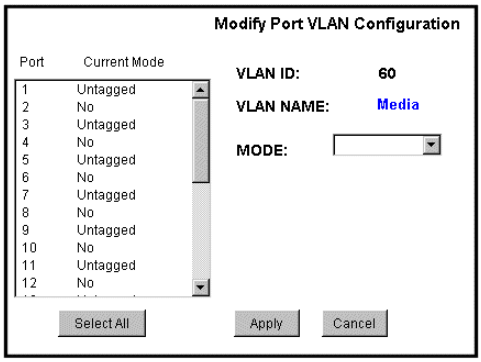
    c. In the VLAN ID field enter `60`.

    d. Click **Add VLAN**.

    e. Click **Main Screen** to return to VLAN Configuration.

15. Configure the Media VLAN as follows:

    a. In the Media VLAN row, click **Modify**.



b. Select all the odd numbered ports. (Tip: Use Ctrl + Click.)

c. In the Mode drop-down list, select **Untagged**, then click **Apply**. This removes the odd ports from the default (Control) VLAN.

   If you have a trunk, do not configure it as "Tagged". Media VLAN traffic (iSCSI) does not go over the trunk.

16. Click the **VLAN Configuration** tab.

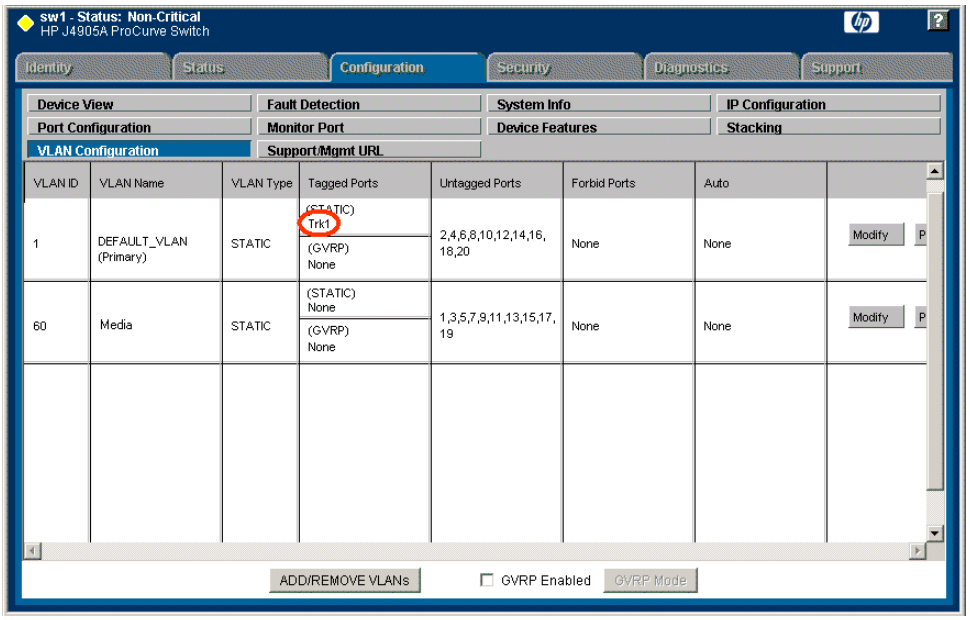
17. If you have a trunk, configure the default (Control) VLAN as follows:

    a. In the DEFAULT_VLAN row, click **Modify**.

    b. In the Current Mode list box, scroll down and select the trunk.

    c. In the Mode drop-down list, select **Tagged**, then click **Apply**. This allows default VLAN traffic (non-iSCSI) to go over the trunk.

18. Click the **VLAN Configuration** tab.



19. If you have a trunk, verify that for the default VLAN the trunk is displayed in the Tagged Ports column.
20. If you have two switches, repeat this procedure for the other switch.
21. Close the switch configuration application.

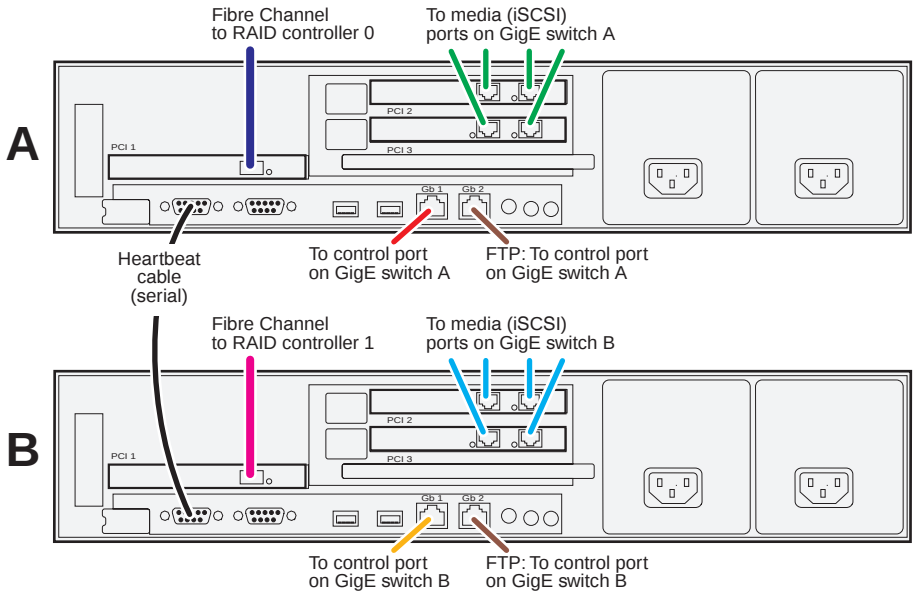
Setting up the LS K2 Media Servers for Level 30R

The Dell PowerEdge 2950 is qualified as the platform for the LS K2 Media Server.

Do the following to prepare LS K2 Media Servers for Level 30R:

- Install the server in its permanent location. Refer to the rack mount instructions that you received with the server's product bundle.
- Provide power to the servers.
- Connect cables as follows:

Dell 2950 PowerEdge server



Connect the four iSCSI interface ports to media ports on the GigE switch. Connect the A server to the A GigE switch. Connect the B server to the B GigE switch.

Connect the motherboard GigE port 1 and GigE port 2 to control ports on the GigE switch. Connect the A server to the A GigE switch. Connect the B server to the B GigE switch.

Connect the Fibre Channel port to the RAID storage device. Connect the A server to controller 0 and the B server to controller 1.

Make a direct connection between the serial ports of the two servers.

Take care to use the proper serial cable to interconnect redundant K2 Media Servers. This cable supports the heartbeat mechanism whereby the servers monitor each other's health. It is a 9 pin serial cable, but it is not a standard RS-232 null modem cable. The heartbeat cable is supplied with your system

(Grass Valley part number 174-8137-00). Refer to the *K2 Media Client System Guide* for pinout details.

- Assign a control network IP address to GigE port 1. Use standard Windows procedures. Refer to "Networking tips" on page 106.
- Change the hostname. Use standard Windows procedures.
- Configure SNMP properties so the trap destination points to the NetCentral server PC. Use standard Windows procedures. If you are not using the SNMP community name "public", configure the community name and set permissions to RW. Also make sure that the Authentication trap is enabled.

Also refer to "K2 Media Server descriptions" on page 653.

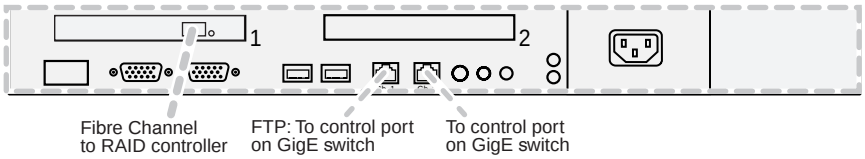
Setting up the NH1 K2 Media Server

If your system has one or more NH1 K2 Media Servers, prepare the servers using this section.

The Dell PowerEdge 1950 is qualified as the platform for the NH1 K2 Media Server.

Do the following to prepare a NH1 K2 Media Server:

- Install the server in its permanent location. Refer to the rack mount instructions that you received with the server's product bundle.
- Provide power to the server.
- Connect cables as follows:



Connect the motherboard GigE port 1 (control) and GigE port 2 (FTP) to control ports on the GigE switch. If you have more than one NH1 server, balance servers between the A GigE switch and the B GigE switch.

Connect the Fibre Channel port to the RAID storage device. If you have more than one NH1 server, balance servers between controller 0 and controller 1.

- Assign a control network IP address to GigE port 1. Use standard Windows procedures. Refer to "Networking tips" on page 106.
- Change the hostname. Use standard Windows procedures.
- Configure SNMP properties so the trap destination points to the NetCentral server PC. Use standard Windows procedures. If you are not using the SNMP community name "public", configure the community name and set permissions to RW. Also make sure that the Authentication trap is enabled.

Also refer to "K2 Media Server descriptions" on page 653.

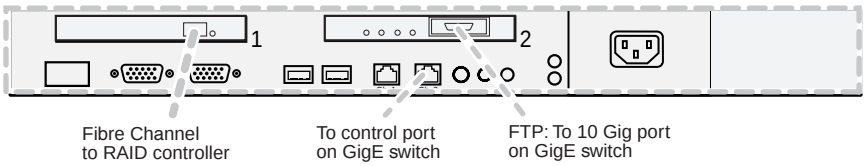
Setting up the NH1-10GE K2 Media Server

If your system has one or more NH1-10GE K2 Media Servers, prepare the servers using this section.

The Dell PowerEdge 1950 is qualified as the platform for the NH1-10GE K2 Media Server.

Do the following to prepare a NH1-10GE K2 Media Server:

- Install the server in its permanent location. Refer to the rack mount instructions that you received with the server's product bundle.
- Provide power to the server.
- Connect cables as follows:



  Connect the motherboard GigE port 1 (control) to a control port on the GigE switch. If you have more than one NH1-10GE server, balance servers between the A GigE switch and the B GigE switch.

  Connect the 10 Gig FTP port to the 10 Gig port on the rear of the GigE switch. If you have more than one NH1-10GE server, balance servers between the A GigE switch and the B GigE switch.

  Connect the Fibre Channel port to the RAID storage device. If you have more than one NH1-10GE server, balance servers between controller 0 and controller 1.

- Assign a control network IP address to GigE port 1. Use standard Windows procedures. Refer to "Networking tips" on page 106.
- Change the hostname. Use standard Windows procedures.
- Configure SNMP properties so the trap destination points to the NetCentral server PC. Use standard Windows procedures. If you are not using the SNMP community name "public", configure the community name and set permissions to RW. Also make sure that the Authentication trap is enabled.

Also refer to "K2 Media Server descriptions" on page 653.

Setting up the L30R RAID chassis

Do the following to prepare the L30R RAID storage devices:

- Install the chassis in its permanent location. After mounting the chassis in the rack, you must secure brackets to the front rail to support the Grass Valley bezel. Refer to the *K2 Lx0 RAID Instruction Manual* for rack mount instructions.
- "Connect the L30R RAID Primary and Expansion chassis" on page 558
- "Power on the L30R RAID chassis" on page 559

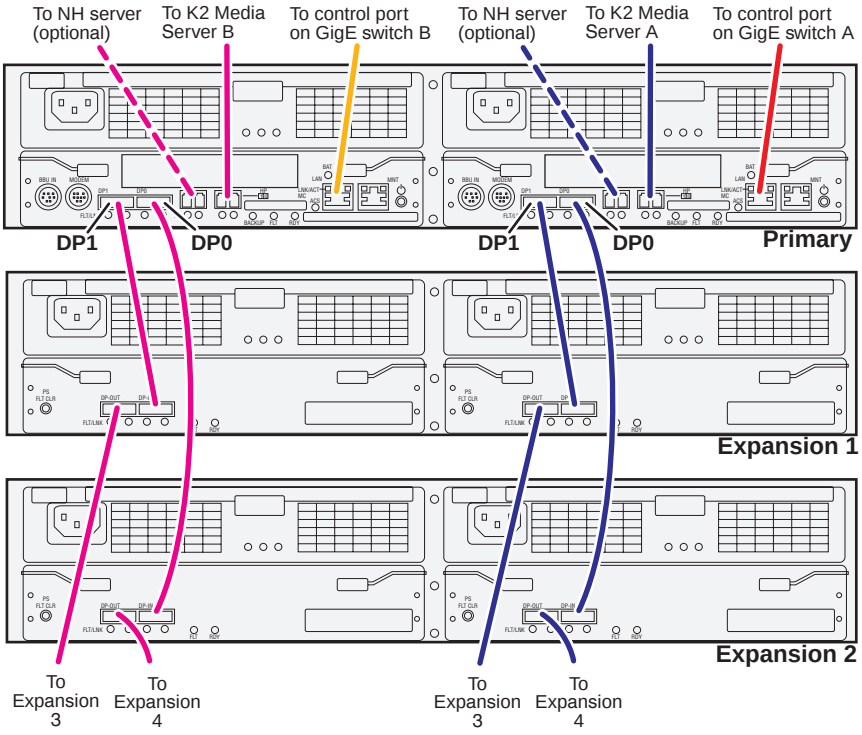
In addition, you will configure network settings, SNMP settings, and bind RAID disks. These tasks are part of the K2 System Configuration application and Storage Utility procedures later in this chapter.

On the L30R RAID, you do not need to manually set a Fibre Channel address ID on controllers or a chassis address on Expansion chassis.

Also refer to "K2 RAID storage description" on page 659.

Connect the L30R RAID Primary and Expansion chassis

Connect Ethernet, Fibre Channel, and SAS cabling as shown.



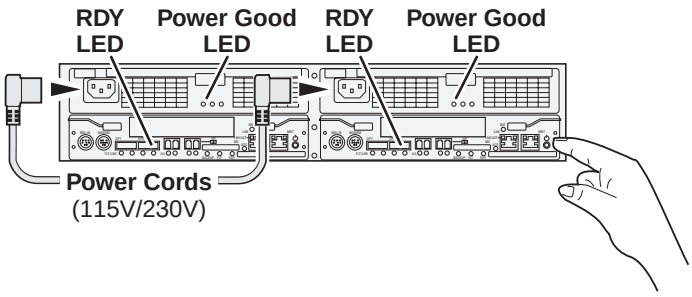
If you have more Expansion chassis than those illustrated, continue the indicated cabling pattern, alternating connections for additional Expansion chassis between DP1 and DP0. Expansion chassis 1, 3, 5, 7, and 9 connect to DP1. Expansion chassis 2, 4, 6, 8, and 10 connect to DP0.

Once the RAID storage is connected and configured, do not swap Expansion chassis or otherwise reconfigure storage. If you connect an Expansion chassis in a different order or to the wrong controller, the controller will see a configuration mismatch and fault.

Power on the L30R RAID chassis

Connect power cords and power up RAID storage devices as follows:

1. Verify power and cabling.
2. Press and hold down the power button on the controller, as shown.



   If the RAID chassis has two controllers, you can press the power button on either controller. You do not need to press both power buttons.

   Pressing the power button on a controller also powers on any connected Expansion chassis. There are no power buttons on Expansion chassis.

3. Release the power button when the Power Good LED on the power supply is illuminated. This takes 1-3 seconds.
4. Wait while the primary RAID chassis performs self-test and initialization. This takes about four minutes. While this is taking place, the RDY LED is illuminated with a steady on light.
5. Watch for the RDY LED to begin blinking at one second intervals. The LED might turn off and back on two times before starting the one second blink pattern. When the RDY LED is blinking at one second intervals, the self-test and initialization is complete and the chassis is ready for use.

Your preparations for L30R RAID storage are now complete.

Preparing K2 Storage System clients

Any devices that function as iSCSI clients to the K2 Storage System must be prepared with the following requirements:

- One or more connections to the control network.
- A static IP address for the control network.
- For a redundant K2 Storage System, K2 Media Clients have one connection to the A media (iSCSI) network and one connection to the B media (iSCSI) network. Other iSCSI clients with just one media port connect to either the A or the B network.

Additional steps that are required for Aurora Edits include the following:

- Implement Aurora Edit security features.
- Install SNFS software and K2 software.

For more information, refer to the *Aurora Edit Installation and Configuration Guide*.

Additional steps that are required for K2 Media Clients include the following:

- You must install Multi-path I/O software if the K2 Media Client connects to the K2 Storage System with a redundant Ethernet (iSCSI) fabric. For example, the following K2 Storage Systems have a redundant Ethernet fabric:
  - Level 2R
  - Level 3R
  - Level 10R
  - Level 20R
  - Level 30R

For more information refer to the *K2 Media Client System Guide*.

K2 configuration and NetCentral

Before you begin using the K2 System Configuration application to configure the storage system, you should set up the NetCentral system according to the following requirements:

- **NetCentral installed** — NetCentral server software must be installed on a NetCentral server PC. This can be the K2 configuration Control Point PC or another PC that has network communication with the K2 Storage System control network.
- **Device providers installed** — A device provider must be installed on the NetCentral server PC for each type of device in the K2 Storage System. For a Level 30R storage system, the following device providers must be installed:
  - Control point PC device provider — This is the Windows monitoring device provider.
  - K2 Media Server device provider
  - HP Gigabit Switch device provider or Cisco Gigabit Switch device provider
  - K2 Media Client device provider, if any K2 Media Clients are accessing the Level 30R storage system.
  - Device provider for iSCSI clients, if any iSCSI clients such as Aurora Edits are accessing the Level 30R storage system.
  - K2 L30R RAID storage device provider. This device provider supports RAID devices for Levels 10, 20, and 30.
- **Grass Valley PC Monitoring software installed** — This software must be installed on the K2 configuration Control Point PC. It includes Grass Valley SNMP agents and other WMI based components to perform process monitoring. This provides the

information for some of the SNMP trap messages that must be sent to NetCentral.

- **Control Point PC monitored by NetCentral** — The K2 configuration Control Point PC should be added to the NetCentral system and fully monitored by NetCentral. This means that its SNMP trap destination is set to send SNMP traps to the NetCentral server PC. Whether the Control Point PC and the NetCentral server PC are the same PC or are different PCs, you should still add the Control Point PC to NetCentral.

Refer to the *NetCentral User Guide* to set up the NetCentral system. After installing a device provider, you can find additional documentation about monitoring that type of device on the NetCentral Help menu.

Networking for Level 30R

Use the topics in this section to configure the Gigabit Ethernet (GigE) network for the Level 30R storage system.

- "Networking requirements" on page 562
- "Networking tips" on page 563
- "Setting up host tables" on page 564
- "Testing the control network" on page 566

Networking requirements

Required networking strategies for a Level 30R (a redundant K2 Storage System) are as follows:

- Four networks:
  - Media network A — Exclusively for iSCSI traffic. For failover purposes, this network restricts traffic between an "A" media port on a K2 Media Client and the "A" K2 Media Server with the role of media file system/database server.
  - Media network B — Exclusively for iSCSI traffic. For failover purposes, this network restricts traffic between a "B" media port on a K2 Media Client and the "B" K2 Media Server with the role of media file system/database server.
  - Streaming/FTP network — For media transfers and FTP traffic.
  - Control network — For all other non-streaming, non-iSCSI traffic.
- Networks must be on separate subnets.
- The real-time iSCSI traffic of the media networks (A and B) is kept separate from traffic that is not real-time, such as that of the streaming/FTP network and the control network. This separation is provided by dedicated Gigabit ports, cables, and by a dedicated VLAN on the HP GigE switch or by separate switches.
- K2 Media Servers have a dedicated FTP port. Make a dedicated FTP connection to the FTP port.
- While control and FTP traffic is each on its own subnet, it is not required that each type of traffic has its own VLAN on GigE switches. For example, you make both FTP and control connections to the "control" ports (DEFAULT_VLAN) on the HP GigE switch.
- Static IP addresses are required for the media networks on K2 Storage System iSCSI devices. This includes K2 Media Servers, generic iSCSI clients (such as Aurora Edits), and K2 Media Clients.
- Machine names (host names) assigned to each K2 device.
- Host tables (hosts files) provide name resolution on each K2 Media Client, iSCSI client, and K2 Media Server.
- IP addresses for FTP/streaming ports must have name resolution such that hostnames are appended with the "_he0" suffix. You can use host tables (as in "Setting up host tables" on page 564) or another mechanism to provide the name

resolution. This directs the streaming traffic to the correct port. Refer to the *K2 Media Client System Guide* for a complete explanation.

- K2 Media Servers (including optional NH servers) must be on the streaming network, as they provide the FTP interface for shared storage streaming traffic. Shared storage K2 Media Clients do not need to be on the streaming network because they do not send or receive streaming traffic.
- On the shared storage K2 Media Client, the two control GigE ports are configured as a team. The control team shares a single IP address. Do not attempt to un-team the control ports. On the Level 30R K2 Storage System (a redundant K2 Storage System), both control ports are connected and the control team provides redundancy.
- On the shared storage K2 Media Client, the two media (iSCSI) GigE ports are not teamed. On the Level 30R K2 Storage System (a redundant K2 Storage System), both media ports are connected and each media port is assigned to a different media (iSCSI) network, which is required for redundancy.

Also refer to "About networks and FTP" on page 684 and "Design considerations for Ethernet switches" on page 759.

Use the following procedures as necessary to implement your networking strategies.

NOTE: It is recommended that you configure Media network (iSCSI) IP addresses and Streaming network IP addresses using the K2 System Configuration application, rather than doing so on the local machine using standard Windows procedures.

Networking tips

- Before beginning network configuration, determine the IP addresses and names needed for the machines in your K2 system. Work with the network administrator at your facility to have those IP addresses and names available for your use.
- Establish a consistent convention for machine names and IP addresses. It is recommended that you embed a root name or other unique identifier for this particular K2 Storage System in the computer name. Also, a common convention for IP addresses is to use a numerical pattern or sequence in the IP addresses to indicate device-types and/or ports, as in the following example:

NOTE: This example assumes a subnet mask of 255.255.255.0

Example of Level 30R names and IP addresses

Computer name	Device type	Streaming network addresses	Control network addresses	Media network addresses	Comments
root_server_1	K2 Media Server	192.168.101.11[a]	192.168.100.11	192.168.99.11	root_server_1 and root_server_2 are a redundant pair.
				192.168.99.12	
				192.168.99.13	
				192.168.99.14	
root_server_2	K2 Media Server	192.168.101.21[b]	192.168.100.21	192.168.98.21	
				192.168.98.22	
				192.168.98.23	
				192.168.98.24	
root_server_3 (optional)	NH K2 Media Server	192.168.101.31[c]	192.168.100.31	—	This server has roles of FTP server and NAS server only.
root_raid_1	RAID	—	192.168.100.51	—	Each RAID controller is on the control network for monitoring.
root_raid_2	RAID	—	192.168.100.52	—	
root_gige_1	GigE switch	—	192.168.100.61	—	—
root_gige_2	GigE switch	—	192.168.100.62	—	—
root_cppc_1	Control point PC	—	192.168.100.81	—	—
root_client_1	iSCSI client	—	192.168.100.111	192.168.99.111	For the control network, one IP address is shared between the two teamed ports. For media networks, subnet 99 is the "A" network and subnet 98 is the "B" network.
				192.168.98.112	
root_client_2	iSCSI client	—	192.168.100.121	192.168.99.121	
				192.168.98.122	
root_client_3	iSCSI client	—	192.168.100.131	192.168.99.131	
				192.168.98.132	
root_client_4	iSCSI client	—	192.168.100.141	192.168.99.141	
				192.168.98.142	

[a] This IP address must resolve to hostname root_server_1_he0
[b] This IP address must resolve to hostname root_server_2_he0
[c] This IP address must resolve to hostname root_server_3_he0

Setting up host tables

The *hosts* file is used by the control network and the streaming/FTP network to determine the IP address of devices on the network when only a the device name (hostname) is given. The steps that follow describe how to edit the *hosts* file located at *C:\Windows\system32\drivers\etc\hosts* on Windows XP and Windows 2003

Server operating system computers. If you include the names and addresses of all the devices on the network, then you can copy the same file onto all the other K2 devices instead of editing the *hosts* file on each K2 device.

For FTP transfers on a K2 Storage System, transfers go to/from K2 Media Servers that have the role of FTP server. No transfers go directly to/from the shared storage K2 Media Clients that are on the K2 Storage System. So in the hosts file, you must add the "he_0" extension to a K2 Media Server hostname and associate that hostname with the K2 Media Server's FTP/streaming network IP address.

Refer to the *K2 Media Client System Guide* for more information.

To edit the *hosts* file manually:

1. Open the following file using Notepad or some other text editing application:

   C:\Windows\system32\drivers\etc\hosts

2. Enter all IP addresses with machine names. The text format is simple. First type the Ethernet IP address, then use the TAB key or Space bar to insert a few spaces. Then type the machine name.

   Here is an example:

   ```
   192.168.100.11     root_server_1
   192.168.101.11     root_server_1_he0
   192.168.100.21     root_server_2
   192.168.101.21     root_server_2_he0
   192.168.100.31     root_server_3
   192.168.101.31     root_server_3_he0
   192.168.100.51     root_raid_1
   192.168.100.61     root_gige_1
   ```

3. Save the file and exit the text editor.

4. Copy the new *hosts* file onto all the other machines. This is easier than editing the file on each machine.

Host table tips

- If transferring to or from a Profile XP or Open SAN system via UIM, the *hosts* file must also follow UIM naming conventions for those systems. Refer to the UIM Instruction Manual.
- Do not enter media (iSCSI) network IP addresses in the host table, as hostname resolution is not required for the media network.
- Use the following tip with care. While it can solve a problem, it also introduces a name resolution "anomaly" that might be confusing if not considered in future troubleshooting activities.

  For each SAN (shared storage) K2 Media Client, add the "_he0" suffix to the hostname but then associate that hostname with the K2 Media ***Server's*** FTP/streaming network IP address, ***not*** the K2 Media ***Client's*** IP address. Aliasing K2 Media Client hostnames in this way would not be required if the transfer source/destination was always correctly specified as the K2 Media Server. However, a

common mistake is to attempt a transfer in which the source/destination is incorrectly specified as the K2 Media Client. The host file aliasing corrects this mistake and redirects to the K2 Media Server, which is the correct transfer source/destination.

An example of a *hosts* file entry with this type of aliasing is as follows:

```
192.168.101.11     server_1_he0 client_1_he0 client_2_he0
```

Testing the control network

To test the control network use the *ping* command as follows:

1. On the control point PC, click **Start | Run**. The Run dialog box opens.
2. Type `cmd` and click **OK**. The command prompt window opens.
3. Type `ping`, then a space, then the name of one of your K2 Storage System devices, such as the Gigabit Ethernet switch, as in the following example:

   ```
   ping root_gige_1
   ```

4. Press **Enter**.

   The ping command should return the IP address of the device, as in the following example:

   ```
   Pinging root_gige_1.mycorp.com [192.168.100.61] with
   32 bytes of data:


   Reply from 192.168.100.61: bytes=32 time=10ms TTL=127
   Reply from 192.168.100.61: bytes=32 time<10ms TTL=127
   Reply from 192.168.100.61: bytes=32 time<10ms TTL=127
   Reply from 192.168.100.61: bytes=32 time<10ms TTL=127
   ```

   This verifies that the name of the device is being correctly resolved to the IP address, which indicates that on the Control Point PC the host table entry is correct.

5. Ping the other K2 Storage System devices to which you have assigned control network IP addresses.
6. Go to each Windows device in the K2 Storage System and repeat this procedure. This verifies that network communication is correct to and from all devices.

Configuring the Level 30R storage system

Use the topics in this section to do the initial configuration of the Level 30R storage system.

- "Prerequisites for initial configuration" on page 567
- "Defining a new K2 Storage System" on page 568
- "Configuring server A - Part 1" on page 570
- "Configuring RAID" on page 572
- "Creating a new file system" on page 578
- "Configuring server A - Part 2" on page 580
- "Configuring the redundant server" on page 583
- "Configuring optional NH servers" on page 587

Prerequisites for initial configuration

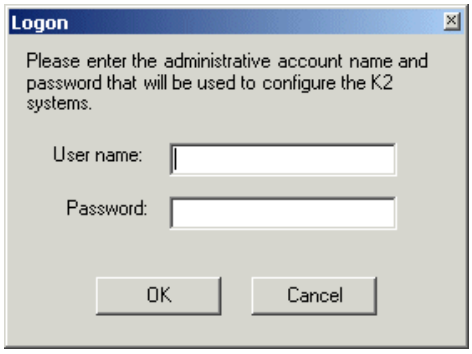
Before beginning your initial configuration, make sure the devices of the K2 Storage System meet the following prerequisites. Refer to sections earlier in this manual for detailed information. Also refer to Chapter 14, "Description of K2 Storage Devices".

Devices	Prerequisite for Level 30R configuration
Control point PC	Ethernet cable connected Control Point software installed Control network IP address assigned Network communication over the control network with all other K2 devices Power on
Ethernet switch	Ethernet cables connected Control network IP address assigned VLANs set up Trunks set up Power on
K2 Media Server	Ethernet cables connected Fibre Channel cable connected Redundant servers connected by serial cable Software installed, as from the factory, including QuickTime 7 Control network IP address assigned Power on for all servers

Defining a new K2 Storage System

Define a Level 30R K2 Storage System as follows:

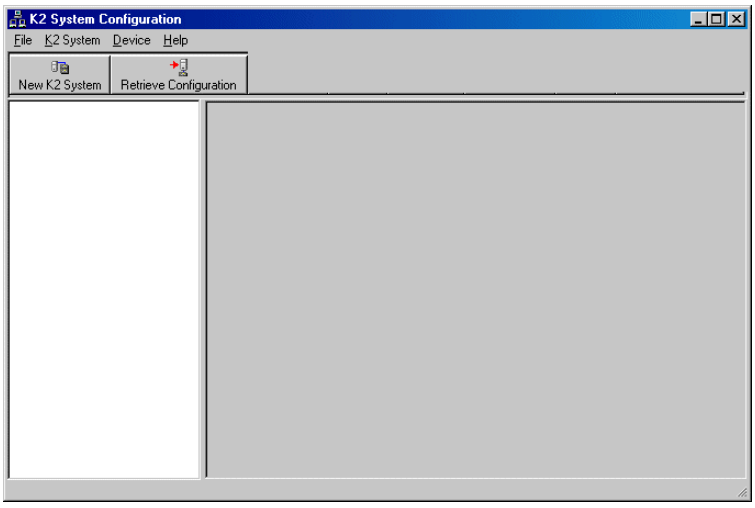
1. On the control point PC, open the K2 System Configuration application. A login dialog box opens.



2. Log in to the K2 System Configuration application with the Windows administrator account. By default this as follows:

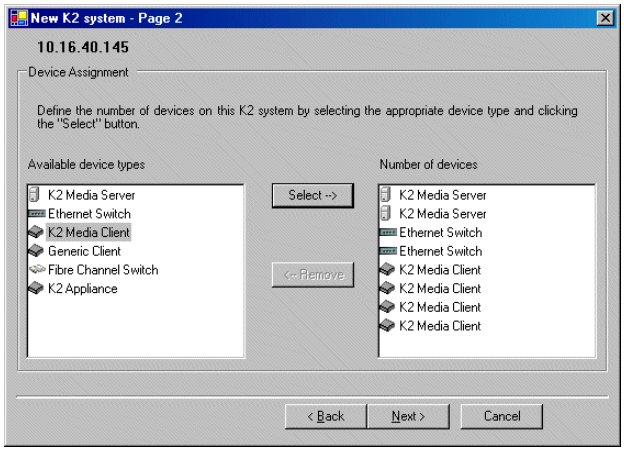
   - Username: administrator
   - Password: adminK2

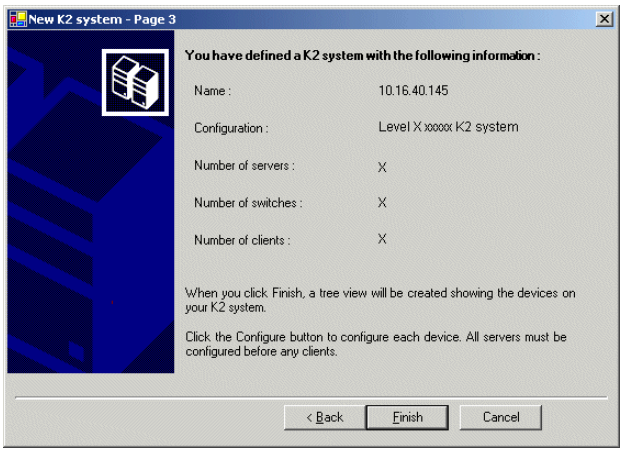
   Refer to "Setting up application security" on page 688 for more information about administrator accounts and logging in to applications.



3. Click **New K2 System**. The New K2 System wizard opens.

4. Follow the on-screen text to define your Level 30R K2 Storage System, as described in the following table.

On this page…	Do this…
Page 1	 Create a name for your Level 30R K2 Storage System and type it in the Name box. Select **Level 30**. Select the **Server redundancy** option. Click **Next**
Page 2	 Move the following into the Number of Devices Box: • Two K2 Media Servers • Two Ethernet switches • K2 Media Clients as appropriate for your system. • (Optional) One or more K2 Media Servers to represent each NH K2 Media Server on your system. • (Optional) Other devices as appropriate for your system. Click **Next**.

On this page...	Do this...
Page 3	 Review the information on this page and verify that you have correctly defined your K2 Storage System. For a Level 30R storage system you should have the following: • Two Gigabit Ethernet switches • Two K2 Media Servers • Optionally, one or more NH K2 Media Servers • The number and type of clients appropriate for your system. Click **Finish**. The Define New K2 Storage System wizard closes.

Your K2 Storage System appears in the tree view of the K2 System Configuration application.

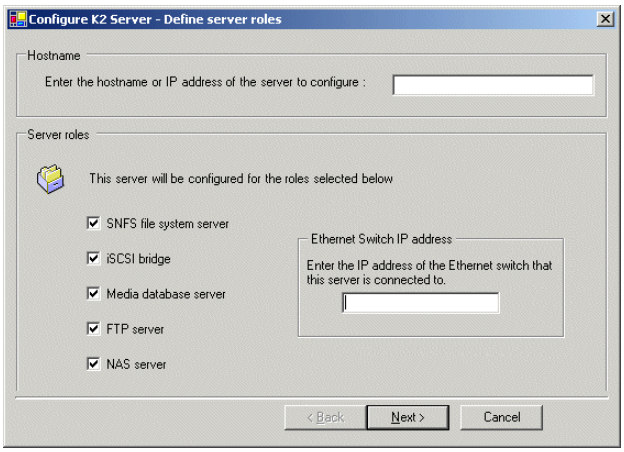
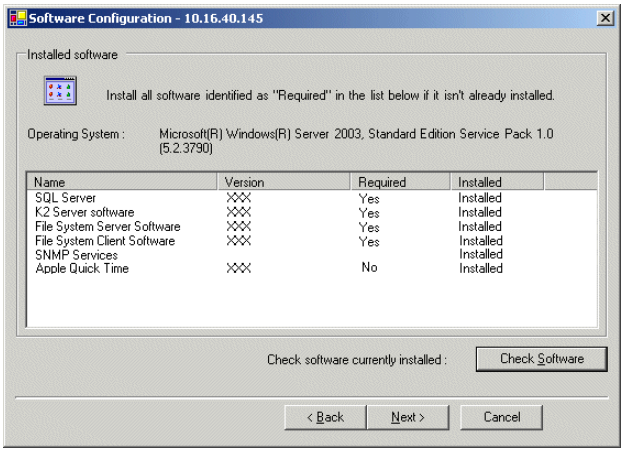
5. Continue with the next procedure.

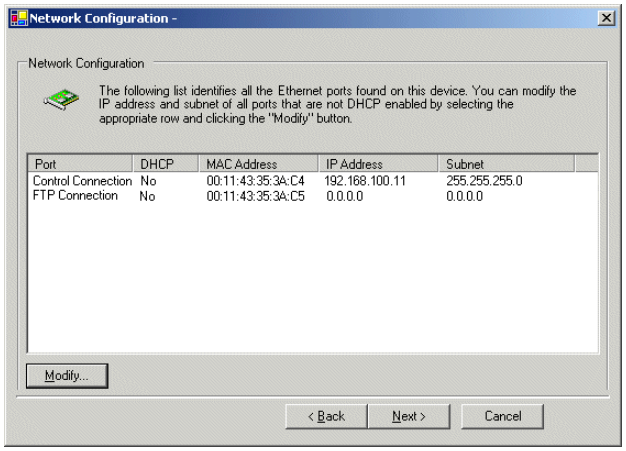
Configuring server A - Part 1

1. In the K2 System Configuration application tree view, select [**K2Server1]**.

2. Click the **Configure** button. The Configure K2 Server wizard opens. Follow the on-screen text to configure the for a Level 30R K2 Storage System, as

described in the following table:

On this page…	Do this…
Define server roles	 Enter the name or IP address for the K2 Media Server, as currently configured on the machine. Enter the name or IP address of the Ethernet switch, as currently configured on the switch, to which the K2 Media Server is connected. For Level 30R redundant, select all roles. Click **Next**
Software Configuration This page checks for the software required to support the roles you selected on the previous page. Software required on the Level 30R K2 Media Server A is as follows: • SQL Server • K2 Server • File System Server • File System Client • SNMP Services • QuickTime	 If software with *Yes* in the Required column reports as *Not Installed*, you must first install it on the before continuing. Refer to *Chapter 16, Managing K2 software*. After installing the software, click **Check Software**. When all required software reports as *Installed*, click **Next**.

On this page…	Do this…
Network Configuration This page displays the control network Ethernet port, and allows you to configure the FTP/ Streaming network Ethernet port. ***NOTE: This page does not configure the iSCSI interface (media network) ports.***	 The top port is the port over which the K2 System Configuration application is communicating with the. If correctly configured, it is already assigned the control network IP address, as displayed on this page. Select the other port and click **Modify**. A network configuration dialog box opens. Enter the FTP/Streaming IP address and the subnet mask and click **Apply**. Click **Next**.
File System Server Configuration	Enter the name or IP address of the redundant K2 Media Server (server B). Do not yet click Next. Do not yet enter anything in the File System Server #2 box. Click **Launch Storage Manager**. Storage Utility opens.

3. Continue with the next procedure to use Storage Utility to configure the storage and file system.

   Leave the Configure K2 Server wizard open while you are using Storage Utility. When you are done with Storage Utility, you continue with the wizard.

Configuring RAID

Use Storage Utility to complete the configuration of the L30R RAID chassis, as explained in the following topics:

- "Configuring RAID network and SNMP settings"
- "Binding disk modules"

Refer to "Prerequisites for initial configuration" on page 567 to confirm that the RAID storage is ready for configuration.

Configuring RAID network and SNMP settings

Use the Storage Utility to configure the following settings for the Level 30R RAID controllers:

- IP address
- Subnet mask

- Gateway Address
- SNMP trap destinations

For L30R RAID, network and SNMP settings are set and stored on the RAID controller module. For the RAID chassis with two controllers, each controller has its own network settings and the RAID chassis exists as two entities on the control network.

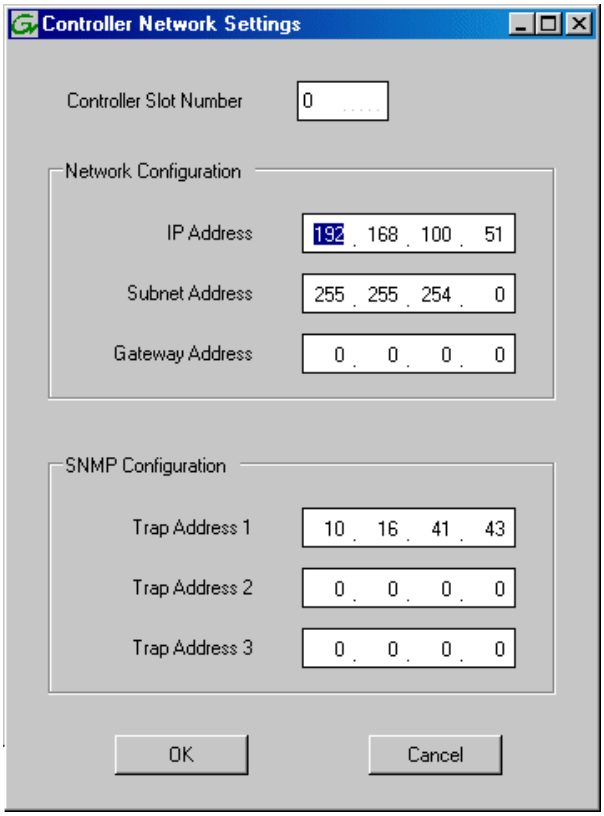
The RAID storage device is configured by default for the SNMP community name “public”. If your site’s policies require using a different SNMP community name, contact your Grass Valley representative.

To configure these settings, do the following:

1. Launch Storage Utility from the K2 System Configuration application as in the previous procedure.
2. As prompted, wait while Storage Utility gathers system information, then Storage Utility opens.
3. In Storage Utility tree view, expand the node for the L30R RAID, right-click the icon for a L30R RAID controller, and select **Configuration | Network Properties**.

   The Controller Network Settings dialog box opens.

   For a L30R RAID chassis with two controllers, you can make settings on both controllers using this dialog box.



4. In the Controller Slot Number field enter **0** and then press **Enter**. The settings from controller 0 are loaded into the Controller Network Settings dialog box and are available for you to modify.
5. Enter the control network IP address and other network settings.
6. You want SNMP trap messages go to the NetCentral server PC, so for SNMP Configuration enter the IP address of the NetCentral server PC. You can also enter IP addresses for other SNMP managers to which you want to send SNMP trap messages.
7. For the RAID chassis with two controllers, in the Controller Slot Number field enter **1** and then press **Enter**. The settings from controller 1 are loaded into the Controller Network Settings dialog box and are available for you to modify. Repeat the previous steps to configure controller 1.
8. Click **OK** to save settings and close.
9. In Storage Utility click **View | Refresh**. Continue with the next procedure "Binding disk modules".

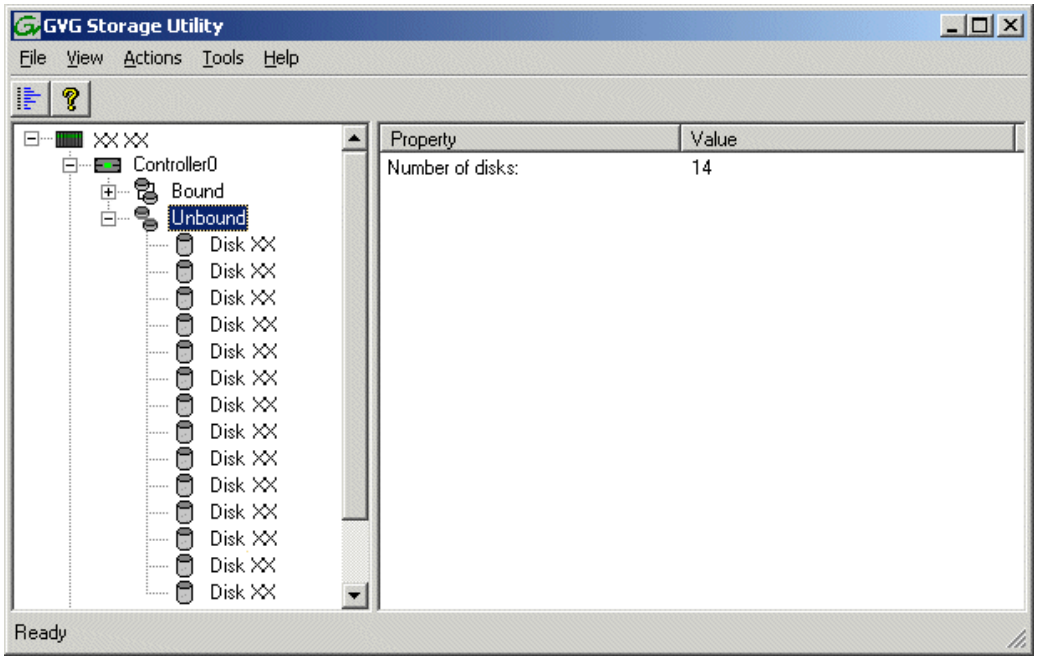
Binding disk modules

Use the following procedure to bind disk modules as required for the Level 30R storage system.

Also refer to "About RANKs and LUNs in Storage Utility" in Chapter 15, *Overview of K2 Storage Tools*.

NOTE: Binding destroys all user data on the disks.

1. In the Storage Utility main window, identify bound RANKs and unbound disks by their placement in the hierarchy of the tree view. In the following illustration, disk numbers are represented by "XX". Refer to "Identifying disks" on page 744 for an explanation of how disks are actually numbered in Storage Utility.



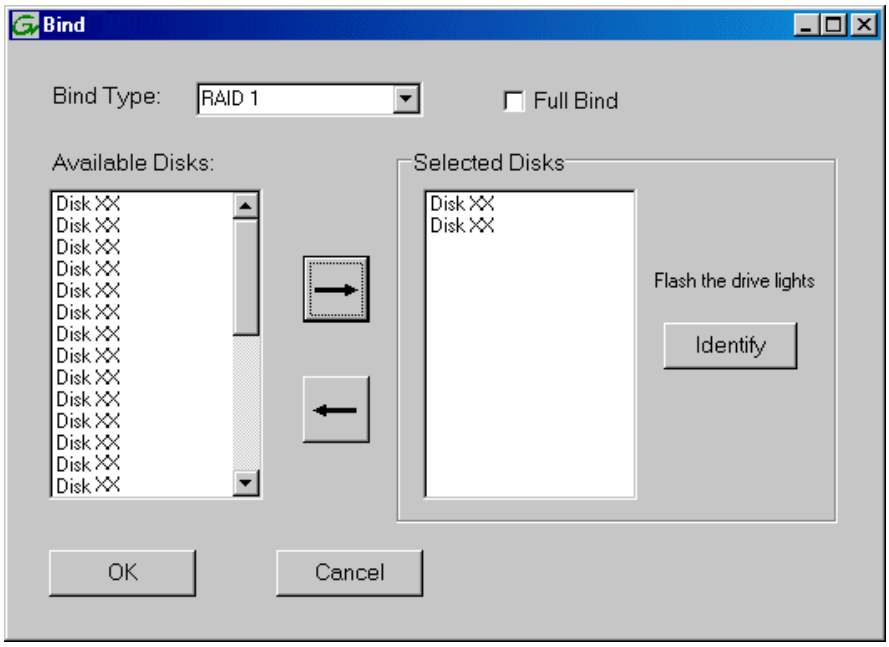
Redundant systems store metadata files and journal files on the primary RAID chassis. The first six disk slots in the chassis are dedicated for metadata/journal files. In the first five slots are five metadata/journal disks. The sixth slot is filled with a blank. Two disks are bound as a RAID 1 RANK for metadata storage and two disks are bound as a RAID 1 RANK for journal storage. The fifth disk is bound as a Hot Spare for the other four metadata/journal disks. The remaining six disks in the primary RAID chassis and all disks in Expansion chassis are for media storage. Media storage disks are bound as RAID 5 or RAID 6 in RANKs consisting of six disks each.

View disk properties and identify the four disks you will use for the metadata/journal RAID 1 RANKs, the one metadata/journal Hot Spare disk, any other disks that you intend to use for Hot Spares, and the remainder of the disks that are available for media storage. Make sure you select disks appropriately as you bind disks in the remainder of this procedure.

2. For systems that use RAID 1 RANKs, you must now create the separate RAID 1 storage for metadata files and journal files. To bind unbound disks for metadata and journal storage, do the following:

   a. Right-click the **Unbound** node for the controller, then select **Bind** in the context menu. (If the RAID chassis has two controllers, both controllers are represented by the single “Controller” node)

      The Bind dialog box opens showing all unbound disks for the controller listed in the Available Disk list.



b. Leave **Full Bind** unchecked. Refer to "About full/background bind" on page 748.

c. In the **Bind Type** drop down box, select **RAID 1**.

d. In the Available Disks box, select two contiguous disks at the top of the list. These should be the first two disks in the primary RAID chassis. (TIP: Use 'shift-click' or 'control-click' to select disks.) This creates a RAID 1 RANK for metadata storage.

e. Click the add (arrow) button to add disks to the Selected Disks list.

NOTE: As an aid in identifying a disk module's physical location, select it in the Selected Disks list, then click* Identify Disks. *This causes the disk drive light to flash.

f. Click **OK** to close the Bind dialog box and begin the binding process. The Progress Report dialog box opens, showing the status of the binding process.

g. Close the Progress Report and repeat the previous steps, selecting two more contiguous disks to create another RAID 1 RANK for journal storage. These should be the next two disks in the primary RAID chassis.

h. Make the fifth disk in the primary RAID chassis a Hot Spare. In the **Bind Type** drop down box, select **Hot Spare**.

i. In the Available Disks box, select the fifth disk in the primary RAID chassis.

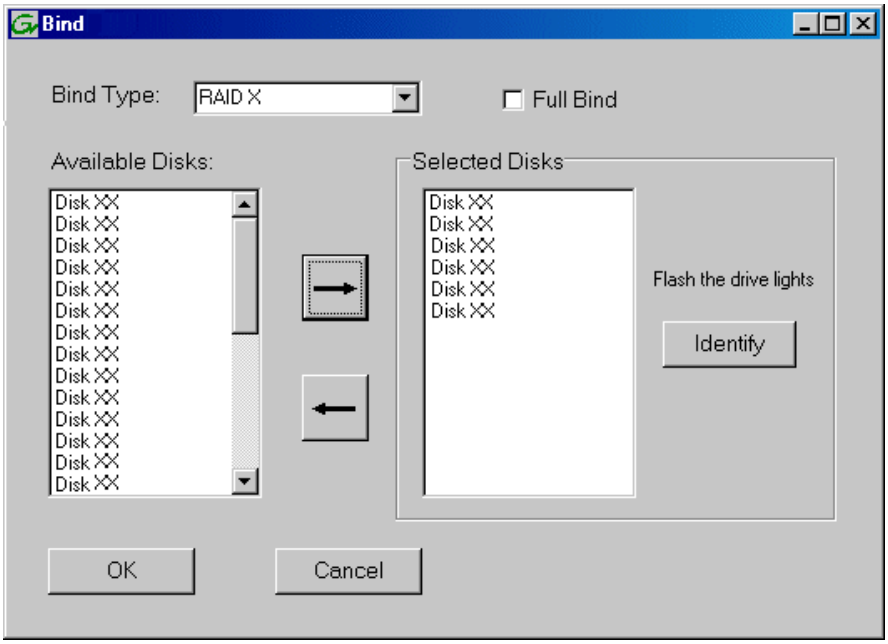
j. Click the add (arrow) button to add the disk to the Selected Disks list.

k. Click **OK** to close the dialog box and begin the binding process.

3. To bind unbound disks for media storage, do the following:

a. Right-click the **Unbound** node for a controller, then select **Bind** in the context menu. (If the RAID chassis has two controllers, both controllers are represented by the single "Controller" node)

The Bind dialog box opens showing all unbound disks for the controller listed in the Available Disk list.



b. Leave Full Bind unchecked. Refer to "About full/background bind" on page 748.

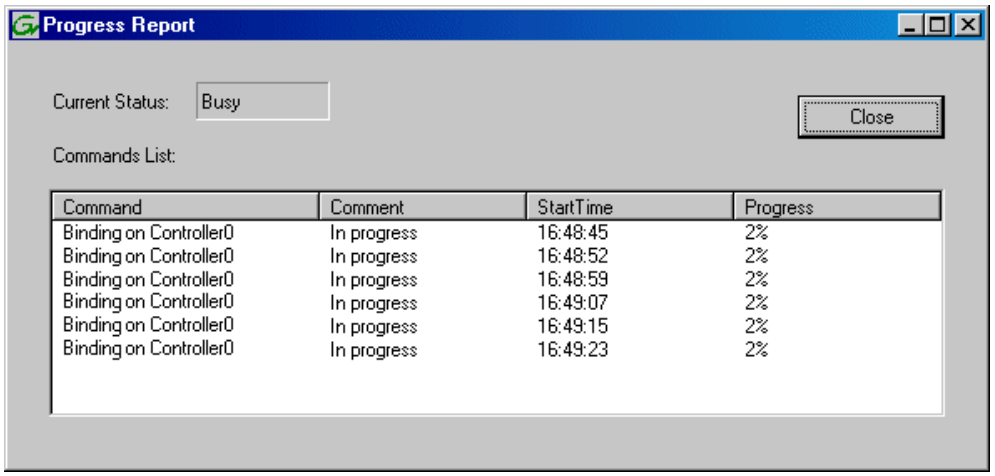
c. In the **Bind Type** drop down box, select **RAID 5** or **RAID 6**, as specified by your system design.

d. In the Available Disks box, select six contiguous disks at the top of the list. (TIP: Use 'shift-click' or 'control-click' to select disks.).

e. Click the add (arrow) button to add disks to the Selected Disks list.

NOTE: As an aid in identifying a disk module's physical location, select it in the Selected Disks list, then click* Identify Disks. *This causes the disk drive light to flash.

f. Click **OK** to close the Bind dialog box and begin the binding process. The Progress Report dialog box opens, showing the status of the binding process.



g. Close the Progress Report and repeat these steps for other unbound disks. If specified by your system design, you can bind some disks as Hot Spares, as explained in "Binding Hot Spare drives" on page 751. When you are done, if you did not bind any extra Hot Spares, you should have the following results:

   For L30R storage, on the primary RAID chassis you should have two RAID 1 RANKs of two disks each, one Hot Spare Disk, and one RAID 5 or RAID 6 RANK of six disks. For each optional Expansion chassis, you would have an additional one or two RAID 5 or RAID 6 RANKs of six disks each.

h. Click **Close** in Progress Report window.

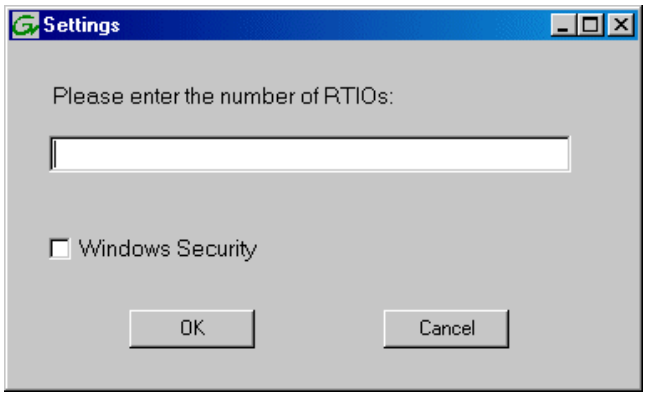
4. Restart the K2 Media Server.

NOTE: Make sure start up processes on the K2 Media Server are complete before proceeding.

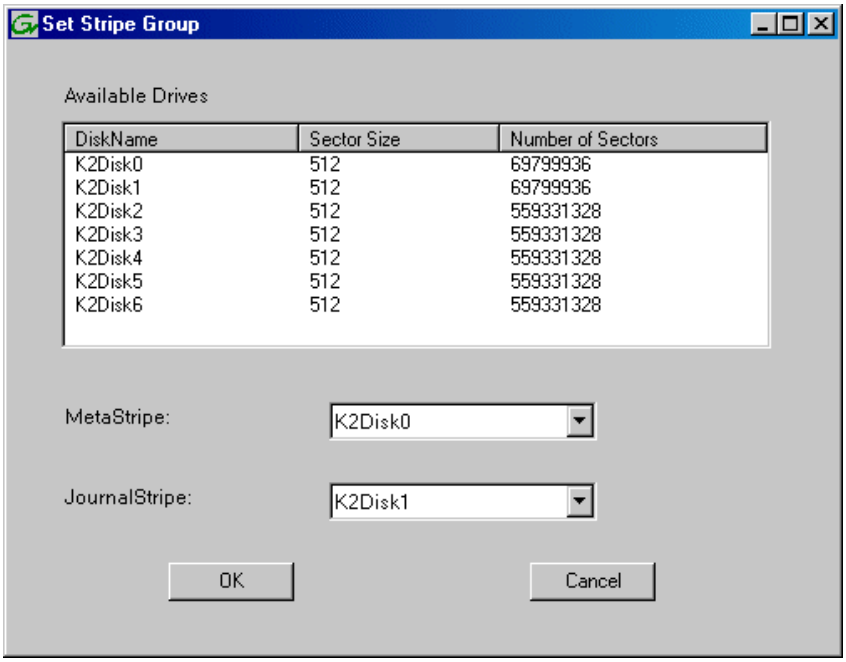
5. Continue with the next procedure "Creating a new file system".

Creating a new file system

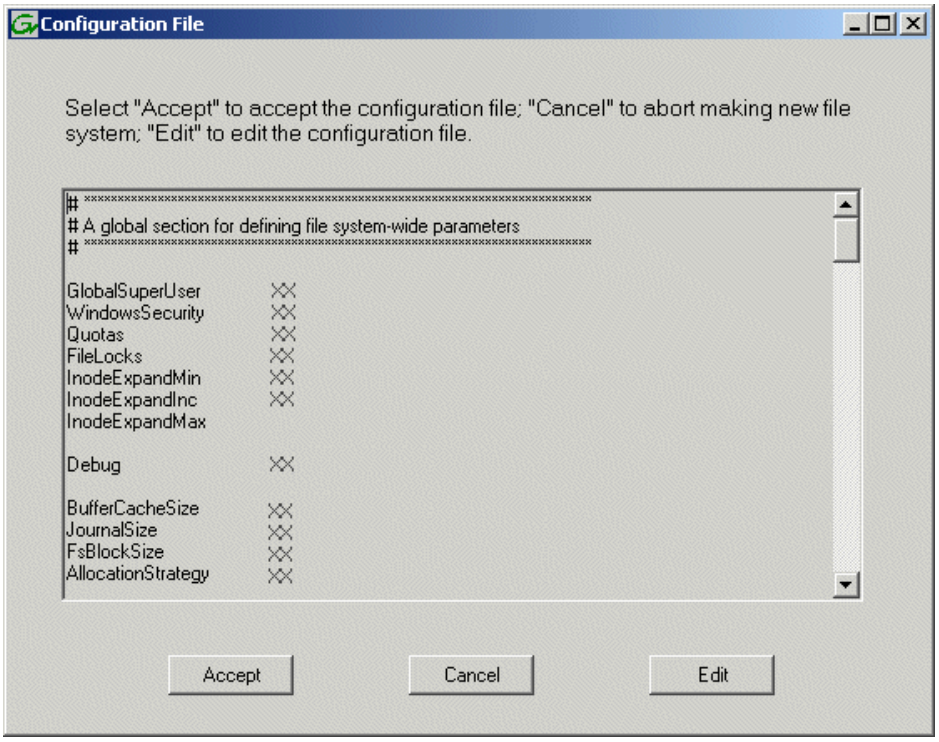
1. In Storage Utility, click **Tools | Make New File System**. The Setting dialog box opens.



2. For the Real Time Input/Output (RTIO) rate, enter the value specified by your system design. If you do not know this value, contact your Grass Valley representative.
3. If the K2 Storage System is to be accessed by only K2 Media Clients you can leave Windows Security unchecked. If accessed by Aurora Edits, refer to the *Aurora Edit Installation and Configuration Guide* for instructions.
4. Click **OK**. The Set Stripe Group dialog box opens.



5. If you have RAID 1 RANKS, assign a RAID 1 RANK as a metadata stripe and another RAID 1 RANK as a journal stripe. You can distinguish RAID 1 RANKs from media RANKs by the value in the Number of Sectors column.
6. Click **OK**. The Configuration File dialog box opens.



The configuration file for the media file system is displayed. You can verify media file system parameters by viewing this file. Do not edit this file. Click **Accept**.

A "…Please wait…" message box displays progress and a "…succeeded…" message confirms the process is complete.

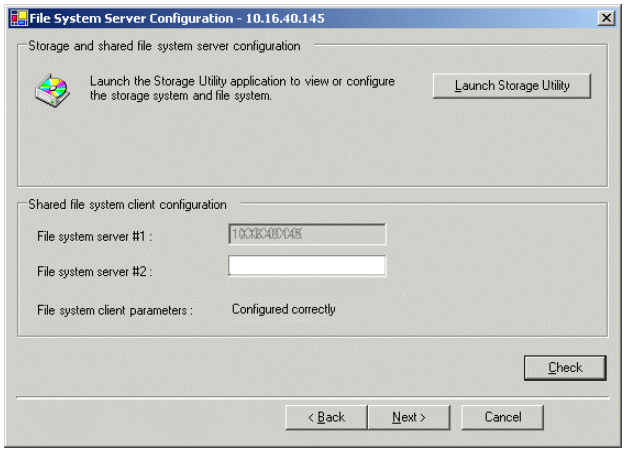
7. A message informs you that you must restart the K2 Media Server, however the restart at the end of the Configure K2 Server wizard suffices, so you do not need to restart now.
8. Close the Storage Utility.

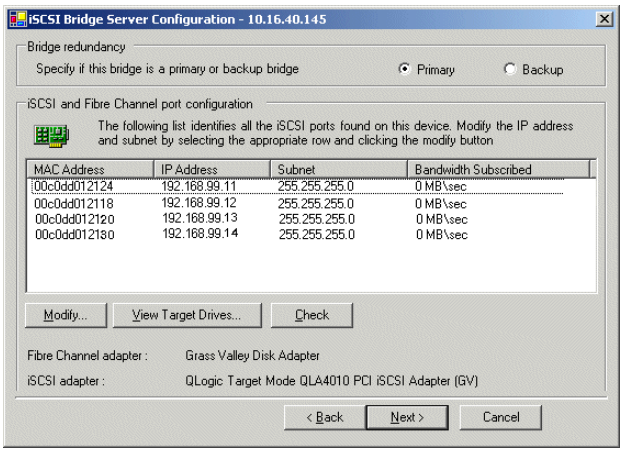
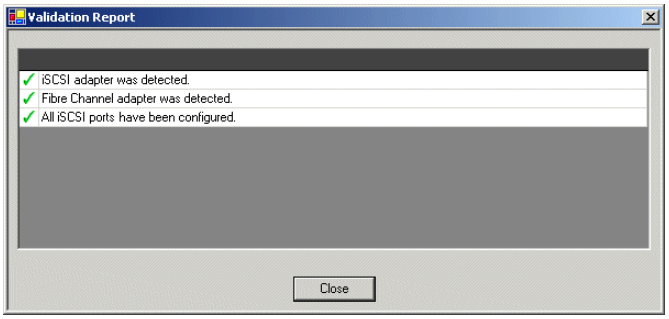
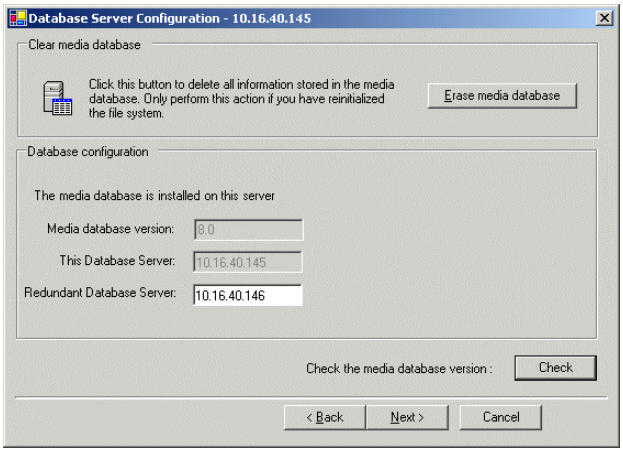
NOTE: Do not attempt to start K2 Media Clients or otherwise bring the K2 Storage System online until instructed to do so later in this chapter.

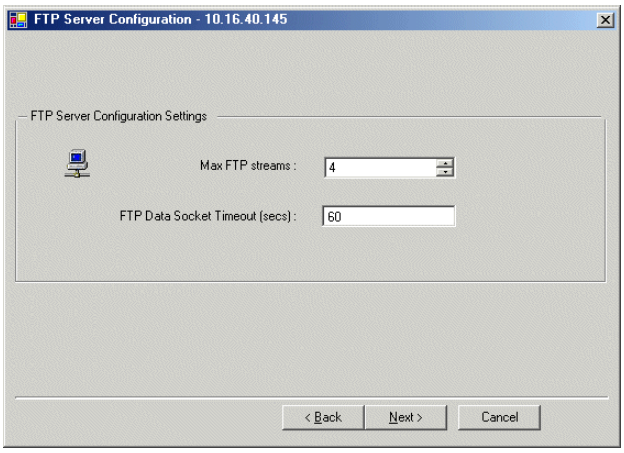
9. Continue with the next procedure.

Configuring server A - Part 2

1. Return to the Configure K2 Server page from which you launched Storage Utility and proceed as described in the following table:

On this page…	Do this…
File System Server Configuration This page checks on the configuration of the K2 Media Server in one of its main roles as a file system server. The K2 Media Server also functions as a file system client, which is also checked from this page.	 If you have not already done so, enter the name or IP address of the redundant K2 Media Server (server B). Click **Check**. When the wizard reports that the configuration is correct, click **Next**. If you get a "The V: will not be available until this device is rebooted…" message, you can safely continue with this procedure and follow the instructions related to this message later in the procedure.

On this page…	Do this…
iSCSI Bridge Server Configuration This page manages the components that bridge between iSCSI (the GigE media network) and the Fibre Channel connection to the RAID storage. You configure network settings on the iSCSI adapters and the page validates that the Fibre Channel adapter is in place and that the media RANKs are visible as iSCSI targets.	 Select **Primary**. Select an iSCSI adapter and click **Modify**. A network configuration dialog box opens. Enter the media network IP address and the subnet mask and click **Apply**. Do the same for the other iSCSI adapters. Click **Check**. The Validation Report opens.  Confirm that the iSCSI configuration is successful. Close the Validation Report and then click **Next**.
Database Server Configuration	 Enter the name or IP address of K2 Media server B. This is the redundant partner of the server you are now configuring. Click **Next**.

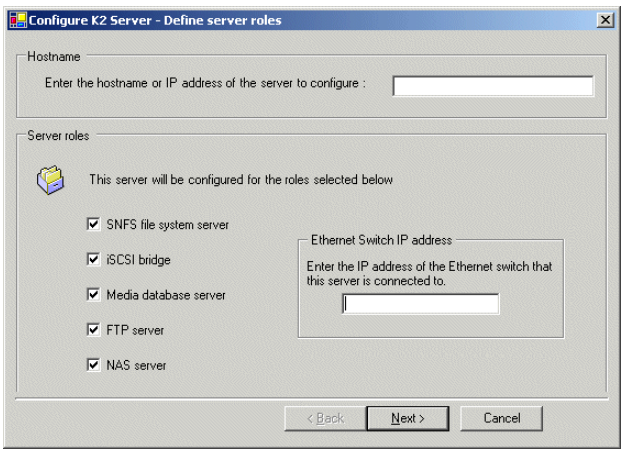
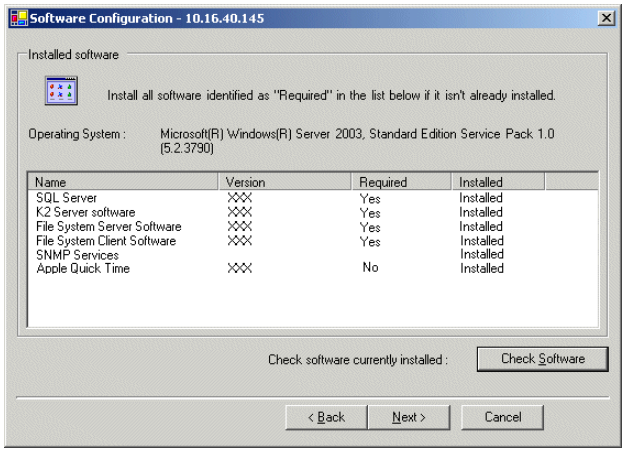
On this page…	Do this…
FTP Server Configuration	 Do not modify these settings. Leave at default values of Max FTP streams = 4 and FTP Data Socket Timeout = 60. Only qualified Grass Valley personnel should specify other values, as these settings are intended for use only with custom systems designed by Grass Valley. Click **Next**
Completing the Configuration Wizard	Click **Finish**. The wizard closes. The server restarts. Wait until all startup processes have completed before continuing.

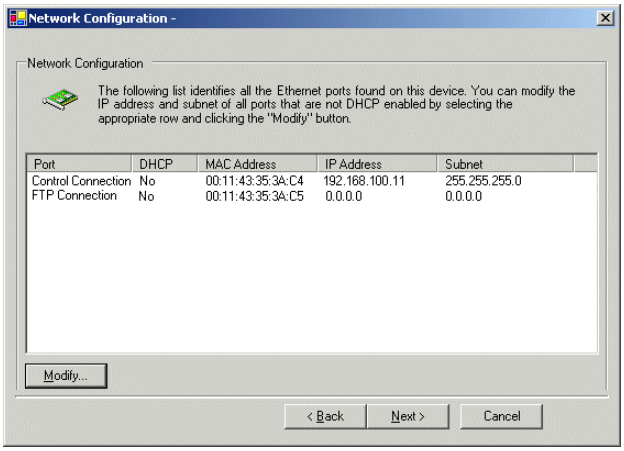
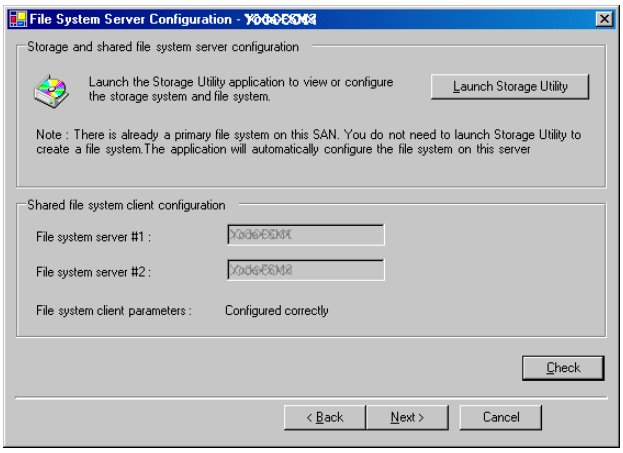
Configuring the redundant server

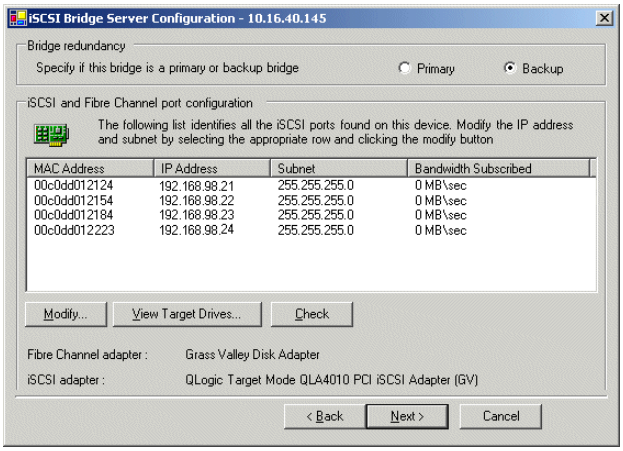
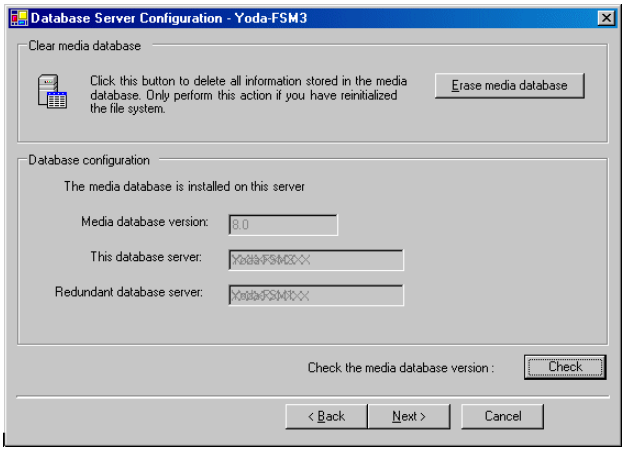
You must wait for the primary K2 Media Server to restart before continuing. To verify, from the control point PC open the MS-DOS command prompt and use the "ping" command.

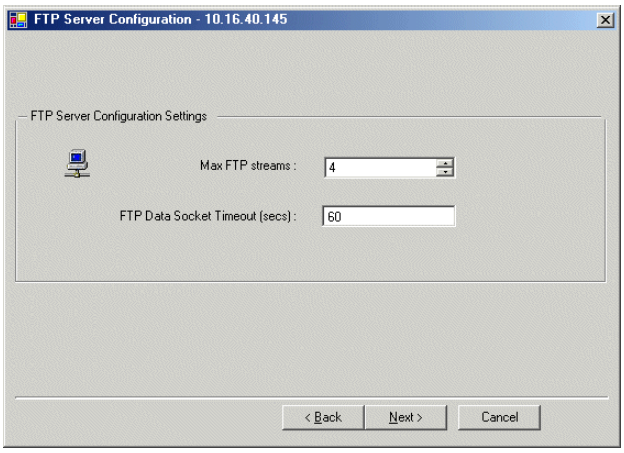
After you have configured the first K2 Media Server (server A) you next configure the redundant K2 Media Serer (server B).

1. In the K2 System Configuration application tree view, select the K2 Media Server you are configuring as server B.
2. Click the **Configure** button. The Configure K2 Storage System Server wizard opens. Follow the on-screen text to configure the server for a Level 30R K2 Storage System, as described in the following table. Some screens require no input from you, as they are based on the configurations already completed on a previously configured K2 Media Server.

On this page…	Do this…
Define server roles	 Enter the name for the K2 Media Server. This should be the current network name of the machine. Enter the name or IP address of the Ethernet switch, as currently configured on the switch, to which the K2 Media Server is connected. Select all roles. Click **Next**
Software Configuration This page checks for the software required to support the roles you selected on the previous page. Software required on K2 Media Server B is as follows: • SQL Server • K2 Server • File System Server • File System Client • SNMP Services • QuickTime	 If software with *Yes* in the Required column reports as *Not Installed*, you must first install it on the K2 Media Server before continuing. Refer to *Chapter 16, Managing K2 software*. After installing the software, click **Check Software**. When all required software reports as *Installed*, click **Next**.

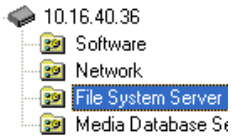
On this page…	Do this…
Network Configuration This page displays the control network Ethernet port, and allows you to configure the FTP/ Streaming network Ethernet port. ***NOTE: This page does not configure the iSCSI interface (media network) ports.***	 The top port is the port over which the K2 System Configuration application is communicating with the K2 Media Server. If correctly configured, it is already assigned the control network IP address, as displayed on this page. Select the other port and click **Modify**. A network configuration dialog box opens. Enter the FTP/Streaming IP address and the subnet mask and click **Apply**. Click **Next**.
File System Server Configuration This page checks on the configuration of the K2 Media Server in one of its main roles as a file system server. The K2 Media Server also functions as a file system client, which is also checked from this page. It is not necessary to bind RANKs or create a file system, since this task was completed when you configured the previous K2 Media Server.	 Click **Next**. Confirm messages about copying *default.cfg* to the other server. If you get a "The V: will not be available until this device is rebooted…" message, you can safely continue with this procedure and follow the instructions related to this message later in the procedure.

On this page…	Do this…
iSCSI Bridge Server Configuration This page manages the components that bridge between iSCSI (the GigE media network) and the Fibre Channel connection to the RAID storage. You configure network settings on the iSCSI adapters and the page validates that the Fibre Channel adapter is in place and that the media RANKs are visible as iSCSI targets. ***NOTE: The iSCSI adapters on this server must be on a different subnet than those on its redundant server partner.***	 Select **Backup**. Select an iSCSI adapter and click **Modify**. A network configuration dialog box opens. Enter the media network IP address and subnet mask and click **Apply**. Do the same for the other iSCSI adapters. To verify drives, click **Check** then **View Target Drives**. You should see all your media drives listed. Click **Next**.
Database Server Configuration	 You do not need to enter or configure anything on this page. Click **Next**.

On this page…	Do this…
FTP Server Configuration	 Do not modify these settings. Leave at default values of Max FTP streams = 4 and FTP Data Socket Timeout = 60. Only qualified Grass Valley personnel should specify other values, as these settings are intended for use only with custom systems designed by Grass Valley. Click **Next**
Completing the Configuration Wizard	Click **Finish**. The wizard closes. The K2 Media Server restarts. Do not proceed until restart processes are finished.

3. If you got a “The V: will not be available until this device is rebooted…” message on the File System Server Configuration page, after the K2 Media Server restarts, do the following:

   a. In the K2 System Configuration application tree view, under the K2 Media Server select the File System Server node.



   The File System Server Configuration page appears.

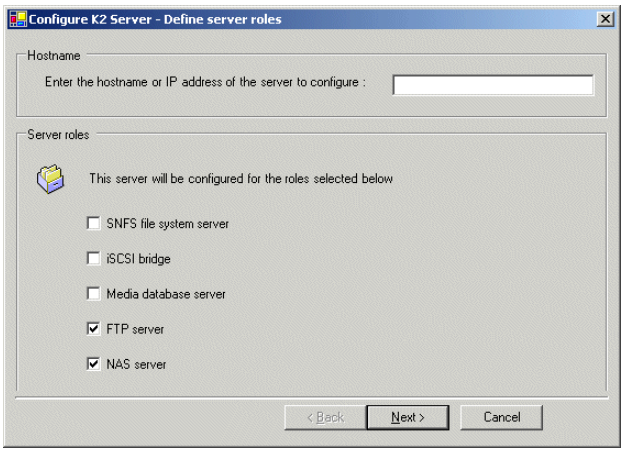
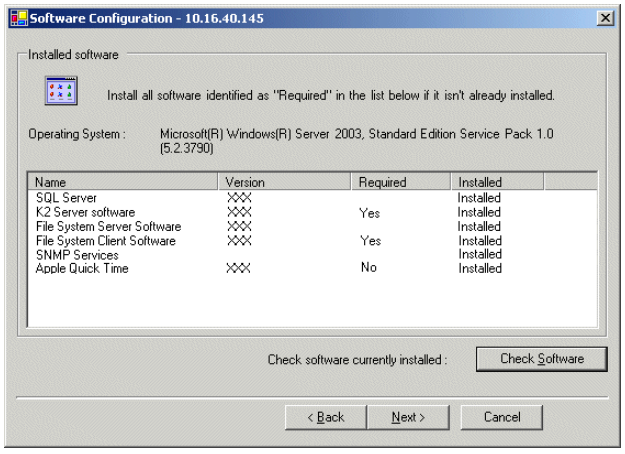
   b. Click **Check** and verify that the V: drive is shared. This is required for NAS server functionality.

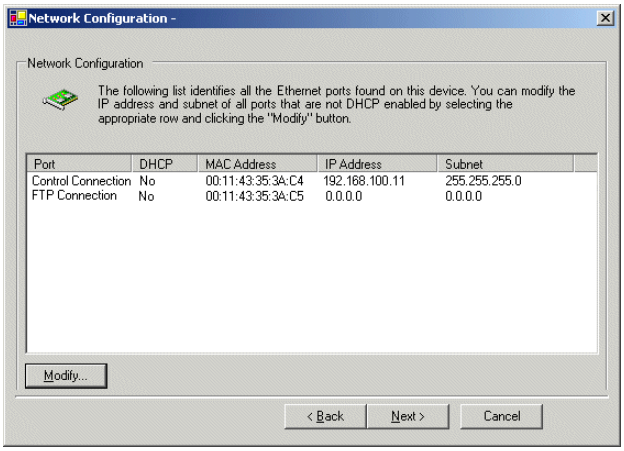
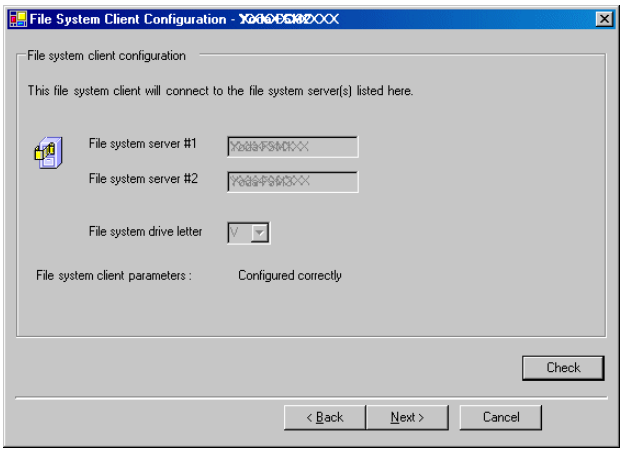
Configuring optional NH servers

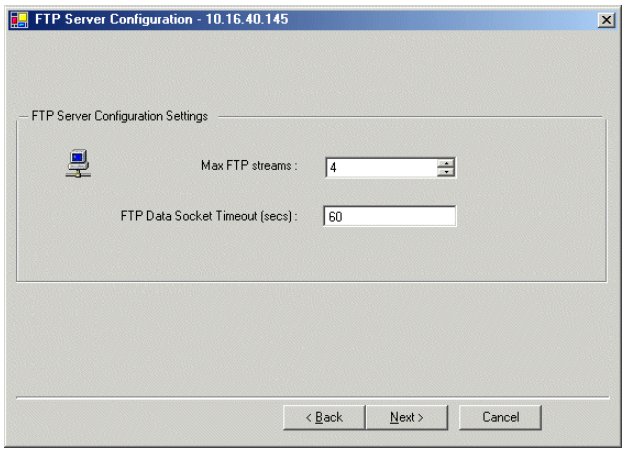
If you have one or more optional NH K2 Media Servers, you next configure those servers. This section applies to both NH1 (1 Gig FTP) servers and NH1-10GE (10 Gig FTP) servers.

NOTE: Multiple NH servers on a K2 Storage System must be of the same type, either all NH1 or all NH1-10GE.

1. In the K2 System Configuration application tree view, select the K2 Media Server you are configuring.
2. Click the **Configure** button. The Configure K2 Server wizard opens. Follow the on-screen text to configure the server for a Level 30R K2 Storage System, as described in the following table. Some screens require no input from you, as they are based on the configurations already completed on a previously configured K2 Media Server.

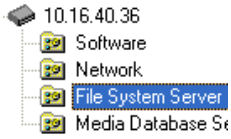
On this page...	Do this...
Define server roles	 Enter the name for the K2 Media Server. This should be the current network name of the machine. Select FTP server and NAS server. Click **Next**
Software Configuration This page checks for the software required to support the roles you selected on the previous page. Software required on a NH K2 Media Server is as follows: • K2 Server • File System Client • QuickTime	 If software with *Yes* in the Required column reports as *Not Installed*, you must first install it on the K2 Media Server before continuing. Refer to *Chapter 16, Managing K2 software*. After installing the software, click **Check Software**. When all required software reports as *Installed*, click **Next**.

On this page…	Do this…
Network Configuration This page displays the control network Ethernet port, and allows you to configure the FTP/ Streaming network Ethernet port.	 The top port is the port over which the K2 System Configuration application is communicating with the K2 Media Server. If correctly configured, it is already assigned the control network IP address, as displayed on this page. Select the other port and click **Modify**. A network configuration dialog box opens. Enter the FTP/Streaming IP address and the subnet mask and click **Apply**. Click **Next**.
File System Client Configuration This K2 Media Server does not function as a file system server. It does function as a file system client, which is validated from this page.	 Click **Check**. When the wizard reports that the configuration check is successful, click **Next**.

On this page…	Do this…
FTP Server Configuration	 Do not modify these settings. Leave at default values of Max FTP streams = 4 and FTP Data Socket Timeout = 60. Only qualified Grass Valley personnel should specify other values, as these settings are intended for use only with custom systems designed by Grass Valley. Click **Next**
Completing the Configuration Wizard	Click **Finish**. The wizard closes. The K2 Media Server restarts. Do not proceed until restart processes are finished.

3. If you got a "The V: will not be available until this device is rebooted…" message on the File System Server Configuration page, after the K2 Media Server restarts, do the following:

   a. In the K2 System Configuration application tree view, under the K2 Media Server select the File System Server node.



   The File System Server Configuration page appears.

   b. Click **Check** and verify that the V: drive is shared. This is required for NAS server functionality.

4. Repeat this procedure for remaining NH K2 Media Servers, if any.

Your configurations for the Level 30R K2 Storage System are complete.

Adding K2 Storage System clients

You can add now clients, such as K2 Media Clients or Aurora Edits, to the K2 Storage System and configure them using the K2 System Configuration application.

- For Aurora Edits, refer to the *Aurora Edit Installation and Configuration Guide* for instructions.
- For K2 Media Clients, refer to *K2 Media Client System Guide* for instructions.

NOTE: You must install MPIO software on K2 Media Clients that access shared storage on a redundant K2 Storage System.

Basic operations for Level 30R storage

Use the following procedures as you work on your Level 30R storage system:

- "Level 30R system power-off procedure"
- "Level 30R system power-on procedure"

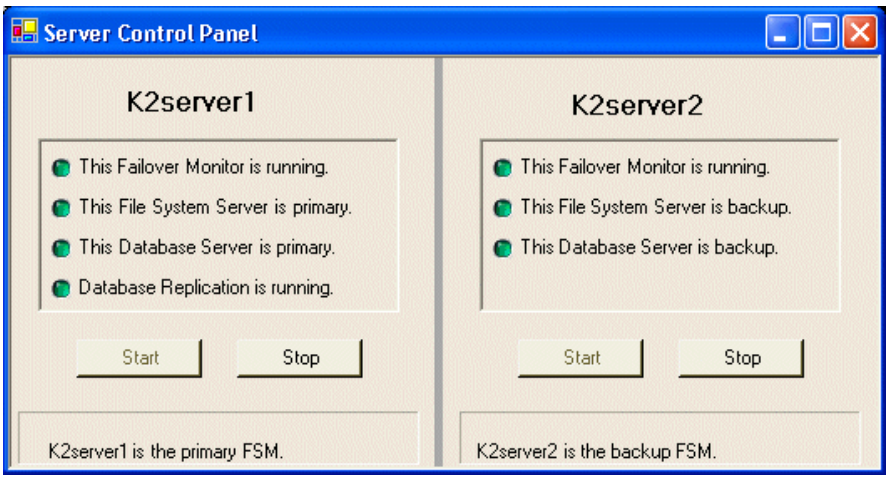
For other procedures refer to "Administering and maintaining the K2 Storage System" on page 687.

Level 30R system power-off procedure

Use the following sequence to power-off the Level 30R storage system.

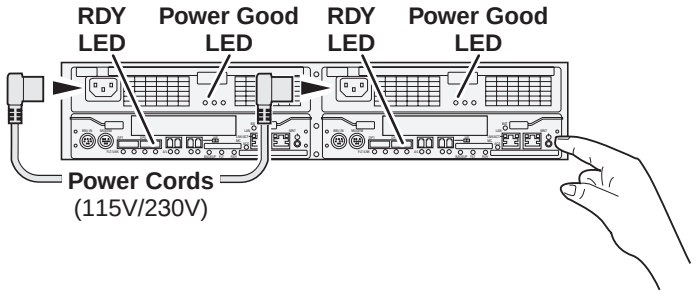
1. Power-off all K2 Media clients or other iSCSI clients.
2. From the K2 System Configuration application, in the tree view select the name of the K2 Storage System, which is the top node of the storage system tree. Then click the **Server Control Panel** button.

The Server Control Panel opens.



3. Take note of which is the primary K2 Media Server and which is the backup K2 Media Server. The order in which you put servers back into service when you power up the K2 Storage System is dependent on their primary/backup roles at the time when you power down the K2 Storage System.
4. For the backup K2 Media Server, click **Stop**. This takes the server out of service.
5. Shut down the backup K2 Media Server, if it does not shut down automatically.
6. For the primary K2 Media Server, click **Stop**. This takes the server out of service.
7. Shut down the primary K2 Media Server, if it does not shut down automatically.
8. Shut down optional NH K2 Media Servers, if any.

9. On the primary RAID chassis controller, identify the RDY LED. It blinks at a rate of 1 blink per second during normal operation.



10. Press and hold down the power button on a RAID controller. You can press the power button on either RAID controller 0 or RAID controller 1.

11. Release the power button in about 5 seconds, when the RDY LED blinks more quickly, at a rate of about 2 blinks per second. Do not hold down the power button for longer than 15 seconds.

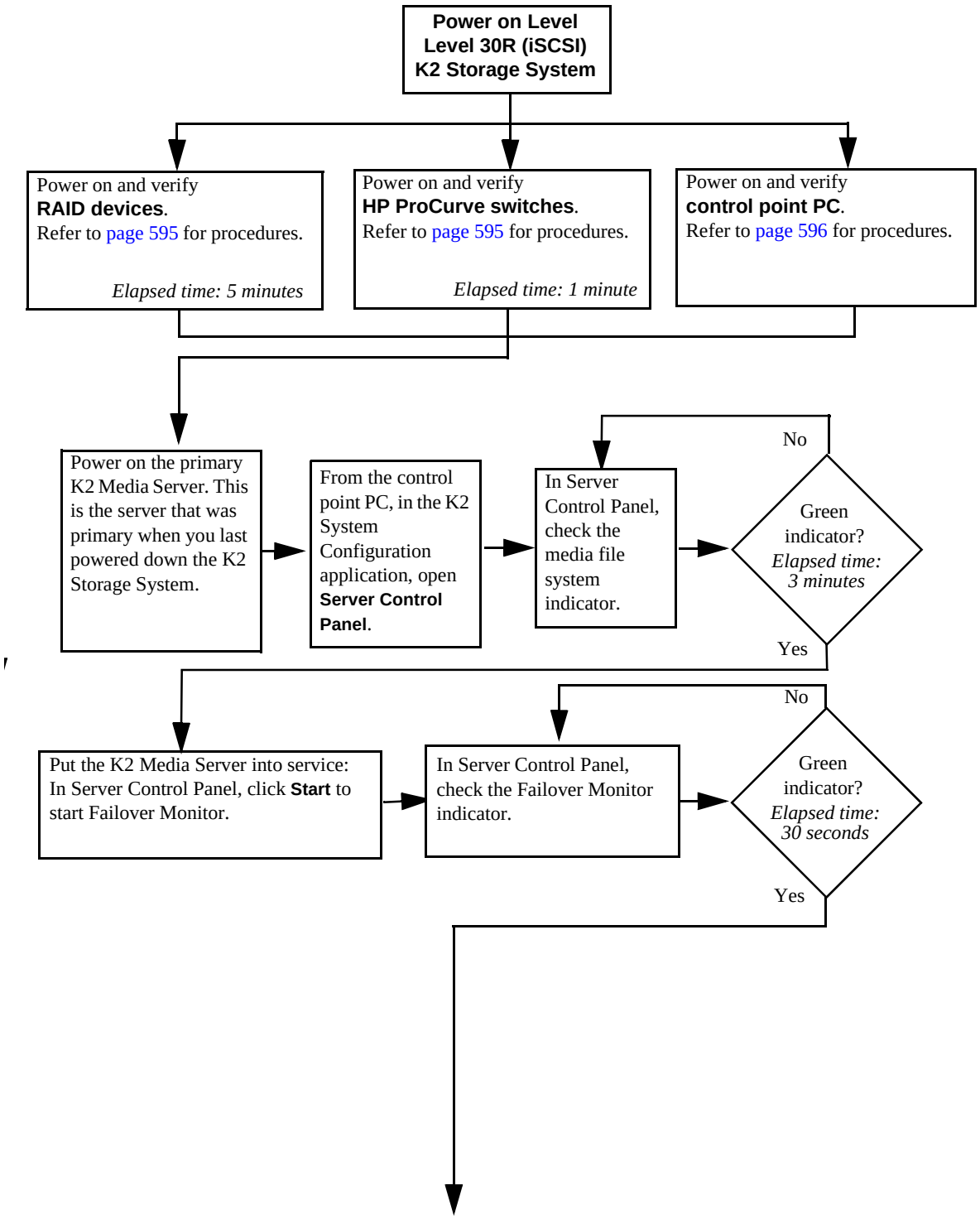
    The power button on the RAID controller turns off power for the primary RAID chassis and any connected Expansion chassis. Power-off normally occurs within 20 seconds and is indicated when LEDs other than those on the power supplies go off and the fans stop rotating.

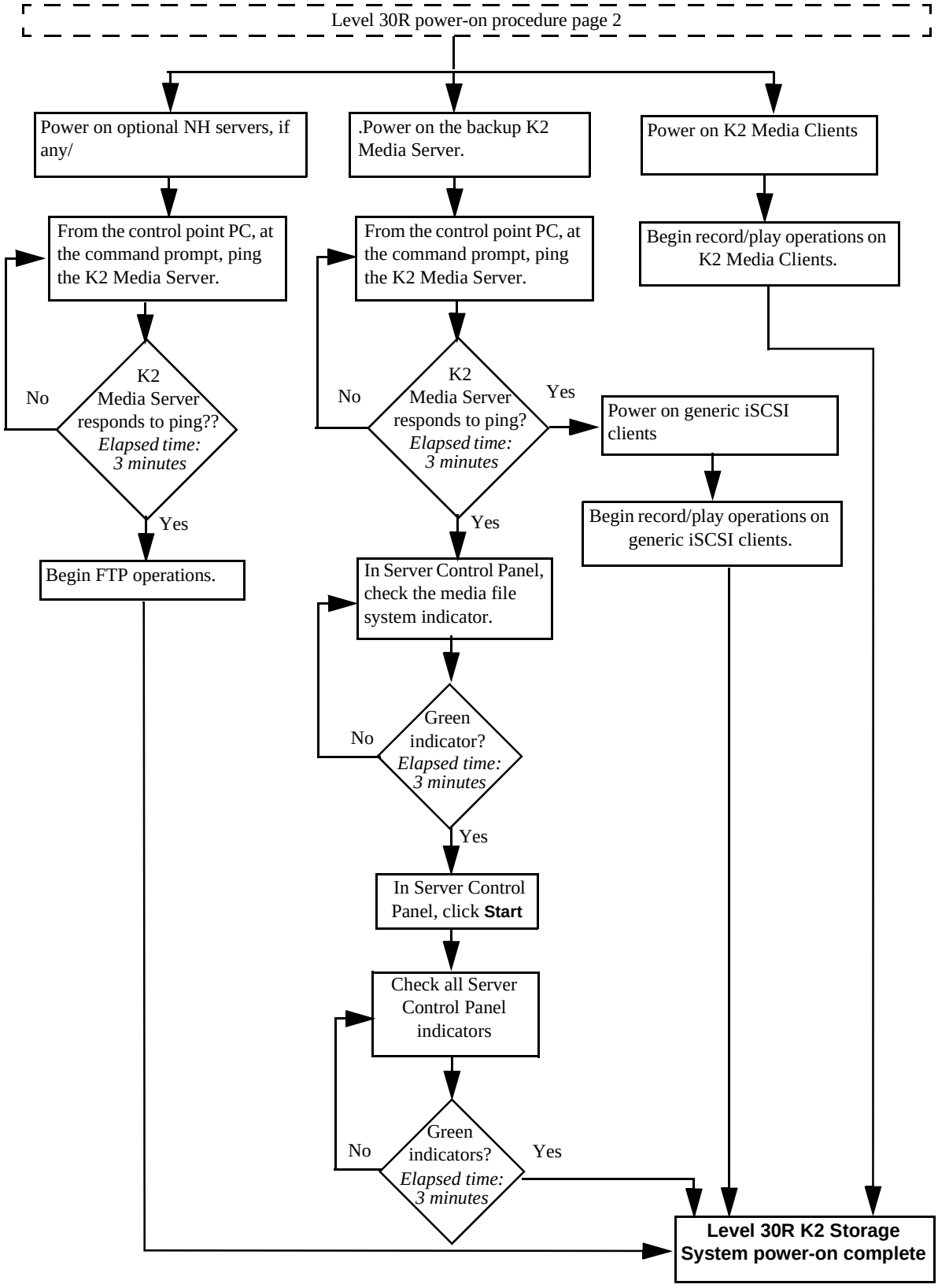
12. Wait for RAID power-off to complete before proceeding.

13. Power-off all Ethernet switches.

14. Power-off the control point PC and/or the NetCentral server PC, if necessary.

Level 30R system power-on procedure

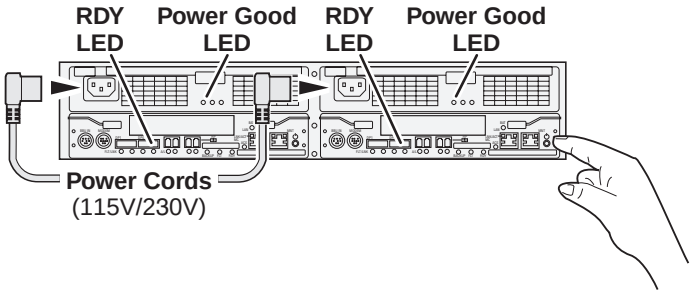



Level 30R power-on procedure page 2
Power on optional NH servers, if any/
.Power on the backup K2 Media Server.
Power on K2 Media Clients
From the control point PC, at the command prompt, ping the K2 Media Server.
From the control point PC, at the command prompt, ping the K2 Media Server.
Begin record/play operations on K2 Media Clients.
K2 Media Server responds to ping?? Elapsed time: 3 minutes
No
Yes
K2 Media Server responds to ping? Elapsed time: 3 minutes
No
Yes
Power on generic iSCSI clients
Begin record/play operations on generic iSCSI clients.
Begin FTP operations.
In Server Control Panel, check the media file system indicator.
Green indicator? Elapsed time: 3 minutes
No
Yes
In Server Control Panel, click Start
Check all Server Control Panel indicators
Green indicators? Elapsed time: 3 minutes
No
Yes
Level 30R K2 Storage System power-on complete

Powering on Level 10, 20, 30, and Nearline 10 RAID storage devices

Use the following procedure to power on and verify proper operation of RAID storage devices.

1. Verify power and cabling.
2. Press and hold down the power button on the controller, as shown.



   If the RAID chassis has two controllers, you can press the power button on either controller. You do not need to press both power buttons.

   Pressing the power button on a controller also powers on any connected Expansion chassis. There are no power buttons on Expansion chassis.

3. Release the power button when the Power Good LED on the power supply is illuminated. This takes 1-3 seconds.
4. Wait while the primary RAID chassis performs self-test and initialization. This takes about four minutes. While this is taking place, the RDY LED is illuminated with a steady on light.
5. Watch for the RDY LED to begin blinking at one second intervals. The LED might turn off and back on two times before starting the one second blink pattern. When the RDY LED is blinking at one second intervals, the self-test and initialization is complete and the chassis is ready for use.

Powering on the HP ProCurve switch

Use the following procedure to power on and verify proper operation of the HP ProCurve switch.

1. Power up the switch.
2. Watch LEDs to verify proper operation. The diagnostic self test LED Behavior is as follows:
   - Initially, all the status, LED Mode and port LEDs are on for most of the duration of the test.
   - Most of the LEDs go off and then may come on again during phases of the self test. For the duration of the self test, the Test LED stays on.

   If the ports are connected to active network devices, the LEDs behave according to the LED Mode selected. In the default view mode (Link), the LEDs should be on.

- If the ports are connected to active network devices, the LEDs behave according to the LED Mode selected. In the default view mode (Link), the LEDs should be on.
- If the ports are not connected to active network devices, the LEDs will stay off.

Powering on the control point PC

Use the following procedure to power on K2 Storage System's control point PC and verify proper operation during power up of the system.

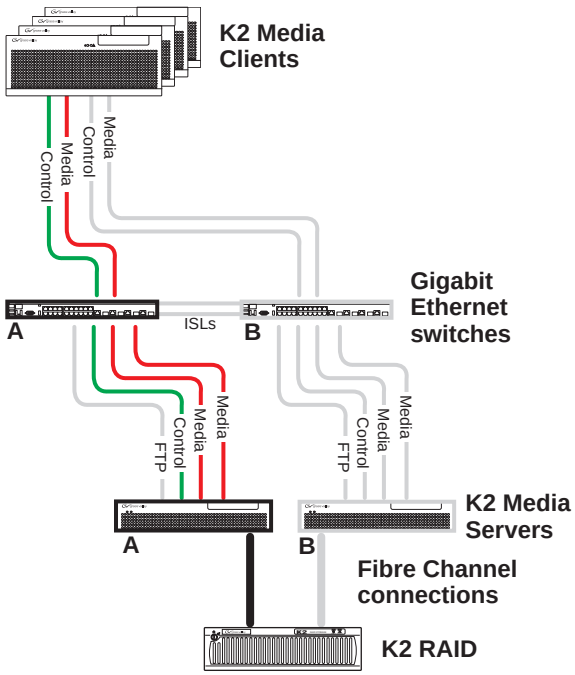
1. Power up and log on to the PC using standard Windows procedures.
2. Start and log on to NetCentral.
3. NetCentral reports devices as offline. As each device of the K2 Storage System is powered on, check NetCentral to verify the device's status

Failover behaviors

If a fault occurs and one of the failover mechanisms is triggered, a redundant K2 Storage System behaves as explained in following sections.

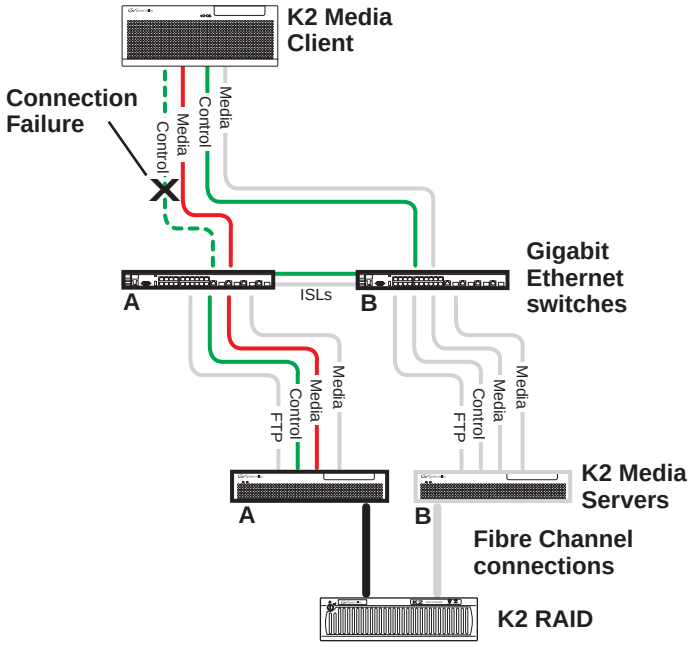
The diagrams that follow are representative of a generic redundant K2 Storage System. Some details, such as the number of media connections, might not be the same as your K2 Storage System. These diagrams illustrate the media (iSCSI) and control paths as they interact with the redundant K2 Media Servers in their role of media file system/database server and iSCSI bridge. Interactions of FTP traffic and/or paths involving K2 Media Servers with other roles are not illustrated.

Pre-failover behavior



The system operates initially with both media and control traffic on GigE switch “A” and K2 Media Server “A”. Media (iSCSI) traffic is using media network “A”. The iSCSI adapters (TOEs) on the “A” K2 Media Server provide access to the Fibre Channel connected RAID storage. K2 Media Server “A” is the media file system/database server.

Control team failover behavior



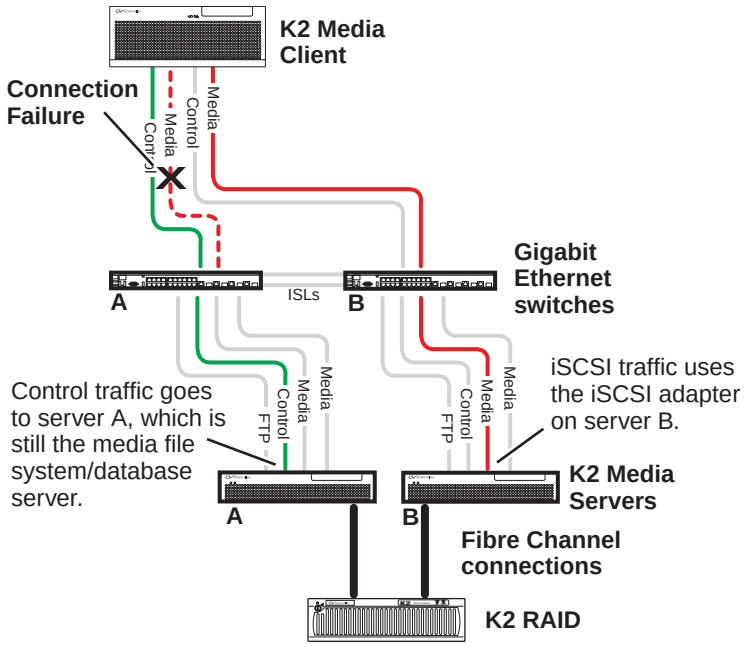
If the following system connection fails to respond to network communication:

- The control connection between a K2 Media Client and GigE switch “A”.

Then the following failover behavior occurs:

1. The control team on the K2 Media Client fails over and communication begins on the other control port.
2. The control communication finds a path through GigE “B” switch and across an ISL to GigE switch “A” to reach the same control port on the same K2 Media Server.
3. Media (iSCSI) traffic keeps using the same path.
4. K2 Media Server “A” is still the media file system/database server. The media file system (SNFS) and media database (SQL) do not fail over.
5. The other K2 Media Clients (not affected by the connection failure) keep using the same paths for media and control, as in the previous diagram “Pre-failover behavior”.

K2 Media Client media (iSCSI) connection failover behavior



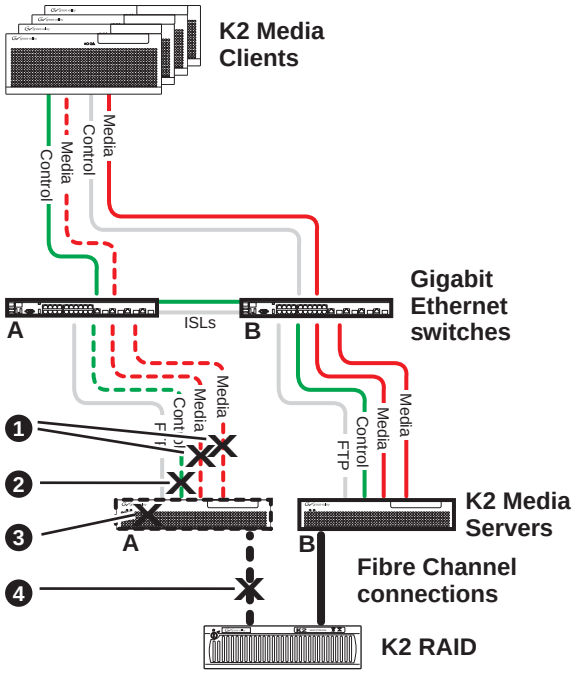
If the following system connection fails to respond to network communication:

- Media (iSCSI) network “A” connection between a K2 Media Client and the GigE switch.

Then the following failover behavior occurs:

1. The K2 Media Client drops communication on its “A” media port and begins using its “B” media port and the “B” media (iSCSI) network. The iSCSI adapter (TOE) on the “B” K2 Media Server provides access to the Fibre Channel connected RAID storage.
2. Control traffic keeps using the same path to K2 Media Server “A”.
3. K2 Media Server “A” is still the media file system/database server. The media file system (SNFS) and media database (SQL) do not fail over.
4. The other K2 Media Clients (not affected by the component failure) keep using the same paths for media and control, as in the previous diagram “Pre-failover behavior”. This means the K2 Media Clients unaffected by the failover are using the iSCSI adapter (TOE) on the “A” K2 Media Server to provide access to the Fibre Channel connected RAID storage, while at the same time the affected K2 Media Clients are using the iSCSI adapter (TOE) on the “B” K2 Media Server to provide access to the Fibre Channel connected RAID storage. In this case both RAID controller are simultaneously providing disk access.

K2 Media Server failover behavior

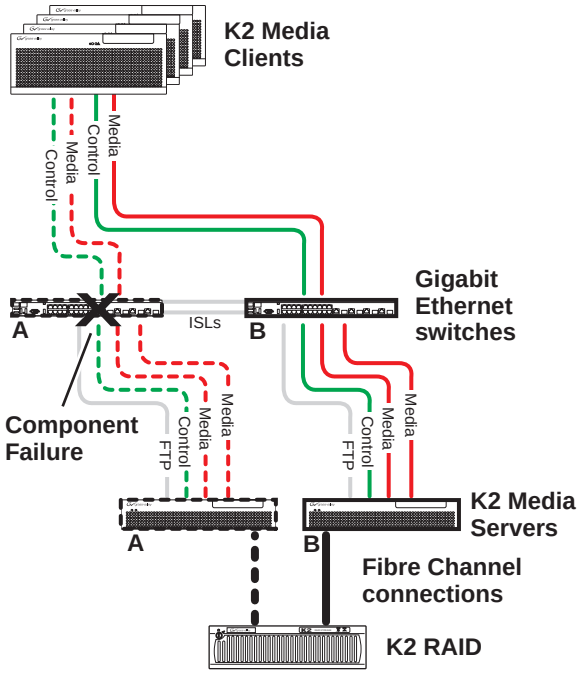


If the following system connection or component fails to respond to network communication:

Then the following failover behavior occurs:

1. The media file system (SNFS) and media database (SQL) on K2 Media Server “A” fail over and K2 Media Server “B” becomes the active media file system/database server.
2. All K2 Media Clients drop communication on the “A” media port and begin using the “B” media port, finding a path through GigE switch “B” to K2 Media Server “B”. All K2 Media Clients use an iSCSI adapter (TOE) on the “B” K2 Media Server to provide access to the Fibre Channel connected RAID storage.
3. All K2 Media Clients keep communicating on the same control port, finding a new path through GigE switch “A” and across an ISL to GigE switch “B” to reach K2 Media Server “B”.

K2 Media Server failover with Control team failover behavior



If the following system component fails to respond to system communication:

- The “A” GigE switch

Then the following failover behavior occurs:

1. The media file system (SNFS) and media database (SQL) on K2 Media Server “A” fail over and K2 Media Server “B” becomes the active media file system/database server.
2. All K2 Media Clients drop communication on the “A” media port and begin using the “B” media port, finding a path through GigE switch “B” to K2 Media Server “B”. All K2 Media Clients use an iSCSI adapter (TOE) on the “B” K2 Media Server to provide access to the Fibre Channel connected RAID storage.
3. For all K2 Media Clients, communication fails on the control port, so the control team fails over and communication begins on the other control port.
4. For all K2 Media Clients, control communication finds a path through GigE switch “B” to K2 Media Server “B”.

Chapter 13

Installing the Nearline 10 Storage System

The K2 Nearline 10 (NL10) and Nearline 10 Redundant (NL10R) storage systems were initially released with K2 system software version 3.2 in September 2007.

Use this chapter to install either the Nearline 10 or the Nearline 10R K2 Storage System.

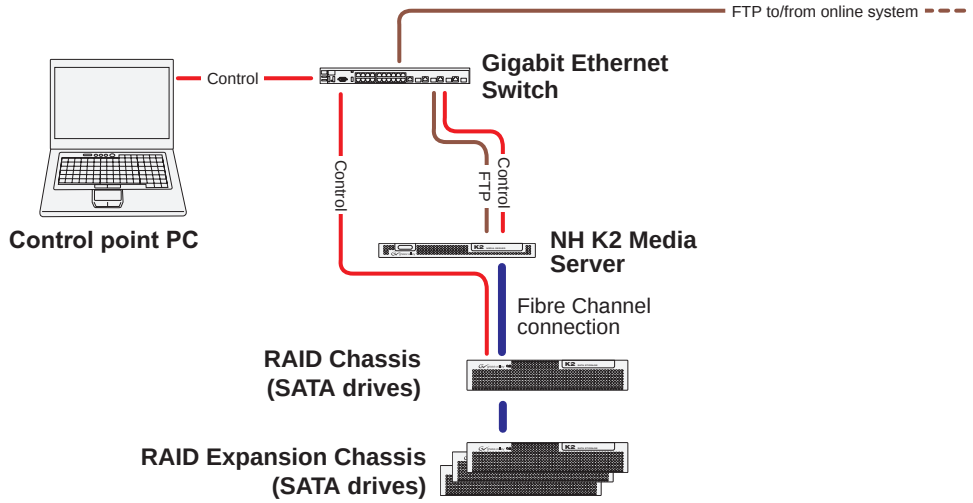
This chapter includes the following topics:

- "Nearline 10 system description" on page 604
- "Preparing nearline 10 devices" on page 605
- "Networking for nearline 10" on page 622
- "Configuring the nearline 10 storage system" on page 626
- "Basic operations for nearline 10 storage" on page 643

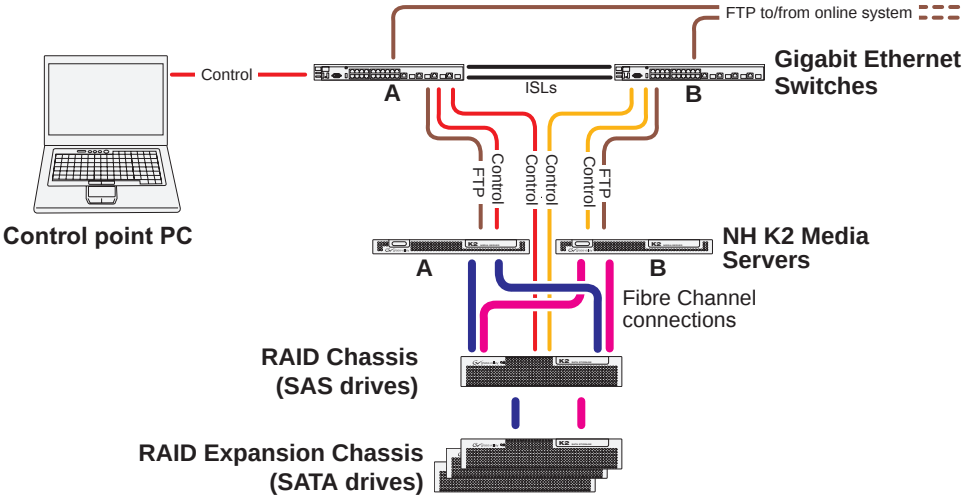
Work through these topics sequentially to install the storage system.

Nearline 10 system description

Nearline 10 (non-redundant)



Nearline 10 Redundant



This section describes both the Nearline 10 non-redundant (NL10) and the Nearline 10 redundant (NL10R) K2 Storage System. This is a 4 Gb/s Nearline K2 Storage System. The 4 Gb/s bandwidth available on this system is a feature that distinguishes it from the previous Nearline K2 Storage System, which has a 2 Gb/s bandwidth.

The purpose of the Nearline storage system is to provide a large pool of storage to which files can be saved. The Nearline system is considered an “offline” system, which means the system stores files only, such GXF files or MXF files, with no ability to record or play those files directly on the system. This is because the Nearline system has no media database to support “movies” or “clips”, such as there is on an “online” K2 Level 10, 20, or 30 storage system. However, the files on a Nearline system can be readily available to an online K2 system via FTP transfer.

The non-redundant Nearline storage system has one Gigabit Ethernet switch. The redundant Nearline storage system has two Gigabit Ethernet switches, connected by Inter-Switch Links (ISLs) to support a redundant Ethernet fabric.

The storage system has one (non-redundant) or two (redundant) NH K2 Media Servers. These can be NH1 (one Gig FTP bandwidth) or NH1-10GE (ten Gig FTP bandwidth) servers, but all NH servers on a system must be of the same type: either all NH1 or all NH1-10GE. The NH server for a Nearline system has two ports for Fibre Channel connections. NH servers do not have media (iSCSI) ports.

A NH server on a Nearline system is configured with roles of FTP server and Media file system server. On a redundant system these roles are identical on both servers and provide redundancy as follows:

- FTP server — On a redundant system both servers are active in this role simultaneously. To provide FTP redundancy in the event of a server failure, your facility's FTP system must be able to access alternate FTP servers.
- Media file system server — On a redundant system only one server is active at any one time in this role, and the media file system provides redundancy. If a fault occurs on the active server, one of the other servers automatically takes over as the active media file system server.

In the Nearline system no K2 Media Servers take the role of iSCSI bridge or media database server.

No K2 Media Clients or any other generic client are part of the Nearline system.

SATA drives provide the primary media file storage on a Nearline system. While these drives do not provide the high bandwidth of the SAS drives required by an online K2 storage system, they offer larger capacity and lower cost. This makes SATA drives ideal for the Nearline storage system.

The primary RAID chassis has one controller (NL10) or two controllers (NL10R). The primary RAID chassis is connected via Fibre Channel to the NH server. In the redundant system, these Fibre Channel connections access the disks simultaneously for increased bandwidth. Each controller in the RAID chassis is also connected to the GigE control network, which is required for SNMP (NetCentral) monitoring.

There must be one primary RAID chassis and may be up to six optional Expansion chassis. Primary chassis and Expansion chassis contain twelve SATA drives. All disks (SATA) in both primary and optional Expansion chassis are bound as RAID 6.

The K2 configuration control point PC is connected to the GigE control network. The K2 System Configuration application runs on this PC for configuring the storage system.

Refer to Chapter 14, *Description of K2 Storage Devices* for more information. Also refer to "Design considerations for Ethernet switches" on page 759.

Preparing nearline 10 devices

Use the topics in this section to prepare each device so that it is ready to become part of the nearline 10 storage system.

- "Setting up the Control Point PC" on page 606

- "Setting up the Nearline GigE switches" on page 606
- "Setting up the NH1 K2 Media Server for Nearline" on page 615
- "Setting up the NH1-10GE K2 Media Server for Nearline" on page 616
- "Setting up the Nearline 10 RAID chassis" on page 618

Setting up the Control Point PC

To set up the K2 configuration Control Point PC, you have the following options:

- Use the Grass Valley Control Point PC that comes from the factory with software pre-installed. This includes the K2 System Configuration application, remote AppCenter, and NetCentral software. Refer to the *K2 Media Client System Guide* for rack mount instructions.
- Use a PC that you own and install the required software.

For either option, you must do the following for the Control Point PC that runs the K2 System Configuration application:

- Assign a control network IP address to the PC. Refer to "Networking tips" on page 106.
- Connect the PC to the GigE control network.

To use your own PC, you must additionally do the following:

- Verify that the PC meets system requirements, then install the Control Point software and other supporting software, as specified in the *K2 Media Client System Guide*.
- Install and license NetCentral server software. You can install this on the NetCentral server PC, which can be the K2 configuration Control Point PC. Refer to the *NetCentral User Guide*.

Also refer to "Control point PC description" on page 650.

To fix the screen resolution problem seen with NetCentral on the Grass Valley Control Point PC, do the following:

1. Go to Display properties (right mouse selection of properties on the display area)
2. Select Settings tab
3. Select the Advanced button
4. In the General tab, set the DPI setting to Normal size (96 DPI)
5. Restart the PC

Setting up the Nearline GigE switches

These procedures are for the HP ProCurve 2900 series switch.

If you are using a non-HP switch, apply the information in the following procedures accordingly. Refer to the documentation you received with the switch as necessary.

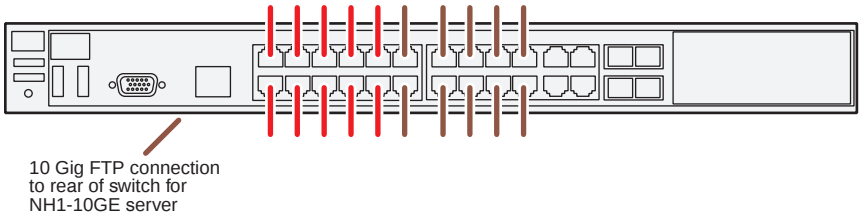
It is not required that a GigE switch be dedicated to the Nearline system. If enough "control" ports (non-iSCSI ports) are available on a switch or switches configured for an online K2 Storage System (such as Level 10, 20, or 30), the Nearline system can be connected to those control ports. If a separate GigE switch is necessary for the Nearline system, and the GigE switch is not used for "media" traffic (real-time iSCSI traffic) from an online K2 Storage System, you can use the following procedures to set up the GigE switch.

- Use CAT5e or CAT6 cables. The maximum cable length is 50 meters for CAT5e and 100 meters for CAT6.
- Assign an IP address and logon to each switch. Refer to "Configuring the GigE switch via serial connection" on page 608.
- Install the switches in their permanent location.
- Provide power to the switches.

NOTE: If the switch is used for the Nearline system only and there is no K2 media (real-time iSCSI) traffic on the switch, there is no need for VLANs or dedicated "media" ports.

If you have a NL10 system with one switch, connect as follows:

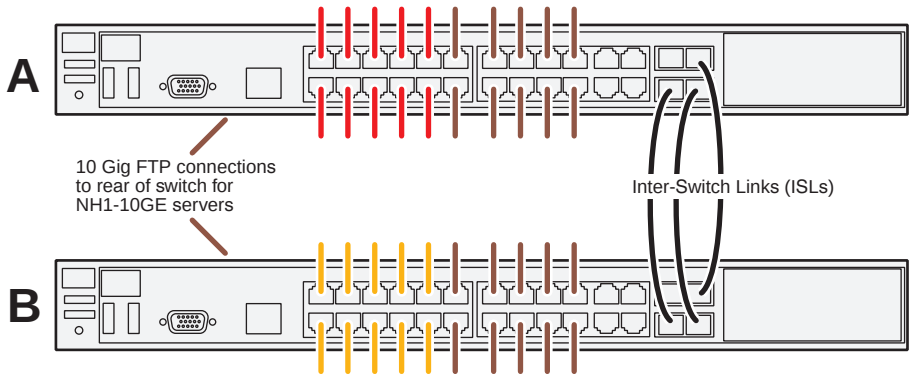
One 2900 series switch on a NL10 system



- Make one connection from the RAID controller and one connection from the control point PC.
- If you have the NH1 K2 Media Server, make two connections (control and FTP) from the server.
- If you have the NH1-10GE K2 Media Server, connect its 10 Gig FTP network connection to a 10 Gig port on the rear of the switch and connect its control network connection to a control port on the switch.

If you have a NL10R system with two switches, connect as follows:

Two 2900 series switches on a NL10R system



- To the ports on switch A, make a connection from RAID controller 0 and from the control point PC.
- To the ports on switch B, make a connection from RAID controller 1.
- If you have NH1 K2 Media Servers, from each server make two connections, one for control and one for FTP. Connect server A to switch A and connect server B to switch B.
- If you have NH1-10GE K2 Media Servers, from each server connect its 10 Gig FTP network connection to a 10 Gig port on the rear of the switch and connect its control network connection to a control port on the switch. Connect server A to switch A and connect server B to switch B.
- Interconnect switch A and switch B with three 1 Gig ISLs.

Refer to "Nearline 10 system description" on page 604 for a diagram of the complete system.

Configuring the GigE switch via serial connection

NOTE: Make sure you check the switch firmware and upgrade if necessary, as instructed at the end of this procedure.

The following procedure is for the HP ProCurve switch 2900 series. Do not use this procedure on other switch models.

For Nearline 10 with two switches, do the following on each switch.

Use a direct console connection to the switch, start a console session, and access the Switch Setup screen to set the IP address.

1. Configure the PC terminal emulator on the control point PC or another PC as a DEC VT-100 (ANSI) terminal or use a VT-100 terminal, and configure either one to operate with these settings:
   - Baud rate 115200
   - 8 data bits, 1 stop bit, no parity, and flow control set to Xon/Xoff
   - Also disable (uncheck) the "Use Function, Arrow, and Ctrl Keys for Windows"

option

2. Connect the PC to the switch's Console Port using the console cable included with the switch. (If your PC or terminal has a 25-pin serial connector, first attach a 9-pin to 25-pin straight-through adapter at one end of the console cable.)
3. Turn on the PC's power and start the PC terminal program.
4. Press **Enter** two or three times and you will see the copyright page and the message "Press any key to continue". Press a key, and you will then see the switch console command (CLI) prompt.

NOTE: If you press Enter too many times and get past the log in, enter the command EN to get into the command line.

5. Type the following, then press **Enter**:

   `menu`

   If prompted to save the current configuration, answer no (press the n key) to proceed. The main menu opens.
6. On the main menu, choose **Switch Configuration,** then press **Enter**.
7. Select **IP Configuration**, then press **Enter**.
8. Press the right-arrow key to choose **Edit**, then press **Enter**. Tab to fields and enter information as follows:
   a. Change **Gateway** to be the default router.
   b. Tab to the **IP Config (DHCP/Bootp)** field and use the Space bar to select the **Manual** option.
   c. Tab to the **IP Address** field and enter the switch's control network IP address. Refer to "Networking tips" on page 106.
   d. Tab to the **Subnet Mask** field and enter the subnet mask used for your network.
9. Press **Enter**, then right-arrow to **Save**. Press **Enter** and revert to previous menu.
10. Select **Return to Main Menu** and press **Enter**.
11. From the main menu, chose **Console Passwords** and press **Enter**. The Set Password Menu opens.
12. Chose **Set Manager Password** and press **Enter**.
13. When prompted for the password, type a password of up to 16 ASCII characters with no spaces and press **Enter**. The password can be one that is used on other K2 devices, such as "adminK2" or "K2admin", or it can be your site's administrator password.
14. When prompted to enter the password again, retype the password and press **Enter**.
15. Select **Return to Main Menu** and press **Enter**.
16. From the main menu, tab to **Command Line (CLI)** and press **Enter**. The command prompt appears.
17. Type the following, then press **Enter**:

```
configure
```

You are now in configuration mode.

18. Configure an administrator username. The username can be one that is used on other K2 devices, such as “administrator” or “K2admin”, or it can be your site's administrator username. For example, to set the username to “administrator” type the following, then press **Enter**:

```
password manager user-name administrator
```

19. When prompted, enter and re-enter the password.

20. Set spanning tree to RSTP. Type the following, then press **Enter**:

```
spanning-tree force-version rstp-operation
```

This configures spanning tree, but it does not turn spanning tree on. You must turn spanning tree on using the switch’s Web interface, as explained in the next procedure “Configuring the GigE switch via the Web interface”.

21. Decide your SNMP community name as explained in the following options, then proceed with the next step:

- If you decide to use a unique SNMP community name (not “public”), add the community and set its RW permissions. For example, if the community name is “K2”, type the following, then press **Enter**:

```
snmp-server community K2 unrestricted
```

- If you decide to use the default SNMP community “public” for NetCentral monitoring, which already has RW permissions set as required by NetCentral, proceed to the next step.

22. Enter the SNMP community and IP address of the NetCentral server PC. For example, if the IP address is “192.168.40.11” and the community is “public”, you type the following, then press **Enter**:

```
snmp-server host public 192.168.40.11
```

23. Enable Authentication traps. Type the following, then press **Enter**:

```
snmp-server enable traps authentication
```

This allows NetCentral to test the switch to verify that it can send its SNMP trap messages to NetCentral.

24. Type the following, then press **Enter**:

```
menu
```

When prompted, save the configuration by pressing the y key. The main menu opens.

25. If you need a trunk for ISLs to gang switches together, use the following steps. These steps illustrate trunking the last three 1 Gig ports for three 1 Gig ISLs, which is the recommended configuration for ISLs on all multi-switch K2 Storage Systems. Refer to “Design considerations for Ethernet switches” on page 759 and consult with your Grass Valley representative if your requirements deviate from the recommended policy:

a. At the main menu, select **Switch Configuration** and press **Enter**.

b. Choose selection **Port/Trunk Settings** and press **Enter**.

c. Press the right-arrow key to choose **Edit**, then press **Enter**.

d. Down arrow until at the bottom of the list of ports and select the last (highest port number) 1 Gig port in the list.

e. Right-arrow over to the Group column.

f. Use the Space bar and set the bottom 1 Gig port to **Trk1**.

g. Set the next port up also to **Trk1**.

h. Set the next port up also to **Trk1**.

i. Press **Enter**, then right-arrow to **Save**. Press **Enter** and revert to previous menu.

26. Select **Return to Main Menu** and press **Enter**.

27. From the main menu, tab to **Command Line (CLI)** and press **Enter**. The command prompt appears.

28. Check the version of firmware currently installed on the switch. Type the following, then press **Enter**:

```
show flash
```

Information is displayed similar to the following example:

```
HP_iSCSI_switch1# show flash
Image            Size(Bytes)    Date    Version
-----            ----------   -------- -------
Primary Image    : 3287779    03/15/05 M.08.66
Secondary Image  : 3287779    03/15/05 M.08.66
Boot Rom Version: I.08.07
Current Boot     : Primary
```

29. Check the Primary Image Version and refer to your *K2 Storage System Release Notes* for information about currently supported versions. Then proceed as follows:

- If *K2 Storage System Release Notes* instruct you to change the firmware on the switch, do so before continuing. Refer to the documentation you received with the switch for instructions to change the firmware. Then continue with the next procedure "Configuring the GigE switch via the Web interface".
- If *K2 Storage System Release Notes* confirm that the version on the switch is a currently supported version, continue with the next procedure.

30. Type the following, then press **Enter**:

```
menu
```

The main menu opens.

31. From the main menu, choose **Reboot Switch** and press **Enter**. When prompted "Continue Reboot…?', answer yes (press the y key) to proceed. The switch restarts.

32. You can now use the switch's web browser interface for further configuration, as instructed in the next procedure.

33.Close the PC terminal program and disconnect the console cable.

Continue with the next procedure "Configuring the GigE switch via the Web interface".

Configuring the GigE switch via the Web interface

The following procedure is for the HP ProCurve switch 2900 series. Do not use this procedure on other switch models.

For Nearline 10 with two switches, do the following on each switch.

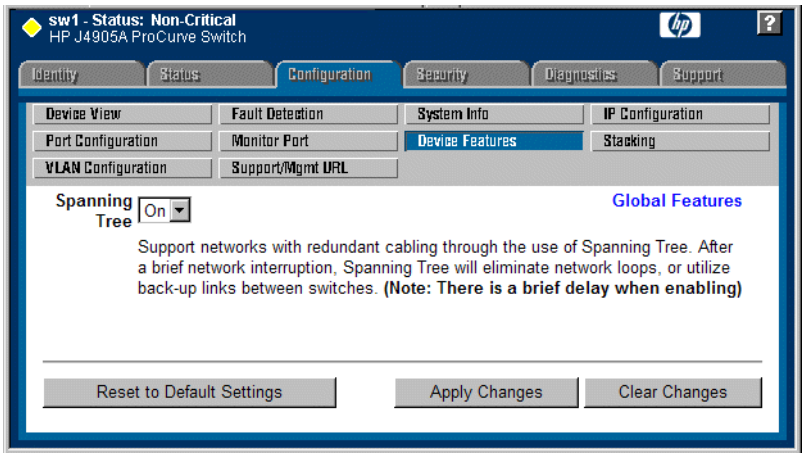
1. From the control point PC or another PC, make sure that you have a direct Ethernet cable connection to the switch, with no switches, routers, proxies, or other networking devices in between.
2. On the PC, open Internet Explorer and type the switch's IP address in the Address field, as in the following example.

   `http://192.168.100.61`

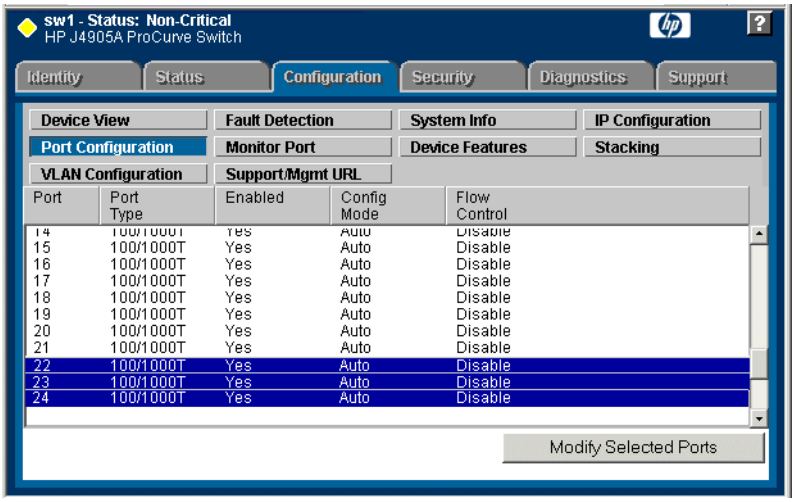
   This should be the name or IP address as currently configured on the switch.
3. Press **Enter** to open the switch's configuration application.

NOTE: The configuration application for the HP ProCurve switch requires Java.

   You can also access the switch's configuration application from the K2 System Configuration application.
4. In the switch's configuration application, choose **Configuration**, then **Device Features**.



5. Set Spanning Tree to **On** and click **Apply Changes**. If prompted, log in with the switch's administrator username and password.
6. Click **Port Configuration**.

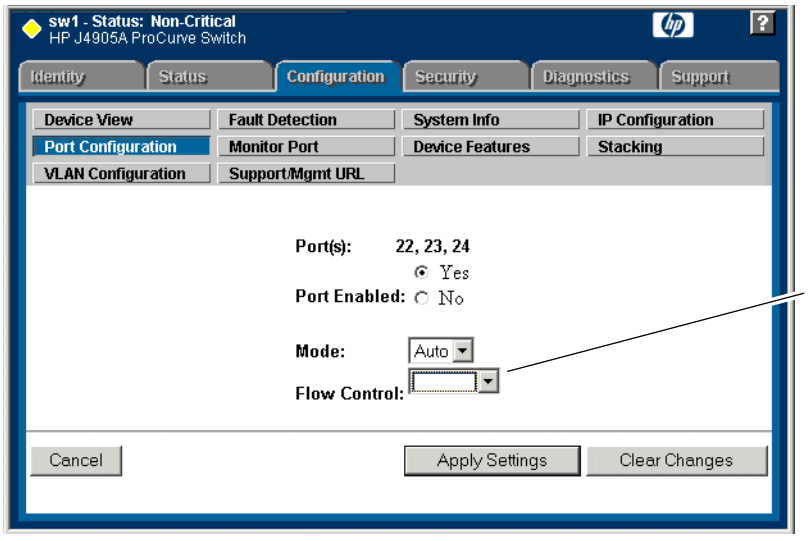


7. If you do not need trunks, such as on a one-switch system, skip to the next step in this procedure. If you need trunks, such as on a two-switch system with ISLs, do the following:

   a. Select (Ctrl + Click) the trunked ports. Typically the trunked ports are at the bottom of the list and are labeled Trk1.

   b. Click **Modify Selected Ports**.

      If prompted, log in as administrator.



   c. For the trunked ports, set Port Enabled to **Yes**. On some switch models, some ports are disabled by default, so make sure you enable them. Leave Mode as default of **Auto**.

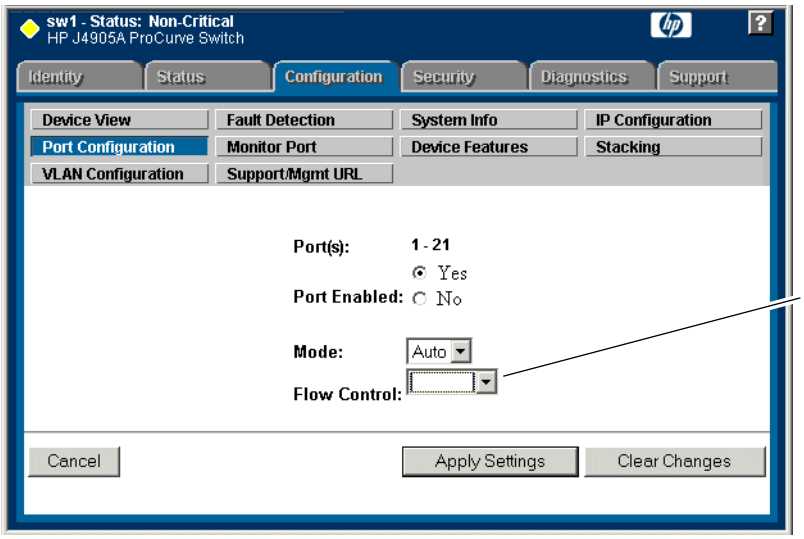
   d. Set Flow Control as follows:

      - Set to **Enable**.

NOTE: This setting is for the 2900 series switch. Other switch models might require a different setting.

e. Click **Apply Settings**.

8. On the Port Configuration page, do one of the following:
   - If you do not have trunks, select all ports.
   - If you have trunks, select the remaining ports (the ports not trunked).
9. Click **Modify Selected Ports**.



This setting varies depending on switch model. Set as instructed in text.

10. Make sure Port Enabled is set to **Yes**, leave Mode as default of **Auto**.
11. Set Flow Control as follows:
    - Set to **Enable**.

NOTE: This setting is for the 2900 series switch. Other switch models might require a different setting.

12. Click **Apply Settings**. Wait until settings are applied and the Web interface becomes active.

NOTE: If the switch is used for the Nearline system only and there is no K2 media (real-time iSCSI) traffic on the switch, there is no need to configure VLANs.

13. Close the switch configuration application.

Setting up the NH1 K2 Media Server for Nearline

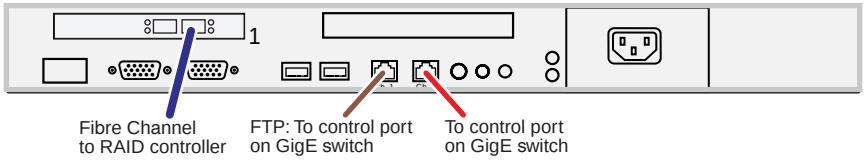
If your system has one or two NH1 K2 Media Servers, prepare each server using this section.

The Dell PowerEdge 1950 is qualified as the platform for the NH1 K2 Media Server.

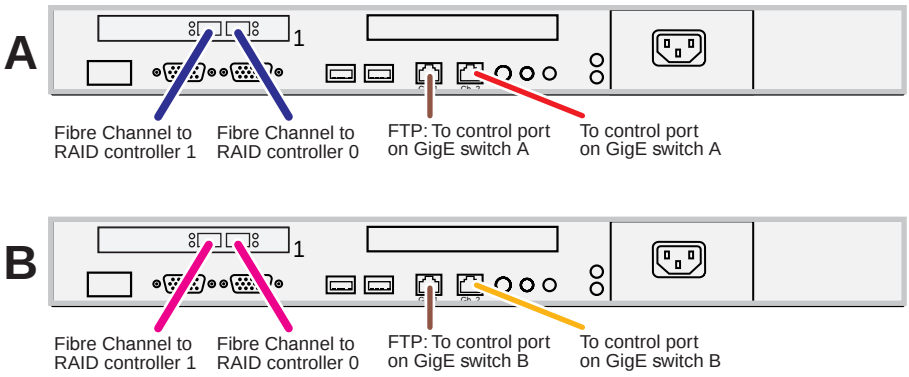
Do the following to prepare a NH1 K2 Media Server:

- Install the server in its permanent location. Refer to the rack mount instructions that you received with the server's product bundle.
- Provide power to the server.
- Connect cables as follows:

One NH1 K2 Media Server on a N10 system



Two NH1 K2 Media Servers on a NL10R system



Connect the motherboard GigE port 1 (control) and GigE port 2 (FTP) to control ports on the GigE switch. For the NL10R system, connect server A to GigE switch A and connect server B to the GigE switch B.

Connect Fibre Channel ports to the RAID storage device. For the NL10 system, connect one Fibre Channel port to the RAID controller. For the NL10R system, on each server connect one Fibre channel port to controller 0 and one Fibre channel port to controller 1.

- Assign a control network IP address to GigE port 1. Use standard Windows procedures. Refer to "Networking tips" on page 106.
- Change the hostname. Use standard Windows procedures.
- Configure SNMP properties so the trap destination points to the NetCentral server PC. Use standard Windows procedures. If you are not using the SNMP community name "public", configure the community name and set permissions to RW. Also make sure that the Authentication trap is enabled.

- For the NL10R system, install MPIO software. Refer to "Installing Multi-Path I/O Software on NL10R K2 Media Servers" on page 617

Also refer to "K2 Media Server descriptions" on page 653.

Setting up the NH1-10GE K2 Media Server for Nearline

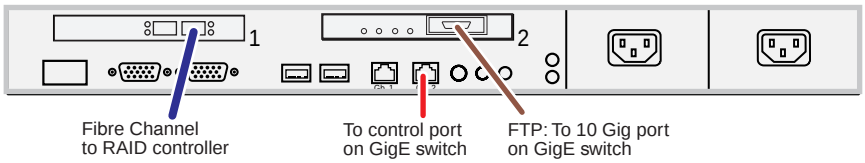
If your system has one or two NH1-10GE K2 Media Servers, prepare each server using this section.

The Dell PowerEdge 1950 is qualified as the platform for the NH1-10GE K2 Media Server.

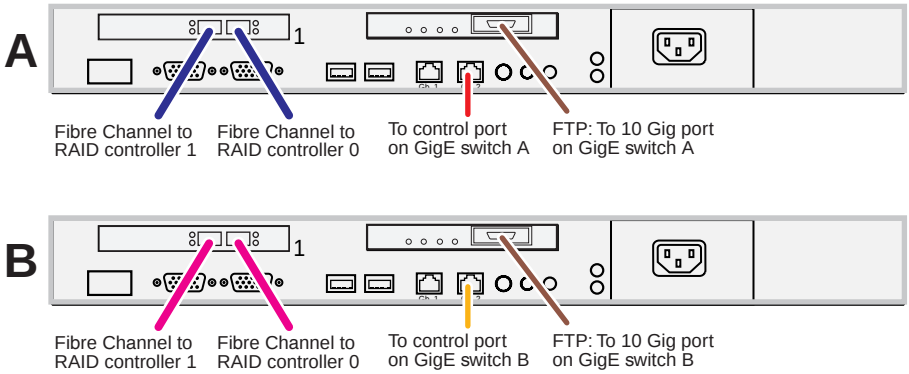
Do the following to prepare a NH1-10GE K2 Media Server:

- Install the server in its permanent location. Refer to the rack mount instructions that you received with the server's product bundle.
- Provide power to the server.
- Connect cables as follows:

One NH1-10GE K2 Media Server on a NL10 system



Two NH1-10GE K2 Media Servers on a NL10R system



Connect the motherboard GigE port 1 (control) to a control port on the GigE switch. For the NL10R system, connect server A to GigE switch A and connect server B to the GigE switch B.

Connect the 10 Gig FTP port to the 10 Gig port on the rear of the GigE switch. For the NL10R system, connect server A to GigE switch A and connect server B to the GigE switch B.

Connect Fibre Channel ports to the RAID storage device. For the NL10 system, connect one Fibre Channel port to the RAID controller. For the NL10R system, on each server connect one Fibre channel port to controller 0 and one Fibre channel port to controller 1.

- Assign a control network IP address to GigE port 1. Use standard Windows procedures. Refer to "Networking tips" on page 106.
- Change the hostname. Use standard Windows procedures.
- Configure SNMP properties so the trap destination points to the NetCentral server PC. Use standard Windows procedures. If you are not using the SNMP community name "public", configure the community name and set permissions to RW. Also make sure that the Authentication trap is enabled.
- For the NL10R system, install MPIO software. Refer to "Installing Multi-Path I/O Software on NL10R K2 Media Servers" on page 617

Also refer to "K2 Media Server descriptions" on page 653.

Installing Multi-Path I/O Software on NL10R K2 Media Servers

The following procedure is required for K2 Media Servers on NL10R systems and other nearline redundant systems.

The installation files for the Multi-Path I/O software are copied on to the K2 Media Server when the K2 system software is installed.

To install Multi-Path I/O software on a K2 Media Server, do the following:

1. Stop all media access on the K2 Storage System.
2. Access the Windows desktop on the K2 Media Server. You can do this locally with a connected keyboard, mouse, and monitor or remotely via the Windows Remote Desktop Connection.
3. Click **Start | Run**, type `cmd` and press **Enter**. The MS-DOS command prompt window opens.
4. From the command prompt, navigate to the *C:\profile\mpio* directory.
5. Type the following at the command prompt:

   C:\profile\mpio>gdsminstall.exe -i c:\profile\mpio gdsm.inf Root\GDSM
6. Press **Enter**. The software is installed. The command prompt window reports the following:

```
Pre-Installing the Multi-Path Adapter Filter...
Success

Installing the Multi-Path Bus Driver...
Success

Installing the Device Specific Module...
Success

Installing the Multi-Path Device Driver...
```

```
Success (but need a reboot)
```

7. Restart the K2 Media Server.
8. After restart, to verify that the software is installed, on the Windows desktop right-click **My Computer** and select **Manage**. The Computer Management window opens.
9. In the left pane select **Device Manager**.
6. In the right pane open the **System devices** node and verify that **GVG ISCSI Multi-Path Device Specific Module** is listed.

Setting up the Nearline 10 RAID chassis

Do the following to prepare the Nearline 10 RAID storage devices:

- Install the chassis in its permanent location. After mounting the chassis in the rack, you must secure brackets to the front rail to support the Grass Valley bezel. Refer to the *K2 Lx0 RAID Instruction Manual* for rack mount instructions.
- "Connect the Nearline 10 RAID Primary and Expansion chassis" on page 618
- "Power on the Nearline 10 RAID chassis" on page 620

In addition, you will configure network settings, SNMP settings, and bind RAID disks. These tasks are part of the K2 System Configuration application and Storage Utility procedures later in this chapter.

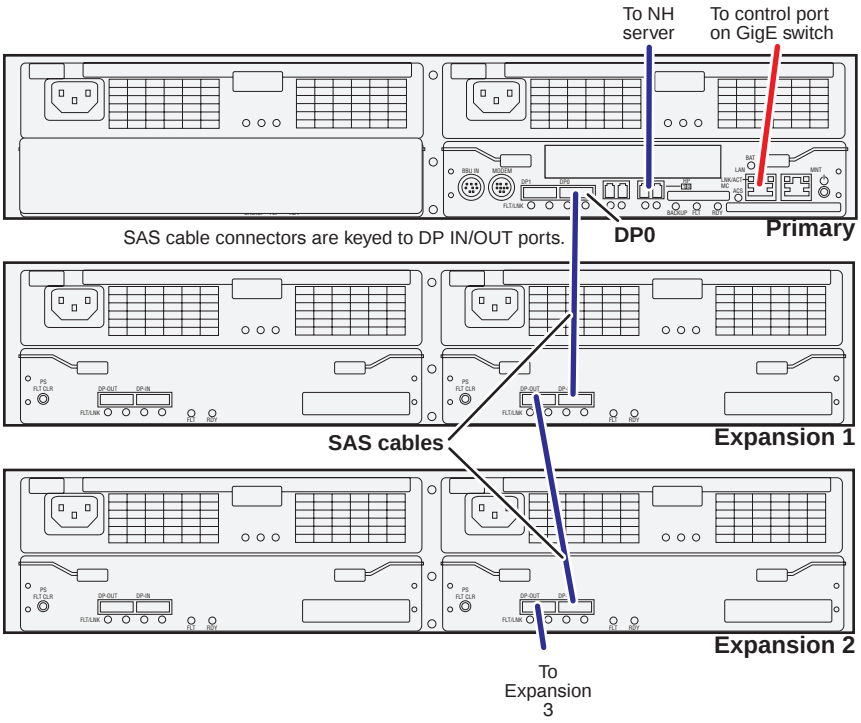
On the Nearline 10 RAID, you do not need to manually set a Fibre Channel address ID on controllers or a chassis address on Expansion chassis.

Also refer to "K2 RAID storage description" on page 659.

Connect the Nearline 10 RAID Primary and Expansion chassis

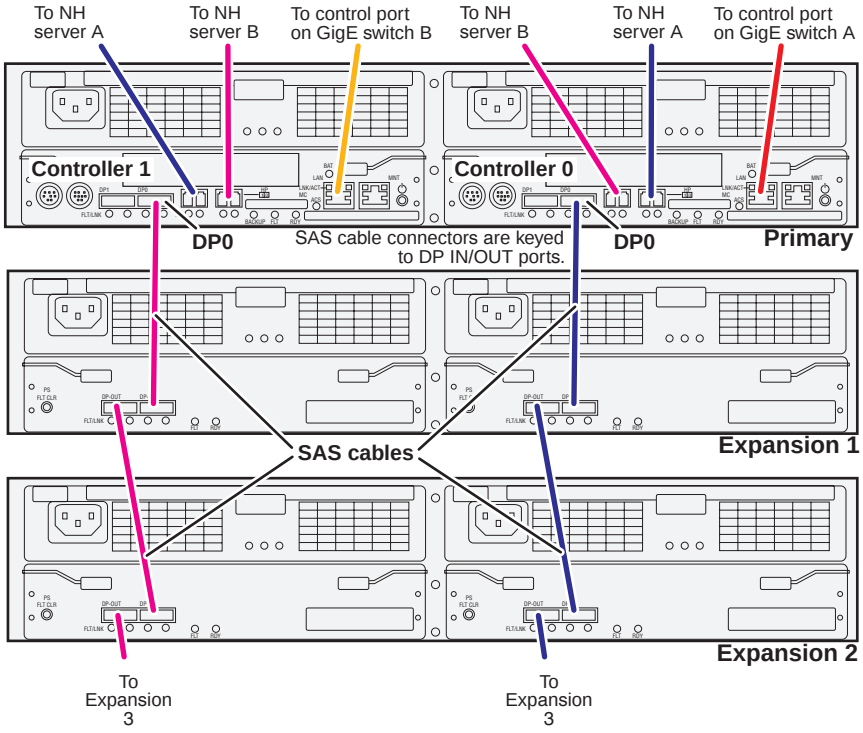
Connect Ethernet, Fibre Channel, and SAS cabling as shown.

NL10 system



For the NL10 systems, if you have more Expansion chassis than those illustrated, continue the indicated cabling pattern, connecting additional chassis to DP0.

NL10R system



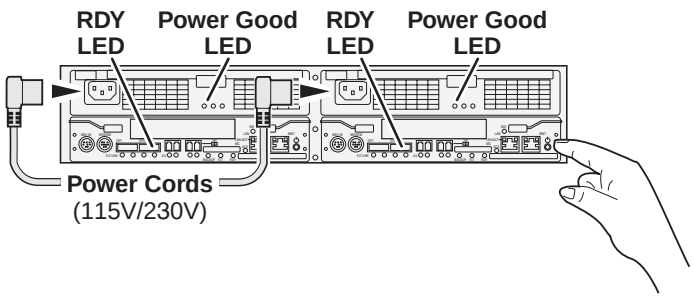
For the NL10R system, if you have more Expansion chassis than those illustrated, continue the indicated cabling pattern, alternating connections for additional Expansion chassis between DP1 and DP0. Expansion chassis 1, 3, 5, 7, and 9 connect to DP1. Expansion chassis 2, 4, 6, 8, and 10 connect to DP0.

Once the RAID storage is connected and configured, do not swap Expansion chassis or otherwise reconfigure storage. If you connect an Expansion chassis in a different order or to the wrong controller, the controller will see a configuration mismatch and fault.

Power on the Nearline 10 RAID chassis

Connect power cords and power up RAID storage devices as follows:

1. Verify power and cabling.
2. Press and hold down the power button on the controller, as shown.



If the RAID chassis has two controllers, you can press the power button on either controller. You do not need to press both power buttons.

Pressing the power button on a controller also powers on any connected Expansion chassis. There are no power buttons on Expansion chassis.

3. Release the power button when the Power Good LED on the power supply is illuminated. This takes 1-3 seconds.
4. Wait while the primary RAID chassis performs self-test and initialization. This takes about four minutes. While this is taking place, the RDY LED is illuminated with a steady on light.
5. Watch for the RDY LED to begin blinking at one second intervals. The LED might turn off and back on two times before starting the one second blink pattern. When the RDY LED is blinking at one second intervals, the self-test and initialization is complete and the chassis is ready for use.

Your preparations for Nearline 10 RAID storage are now complete.

Networking for nearline 10

Use the topics in this section to configure the Gigabit Ethernet (GigE) network for the nearline 10 storage system.

- "Networking requirements" on page 622
- "Networking tips" on page 622
- "Setting up host tables" on page 623
- "Testing the control network" on page 624

Networking requirements

Networking strategies for a Nearline Storage System are as follows:

- Two networks:

NOTE: The Nearline Storage System does not use the K2 media (iSCSI) network.

  - Streaming/FTP network — For media transfers and FTP traffic. This is the primary network for media moving to and from the Nearline storage system.
  - Control network — For all other non-streaming, non-iSCSI traffic.

- Networks must be on separate subnets.
- While control and FTP traffic is each on its own subnet, it is not required that each type of traffic has its own VLAN on GigE switches. For example, you make both FTP and control connections to the "control" ports (DEFAULT_VLAN) on the HP GigE switch.
- Machine names (host names) assigned to each K2 device.
- IP addresses for FTP/streaming ports must have name resolution such that hostnames are appended with the "_he0" suffix. You can use host tables (as in "Setting up host tables" on page 623) or another mechanism to provide the name resolution. This directs the streaming traffic to the correct port. Refer to the *K2 Media Client System Guide* for a complete explanation.
- NH K2 Media Servers must be on the streaming network, as they provide the FTP interface for nearline storage streaming traffic.

Also refer to "About networks and FTP" on page 684 and "Design considerations for Ethernet switches" on page 759.

Use the following procedures as necessary to implement your networking strategies.

NOTE: It is recommended that you configure Streaming network IP addresses using the K2 System Configuration application, rather than doing so on the local machine using standard Windows procedures.

Networking tips

- Before beginning network configuration, determine the IP addresses and names needed for the machines in your K2 system. Work with the network administrator at your facility to have those IP addresses and names available for your use.

- Establish a consistent convention for machine names and IP addresses. It is recommended that you embed a root name or other unique identifier for this particular K2 Storage System in the computer name. Also, a common convention for IP addresses is to use a numerical pattern or sequence in the IP addresses to indicate device-types and/or ports, as in the following example:

NOTE: This example assumes a subnet mask of 255.255.255.0

Example of Nearline storage system names and IP addresses

Computer name	Device type	Streaming network addresses	Control network addresses	Comments
root_server_1	NH K2 Media Server	192.168.101.11[a]	192.168.100.11	Servers use the streaming network in their role of FTP server and the control network in their role as media file system server.
root_server_2 (only on NL10R system)	NH K2 Media Server	192.168.101.21[b]	192.168.100.21	
root_raid_1	RAID	—	192.168.100.51	Each RAID controller is on the control network for monitoring.
root_raid_2 (only on NL10R system)	RAID	—	192.168.100.52	
root_gige_1	GigE switch	—	192.168.100.61	—
root_gige_2 (only on NL10R system)	GigE switch	—	192.168.100.62	—
root_cppc_1	Control point PC	root_gige_2	GigE switch	—

[a.] This IP address must resolve to hostname root_server_1_he0
[b.] This IP address must resolve to hostname root_server_2_he0

Setting up host tables

The *hosts* file is used by the control network and the streaming/FTP network to determine the IP address of devices on the network when only a the device name (hostname) is given. The steps that follow describe how to edit the *hosts* file located at *C:\Windows\system32\drivers\etc\hosts* on Windows XP and Windows 2003 Server operating system computers. If you include the names and addresses of all the devices on the network, then you can copy the same file onto all the other K2 devices instead of editing the *hosts* file on each K2 device.

For FTP transfers on a K2 Storage System, transfers go to/from K2 Media Servers that have the role of FTP server. No transfers go directly to/from the shared storage K2 Media Clients that are on the K2 Storage System. So in the hosts file, you must add the “he_0” extension to a K2 Media Server hostname and associate that hostname with the K2 Media Server’s FTP/streaming network IP address.

Refer to the *K2 Media Client System Guide* for more information.

To edit the *hosts* file manually:

1. Open the following file using Notepad or some other text editing application:

   C:\Windows\system32\drivers\etc\hosts

2. Enter all IP addresses with machine names. The text format is simple. First type the Ethernet IP address, then use the TAB key or Space bar to insert a few spaces. Then type the machine name.

   Here is an example:

```
192.168.100.11     root_server_1
192.168.101.11     root_server_1_he0
192.168.100.21     root_server_2
192.168.101.21     root_server_2_he0
192.168.100.51     root_raid_1
192.168.100.61     root_gige_1
```

3. Save the file and exit the text editor.

4. Copy the new *hosts* file onto all the other machines. This is easier than editing the file on each machine.

Host table tips

- If transferring to or from a Profile XP or Open SAN system via UIM, the *hosts* file must also follow UIM naming conventions for those systems. Refer to the UIM Instruction Manual.
- Do not enter media (iSCSI) network IP addresses in the host table, as hostname resolution is not required for the media network.

Testing the control network

To test the control network use the *ping* command as follows:

1. On the control point PC, click **Start | Run**. The Run dialog box opens.
2. Type `cmd` and click **OK**. The command prompt window opens.
3. Type `ping`, then a space, then the name of one of your K2 Storage System devices, such as the Gigabit Ethernet switch, as in the following example:

```
ping root_gige_1
```

4. Press **Enter**.

   The ping command should return the IP address of the device, as in the following example:

```
Pinging root_gige_1.mycorp.com [192.168.100.61] with
32 bytes of data:


Reply from 192.168.100.61: bytes=32 time=10ms TTL=127
Reply from 192.168.100.61: bytes=32 time<10ms TTL=127
```

```
Reply from 192.168.100.61: bytes=32 time<10ms TTL=127
Reply from 192.168.100.61: bytes=32 time<10ms TTL=127
```

This verifies that the name of the device is being correctly resolved to the IP address, which indicates that on the Control Point PC the host table entry is correct.

5. Ping the other K2 Storage System devices to which you have assigned control network IP addresses.
6. Go to each Windows device in the K2 Storage System and repeat this procedure. This verifies that network communication is correct to and from all devices.

Configuring the nearline 10 storage system

Use the topics in this section to do the initial configuration of the nearline 10 storage system.

- "Prerequisites for initial configuration" on page 626
- "Defining a new K2 Storage System" on page 627
- "Configuring the NH server - Part 1" on page 629
- "Configuring RAID" on page 632
- "Creating a new file system" on page 637
- "Configuring the NH server - Part 2" on page 638
- "Configuring the second NH server for NL10R" on page 639

Prerequisites for initial configuration

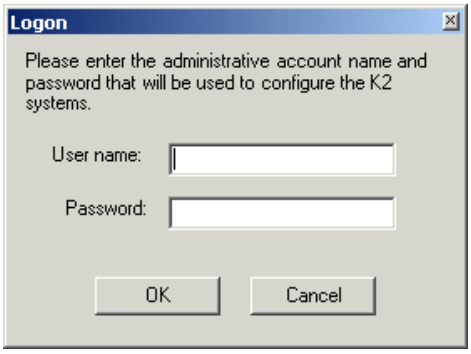
Before beginning your initial configuration, make sure the devices of the K2 Storage System meet the following prerequisites. Refer to sections earlier in this manual for detailed information. Also refer to Chapter 14, "Description of K2 Storage Devices".

Devices	Prerequisite for nearline 10 configuration
Control point PC	Ethernet cable connected Control Point software installed Control network IP address assigned Network communication over the control network with all other K2 devices Power on
Ethernet switch	Ethernet cables connected Control network IP address assigned Power on

Defining a new K2 Storage System

Define a nearline 10 K2 Storage System as follows:

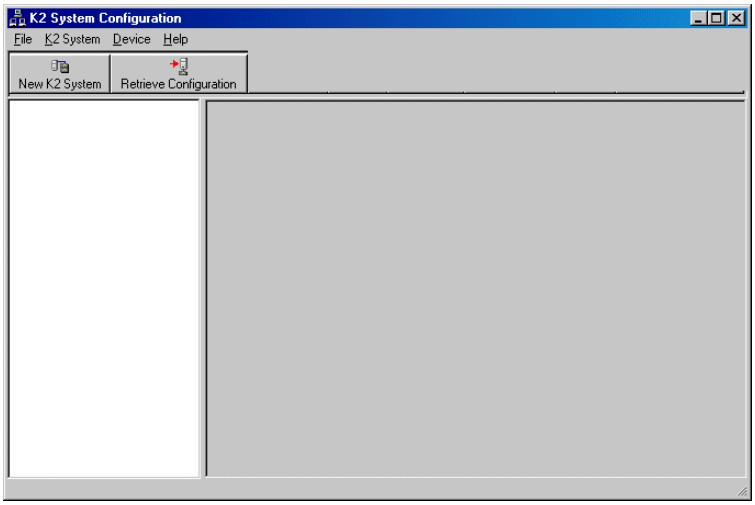
1. On the control point PC, open the K2 System Configuration application. A login dialog box opens.



2. Log in to the K2 System Configuration application with the Windows administrator account. By default this as follows:

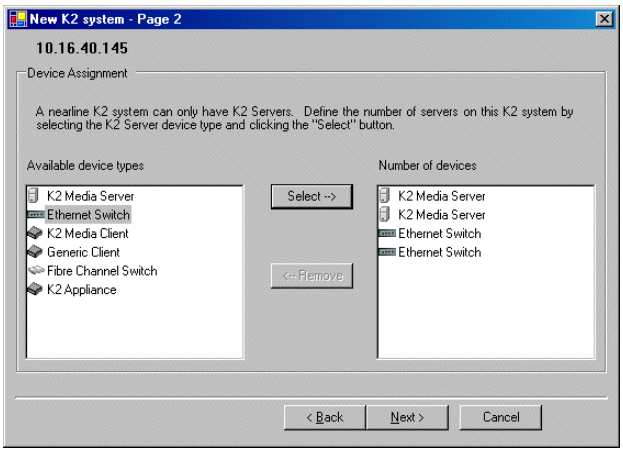
   - Username: administrator
   - Password: adminK2

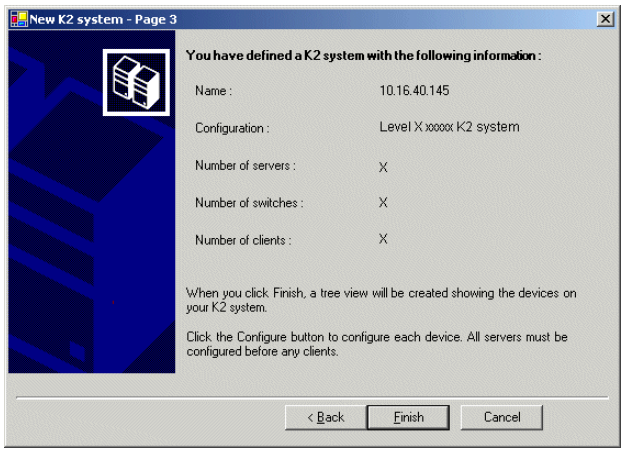
   Refer to "Setting up application security" on page 688 for more information about administrator accounts and logging in to applications.



3. Click **New K2 System**. The New K2 System wizard opens.

4. Follow the on-screen text to define your nearline 10 K2 Storage System, as described in the following table.

On this page...	Do this...
Page 1	 Create a name for your Nearline 10 K2 Storage System and type it in the Name box. Select **Nearline**. The Server redundancy option is not selected and is disabled. This option applies to media database redundancy. Since the Nearline system has no media database, this setting is correct for both redundant and non-redundant Nearline systems. Click **Next**
Page 2	 For a NL10 system, move the following into the Number of Devices Box: • One K2 Media Server • One Ethernet switch For a NL10R system, move the following into the Number of Devices Box: • Two K2 Media Servers • Two Ethernet switches Click **Next**.

On this page…	Do this…
Page 3	 Review the information on this page and verify that you have correctly defined your K2 Storage System. For a Nearline 10 storage system you should have the following: • One K2 Media Server • One Ethernet switch For a Nearline 10R storage system you should have the following: • Two K2 Media Servers • Two Ethernet switches Click **Finish**. The Define New K2 Storage System wizard closes.

Your K2 Storage System appears in the tree view of the K2 System Configuration application.

5. Continue with the next procedure.

Configuring the NH server - Part 1

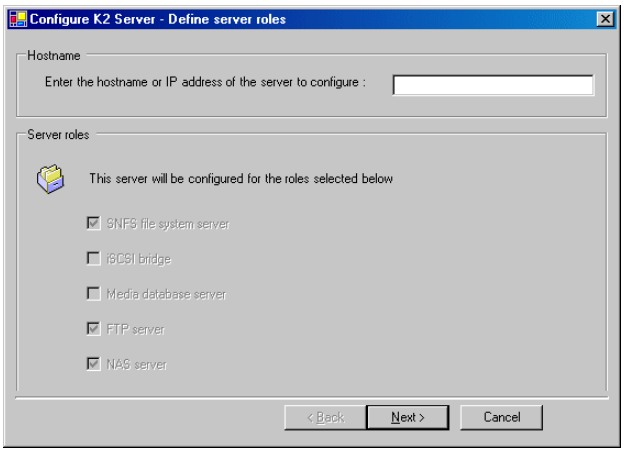
1. In the K2 System Configuration application tree view, select [**K2Server1]**.

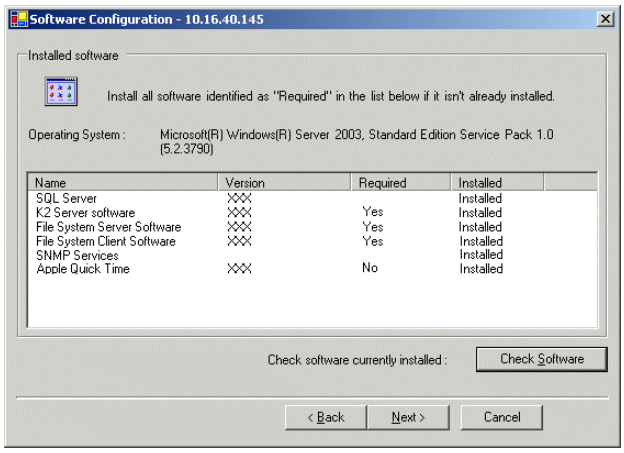
   For a NL10 system, this is the one NH server. For a NL10R system, this is NH server A

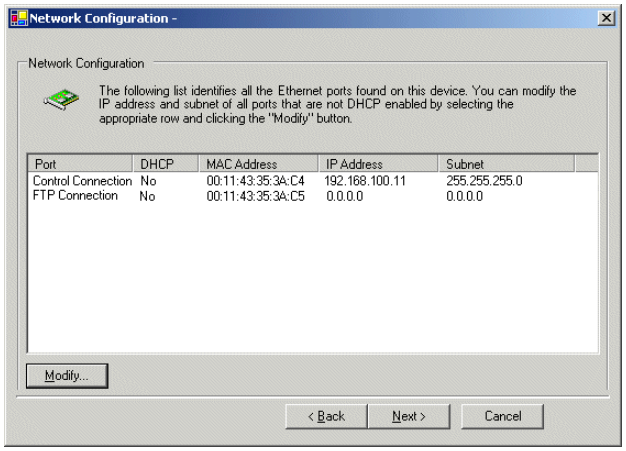
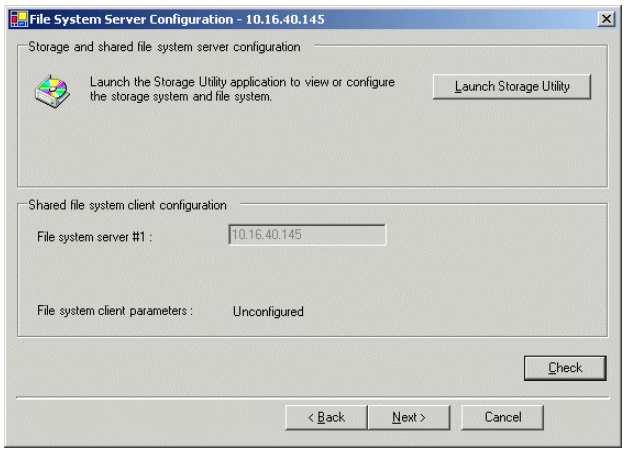
2. Click the **Configure** button.

   The Configure K2 Server wizard opens. Follow the on-screen text to configure the NH server for a Nearline 10 K2 Storage

System, as described in the following table:

On this page...	Do this...
Define server roles	 Enter the name or IP address for the K2 Media Server, as currently configured on the machine. For Nearline server roles, selections are disabled. Leave **SNFS file system server**, **FTP server**, and **NAS server** selected. The wizard does not allow you to select Media Database Server. There is no Media Database Server in a nearline system. Click **Next**

On this page…	Do this…
Software Configuration This page checks for the software required to support the roles you selected on the previous page. Software required on a NL10 K2 Media Server is as follows: • K2 Server • File System Server • File System Client • QuickTime Software required on a NL10R K2 Media Server is as follows: • K2 Server • File System Server • File System Client • QuickTime • MPIO ***NOTE: MPIO software is required on K2 Media Servers in the NL10R system and in other nearline redundant systems.***	 If software with *Yes* in the Required column reports as *Not Installed*, you must first install it on the K2 Media Server before continuing. Refer to *Chapter 16, Managing K2 software*. After installing the software, click **Check Software**. When all required software reports as *Installed*, click **Next**.

On this page…	Do this…
Network Configuration This page displays the control network Ethernet port, and allows you to configure the FTP/ Streaming network Ethernet port.	 The top port is the port over which the K2 System Configuration application is communicating with the. If correctly configured, it is already assigned the control network IP address, as displayed on this page. Select the other port and click **Modify**. A network configuration dialog box opens. Enter the FTP/Streaming IP address and the subnet mask and click **Apply**. Click **Next**.
File System Server Configuration	 Click **Launch Storage Manager**. Storage Utility opens.

3. Continue with the next procedure to use Storage Utility to configure the file system.

   Leave the Configure K2 Server wizard open while you are using Storage Utility. When you are done with Storage Utility, you continue with the wizard.

Configuring RAID

Use Storage Utility to complete the configuration of the Nearline 10 RAID chassis, as explained in the following topics:

Configuring RAID network and SNMP settings

Use the Storage Utility to configure the following settings for the Nearline RAID controller or controllers:

- IP address
- Subnet mask
- Gateway Address
- SNMP trap destinations

For Nearline 10 RAID, network and SNMP settings are set and stored on the RAID controller module. For the RAID chassis with two controllers, each controller has its own network settings and the RAID chassis exists as two entities on the control network.

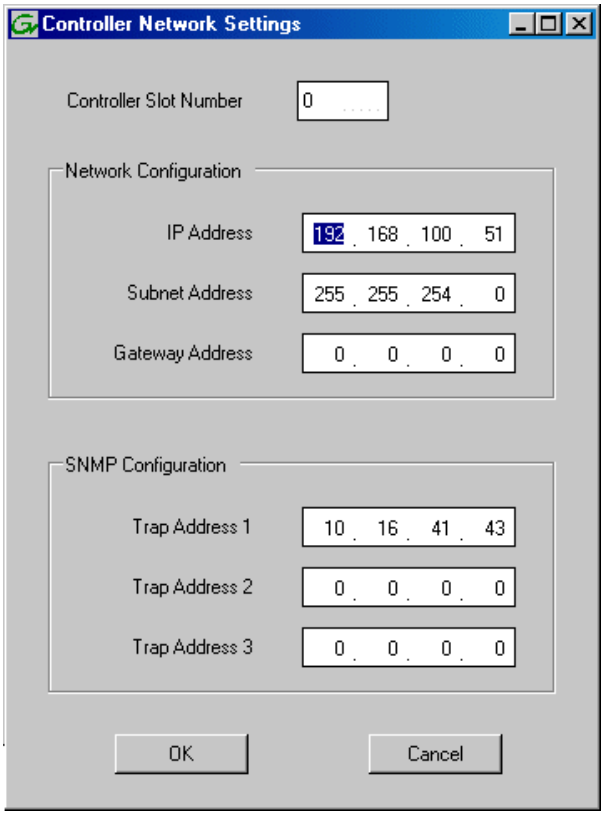
The RAID storage device is configured by default for the SNMP community name “public”. If your site’s policies require using a different SNMP community name, contact your Grass Valley representative.

To configure these settings, do the following:

1. Launch Storage Utility from the K2 System Configuration application as in the previous procedure.
2. As prompted, wait while Storage Utility gathers system information, then Storage Utility opens.
3. In Storage Utility tree view, expand the node for the Nearline 10 RAID, right-click the icon for a Nearline 10 RAID controller, and select **Configuration | Network Properties**.

   The Controller Network Settings dialog box opens.

   For a Nearline 10 RAID chassis with two controllers, you can make settings on both controllers using this dialog box.



4. In the Controller Slot Number field enter **0** and then press **Enter**. The settings from controller 0 are loaded into the Controller Network Settings dialog box and are available for you to modify.
5. Enter the control network IP address and other network settings.
6. You want SNMP trap messages go to the NetCentral server PC, so for SNMP Configuration enter the IP address of the NetCentral server PC. You can also enter IP addresses for other SNMP managers to which you want to send SNMP trap messages.
7. For the RAID chassis with two controllers, in the Controller Slot Number field enter **1** and then press **Enter**. The settings from controller 1 are loaded into the Controller Network Settings dialog box and are available for you to modify. Repeat the previous steps to configure controller 1.
8. Click **OK** to save settings and close.
9. In Storage Utility click **View | Refresh**. Continue with the next procedure "Binding disk modules".

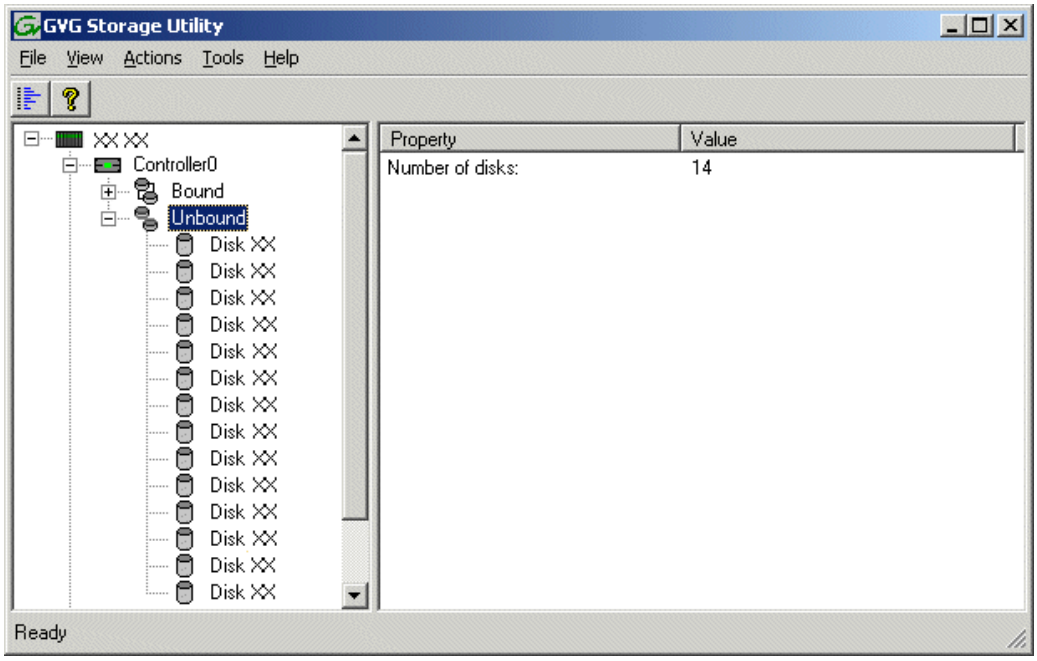
Binding disk modules

Use the following procedure to bind disk modules as required for the nearline 10 storage system.

Also refer to "About RANKs and LUNs in Storage Utility" in Chapter 15, *Overview of K2 Storage Tools*.

NOTE: Binding destroys all user data on the disks.

1. In the Storage Utility main window, identify bound RANKs and unbound disks by their placement in the hierarchy of the tree view. In the following illustration, disk numbers are represented by "XX". Refer to "Identifying disks" on page 744 for an explanation of how disks are actually numbered in Storage Utility.



NL10 systems store media files across both the primary RAID chassis and the optional Expansion chassis.

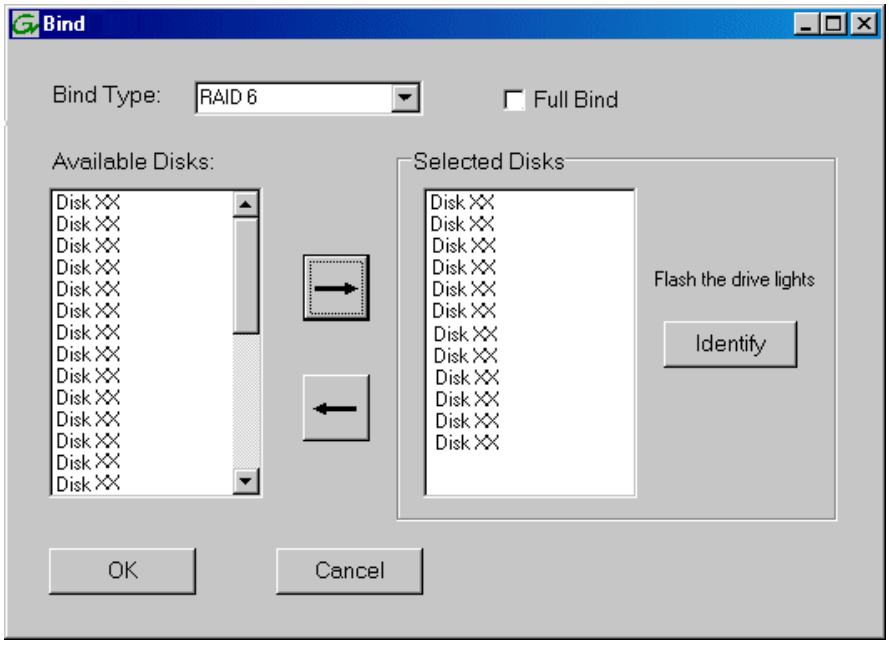
NL10R systems also store media files across both the primary RAID chassis and the optional Expansion chassis. In addition, metadata files and journal files are mixed in with the media files.

The RAID configuration is the same on all chassis. Each chassis contains SATA disks, which are bound as RAID 6 in a RANK of twelve disks. One twelve disk RANK fills one chassis.

2. To bind SATA disks for media file storage, do the following:

   a. Right-click the **Unbound** node for a controller, then select **Bind** in the context menu. (If the RAID chassis has two controllers, both controllers are represented by the single "Controller" node)

      The Bind dialog box opens showing all unbound disks for the controller listed in the Available Disk list.



b. Leave Full Bind unchecked. Refer to "About full/background bind" on page 748.

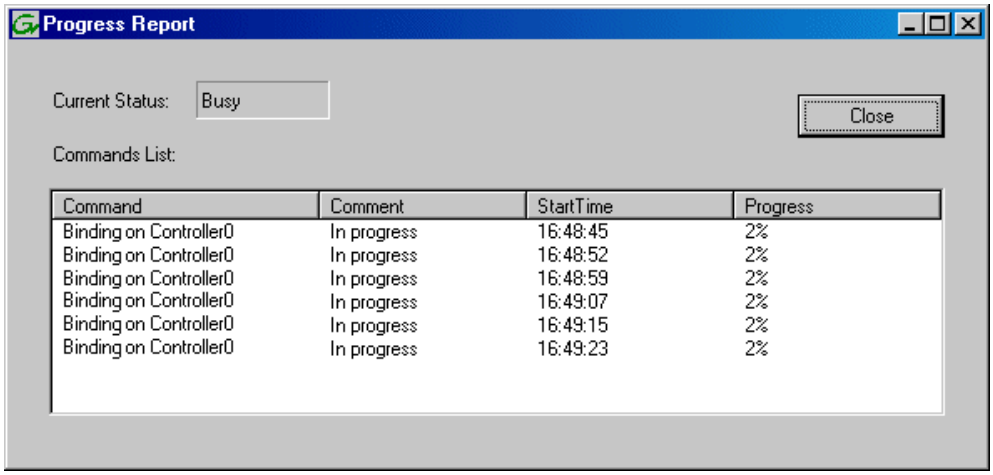
c. In the **Bind Type** drop down box, select **RAID 6**.

d. In the Available Disks box, select twelve contiguous disks at the top of the list. (TIP: Use 'shift-click' or 'control-click' to select disks.).

e. Click the add (arrow) button to add disks to the Selected Disks list.

NOTE: As an aid in identifying a disk module's physical location, select it in the Selected Disks list, then click* Identify Disks. *This causes the disk drive light to flash.

f. Click **OK** to close the Bind dialog box and begin the binding process. The Progress Report dialog box opens, showing the status of the binding process.



g. Close the Progress Report and repeat these steps for other unbound disks. If specified by your system design, you can bind some disks as Hot Spares, as explained in "Binding Hot Spare drives" on page 751. When you are done, if you did not bind any extra Hot Spares, you should have the following results:

   For a NL10 or a NL10R system, the disks in the primary RAID chassis and in optional Expansion chassis should be bound as RAID 6 RANKs, with twelve disks to a RANK.

h. Click **Close** in Progress Report window.

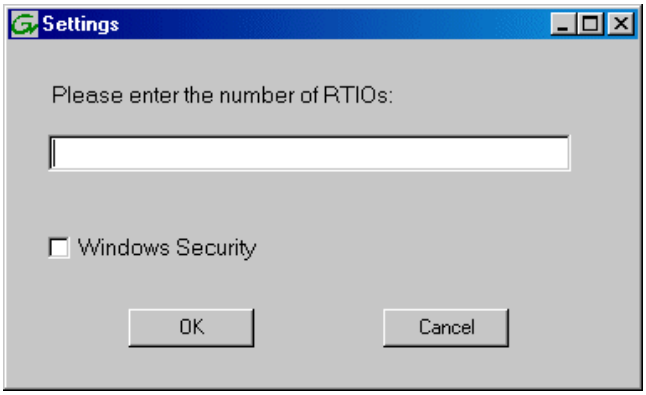
3. Restart the K2 Media Server.

NOTE: Make sure start up processes on the K2 Media Server are complete before proceeding.

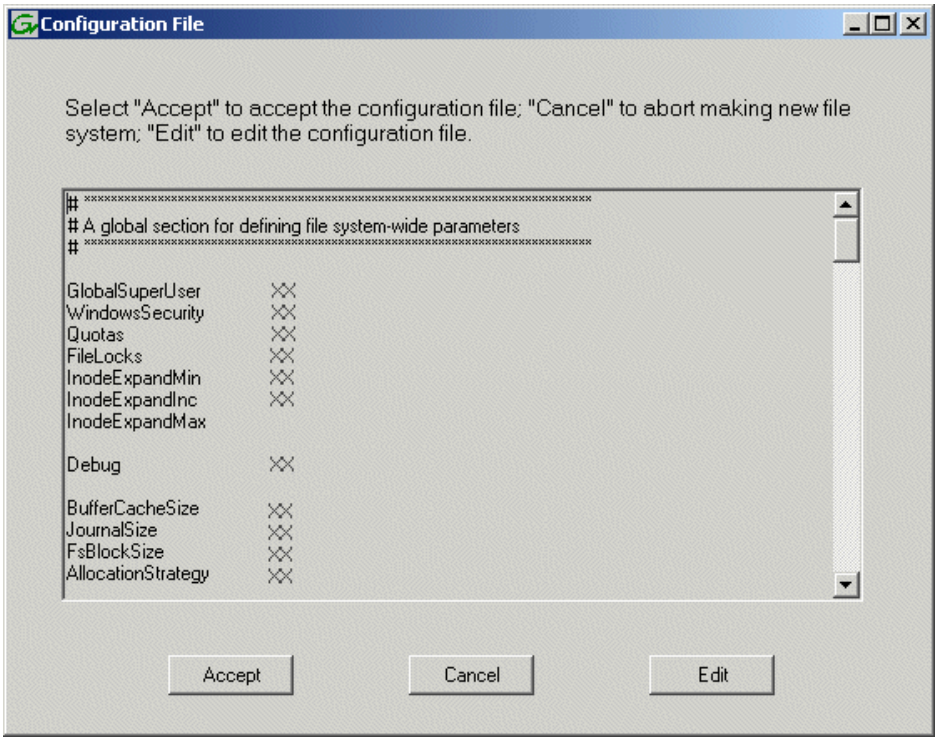
4. Continue with the next procedure "Creating a new file system".

Creating a new file system

1. In Storage Utility, click **Tools | Make New File System**. The Setting dialog box opens.



2. For a Nearline system, enter zero as the Real Time Input/Output (RTIO) rate.
3. Leave Windows Security unchecked.
4. Click **OK**. The Configuration File dialog box opens.



The configuration file for the media file system is displayed. You can verify media file system parameters by viewing this file. Do not edit this file. Click **Accept**.

A "…Please wait…" message box displays progress and a "…succeeded…" message confirms the process is complete.

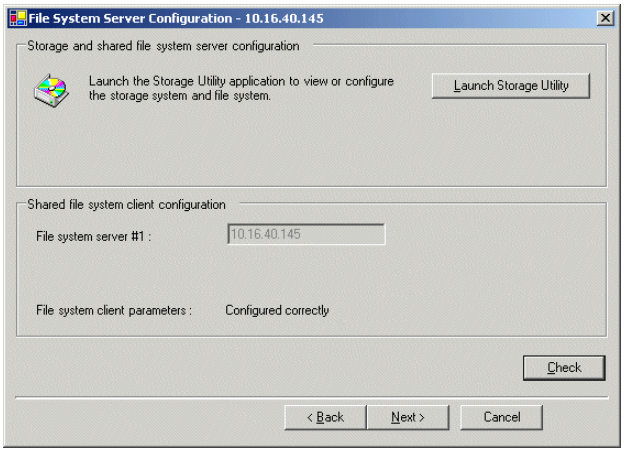
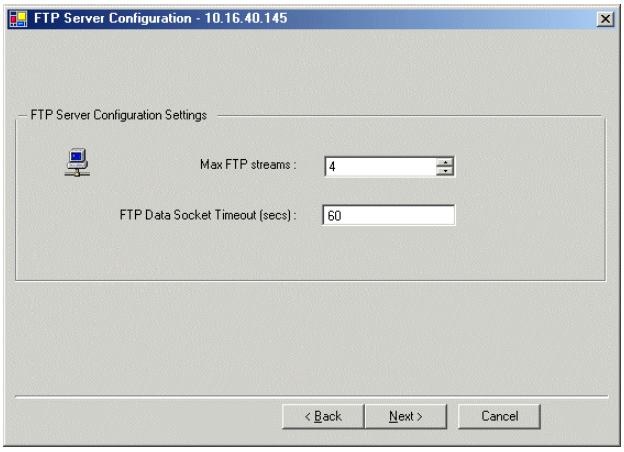
5. A message informs you that you must restart the K2 Media Server, however the restart at the end of the Configure K2 Server wizard suffices, so you do not need to restart now.
6. Close the Storage Utility.

NOTE: Do not attempt to bring the K2 Storage System online until instructed to do so later in this chapter.

7. Continue with the next procedure.

Configuring the NH server - Part 2

1. Return to the Configure K2 Server page from which you launched Storage Utility and proceed as described in the following table:

On this page…	Do this…
File System Server Configuration This page checks on the configuration of the server in one of its main roles as a file system server. The server also functions as a file system client, which is also checked from this page.	 Click **Check**. When the wizard reports that the configuration is correct, click **Next**. If you get a "The V: will not be available until this device is rebooted…" message, you can safely continue with this procedure and follow the instructions related to this message later in the procedure.
FTP Server Configuration	 Do not modify these settings. Leave at default values of Max FTP streams = 4 and FTP Data Socket Timeout = 60. Only qualified Grass Valley personnel should specify other values, as these settings are intended for use only with custom systems designed by Grass Valley. Click **Next**
Completing the Configuration Wizard	Click **Finish**. The wizard closes. The server restarts. Wait until all startup processes have completed before continuing.

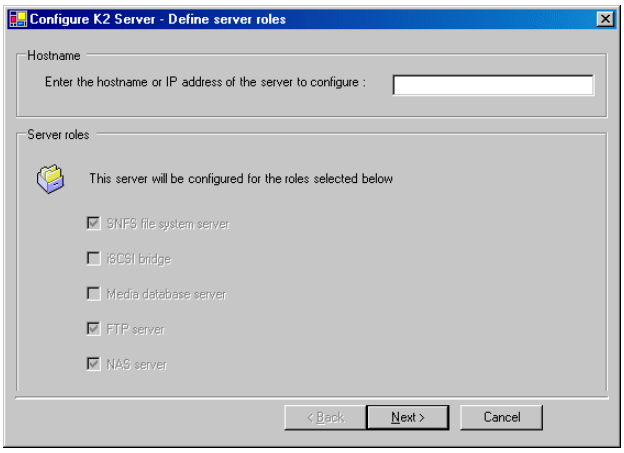
Configuring the second NH server for NL10R

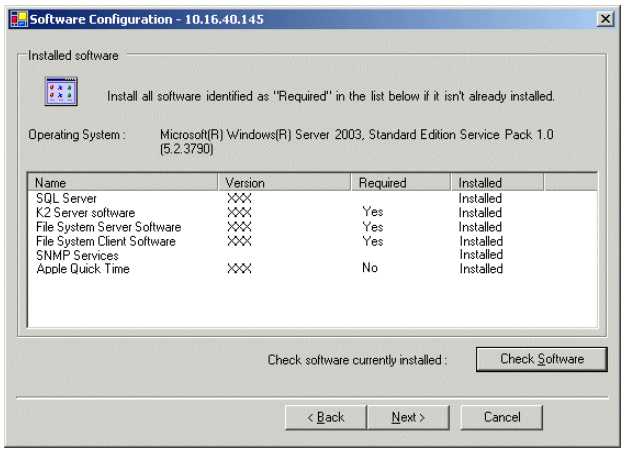
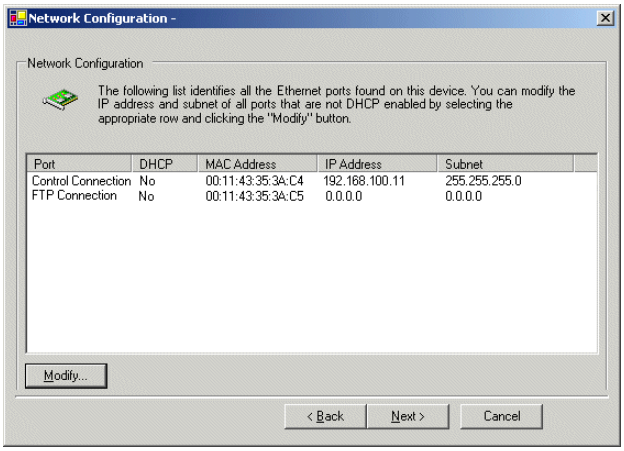
On NL10R systems, both NH K2 Media Servers are identical, with the exception that only one server can be the active media file system server at any time. For this reason the K2 System Configuration application embeds the configuration and start of the

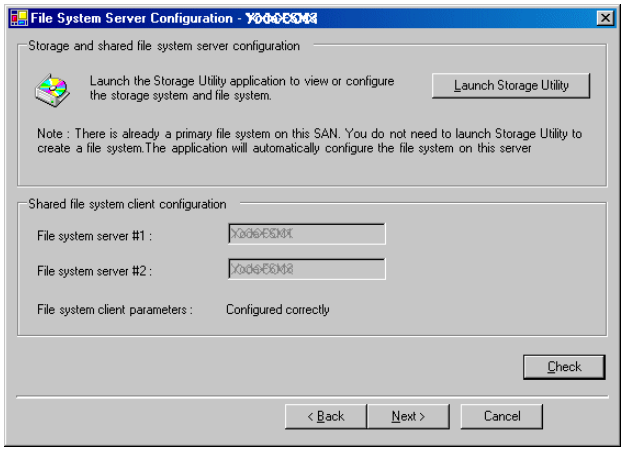
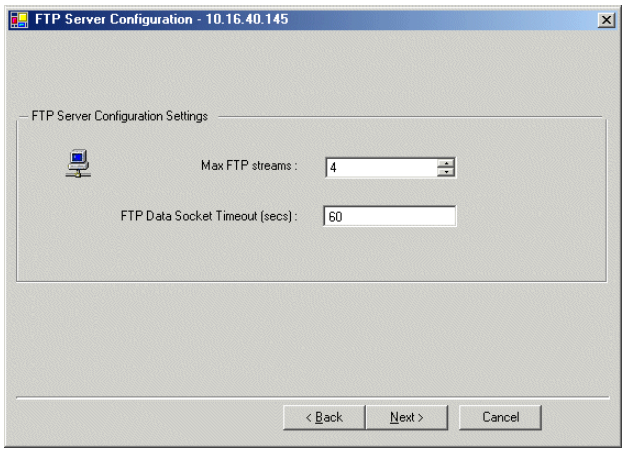
media file system into the wizard when you configure the first NH K2 Media Server, as in the previous procedure. That server is now the acting media file system server. You can now configure the remaining server using the following procedure.

NOTE: Multiple NH servers on a K2 Storage System must be of the same type, either all NH1 or all NH1-10GE.

1. In the K2 System Configuration application tree view, select the K2 Media Server you are configuring.
2. Click the **Configure** button. The Configure K2 Server wizard opens. Follow the on-screen text to configure the server for a nearline 10 K2 Storage System, as described in the following table. Some screens require no input from you, as they are based on the configurations already completed on a previously configured K2 Media Server.

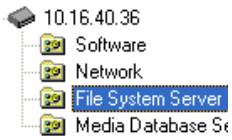
On this page...	Do this...
Define server roles	 Enter the name or IP address for theK2 Media Server, as currently configured on the machine. For Nearline server roles, selections are disabled. Leave **SNFS file system server**, **FTP server**, and **NAS server** selected. Click **Next**

On this page…	Do this…
Software Configuration This page checks for the software required to support the roles you selected on the previous page. Software required on a NL10R K2 Media Server is as follows: • K2 Server • File System Server • File System Client • QuickTime • MPIO ***NOTE: MPIO software is required on K2 Media Servers in the NL10R system and in other nearline redundant systems.***	 If software with *Yes* in the Required column reports as *Not Installed*, you must first install it on the K2 Media Server before continuing. Refer to *Chapter 16, Managing K2 software*. After installing the software, click **Check Software**. When all required software reports as *Installed*, click **Next**.
Network Configuration This page displays the control network Ethernet port, and allows you to configure the FTP/ Streaming network Ethernet port.	 The top port is the port over which the K2 System Configuration application is communicating with the K2 Media Server. If correctly configured, it is already assigned the control network IP address, as displayed on this page. Select the other port and click **Modify**. A network configuration dialog box opens. Enter the FTP/Streaming IP address and the subnet mask and click **Apply**. Click **Next**.

On this page…	Do this…
File System Server Configuration This page checks on the configuration of the K2 Media Server in one of its main roles as a file system server. The K2 Media Server also functions as a file system client, which is also checked from this page. It is not necessary to bind RANKs or create a file system, since those tasks were completed when you configured the first K2 Media Server.	 Click **Check**. Confirm a "… default.cfg file copied…" message. When the wizard reports that the configuration check is successful, click **Next**. and **Yes** to confirm copying *default.cfg* to the server. If you get a "The V: will not be available until this device is rebooted…" message, you can safely continue with this procedure and follow the instructions related to this message later in the procedure.
FTP Server Configuration	 Do not modify these settings. Leave at default values of Max FTP streams = 4 and FTP Data Socket Timeout = 60. Only qualified Grass Valley personnel should specify other values, as these settings are intended for use only with custom systems designed by Grass Valley. Click **Next**
Completing the Configuration Wizard	Click **Finish**. The wizard closes. The K2 Media Server restarts. Do not proceed until restart processes are finished.

3. If you got a "The V: will not be available until this device is rebooted…" message on the File System Server Configuration page, after the K2 Media Server restarts, do the following:

   a. In the K2 System Configuration application tree view, under the K2 Media Server select the File System Server node.



The File System Server Configuration page appears.

b. Click **Check** and verify that the V: drive is shared. This is required for NAS server functionality.

4. Repeat this procedure for remaining NH K2 Media Servers, if any.

Your configurations for the nearline 10 K2 Storage System are complete.

Basic operations for nearline 10 storage

Use the following procedures as you work on your Nearline 10 storage system:

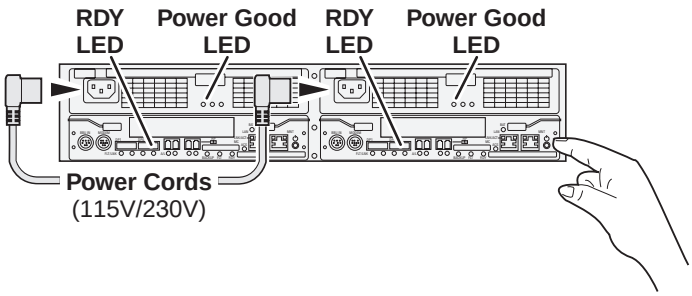
- "Nearline 10 system power-off procedure"
- "Nearline 10 system power-on procedure"
- "Using FTP for file transfer"

For other procedures refer to "Administering and maintaining the K2 Storage System" on page 687.

Nearline 10 system power-off procedure

Use the following sequence to power-off the Nearline 10 storage system.

1. Stop all FTP streams or other media operations on the nearline 10 storage system.
2. Shut down the K2 Media Servers.
3. On the primary RAID chassis controller, identify the RDY LED. It blinks at a rate of 1 blink per second during normal operation.



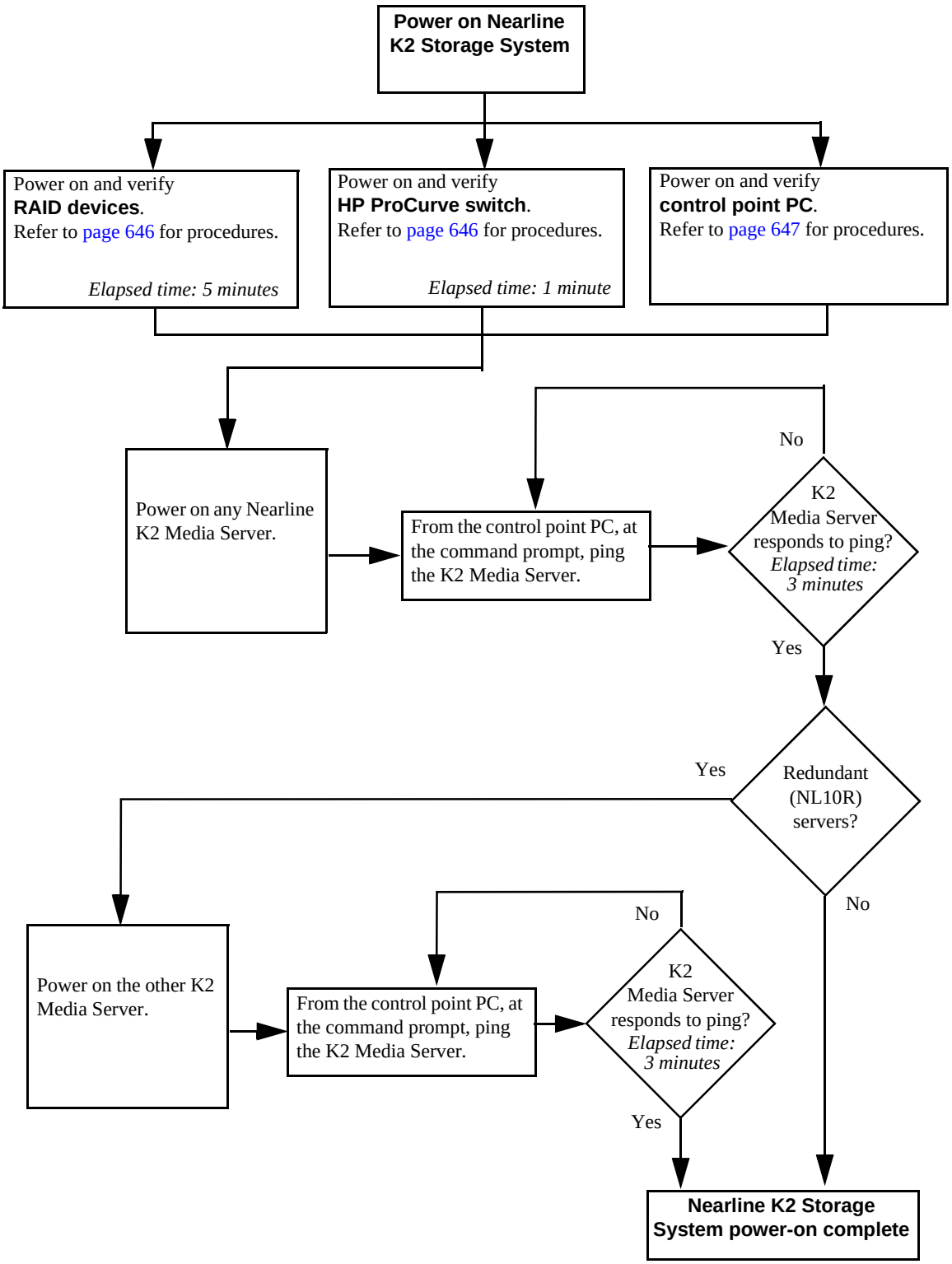
4. Press and hold down the power button on a RAID controller. You can press the power button on either RAID controller 0 or RAID controller 1.
5. Release the power button in about 5 seconds, when the RDY LED blinks more

quickly, at a rate of about 2 blinks per second. Do not hold down the power button for longer than 15 seconds.

The power button on the RAID controller turns off power for the primary RAID chassis and any connected Expansion chassis. Power-off normally occurs within 20 seconds and is indicated when LEDs other than those on the power supplies go off and the fans stop rotating.

6. Wait for RAID power-off to complete before proceeding.
7. Power-off all Ethernet switches.
8. Power-off the control point PC and/or the NetCentral server PC, if necessary.

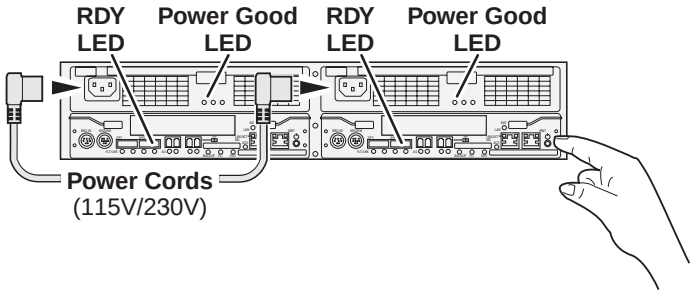
Nearline 10 system power-on procedure



Powering on Level 10, 20, 30, and Nearline 10 RAID storage devices

Use the following procedure to power on and verify proper operation of RAID storage devices.

1. Verify power and cabling.
2. Press and hold down the power button on the controller, as shown.



   If the RAID chassis has two controllers, you can press the power button on either controller. You do not need to press both power buttons.

   Pressing the power button on a controller also powers on any connected Expansion chassis. There are no power buttons on Expansion chassis.

3. Release the power button when the Power Good LED on the power supply is illuminated. This takes 1-3 seconds.
4. Wait while the primary RAID chassis performs self-test and initialization. This takes about four minutes. While this is taking place, the RDY LED is illuminated with a steady on light.
5. Watch for the RDY LED to begin blinking at one second intervals. The LED might turn off and back on two times before starting the one second blink pattern. When the RDY LED is blinking at one second intervals, the self-test and initialization is complete and the chassis is ready for use.

Powering on the HP ProCurve switch

Use the following procedure to power on and verify proper operation of the HP ProCurve switch.

1. Power up the switch.
2. Watch LEDs to verify proper operation. The diagnostic self test LED Behavior is as follows:
   - Initially, all the status, LED Mode and port LEDs are on for most of the duration of the test.
   - Most of the LEDs go off and then may come on again during phases of the self test. For the duration of the self test, the Test LED stays on.

   If the ports are connected to active network devices, the LEDs behave according to the LED Mode selected. In the default view mode (Link), the LEDs should be on.

- If the ports are connected to active network devices, the LEDs behave according to the LED Mode selected. In the default view mode (Link), the LEDs should be on.
- If the ports are not connected to active network devices, the LEDs will stay off.

Powering on the control point PC

Use the following procedure to power on K2 Storage System's control point PC and verify proper operation during power up of the system.

1. Power up and log on to the PC using standard Windows procedures.
2. Start and log on to NetCentral.
3. NetCentral reports devices as offline. As each device of the K2 Storage System is powered on, check NetCentral to verify the device's status

Using FTP for file transfer

Since the Nearline system has no media database, procedures that apply to "online" K2 storage systems (Levels 10, 20, and 30) do not globally apply to the Nearline storage system. This includes procedures for streaming, import, export, and FTP.

The rules for transferring to/from a K2 Nearline storage system are as follows:

- Transfer files only. Streaming media, as in AppCenter's **Import/Send to | Stream** feature, is not supported.
- K2 media must be transferred to/from the Nearline system as a GXF or MXF file.
- Passive FTP mode is supported. You must use this mode for FTP transfers.
- For the list of FTP commands supported, refer to "FTP commands supported" on page 684.
- In addition to FTP transfers, you can also map shared drives and use basic Windows networking to move files to/from a Nearline storage system.

You should use the dedicated K2 FTP/streaming network. The rules for this network are summarized as follows:

- The network must be on a separate subnet.
- Dedicated GigE cables must be connected to the FTP GigE port on K2 Media Servers.
- For network hostname resolution, hostnames mapped to FTP IP addresses must have a "_he0" suffix appended to the name.

For more information about the FTP/streaming network, refer to "About networks and FTP" on page 684

Additional information about Nearline FTP is as follows:

- K2 FTP protocol supports clip and bin names in non-English locales (international languages) using UTF-8 character encoding. Refer to specifications for internationalization in the *K2 Media Client System Guide*.

- The Nearline FTP interface does not have GXF and MXF folders to support format-specific functionality, as does the K2 FTP interface for “online” K2 systems. This means the Nearline FTP interface treats all files, including GXF and MXF, as generic files with no particular consideration for any file format.

Chapter 14

Description of K2 Storage Devices

This chapter contains descriptions of the devices that make up the K2 Storage System, as follows:

- "Control point PC description" on page 650
- "K2 Ethernet switch description" on page 651
- "K2 Media Server descriptions" on page 653
- "K2 RAID storage description" on page 659

Control point PC description

A control point PC runs applications from which you operate, configure, and monitor the K2 Storage System. You can have one or more PCs that provide control point functionality. You must have at least one control point PC on which you install and run the K2 System Configuration application.

The primary applications that run on a control point PC are as follows:

- The K2 System Configuration application
- Storage Utility
- AppCenter
- NetCentral

Refer to Chapter 15, *Overview of K2 Storage Tools* and the *K2 Media Client User Guide* for descriptions of these applications.

In addition, you can use the control point PC for the following applications:

- QuickTime
- Adobe Acrobat Reader
- Windows Remote Desktop Connection

You can purchase a control point PC from Grass Valley. In this case the PC has all the above software pre-installed at the factory. When you receive the PC it is ready to install on the K2 Storage System control network and begin using with minimal configuration. Refer to the *K2 Media Client System Guide* for rack mount instructions.

You can also build your own control point PC by installing and configuring software on an existing PC. Refer to the *K2 Media Client System Guide* for specifications and instructions.

K2 Ethernet switch description

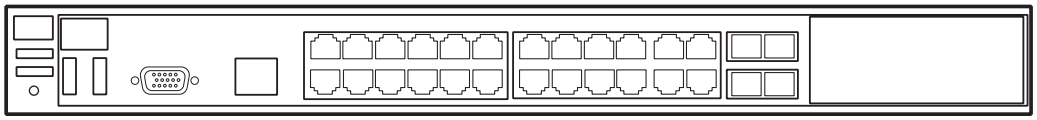
The K2 Ethernet switch provides the primary network fabric of the K2 Storage System. The switch supports Gigabit Ethernet connections, which provides the bandwidth required for the iSCSI media traffic.

The HP ProCurve switch is qualified as the K2 Ethernet switch.

The 3400cl series switch was qualified and released with previous K2 Storage Systems. Refer to previous versions of the *K2 Storage System Instruction Manual* for information about the 3400cl series switch.

The 2900 series switch is qualified for all K2 Storage Systems. This section provides information on the 2900 series switch.

2900 series switch



The HP ProCurve switch is a store-and-forward device offering low latency for high-speed networking. In addition, the switch offers full network management capabilities.

You must use the HP ProCurve switch for iSCSI traffic. You can use a Cisco switch, such as the Cisco Catalyst 3750 Gigabit Ethernet switch, for control and FTP/ streaming traffic, if required by your site.

Refer to the manuals that you receive with the switch for more information.

Refer to the installation chapters earlier in this manual for connection and configuration instructions.

K2 Ethernet switch specifications

The K2 Ethernet switch is a HP ProCurve switch, with specifications as follows:

ProCurve switch 2900-24G:

Characteristic	Specification
Ports	20 RJ-45 10/100/1000 ports (IEEE 802.3 Type 10Base-T, IEEE 802.3u Type 100Base-TX, IEEE 802.3ab 1000Base-T Gigabit Ethernet) 2 CX4 10-GbE ports 2 X2 ports 1 RS-232C DB-9 console port 4 Dual Personality Ports each port can be used as either an RJ-45 10/100/1000 port (IEEE 802.3 Type 10Base-T; IEEE 802.3u Type 100Base-TX; IEEE 802.3ab 1000Base-T Gigabit Ethernet) or an open mini-GBIC slot (for use with mini-GBIC transceivers)

Characteristic	Specification
Dimensions	15.43 x 17.44 x 1.73 in. (39.2 x 44.3 x 4.4 cm) 1U height
Weight	14.11 lb (6.3 kg)
Input voltage	100-127/200-240 volts, 50/60 Hz
Temperature	Operating: 32 °F to 131 °F (0 °C to 55 °C) Non-operating: -40 °F to 158 °F (-40 °C to 70 °C)
Relative humidity: (non-condensing)	Operating: 15% to 95% at 104 °F (40 °C) Non-operating: 15% to 90% at 149 °F (65 °C)
Maximum altitude	up to 15091 ft (4.6 km)

K2 Media Server descriptions

The central component of the K2 Storage System is the K2 Media Server.

The Dell 2850 and the Dell 2950 were qualified as the K2 Media Server with the 2 gig K2 Storage Systems previously released. Refer to previous versions of the *K2 Storage System Instruction Manual* for information about these K2 Media Servers.

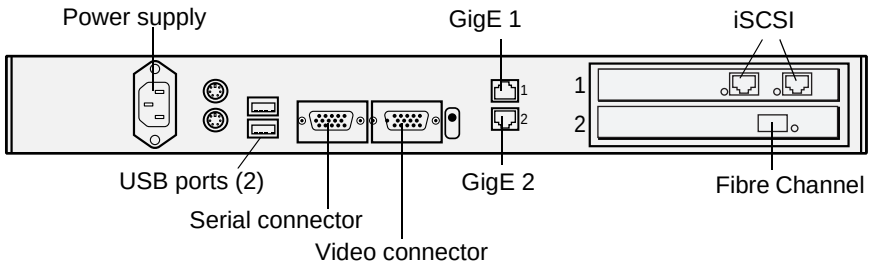
The 4 Gig K2 Storage Systems have several types of K2 Media Servers available, as explained in the following sections:

- "L10 K2 Media Server description"
- "GS K2 Media Server description"
- "LS K2 Media Server description"
- "NH K2 Media Server"

L10 K2 Media Server description

The L10 K2 Media Server is used on Level 10 and Level 10R K2 Storage Systems. The Dell PowerEdge 860 is qualified as the platform for the L10 K2 Media Server.

Dell PowerEdge 860 server



The following interfaces provide K2 Storage System functionality:

- Two GigE ports on the motherboard
- One dual port iSCSI interface card. Each port is also referred to as a TOE (TCP/IP Offload Engine). Only one port is used for a L10 or L10R system.
- One single port Fibre Channel card.

L10 K2 Media Server specifications

The L10 K2 Media Server is built on a Dell PowerEdge 860 server platform. Specifications that are unique to it purpose as a K2 Media Server are listed in the following table. For a complete list of specifications, refer to Dell documentation.

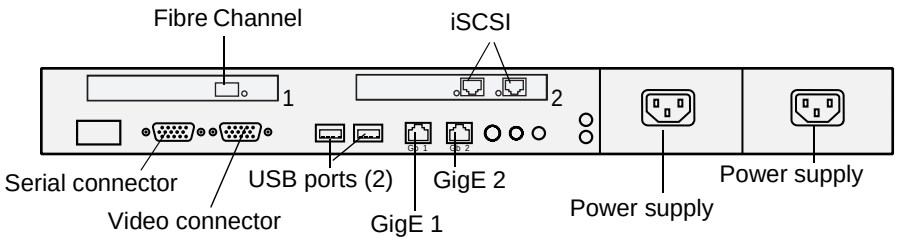
Dell PowerEdge 860 server

Characteristic	Specification
Operating System	Microsoft® Windows® XP
Fibre Channel Adapter	LSI7104EP-LC single-channel 4Gb/s PCIe Host Bus Adapter
iSCSI Adapter	Qlogic SANblade 1-Gbps iSCSI dual-TOE PCI-X Host Bus Adapter
Communications	Dual embedded Broadcom® Gigabit Ethernet NIC on motherboard
Form Factor	1U
Power	Single power supply (345W)

GS K2 Media Server description

The GS K2 Media Server is used on Level 20 and Level 20R K2 Storage Systems. The Dell PowerEdge 1950 is qualified as the platform for the GS K2 Media Server.

Dell PowerEdge 1950 server



The following interfaces provide K2 Storage System functionality:

- Two GigE ports on the motherboard
- One dual port iSCSI interface card. Each port is also referred to as a TOE (TCP/IP Offload Engine).
- One single port Fibre Channel card.

GS K2 Media Server specifications

The GS K2 Media Server is built on a Dell PowerEdge 1950 server platform. Specifications that are unique to it purpose as a K2 Media Server are listed in the following table. For a complete list of specifications, refer to Dell documentation.

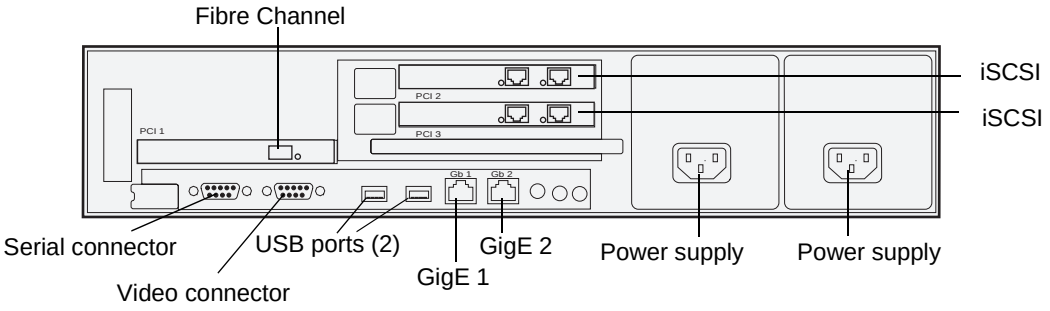
Dell 1950 PowerEdge server

Characteristic	Specification
Operating System	Microsoft® Windows® Server 2003, Standard Edition
Fibre Channel Adapter	LSI7104XP-LC single-channel 4Gb/s PCI-X Host Bus Adapter
iSCSI Adapter	Qlogic SANblade 1-Gbps iSCSI dual-TOE PCI-X Host Bus Adapter
Communications	Dual Embedded Broadcom NetXtreme II 5708 Gigabit Ethernet NIC
Form Factor	1U

LS K2 Media Server description

The LS K2 Media Server is used on Level 30 and Level 30R K2 Storage Systems. The Dell PowerEdge 2950 is qualified as the platform for the LS K2 Media Server.

Dell PowerEdge 2950 server



The following interfaces provide K2 Storage System functionality:

- Two GigE ports on the motherboard
- Two dual port iSCSI interface card. Each port is also referred to as a TOE (TCP/IP Offload Engine).
- One single port Fibre Channel card.

LS K2 Media Server specifications

The LS K2 Media Server is built on a Dell PowerEdge 2950 server platform. Specifications that are unique to it purpose as a K2 Media Server are listed in the following table. For a complete list of specifications, refer to Dell documentation.

Dell 2950 PowerEdge server

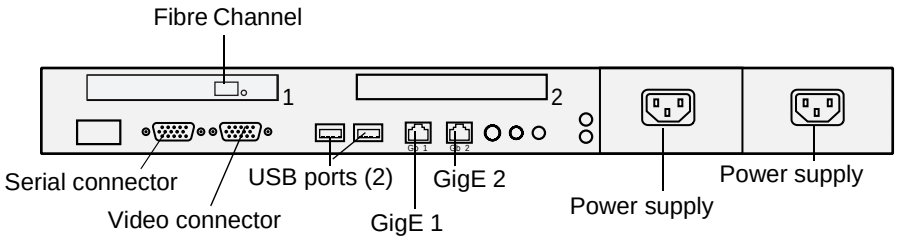
Characteristic	Specification
Operating System	Microsoft® Windows® Server 2003, Standard Edition
Fibre Channel Adapter	LSI7104EP-LC single-channel 4Gb/s PCIe Host Bus Adapter
iSCSI Adapter	Qlogic SANblade 1-Gbps iSCSI dual-TOE PCI-X Host Bus Adapter
Communications	Dual Embedded Broadcom NetXtreme II5708 Gigabit Ethernet NIC
Form Factor	2U

NH K2 Media Server

The NH K2 Media Server is an optional server that can be used on Level 20, 20R, 30, 30R, NL10, and NL10R K2 Storage Systems. The Dell PowerEdge 1950 is qualified as the platform for the NH K2 Media Server.

Options are available to support variants of the NH K2 Media Server, as follows:

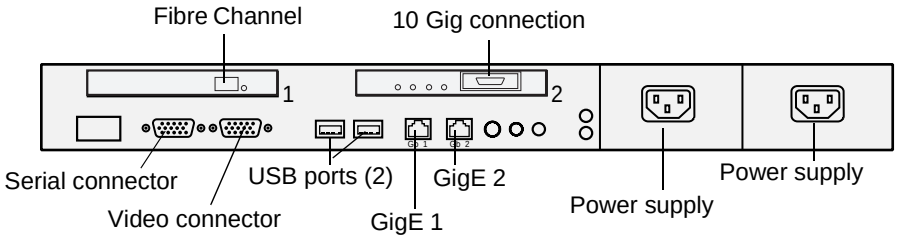
NH1 Dell PowerEdge 1950 server



The NH1 K2 Media Server provides 1 Gig FTP available bandwidth. The following interfaces provide K2 Storage System functionality:

- Two GigE ports on the motherboard.
- One single port Fibre Channel card. For Nearline systems, the Fibre Channel card has two ports.

NH1-10GE Dell PowerEdge 1950 server



The NH1-10GE K2 Media Server provides I0 Gig FTP available bandwidth. The following interfaces provide K2 Storage System functionality:

- One GigE port on the motherboard. The second GigE port is not used.
- One 10 Gig port.
- One single port Fibre Channel card. For Nearline systems, the Fibre Channel card has two ports.

NH K2 Media Server specifications

The NH K2 Media Server is built on a Dell PowerEdge 1950 server platform. Specifications that are unique to it purpose as a K2 Media Server are listed in the following table. For a complete list of specifications, refer to Dell documentation.

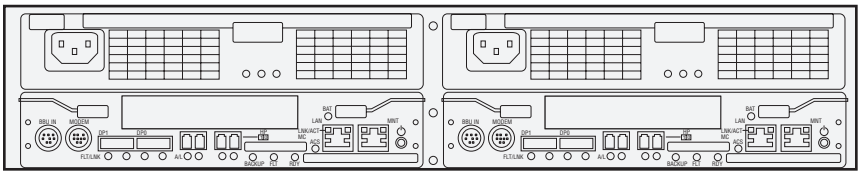
Dell 1950 PowerEdge server

Characteristic	Specification
Operating System	Microsoft® Windows® Server 2003, Standard Edition
Fibre Channel Adapter	LSI7104XP-LC single-channel 4Gb/s PCI-X Host Bus Adapter for online systems LSI7204XP-LC dual-channel 4Gb/s PCI-X Host Bus Adapter for nearline systems.
Communications	Dual Embedded Broadcom NetXtreme II 5708 Gigabit Ethernet NIC Intel® PRO/10GbE CX4 Server Adapter for NH1-10GE
Form Factor	1U

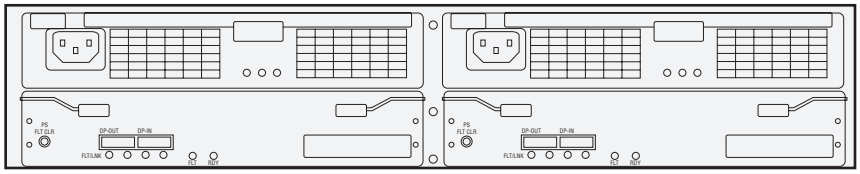
K2 RAID storage description

The K2 RAID Storage is used in Level 10, 10R, 20, 20R, 30, 30R, and Nearline K2 Storage Systems. The RAID storage device is a high performance, high availability mass storage system. The RAID chassis 4Gb/s host interface supports industry standard Fibre Channel technology. K2 RAID is available with either SAS drives for online storage or SATA drives for nearline storage.

K2 RAID Chassis (primary)



K2 RAID Expansion Chassis



The RAID Expansion Chassis provides additional storage capacity. The Expansion Chassis has two Expansion Adapters installed.

Refer to the installation chapters earlier in this manual for connection and configuration instructions.

The K2 RAID is NEC models D1-10/D3-10. For specifications and servicing information, refer to the *K2 RAID Storage Instruction Manual*.

Chapter 15

Overview of K2 Storage Tools

Topics in the chapter include the following:

- "K2 System Configuration" on page 661
- "Server Control Panel" on page 663
- "Storage Utility" on page 663
- "NetCentral" on page 665
- "Windows Remote Desktop Connection" on page 665

K2 System Configuration

The K2 System Configuration application (K2 Config) is the primary tool for configuring the K2 Storage System. Once the devices of the storage system are cabled and are communicating on the control network, you can do all the configuration required to create a working K2 Storage System using the K2 System Configuration application.

After your K2 Storage System is initially installed and configured, as instructed in the installation chapters earlier in this manual, if you need to reconfigure the system you should do so using the K2 System Configuration Application. This enforces consistent policy and sequencing for reconfiguration tasks, which makes the system easier to maintain and aids in troubleshooting should a problem arise.

The K2 System Configuration application runs on a control point PC and accesses the devices of the K2 Storage System via the control network. You can configure the devices of the K2 Storage System as follows:

- K2 Media Client and K2 Media Server — These devices are configured directly by the K2 System Configuration application.
- K2 Level 2, Level 3, Level 10–30 (SAS and SATA), and Nearline RAID storage devices — The K2 System Configuration application launches a remote instance of Storage Utility, which configures RAID storage devices. Storage Utility components run on the K2 Media Server and the configuration actually takes place via the Fibre Channel connection between the K2 Media Server and the RAID storage device.
- Ethernet switches — The K2 System Configuration application can launch a switch's web-based configuration application.

If necessary, you can install and run the K2 System Configuration application on multiple PCs in your facility. Refer to "Accessing a K2 Storage System from multiple PCs" on page 694 for constraints and considerations.

To open the K2 System Configuration application do the following:

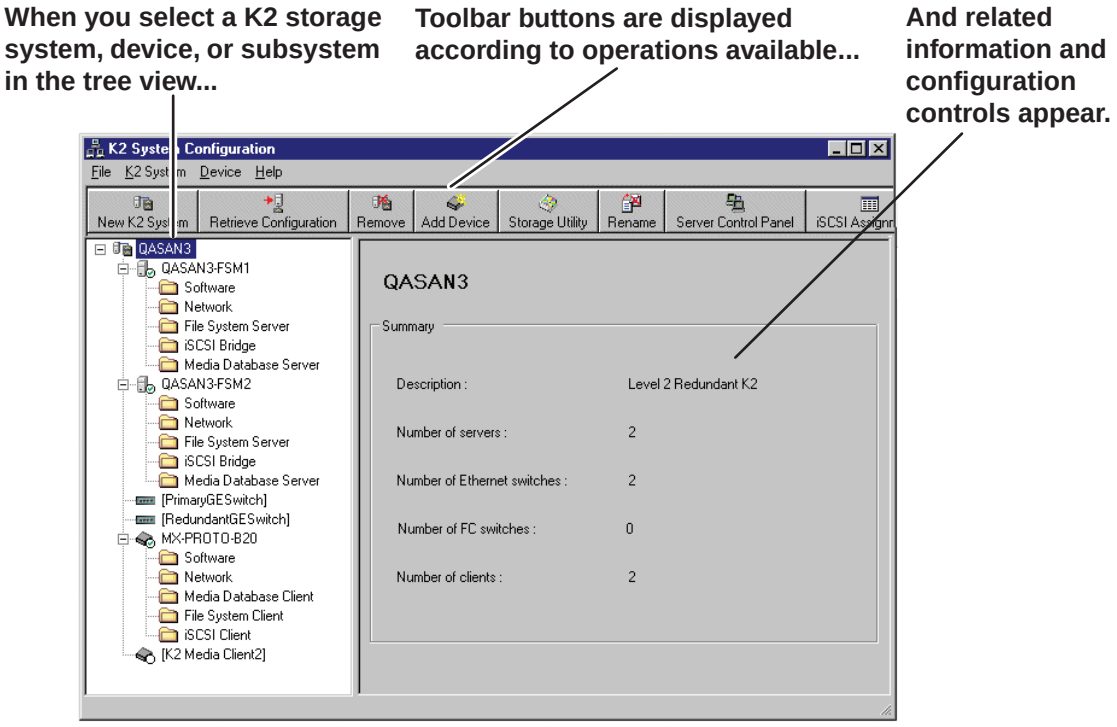
1. On the control point PC open the K2 System Configuration application shortcut on the desktop. The K2 System Configuration application log in dialog box opens.
2. Log in using the designated administrator account for configuring K2 Storage

System devices. By default this account is as follows:

Username: administrator

Password: adminK2

3. The K2 System Configuration application opens.



If you have one or more K2 Storage Systems currently configured, the K2 System Configuration application displays the systems in the tree view.

If you have not yet configured a K2 Storage System, the K2 System Configuration application opens with the tree view blank. Refer to the installation chapters earlier in this manual to add and configure a new K2 Storage System.

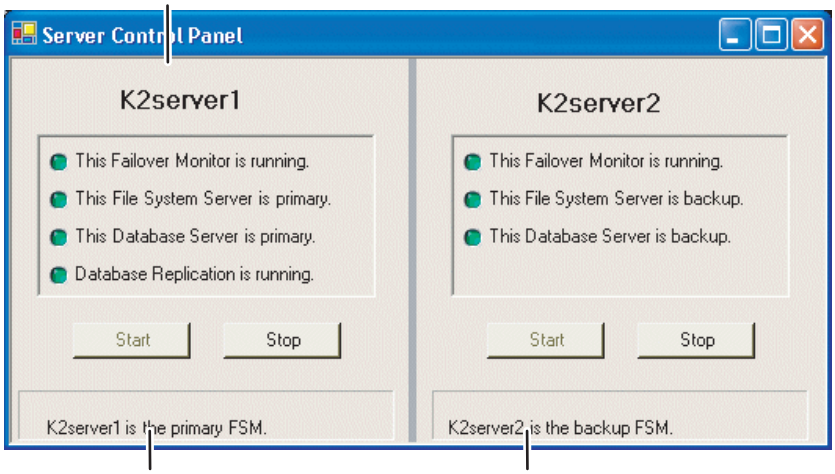
You can expand and select nodes in the tree view to view K2 Storage Systems, individual devices, and configuration settings. When you do so, the K2 System Configuration application displays information as found in a configuration file, rather than continuously polling devices to get their latest information. The configuration file is saved on the V: drive, along with the media files in the shared storage system. The configuration file is updated and saved whenever you change a configuration using the K2 System Configuration application. That is why you must always use the K2 System Configuration application to change settings on the storage system, so the most recently changed configurations will always be stored in the configuration file and displayed.

Server Control Panel

Server Control Panel allows you to monitor and control the current status of a K2 Media Server in its roles as the media file system server and the media database server. This is especially useful for redundant K2 Storage Systems, as you must know if a server is currently acting as primary or as backup before attempting any troubleshooting or service work.

Server Control Panel displays information about the Failover Service, the media file system server primary/redundant roles, the media database primary/redundant roles, and database replication.

If your K2 Storage System does not have redundant servers, only the left panel (one server) appears.



If your K2 Storage System has redundant servers, both panels (two servers) appear.

NOTE: Do not click Stop or Start unless you intend to manually control the current primary/redundant roles. Using these buttons can trigger an automatic system recovery (failover) event.

To launch Server Control Panel, in the K2 System Configuration application, click the **Server Control Panel** button.

You can also launch Server Control Panel on the local K2 Media Server. When you do so you must log in with administrator-level privileges.

Refer to procedures in Chapter 18, *Administering and maintaining the K2 Storage System* to use Server Control Panel for maintenance, service, and other tasks.

Storage Utility

You should be aware that there are two versions of Storage Utility:

- Storage Utility for the K2 Storage System
- Storage Utility for stand-alone K2 Media Clients with their own storage

This section explains Storage Utility for the K2 Storage System. Refer to the *K2 Media Client System Guide* to learn about Storage Utility for stand-alone K2 Media Clients.

NOTE: For shared storage, run Storage Utility only via the K2 System Configuration application.

The Storage Utility is your primary access to the media file system, the media database, and media disks of the K2 Storage System for configuration, maintenance, and repair. It is launched from the K2 System Configuration application.

CAUTION: Use the Storage Utility only as directed by a documented procedure or by Grass Valley Support. If used improperly, the Storage Utility can render your K2 Storage System inoperable or result in the loss of all your media.

The Storage Utility's primary functionality is hosted by the K2 Media Server. The Storage Utility uses the Fibre Channel connection between the K2 Media Server and the RAID storage device for access and configuration. When you launch Storage Utility from the K2 System Configuration application on the control point PC, you use a Storage Utility remote interface to control the main application as it runs on the K2 Media Server.

The Storage Utility requires that the storage system be in an offline operating mode before it allows any configuration to take place. Take your K2 Storage System devices offline before configuring with Storage Utility. This means all media access operations are disabled while you are using the Storage Utility.

NOTE: Do not run Storage Utility as a stand-alone application, separate from the K2 System Configuration application. To maintain a valid K2 Storage System all configuration must be controlled and tracked through the K2 System Configuration application.

Refer to Chapter 18, *Administering and maintaining the K2 Storage System* for procedures for using Storage Utility.

NOTE: Do not use the "Power Console Plus" (PCP) utility on a K2 Media Client. This utility is for use by qualified Grass Valley Service personnel only. When this utility is opened it scans the SCSI bus and interferes with record and play operations.

About RANKs and LUNs in Storage Utility

With Storage Utility you bind disks into a group. This group is a logical unit recognized by the Windows operating system, the media file system, and other software.

Storage Utility labels this group of disks a RANK. This is different than previous versions of Storage Utility which labeled the group of disks a LUN. Storage Utility on the stand-alone storage K2 Media Client also labels the group of disks a LUN:

This name change is necessary because the maximum disk size recognized by some Windows operating systems is relatively low, and in a K2 Storage System with large capacity disks, a group of disks can exceed this maximum size. To solve the problem, Storage Utility binds disks as smaller size LUNs which can be recognized by the Windows operating system, but combines multiple LUNs into a larger size RANK, to support the K2 Storage System.

In Storage Utility, there is no operational difference between what is currently labeled a RANK and what was previously labeled a LUN. The task you accomplish are identical. Storage Utility does report the number of LUNs in each RANK, which is useful information if you need to view disks from Windows operating system administrative tools.

NetCentral

NetCentral is Grass Valley's monitoring application and is required on a K2 Storage System. The NetCentral server component runs on a NetCentral server PC, which could also be a K2 system control point PC. The devices of the K2 Storage System report status, primarily via Simple Network Management Protocol (SNMP), to NetCentral on the NetCentral server PC.

Refer to the *NetCentral User Guide* to get the NetCentral system installed and operating. You must install a NetCentral device provider on the NetCentral server PC for each type of device you are monitoring. For detailed information about setting up and monitoring each type of device, go to the NetCentral **Help** menu and read the online help for the device-type.

NOTE: NetCentral is optional if you are using a K2 Media Client with stand-alone only. NetCentral is required if you are using a K2 Media Client with a shared storage system.

Windows Remote Desktop Connection

You can connect to a K2 Media Client or a K2 Media Server remotely using the Microsoft Windows Remote Desktop Connection application. Do not use the Remote Desktop Connection to access the PC running the Control Point software or to access the AppCenter application; results may be unreliable. Also, take care when accessing an online K2 system on which media access is underway. The additional load on network and system resources could cause unpredictable results.

You can use either the name or the IP address to access the K2 system.

NOTE: Before you can use the Remote Desktop Connection, you need network access and permissions to connect to the K2 system.

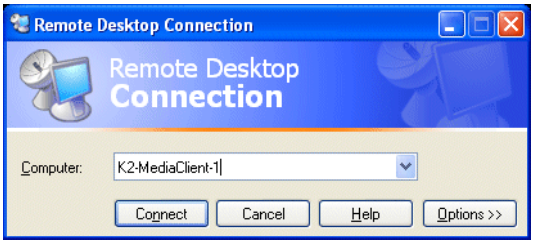
To access the Remote Desktop Connection, follow these steps:

1. Click the **Start** button on the Windows task bar

   —or—

Press the Windows key on the keyboard.

2. Select **Programs | Accessories | Communications | Remote Desktop Connection**. The Remote Desktop dialog box displays.



3. Enter the name or IP address of the K2 system and click the **Connect** button. Alternately, you can click the down arrow of the text box and browse for the K2 system or select a previously entered computer.

Chapter 16

Managing K2 software

This chapter provides information about the software components of the K2 Storage System. Topics include the following:

- "About K2 software"
- "Installing K2 software"
- "Pre-installed software"
- "Backup and recovery strategies"

About K2 software

Check *K2 Media Client Release Notes* for the latest information about software.

At the time of this writing, the primary software installations for the K2 Storage System and K2 products are as follows:

This software…	Is distributed on…	With the installation file located at…	Which is installed on…	And is described as follows:
K2 Client	The K2 System Software CD	..*K2Client**setup.exe*	K2 Media Clients	Provides core functionality for all K2 Media Client models.
K2 Server	The K2 System Software CD	..*K2Server**setup.exe*	K2 Media Servers	Provides core functionality for all K2 Media Servers in all roles.
Control Point	The K2 System Software CD	..*ControlPoint**setup.exe*	Control Point PCs	Provides remote control and configuration of K2 Media Clients (both internal and external storage) as well as the K2 Storage System.
Media File System (SNFS)	The K2 System Software CD	..*snfs**gvSnfsxxSetupK2.bat*	K2 Media Servers, stand-alone K2 Media Clients, and shared storage (SAN) K2 Media Clients	Install only as instructed by release notes.
NetCentral	The NetCentral Manager CD	..*ServerSetup.exe*	The NetCentral server PC (this can be a Control Point PC)	Provides remote monitoring of all K2 products.

In addition, the following software is installed in special cases:

- Multi-Path I/O software — You must install this software on a K2 Media Client

that has redundant paths to storage. This includes a K2 Media Client that is part of a redundant K2 Storage System and a K2 Media Client directly connected via redundant Fibre Channel connections to its own external RAID storage. Refer to the *K2 Media Client System Guide* for more information.

Software components installed

Each of the K2 installation packages installs software components that provide the functionality for various applications and system tools. Refer to Chapter 15, *Overview of K2 Storage Tools* and to the *K2 Media Client System Guide* for descriptions. The components installed are as follows:

Software	Components installed	Comments
K2 Client	Core system software	Provides the primary media functionality.
	AppCenter user interface	Allows you to operate AppCenter on the local machine.
	AppServer	Provides AppCenter functionality. It is accessed by both the remote AppCenter (on a Control Point PC) and the local AppCenter user interface.
	Storage Utility	Configures the media storage on stand-alone storage K2 Media Clients only. Do not run Storage Utility on shared storage K2 Media Clients.
	K2 System Configuration	Supports configuration of an external storage K2 Media Client for shared storage. Provides to the remotely connected K2 System Configuration application the ability to configure the local machine. You cannot run the K2 System Configuration user interface on the local K2 Media Client.
	Multi-Path I/O	Installation files copied to K2 Media Client but software not installed.
K2 Server	Core system software	Provides the primary media functionality.
	Storage Utility	Provides functionality for the remotely connected Storage Utility that runs on the Control Point PC. You should not run Storage Utility locally on the K2 Media Server.
	K2 System Configuration	Provides to the remotely connected K2 System Configuration application the ability to configure the local machine. You cannot run the K2 System Configuration user interface on the local K2 Media Server.
Control Point	AppCenter user interface	Connects to K2 Media Clients for control and configuration of channels.
	K2 System Configuration user interface	Connects to K2 Media Clients, K2 Media Servers, RAID storage, and Gigabit switches for configuration of the K2 Storage System.
	Storage Utility	Connects to the K2 Media Server, and through the K2 Media Server to the RAID storage, for configuration of the media file system, media database, and RAID storage.

Installing K2 software

Except as noted in the preceding sections, when you receive your K2 systems, you do not need to install software. The system has the most recent software pre-installed at the factory.

If you are upgrading software, refer to the *K2 Media Client Release Notes* and the *K2 Storage System Release Notes* for that version of software for specific software upgrade procedures. To upgrade shared storage K2 Media Clients, you must use the proper sequence and upgrade all K2 Media Servers and K2 Media Clients to the same software version. Upgrade K2 Media Servers first, then K2 Media Clients. Refer to *K2 Storage System Release Notes* for the complete explanation of the rules that apply to upgrading software on the K2 Storage System.

Before upgrading K2 software, you should make a recovery disk images of K2 systems. Refer to "Backup and recovery strategies" on page 670 for K2 Media Server procedures. Refer to the *K2 Media Client Service Manual* for K2 Media Client procedures.

Re-installing Grass Valley software

NOTE: Follow these instructions if you need to re-install software. If you are upgrading to a new release version, see the Release Notes for the latest information on installation procedures. For more information on recovery procedures, see "Backup and recovery strategies" on page 670.

K2 Client software

Refer to the *K2 Media Client System Guide* for information about re-installing K2 Client software.

K2 Server software

1. Make sure all connected K2 Media Clients are shut down.
2. Insert the K2 System Software CD in the K2 Media Server's CD drive, if it is not already inserted, or otherwise access the installation files.
3. Open the following file:

   ..\K2Server\setup.exe
4. Follow on-screen instructions, clicking **Next** and **Finish** to complete the installation.
5. When prompted, restart the machine.

NOTE: You must restart after installing K2 software.

Control Point software

Follow the onscreen instructions. Click **Next** and **Finish** to complete the installation.

Pre-installed software

Software is pre-installed on a K2 Media Server when you receive it from the factory. Check *K2 Storage System Release Notes* for the most up-to-date list with version information.

Backup and recovery strategies

Procedures in this section are as follows:

- "About the recovery disk image process" on page 670
- "Creating a recovery disk image for storing on E:" on page 672
- "Creating a recovery disk image CD set" on page 673
- "Restoring from a system-specific recovery disk image on E:" on page 675
- "Restoring from the generic recovery disk image on E:" on page 676
- "Restoring from a recovery disk image CD set" on page 680
- "Activating the Windows operating system" on page 681

About the recovery disk image process

On the K2 Media Server, there are three partitions on the system drive to support backup and recovery strategies as follows:

- The C: drive is for the Windows operating system and applications.
- The D: drive is for the media file system (SNFS) and the media database (SQL). This allows you to restore the Windows operating system on the C: drive, yet keep the files on the D: drive intact. You can also restore the D: drive itself, however your backup and recovery strategy is different for non-redundant and redundant systems, as follows:
  - On non-redundant servers the media file system program, metadata, and journal files are on the D: drive. Also the media database program and data files are on the D: drive. Therefore if you ever have a D: drive fault and you need to recover the data files (metadata, journal, and database), you can only restore them to the "snap-shot" contained in the most recent disk image you created. When you do this you restore the program files as well.
  - For redundant K2 Storage Systems, the media file system program is on the D: drive, but the metadata and journal files are stored on the shared RAID storage. Also the media database program and data files are on the D: drive, but the data files are replicated to the redundant server. Therefore, if you ever have a D: drive fault, you can restore the media file system and database programs from a recovery disk image, and then restore the data files (metadata, journal, database) from their protected locations elsewhere.
- The E: drive is for storing a system image of the other partitions. From the E: drive you can restore images to the C: and D: drives.

When you receive a K2 Media Server from the factory, the machine has a generic image on the E: drive. This image is not specific to the individual machine. It is generic for all machines of that type.

You receive a recovery CD with your K2 Media Server. This recovery CD does not contain a disk image. Rather, the recovery CD is bootable and contains the Acronis True Image software necessary to create and restore a disk image. You also receive a similar recovery CD for K2 Media Clients, but it is specifically for the desktop

Windows operating system (Windows XP), rather than for the server Windows operating system (Windows 2003 server) which runs on the K2 Media Server. Do not interchange these recovery CDs.

After your K2 Media Server is installed, configured, and running in your system environment, you should create new recovery disk images for the machine to capture settings changed from default. These “first birthday” images are the baseline recovery image for the machine in its life in your facility. You should likewise create new recovery disk images after completing any process that changes system software or data, such as a software upgrade. In this way you retain the ability to restore to a recent “last known good” state.

For the highest degree of safety, you should create a set of disk image recovery CDs, in addition to storing disk images on the E: partition. Since system drives are RAID protected, in most failure cases the disk images on the E: partition will still be accessible. But in the unlikely even of a catastrophic failure whereby you lose the entire RAID protected system drive, you can use your disk image recovery CDs to restore the system.

NOTE: Recovery disk images do not back up the media files themselves. You must implement other mechanisms, such as a redundant storage system or mirrored storage systems, to back up media files.

The recommended recovery disk image process is summarized in the following steps.

At the K2 Media Server first birthday…

1. Boot from the Recovery CD.
2. Create a set of disk image recovery CDs. These CDs contain the C:, D:, and E: partitions.
3. Create a disk image, writing the disk image to the E: partition. This disk image contains the C: and D: partitions.
4. Copy the disk image from the E: partition to another location, such as a network drive.

At milestones, such as after software upgrades…

1. Boot from the Recovery CD.
2. Create a disk image, writing the disk image to the E: partition. This disk image contains the C: and D: partitions.
3. Copy the disk image from the E: partition to another location, such as a network drive.

If you need to restore the K2 Media Server…

1. Boot from the Recovery CD.
2. If the E: partition is accessible, read the image from the E: partition to restore the C: partition, restore the D: partition, or restore both partitions.
3. If the E: partition is not accessible, do the following:
   a. Read the disk image from your set of CDs and restore all three partitions.
   b. Restart into Windows.
   c. Copy your most recent disk image to the E: partition.
   d. Boot from the Recovery CD.
   e. Read the image from the E: partition to restore the C: partition, restore the D: partition, or restore both partitions.

Plan a recovery strategy that is appropriate for your facility, then refer to the following procedures as necessary to implement your strategy.

Creating a recovery disk image for storing on E:

Do the following at the local K2 Media Server to create a disk image of the C: partition and the D: partition and store the image file on the E: partition:

1. Make sure that media access is stopped and that the K2 Media Server on which you are working is out of service.
2. If you have not already done so, connect keyboard, monitor, and mouse to the K2 Media Server.
3. Insert the Recovery CD and restart the machine.

   The machine boots from the disc. The Acronis True Image program loads.
4. At the startup screen, select **True Image Server (Full Version)**.

The Acronis True Image program loads.

The Acronis True Image main window appears.

5. In the Acronis True Image main window, click **Backup**.

   The Create Backup Wizard opens.

6. On the Welcome page, click **Next**.

   The Select Backup Type page opens.

7. Select **The entire disk contents or individual partition** and then click **Next**.

   The Partitions Selection page opens.

8. Select the **System (C:)** and the **Database (D:)** partitions and then click **Next**.

   The Backup Archive Location page opens.

9. In the tree view select the **Backup (E:)** partition and then enter the name of the image file you are creating. Create the file name using the K2 Media Server hostname and the date. Name the file with the .tib extension. For example, if the hostname is K2Server1, in the File name field you would have `E:\K2Server1_20051027.tib`. Click **Next**.

   The Backup Creation Options page opens.

10. Do not change any settings on this page. Click **Next**.

    The Archive Comment page opens.

11. If desired, enter image comments, such as the date, time, and software versions contained in the image you are creating. Click **Next**.

    The "…ready to proceed…" page opens.

12. Verify that you are creating images from the C: and D: partitions and writing to the E: partition. Click **Proceed**.

    The Operation Progress page opens and displays progress.

13. When a "Backup archive creation has been successfully completed" message appears, click **OK**.

14. Click **Operations | Exit** to exit the Acronis True Image program.

    The K2 Media Server device restarts automatically.

15. Remove the Recovery CD while the K2 Media Server device is shutting down.

16. Upon restart, log on to Windows.

17. Open Windows Explorer and find the image file on the E: partition.

Creating a recovery disk image CD set

Do the following at the local K2 Media Server to create a disk image of the entire system drive, which includes the C:, D:, and E: partitions, and store the image file on a set of CDs:

1. Make sure that media access is stopped and that the K2 Media Server on which you are working is out of service.

2. If you have not already done so, connect keyboard, monitor, and mouse to the K2 Media Server.
3. Insert the Recovery CD and restart the machine.

   The machine boots from the disc. The Acronis True Image program loads.
4. At the startup screen, select **True Image Server (Full Version)**.

   The Acronis True Image program loads.

   The Acronis True Image main window appears.
5. In the Acronis True Image main window, click **Backup**.

   The Create Backup Wizard opens.
6. On the Welcome page, click **Next**.

   The Select Backup Type page opens.
7. Select **The entire disk contents or individual partition** and then click **Next**.

   The Partitions Selection page opens.
8. Select **Disk 1** to select the System (C:), the Database (D:), and the Backup (E:) partitions and then click **Next**.

   The Backup Archive Location page opens.
9. In the tree view select **CD-RW Drive (F:)** and then enter the name of the image file you are creating. Create the file name using the K2 Media Server hostname and the date. Name the file with the .tib extension. For example, if the hostname is K2Server1, in the File name field you would have `F:\K2Server1_20051027.tib`. Click **Next**.

   The Backup Creation Options page opens.
10. Do not change any settings on this page. Click **Next**.

    The Archive Comment page opens.
11. If desired, enter image comments, such as the date, time, and software versions contained on the image you are creating. Click **Next**.

    The "…ready to proceed…" page opens.
12. Remove the Recovery CD and insert a blank CD.
13. Verify that you are creating an image from Disk 1 and writing to the CD-RW Drive (F:). Click **Proceed**.

    The Operation Progress page opens and displays progress.
14. Remove and insert CDs as prompted. As you remove each burned CD make sure you label it correctly to show the sequence of CDs.
15. When a "Backup archive creation has been successfully completed" message appears, click **OK**.
16. Click **Operations | Exit** to exit the Acronis True Image program.

    The K2 Media Server restarts automatically.
17. Remove any CD that is still in the CD drive while the K2 Media Server is shutting

down.

Restoring from a system-specific recovery disk image on E:

The following procedure can be used on a K2 Media Server that needs its image restored, if the image was made from that specific machine. If the image is the generic factory-default image, refer to the next procedure "Restoring from the generic recovery disk image on E:"

1. Make sure that media access is stopped and that the K2 Media Server on which you are working is out of service.
2. If you have not already done so, connect keyboard, monitor, and mouse to the K2 Media Server.
3. Insert the Recovery CD and restart the machine. If there is a problem restarting, hold the standby button down for five seconds to force a hard shutdown. Then press the standby button again to startup.

   The machine boots from the disc. The Acronis True Image program loads.
4. At the startup screen, select **True Image Server (Full Version)**.

   The Acronis True Image program loads.

   The Acronis True Image main window appears.
5. In the Acronis True Image main window, click **Recovery**.

   The Restore Data Wizard opens.
6. On the Welcome page, click **Next**.

   The Archive Selection page opens.
7. In the tree view expand the node for the E: partition and select the image file, then click **Next**:

   The Verify Archive Before the Restoring page opens.
8. Leave the selection at **No, I don't want to verify** and then click **Next**.

   The Partition or Disk to Restore page opens.
9. Select **System (C:)** and then click **Next**.

   The Restored Partition Location page opens.
10. Select **System (C:)** and then click **Next**.

    The Restored Partition Type page opens.
11. Leave the selection at **Active** and then click **Next**.

    The Restored Partition Size page opens.
12. Leave settings at their defaults. The size reported in the upper pane is the size detected of the actual C: partition. This should be the same as that reported in the Partition size field in the middle of the page. Free space before and Free space after should both be reported at 0 bytes. Click **Next**.

    The Next Selection page opens.
13. Depending on the partitions you are restoring, do one of the following:

- If you are restoring only the C: partition, select **No, I do not** and then click **Next**.

  The "…ready to proceed…" page opens.

  Skip ahead to step 20.

- If you are also restoring the D: partition, select **Yes, I want to restore another partition or hard disk drive** and then click **Next**.

  The Partition or Disk to Restore page opens. Continue with the next step in this procedure.

14. Select **Database (D:)** and then click **Next**.

    The Restored Partition Location page opens.

15. Select **Database (D:)** and then click **Next**.

    The Restored Partition Type page opens.

16. Leave the selection at **Primary** and then click **Next**.

    The Restored Partition Size page opens.

17. Leave settings at their defaults. The size reported in the upper pane is the size detected of the actual D: partition. This should be the same as that reported in the Partition size field in the middle of the page. Free space before and Free space after should both be reported at 0 bytes. Click **Next**.

    The Next Selection page opens.

18. Select **No, I do not** and then click **Next**.

    The Restore Operation option page opens.

19. Do not make any selections. Click **Next**.

    The "…ready to proceed…" page opens.

20. Verify that you are restoring the correct partition or partitions. Click **Proceed**.

    The Operation Progress page opens and displays progress.

21. When a "The data was successfully restored" message appears, click **OK**.

22. Click **Operations | Exit** to exit the Acronis True Image program.

    The K2 Media Server restarts automatically.

23. Remove any CD currently in the CD drive while the K2 Media Server is shutting down.

Restoring from the generic recovery disk image on E:

There can be multiple versions of the generic recovery disk image on the K2 Media Server's E: partition. Refer to *K2 Storage System Release Notes* to determine which version you should use.

This procedure can be used on a K2 Media Server that needs to be restored to its factory default state. For example, if you neglected to make a first birthday image, you might need to use this procedure. If the image from which you are restoring was made from the specific machine, refer to the previous procedure "Restoring from a system-specific recovery disk image on E:".

NOTE: This procedure restores the K2 Media Server (both C: and D: partitions) to its factory default condition. Passwords and other site-specific configurations are reset to factory defaults.

1. Make sure that media access is stopped and that the K2 Media Server on which you are working is out of service.
2. If you have not already done so, connect keyboard, monitor, and mouse to the K2 Media Server.
3. Insert the Recovery CD and restart the machine. If there is a problem restarting, hold the standby button down for five seconds to force a hard shutdown. Then press the standby button again to startup.

   The machine boots from the disc. The Acronis True Image program loads.
4. At the startup screen, select **True Image Server (Full Version)**.

   The Acronis True Image program loads.

   The Acronis True Image main window appears.
5. In the Acronis True Image main window, click **Recovery**.

   The Restore Data Wizard opens.
6. On the Welcome page, click **Next**.

   The Archive Selection page opens.
7. In the tree view expand the node for the E: partition and select the image file, then click **Next**:

   The Verify Archive Before the Restoring page opens.
8. Leave the selection at **No, I don't want to verify** and then click **Next**.

   The Partition or Disk to Restore page opens.
9. Select **System (C:)** and then click **Next**.

   The Restored Partition Location page opens.
10. Select **System (C:)** and then click **Next**.

    The Restored Partition Type page opens.
11. Leave the selection at **Active** and then click **Next**.

    The Restored Partition Size page opens.
12. Leave settings at their defaults. The size reported in the upper pane is the size detected of the actual C: partition. This should be the same as that reported in the Partition size field in the middle of the page. Free space before and Free space after should both be reported at 0 bytes. Click **Next**.

    The Next Selection page opens.
13. Depending on the partitions you are restoring, do one of the following:

    - If you are restoring only the C: partition, select **No, I do not** and then click **Next**.

      The "…ready to proceed…" page opens.

      Skip ahead to step 20.

- If you are also restoring the D: partition, select **Yes, I want to restore another partition or hard disk drive** and then click **Next**.

  The Partition or Disk to Restore page opens. Continue with the next step in this procedure.

14. Select **Database (D:)** and then click **Next**.

    The Restored Partition Location page opens.

15. Select **Database (D:)** and then click **Next**.

    The Restored Partition Type page opens.

16. Leave the selection at **Primary** and then click **Next**.

    The Restored Partition Size page opens.

17. Leave settings at their defaults. The size reported in the upper pane is the size detected of the actual D: partition. This should be the same as that reported in the Partition size field in the middle of the page. Free space before and Free space after should both be reported at 0 bytes. Click **Next**.

    The Next Selection page opens.

18. Select **No, I do not** and then click **Next**.

    The Restore Operation option page opens.

19. Do not make any selections. Click **Next**.

    The "…ready to proceed…" page opens.

20. Verify that you are restoring the correct partition or partitions. Click **Proceed**.

    The Operation Progress page opens and displays progress.

21. When a "The data was successfully restored" message appears, click **OK**.

22. Click **Operations | Exit** to exit the Acronis True Image program.

    The K2 Media Server restarts automatically.

23. Remove any CD currently in the CD drive while the K2 Media Server is shutting down.

24. Upon restart the Windows Setup Wizard automatically opens. Do Windows setup as follows:

    a. Enter in Windows Product Key and click **Next**.

       The Product Key is on a sticker on the top of the machine near the front right corner.

    b. Enter the name of the machine.

       For a K2 Media Server name, enter the Serial Number (located at right side and rear).

       The password is pre-set to the factory default. Leave the password as is.

    c. Click **Next**

    d. Set Time and click **Next**.

    Windows loads network components and restarts the K2 Media Server.

Upon restart, a Found New Hardware wizard and/or messages about services/ drivers can be displayed.

25. To respond to Found New Hardware wizards and/or messages about services/ drivers, refer to *K2 Storage System Release Notes* for instructions. The way you respond depends on the type of K2 Media Server and the recovery disk image version you are using.
26. Set the Rx/Tx Descriptors value on both Ethernet adapters as follows:
    a. On the Windows desktop, right-click **K2 Media Server** (My Computer) and select **Manage**. The Computer Management window opens.
    b. In the left pane select **Device Manager**. Device Manager opens in the right pane.
    c. In the right pane, expand **Network Adapters**.
    d. Highlight and right-click the **Intel® PRO/1000 MT Dual Port Server Adapter**.
    e. Select **Properties**. The Properties dialog box opens.
    f. Click **Advanced** tab.
    g. In the Settings list, select **Performance Options**, then click the **Properties** button. The Performance Options dialog box opens.
    h. In the Property list, select **Receive Descriptors**.
    i. In the Values field, use the up/down arrows to set the value to **1024**. If 1024 is not available, select a different entry in the settings list, then select back to Receive Descriptors. This resets the values available in the Values field.
    j. In the Settings list, select **Transmit Descriptors**.
    k. In the Values field, set the value to **1024**.
    l. Click **OK** to save settings and close dialog boxes.
    m. Repeat this step and set the Rx/Tx Descriptors value on the remaining Ethernet adapter.
27. Close the Computer Management window.
28. On the Windows desktop right-click **My Network Places** and select **Properties**. The Network Connections window opens.
29. On the menu bar at the top of the window, select **Advanced**, then **Advanced Settings…**
30. Select **Control Connection** in Connections field.
31. Use the up arrow button, move the **Control Connection** to the top of the list (TOP priority - 1st).
32. Ensure that FTP Connection is below the Control Connection.
    If not, select FTP Connection, and move it below the Control Connection.
33. Click **OK** to save settings and close.
34. Install K2 Media Server software. Also install related software, such as SNFS, if required for the latest upgrade. Refer to your latest *K2 Storage System Release Notes* for detailed instructions.

35. You must active the Windows operating system within 30 days. Refer to "Activating the Windows operating system" on page 681

The K2 Media Server is now restored to its factory-default state. However, you can complete its configuration as part of a K2 Storage System by using the K2 System Configuration application. Refer to the *K2 Storage System Instruction Manual* for detailed procedures.

Restoring from a recovery disk image CD set

The following procedure can be used on a K2 Media Server that needs all three partitions on the system drive restored.

This procedure assumes that the image on the CD set is the system-specific image, for the particular machine that you are restoring.

NOTE: At any step in this procedure if a message appears asking for disc/volume, insert CDs as prompted until you can proceed to the next step.

1. Make sure that media access is stopped and that the K2 Media Server on which you are working is not being used.
2. If you have not already done so, connect keyboard, monitor, and mouse to the K2 Media Server.
3. Insert the Recovery CD and restart the machine. If there is a problem restarting, hold the standby button down for five seconds to force a hard shutdown. Then press the standby button again to startup.

   The machine boots from the disc. The Acronis startup screen appears.
4. At the startup screen, select **True Image Server (Full Version)**.

   The Acronis True Image program loads.

   The Acronis True Image main window appears.
5. Insert the last CD (volume) in your recovery disk image CD set. For example, if there are three CDs that make up the disk image, insert the third CD.
6. In the Acronis True Image main window, click **Recovery**.

   The Restore Data Wizard opens.
7. On the Welcome page, click **Next**.

   The Archive Selection page opens.
8. In the tree view expand the node for the CD ROM drive and select the image file, then click **Next**:

   The Restoration Type Selection page opens.
9. Select **Restore disks or partitions** and then click **Next**.

   The Partition or Disk to Restore page opens.
10. Select **Disk 1**. This selects all three partitions to be restored.

    If you do not want to restore all three partitions, refer to similar steps in "Restoring from a system-specific recovery disk image on E:" on page 675.

    Click **Next**.

The Restored Partition Sizing page opens.

11. Select **No, I don't want to resize source partitions** and then click **Next**.

    The Restored Hard Disk Drive Location page opens.

12. Select **Disk 1** and then click **Next**.

    The Non-Empty Destination Hard Disk Drive page opens.

13. Select **Yes…delete all partitions…** and then click **Next**.

    If messages appear asking for disks, insert CDs sequentially and click **Retry** until you can proceed to the next step.

    The Next Selection page opens.

14. Select **No, I do not** and then click **Next**.

    The Restore Operation option page opens.

15. Do not make any selections. Click **Next**.

    The "…ready to proceed…" page opens.

16. Verify that you are restoring partitions. Click **Proceed**.

    The Operation Progress page opens and displays progress.

17. Insert CDs as prompted. As messages appear asking for disks, insert CDs sequentially and click **Retry**.

18. When a "The data was successfully restored" message appears, click **OK**.

19. Click **Operations | Exit** to exit the Acronis True Image program.

    The K2 Media Server restarts automatically.

20. Remove the Recovery CD while the K2 Media Server is shutting down.

Activating the Windows operating system

If a K2 Media Server is restored to its factory default state or otherwise has the Windows operating system re-applied, you might need to active the operating system. This procedure provides instructions for doing this while the machine is connected to the Internet. The Activation wizard provides other options, which you can also choose if desired.

To active the Windows operating system on a K2 device, do the following:

1. Make sure the machine is connected to the Internet.
2. From the Windows desktop, in the system tray double-click on the key symbol icon. The Activate window opens.
3. Select **Yes, let's activate Windows over the Internet now** and click **Next**.
4. When prompted, "If you want to register with Microsoft right now.", select **No**.
5. Wait for the connection. If the system times out, you are prompted for entering information in the Internet Protocol Connection dialog. Enter the proxy address and port number as appropriate for your facility's connections.
6. Ensure that "You have successfully activated your copy of Windows" message

appears in Activate Windows.

7. Click **OK** to close the Activate Windows.

Chapter 17

FTP on the K2 Storage System

This chapter applies to “online” K2 systems only. This includes stand-alone storage K2 Media Clients and K2 Storage Systems with attached shared storage K2 Media Clients.

Topics in this chapter include the following:

- “About the K2 FTP interface”
- “About networks and FTP”

For FTP information about the K2 Nearline Storage System, which is considered an “offline” system, refer to Nearline chapters elsewhere in this manual.

About the K2 FTP interface

An application writer may choose to initiate media file transfers via FTP. If you do not have a preferred brand of FTP software, you can use Microsoft Internet Explorer. The K2 FTP interface displays with a GXF folder and an MXF folder. Use the appropriate folder, depending on if you are transferring GXF or MXF. Refer to the *K2 Media Client System Guide* for more information.

If connecting to the FTP server on a K2 system from a third-party Windows PC, make sure that the PC has TCP Window scaling enabled. (For more information on TCP Window scaling, see the Microsoft Support Knowledge Base web site.)

The K2 FTP server runs on K2 Media Servers that have the role of FTP server. While it also runs on K2 Media Clients with their own storage, it is important to understand that it does ***not*** run on shared storage K2 Media Clients. When you FTP files to/from a K2 Storage System, you use the FTP server on the K2 Media Server, not on the K2 Media Client that accesses the shared storage on the K2 Storage System. Do not attempt to transfer FTP files to/from one of the K2 Storage System clients. For information on streaming/transfer procedures in general, see the *K2 Media Client User Guide*.

NOTE: When using FTP in a shared storage environment, please ensure that all FTP communication takes place on the FTP/Streaming network, and not on the Command/Control network.

K2 FTP protocol supports clip and bin names in non-English locales (international languages) using UTF-8 character encoding. Refer to specifications for internationalization in the *K2 Media Client System Guide*.

FTP commands supported

For a list of the FTP commands supported by the K2 FTP interface refer to the *K2 Media Client System Guide*.

FTP security

K2 security features that affect the K2 FTP interface are based on the logon user account for the FTP session. For an explanation of these security features, refer to the *K2 Media Client System Guide*.

About networks and FTP

The requirements for FTP/streaming transfers in and out of online K2 systems are as follows:

- The FTP/streaming traffic must be on a separate subnet. Do not put control and FTP traffic on the same subnet. FTP traffic can potentially consume so much bandwidth that it interferes with control traffic, which can cause errors in real-time record/play operations.
- Dedicated GigE connections must be made to the dedicated FTP GigE port on stand-alone storage K2 Media Clients and on K2 Media Servers that take the role of FTP server.
- For some system client, non-K2 devices, it is permissible to use one NIC with two IP addresses. One address is on the control subnet and one is on the FTP subnet. An example of such a client is the Aurora Edit.
- For network hostname resolution, hostnames mapped to FTP IP addresses must have a "_he0" suffix appended to the name.
- Use the following tip with care. While it can solve a problem, it also introduces a name resolution "anomaly" that might be confusing if not considered in future troubleshooting activities.

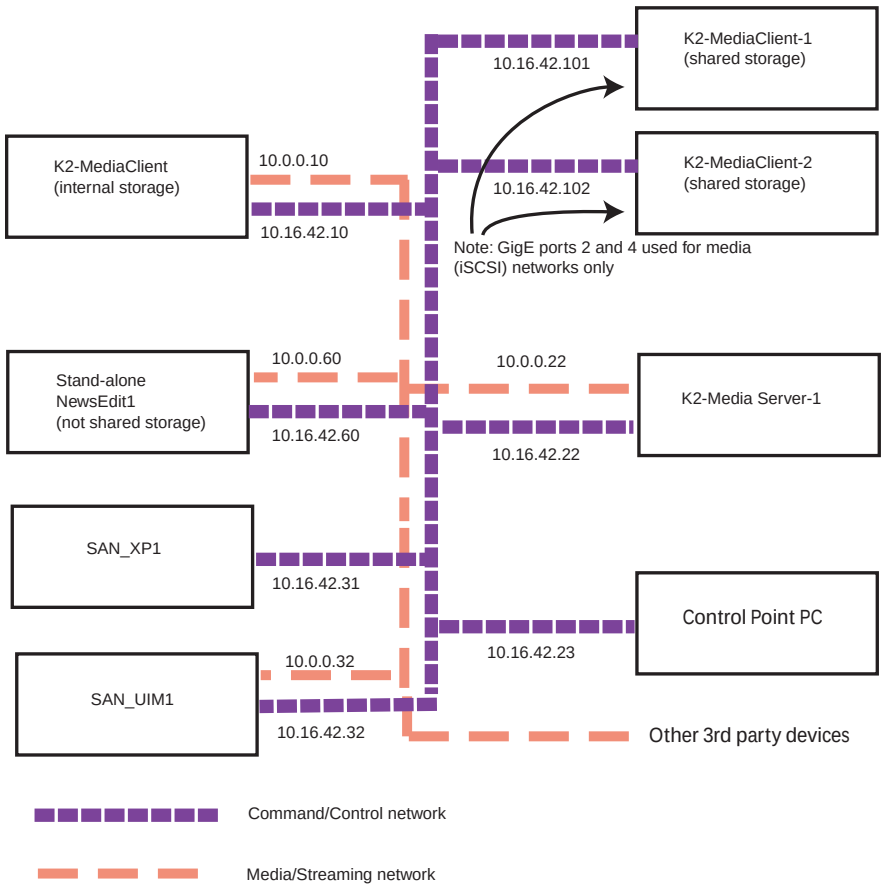
  You can provide "error correction" aliasing for shared storage (SAN) K2 Media Clients. For each shared storage K2 Media Client, add the "_he0" extension to the hostname but then associate that hostname with the K2 Media Server's FTP/streaming network IP address, not the K2 Media Client's IP address. Aliasing K2 Media Client hostnames in this way would not be required if the transfer source/destination was always correctly specified as the K2 Media Server. However, a common mistake is to attempt a transfer in which the source/destination is incorrectly specified as the K2 Media Client. This "error correction" host file aliasing redirects to the K2 Media Server, which is the correct transfer source/destination.

Also refer to the networking sections in the installation chapters elsewhere in this manual for network information specific to each K2 Storage System level.

Sample network configuration and hosts file

The following diagram illustrates one possible configuration setup, with both the control network and the FTP/Streaming network shown. The media (iSCSI) network is not shown. This diagram includes a stand-alone K2 Media Client with its own

storage, a K2 Media Client with shared storage (as on a K2 Storage System), a K2 Media Server (as an FTP server on K2 Storage System), as well as other Grass Valley systems.



The following example shows the contents of a default Windows hosts file with new lines added that match the IP addresses and host names in the previous sample diagram.

All lines beginning with a # are comments and can be ignored or deleted.

```
# Copyright (c) 1993-1995 Microsoft Corp.
# This is a sample HOSTS file used by Microsoft TCP/IP for Windows.
# This file contains the mappings of IP addresses to host names. Each
# entry should be kept on an individual line. The IP address should
# be placed in the first column followed by the corresponding host name.
# The IP address and the host name should be separated by at least one
# space.
# Additionally, comments (such as these) may be inserted on individual
# lines or following the machine name denoted by a '#' symbol.
#
# For example:
```

```
# 102.54.94.97  rhino.acme.com # source server
# 38.25.63.10     x.acme.com  # x client host

127.0.0.1       localhost

10.16.42.10     K2-MediaClient
10.0.0.10       K2-MediaClient_he0

10.16.42.101    K2-MediaClient-1
10.16.42.102    K2-MediaClient-2

10.16.42.22     K2-MediaServer-1
10.0.0.22       K2-MediaServer-1_he0 K2-MediaClient-1_he0 K2-MediaClient-2_he0

10.16.42.23     ControlPointPC

10.16.42.60     NewsEdit1
10.0.0.60       NewsEdit1_he0

10.16.42.31     SAN_XP1
10.0.0.32       SAN_XP1_he0 SAN_UIM1_he0
10.16.42.32     SAN_UIM1
```

Chapter 18

Administering and maintaining the K2 Storage System

Topics in this chapter include the following:

- "Setting up application security" on page 688
- "Virus scanning and protection policies" on page 689
- "Synchronizing system clocks" on page 690
- "Modifying K2 Storage System settings" on page 691
- "Managing redundancy on a K2 Storage System" on page 697
- "Working with K2 Media Servers" on page 701
- "Working with K2 Media Clients" on page 712
- "Using Storage Utility" on page 716
- "Working on the media file system and database" on page 718
- "Working with RAID storage" on page 743
- "Working with Ethernet switches" on page 759

Setting up application security

The K2 System Configuration application and the Storage Utility application both require that you be logged in to the application with administrator privileges in order to modify any settings. These privileges are based on the Windows account that you use when you log in to the K2 System Configuration application. When you open Storage Utility from within the K2 System Configuration application, the account information is passed to Storage Utility, so you do not need to log in separately to Storage Utility.

You must use a Windows account that has local administrator privileges on the machine to be configured. For example, when you are on a control point PC and you run the K2 System Configuration application for the purpose of configuring a K2 Media Server, the account with which you log in to the K2 System Configuration application must be present on the K2 Media Server and must have administrator privileges on the K2 Media Server.

By default, all K2 Storage System machines are set up with the following accounts:

Account	Username	Password	K2 Configuration permissions	Storage Utility permissions
Windows Administrator	Administrator	adminK2	Run/change	Run/change
K2 Administrator	K2 Admin	K2admin	Run/change	Run/change
K2 User	K2 User	K2user	No access	No access

For initial setup and configuration, you can use the default Windows Administrator username and password to log in to applications and machines as you work on your K2 Storage System. However, for ongoing security you should change the username/password and/or create unique accounts with similar privileges. When you do this, you must ensure that the accounts are present locally on all K2 Storage System machines, including control point PCs, K2 Media Servers, K2 Media Clients, and other iSCSI clients.

Refer to the *K2 Media Client System Guide* for information about media access security, channel access security, and protocol access security.

NetCentral also has accounts for security levels, as follows:

- NetCentral Administrator
- NetCentral Technician
- NetCentral User

Refer to the *NetCentral User Guide* for more information.

The NetCentral Administrator account maps to the K2 Administrator account, and the NetCentral User account maps to the K2 User account. Account information is passed between NetCentral and the K2 System Configuration application.

Virus scanning and protection policies

The K2 Media Client and the K2 Media Server are based on a standard Windows operating system platform. It is important to defend this system against virus or SpyWare attacks. Grass Valley supports the scanning of system drives (the disk drives or drive partition used to house the operating system and installed application software) from a PC that is running the scanning program while the K2 computers are being used to record or play video to air. The anti-virus package executing on the PC can be scheduled to scan the system drives of multiple K2 Systems.

The following strategies are recommended for virus scanning:

- Run the scanning software on a dedicated PC that connects to the K2 system via a network mount. Do not run scanning software locally on the K2 system.
- Connect to the K2 computer via 100BaseT network. This constrains the bandwidth and system resources consumed, so as to not interfere with media operations. Do not connect and scan via Gigabit Ethernet.
- Grass Valley does not support the running of anti-virus programs on a K2 computer itself at the same time the system is being used to record or play video to air.

With these recommended strategies, you should be able to scan K2 computers without interrupting media access.

In addition, the following protection policies are recommended:

- Where possible, K2 systems should be run in a closed and protected environment without network access to the corporate IS environment or the outside world.
- If the K2 system must operate in a larger network, Grass Valley recommends that access be through a gateway or firewall to provide anti-virus protection. The firewall should allow incoming HTTP (TCP ports 80 and 280) connections for client and configuration connections to the K2 system inside the private network. Additionally, ports should allow incoming packets so requests can be properly processed. The port that needs to be open is port 445 for TCP and UDP for Windows and SAMBA shares. If your site's policies require that these port numbers change, contact Grass Valley support for assistance.
- Access to the K2 system should be controlled in order to limit the likelihood of malicious or unintended introduction of viruses.
- The front and rear USB ports of K2 systems should normally be disabled; they should only be used by Windows administrators. On a K2 Media Client, be careful that you do not disable the internal USB connection to the RS-422 boards. Refer to the *K2 Media Client System Guide*.

Ports used by K2 services

The following ports are used by the applications and system tools of the K2 family of products:

Port #	Type of connection	Service name	Description
49168	HTTP	Grass Valley K2 Config	K2 System Configuration application connection between a control point PC and the K2 Storage System device configured. Both HTTP and TCP connections are required. Most functions use the HTTP connection, but a few functions that require longer time periods use TCP.
49169	TCP		
49170	HTTP	Grass Valley Transfer Queue Service	Transfer Manager connection between source system and destination system.
49171	TCP	Grass Valley AppService	AppCenter connection for connection between control point PC and K2 Media Client.
49172	HTTP	Grass Valley Storage Utility Host	Connection for Storage Utility between the control point PC and the K2 system being configured.

Synchronizing system clocks

It is required that the system clocks on the devices of the K2 Storage System be kept synchronized. The main purpose for this time synchronization is so that entries in the various logs on the K2 Storage System devices can be correlated. The following procedure describes a mechanism by which clocks are synchronized. If your facility has other mechanisms by which you synchronize system clocks, you can use your own methods, as long as it accomplishes the goal of keeping the system clocks synchronized.

To synchronize system clocks, do the following:

1. Designate a K2 Media Server as the time server.
2. On each K2 Media Client, iSCSI client, and any additional K2 Media Servers, in the Windows **Control Panel** open **Date and Time**.
3. On the **Internet Time** tab, enter the K2 Media Server that is the time server.

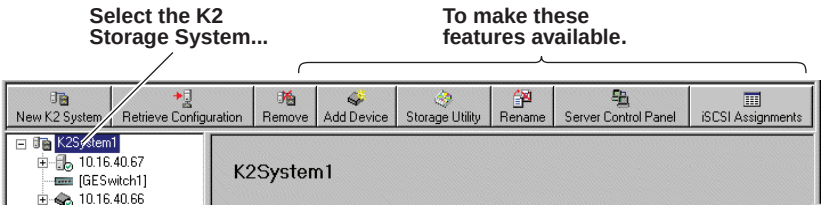
Modifying K2 Storage System settings

Use the procedures in this section when changing or viewing settings on an existing K2 Storage System. These are the settings that define the K2 Storage System. Procedures are as follows:

- "Accessing K2 Storage System features" on page 691
- "Renaming a K2 Storage System" on page 691
- "Adding devices to a K2 Storage System" on page 692
- "Removing a K2 Storage System" on page 694
- "Accessing a K2 Storage System from multiple PCs" on page 694
- "Reconnecting to a K2 Storage System" on page 695
- "Taking a K2 Storage System offline" on page 695
- "Bringing a K2 Storage System online" on page 696
- "Viewing iSCSI assignments" on page 696

Accessing K2 Storage System features

In the K2 Configuration Application, features for modifying K2 Storage System settings are as follows:



Renaming a K2 Storage System

The requirements for renaming an existing K2 Storage System are as follows:

- You must be logged in to the K2 System Configuration application with permissions equivalent to K2 administrator or higher.
- The devices of the K2 Storage System do not need to be offline, and there is no restart of devices required.

To rename an existing K2 Storage System, do the following:

1. In the tree view, select the current name of the K2 Storage System, which is the top node of the storage system tree.
2. Click **Rename**. The Rename dialog box opens.
3. Enter the new name of the storage system and click **Apply**.

Adding devices to a K2 Storage System

Refer to the following topics to add devices to an existing K2 Storage System:

- "Adding an iSCSI client"
- "Adding an Ethernet switch"
- "Adding a K2 Media Server"

Also refer to "Adding a K2 Media client" on page 713.

Adding an iSCSI client

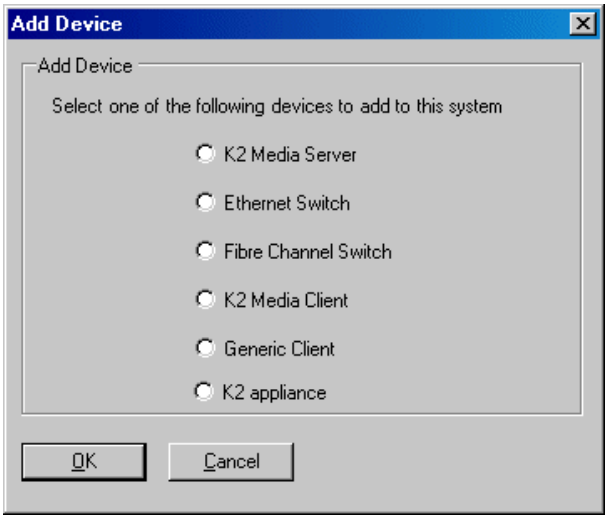
Refer to the documentation for the type of iSCSI client you are adding. If you are adding a Aurora Edit, refer to the *Aurora Edit Installation and Configuration Guide*. The options and configurations for generic iSCSI clients are different than those available for a K2 Media Client, so you should not attempt this procedure without specific instructions for the type of iSCSI client you are adding.

The requirements for adding an iSCSI client to an existing K2 Storage System are as follows:

- You must be logged in to the K2 System Configuration application with permissions equivalent to K2 administrator or higher.
- The devices of the K2 Storage System do not need to be offline, and there is no restart of devices required.

To add an iSCSI client to an existing K2 Storage System, do the following:

1. In the tree view, select the name of the K2 Storage System, which is the top node of the storage system tree.
2. Click **Add Device**. The Add Device dialog box opens.



3. Select **Generic Client**.
4. Click **OK**. The new client appears in the tree view.

5. Configure the client as appropriate. Refer to the documentation for the device. For example, if adding an Aurora Edit, refer to the *Aurora Edit Installation and Configuration Guide*.

Adding an Ethernet switch

The requirements for adding a Gigabit Ethernet switch to an existing K2 Storage System are as follows:

- You must be logged in to the K2 System Configuration application with permissions equivalent to K2 administrator or higher.
- The devices of the K2 Storage System do not need to be offline, and there is no restart of devices required.

To add a Gigabit Ethernet switch to an existing K2 Storage System, do the following:

1. In the tree view, select the name of the K2 Storage System, which is the top node of the storage system tree.
2. Click **Add Device**. The Add Device dialog box opens.
3. Select **Ethernet Switch**.
4. Click **OK**. The new switch appears in the tree view.
5. Configure the switch as appropriate.

Adding a K2 Media Server

With Levels 2, 2R, 3, and 3R, the K2 System Configuration application enforces the number of K2 Media Servers, as pre-defined for the level of the system. The application does not allow you to add K2 Media Servers. Refer to the installation chapter for each level for more information.

With Levels 10, 10R, 20, 20R, 30, 30R, NL10, and NL10R, the K2 System Configuration application does not enforce the number of K2 Media Servers. However, your system design must support any additional servers. Consult with qualified Grass Valley personnel before adding servers.

For all system levels and designs, adding a K2 Media Server with the role of media file system/database server to an existing K2 Storage System is not supported as a customer procedure. Adding a server with these roles fundamentally changes the baseline design of the system, which means you must dismantle one or more pieces of the existing system and create a new system. This requires custom design and implementation services that should only be attempted by qualified Grass Valley personnel.

Also refer to “Replacing a K2 Media Server” on page 706.

On some Level 20, 20R, 30, or 30R systems, the system design supports adding an optional NH K2 Media Server, as follows:

1. In the tree view, select the name of the K2 Storage System, which is the top node of the storage system tree.
2. Click **Add Device**. The Add Device dialog box opens.
3. Select **K2 Media Server**.

4. Click **OK**. The new server appears in the tree view.
5. Configure the server as instructed in the installation chapter for the level of the K2 Storage System.

Removing a K2 Storage System

The requirements for removing a K2 Storage System from the K2 System Configuration application are as follows:

- You must be logged in to the K2 System Configuration application with permissions equivalent to K2 administrator or higher.
- The K2 Storage System can continue operations while it is removed from the K2 System Configuration application. As long as you are removing only the complete K2 Storage System and not removing any individual devices, there is no need to put devices offline or restart devices.
- For ongoing maintenance and support, you must always have at least one control point from which you can access the K2 Storage System with the K2 System Configuration application. If you have installations of the K2 System Configuration application on multiple control point PCs, do not remove the K2 Storage System from all control point PCs at the same time.

To remove a K2 Storage System from the K2 System Configuration application, do the following:

1. In the tree view, select the name of the K2 Storage System, which is the top node of the storage system tree.
2. Click **Remove**. The storage system is removed from the tree view.

Accessing a K2 Storage System from multiple PCs

It is recommended that you install the K2 System Configuration application on one PC only in your facility. This eliminates potential problems in the installation, configuration, and maintenance of your K2 Storage System.

However, if necessary you can install and run the K2 System Configuration application on multiple PCs in your facility. The rule for multiple access is that the first instance of the K2 System Configuration application to access a K2 Storage System in essence “locks out” any other instances. It is therefore recommended that you constrain your use of the application from multiple PCs as follows:

- Designate a control point PC as the configuration PC and then configure the K2 Storage System or device from that PC only.
- On the other control point PCs, limit operations to view-only when accessing the K2 Storage System. You can select nodes in the tree view to view devices, roles, and subsystems. However, do not click any buttons except the “Check” buttons that appear on property pages.

To access a K2 Storage System from multiple control point PCs, do the following:

1. Install Control Point software on the designated K2 System Configuration control point PC and complete the initial system configuration. Close the K2 System

Configuration application on that PC.

2. Install Control Point software on another control point PC and open the K2 System Configuration application.
3. Select **Retrieve Configuration** and enter the name or IP address of the K2 Media Server for the K2 Storage System. If the K2 Storage System has multiple K2 Media Servers, you must enter the name or IP address of the server configured first.

   If there is another instance of the K2 System Configuration application on a different control point PC currently accessing the K2 Storage System, a message informs you of this and you are not allowed to access the system.

   If access is allowed, a Retrieving Configuration message box shows progress. It can take over 30 seconds to retrieve the configuration. When the configuration is retrieved, the K2 Storage System appears in the tree view. Make sure that you only attempt view-only operations from this PC. Do not configure the K2 Storage System from this PC.
4. Repeat the previous steps for other control point PCs from which you need access to the K2 Storage System.

When you expand and select nodes in the tree view to view K2 Storage Systems, individual devices, and configuration settings, the K2 System Configuration application displays information as found in a configuration file, rather than continuously polling devices to get their latest information. The configuration file is saved on the V: drive, along with the media files in the shared storage system. When you use the Retrieve Configuration feature, you are connecting to the configuration file.

Reconnecting to a K2 Storage System

If you replace the K2 System Configuration control point PC or otherwise lose the connection to a K2 Storage System from the K2 System Configuration application, you can reconnect. The requirements for reconnecting to a K2 Storage System from the K2 System Configuration application are as follows:

- You must be logged in to the K2 System Configuration application with permissions equivalent to K2 administrator or higher.

To reconnect to a K2 Storage System, select **Retrieve Configuration** and enter the name or IP address of the K2 Media Server for the K2 Storage System. If the K2 Storage System has multiple K2 Media Servers, you must enter the name or IP address of the server configured first, which is designated as server 1, server A, or server 1A, depending on the level of the system.

The K2 Storage System appears in the tree view.

Taking a K2 Storage System offline

To take a K2 Storage System offline, do the following:

1. Stop all media access.
2. Shut down all K2 Media Clients and all generic clients.
3. Take all K2 Media Servers out of service. If you have redundant servers, make sure that you know (and remember) which server is the current primary and which

server is the current backup, and that you take primary/backup servers out of service in the proper order. Refer to "Taking a K2 Media Server out of service" on page 701.

Bringing a K2 Storage System online

To bring a K2 Storage System online, do the following:

1. Verify that RAID storage devices, Ethernet switches, and other supporting system are powered up. Refer to the installation chapter for your level of K2 Storage System earlier in this manual for power on procedures.
2. If K2 Media Servers are powered down, power them up. Refer to the installation chapter for your level of K2 Storage System earlier in this manual for power on procedures.
3. Place K2 Media servers in service. If you have redundant servers, make sure that you place primary/backup servers in service in the proper order. Refer to "Placing a K2 Media Server in service" on page 703.
4. Power on all K2 Media Clients and all generic clients.

Viewing iSCSI assignments

You can review a report of clients and their iSCSI configuration on a K2 Storage System as follows:

1. In the tree view, select the name of the K2 Storage System, which is the top node of the storage system tree.
2. Click **iSCSI Assignments**. The iSCSI Port Assignments report opens.

The report displays the following information.

- K2 Media Servers with the role of iSCSI bridge
- Each server's iSCSI ports, identified by IP address
- For each iSCSI port, the iSCSI clients assigned and their bandwidth subscription.

Managing redundancy on a K2 Storage System

If you have a redundant K2 Storage System, use the procedures in this section to control the primary/redundant roles of the K2 Media Servers. Procedures are as follows:

- "Identifying current primary/backup K2 Media Servers" on page 697
- "Triggering an intentional failover" on page 699

Identifying current primary/backup K2 Media Servers

Before attempting any configuration or service work on a redundant K2 Media Server, you must know if the server is the current primary server or the current backup server for the media file system and database. While most configuration and service work can be accomplished on a backup server without affecting the operation of the Storage System, if you attempt configuration or service work on the operating primary server, it will likely result in record/play failures and/or a loss of media.

To identify the current primary/backup K2 Media Server, use one or more of the methods described in the following procedures:

Identifying primary/backup from NetCentral

While monitoring the K2 Media Server in NetCentral, do the following:

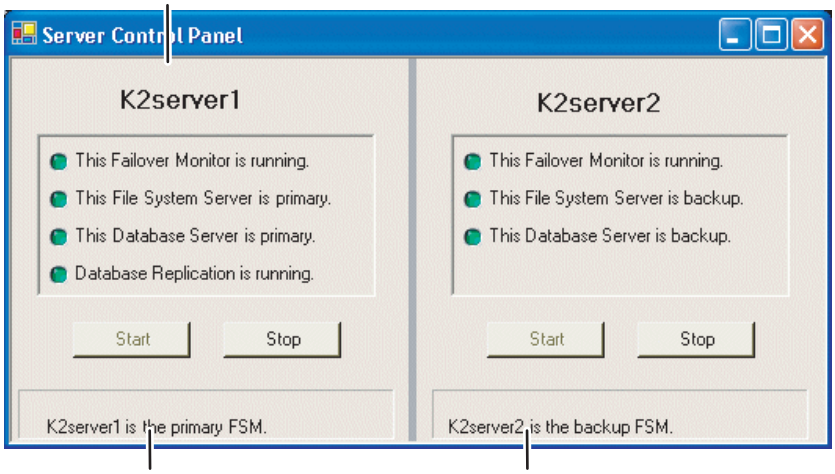
1. In the NetCentral tree view, select the K2 Media Server.
2. Click the **Facility** view control button
3. Open the **Roles** subsystem
4. Click the **Media Database Server** link.

   The Media Database Server dialog box opens and reports the Failover Mode as either Primary or Backup.

Identifying primary/backup from the K2 System Configuration application

1. In the tree view, select the name of the K2 Storage System, which is the top node of the storage system tree.
2. Click the **Server Control Panel** button. The Server Control Panel opens.

If your K2 Storage System does not have redundant servers, only the left panel (one server) appears.



If your K2 Storage System has redundant servers, both panels (two servers) appear.

3. Identify the primary K2 Media Server and the backup K2 Media Server.
4. Also determine if database replication is currently taking place. You must not attempt to trigger an intentional failover event or otherwise take servers out of service until database replication is complete.

If the K2 Storage System does not have redundant servers, only one server (the left half of the Server Control Panel) is displayed, and there is no indicator for database replication.

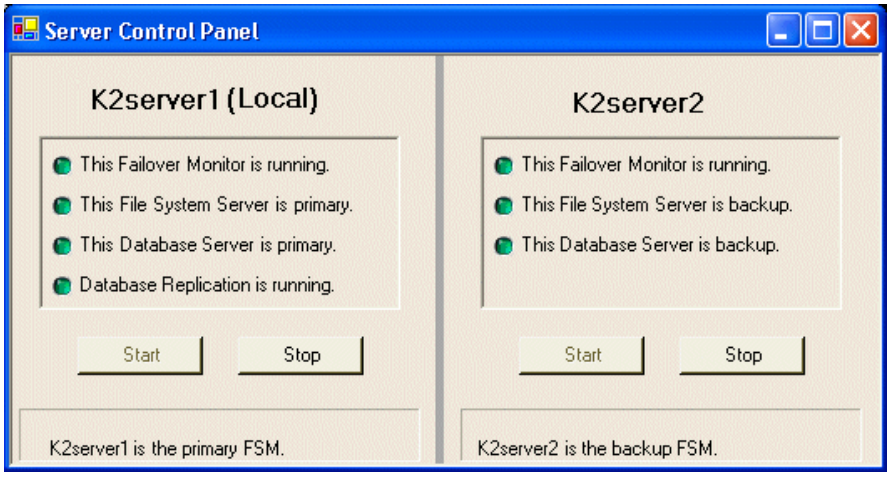
For Nearline K2 Storage Systems, the Server Control Panel is not available from the K2 System Configuration application.

Identifying primary/backup from the local K2 Media Server

The following procedure assumes that you are at the local K2 Media Server and you need to check its status in its role of media file system/database server, especially regarding redundancy. The recommended mode for local operation of a K2 Media Server is to use a connected keyboard, monitor, and mouse. You can also use Windows Remote Desktop Connection from a network-connected PC to access the Windows desktop for "local" operation, but this is not recommended if the system is currently online with media access underway. The additional load on network and local system resources could cause unpredictable results.

To identify primary/backup from the local K2 Media Server, do the following:

1. If you have not already done so, connect keyboard, monitor, and mouse to the K2 Media Server and log on to Windows.
2. On the Windows desktop, click **Start | Grass Valley | Server Control Panel**.
3. Log on to Server Control panel with administrator-level permissions. The Server Control Panel opens.



4. Determine if the local machine is currently the primary K2 Media Server or the backup K2 Media Server.

If the K2 Storage System does not have redundant servers, only one server (the left half of the Server Control Panel) is displayed, and there is no indicator for database replication.

For the K2 Media Servers of a Nearline K2 Storage System, Server Control Panel on the local K2 Media Server reports if the server is the current active media file system (SNFS) server. No database information is displayed, since the Nearline system does not have a media database.

Triggering an intentional failover

⚠ ***WARNING: Do not attempt this procedure except under the supervision of qualified Grass Valley personnel.***

The following procedure renders the primary K2 Media Server unqualified to carry out its role in managing the K2 Storage System. The backup K2 Media Server detects this condition and triggers a failover in which it takes the primary server out of service and takes control of the K2 Storage System. Therefore, before using these procedures, verify that the backup K2 Media Server is fully operational and qualified to take control of the K2 Storage System. If there has been a recent failover event, wait until media database replication processes are complete. Also, be aware that the failover capabilities of the K2 Storage System are degraded until you place the machine back into service as the backup K2 Media Server.

You should stop all media access before attempting this procedure. If media access is underway, there will be period of time in which media loss will occur.

In the following procedures, K2server1 and K2server2 represent your redundant K2 Media Servers. The procedure begins with K2server1 acting as the primary K2 Media Server.

1. Verify primary/backup roles, make sure that replication is complete, and make sure K2server2 (the backup) is qualified and ready to become primary.

2. From the K2 System Configuration application, open **Server Control Panel**.
3. In Server Control Panel for K2server1 click **Stop**. This starts the failover process.

   K2server1 shuts down. K2server2 detects (via the absence of the heartbeat signal on the serial cable) that K2server1 is gone, so K2server2 takes over as primary.
4. Allow the failover process to complete, until K2server2 is operating correctly in its new role as the primary K2 Media Server for the K2 Storage System.
5. Verify K2server2 as primary as explained in "Identifying current primary/backup K2 Media Servers" on page 697.
6. Start up K2server1. It is now out of service. Failover Monitor service is off. If you need to do service work on K2server1, you can do it now. After your work is complete, proceed with the next step.
7. In Server Control Panel, for K2server1, click **Start**. This starts Failover Monitor service, which notifies K2server2 (via a heartbeat signal on the serial cable) that K2server1 is coming online as backup.

   K2server1 is not yet qualified to act as backup because the Movie database is potentially out-of-sync with the Movie database on K2server2. The Failover Monitor service detects this, so it triggers the replication of the media database from K2server2 onto K2server1.
8. In Server Control Panel, monitor the database replication process. Wait until database replication completes, as reported by the Server Control Panel.
9. After database replication is complete, verify K2server1 as backup as explained in "Identifying current primary/backup K2 Media Servers" on page 697.
10. All failover processes are complete. All media management mechanisms are now running and K2server1 is now qualified and acting as the backup.

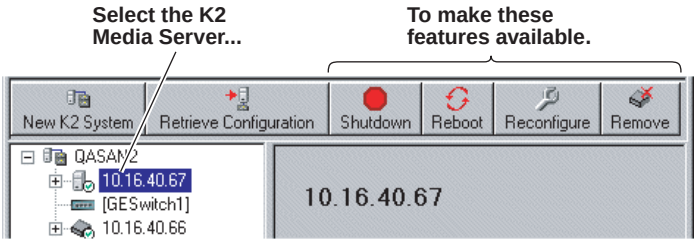
Working with K2 Media Servers

Use the procedures in this section when doing configuration or service work on a K2 Media Server that is part of an existing K2 Storage System. Procedures are as follows:

- "Accessing K2 Media Server features" on page 701
- "Taking a K2 Media Server out of service" on page 701
- "Using the Stop button in Server Control Panel" on page 703
- "Placing a K2 Media Server in service" on page 703
- "Shutting down or restarting a K2 Media Server" on page 704
- "Identifying K2 Media Server software versions" on page 704
- "Modifying K2 Media Server network settings" on page 705
- "Removing a K2 Media Server" on page 706
- "Replacing a K2 Media Server" on page 706
- "Replacing an iSCSI interface adapter (TOE card)" on page 708
- "Recovering from a failed K2 Media Server system battery" on page 709
- "Checking K2 Media Server services" on page 710
- "Disabling OpForce" on page 711

Accessing K2 Media Server features

In the K2 Configuration Application, features for working on a K2 Media Server are as follows:



Taking a K2 Media Server out of service

This procedure applies to K2 Media Servers that are taking the role of media file system and database server.

When you put a K2 Media Server out of service you stop services such that the K2 Media Server is prevented from functioning as a media file system and/or database server. In this state no media operations can take place.

If there is just one K2 Media Server in the role of media file system and database server, before you take the K2 Media Server out of service, you should stop all media access on the K2 Storage system.

If there are redundant K2 Media Servers currently in service (both primary and backup) in the role of media file system and database server, take only the backup out of service. Do not take the primary out of service. If you take the primary out of service it will trigger a failover event. If the K2 Media Server that you want to take out of service is currently the primary, you have the following options:

- Make the current primary K2 Media Server the backup in an orderly fashion. Refer to "Triggering an intentional failover" on page 699. Then, when the K2 Media Server is the backup, you can take it out of service.
- Take the current backup out of service (shutdown) so that the primary K2 Media Server is the only file system/database server currently in service. You can then take the primary K2 Media Server out of service without triggering a failover event.

Also refer to "Using the Stop button in Server Control Panel" on page 703.

To take a media file system/database K2 Media Server out of service, do the following:

1. Stop all media access on the K2 Storage System.
2. In the K2 System Configuration application tree view, select the K2 Storage System.
3. Select **Server Control Panel**. The Server Control Panel opens.
4. Identify the K2 Media Server you intend to take out of service. If there are redundant K2 Media Servers, consider that you might trigger a failover event. Refer to the explanation earlier in this section and to "Triggering an intentional failover" on page 699.

   Also refer to the next section "Using the Stop button in Server Control Panel" to consider the action that you want to take.
5. When you are sure that you understand the implications of taking the K2 Media Server out of service, click the **Stop** button for that server.
6. Proceed as follows:
   - If the server shuts down automatically, allow the shutdown processes to complete. Then start the server. As specified in the next section "Using the Stop button in Server Control Panel", when a redundant server restarts, it comes up in an out of service state.
   - If the server continues to run, it is in an out of service state.

Using the Stop button in Server Control Panel

In Server Control Panel, the following behaviors occur when using the Stop button.

On a system with this configuration of K2 Media Servers taking the role of media file system/database server…	With server(s) in this state…	When you click the Stop button on this server…	The following behavior occurs.
Redundant servers	Both primary and backup are in service (online)	Primary	The server automatically powers itself down. This causes a failover event to occur and the backup server becomes primary. When you restart the former primary server, it comes up out of service.
		Backup	The server automatically powers itself down. When you restart the server, it comes up out of service.
Redundant servers	Only the primary is in service. The other server is either shut down or it is powered on but out of service.	Primary	The media file system services stop, but the server continues to run. It does not automatically shut down. The server is now out of service.
One (non-redundant) server	The server is in service	Primary (the only server)	The media file system services stop, but the server continues to run. It does not automatically shut down. The server is now out of service.

For Nearline K2 Storage Systems, the Server Control Panel is not available from the K2 System Configuration application.

Placing a K2 Media Server in service

This procedure applies to K2 Media Servers that are taking the role of media file system and database server.

When you put a K2 Media Server in service you start the failover service software. This makes the K2 Media Server capable of taking the role of media file system and database server. If a redundant K2 Media Server is currently in service as primary, placing the backup K2 Media Server in service triggers the media database replication process, in which the media database on the backup is synched up with the media database on the primary.

On K2 Storage Systems with redundant K2 Media Servers in the role of media file system and database server, you must manually place the server in service whenever you power up or restart the server. This is because the Failover Monitor service—which must be running to qualify the server in the role of media file system and

database server—is set to manual start mode. It does not start automatically. This allows you to control server redundancy in the various shutdown, powerup, restart scenarios you might encounter between your two servers.

To place a K2 Media Server in service, do the following:

1. In the K2 System Configuration application tree view, select the K2 Storage System.
2. Select **Server Control Panel**. The Server Control Panel opens.
3. Identify the K2 Media Server you intend to place in service, and consider the following:
   - On non-redundant K2 Storage Systems, check to see if the Failover Monitor service is already running. In most cases it will be, since when the K2 Media Server starts up, the Failover Monitor service starts automatically. If it is not running, continue with this procedure.
   - On redundant K2 Storage Systems, verify that the Failover Monitor service is not running on the server you intend to place in service. Also make sure that the media database is healthy on the K2 Media Server currently acting as primary. If you know there are problems with the media database on the primary server, these problems will likely be populated to the backup K2 Media Server via the media database replication process when you place it in service, in which case you should not place the backup server in service.
4. For the K2 Media Server that you want to place in service, click the **Start** button. This starts the failover service. If you are placing a backup K2 Media Server into service, the database replication process begins. Database replication must complete before the server is qualified to act as the backup server.

Shutting down or restarting a K2 Media Server

To shut down or restart a K2 Media server that is in the role of media file system and database server, first put the server out of service, as explained in the procedures earlier in this section. Then you can shut down or restart the K2 Media Server.

To shut down or restart a K2 Media server that is not in the role of media file system and database server, consider that the K2 Media Server can host the iSCSI interface adapters by which clients access the shared storage. You should stop all media access before shutting down or restarting any K2 Media Server that hosts an iSCSI interface adapter.

Identifying K2 Media Server software versions

Your options for identifying K2 Media Server software versions are as follows:

- In NetCentral, select the **Facility** button, then in the tree view open the node for the K2 Media Server. This exposes the subsystems. You can find software version information on property pages for the **Software** subsystem and the **Roles** subsystem.
- In the K2 System Configuration application tree view, open the node for the K2 Media Server. This exposes the nodes for individual configuration pages. Select the **Software** configuration page to view software version information. To check for recent changes in software, click the **Check** button.

Modifying K2 Media Server network settings

Read the following sections for considerations and procedures for modifying network settings on a K2 Media Server.

Modifying K2 Media Server control network settings

If the K2 Media Server takes the role of media file system and database server, modifying its control network settings on an existing K2 Storage System is not supported as a customer procedure. This is because the network identity of the K2 Media Server is embedded throughout the K2 Storage System. To reconfigure this network identity, you must reconfigure the entire system from the start. Contact your Grass Valley representative for assistance.

Modifying K2 Media Server FTP network settings

You can modify the FTP network settings using the K2 System Configuration application without directly affecting the media file system or database. However, you must be aware of the requirements of your site's FTP, file transfer, and streaming system design, as the FTP network settings will likely need to be changed elsewhere.

Modifying K2 Media Server media network settings

Use this procedure if you must change the IP address assigned to an iSCSI interface board on a K2 media server. This should not be necessary for a normally operating system and in fact it should be avoided if possible, as it requires a complete reconfiguration of all iSCSI clients.

To change the IP address assigned to an iSCSI interface board, open the K2 System Configuration application on the control point PC and do the following:

1. Make sure you know the load balancing bandwidth parameters for each of the iSCSI clients, as you must re-enter these values later in this procedure.
2. Put all the devices of the K2 storage system in an offline or out of service state. Refer to the appropriate procedures in this chapter.
3. Remove all iSCSI clients from the K2 Storage System. To do this, select each iSCSI client and click **Remove**.
4. In the tree view, expand the node for the media server that has the iSCSI interface adapter for which you need to change the IP address and click the **iSCSI Bridge** node. The iSCSI Bridge Server configuration page opens.
5. Select the iSCSI adapter for which you need to change the IP address and click **Modify**. A network configuration dialog box opens. Enter the IP address and subnet mask and click **Apply**.
6. Add each iSCSI client again and reconfigure. Make sure you add them in the correct order (highest bandwidth first) and enter the same bandwidth values (load balancing) for each client as the values originally configured.
7. Place the devices of the K2 Storage System back online.

Removing a K2 Media Server

In a functioning K2 Storage System, you should not permanently remove a K2 Media Server that takes the role of media file system/database server, as this changes system capabilities and results in the failure of some or all of the media operations for which the system was designed. Remove a K2 Media Server only under the direct supervision of qualified Grass Valley personnel.

If you are replacing a faulty server with a replacement server, use the next procedure "Replacing a K2 Media Server".

Replacing a K2 Media Server

Use this procedure if a K2 Media Server in a working system is faulty or otherwise needs to be replaced with a new K2 Media Server.

The requirements for replacing a K2 Media Server on an existing K2 Storage System are as follows:

- You must be logged in to the K2 System Configuration application with permissions equivalent to K2 administrator or higher.

NOTE: If you are replacing a non-redundant media file system/database server, you lose all media during the replacement process.

To replace a K2 Media Server, do the following:

1. If the server hosts an iSCSI interface adapter, copy down iSCSI bandwidth settings for K2 Media Clients and other iSCSI clients that use the faulty server as their iSCSI target, as follows:
   a. In the K2 System Configuration application, select the K2 Storage System in the tree view and then click the button in the toolbar to view client iSCSI assignments. A page opens that displays each client's primary and secondary iSCSI targets.
   b. In the tree view, select one of the clients that have the faulty server as a primary or secondary iSCSI target.
   c. Open the client's iSCSI Initiator Configuration page and click **Modify**. The Bandwidth Input dialog box opens.
   d. Copy down the bandwidth settings configured for that client and then close the Bandwidth Input dialog box.
   e. Repeat these steps for each client that has the faulty server as a primary or secondary iSCSI target.
2. If the server hosts an iSCSI interface adapter, in the K2 System Configuration application, for the faulty K2 Media Server, open the iSCSI bridge page and make a note of the IP addresses.
3. Copy down network and hostname settings for the faulty K2 Media Server. You can do this from the K2 System Configuration application Network Configuration page.
4. Save a copy of the host table from the faulty K2 Media Server. You can find the host table at the following location:

C:\WINDOWS\system32\drivers\etc\hosts

5. If the server hosts an iSCSI interface adapter, in the K2 System Configuration application, remove the K2 Media Clients and other iSCSI clients that use the faulty server as their iSCSI target, as determined in step 1 earlier in this procedure.
6. Stop all media access and power down all K2 Media Clients and other iSCSI clients.
7. If the faulty server is a media file system/database server, take the K2 Media Server out of service, as explained "Taking a K2 Media Server out of service" on page 701. If it is a redundant server, it must be the backup before you take it out of service.
8. In the K2 System Configuration application, remove the faulty K2 Media Server as follows:
   a. In the tree view, select the K2 Media Server
   b. Click **Remove** and **Yes** to confirm. The K2 Media Server is removed from the tree view.
9. Physically remove the faulty K2 Media Server and put the replacement server in its place. Reconnect all cables to the replacement server as they were to the faulty server.

NOTE: If the replacement server was previously configured on a K2 Storage System, you must restart it before adding it to a K2 Storage System or in any other way reconfiguring it for use.

10. Configure the network settings and hostname on the replacement server to be the same as they were on the faulty server. You need do this only for the control network, as other settings are configured using the K2 System Configuration application later in this procedure.
11. Copy the host table onto the replacement server.
12. In the K2 System Configuration application, add and configure the replacement server. Refer to the installation chapter for the level of your system earlier in this manual for specific procedures, with the following special instructions:
    a. Add the server to the K2 Storage System, using the **Add Device** button.
    b. Configure the replacement server so that its settings are all the same as they were on the faulty server.
       - On the Define Server Roles page, assign the same roles.
       - On the Network Configuration page, enter the same network settings for the FTP network. (You already configured the control network in step 10 earlier in this procedure.)
       - If the server hosts an iSCSI interface adapter, on the iSCSI Bridge Server Configuration page, enter the same settings.
    c. After completing the configuration, restart the machine to put changes into effect.
13. If the server hosts an iSCSI interface adapter, in the K2 System Configuration

application, add the clients that you removed in step 5 earlier in this procedure. Refer to the *K2 Media Client System Guide* for specific procedures, with the following special instructions:

a. Add the client with the highest iSCSI bandwidth first.

b. On each client, configure iSCSI bandwidth settings so they are the same as they were before.

14. Power up all K2 Media Clients and other iSCSI clients and test media access.

The replacing a server procedure is complete.

Replacing an iSCSI interface adapter (TOE card)

If you must replace an iSCSI interface adapter (TOE card) in a K2 Media Server, do the following:

1. In the K2 System Configuration application, for the machine with the faulty iSCSI interface adapter, open the iSCSI bridge page and make a note of the IP addresses. Later in this procedure you must assign the replacement adapter the same IP address or addresses as currently assigned to the faulty adapter.
2. Identify the K2 Media Clients and iSCSI clients to which the faulty iSCSI interface adapter is assigned as iSCSI Target IP Address. For each client of the K2 Storage System, look at the iSCSI Initiator Configuration page to determine this.
3. Make sure you know the load balancing bandwidth parameters for each of the clients to which the faulty iSCSI interface adapter is assigned, as you must re-enter these values later in this procedure.
4. Take the clients of the K2 Storage System offline and take all K2 Media Servers out of service.
5. In the K2 System Configuration application, remove all clients to which the faulty iSCSI interface adapter is assigned. To do this, select each client and click **Remove**.
6. Power down the machine with the faulty iSCSI interface adapter and replace the iSCSI interface adapter. Refer to the service documentation on the Dell Documentation CD for procedures.
7. Power up the machine with the replacement iSCSI interface adapter.
8. In the K2 System Configuration application, open the iSCSI bridge page for that machine. It displays the replacement adapter, identified by MAC address, with its IP address set to 0.0.0.0.
9. Assign the replacement adapter the same IP address as originally assigned to the faulty adapter.
10. Restart the machine to put the change into effect.
11. Add each client to which the faulty iSCSI interface adapter was assigned (those removed earlier in this procedure) and reconfigure. Make sure you add them in the correct order (highest bandwidth first) and enter the same bandwidth values (load balancing) for each client as the values originally configured.
12. Place the devices of the K2 Storage System back online. Refer to procedures earlier in this chapter as appropriate for your K2 Storage System level and/or redundant

server configuration.

Recovering from a failed K2 Media Server system battery

The following procedure applies to K2 Media Servers based on the Dell 2850/2950 platform. K2 Media Servers on other Dell models can have similar procedures. Refer to the service documentation on the Dell Documentation CD for specific procedures.

When the system battery in a K2 Media Server fails (non rechargeable) the system configuration is lost, and the system will not complete startup processes when the battery is replaced.

To recover from a failed battery on a Dell 2950, do the following:

1. Restart the K2 Media Server.

   A startup screen displays the message “Invalid configuration information - Please run setup program. Time of day not set - Please run setup program.”

2. Press **F2** to enter setup.
3. Set the system date and time
4. Select **System Setup | Integrated Devices**
5. Select **RAID**. This also sets ChA and ChB to RAID
6. Restart the K2 Media Server.

   A startup screen displays the message “Warning: Detected mode change from SCSI to RAID on ChA of the embedded RAID system.”

7. Select **Yes**.

   A startup screen displays the message “Warning: Detected mode change from SCSI to RAID on ChB of the embedded RAID system.”

8. Select **Yes**.

   The K2 Media Server restarts as normal.

When startup completes, normal operation is restored.

Checking K2 Media Server services

The following table specifies the startup type of services that affect the machine's functionality as a K2 Media Server. Unless otherwise noted, services with startup type *Automatic* are started, while services with startup type *Manual* or *Disabled* are not started. You can use this table to check services if you suspect that they have been tampered with or for any reason are not set correctly.

To reset services, reconfigure the server with the K2 System Configuration application, starting at the beginning of the configuration wizard. Do not manually change the way services run on a configured K2 Media Server.

	Startup Type of service for K2 Media Server Roles				
Service	**SNFS file system server**	**iSCSI bridge**	**Media database server[a]**	**FTP server**	**NAS server**
Ati HotKey Poller	Disabled	Disabled	Disabled	Disabled	Disabled
Grass Valley FSM FailoverMonitor	Manual on redundant[b] servers; Manual on non-redundant[c] servers.	Manual	Manual on redundant[b] servers; Manual on non-redundant[c] servers.	Manual	Manual
*Grass Valley FTP Service	Manual	Manual	Manual	Automatic[d]	Manual
Grass Valley File-Import Watcher[e]	Manual	Manual	Manual	Manual	Manual
Grass Valley K2 Config	Automatic	Automatic	Automatic	Automatic	Automatic
Grass Valley MegaRaid Server[f]	Manual	Manual	Manual	Manual	Manual
Grass Valley Server Monitor	Automatic	Automatic	Automatic	Automatic	Automatic
Grass Valley Storage Utility Host	Automatic	Automatic	Automatic	Automatic	Automatic
*Grass Valley Transfer Queue Service	Manual	Manual	Manual	Automatic[d]	Manual
*MSSQLSERVER	Manual	Manual	Automatic[d]	Manual	Manual
MSSQLServerADHelper	Disabled	Disabled	Disabled	Disabled	Disabled
OpForce	Disabled	Disabled	Disabled	Disabled	Disabled
SNMP Service	Automatic	Automatic	Automatic	Automatic	Automatic
SNMP Trap Service[g]	Automatic	Automatic	Automatic	Automatic	Automatic
*SQLSERVERAGENT[h]	Manual	Manual	Automatic[d]	Manual	Manual
*StorNext File System File System	Automatic[d]	Automatic	Manual	Automatic	Automatic
*StorNext File System RPC Port Mapper	Automatic[d]	Automatic	Manual	Automatic	Automatic

a. If a K2 Media Server is a media database server, it must also have the role of SNFS file system server.

b. After startup confirm redundant status of servers and then use Server Control Panel to start this service accordingly.

c. When a non-redundant server starts up, this service is started automatically by the Server Monitor service.

d. This startup type is top priority for servers with this role. In other words, if a server has this role, then this is always the service's startup type, regardless of other roles that specify a different startup type.

e. Startup type set to Automatic by the K2 Capture Services utility when the HotBin feature is configured. The HotBin feature is supported only on servers with role of FTP server.

f. This service has no purpose on a K2 Media Server. It is only used on a K2 Media Client.

g. This service has no purpose on a K2 Media Server. It is only used for receiving traps on a SNMP manager.

h. Log On As Administrator

* Startup type set by the K2 System Configuration application

Disabling OpForce

The following procedure applies to K2 Media Servers based on the Dell 2850/2950 platform.

K2 Media Servers shipped from the factory already have the *OpForce* service disabled, so this procedure is not necessary in most cases.

When the *OpForce* service is enabled, it slows the startup processes on a K2 Media Server. This service comes from the Dell Open Manage utility and supports provisioning multiple servers simultaneously. This service is not necessary for operation on a K2 Storage System.

If your K2 Storage System has redundant K2 Media Servers in the role of media file system/database server, use the following sequence:

1. Do the procedure on the backup server.
2. Shut down the backup server and leave it shut down. Do not startup the backup server at this time.
3. Do the procedure on the primary server.
4. Restart the primary server. Wait until startup is complete and networks are up before continuing.
5. Start up the backup server. Wait until startup is complete and networks are up before continuing.

To turn the OpForce service off on a K2 Media Server, do the following:

1. Stop all media access on the K2 Storage System.
2. From the Windows Startbar, open **Settings | Control Panel | Administrative Tools | Services**. The Services control panel opens.
3. Locate the OpForce service and configure it as follows:
   a. Change the startup state to **Disabled**.
   b. Click **Apply**.
4. Depending on the primary/backup status of the server, shutdown or restart the K2 Media Server.
5. Do this procedure as applicable on your remaining K2 Media Servers.

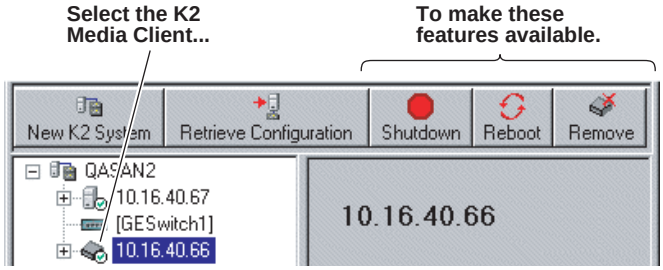
Working with K2 Media Clients

Use the procedures in this section when doing configuration or service work on a shared storage K2 Media Client that is part of an existing K2 Storage System. Procedures are as follows:

- "Accessing K2 Media Client features" on page 712
- "Taking a K2 Media Client offline" on page 713
- "Bringing a K2 Media Client online" on page 713
- "Shutting down or restarting a K2 Media Client" on page 712
- "Adding a K2 Media client" on page 713
- "Removing a K2 Media Client" on page 714
- "Adding a K2 Media client" on page 713
- "Identifying K2 Media Client software versions" on page 714
- "Modifying K2 Media Client control network settings" on page 715
- "Modifying K2 Media Client media (iSCSI) network settings" on page 715
- "Modifying load balancing" on page 715

Accessing K2 Media Client features

In the K2 Configuration Application, features for working on a shared storage K2 Media Client are as follows:



Shutting down or restarting a K2 Media Client

Before you shut down or restart a K2 Media Client, you should stop all media access.

Your options for shutting down a K2 Media Client are as follows:

- Do a local shutdown/restart via AppCenter. Assuming a keyboard, monitor, and mouse is connected to the local K2 Media Client, in AppCenter select **System | Shutdown**, then select **Shutdown** or **Restart** and **OK**. AppCenter exits, Windows shuts down and powers off the K2 Media Client.
- Do a local shutdown/restart via Windows. Assuming a keyboard, monitor, and mouse is connected to the local K2 Media Client, if AppCenter is not open, you can use the normal Windows procedure to shutdown. You can also do this type of

shutdown/restart using the Windows Remote Desktop Connection.

- Do a remote shutdown/restart via the K2 System Configuration application. In the tree view select the K2 Media Client and then click **Shutdown** or **Reboot**.
- Do a local hard shutdown. Use this method only when there is a problem that prevents you from using one of the other methods for an orderly shutdown. To do a hard shutdown, hold down the standby button for approximately five seconds. To restart, press the standby button again.

Taking a K2 Media Client offline

To take a K2 Media Client offline, simply stop all media access and then shut down the K2 Media Client.

Bringing a K2 Media Client online

To bring a K2 Media Client online, simply restart the K2 Media Client. When the K2 Media Client starts up, it is always in the online state.

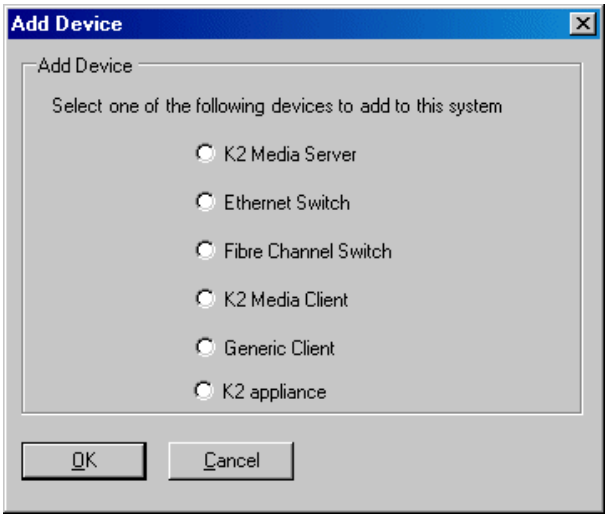
Adding a K2 Media client

The requirements for adding a K2 Media client to an existing K2 Storage System are as follows:

- You must be logged in to the K2 System Configuration application with permissions equivalent to K2 administrator or higher.
- The K2 Storage System must have adequate bandwidth available to meet the bandwidth needs of the K2 Media Client you are adding.
- The devices of the K2 Storage System do not need to be offline, and there is no restart of devices required.

To add a K2 Media Client to an existing K2 Storage System, do the following:

1. In the tree view, select the name of the K2 Storage System, which is the top node of the storage system tree.
2. Click **Add Device**. The Add Device dialog box opens.



3. Select the **K2 Media Client**.
4. Click **OK**. The new client device appears in the tree view.
5. Configure the K2 Media Client as appropriate.

Removing a K2 Media Client

The requirements for removing a K2 Media Client from an existing K2 Storage System are as follows:

- You must be logged in to the K2 System Configuration application with permissions equivalent to K2 administrator or higher.
- Media access must be stopped on the K2 Media Client you are removing.
- You can remove a K2 Media Client without disrupting the operation of the rest of the storage system.

To remove a K2 Media Client, do the following:

1. Stop media access on the K2 Media Client.
2. In the tree view, select K2 Media Client.
3. Click **Remove** and **Yes** to confirm. The K2 Media Client is removed from the tree view.
4. You must restart the K2 Media Client before re-adding it to a K2 Storage System or in any other way reconfiguring it for use.

Identifying K2 Media Client software versions

Your options for identifying K2 Media Client software version are as follows:

- In NetCentral, select the **Facility** button, then in the tree view open the node for the K2 Media Client. This exposes the subsystems. You can find software version information on property pages for the **Software** subsystem.

- In the K2 System Configuration application tree view, open the node for the K2 Media Client. This exposes the nodes for individual configuration pages. Select the **Software** configuration page to view software version information. To check for recent changes in software, click the **Check** button.

Modifying K2 Media Client control network settings

To modify the hostname or IP address of a K2 Media Client, use the following procedure. Refer to procedures elsewhere in this chapter for the details of individual steps.

1. Make sure you know the load balancing (bandwidth) parameters currently set for the K2 Media Client in the K2 System Configuration application. You must reconfigure these parameters later in this procedure.
2. Remove the K2 Media Client from the K2 Storage System.
3. Modify the hostname or IP address.
4. Edit *hosts* files or other name resolution mechanisms for all the devices of the K2 Storage System.
5. Add the K2 Media Client as a new device to the K2 Storage System, load balancing the K2 Media Client just as it was previously. This is important, as you want the K2 System Configuration application to assign it to the same available bandwidth on the same iSCSI target as previously.

Modifying K2 Media Client media (iSCSI) network settings

To modify a media network IP address for a K2 Media Client, use the following procedure. Refer to procedures elsewhere in this document for the details of individual steps.

1. Stop media access on the K2 Media Client.
2. In the K2 System Configuration application, open the Network configuration page for the K2 Media Client.
3. Modify the IP address.
4. Restart the K2 Media Client.

Modifying load balancing

Modifying the iSCSI load balancing on an existing K2 Storage System is not supported as a customer procedure. This is because the load balancing is a fundamental baseline for the design of the system. To change the load balancing specifications requires custom design and implementation services that should only be attempted by qualified Grass Valley personnel.

Refer to the *K2 Media Client System Guide* for a general discussion of load balancing.

Using Storage Utility

When doing configuration or service work on the media file system, the media database, or the RAID storage devices of an existing K2 Storage System, the primary tool is the Storage Utility. Refer to "Storage Utility" on page 663 for a general description.

CAUTION: Use the Storage Utility only as directed by a documented procedure or by Grass Valley Support. If used improperly, the Storage Utility can render your K2 Storage System inoperable or result in the loss of all your media.

The installation chapters earlier in this document provide instructions for using Storage Utility as you initially set up and configure a K2 Storage System. You should refer to those instructions for information that is specific to the level of your K2 Storage System. Procedures in this section are as follows:

- "Accessing Storage Utility" on page 716
- "Overview of Storage Utility" on page 717

Accessing Storage Utility

To access the Storage Utility, you must open it from within the K2 System Configuration application. Access permissions are passed from the K2 System Configuration application to the Storage Utility as it opens, so make sure that you are logged in with sufficient permissions.

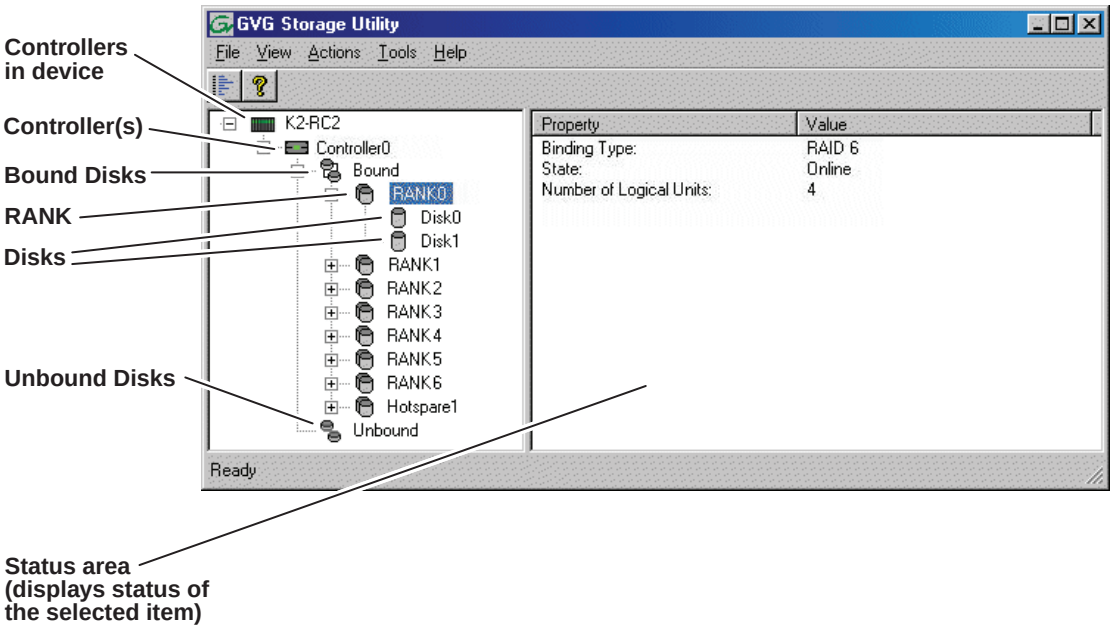
You open the Storage Utility from within the K2 System Configuration application in the following ways:

- In the K2 System Configuration application tree view, select the name of the K2 Storage System, which is the top node of the storage system tree. Then click the **Storage Utility** button. Storage Utility opens. In this case the connection to the RAID storage devices is via the K2 Media Server first configured, which is designated as server 1, server A, or server 1A, depending on the level of the storage system.
- In the K2 System Configuration application tree view, open the node for a K2 Media Server and select the **File System Server** node to open its property page. On the property page click **Launch Storage Utility**. Storage Utility opens. In this case the connection to the RAID storage devices is via the selected K2 Media Server.

NOTE: Do not run Storage Utility on a shared storage K2 Media Client.

NOTE: Do not run Storage Utility as a stand-alone application, separate from the K2 System Configuration application. To maintain a valid K2 Storage System all configuration must be controlled and tracked through the K2 System Configuration application.

Overview of Storage Utility



The Storage Utility user interface includes a tree view in the left-hand pane, and a status information area displayed in the right-hand pane. The tree view displays the hardware that make up the RAID storage system connected. The context menus in the tree view are used to configure storage. The right-hand status pane displays information about the item selected in the tree view. The tree view hierarchy is as follows:

Controllers in device - Provides a logical grouping of the RAID Controllers in a primary RAID chassis.

Controller - Represents the RAID Controllers found. These are numbered in the order discovered. The controller icon represents both RAID Controller A and, if installed, RAID Controller B. To determine if an optional RAID Controller B is installed, select the Controller icon in the tree view, then examine the status pane for peer status.

Bound Disks - Expanding the Bound node displays all bound disks.

RANK - Represents a bound RANK. Expanding the RANK node displays the disk modules that make up the RANK.

UnBound disks - Expanding the UnBound node, displays all unbound disk modules.

Disks - Represents the disk modules.

The Storage Utility detects disks available and lists them on the opening screen.

Refer to “About RANKs and LUNs in Storage Utility” in Chapter 15, *Overview of K2 Storage Tools*.

Refer to the following procedures to use Storage Utility for maintenance and configuration tasks

Working on the media file system and database

Use the procedures in this section when doing configuration or service work on the media file system or the media database of an existing K2 Storage System. Procedures are as follows:

- "Checking the media file system" on page 718
- "Cleaning unreferenced files and movies" on page 718
- "Making a new media file system" on page 719
- "Expanding the media file system by capacity" on page 721
- "Expanding the media file system by bandwidth" on page 722
- "Backing up the media database" on page 726

Checking the media file system

This procedure checks the media file system but retains current media files. The requirements for this procedure are as follows:

- You must access Storage Utility (via the K2 System Configuration application login) with permissions equivalent to K2 administrator or higher.
- When you access Storage Utility, the K2 Storage System must be offline.
- All iSCSI clients and K2 Media Clients in the K2 Storage System must be offline.

NOTE: This procedure can take 20 hours or more on a large storage system. Do not start this process unless you have adequate time set aside.

To check the media file system, do the following:

1. In Storage Utility, click **Tools | Check File System**.
2. A message box appears "Checking media file system. Please wait". Observe progress.

   If problems are discovered they are reported. If the check process passes, when the process is complete a message appears to confirm success.
3. Click **OK** to dismiss the results.

   Your file system has been checked.

Cleaning unreferenced files and movies

These procedures allow you to keep the media database and the media files in sync. You can check the movies (clips) in the media database for the references to media files that should be currently stored on the media disks. Likewise, you can check for media files that are not referenced by a movie in the media database. If you find any unreferenced files or movies, you can delete them. The requirements for these procedures are as follows:

- You must access Storage Utility (via the K2 System Configuration application login) with permissions equivalent to K2 administrator or higher.
- When you access Storage Utility, the K2 Storage System must be offline.

- All iSCSI clients and K2 Media Clients in the K2 Storage System must be offline.

To clean unreferenced files, do the following:

1. In Storage Utility, click **Tools | Clean Unreferenced Files**.
2. A message box appears "…searching…Please wait". Observe progress.
3. A message box reports results. Respond as follows:
   - If no unreferenced files are found, click **OK** to dismiss the results.
   - If unreferenced files are discovered, you are prompted to delete them. Click **Yes** to delete the files or **No** to leave the files intact.

To clean unreferenced movies, do the following:

1. In Storage Utility, click **Tools | Clean Unreferenced Movies**.
2. A message box appears "…searching…Please wait". Observe progress.
3. A message box reports results. Respond as follows:
   - If no unreferenced movies are found, click **OK** to dismiss the results.
   - If unreferenced movies are discovered, you are prompted to delete them. Click **Yes** to delete the movies or **No** to leave the movies intact.

Making a new media file system

The requirements for this procedure are as follows:

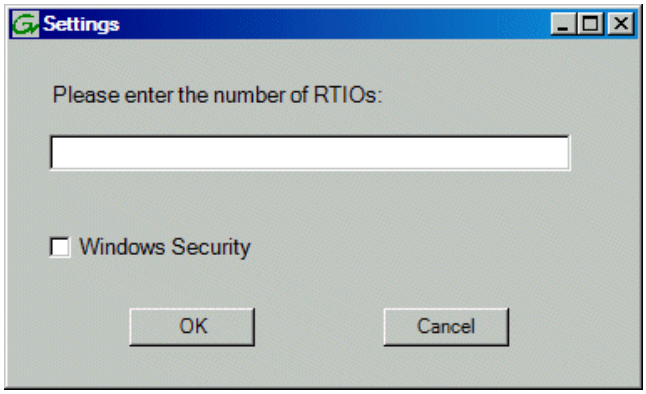
- You must access Storage Utility (via the K2 System Configuration application login) with permissions equivalent to K2 administrator or higher.
- When you access Storage Utility, the K2 Storage System must be offline.
- All iSCSI clients and K2 Media Clients in the K2 Storage System must be shut down.

NOTE: You lose all media with this procedure.

To make a new media file system, do the following:

1. In Storage Utility, click **Tools | Make New File System**.

   The Settings dialog box opens.



2. Configure the Settings dialog box as follows:
   - For Real Time Input Output (RTIOs), enter the number specified for the design of your K2 Storage System. Contact your Grass Valley representative if you do not know this number.
   - For Windows Security on a K2 Storage System with only K2 Media Clients, leave this setting unchecked.
   - For Windows Security on a K2 Storage System with Aurora Edits, refer to the *Aurora Edit Installation and Configuration Guide*.

   Click **OK**. The Configuration File dialog box opens.
3. On the Configuration File dialog box, you can view media file system settings, but do not attempt to change them. Click **Accept**.

   A "Making new file system. Please wait" message box displays progress.
4. When a message "Succeeded to make the new file system…" appears, click **OK**.
5. Restart the K2 Media Server.
6. You now have a blank (empty) file system. However, the media database still contains references to media files which are no longer present in the file system. To clear the media database do the following:
   a. In the K2 System Configuration application tree view, open the node for the K2 Media Server and select the **Database Server** node to open its property page.
   b. On the Database Server property page click **Erase media database**.

      A message box displays progress.
   c. Wait until a message confirms that the process is complete. This can take several minutes.
   d. If you have redundant K2 Media Servers, repeat these steps to clear the media database on the other (redundant) server.
7. Close Storage Utility.
8. Place the K2 Storage System back online.

Expanding the media file system by capacity

NOTE: This procedure should only be attempted under the supervision of qualified Grass Valley support personnel. Contact your Grass Valley representative for assistance.

If you need to increase the storage capacity of your K2 Storage System, you can do so by adding one or more Expansion Chassis, up to the maximum number of chassis allowed for your level of storage.

When expanding by capacity, you must add enough storage to support the entire bandwidth load of the system. For example, if the current system requires six RANKs to support its bandwidth specification, then you must add another six RANKs to expand the system's storage capacity.

When you add an Expansion Chassis to increase storage capacity, use the following procedure:

1. Install and cable the Expansion Chassis.
2. Bind the RANKs in the Expansions Chassis using Background Bind.
3. When binding is complete, put the K2 Storage System in an offline state as follows:
   - You must access Storage Utility (via the K2 System Configuration application login) with permissions equivalent to K2 administrator or higher.
   - When you access Storage Utility, the K2 Storage System must be offline.
   - All iSCSI clients and K2 Media Clients in the K2 Storage System must be shut down.
4. Restart all K2 Media Servers. Do not use the standard startup processes here. Just start up the server(s) and wait until the Windows desktop appears. Especially do not open Server Control Panel or start Failover Monitor.
5. On the K2 Media Server with the role of primary media file system/database server, save a copy of the following files to a different location:

   D:\snfs\config\default.cfg

   D:\snfs\config\cvlabels
6. In Storage Utility, select **Tools | Expand File System By Capacity**.
7. A message box reports progress. When a message reports success, the process is complete.
8. Restart the K2 Storage System.

Expanding the media file system by bandwidth

If you want to retain your media file system and yet expand the bandwidth of your K2 Storage System, you must use the following procedures for dynamic bandwidth expansion. This process allows you to add RANKs to the stripe group, thereby expanding its width, without reinitializing the file system. This keeps the existing media intact. The additional RANKs can be made up of new disks in existing RAID chassis, disks in new Expansion Chassis, or disks in new primary RAID chassis.

After the file system is expanded, existing media is still striped across the original narrower stripe group, so it can not take advantage of the increased bandwidth. Also, if there is a significant portion of the storage pool occupied by this existing media, its presence reduces the extent to which new media can use the increased bandwidth. For this reason the dynamic bandwidth expansion process provides the Restripe Utility, which restripes the existing media across the new wider stripe group. This enables both the existing media and new media to get full benefit of the increased bandwidth. Refer to "Managing the Restripe Utility" on page 725 for more information.

If the media on your file system has a high turnover rate and you know existing media is to be deleted right away, you have the option of disabling the Restripe Utility. This saves the system resources and time required to restripe media.

Dynamic bandwidth expansion is supported only with K2 system software version 3.2 and higher.

NOTE: Adding RAID storage devices changes your system design and must be specified for your K2 Storage System by Grass Valley. Do not attempt to add RAID storage devices without support from Grass Valley.

Dynamic bandwidth expansion checklist

Grass Valley personnel who have received K2 Storage System training can use the following checklist to expand the bandwidth of an K2 Storage System system.

Dynamic bandwidth expansion checklist

Task	Documentation	Tips
Set up and configure RAID		
❑ Rack any new RAID equipment	—	—
❑ Verify recovery disk images. Update if necessary.	"Backup and recovery strategies" on page 670	—
❑ Stop all media access and power down K2 Media Clients and other K2 Storage System clients.	Refer to the power down procedure in the installation chapter for your level of K2 Storage System.	—
❑ Clean unreferenced files and movies.	"Cleaning unreferenced files and movies" on page 718.	—
❑ Power down the remaining devices of the K2 Storage System.	Refer to the power down procedure in the installation chapter for your level of K2 Storage System.	—
❑ Add disks or RAID equipment to support the additional RANKs.	If adding new RAID equipment, rack, cable, and configure as instructed in the installation chapter for your level of K2 Storage System.	As applicable, remember to set Fibre Channel addresses on RAID controllers and chassis addresses on Expansion Adapters.
❑ Startup the RAID equipment.	Refer to the start up procedure in the installation chapter for your level of K2 Storage System.	—
❑ Start up the primary K2 Media Server.	Refer to the start up procedure in the installation chapter for your level of K2 Storage System.	If there are multiple K2 Media Servers, this is the server that takes the role of media file system server. On a redundant K2 Storage System, this is the server functioning as primary when the system was last powered down.
❑ Back up configuration files from the primary K2 Media Server.	Save a copy of the following files to a different location: *D:\snfs\config\default.cfg* *D:\snfs\config\cvlabels*	If there is a problem with the expansion process, contact Grass Valley Support for instructions on using these files to recover.
❑ From the control point PC, open the K2 System Configuration application and launch Storage Utility.	"Accessing Storage Utility" on page 716	Make sure that versions are correct and consistent on both new and existing RAID storage devices.
❑ Verify versions of controller microcode and disk firmware. Update if necessary.	Refer to *K2 Storage System Release Notes* and "Checking controller microcode" on page 744	Make sure that versions are compatible on both new and existing disks and RAID storage devices.
❑ Bind RANKs using the new disks. Wait for the binding process to complete.	"About full/background bind" on page 748	Do not unbind or bind existing RANKs. Doing so destroys all data. If in doubt, flash drive lights to identify disks.
❑ Close Storage Utility.	—	—

Task	Documentation	Tips
❑ Restart the primary K2 Media Server.	Do not use the standard startup processes here. Just start up the server and wait until the Windows desktop appears. On a redundant K2 Storage System, do not open Server Control Panel or manually start Failover Monitor.	Check the Windows Device Manager to verify that the server "sees" both the old RANKs and the new RANKs.
❑ Start up all remaining K2 Media Servers that are connected to the K2 Storage System.	Do not use the standard startup processes here. Just start up the server(s) and wait until the Windows desktop appears. On a redundant K2 Storage System, do not open Server Control Panel or manually start Failover Monitor.	—
Configure media file system		
❑ From the control point PC, open the K2 System Configuration application and launch Storage Utility.	"Accessing Storage Utility" on page 716	In Storage Utility make sure both old RANKs and new RANKs are displayed.
❑ Using Storage Utility, expand the file system by bandwidth.	1. Select **Tools | Expand File System By Bandwidth** and answer **Yes** to confirm. A dialog box opens, asking if you want to restripe existing media after bandwidth expansion. 2. Click **Yes** to restripe media, **No** to skip restriping. The expansion process runs. A dialog box displays progress. 3. Wait for the process to complete. On a large system this can take over 30 minutes. 4. A "…succeeded…" message is displayed when done. Click **OK** and Storage Utility closes. 5. The K2 System Configuration application displays a message informing you to restart servers. Click **OK**.	When asked about restriping existing media, the typical response is to click Yes. In any case this does no harm. Click No only if you are sure you do not need to restripe existing media, such as in the following cases: • You have very little existing media so the fact that it cannot use the new stripe group does not impact future media operations or capacity. • Your existing media is to be deleted soon so you don't care if it uses the new stripe group. Make sure Storage Utility is closed before proceeding.
❑ Restart all K2 Media Servers.	Refer to the start up procedure in the installation chapter for your level of K2 Storage System. Make sure to first start servers with the role of media file system/database server and, if a redundant K2 Storage System, manually start Failover Monitor.	When the server that takes the role of FTP server starts, one of the following happens: • If you answered "Yes" to restripe existing media in the step above, the Restripe Utility automatically launches and begins restriping media. • If you answered "No" to restripe existing media in the step above, the Restripe Utility does not launch.
❑ Monitor the Restripe Utility,	"Managing the Restripe Utility" on page 725	On a file system with a large amount of existing media, this can take days. ***NOTE: Do not stop the FTP server once the restripe process begins.***
❑ Record system information	—	Make sure you keep diagrams and other on-site documentation up to date.

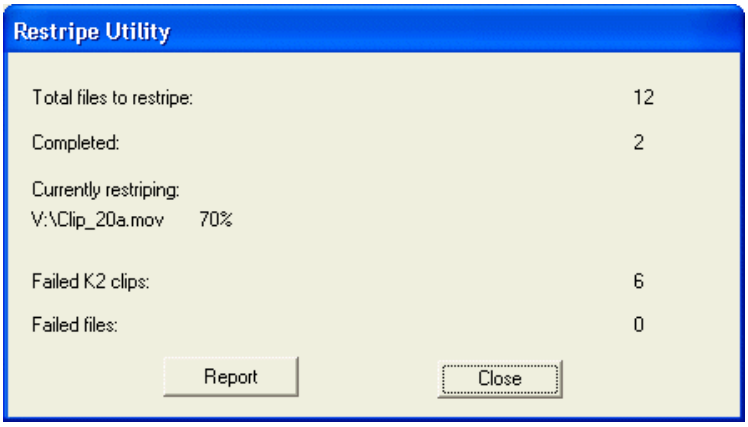
Managing the Restripe Utility

If you answer “Yes” to the dialog box that asks about restriping existing media, after the bandwidth expansion process completes, Storage Utility exits with a special code. On receiving the special exit code, the K2 System Configuration application sets the current date in the registry of the K2 Media Server that takes the role of FTP server.

When the FTP server restarts, the Restripe Utility automatically opens. The Restripe Utility reads the date set in the registry, finds clips and files created before that date, and restripes the clips and files, one at a time.

You can monitor the Restripe Utility in the following ways:

- While the Restripe Utility is running, it is represented by an icon in the system tray. You can right-click this icon and open the Restripe Utility window.



- The Restripe Utility window reports first on the progress of K2 clips being restriped, then on the progress of files being restriped.
- Click the Report button for a list of clips and files that failed to be restriped, if any.
- When the Restripe Utility completes its processes, it reports its results to *C:\profile\RestripeResult.txt*. Open this file in Notepad to verify successful results.

You can start and stop the Restripe Utility manually as follows:

- At any time while the Restripe Utility is in the process of restriping clips, you can right-click the icon in the system tray, and select **Abort**. This stops the restripe process and closes the Restripe Utility.

NOTE: Stopping the Restripe Utility before it completes its processes leaves some of your existing media still striped across the original narrower stripe group. Once the Restripe Utility is stopped, you cannot restripe that existing media.

Backing up the media database

On a K2 Storage System, you can back up the K2 media database as part of your system recovery plan. When you back up the database, remember that you are backing up only the records in the database. These records point to media files, but they are not the actual media files themselves. Therefore when you backup the database only, you are not backing up your media.

Use the following procedures to backup and restore the media database, depending on the version of SQL Server:

- "Determining your SQL Server database version" on page 726
- "Back up SQL Server 2000 database" on page 726
- "Back up SQL Server 2005 database" on page 729
- "Restore SQL Server 2000 database" on page 732
- "Restore SQL Server 2005 database" on page 736

Determining your SQL Server database version

In 2007, K2 Media Servers began shipping from the factory with SQL Server 2005 installed. Prior to that time, SQL Server 2000 was installed. If you are not sure which version is on your K2 Media Server, use the following procedure.

1. On the K2 Media Server, open the Windows Control Panel.
2. Open **Add or Remove Programs**.
3. Locate the Microsoft SQL Server program and identify the version.

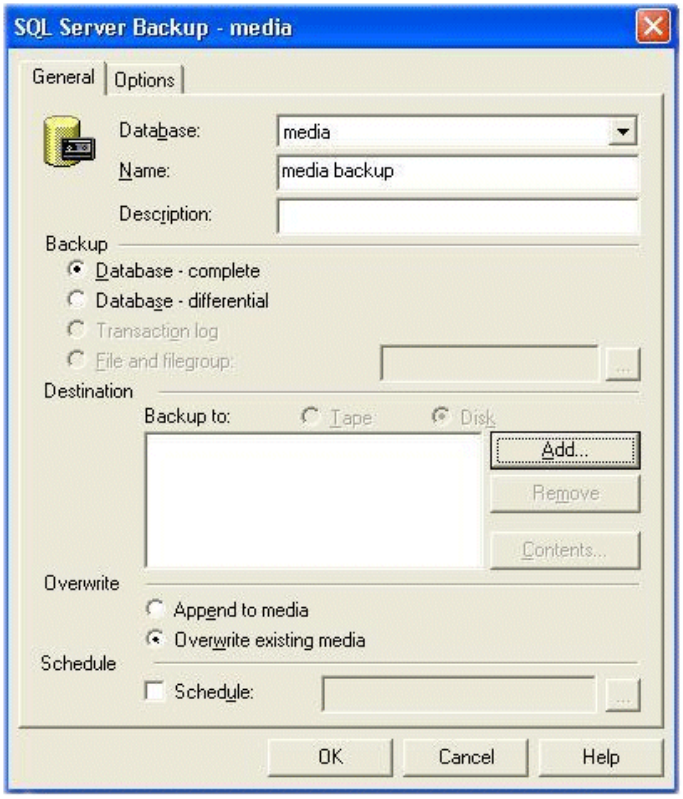
Back up SQL Server 2000 database

If the K2 Media Server has SQL Server 2000, use the following procedure to back up the media database.

If you have a redundant K2 Storage System, backup up the database on the K2 Media Server that is the primary media file system/database server.

1. From the K2 Media Server Windows desktop, open **Start | All Programs | Microsoft SQL Server | Enterprise Manager**. Enterprise Manager opens.
2. In Enterprise Manager, expand the tree view as follows:

   Microsoft SQL Servers | SQL Server Group | (local) | Databases | media
3. In the Enterprise Manager tree view, right-click the **media** node and select **All Tasks | Backup Database**. The SQL Server Backup dialog box opens.



4. In the SQL Server Backup dialog box, select **Database – complete** and **Overwrite existing media**.

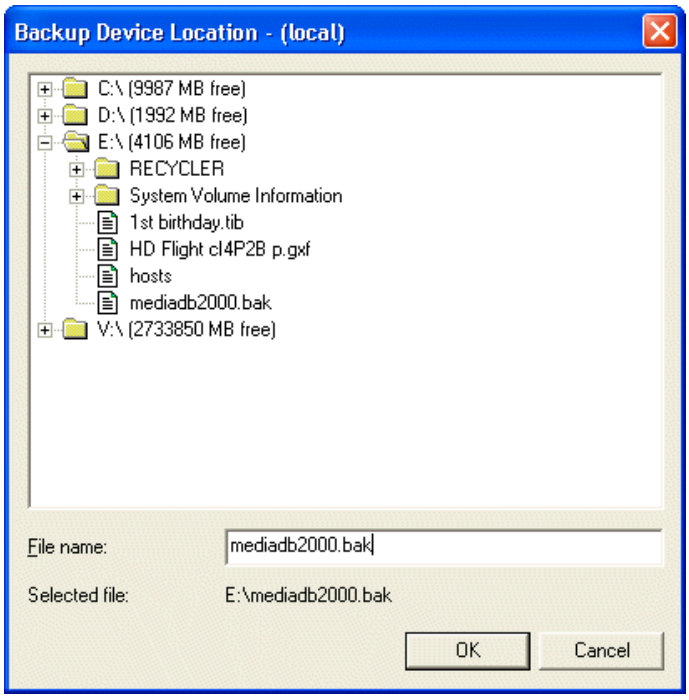
5. In the SQL Server Backup dialog box, the Destination area lists the path to any previous backups. Specify the current backup destination as follows:

   - If you are backing up the database to the same location and file name as a previous backup, select the backup path to specify it as the destination for the current backup. Then skip ahead to step 10 of this procedure.

NOTE: Do not store the backup file on the C: drive.

   - If there are no previous backup destinations listed or you are backing up the database to a different path than those listed, click **Add**. The Select Backup Destination dialog box opens. Continue with the next step in this procedure.

6. In the Select Backup Destination dialog box, select **File name** and click the **...** button. The Backup Device Location dialog box opens.



7. In the Backup Device Location dialog box, browse to your desired location to store the database backup file. For example, you could store the database backup on the E: partition.

NOTE: Do not store the backup file on the C: drive.

8. In the Backup Device Location dialog box, specify a file name with a ".bak" extension and click **OK**. The Backup Device Location dialog box closes and reveals the Select Backup Destination dialog box.

9. In the Select Backup Destination dialog box, click **OK**. The Select Backup Destination dialog box closes and reveals the SQL Server Backup dialog box.
10. In the SQL Server Backup dialog box, click **OK**.

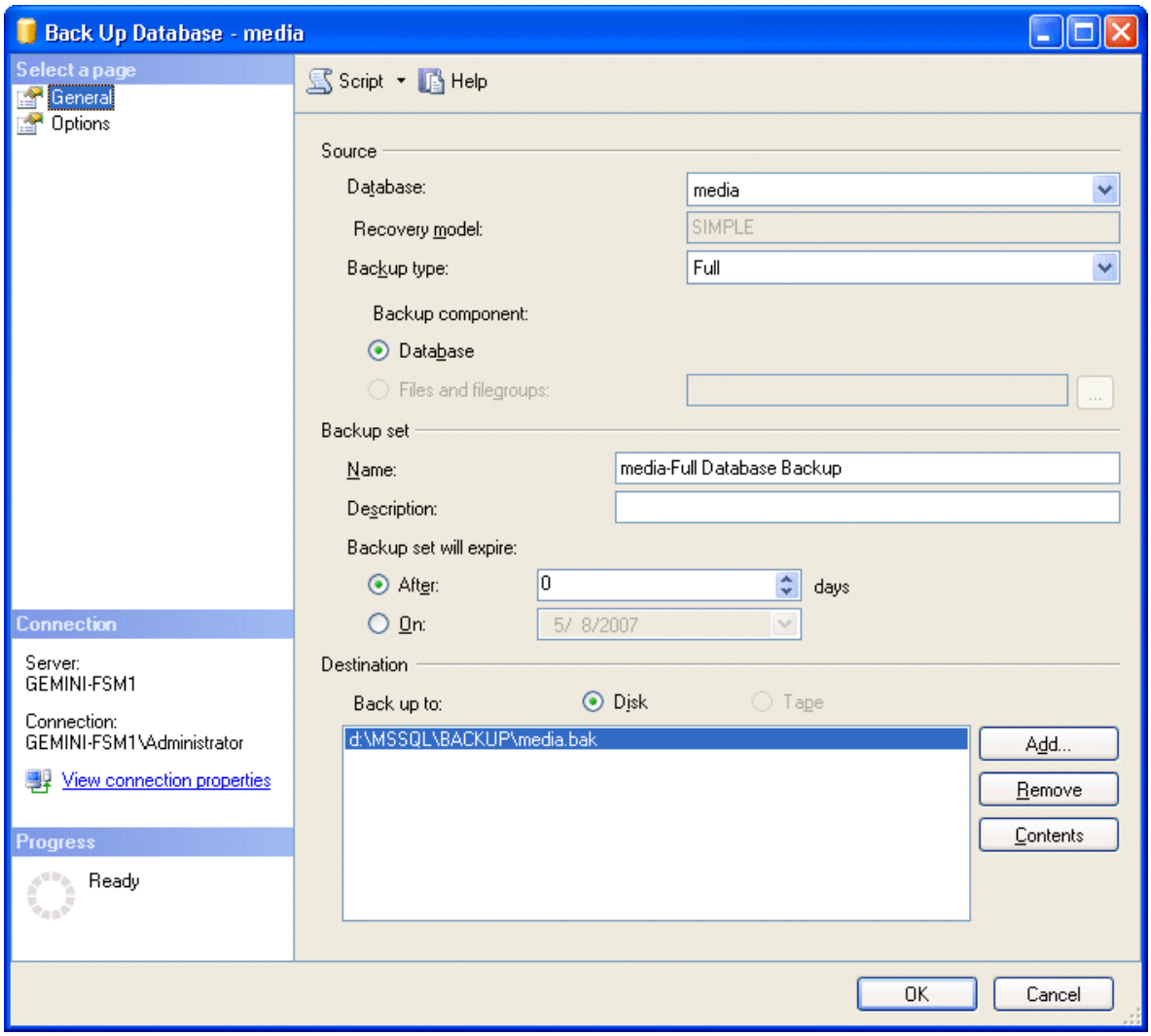
    A Backup Progress dialog box displays progress as the backup process runs. When finished, a "…completed successfully" message is displayed.

Back up SQL Server 2005 database

If the K2 Media Server has SQL Server 2005, use the following procedure to back up the media database.

If you have a redundant K2 Storage System, backup up the database on the K2 Media Server that is the primary media file system/database server.

1. From the K2 Media Server Windows desktop, open **Start | All Programs | Microsoft SQL Server 2005 | SQL Server Management Studio**. When prompted, click **Connect** to connect to the server. Management Studio opens.
2. In Management Studio, expand the tree view and open the **Databases** node.
3. In the Management Studio tree view, right-click the **media** node and select **Tasks | Backup**. The Back Up Database dialog box opens.



4. In the Back Up Database dialog box, the Destination area lists the path to any previous backups. Specify the current backup destination as follows:

   - If you are backing up the database to the same location and file name as a previous backup, select the backup path to specify it as the destination for the current backup. Then skip ahead to step 9 of this procedure.

NOTE: Do not store the backup file on the C: drive.

   - If there are no previous backup destinations listed or you are backing up the database to a different path than those listed, click **Add**. The Select Backup Destination dialog box opens. Continue with the next step in this procedure.

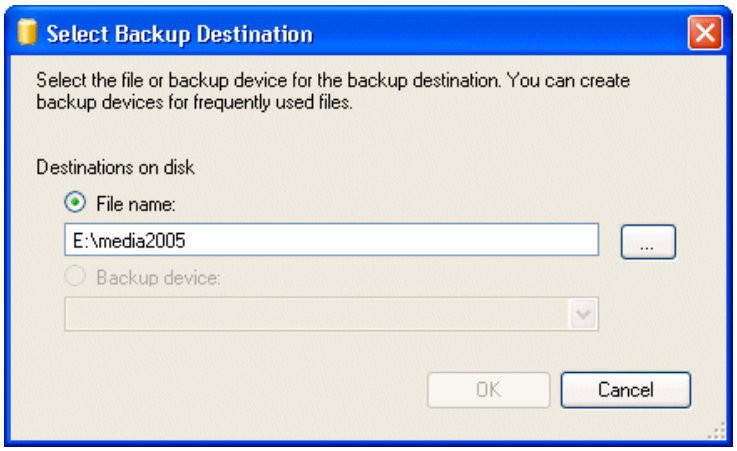
5. In the Select Backup Destination dialog box, choose **File name** and click the **...** button. The Locate Database Files dialog box opens.

6. In the Locate Database Files dialog box, browse to your desired location to store your database backup. For example, you could store the database backup on the E:

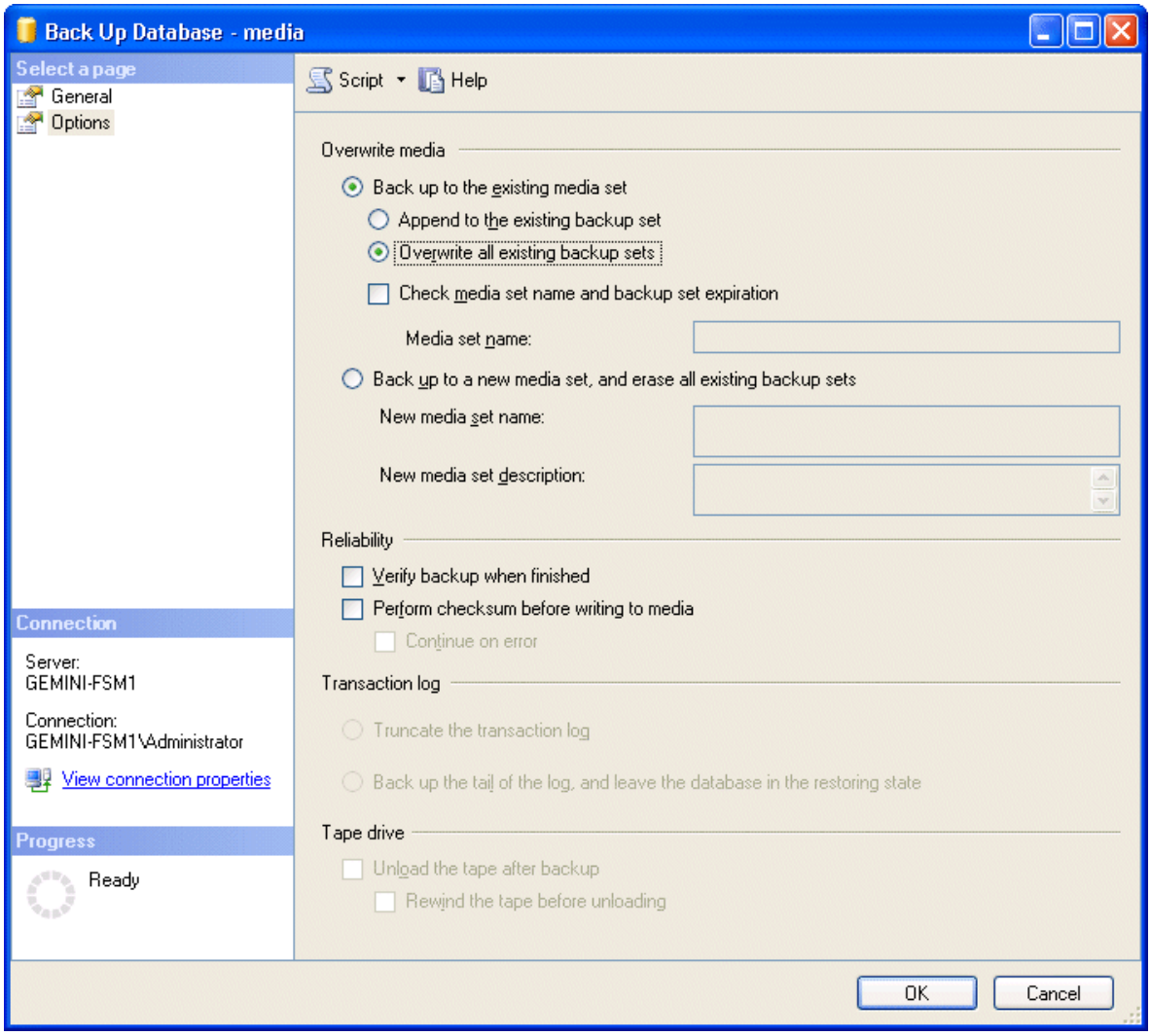
partition.

NOTE: Do not store the backup file on the C: drive.

7. In the Locate Database Files dialog box, enter a file name for the database backup file. There is no need to enter an extension for the file name. Then click **OK**. The Locate Database Files dialog box closes and reveals the Select Backup Destination dialog box.



8. On the Select Backup Destination dialog box, click **OK**. The Select Backup Destination dialog box closes and reveals the Back Up Database dialog box.
9. On the Back Up Database dialog box, in the Select a page area, click **Options**. The Options view opens.



10. In the Back Up Database Options view, select **Back up the existing media set** and **Overwrite all existing backup sets**.

11. In the Back Up Database dialog box, click **OK**. The backup process runs.

    In the Progress area, progress is displayed. When complete, a "…completed successfully" message is displayed.

12. On the message, click **OK** to close the message box and the Back Up Database dialog box.

Restore SQL Server 2000 database

If the K2 Media Server has SQL Server 2000, use the following procedure to restore the media database.

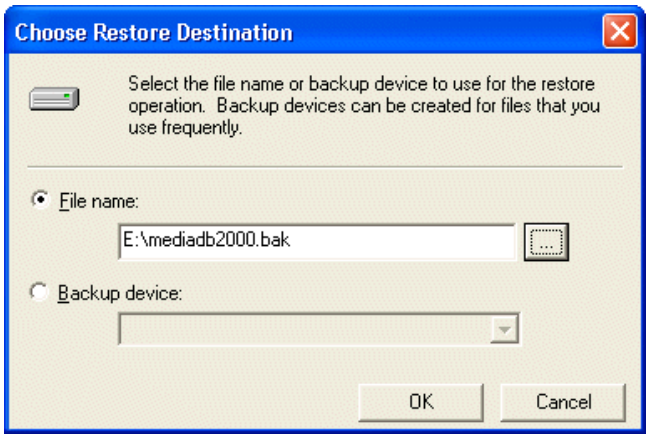
Before restoring the database, take the K2 Storage System offline and take the media file system/database server or servers out of service. Refer to "Taking a K2 Media Server out of service" on page 701. There must be no connections to the media database and Failover Monitor must be off.

If you have a redundant K2 Storage System, restore the database to the K2 Media Server that is the primary media file system/database server.

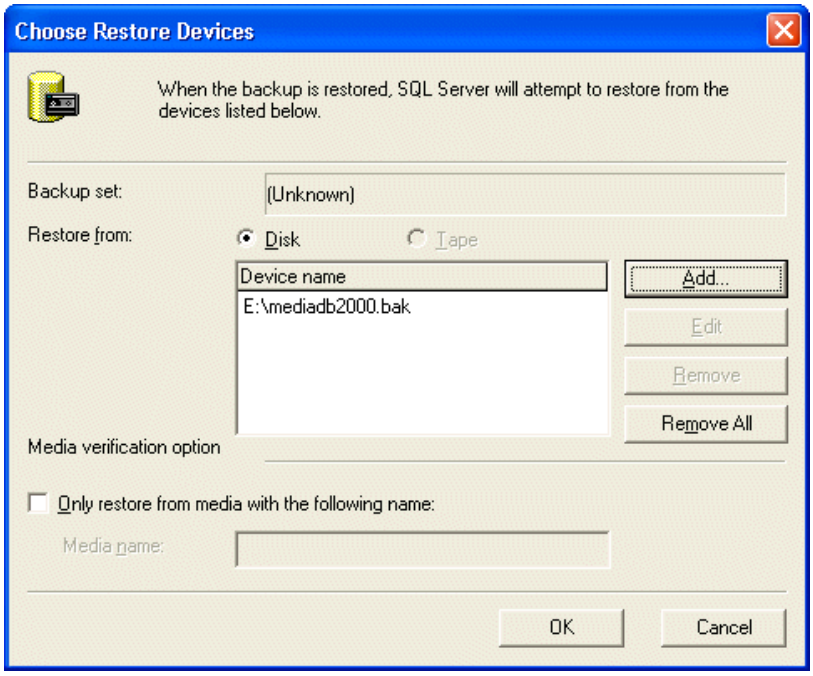
1. From the K2 Media Sever Windows desktop, click **Start | Programs | Microsoft SQL Server | Enterprise Manager**. Enterprise Manager opens.
2. In Enterprise Manager, expand the tree view as follows:

   Microsoft SQL Servers | SQL Server Group | (local) | Databases
3. In the Enterprise Manager tree view, right-click the **Databases** node and select **All Tasks | Restore Database**. The Restore database dialog box opens.
4. In the Restore Database dialog box, in the **Restore as database** drop-down list, type the following:

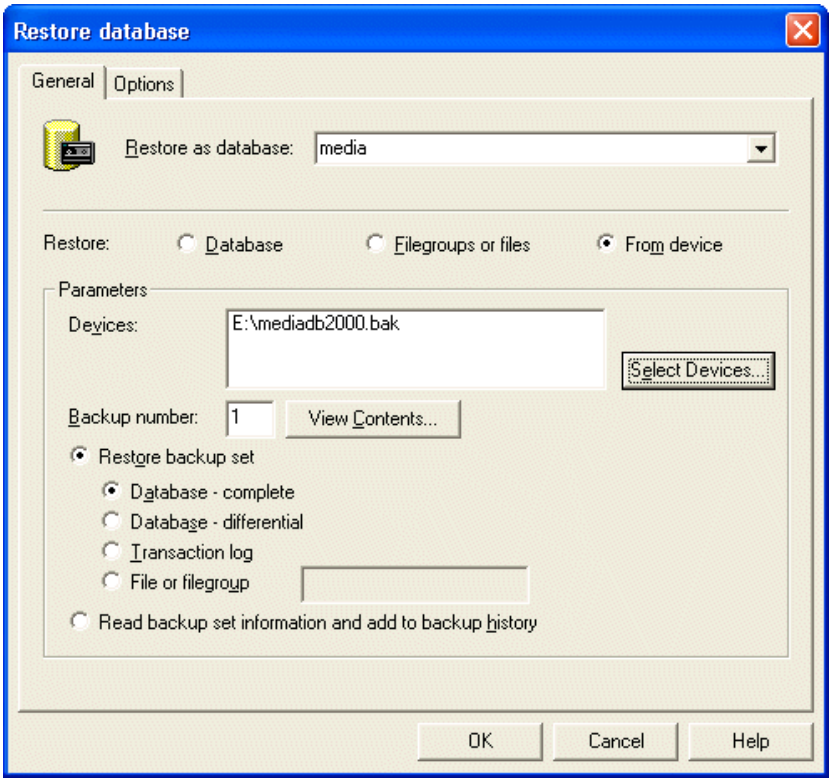
   `media`
5. In the Restore Database dialog box, select **From device**.
6. In the Restore Database dialog box, click **Select Devices**. The Chose Restore Devices dialog box opens.
7. In the Chose Restore Devices dialog box, select **Disk** and then click **Add**. The Chose Restore Destination dialog box opens.
8. In the Chose Restore Destination dialog box, select **File name** and then click the **...** button. The Backup Device Location dialog box opens.
9. Browse to and select the backup file, then click **OK**. The Backup Device Location dialog box closes and reveals the Choose Restore Destination dialog box.



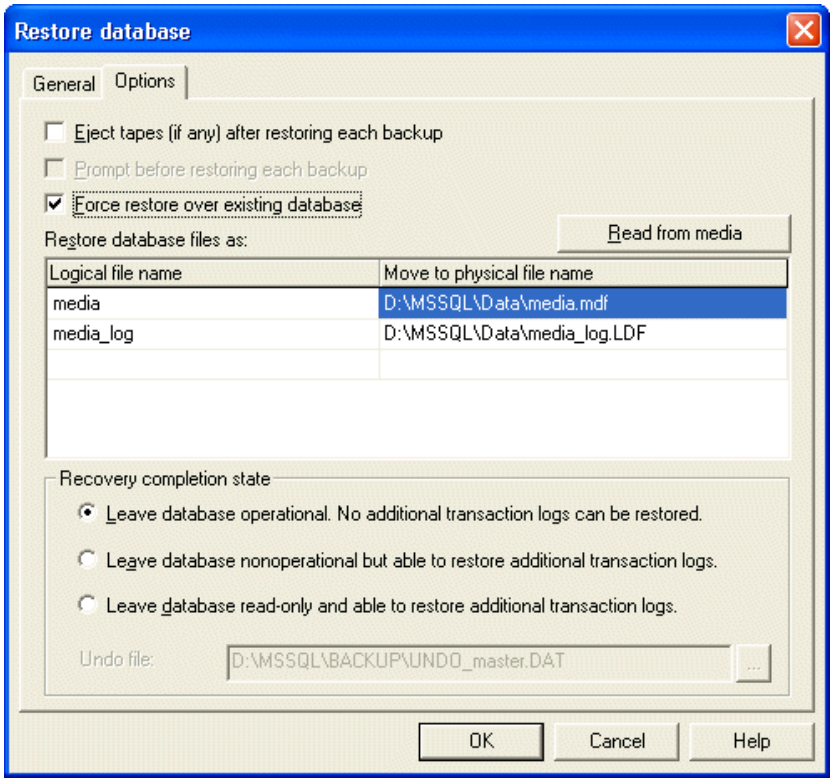
10. In the Choose Restore Destination dialog box, click **OK**. The Choose Restore Destination dialog box closes and reveals the Choose Restore Devices dialog box.



11. In the Choose Restore Devices dialog box, click **OK**. The Choose Restore Devices dialog box closes and reveals the Restore database dialog box.



12. In the Restore database dialog box, select **Restore backup set** and **Database - complete**.
13. In the Restore database dialog box, select the **Options** tab. The Options view appears.



14. In the Restore database Options view, select **Force restore over existing database**.
15. Click **OK**. The restore process runs.
16. When the restore process is complete, you can place the K2 Media Server into service and bring the K2 Storage System online. If you have a redundant K2 Storage System, you must place the K2 Media Servers into service in the proper sequence (first primary, then backup) to ensure that the database is replicated correctly. Refer to "Placing a K2 Media Server in service" on page 703.

Restore SQL Server 2005 database

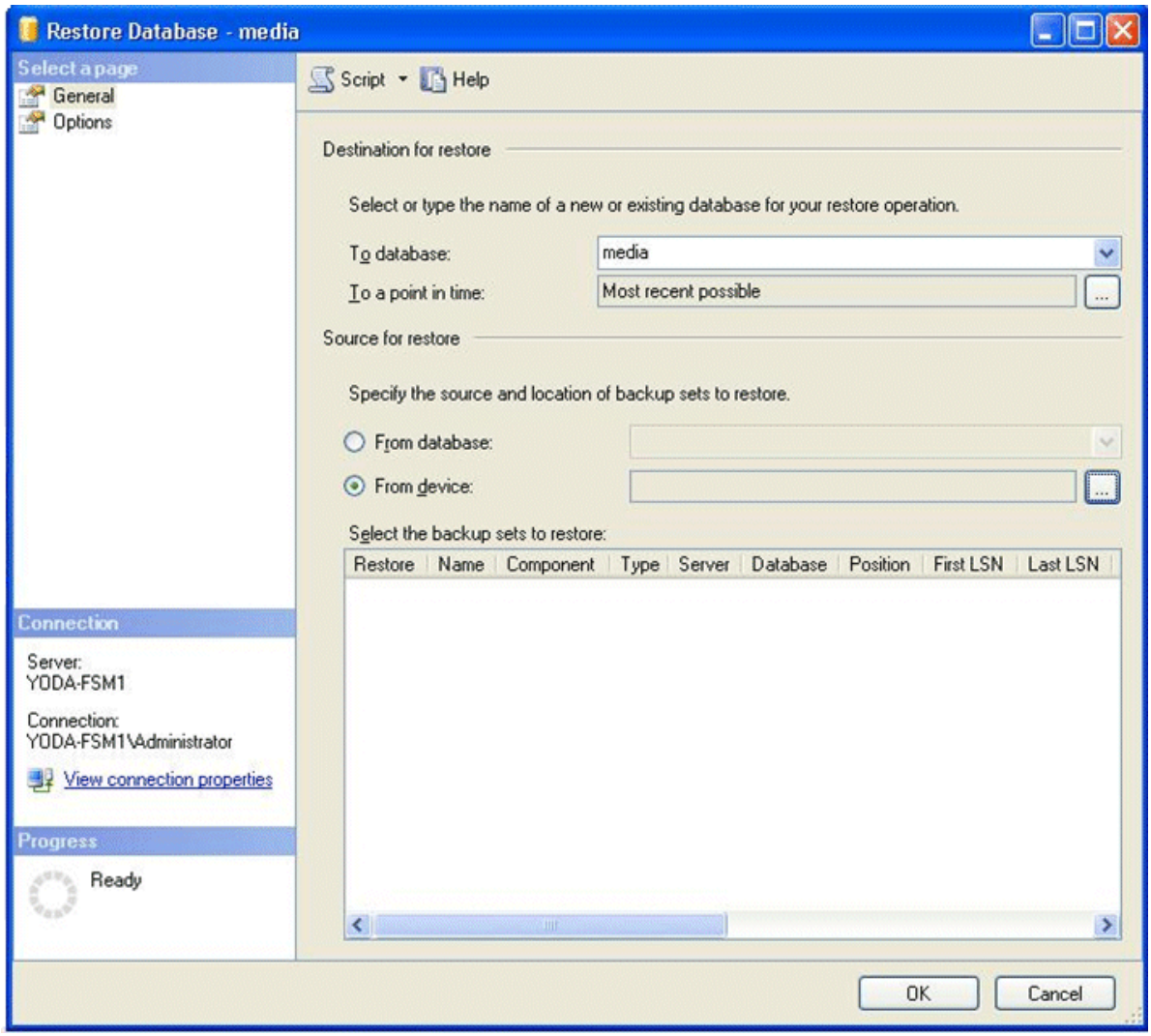
If the K2 Media Server has SQL Server 2005, use the following procedure to restore the media database.

Before restoring the database, take the K2 Storage System offline and take the media file system/database server or servers out of service. Refer to "Taking a K2 Media Server out of service" on page 701. There must be no connections to the media database and Failover Monitor must be off.

If you have a redundant K2 Storage System, restore the database to the K2 Media Server that is the primary media file system/database server.

1. From the K2 Media Server Windows desktop, open **Start | All Programs | Microsoft SQL Server 2005 | SQL Server Management Studio**. When prompted, click **Connect** to connect to the server. Management Studio opens.

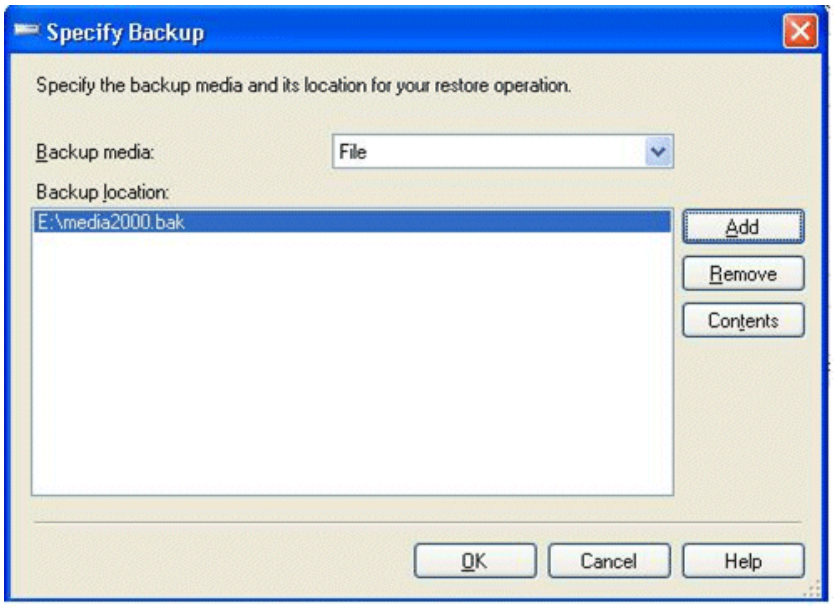
2. In Management Studio, expand the tree view.
3. In the Management Studio tree view, right-click the **Databases** node and select **Restore Database**. The Restore Database dialog box opens.



19. In the The Restore Database dialog box, in the **To database** drop-down list, type the following:

    ```
    media
    ```

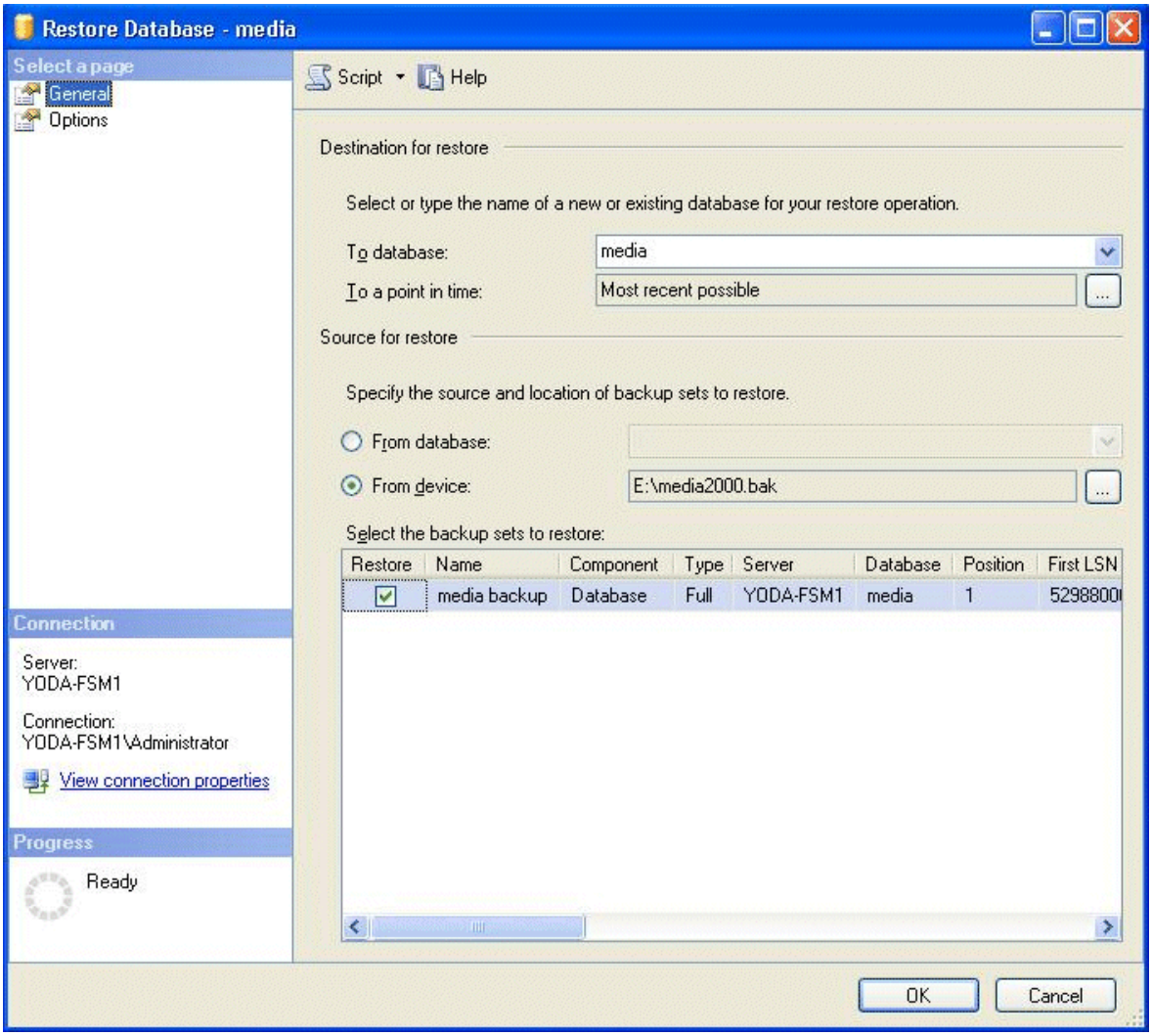
20. Click **From Device** and the click the **...** button. The Specify Backup dialog box opens.



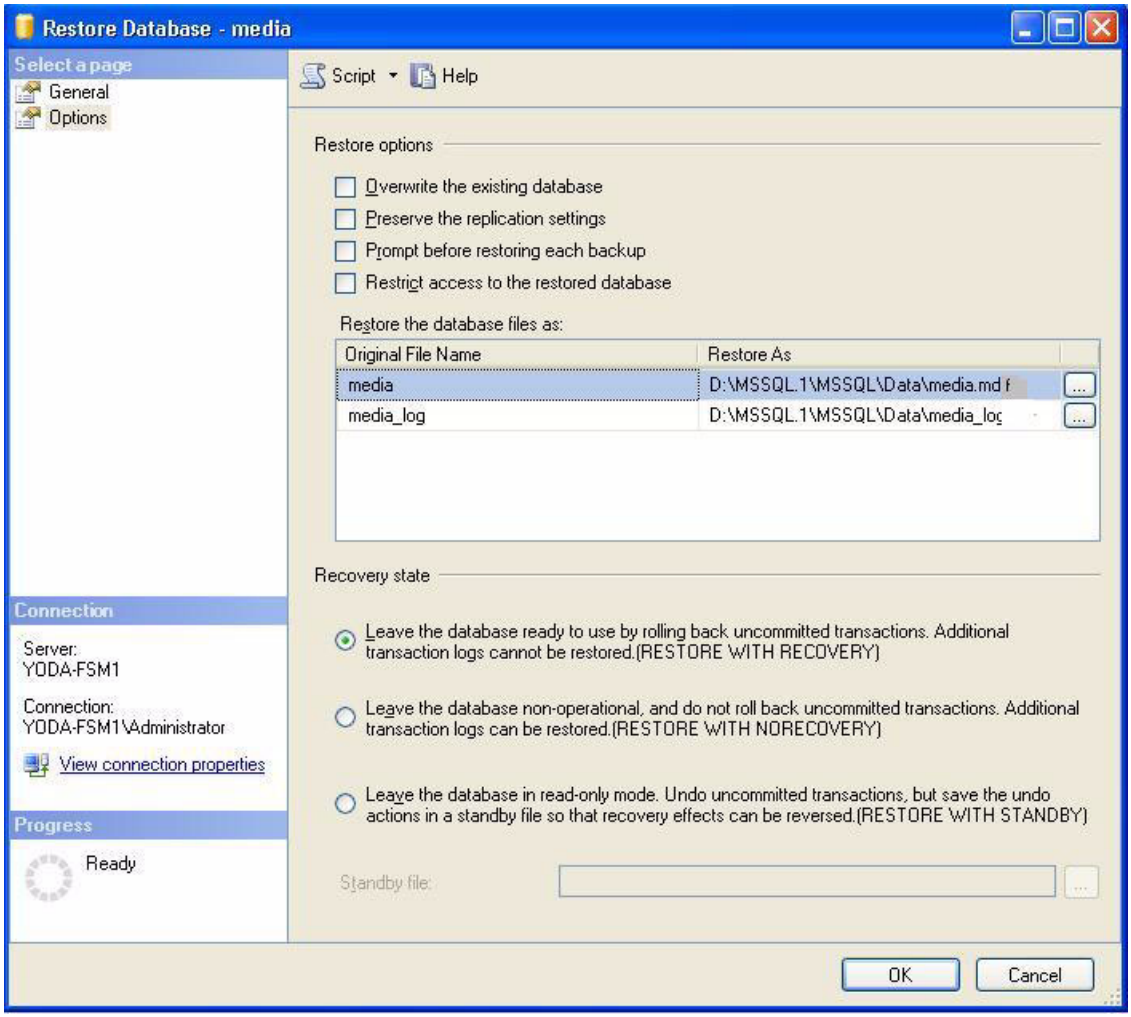
4. In the Specify Backup dialog box, in the Backup media drop-down list, select **File** and then click **Add**. The Locate Backup File dialog box opens.

21. In the Locate Backup File dialog box, browse to and select the backup file, then click **OK**. The Locate Backup File dialog box closes and reveals the Specify Backup dialog box.

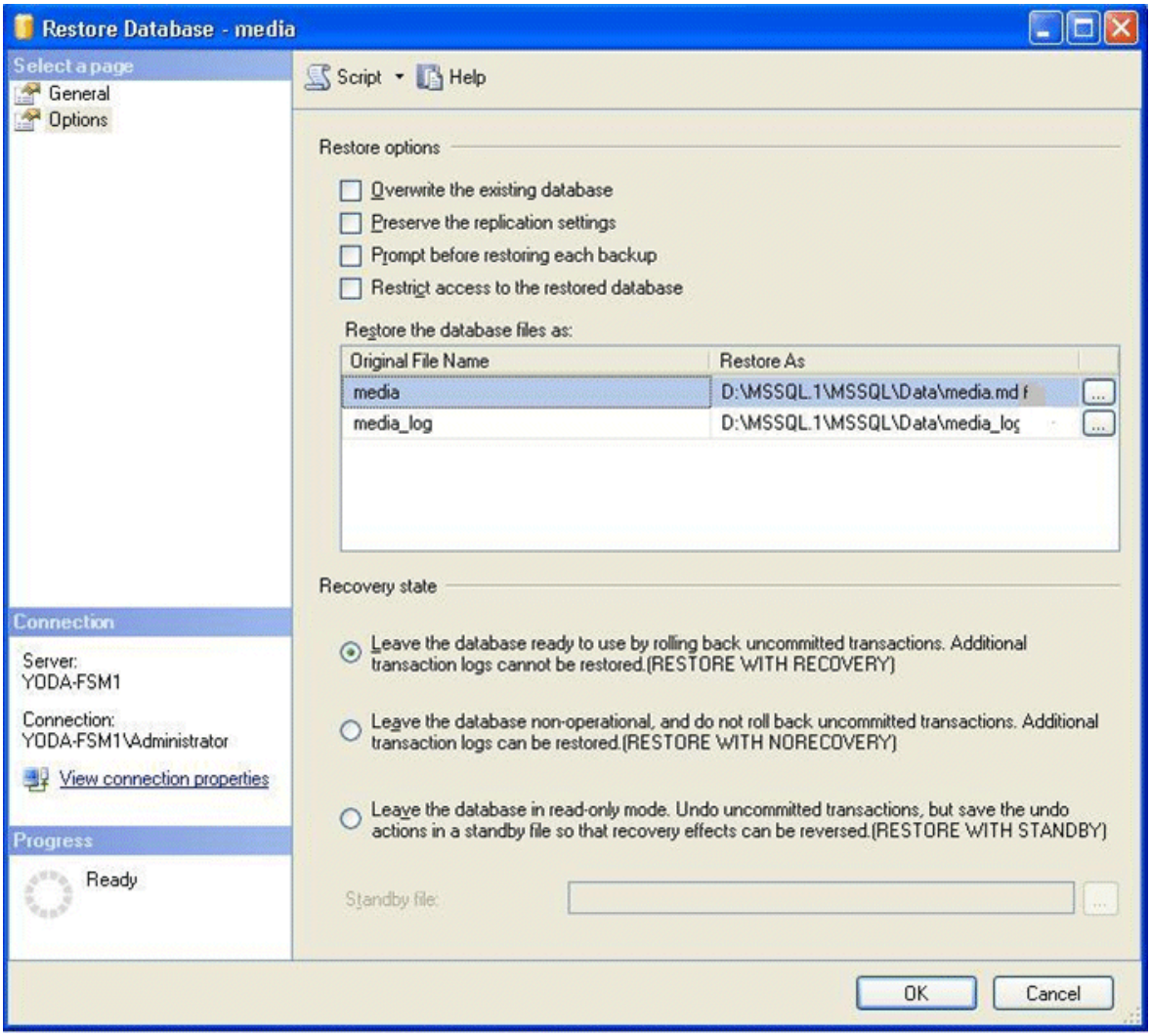
22. In the Specify Backup dialog box, click **OK**. The Specify Backup dialog box closes and reveals the Restore Database dialog box.



5. In the Restore Database dialog box, under “Select the backup sets to restore”, in the row that specifies the media database, check the box in the **Restore** column.



23.In the “Select a page” area, select **Options**. The Options view opens.



6. In the Restore Database Options view, specify the location to restore the media database data file, as follows:
   a. Under “Restore the database files as”, identify the row that specifies the media database data file. This is the row that lists *media* in the Original File Name column.
   b. In the data file row, check the **...** button. The Locate Database Files dialog box opens.
   c. In the Locate Database Files dialog box, browse to the following location:

      D:\MSSQL.1\MSSQL\Data
   d. In the File name field, type the following:

      `media.mdf`
   e. Click **OK**. The Locate Database Files dialog box closes.
7. In the Restore Database Options view, specify the location to restore the media

database transaction log file, as follows:

a. Under “Restore the database files as”, identify the row that specifies the media database transaction log file. This is the row that lists *media_log* in the Original File Name column.

b. In the transaction log file row, check the **...** button. The Locate Database Files dialog box opens.

c. In the Locate Database Files dialog box, browse to the following location:

D:\MSSQL.1\MSSQL\Data

d. In the File name field, type the following:

`media_log.ldf`

e. Click **OK**. The restore process runs.

8. When the restore process is complete, you can place the K2 Media Server into service and bring the K2 Storage System online. If you have a redundant K2 Storage System, you must place the K2 Media Servers into service in the proper sequence (first primary, then backup) to ensure that the database is replicated correctly. Refer to “Placing a K2 Media Server in service” on page 703.

Working with RAID storage

Use the procedures in this section when doing configuration or service work on the RAID storage devices of an existing K2 Storage System. Procedures are as follows:

- "Checking RAID storage subsystem status" on page 743
- "Checking controller microcode" on page 744
- "Identifying disks" on page 744
- "Get controller logs" on page 747
- "Unbind RANK" on page 747
- "About full/background bind" on page 748
- "About full/background bind" on page 748
- "Binding Hot Spare drives" on page 751
- "Loading RAID controller microcode" on page 751
- "Downloading disk drive firmware" on page 752
- "Replacing a disk module" on page 753
- "Replacing a controller" on page 754
- "Upgrading to L30 controllers" on page 755
- "Configuring Level 2 RAID chassis network and SNMP settings" on page 756
- "Configuring Level 3, 10, 20, 30 RAID chassis network and SNMP settings" on page 757

Checking RAID storage subsystem status

Some limited status information for storage subsystems is displayed in the Storage Utility. This can be helpful when configuring storage. You can view status information by selecting items in the tree view.

Item in tree view	Status information displayed
Controllers in Device	Number of Controllers
Controller	Peer Status Primary IP Serial Number Slot Peer Slot Microcode Version
Bound	Number of LUNs
RANK	Binding Type, such as RAID 1 State (online or offline) Number of Logical Units

Item in tree view	Status information displayed
Disk	Firmware Vendor State Product ID Capacity
Unbound	Number of disks

Checking controller microcode

As explained in the previous section, to check controller microcode, in Storage Utility select the controller in the tree view and the microcode version is displayed.

Identifying disks

When you do maintenance or service work on your RAID storage, it is important for many tasks that you positively identify the disk or disks on which you are working. Your primary indicators for this are the numbering of the disks in Storage Utility and the ability to flash the disk LED on a physical disk or a group of disks.

Level 2 RAID disk numbering

In Storage Utility, Level 2 RAID disks are numbered with a normal decimal sequence, starting with zero (0, 1, 2, 3, etc.). However, it is important to note that there is no disk 15. The primary RAID chassis contains disks 0 through 14, while the Expansion Chassis contains disks 16 through 30.

Level 3 RAID disk numbering

In Storage Utility, Level 3 RAID disks are numbered with a hexadecimal convention, as follows:

Chassis	Disk numbers, from left to right, facing chassis front														
Primary	00	01	02	03	04	05	06	07	08	09	0A	0B	0C	0D	0E
Expansion 1	10	11	12	13	14	15	16	17	18	19	1A	1B	1C	1D	1E
Expansion 2	40	41	42	43	44	45	46	47	48	49	4A	4B	4C	4D	4E
Expansion 3	50	51	52	53	54	55	56	57	58	59	5A	5B	5C	5D	5E
Expansion 4	80	81	82	83	84	85	86	87	88	89	8A	8B	8C	8D	8E
Expansion 5	90	91	92	93	94	95	96	97	98	99	9A	9B	9C	9D	9E

Chassis	Disk numbers, from left to right, facing chassis front														
Expansion 6	C0	C1	C2	C3	C4	C5	C6	C7	C8	C9	CA	CB	CC	CD	CE
Expansion 7	D0	D1	D2	D3	D4	D5	D6	D7	D8	D9	DA	DB	DC	DD	DE

Level 10 - 30 RAID disk numbering

In Storage Utility, Level 10 through 30 (SAS and SATA) RAID disks are numbered with a hexadecimal convention, similar to Level 3 RAID disks. Disk modules are identified based on the chassis address and physical location, as explained in the following sections.

Level 10, 20, and NL10 disk numbering

When Expansion chassis are all connected to DP0, as in Levels 10, 10R, 20, 20R, NL10, and NL10R, disks are numbered as follows:

Chassis...	Connects to...	With disk numbering as follows:			
Primary	DP0 (internal connection)	00	01	02	03
		04	05	06	07
		08	09	0A	0B
Expansion 1	DP0	10	11	12	13
		14	15	16	17
		18	19	1A	1B
Expansion 2	DP0	20	21	22	23
		24	25	26	27
		28	29	2A	2B
Expansion 3	DP0	30	31	32	33
		34	35	36	37
		38	39	3A	3B
Expansion 4	DP0	40	41	42	43
		44	45	46	47
		48	49	4A	4B
Expansion 5	DP0	50	51	52	53
		54	55	56	57
		58	59	5A	5B
Expansion 6	DP0	60	61	62	63
		64	65	66	67
		68	69	6A	6B
Expansion 7	DP0	70	71	72	73
		74	75	76	77
		78	79	7A	7B

Level 30 disk numbering

When Expansion chassis are connected to DP0 and DP1 in an alternating pattern, the disk numbering is as follows. This is the connection pattern for Levels 30 and 30R. With this pattern, the first Expansion chassis connected to DP1 always has a chassis address of 8, regardless of how many Expansion chassis are connected to DP0.

Chassis...	Connects to...	With disk numbering as follows:			
Primary	DP0 (internal connection)	00	01	02	03
		04	05	06	07
		08	09	0A	0B
Expansion 2	DP0	10	11	12	13
		14	15	16	17
		18	19	1A	1B
Expansion 4	DP0	20	21	22	23
		24	25	26	27
		28	29	2A	2B
Expansion 6	DP0	30	31	32	33
		34	35	36	37
		38	39	3A	3B
Expansion 8	DP0	40	41	42	43
		44	45	46	47
		48	49	4A	4B
Expansion 10	DP0	50	51	52	53
		54	55	56	57
		58	59	5A	5B

Chassis...	Connects to...	With disk numbering as follows:			
—	—	—			
Expansion 1	DP1	80	81	82	83
		84	85	86	87
		88	89	8A	8B
Expansion 3	DP1	90	91	92	93
		94	95	96	97
		98	99	9A	9B
Expansion 5	DP1	A0	A1	A2	A3
		A4	A5	A6	A7
		A8	A9	AA	AB
Expansion 7	DP1	B0	B1	B2	B3
		B4	B5	B6	B7
		B8	B9	BA	BB
Expansion 9	DP1	C0	C1	C2	C3
		C4	C5	C6	C7
		C8	C9	CA	CB

Flashing disk LEDs

Storage Utility's Identify feature allows you to flash the disk LEDs so that you can physically locate a specific disk module or group of disk modules that make up a RANK. Always use the disk identify feature before removing and replacing a failed disk module. Accidentally removing the wrong disk module can destroy all data on the disk drives.

To identify RAID disks by flashing disk LEDs, do the following:

1. Open Storage Utility and in the tree view expand all nodes so that all disks are displayed.
2. Open the bezel on the RAID storage chassis or otherwise make sure you can see disk LEDs.
3. Identify the disks in a RANK or identify a single disk, as follows:
   a. In the Storage Utility tree view, right-click a RANK or right-click a single disk, then select **Identify RANK** or **Identify Disk** in the context menu. A message box opens with a message that informs you that a disk or disks are blinking.
   b. The LEDs for the disk or disks display a flashing pattern. Verify the location of

the disk or disks.

Get controller logs

1. In the Storage Utility tree view, select the controller.
2. Click **Actions | Get Controller Logs**.
3. A message informs you of the location of the logs.
4. Find the log files on the K2 Media Sever at *C:\profile\logs*.

Unbind RANK

Unbinding reverses the bind process. Unbinding might be needed when reconfiguring a storage system.

CAUTION: Unbinding destroys all data stored on disk modules.

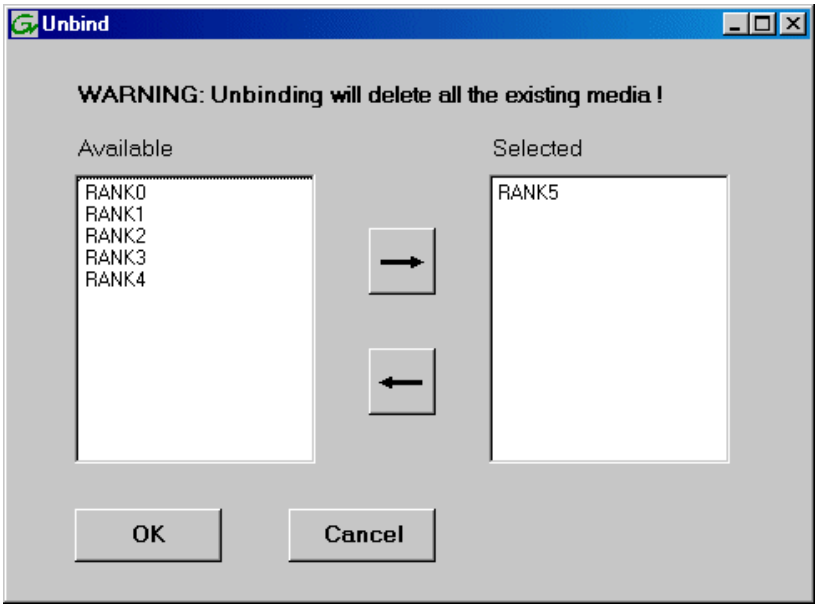
Refer to "About RANKs and LUNs in Storage Utility" in Chapter 15, *Overview of K2 Storage Tools*.

The requirements for this procedure are as follows:

- You must access Storage Utility (via the K2 System Configuration application login) with permissions equivalent to K2 administrator or higher.
- When you access Storage Utility, the K2 Storage System must be offline.
- All iSCSI clients and K2 Media Clients in the K2 Storage System must be shut down.

To unbind a RANK, do the following:

1. In the tree view, right-click the RANK and select **Unbind**.
2. When warning messages appear "…destroy all existing media…" and "Are you sure?", click **OK** to continue. The Unbind dialog box opens.



3. Verify that the RANK or RANKs you intend to unbind is in the Selected box. If not, select RANKs and click the arrow buttons until the RANKs you intend to bind are in the Selected box and the RANKs you do not intend to unbind are in the Available box.

NOTE: As an aid in identifying a disk module's physical location, select it in the Selected Disks list, then click* Identify Disks. *This causes the disk drive LED to flash.

4. Click **OK** to close the Unbind dialog box and begin the unbinding process. The Progress Report dialog box opens, showing the status of the unbinding process.
5. When progress reports 100% complete, the RANK is unbound.
6. Restart the K2 Media Server.

About full/background bind

When binding RAID disks, you can now choose to do either a full bind or a background bind. Background bind is recommended, which is a change from previous instructions, in which full bind only was allowed. These binding processes are described as follows:

- Full bind — During this process, the K2 Storage System must be in the offline mode. While the full bind process is underway, disks are not available for data access of any kind. On a large storage system, the full bind process can take many hours, so you should plan ahead for this process. For example, binding 750 Gig SATA drives can take up to 3 days.
- Background bind — During this process, the K2 Storage System can be in a restricted online mode. Disks are available for data access, but the overall performance of the RAID storage is significantly reduced. While the background bind process is underway, you can initiate media access on your storage system for limited testing of operations, such as record, play, and transfer, but do not run

media access at full bandwidth. The background bind process is useful when doing initial system installation and configuration, as it does not require the long wait time required for full bind. You can have RAID disks binding while you move on to other tasks that require RAID media access.

With either type of binding process, you should bind multiple RANKs simultaneously, to reduce the overall time required to bind disks.

Bind RANK

Binding disk modules formats them into a logical units called RANKs. The disks that make up a RANK are accessed as a contiguous disk space. Disk modules must be bound before they can be part of the video storage file system.

You can use the Storage Utility to bind disk modules as RAID 1, RAID 3, RAID 5, or as hot spare RANKs, depending on the storage needs of your system.

For simplicity, the Storage Utility only allows binding the first available (at the top of the Available Disks list) contiguous disk modules into RANKs. After binding, disk modules become slot specific and cannot be moved to other disk module slots.

Refer to "About RANKs and LUNs in Storage Utility" in Chapter 15, *Overview of K2 Storage Tools*.

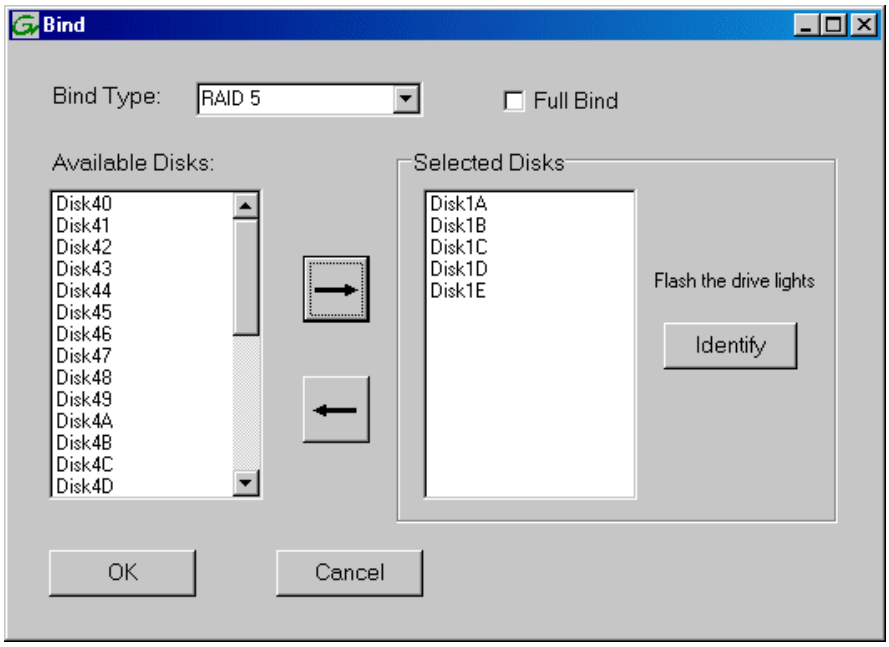
The requirements for this procedure are as follows:

- You must access Storage Utility (via the K2 System Configuration application login) with permissions equivalent to K2 administrator or higher.
- When you access Storage Utility, the K2 Storage System must be offline.
- All iSCSI clients and K2 Media Clients in the K2 Storage System must be shut down.

To bind a RANK, do the following:

1. In the tree view, right-click the **Unbound** node and select **Bind**. (Peer controllers that share the same set of disks are automatically selected as a pair.)

The Bind dialog box opens showing all unbound disks for the controller listed in the Available Disk list.



2. Leave **Full Bind** unchecked. Refer to the previous section "About full/background bind".
3. In the **Bind TYPE** drop down box, select the RAID type. Refer to the installation chapter earlier in this document for your level of storage system for specific instructions regarding RAID 1, 3, 5, and 6.
4. In the Available Disks box, select contiguous disks at the top of the list as appropriate for the RAID type. (TIP: Use 'shift-click' or 'control-click' to select disks.)
5. Click the add (arrow) button to add disks to the Selected Disks list.

NOTE: As an aid in identifying a disk module's physical location, select it in the Selected Disks list, then click* Identify Disks. *This causes the disk drive LED to flash.

6. Click **OK** to close the Bind dialog box and begin the binding process. The Progress Report dialog box opens, showing the status of the binding process.
7. Close the Progress Report and repeat these steps for other unbound disks.
8. Upon 100% completion, click **Close** in Progress Report window.
9. Restart the K2 Media Server.

Binding Hot Spare drives

You can bind disks as hot spare drives. Hot spare drives are on standby and are used in the event of a drive failure in a RANK. If a drive fails, the RAID Controller automatically selects a hot spare drive to use in place of the failed drive. This prevents the system from operating in a degraded state.

If the drives you want to designate as hot spares are bound as part of a RANK, you must unbind the drives first, then bind them as hot spares. To function as a Hot Spare, the drive must be at least as fast and have at least as much capacity as the failed drive it replaces.

The requirements for this procedure are as follows:

- You must access Storage Utility (via the K2 System Configuration application login) with permissions equivalent to K2 administrator or higher.
- When you access Storage Utility, the K2 Storage System must be offline.
- All iSCSI clients and K2 Media Clients in the K2 Storage System must be shut down.

To bind drives as hot spare drives, do the following:

1. In Storage Utility, right-click the **Unbound** node for a controller, then select **Bind** in the context menu. (Peer controllers that share the same set of disks are automatically selected as a pair.)

   The Binding dialog box opens showing all unbound disks for the controller listed in the Available Disk list.

2. Select **Hot Spare** using the BIND TYPE drop-down box.
3. In the Available Disks box, select the disk(s) to be used as hot spares, then click the add (arrow) button to add them to the Selected Disks list.

NOTE: As an aid in identifying a disk module's physical location, select it in the Selected Disks list, then click* Identify Disks. *This causes the disk drive LED to flash.

4. Click **OK** to close the Binding… dialog box and begin the binding process. The Progress Report dialog box opens, showing the status of the binding process.
5. Upon 100% completion, click **Close** in Progress Report window.
6. Restart the K2 Media Server.

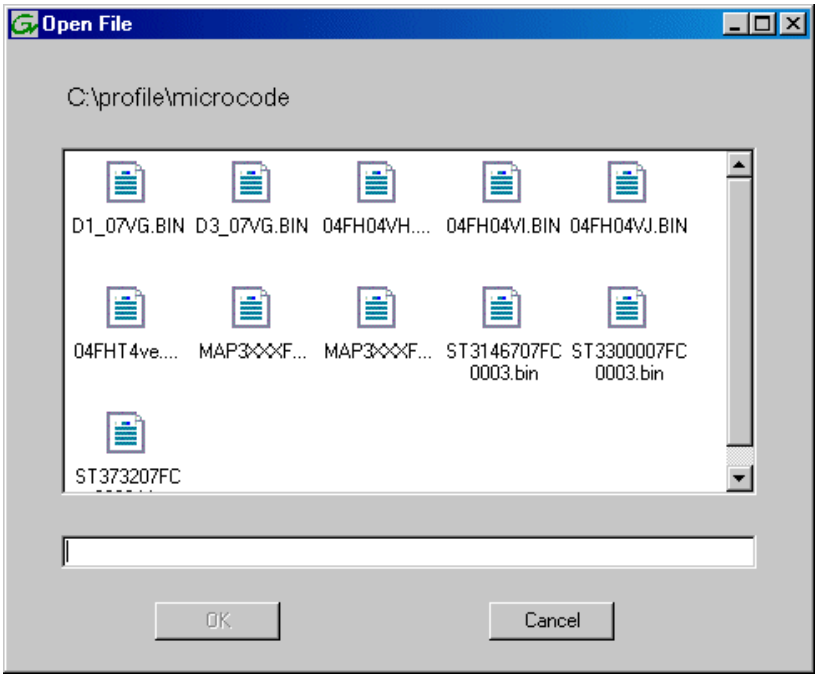
Loading RAID controller microcode

You might be instructed in K2 release notes to upgrade the RAID Controller microcode on the RAID chassis. This allows you to take advantage of the RAID enhancements and benefit from improved reliability.

To upgrade RAID Controller microcode, do the following:

1. In Storage Utility, right-click a controller in the tree view, then select **Advanced | Load Controller Microcode**. Redundant controllers that share the same set of disks are automatically selected and upgraded as a pair.

   The Open File dialog box appears.



2. In the Open File dialog box, browse to the latest controller microcode file for your controller, select the file, and click **OK**.
3. The Progress Report window appears showing the microcode upgrade task and the percentage completion.
4. On 100% completion, power cycle the RAID controller chassis, then restart the K2 Media Server.

Downloading disk drive firmware

You might be instructed in K2 release notes to upgrade disk drive firmware. This allows you to take advantage of the disk drive enhancements and benefit from improved performance and reliability.

To determine your disk drive type and current firmware version, select a disk drive icon in the Storage Utility tree view, then note the drive properties reported in the right-hand pane. Use the following procedure if you need to download disk drive firmware.

NOTE: The disk drives on each controller are upgraded one at a time which can take as long as 2 minutes per drive. Take this into consideration when scheduling the upgrade.

Requirements for this procedure are as follows:

- All K2 Media Clients and other clients must be powered down, or in some other way disconnected from the K2 Storage System.
- The K2 Media Server through which Storage Utility is connected to the RAID Storage must be powered up.

- All other K2 Media Servers must be powered down.

To download disk drive firmware, do the following:

1. Refer to *K2 Storage System Release Notes* to determine firmware types, versions, files, and any other special instructions regarding the particular disk drive firmware you are downloading.
2. In the Storage Utility, right-click a controller in the tree view, then select **Advanced | Download Disk Firmware** in the context menu. The Open File dialog box opens.

NOTE: You can download firmware to a single disk by right-clicking a disk icon in the tree view.

3. In the Open File dialog box, browse to the latest firmware file for your disks, select the file, and click.
4. Click **OK.**

   As instructed by a message that appears, watch the lights on the drives. For each drive, one at a time, the lights flash as firmware loads. Wait until the lights on all the drives on which you are downloading firmware have completed their flashing pattern. This can take several minutes.

   The Progress Report window appears showing the disk firmware download task and the percentage complete.
5. When finished, restart the K2 Media Server. For Level 2 and Level 3 RAID, restart the RAID storage devices as well.

Replacing a disk module

In the event of a disk drive failure, you'll repair the system by replacing the disk module as soon as possible. Refer to the Instruction Manual for your RAID storage chassis for information on removing and replacing disk modules.

NOTE: Always use Storage Utility to physically identify the failed disk module. Accidently removing the wrong disk module can destroy all media on the disk drives.

When the RAID controller detects that the disk module has failed, it automatically disables the disk module. This is reported in Storage Utility, and you should verify that the disk module is disabled before removing it.

In some cases you might suspect that the disk module is going bad, but the controller has not yet detected a failure and has therefore not yet disabled the drive. In this case you should manually disable the disk module before you remove it. This avoids momentary interruptions in signal output that can occur. The disabled state is persistent and the disk remains disabled even if the RAID chassis is restarted. After replacing the disabled disk module, the disk rebuild process starts automatically, which also enables the disk module.

To replace a disk module, do the following:

1. Open Storage Utility.
2. Expand the tree view to display bound disks.

NOTE: Disks modules may not be visible in the tree view if they are part of a newly bound RANK. You must restart your RAID chassis and the K2 Media Server to allow the drive modules to be seen in Storage Utility.

3. Identify the disk in question. Refer to "Identifying disks" on page 744.
4. Select the disk module icon and check its status, then proceed as follows:
   - If the disk module reports as disabled, proceed to the next step in this procedure.
   - If the disk module reports as online, right-click the disk module and select **Advanced | Disable Drive**, then click **OK** to continue. A message "…operation succeeded…" appears. The disk is disabled, as reported by the disk fault LED.

NOTE: If you accidentally disable the wrong disk module, you can enable it again by removing it and then replacing it in the chassis.

5. Remove and replace the disk module.

   Refer to procedures in the Instruction Manual for your RAID storage chassis.

   On inserting the replacement disk module, the RAID controller automatically starts rebuilding the drive. You can verify rebuild status by looking at the disk access LED on the front of the disk module, or by checking disk status in Storage Utility.
6. Wait approximately 1 minute for the disk to initialize.

   The disk ready LED is flashing.
7. To check rebuild status, do the following:
   - Select the replacement disk icon in Storage Utility, then view the disk status in the right-hand pane. You may need to refresh the Storage Utility display. On completion, the drive status changes from *Rebuilding* to *Online*.

Replacing a controller

If the RAID chassis has a single controller (non-redundant), you must take the K2 Storage System offline before replacing a failed controller. Refer to procedures in the Instruction Manual for your RAID storage chassis. The remainder of this procedure does not apply to non-redundant systems.

If the RAID chassis has redundant controllers and is properly cabled and configured for a redundant K2 Storage System, you can replace a failed controller while media access is underway, as described in this procedure. When a controller detects a fault on its redundant partner controller, the good controller disables the faulty controller automatically. In most cases an error message informs you of the fault and when you check the controller's status in Storage Utility it reports as disabled.

However, you can also manually disable a controller. In the event that one of the RAID controllers appears operational, but also reports faults through various log files and status indicators, you can choose to disable the controller and replace it. Disabling the controller and removing it in this way avoids interruptions in signal output that can occur if the module fails or if it is simply hot swapped while it is the active controller. When the replacement RAID controller module is installed, it is automatically enabled and becomes the backup controller.

On a Level 3 or a Level 10/20/30 primary RAID chassis with two controllers, if the replacement controller's firmware is not the same as the firmware on the redundant (currently installed) controller, the firmware on the replacement controller is automatically upgraded or downgraded to match the current system level firmware.

NOTE: Refer to the Instruction Manual for your RAID storage chassis for procedures on removing and replacing the RAID controller module.

To replace a controller, do the following:

1. Open the Storage Utility.
2. Expand the tree view to display the controllers.
3. Select the controller and check its status, then proceed as follows:
   - If the faulty controller reports as disabled, proceed to the next step in this procedure.
   - If the faulty controller reports as online, right-click the controller icon in the tree view, and select **Advanced | Disable Controller 0** or **Disable Controller 1**, then click **OK** to continue.

     The RAID controller is disabled. You can check controller status in the Storage Utility. You may need to refresh the display.

NOTE: If you accidentally disable the wrong controller, you can enable it again by removing it and then replacing it in the chassis.

4. Remove and replace the disabled RAID controller module.

   Refer to procedures in the Instruction Manual for your RAID storage chassis.
5. On inserting the replacement RAID controller, it initializes and is automatically enabled to become the "backup" RAID controller.

Upgrading to L30 controllers

NOTE: Do not attempt this procedure without first consulting Grass Valley Support.

You can upgrade your RAID chassis from Level 10/20 controllers (NEC D1-10) to Level 30 controllers (NEC D3-10). If this is part of expanding the media file system, refer to "Expanding the media file system by capacity" on page 721 and "Expanding the media file system by bandwidth" on page 722.

If you do not change the number of Expansion chassis or their cabling pattern, no special preparations are required before changing the controllers.

If you add Expansion chassis, you need to decide their cabling pattern before changing the controllers. With the Level 30 controller you have the DP1 port available, and Expansion chassis should be balanced between DP0 and DP1. If you can accomplish this by connecting the added Expansion chassis to DP1, no special preparations are required before changing the controllers.

If you decide you need to change the RAID topology and alter the cabling of existing Expansion chassis, you must unbind all existing RAID disks before shutting down the system. Failure to do so results in a configuration mismatch and controller faults.

NOTE: Refer to the Instruction Manual for your RAID storage chassis for procedures on removing and replacing the RAID controller module.

To upgrade controllers, do the following:

1. Power down the entire K2 Storage System, including all RAID devices.
2. Remove cabling to controllers.
3. Remove the Level 10/20 controller or controllers.
4. Insert the Level 30 controller or controllers.
5. Re-cable controller or controllers. If you do not plan to rebind RAID disks, you must connect existing Expansion chassis just as they were before.
6. Connect added Expansion chassis, if any.
7. Power up the K2 Storage System.
8. Download RAID controller microcode, as instructed in "Loading RAID controller microcode" on page 751. Refer to *K2 Storage System Release Notes* for microcode version.
9. Proceed as follows:
   - If you did not add Expansion chassis or otherwise change the topology, the upgrade procedure is complete.
   - If you added or re-cabled Expansion chassis, depending on the changes you are making, do one or more of the following:
     - Bind disks
     - Make a new file system
     - Expand the file system

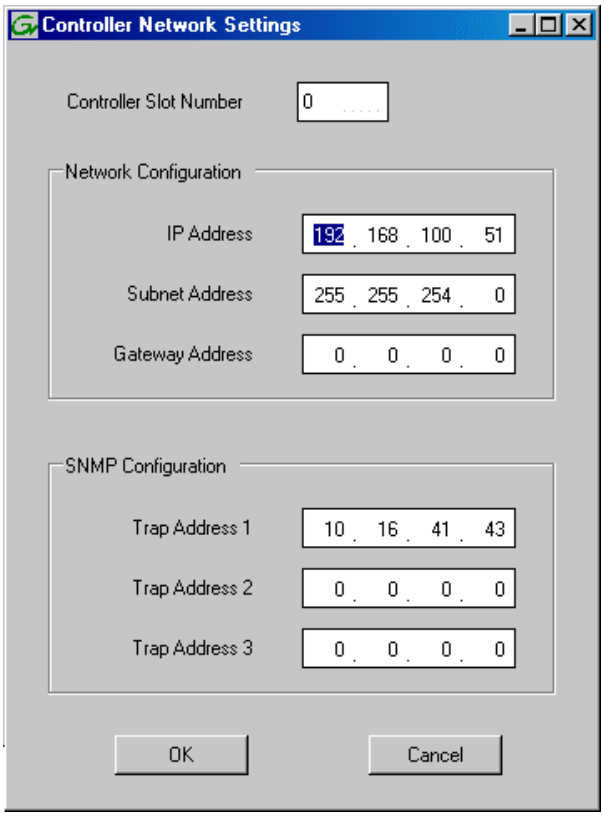
Configuring Level 2 RAID chassis network and SNMP settings

Through Storage Utility you can configure the following settings on a RAID chassis:

- IP address
- Subnet mask
- Gateway Address
- SNMP trap destinations

For the Level 2 RAID chassis, network and SNMP settings are set and stored on the LAN card. Therefore, if the RAID chassis has two RAID controllers, they are configured as a single device, as in the following procedure.

1. In the Storage Utility, right-click the icon for a RAID controller and select **Configuration | Network Properties**. The Network Settings dialog box opens.



2. Enter network settings.
3. For each SNMP manager to which you want to send SNMP trap messages, enter the IP address of the PC hosting the manager. For monitoring with NetCentral, enter the IP address of the NetCentral server PC.
4. Click **OK** to save settings and close.
5. Restart the RAID chassis to put SNMP configuration changes into effect.

Configuring Level 3, 10, 20, 30 RAID chassis network and SNMP settings

Through Storage Utility you can configure the following settings on a RAID chassis:

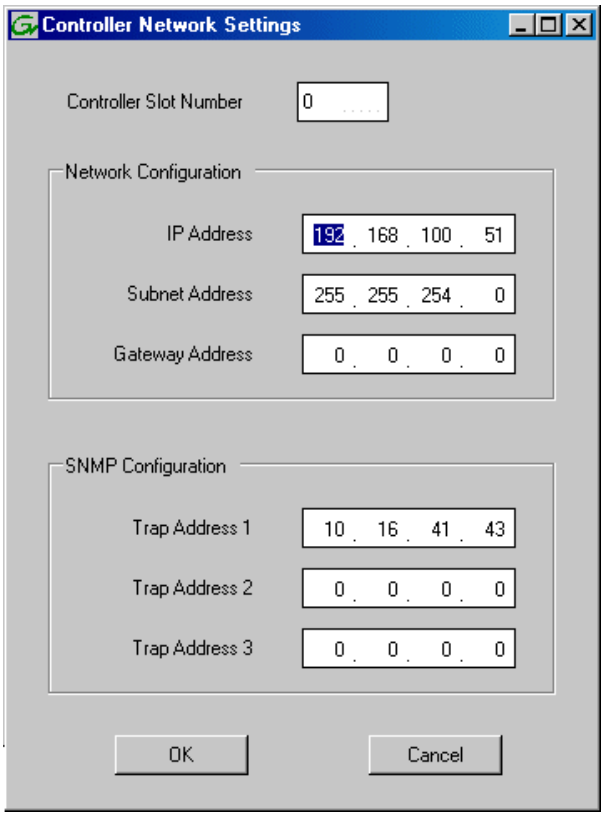
- IP address
- Subnet mask
- Gateway Address
- SNMP trap destinations

For the Level 3, 10, 20, or 30 RAID chassis, network and SNMP settings are set and stored on the RAID controller. Therefore, if the RAID chassis has two controllers, each controller must be configured separately, as in the following procedure.

1. In the K2 System Configuration application tree view, open the node for a K2 Media Server and select the **File System Server** node to open its property page. On

the property page click **Launch Storage Utility**. Storage Utility opens.You can now configure the network settings on the controller connected to the selected K2 Media Server.

2. In the Storage Utility, right-click the icon for a RAID controller and select **Configuration | Network Properties**. The Network Settings dialog box opens.



3. In the Controller Slot Number field enter **0** and then press **Enter**. The settings from controller 0 are loaded into the Controller Network Settings dialog box and are available for you to modify.
4. Enter the control network IP address and other network settings.
5. You want SNMP trap messages go to the NetCentral server PC, so for SNMP Configuration enter the IP address of the NetCentral server PC. You can also enter IP addresses for other SNMP managers to which you want to send SNMP trap messages.
6. If the RAID chassis has two controllers, in the Controller Slot Number field enter **1** and then press **Enter**. The settings from controller 1 are loaded into the Controller Network Settings dialog box and are available for you to modify. Repeat the previous steps to configure controller 1.
7. Click **OK** to save settings and close.
8. Restart the RAID chassis to put SNMP configuration changes into effect.

Working with Ethernet switches

Use the following sections when designing, configuring, or servicing a Gigabit Ethernet switch that is part of an existing K2 Storage System.

Design considerations for Ethernet switches

The following information was qualified using the HP ProCurve switch. You must use the HP ProCurve switch for iSCSI traffic. However, for control and FTP/streaming traffic, it is allowed to use a different brand of switch, such as a Cisco Catalyst switch, if required by your site. If you are using a non-HP switch, apply the information accordingly. Refer to the documentation you received with the switch as necessary.

The primary factors that influence the number and configuration of switches on a K2 Storage System are as follows:

- Redundancy — Non-redundant K2 Storage Systems have only one media (iSCSI) network and can operate with a single switch. Redundant K2 Storage Systems have an "A" media network and a "B" media network and require at least two switches, so that the A network and the B network never share the same switch. Media traffic does not cross between an "A" switch and a "B" switch, so if there are Inter-Switch Links (ISLs) between redundant switches, media traffic does not use these ISLs.
- Separation of iSCSI traffic — Media (iSCSI) traffic must be kept separate from control traffic, FTP/streaming traffic, and any other type of traffic. The recommended way to provide this separation is to configure each switch to have two VLANs, with half the switch's ports on each VLAN. The media (iSCSI) traffic uses one VLAN and all other traffic uses the other VLAN. This "other" traffic can include both FTP and control traffic, as it is allowed that they be on the same VLAN. On very large multiple switch systems, designers with sufficient knowledge can use other options for providing the separation of iSCSI traffic, such as using one switch or fabric exclusively for media traffic and another switch or fabric exclusively for non-media traffic. Also refer to "About networks and FTP" on page 684 and the "Networking for level …" section in the chapter for your level of K2 Storage System elsewhere in this manual for more information about IP addresses, subnets, host tables, and other networking techniques required to keep traffic separate.
- FTP bandwidth — This is a consideration if using multiple switches that share the FTP traffic. In this case you must use sufficient ISLs to provide the bandwidth needed to support your FTP traffic load between switches. Only control traffic and FTP traffic use ISLs, but since FTP traffic is more variable and has potentially higher bandwidth needs, it is the primary consideration when designing ISLs. You do not need to consider iSCSI bandwidth on ISLs.

  Using three 1 Gig ISLs to connect switches is the default configuration for all K2 Storage Systems. This provides sufficient bandwidth for most FTP traffic loads and keeps the 10 Gig ports on the switch available for connection to the optional NH1-10GE server. Other ISL configurations are also available, as explained below.

  Connect and configure ISLs only as specified in the following table, taking your

FTP bandwidth into consideration:

Maximum FTP bandwidth	Trunk/ISLs required
Less than 100 MB/sec	A trunk with three 1 Gb/s ISLs
100 - 300 MB/sec	A trunk with five 1 Gb/s ISLs
More than 300 MB/sec	A trunk with two 10 Gb/s ISLs

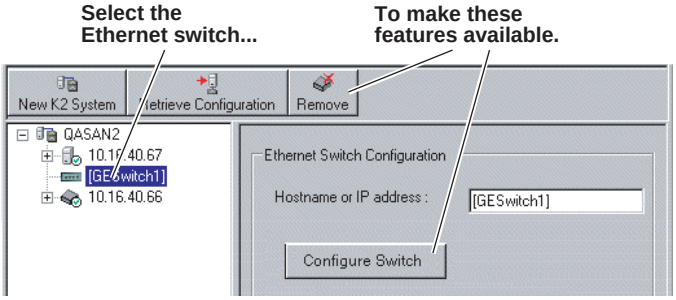
NOTE: One Gig ISLs must be an odd number (3 or 5).

- Port count — The number of client connections, server connections, FTP/streaming connections, and other connections determine how many ports are required. As the port count increases, you must use switches with more ports and/or multiple switches. When multiple switches are used, the port count assigned to each VLAN and the ports used for ISLs must be considered.

Based on these factors, determine the number of switches, the number of ports on each switch, and the ISLs required for your system needs. You can find procedures for configuring the HP ProCurve switch in the chapters elsewhere in this manual for installing each level. Adapt the procedures according to your switch design as you configure your switches.

Configuring a switch through the K2 Configuration application

In the K2 Configuration Application, features for working on a Ethernet switch are as follows:



From the K2 System Configuration application, you can click the **Configure Switch** button to open the switch's web configuration application. Refer to the installation procedures elsewhere in this document for switch configuration information.

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