MORPHEUS

AUTOMATION

Playout Information REST API

2019-05-07

FCC Compliance

In order to comply with FCC/CFR47: Part 15 regulations, it is necessary to use high-quality triple-screened Media or Monitor cable assemblies with integrated ferrite suppression at both ends.

Patent Information

This product may be protected by one or more patents.

For further information, please visit: www.grassvalley.com/patents/

Copyright and Trademark Notice

Terms and Conditions

Important Safety Information

This section provides important safety guidelines for operators and service personnel. Specific warnings and cautions appear throughout the manual where they apply. Please read and follow this important information, especially those instructions related to the risk of electric shock or injury to persons.

Symbols and Their Meanings

Indicates that dangerous high voltage is present within the equipment enclosure that may be of sufficient magnitude to constitute a risk of electric shock.

Indicates that the user, operator or service technician should refer to the product manuals for important operating, maintenance, or service instructions.

This is a prompt to note the fuse rating when replacing fuses. The fuse referenced in the text must be replaced with one having the ratings indicated.

Identifies a protective grounding terminal which must be connected to earth ground prior to making any other equipment connections.
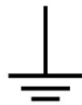
Identifies an external protective grounding terminal which may be connected to earth ground as a supplement to an internal grounding terminal.

Indicates that static sensitive components are present, which may be damaged by electrostatic discharge. Use anti-static procedures, equipment and surfaces during servicing.

Indicates that the equipment has more than one power supply cord, and that all power supply cords must be disconnected before servicing to avoid electric shock.

The presence of this symbol in or on Grass Valley equipment means that it has been tested and certified as complying with applicable Underwriters Laboratory (UL) regulations and recommendations for USA.

The presence of this symbol in or on Grass Valley equipment means that it has been tested and certified as complying with applicable Canadian Standard Association (CSA) regulations and recommendations for USA/Canada.

The presence of this symbol in or on Grass Valley equipment means that it has been tested and certified as complying with applicable Underwriters Laboratory (UL) regulations and recommendations for USA/Canada.

The presence of this symbol in or on Grass Valley equipment means that it has been tested and certified as complying with applicable Intertek Testing Services regulations and recommendations for USA/Canada.

The presence of this symbol in or on Grass Valley product means that it complies with all applicable European Union (CE) directives.

The presence of this symbol in or on Grass Valley product means that it complies with safety of laser product applicable standards.

Warnings

A warning indicates a possible hazard to personnel, which may cause injury or death. Observe the following general warnings when using or working on this equipment:

• Appropriately listed/certified mains supply power cords must be used for the connection of the equipment to the rated mains voltage.

• This product relies on the building's installation for short-circuit (over-current) protection. Ensure that a fuse or circuit breaker for the rated mains voltage is used on the phase conductors.

• Any instructions in this manual that require opening the equipment cover or enclosure are for use by qualified service personnel only.

• Do not operate the equipment in wet or damp conditions.

• This equipment is grounded through the grounding conductor of the power cords. To avoid electrical shock, plug the power cords into a properly wired receptacle before connecting the equipment inputs or outputs.

• Route power cords and other cables so they are not likely to be damaged. Properly support heavy cable bundles to avoid connector damage.

• Disconnect power before cleaning the equipment. Do not use liquid or aerosol cleaners; use only a damp cloth.

• Dangerous voltages may exist at several points in this equipment. To avoid injury, do not touch exposed connections and components while power is on.

• High leakage current may be present. Earth connection of product is essential before connecting power.

• Prior to servicing, remove jewelry such as rings, watches, and other metallic objects.

• To avoid fire hazard, use only the fuse type and rating specified in the service instructions for this product, or on the equipment.

• To avoid explosion, do not operate this equipment in an explosive atmosphere.

• Use proper lift points. Do not use door latches to lift or move equipment.

• Avoid mechanical hazards. Allow all rotating devices to come to a stop before servicing.

• Have qualified service personnel perform safety checks after any service.

Cautions

A caution indicates a possible hazard to equipment that could result in equipment damage. Observe the following cautions when operating or working on this equipment:

• This equipment is meant to be installed in a restricted access location.

• When installing this equipment, do not attach the power cord to building surfaces.

• Products that have no on/off switch, and use an external power supply must be installed in proximity to a main power outlet that is easily accessible.

• Use the correct voltage setting. If this product lacks auto-ranging power supplies, before applying power ensure that each power supply is set to match the power source.

• Provide proper ventilation. To prevent product overheating, provide equipment ventilation in accordance with the installation instructions.

- Do not operate with suspected equipment failure. If you suspect product damage or equipment failure, have the equipment inspected by qualified service personnel.
- To reduce the risk of electric shock, do not perform any servicing other than that contained in the operating instructions unless you are qualified to do so. Refer all servicing to qualified service personnel.
- This unit may have more than one power supply cord. Disconnect all power supply cords before servicing to avoid electric shock.
- Follow static precautions at all times when handling this equipment. Servicing should be done in a static-free environment.
- To reduce the risk of electric shock, plug each power supply cord into separate branch circuits employing separate service grounds.

Electrostatic Discharge (ESD) Protection

Electrostatic discharge occurs when electronic components are improperly handled and can result in intermittent failure or complete damage adversely affecting an electrical circuit. When you remove and replace any card from a frame always follow ESD-prevention procedures:

- Ensure that the frame is electrically connected to earth ground through the power cord or any other means if available.
- Wear an ESD wrist strap ensuring that it makes good skin contact. Connect the grounding clip to an *unpainted surface* of the chassis frame to safely ground unwanted ESD voltages. If no wrist strap is available, ground yourself by touching the *unpainted* metal part of the chassis.
- For safety, periodically check the resistance value of the antistatic strap, which should be between 1 and 10 megohms.
- When temporarily storing a card make sure it is placed in an ESD bag.
- Cards in an earth grounded metal frame or casing do not require any special ESD protection.

Battery Handling

This product may include a backup battery. There is a danger of explosion if the battery is replaced incorrectly. Replace the battery only with the same or equivalent type recommended by the manufacturer. Dispose of used batteries according to the manufacturer's instructions. Before disposing of your Grass Valley equipment, please review the *Disposal and Recycling Information* at:

http://www.grassvalley.com/assets/media/5692/Take-Back_Instructions.pdf

Cautions for LCD and TFT Displays

Excessive usage may harm your vision. Rest for 10 minutes for every 30 minutes of usage.

If the LCD or TFT glass is broken, handle glass fragments with care when disposing of them. If any fluid leaks out of a damaged glass cell, be careful not to get the liquid crystal fluid in your mouth or skin. If the liquid crystal touches your skin or clothes, wash it off immediately using soap and water. Never swallow the fluid. The toxicity is extremely low but caution should be exercised at all times.

Mesures de sécurité et avis importants

La présente section fournit des consignes de sécurité importantes pour les opérateurs et le personnel de service. Des avertissements ou mises en garde spécifiques figurent dans le manuel, dans les sections où ils s'appliquent. Prenez le temps de bien lire les consignes et assurez-vous de les respecter, en particulier celles qui sont destinées à prévenir les décharges électriques ou les blessures.

Signification des symboles utilisés

Signale la présence d'une tension élevée et dangereuse dans le boîtier de l'équipement ; cette tension peut être suffisante pour constituer un risque de décharge électrique.

Avertit l'utilisateur, l'opérateur ou le technicien de maintenance que des instructions importantes relatives à l'utilisation et à l'entretien se trouvent dans la documentation accompagnant l'équipement.

Invite l'utilisateur, l'opérateur ou le technicien de maintenance à prendre note du calibre du fusible lors du remplacement de ce dernier. Le fusible auquel il est fait référence dans le texte doit être remplacé par un fusible du même calibre.

Identifie une borne de mise à la terre de protection. Il faut relier cette borne à la terre avant d'effectuer toute autre connexion à l'équipement.

Identifie une borne de mise à la terre externe qui peut être connectée en tant que borne de mise à la terre supplémentaire.

Signale la présence de composants sensibles à l'électricité statique et qui sont susceptibles d'être endommagés par une décharge électrostatique. Utilisez des procédures, des équipements et des surfaces antistatiques durant les interventions d'entretien.

Le symbole ci-contre signifie que l'appareil comporte plus d'un cordon d'alimentation et qu'il faut débrancher tous les cordons d'alimentation avant toute opération d'entretien, afin de prévenir les chocs électriques.

La marque UL certifie que l'appareil visé a été testé par Underwriters Laboratory (UL) et reconnu conforme aux exigences applicables en matière de sécurité électrique en vigueur au Canada et aux États-Unis.

La marque C-CSA-US certifie que l'appareil visé a été testé par l'Association canadienne de normalisation (CSA) et reconnu conforme aux exigences applicables en matière de sécurité électrique en vigueur au Canada et aux États-Unis.

La marque C-UL-US certifie que l'appareil visé a été testé par Underwriters Laboratory (UL) et reconnu conforme aux exigences applicables en matière de sécurité électrique en vigueur au Canada et aux États-Unis.

La marque ETL Listed d'Intertek pour le marché Nord-Américain certifie que l'appareil visé a été testé par Intertek et reconnu conforme aux exigences applicables en matière de sécurité électrique en vigueur au Canada et aux États-Unis.

Le marquage CE indique que l'appareil visé est conforme aux exigences essentielles des directives applicables de l'Union européenne en matière de sécurité électrique, de compatibilité électromagnétique et de conformité environnementale.

Le symbole ci-contre sur un appareil Grass Valley ou à l'intérieur de l'appareil indique qu'il est conforme aux normes applicables en matière de sécurité laser.

Avertissements

Les avertissements signalent des conditions ou des pratiques susceptibles d'occasionner des blessures graves, voire fatales. Veuillez vous familiariser avec les avertissements d'ordre général ci-dessous :

- Un cordon d'alimentation dûment homologué doit être utilisé pour connecter l'appareil à une tension de secteur de 120 V CA ou 240 V CA.

- La protection de ce produit contre les courts-circuits (surintensités) dépend de l'installation électrique du bâtiment. Assurez-vous qu'un fusible ou un disjoncteur pour 120 V CA ou 240 V CA est utilisé sur les conducteurs de phase.

- Dans le présent manuel, toutes les instructions qui nécessitent d'ouvrir le couvercle de l'équipement sont destinées exclusivement au personnel technique qualifié.

- N'utilisez pas cet appareil dans un environnement humide.

- Cet équipement est mis à la terre par le conducteur de mise à la terre des cordons d'alimentation. Pour éviter les chocs électriques, branchez les cordons d'alimentation sur une prise correctement câblée avant de brancher les entrées et sorties de l'équipement.

- Acheminez les cordons d'alimentation et autres câbles de façon à ce qu'ils ne risquent pas d'être endommagés. Supportez correctement les enroulements de câbles afin de ne pas endommager les connecteurs.

- Coupez l'alimentation avant de nettoyer l'équipement. Ne pas utiliser de nettoyants liquides ou en aérosol. Utilisez uniquement un chiffon humide.

- Des tensions dangereuses peuvent exister en plusieurs points dans cet équipement. Pour éviter toute blessure, ne touchez pas aux connexions ou aux composants exposés lorsque l'appareil est sous tension.

- Avant de procéder à toute opération d'entretien ou de dépannage, enlevez tous vos bijoux (notamment vos bagues, votre montre et autres objets métalliques).

- Pour éviter tout risque d'incendie, utilisez uniquement les fusibles du type et du calibre indiqués sur l'équipement ou dans la documentation qui l'accompagne.

- Ne pas utiliser cet appareil dans une atmosphère explosive.

- Présence possible de courants de fuite. Un raccordement à la masse est indispensable avant la mise sous tension.

- Après tout travail d'entretien ou de réparation, faites effectuer des contrôles de sécurité par le personnel technique qualifié.

Mises en garde

Les mises en garde signalent des conditions ou des pratiques susceptibles d'endommager l'équipement. Veuillez vous familiariser avec les mises en garde ci-dessous :

- L'appareil est conçu pour être installé dans un endroit à accès restreint.

- Au moment d'installer l'équipement, ne fixez pas les cordons d'alimentation aux surfaces intérieures de l'édifice.

- Les produits qui n'ont pas d'interrupteur marche-arrêt et qui disposent d'une source d'alimentation externe doivent être installés à proximité d'une prise de courant facile d'accès.

- Si l'équipement n'est pas pourvu d'un modules d'alimentation auto-adaptables, vérifiez la configuration de chacun des modules d'alimentation avant de les mettre sous tension.

- Assurez une ventilation adéquate. Pour éviter toute surchauffe du produit, assurez une ventilation de l'équipement conformément aux instructions d'installation.

- N'utilisez pas l'équipement si vous suspectez un dysfonctionnement du produit. Faites-le inspecter par un technicien qualifié.

- Pour réduire le risque de choc électrique, n'effectuez pas de réparations autres que celles qui sont décrites dans le présent manuel, sauf si vous êtes qualifié pour le faire. Confiez les réparations à un technicien qualifié. La maintenance doit se réaliser dans un milieu libre d'électricité statique.

- L'appareil peut comporter plus d'un cordon d'alimentation. Afin de prévenir les chocs électriques, débrancher tous les cordons d'alimentation avant toute opération d'entretien.

- Veillez à toujours prendre les mesures de protection antistatique appropriées quand vous manipulez l'équipement.

- Pour réduire le risque de choc électrique, branchez chaque cordon d'alimentation dans des circuits de dérivation distincts utilisant des zones de service distinctes.

Protection contre les décharges électrostatiques (DES)

Une décharge électrostatique peut se produire lorsque des composants électroniques ne sont pas manipulés de manière adéquate, ce qui peut entraîner des défaillances intermittentes ou endommager irrémédiablement un circuit électrique. Au moment de remplacer une carte dans un châssis, prenez toujours les mesures de protection antistatique appropriées :

- Assurez-vous que le châssis est relié électriquement à la terre par le cordon d'alimentation ou tout autre moyen disponible.

- Portez un bracelet antistatique et assurez-vous qu'il est bien en contact avec la peau. Connectez la pince de masse à une *surface non peinte* du châssis pour détourner à la terre toute tension électrostatique indésirable. En l'absence de bracelet antistatique, déchargez l'électricité statique de votre corps en touchant une surface métallique *non peinte* du châssis.

- Pour plus de sécurité, vérifiez périodiquement la valeur de résistance du bracelet antistatique. Elle doit se situer entre 1 et 10 mégohms.

- Si vous devez mettre une carte de côté, assurez-vous de la ranger dans un sac protecteur antistatique.

- Les cartes qui sont reliées à un châssis ou boîtier métallique mis à la terre ne nécessitent pas de protection antistatique spéciale.

Manipulation de la pile

Ce produit peut inclure une pile de sauvegarde. Il y a un risque d'explosion si la pile est remplacée de manière incorrecte. Remplacez la pile uniquement par un modèle identique ou équivalent recommandé par le fabricant. Disposez des piles usagées conformément aux instructions du fabricant. Avant de vous séparer de votre équipement Grass Valley, veuillez consulter les *informations de mise au rebut et de recyclage* à:

http://www.grassvalley.com/assets/media/5692/Take-Back_Instructions.pdf

Précautions pour les écrans LCD et TFT

Regarder l'écran pendant une trop longue période de temps peut nuire à votre vision. Prenez une pause de 10 minutes, après 30 minutes d'utilisation.

Si l'écran LCD ou TFT est brisé, manipulez les fragments de verre avec précaution au moment de vous en débarrasser. veillez à ce que le cristal liquide n'entre pas en contact avec la peau ou la bouche. En cas de contact avec la peau ou les vêtements, laver immédiatement à l'eau savonneuse. Ne jamais ingérer le liquide. La toxicité est extrêmement faible, mais la prudence demeure de mise en tout temps.

Environmental Information

European (CE) WEEE directive.

This symbol on the product(s) means that at the end of life disposal it should not be mixed with general waste.

Visit www.grassvalley.com for recycling information.

Grass Valley believes this environmental information to be correct but cannot guarantee its completeness or accuracy since it is based on data received from sources outside our company. All specifications are subject to change without notice.

If you have questions about Grass Valley environmental and social involvement (WEEE, RoHS, REACH, etc.), please contact us at environment@grassvalley.com.

Lithium Batteries

Battery Warning

<div style="background-color: yellow; border: 1px solid black;">

CAUTION

This equipment contains a lithium battery.

There is a danger of explosion if this is replaced incorrectly.

Replace only with the same or equivalent type.

Dispose of used batteries according to the manufacturer's instructions.

Batteries <u>shall only</u> be replaced by trained service technicians.

</div>

Your Grass Valley equipment usually comes with at least one button battery located on the main printed circuit board. The batteries are used for backup and should not need to be replaced during the lifetime of the equipment.

Battery Disposal

Before disposing of your Grass Valley equipment, please remove the battery as follows:

1 Make sure the AC adapter / power Cord is unplugged from the power outlet.

2 Remove the protective cover from your equipment.

3 Gently remove the battery from its holder using a blunt instrument for leverage such as a screwdriver if necessary. In some cases the battery will need to be desoldered from the PCB.

4 Dispose of the battery and equipment according to your local environmental laws and guidelines.

> WARNING
> - Be careful not to short-circuit the battery by adhering to the appropriate safe handling practices.
> - Do not dispose of batteries in a fire as they may explode.
> - Batteries may explode if damaged or overheated.
> - Do not dismantle, open or shred batteries.
> - In the event of a battery leak, do not allow battery liquid to come in contact with skin or eyes.
> - Seek medical help immediately in case of ingestion, inhalation, skin or eye contact, or suspected exposure to the contents of an opened battery.

Laser Safety - Fiber Output SFP and QSFP Modules Warning

LASER SAFETY

CLASS 1
LASER PRODUCT

The average optical output power does not exceed 0 dBm (1mW) under normal operating conditions. Unused optical outputs should be covered to prevent direct exposure to the laser beam.

Even though the power of these lasers is low, the beam should be treated with caution and common sense because it is intense and concentrated. Laser radiation can cause irreversible and permanent damage of eyesight. Please read the following guidelines carefully:

- Make sure that a fiber is connected to the board's fiber outputs before power is applied. If a fiber cable (e.g. patchcord) is already connected to an output, make sure that the cable's other end is connected, too, before powering up the board.

- **Do not** look in the end of a fiber to see if light is coming out. The laser wavelengths being used are totally invisible to the human eye and can cause permanent damage. Always use optical instrumentation, such as an optical power meter, to verify light output.

Mains Supply Voltage

Before connecting the equipment, observe the safety warnings section and ensure that the local mains supply is within the rating stated on the rear of the equipment.

Safety and EMC Standards

This equipment complies with the following standards:

Safety Standards

Information Technology Equipment - Safety Part 1

EN60950-1: 2006

Safety of Information Technology Equipment Including Electrical Business Equipment.

UL1419 (4th Edition)

Standard for Safety – Professional Video and Audio equipment (UL file number E193966)

EMC Standards

This unit conforms to the following standards:

EN55032:2015 (Class A)

Electromagnetic Compatibility of multimedia equipment - Emission requirements

EN61000-3-2:2014 (Class A)

Electromagnetic Compatibility - Limits for harmonic current emissions

EN61000-3-3:2013

Electromagnetic Compatibility - Limits of voltage changes, voltage fluctuations and flicker

EN55103-2:2009 (Environment E2)

Electromagnetic Compatibility, Product family standard for audio, video, audio-visual and entertainment lighting control apparatus for professional use. Part 2. Immunity

> WARNING
> This equipment is compliant with Class A of CISPR 32. In a residential environment this equipment may cause radio interference.

FCC / CFR 47:Part 15 (Class A)

Federal Communications Commission Rules Part 15, Subpart B

Caution to the user that changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

> Note: 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.

EMC Performance of Cables and Connectors

Grass Valley products are designed to meet or exceed the requirements of the appropriate European EMC standards. In order to achieve this performance in real installations it is essential to use cables and connectors with good EMC characteristics.

All signal connections (including remote control connections) shall be made with screened cables terminated in connectors having a metal shell. The cable screen shall have a large-area contact with the metal shell.

SIGNAL/DATA PORTS

For unconnected signal/data ports on the unit, fit shielding covers. For example, fit EMI blanking covers to SFP+ type ports; and fit 75 Ω RF terminators to BNC type ports

COAXIAL CABLES

Coaxial cables connections (particularly serial digital video connections) shall be made with high-quality double-screened coaxial cables such as Belden 8281 or BBC type PSF1/2M and Belden 1694A (for 3Gbps).

D-TYPE CONNECTORS

D-type connectors shall have metal shells making good RF contact with the cable screen. Connectors having "dimples" which improve the contact between the plug and socket shells, are recommended.

Table of Contents

Introduction

This document describes the functionality, installation, and configuration of the following REST API:

- PlayoutInformationApi

The function of the PlayoutInformationApi is to receive HTTP requests from an independent Client Application (not supplied) containing queries, and to respond with a report containing Event Parameters and their values from the EventStream Aggregator. Only those Event Parameters defined in the EventStream Aggregator model can be reported on (refer to EventStream Aggregator Model Configuration).

> Note: HTTP requests can also be transmitted to the API using a command line tool such as 'cURL' for testing purposes (refer to cURL).

Reports from the API are limited to customer specific Event Parameters that relate to past and / or future main events that are on a channel that is on-air (subevents and break headers cannot be reported upon).

> Note: In a Panoplay environment, only the on-air system is reported upon.

The following intrinsic Event Parameters are supported by default:

- StartTime
- EndTime
- Duration
- EventIdentifier

Other Event Parameters must be configured in order to be supported, for example:

- CarrierLabel
- EventName
- ScheduledEventType
- WebPublicationKey
- WhatsOnCategory

> Note: Event Parameters are configured in the EventStore. If configured to be 'Visible', they will appear in the 'Editor Property Inspector'.

Acceptance or denial of the query parameters contained within an HTTP request are controlled by configurable authorisations within the *PlayoutInformationApi.json* file that is loaded into the EventStream Aggregator.

> Note: For details relating to the HTTP request syntax, refer to The API Request: URL Query Syntax.
>
> For information relating to the *PlayoutInformationApi.json* file syntax, refer to PlayoutInformationApi JSON Syntax.

Figure 1-1 below displays a logical view of the communication architecture.
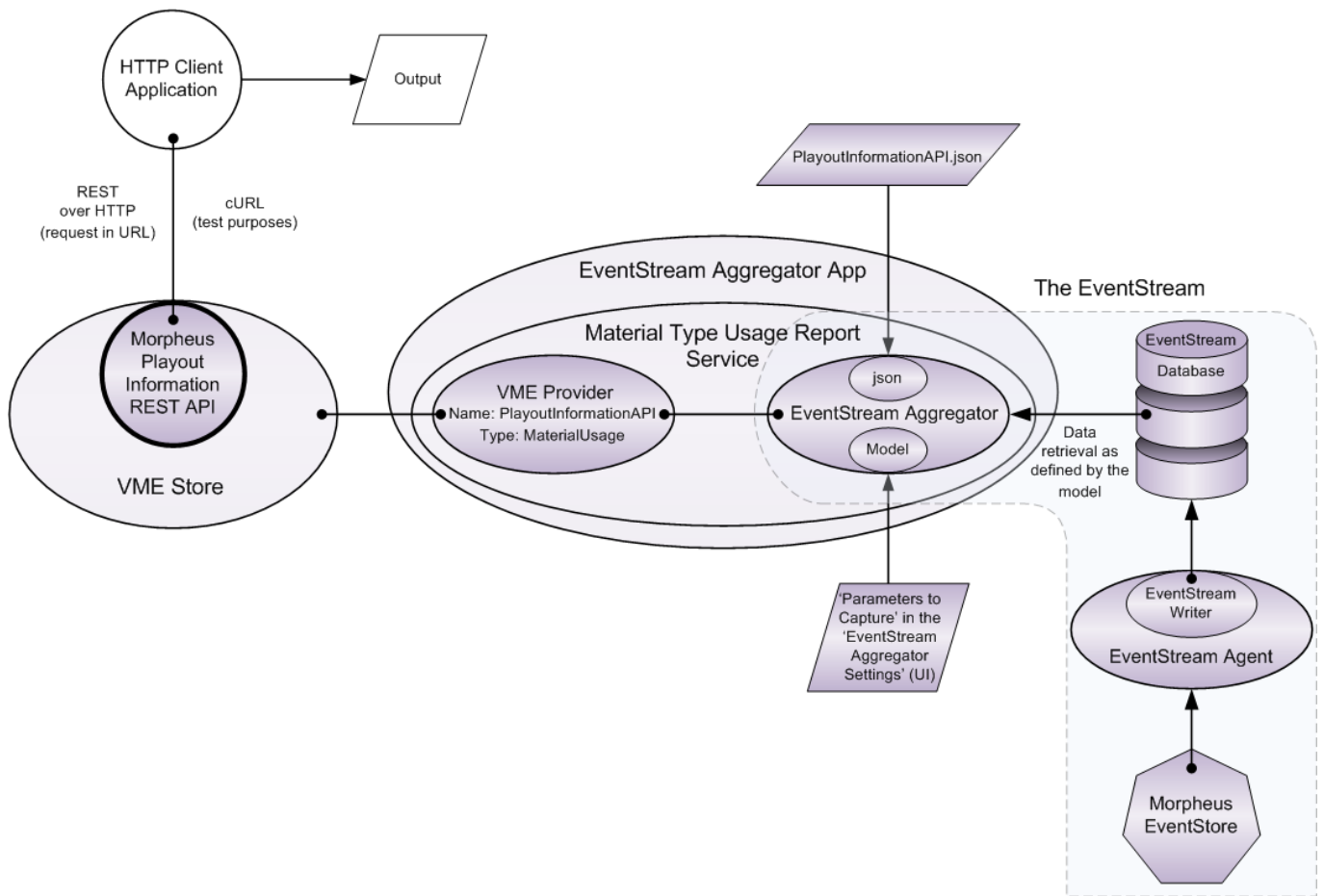
Fig. 1-1: PlayoutInformationApi Communication Architecture

Morpheus Playout Information REST API

Prerequisites, Installation and Configuration

Software Components

The following software components must be installed:

- **VME Store**

  Includes the following:

  Morpheus PlayoutInformationAPI

- **EventStream Aggregator App**

  Includes the following:

  Material Type Usage Report Service

  PlayoutInformationAPI VME Provider

  EventStream Aggregator

- **EventStream Database**

- **EventStream Agent**

  Includes the following:

  EventStream Writer

View Model Engine (VME) Deployment

VME is a web server that interfaces between the web browser and the other system components with which communication is required.

The PlayoutInformationApi is included in the VME installation, and is installed in the *<VmeInstallationDir>\RestTemplates* folder, with the following name:

QueryEvents.cs

> Note: The *<VmeInstallationDir>\RestTemplates* folder includes the *PlayoutInformationAuthModel* subfolder that contains other required API files.

Once installed, the PlayoutInformationApi requires no enabling.

> Note: VME is installed using the PowerShell Desired State Configuration (DSC) method; this is a commissioning task and is therefore beyond the scope of this document.

If VME was previously deployed without the PlayoutInformationAPI, it will be automatically included with a DSC installation update.

> Note: Once an existing VME deployment has been upgraded, the VME Store must be restarted

EventStream Aggregator App Deployment

Installation is performed using the Deploy tool that is located in the Morpheus Shortcuts folder.

Note: The configuration of EventStreaming is documented in the *Morpheus Engineering Manual Supplement - EventStreaming.*

EventStream Aggregator Model Configuration

Customer specific Event Parameters must be defined in the EventStream Aggregator model in order to be reported on following an HTTP request (Figure 2-1). This does not apply to the following intrinsic parameters:

• StartTime

• EndTime

• Duration

• EventIdentifier

Full details are provided in the *Morpheus Engineering Manual Supplement - EventStreaming.*
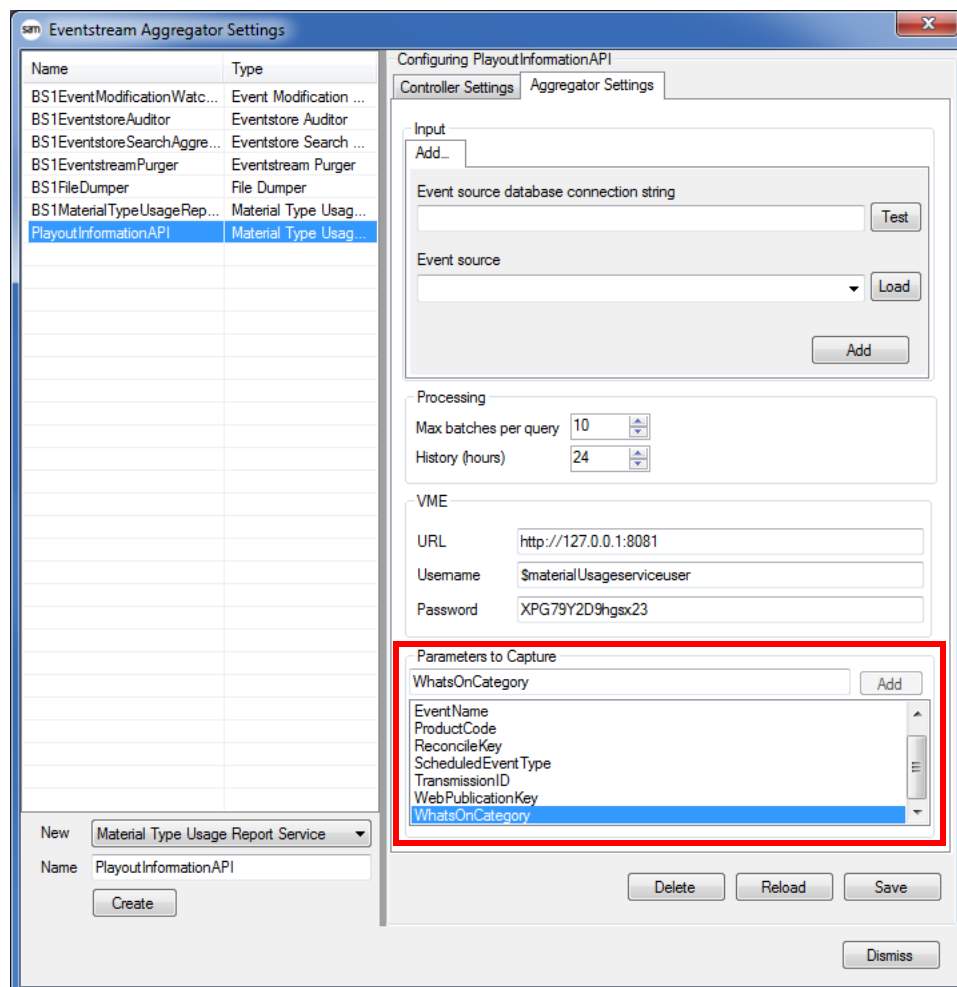
Fig. 2-1: EventStream Aggregator Settings

EventStream Database Deployment

This is a commissioning task that is beyond the scope of this document, neither is it documented in the *Morpheus Engineering Manual Supplement - EventStreaming*.

EventStream Agent Deployment

Installed using the Deploy tool in the Morpheus Shortcuts folder.

Refer to the following document:

> *Morpheus Engineering Manual Supplement - EventStreaming*

EventStream Database Deployment

This is a commissioning task that is beyond the scope of this document, neither is it documented in the *Morpheus Engineering Manual Supplement - EventStreaming*.

Client Application Communication Using HTTP or HTTPS

Whether communication from the client application is able to use HTTP or HTTPS is dependent upon the DSC deployment of VME [refer to View Model Engine (VME) Deployment].

Note: The use of HTTPS requires the installation of an SSL certificate, a process that is not included in the deployment of the PlayoutInformationApi, and is beyond the scope of this document.

Authentication

The HTTP request from the client application must authenticate successfully in order for any results to be returned. The following principles must be adhered to:

- The same username must be configured for the following (i.e. they must all match):

  - The `?user` specified in the URL (refer to <Credentials>&<Role>).

  - The `user` configured in the *PlayoutInformationAPI.json* file.

  - The user specified in the `Authorization` HTTP header (refer to <HTTP Request Header>).

  - The user configured in the VME store (VME user account)

- The name of the role assigned to the VME User Account must be mapped to a role of type "Normal" for the MaterialUsage provider (configured using DSC)

An overview of the authentication process is shown in Figure 2-2. In summary:

- The credentials in the `Authorization` HTTP header authenticate to the VME Store

- The `?user` and `&profile` in the URL authenticates against the JSON file

  Note: The `&profile` specifies one of the optional **"NamedConstraints"** (refer to "NamedConstraints":)

- The VME `&role` in the URL authenticates against the role configured in the VME Store
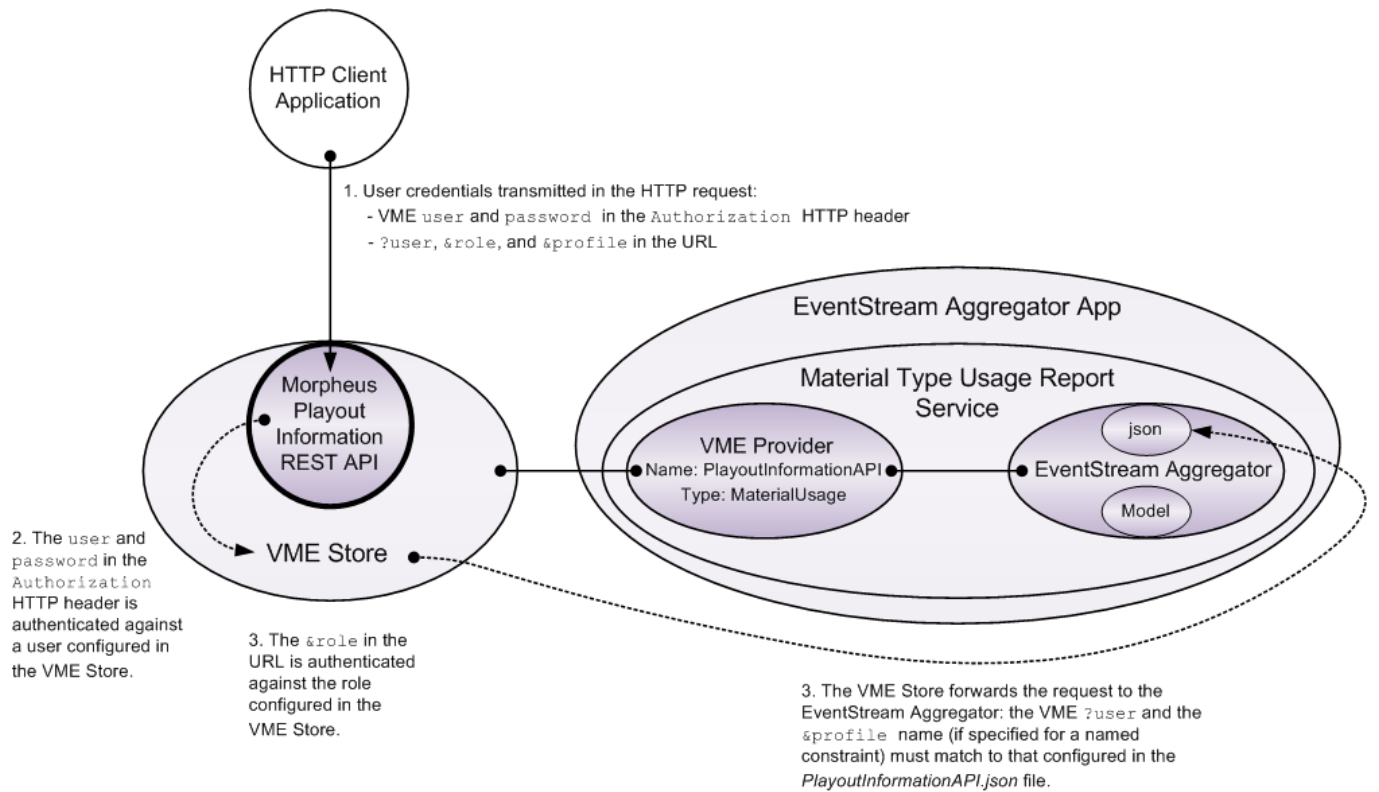
Fig. 2-2: PlayoutInformationApi Authentication Process

The extract from an HTTP request, below, differentiates between the HTTP request header and the URL.

```
* About to connect() to localhost port 8081 (#0)
*   Trying 127.0.0.1... connected
* Server auth using Basic with user 'playoutinformationclient1'
>GET/api/PlayoutInformation/v1/queryEvents?user=playoutinformationclient1&role=Normal
&channel=TestChannel1&start=5&end=00:10:00&filter=WhatsOnCategory=AddressableCommercial
&order=Duration:asc,WebPublicationKey:desc
&select=StartTime,Duration,EventName,WebPublicationKey,CarrierLabel,WhatsOnCategory,TransmissionID
HTTP/1.1
> Authorization: Basic cGxheW91dGluZm9ybWF0aW9uY2xpZW50MTpBcGlQYXNzd29yZA==
> User-Agent: curl/7.23.1 (i386-pc-win32) libcurl/7.23.1 OpenSSL/1.0.0e zlib/1.2.5
> Host: localhost:8081
> Accept: */*
> If-None-Match: 16c611de23ea8c4c
```

URL

HTTP Request Header

VME User Account

A VME user account is routinely created during the DSC deployment process. The client will authenticate to this account using the credentials supplied in the `Authorization` HTTP header in order to access the API (refer to <HTTP Request Header>).

There are two account types:

- Internal accounts

  User accounts and service accounts that authenticate to the VME Store. Service accounts are prefixed with a dollar sign ($), are used for inter-service authentication, and should not be modified.

- Active Directory Accounts

  Only user accounts can authenticate against Active Directory - the root and all service accounts must authenticate internally (i.e. to the VME Store).

VME User Account Role

The name of the role assigned to the VME User Account must be mapped to a role of type "Normal" configured in the MaterialUsage VME Provider.

If authenticating against an Active Directory (AD), the role must match that of an AD group.

Manual Creation of a Material Usage Provider User Account

Should it be necessary to create a user account manually, then follow the instructions below.

1.   Access the VME Store using one of the two following methods:

     a)   Navigate to the VME store using a browser if the URL is known, otherwise

     b)   In the Morpheus Shortcuts folder, click on the **VME** shortcut:

          Select **Tools** > **Launch Browser**.

2.   When prompted for a username and password, log in as 'Root' (only this account has the permissions to create other accounts).

     The VME Store main page is displayed.

3.   Click **Internal** in the menu bar. The 'VME Store - Internal Store Plugin' page is displayed.

4.   Click on **Users**. The 'Users' form is displayed (Figure 2-3).
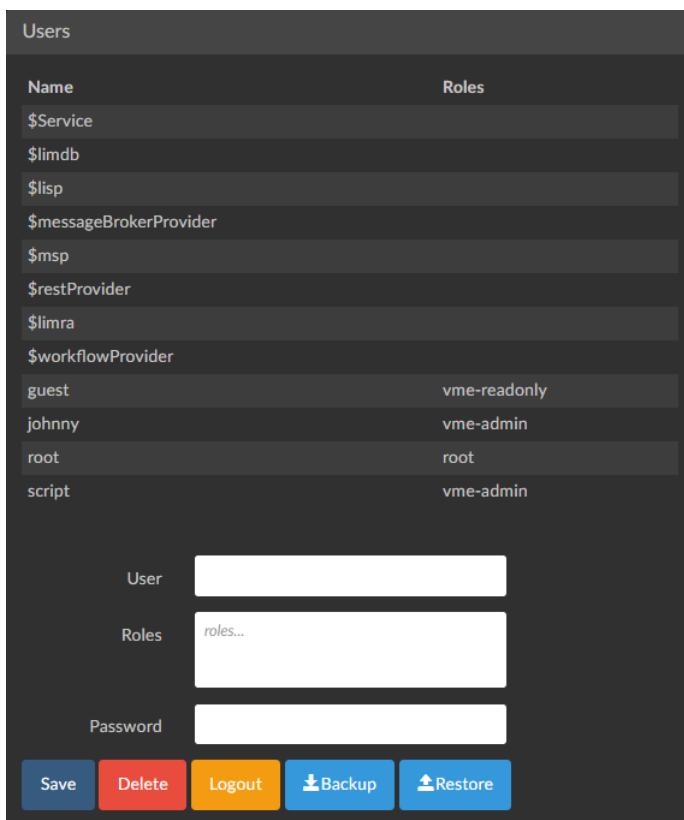
Fig. 2-3: VME Store Users Form

5. Enter the credentials as follows:

    - **User**

      The username.

    - **Role**

      The client role with the authorisations required to perform the desired actions.

      > IMPORTANT: The name of the role assigned to the VME User Account must be mapped to a role of type "Normal" configured in the MaterialUsage VME Provider.

    - **Password**

6. Click on the **Save** button. The new account details will appear in the user list.

Upgrade Considerations

When performing an upgrade to the VME environment or to the EventStream Aggregator, the following recommendations are made:

- The original *EventstreamAggregationRepository* subfolder of the installation directory must be preserved if any existing EventStream Aggregator model configurations are to be retained

- The *PlayoutInformationAPI.json* file in the installation directory will contain customised authorisations and constraints related to particular clients and should not therefore be overwritten

- The default name of the VME Provider is referenced in code, and must therefore remain as 'PlayoutInformationAPI'. It is, for example, configured as such in the 'Eventstream Aggregator Settings' user interface (Figure 2-1)

> IMPORTANT: A disregard for these recommendations will result in a loss of functionality.

User Guide

When the client application transmits an HTTP request to the PlayoutInformationApi, the *PlayoutInformationAPI.json* file in the EventStream Aggregator will restrict the response according to the preconfigured permissions.

This *User Guide* section provides the following information:

- PlayoutInformationApi JSON Syntax

- The API Request: URL Quick Guide

- The API Request: URL Query Syntax

<u>Configuring Time and Date Values</u>

Additional information relating to specifics of the syntax that is relevant to both the PlayoutInformationAPI.json file and the HTTP request.

Time values

A value for a specific time is expressed as a timecode, a format that is integrated into the structure of Morpheus. The syntax differs between drop frame and non drop frame rates, as follows:

Drop frame syntax: `00:00:00;00`

A semi-colon separates seconds and frames.

Non drop frame syntax: `00:00:00:00`

A colon separates seconds and frames.

Ensure that the correct syntax is used. All of the values given in the examples shown in this document use the non drop frame syntax.

Date Values

The date value, specified using the format DD-MMM-YYYY, must use a three letter abbreviation of a calendar month in the English language, as follows:

Month	Abbreviation
January	`JAN`
February	`FEB`
March	`MAR`
April	`APR`
May	`MAY`
June	`JUN`
July	`JUL`
August	`AUG`
September	`SEP`
October	`OCT`
November	`NOV`
December	`DEC`

Example

The 7th February 2019 is specified as follows:

`07-FEB-2019`

PlayoutInformationApi JSON Syntax

The *PlayoutInformationAPI.json* file predominantly contains configurable authorisations, plus a selection of tuning parameters. It is organised into paths in the following manner (abridged):

```
{

    <GlobalConfigurations>

        <TuningParameters>

    "Users": {

        "User1":

            "Group": "GroupA"

            }

        "User2": {

            "Group": "GroupB"

            }

        "User3": {

            "Group": "GroupC"

            }

        }

    "Groups":{

        "GroupA":{

            "DefaultConstraints":{

                "Permitted...":

                "Mandatory...":

        }

            "NamedConstraints":{

                "NCProfile1":{

                    "Permitted..."

                    "Mandatory..."

            }

                "NCProfile2":{

                    "Permitted..."

                    "Mandatory..."

            }

        }
```

```
            "GroupB":{

               "DefaultConstraints":{

                  "Permitted...":

                  "Mandatory...":

               }

               "NamedConstraints":{

                  "NCProfile3":{

                     "Permitted..."

                     "Mandatory..."

                  }

                  "NCProfile4":{

                     "Permitted...":

                     "Mandatory...":

                  }

               }

            }

         }
```

> Note: A default JSON file is automatically created if one does not already exist at the point at which the API receives a request. The file is generated without users and prohibits any reporting.

Within this document, configuration examples are provided for each individual parameter. Additionally, an example is provided of the configuration of the entire *PlayoutInformationAPI.json* file (refer to Example PlayoutInformationAPI.json File).

Global Configurations

Application tuning parameters.

URL:	Global configurations are not specified in an HTTP request.

– **"MinimumDocumentRefreshMilliseconds": 100**

Default = 100 milliseconds

A tuning function that must not be changed from the default.

– **"OnAirChangeOverGraceFrames": 50**

Default = 50 frames

In an architecture in which two Morpheus systems are used for redundancy, such as an X & Y Panoplay environment, the same channel on both systems may have the on-air flag set to 'true' at the point of a state change. This parameter defines how the API should report on the on-air event as follows:

- If the same frame on both X & Y systems is within the configured value then the start time of the earlier event is reported with the end time of the later event

- If the same frame on both X & Y systems is outside of the configured value then both events are reported individually

– **"LongestEventMinutes":**

Default = 120 minutes

As for **"OnAirChangeOverGraceFrames"**, above, in an architecture in which two Morpheus systems are used for redundancy, such as an X & Y Panoplay environment, it is desirable for the API to report on the actual start time of the earliest event on the previously on-air system (according to the **"PermittedRangeStartCriteria"**) and not the actual start time on the currently on-air system following a state change (which is likely to be some time into the total duration of the event). This parameter defines how far back the API should search for the event on the previously on-air system in order to obtain its start time.

Note:	Regardless of the configuration of the parameters **"PermittedRangeStartCriteria"** and **"PermittedRangeEndCriteria"**, the API will always report the actual start time of the event at the beginning of the scale and the actual end time of the event at the end of the scale when they overlap the configured range. For details on the configuration of the range criterion, refer to Groups.

Global Configurations

Users

Credentials to authenticate the user configured in a received HTTP request, and to assign it to a set of constraints (i.e. a Group).

- **"Users":**

   Enter the username(s) that are consistent with those created in the Authentication section of this document.

URL:	A user is specified in a HTTP request as: `?user=<username>`

   - **"Disabled":**

      Default = false

      If set to true then the user is disabled, any HTTP request will fail, and the status code 403 is returned (refer to HTTP Status Codes).

   - **"Group":**

      A user must only be assigned to one of the configured **"Groups"** (for details, refer to Groups).

Example

```
"Users": {

  "userjcr" {

    "Disabled": false,

    "Group": "group451"

  }

}
```

Groups

– **"Groups":**

A group contains the constraints on reporting that will apply to member users. Any number of groups can be created, each with different user constraints as may be necessary.

Each group consists of required **"DefaultConstraints"** and optional **"NamedConstraints"** that are configured in exactly the same manner. If a named constraint is specified in an HTTP request then the **"DefaultConstraints"** will be ignored.

> URL: Groups are not specified in the HTTP request - the association of a user to a group is enforced in the *PlayoutInformationAPI.json* file.

Group configuration is structured as follows:

```
"GroupA" {

    "DefaultConstraints"{

        "Permitted...",

        "Mandatory..."

    },

    "NamedConstraints":{

        "Profile1":{

            "Permitted...",

            "Mandatory..."

        },

        "Profile2":{

            "Permitted...",

            "Mandatory..."

        }

    }

}
```

> Note: For an illustration of the configuration of an entire group, refer to Example PlayoutInformationAPI.json File.

- **"Disabled":**

Default = false

If set to true then the group is disabled and any HTTP request from a user assigned to this group will fail and the status code 403 is returned (refer to HTTP Status Codes).

`"DefaultConstraints":`

If one or more of the **"NamedConstraints"** that are configured for a group are not included in an HTTP request from the client application (using the credentials of a user belonging to the same group) then the equivalent **"DefaultConstraints"** will be applied.

The **"DefaultConstraints"** are subdivided into two classes:

`"Permitted..."`

Parameters that are allowed to be used in an HTTP request.

`"Mandatory..."`

Parameters that will be used whether contained in the HTTP request or not. The definition of the term 'Mandatory' can differ depending upon the particular constraint (details are provided below).

Note: The configuration parameters that apply to **"DefaultConstraints"** also apply to **"NamedConstraints"**, and the behaviour of the restrictions on an HTTP request that are defined by those constraints will be identical.

If one or more **"NamedConstraints"** have been configured, one of which is specified in an HTTP request, then the **"DefaultConstraints"** are ignored.

- **"Disabled":**

Default = false

Disable all **"DefaultConstraints"** or **"NamedConstraints"** (as applicable) within a group by setting the following parameter:

`"Disabled": true`

– "PermittedChannels":

The list of channels that are allowed to be reported on following an HTTP request. Configure any number of **"PermittedChannels"**.

URL: A channel is specified in an HTTP request as: `&channel=<channel_name>`

Example

```
"PermittedChannels":[

    "Channel1",

    "Channel2"

]
```

The following rules apply:

- A channel configured in the **"MandatoryChannelName"** constraint must also be configured in the **"PermittedChannels"** constraint, unless **"PermittedChannels": ["*"]**

- Of the **"PermittedChannels"** only one must be specified in an HTTP request

- One of the **"PermittedChannels"** does not have to be specified in an HTTP request if a **"MandatoryChannelName"** is configured

- If a **"MandatoryChannelName"** is configured and a `&channel` expression is specified in the HTTP request, then they must match

- If **"PermittedChannels": ["*"]** then any channel specified in an HTTP request is valid

– **"PermittedRangeStartCriteria"**:

The results returned following an HTTP request for Event Parameters, configured in the **"PermittedFilters"**, are based upon a range that can be specified in a number of different ways. This parameter applies a restriction on the manner in which the start of the range can be specified.

Configure any number of **"PermittedRangeStartCriteria"**.

URL: The start of a range is specified in an HTTP request as: `&start=<start_expression>`

IMPORTANT: When configuring time or date values, ensure that the Configuring Time and Date Values at the front of the User Guide have been read and understood.

"*"

Allow any `&start` criteria to be used in an HTTP request.

"Earliest"

The oldest Event that is stored in the EventStream Database.

"OffsetFromCurrent"

An amount of time in the past or in the future from the current time according to the EventStream, expressed in the following format:

`-HH:MM:SS:FF` (for the offset to start in the past)

`HH:MM:SS:FF` (for the offset to start in the future)

Where `00:00:00:00` specifies the current time according to the EventStream.

"Count"

A number of Events relative to the **"PermittedRangeEndCriteria"** (expressed as a `&end` parameter in the HTTP request) or the **"MandatoryRangeEndExpression"**.

When used in an HTTP request, the **"PermittedRangeEndCriteria"** (expressed as a `&end` parameter) must be one of the following:

"Latest"

"OffsetFromCurrent"

"Specified"

When using this option, the **"PermittedRangeEndCriteria"**, expressed as a `&end` parameter in the HTTP request, must not be **"Count"**.

"Specified"

A fixed date and time expressed in the following format:

```
DD-MMM-YYYY HH:MM:SS:FF
```

Example

```
"PermittedRangeStartCriteria":[

    "OffsetFromCurrent",

    "Specified"

]
```

The following rules apply:

- A specific range criterion configured in the **"MandatoryRangeStartExpression"** constraint must also be configured in the **"PermittedRangeStartCriteria"** constraint, unless **"PermittedRangeStartCriteria": ["*"].**

- Of the **"PermittedRangeStartCriteria"** only one must be specified in an HTTP request

- A **"PermittedRangeStartCriteria"**, expressed as a &start parameter, does not have to be specified in an HTTP request if a **"MandatoryRangeStartExpression"** is configured

- If a **"MandatoryRangeStartExpression"** is configured and a &start expression is specified in the HTTP request then they must match

– **"PermittedRangeEndCriteria"**:

API calls for Event Parameters, configured in the **"PermittedFilters"**, are based upon a range that can be specified in a number of different ways. This parameter applies a restriction on the manner in which the end of the range can be specified.

Configure any number of **"PermittedRangeEndCriteria"**.

URL: The end of a range is specified in an HTTP request as:
`&end=<end_expression>`

> IMPORTANT: When configuring time or date values, ensure that the Configuring Time and Date Values at the front of the User Guide have been read and understood.

`["*"]`

Allow any `&end` to be used in an HTTP request.

`"Latest"`

The last Event that is stored in the EventStream Database.

`"OffsetFromCurrent"`

An amount of time in the past or in the future from the current time according to the EventStream, expressed in the following format:

`-HH:MM:SS:FF` (for the offset to end in the past)

`HH:MM:SS:FF` (for the offset to end in the future)

Where `00:00:00:00` specifies the current time according to the EventStream

`"Count"`

A number of Events relative to the configured **"PermittedRangeStartCriteria"**, (expressed as a `&start` parameter in the HTTP request) or the **"MandatoryRangeStartExpression"**.

When used in an HTTP request, the **"PermittedRangeStartCriteria"** (expressed as a `&start` parameter) must be one of the following:

`"Earliest"`

`"OffsetFromCurrent"`

`"Specified"`

When using this option, the **"PermittedRangeStartCriteria"**, expressed as a `&start` parameter in the HTTP request, must not be **"Count"**.

"Specified"

A fixed date and time expressed in the following format:

```
DD-MMM-YYYY HH:MM:SS:FF
```

Example

```
"PermittedRangeEndCriteria":[

   "Count"

]
```

The following rules apply:

- A specific range criterion configured in the **"MandatoryRangeEndCriteria"** constraint must also be specified in the **"PermittedRangeEndCriteria"** constraint, unless **"PermittedRangeEndCriteria": ["*"]**

- Of the **"PermittedRangeEndCriteria"** only one must be specified in an HTTP request

- A **"PermittedRangeEndCriteria"**, expressed as a &end parameter, does not have to be specified in an HTTP request if a **"MandatoryRangeEndCriteria"** is configured

- If a **"MandatoryRangeEndCriteria"** is configured and an &end expression is specified in the HTTP request then they must match

- **"PermittedFilters":**

    Filters that specify the Event Parameters and particular value matches that can be reported. Configure any number of **"PermittedFilters"**.

    Multiple Event Parameters with lists of values can be specified in a single filter, and if so they must be configured as comma separated key / value pairs (as shown in the example below).

    | URL: | One or more filters are specified in an HTTP request as: `&filter=<filter_expression1>,<filter_expression2>` |

    The following are examples of Event Parameters that may be used in a filter:

    "*" (any parameter or value in an HTTP request is permitted to be reported on [refer to the examples])

    "CarrierLabel"

    "EventName"

    "ProductCode"

    "ReconcileKey"

    "ScheduledEventType"

    "TransmissionID"

    "WebPublicationKey"

    "WhatsOnCategory": ["Commercial"]

                   ["AddressableCommercial"]

                   ["Promo"]

                   ["Programme"]

                   ["Billboard"]

                   ["*"]

    Example 1

    ```
    "PermittedFilters":{

       "ScheduledEventType": ["*"],

       "WhatsOnCategory": ["Commercial","Promo"]

    }
    ```

    Any value attributed to "ScheduledEventType" is permitted to be reported on following an HTTP request, but only "WhatsOnCategory" of types "Commercial" and "Promo" can be reported on.

Example 2

```
"PermittedFilters":{

    "*": []

}
```

Any *Event Parameter* can be reported on following an HTTP request.

The following rules apply:

- Any of the **"PermittedFilters"** specified in an HTTP request will be supplemented by any configured **"MandatoryFilters"**

- A filter configured in the **"MandatoryFilters"** constraint must also be configured in the **"PermittedFilters"** constraint unless **"PermittedFilters": {"*":[]}**

- If no &filter expression is included in an HTTP request and there are no configured **"MandatoryFilters"**, then no filtering will take place and results for all main events will be included in the response

- A &filter expression is optional in an HTTP request regardless of whether or not **"MandatoryFilters"** are configured

- If an HTTP request includes a &filter expression then it must match to one of the **"PermittedFilters"**

- Configured **"MandatoryFilters"** must not be included in an HTTP request

- **"PermittedSortCriteria":**

  Specifies the manner(s) in which results can be ordered following an HTTP request, not the actual sequence of the ordering (for clarification, refer to the example given below for this constraint). Configure any number of **"PermittedSortCriteria"**.

  > Note: **"PermittedSortCriteria"** is associated with the `&order` parameter in the HTTP request.

  Sorting applies to both intrinsic and to custom Event Parameters. The following are the intrinsic parameters:

  - StartTime

  - EndTime

  - Duration

  - EventIdentifier

  Additionally the option is provided for the results of an HTTP request to be constrained to either ascending or descending order, for each of the Event Parameters individually. The default is ascending order

  > URL: Sort criteria are specified in an HTTP request as:
  > `&order=<event_parameter>:asc|desc`

  `"*"`

  Allow any **"PermittedSortCriteria"** to be specified in an HTTP request as `&sort` parameters

  `"StartTime"`

  Sort by the time at which the events started.

  `"EndTime"`

  Sort by the time at which the events ended.

  `"Duration"`

  Sort by the total duration of each event.

  `"EventIdentifier"`

  Sort by the Morpheus event identifier.

```
"<ParameterName>"
```

Sort by a specified parameter that is configured for an event in the Morpheus automation system.

Example

Given the following constraint configuration:

```
"PermittedSortCriteria":[

    "StartTime",

    "Duration"

]
```

One or the other can be specified in an HTTP request; if both are specified then the sequencing of the results will be prioritised according to the order in which the `&order` criteria is written into the HTTP request. If, for example, the `&order` criteria in the HTTP request is `Duration, StartTime` then the results will be returned ordered by `Duration` first and then by `StartTime` (for those events that have equal durations).

The "`Ascending`" and qualifier can only be specified in the **"MandatorySortCriteria"** constraint, not in the **"PermittedSortCriteria"** constraint.

The following rules apply:

•   A specific range criterion configured in the **"MandatorySortCriteria"** constraint must also be configured in the **"PermittedSortCriteria"** constraint, unless **"PermittedSortCriteria": ["*"]**

•   Sort criteria must be configured in at least one of the following:

    - as **"MandatorySortCriteria"**

    - as `&sort` criteria in an HTTP request

•   Criteria configured as **"MandatorySortCriteria"** must not be specified in an HTTP request

•   Sort criteria contained in an HTTP request is executed subsequently to any that are configured as **"MandatorySortCriteria"**

•   By default, results are returned in ascending order, unless otherwise specified in either the **"MandatorySortCriteria"** or in the HTTP request

– **"PermittedSelectCriteria":**

Criteria that specifies the particular properties of an event that can be reported on. Configure any number of **"PermittedSelectCriteria"**.

Selections apply to both intrinsic and to custom Event Parameters. The following are the intrinsic parameters:

- StartTime

- EndTime

- Duration

- EventIdentifier

URL: Select criteria are specified in an HTTP request as:
`&select=<select_expression>`

IMPORTANT: When configuring time or date values, ensure that the Configuring Time and Date Values at the front of the User Guide have been read and understood.

`"*"`

Allow any `&select` to be used in an HTTP request.

`"StartTime"`

The on-air start time of the Morpheus automation event, specified as follows:

`DD-MMM-YYYY HH:MM:SS:FF`

`"EndTime"`

The on-air end time of the Morpheus automation event, specified as follows:

`DD-MMM-YYYY HH:MM:SS:FF`

`"Duration"`

The total duration of an event. In the case of an event being switched between an X and Y system following a fail over, then the duration will include the time taken to switch the event (should it fall within the timeframe determined by `"OnAirChangeOverGraceFrames"` (refer to Global Configurations).

It is specified as follows:

`HH:MM:SS:FF`

```
"EventIdentifier"
```

A Morpheus event identifier.

```
"<ParameterName>"
```

Any parameter configured for an event in the Morpheus automation system.

Example

```
"PermittedSelectCriteria":[

    "EventIdentifier",

    "StartTime",

    "EndTime",

    "Duration",

    "<ParameterName_A>",

    "<ParameterName_B>"

]
```

The following rules apply:

- Criteria configured in the **"MandatorySelectCriteria"** constraint must also be configured in the **"PermittedSelectCriteria"** constraint, unless **"PermittedSelectCriteria": ["*"]**

- Any **"PermittedSelectCriteria"** specified in an HTTP request will be supplemented by any configured **"MandatorySelectCriteria"**

- An HTTP request must contain one or more matching **"PermittedSelectCriteria"** unless **"MandatorySelectCriteria"** are configured

- Any **"MandatorySelectCriteria"** may also be contained within the HTTP request

– **"MandatoryChannelName":**

The name of a channel that will be enforced as that to be reported on (configure only one channel name).

Example

"MandatoryChannelName":

"Channel1"

The following rules apply:

- If configured, only the channel set as the **"MandatoryChannelName"** can be reported on, regardless of any other **"PermittedChannels"** in the HTTP request

- Criteria configured in the **"MandatoryChannelName"** constraint must also be configured in the **"PermittedChannels"** constraint

- The channel configured as a **"MandatoryChannelName"** is not required to be included in an HTTP request, as it will be reported on regardless

- If the channel is specified in an HTTP request then it must match that configured as **"MandatoryChannelName"**, otherwise an error will be returned

- **"MandatoryRangeStartExpression"**:

    The results returned following an HTTP request for Event Parameters, configured in the **"PermittedFilters"**, are based upon a range that can be specified in a number of different ways. This parameter applies a restriction on the manner in which the start of the range can be specified. Enter the name of a **"MandatoryRangeStartExpression"** that will be enforced (only one **"MandatoryRangeStartExpression"** should be configured).

    > IMPORTANT: When configuring time or date values, ensure that the Configuring Time and Date Values at the front of the User Guide have been read and understood.

    "Earliest"

    The oldest Event that is stored in the EventStream Database.

    "OffsetFromCurrent"

    An amount of time in the past or in the future from the current time according to the EventStream, expressed in the following format:

    -HH:MM:SS:FF (for the offset to start in the past)

    HH:MM:SS:FF (for the offset to start in the future)

    Where 00:00:00:00 specifies the current time according to the EventStream.

    "Count"

    A number of Events relative to the configured **"PermittedRangeEndCriteria"** (expressed as a &end parameter in the HTTP request) or **"MandatoryRangeEndCriteria"** if specified.

    When used in an HTTP request, the **"PermittedRangeEndCriteria"** (expressed as a &end parameter) must be one of the following:

    "Latest"

    "OffsetFromCurrent"

    "Specified"

    When using this option, the **"PermittedRangeEndCriteria"**, expressed as a &end parameter in the HTTP request, or **"MandatoryRangeEndCriteria"** must not be **"Count"**.

    "Specified"

    A fixed date and time expressed in the following format:

    DD-MMM-YYYY HH:MM:SS:FF

Example

"MandatoryRangeStartExpression":

> `"-01:30:00:00"`

Where a value for `"OffsetFromCurrent"` is used.

The following rules apply:

- If configured, only the **"MandatoryRangeStartExpression"** will be applied to the reporting following an HTTP request

- Criteria configured in the **"MandatoryRangeStartExpression"** constraint must also be configured in the **"PermittedRangeStartCriteria"** constraint.

- The configured **"MandatoryRangeStartExpression"** is not required to be included in an HTTP request, as it will be reported on regardless

- If a `&start` expression is included in an HTTP request then it must match that specified as the **"MandatoryRangeStartExpression"**, otherwise an error will be returned

– **"MandatoryRangeEndExpression":**

API calls for Event Parameters, configured in the **"PermittedFilters"**, are based upon a range that can be specified in a number of different ways. This parameter applies a restriction on the manner in which the end of the range can be specified.

Enter the name of a **"MandatoryRangeEndExpression"** that will be enforced (only one **"MandatoryRangeEndExpression"** should be configured).

> IMPORTANT: When configuring time or date values, ensure that the Configuring Time and Date Values at the front of the User Guide have been read and understood.

"Latest"

The last Event that is stored in the EventStream Database.

"OffsetFromCurrent"

An amount of time in the past or in the future, from the current time according to the EventStream, expressed in the following format:

-HH:MM:SS:FF (for the offset to start in the past)

HH:MM:SS:FF (for the offset to start in the future)

Where 00:00:00:00 specifies the current time according to the EventStream.

"Count"

A number of Events relative to the configured **"PermittedRangeStartCriteria"** (expressed as a &start parameter in the HTTP request) or the **"MandatoryRangeStartCriteria"** if specified.

When used in an HTTP request, the **"PermittedRangeStartCriteria"** (expressed as a &start parameter) must be one of the following:

"Earliest"

"OffsetFromCurrent"

"Specified"

When using this option, the "PermittedRangeStartCriteria", expressed as a &end parameter in the HTTP request, or the "MandatoryRangeStartCriteria" must not be "Count".

"Specified"

A fixed date and time expressed in the following format:

DD-MMM-YYYY HH:MM:SS:FF

– **"MandatoryRangeEndExpression":**

Example (using "`Count`")

"`MandatoryRangeEndExpression`":

"`40`"

The following rules apply:

- If configured, only the **"`MandatoryRangeEndExpression`"** will be applied to the reporting following an HTTP request

- Criteria configured in the **"`MandatoryRangeEndExpression`"** constraint must also be configured in the **"`PermittedRangeEndCriteria`"** constraint.

- The configured **"`MandatoryRangeEndExpression`"** is not required to be included in an HTTP request, as it will be reported on regardless

- If an `&end` expression is included in an HTTP request then it must match that specified as the **"`MandatoryRangeEndExpression`"**, otherwise an error will be returned

– **"MandatoryFilters":**

Filters that enforce the Event Parameters and particular value matches that will be reported. Any number of "MandatoryFilters" can be configured, and if so will supplement any &filter received in an HTTP request.

The following are examples of Event Parameters that may be used in "MandatoryFilters":

```
"MandatoryFilters":{

    "CarrierLabel":

    "EventName":

    "ProductCode":

    "ReconcileKey":

    "ScheduledEventType":

    "TransmissionID":

    "WebPublicationKey":

    "WhatsOnCategory": ["Commercial"]

                      ["AddressableCommercial"]

                      ["Promo"]

                      ["Programme"]

                      ["Billboard"]

}
```

Example

```
"MandatoryFilters":{

    "ScheduledEventType": ["Scheduled"],

    "WhatsOnCategory": ["Commercial","AddressableCommercial"]

}
```

The following rules apply:

- Criteria configured in the **"MandatoryFilters"** constraint must also be configured in the **"PermittedFilters"** constraint, unless **"PermittedFilters": {"*":[]}**

- The configured **"MandatoryFilters"** will always be applied and must not be included in an HTTP request

- Any **"PermittedFilters"**, expressed as `&filters` in an HTTP request, will augment constraints applied in **"MandatoryFilters"**

- If no `&filters` are supplied in an HTTP request, and there are no configured **"MandatoryFilters"** then no filtering will take place and results for all main events will be included in the response.

– **"MandatorySortCriteria":**

Criteria that enforces the manner(s) in which results will be ordered following an HTTP request and the actual sequence of the ordering. An HTTP request must contain one or more matching "PermittedSortCriteria" unless "MandatorySortCriteria" are configured.

> Note: **"MandatorySortCriteria"** is associated with the &order parameter in the HTTP request.

Sorting applies to both intrinsic and custom Event Parameters. The following are the intrinsic parameters:

- StartTime
- EndTime
- Duration
- EventIdentifier

Additionally the option is provided for the results of the HTTP request to be constrained to either ascending or descending order, for each of the Event Parameters individually. It is specified as follows:

```
"Ascending": true

"Ascending": false
```

The default is ascending order.

```
{"Name":"StartTime", "Ascending": false}
```

Sort by the time at which the events started. Also shown is the optional "Ascending": false qualifier that can be applied to any of the Event Parameters for the **"MandatorySortCriteria"**.

```
"Name":"EndTime"
```

Sort by the time at which the events ended.

```
"Name":"Duration"
```

Sort by the total duration of each event.

```
"Name":"EventIdentifier"
```

Sort by the Morpheus event identifier.

```
"Name":"<ParameterName>"
```

Sort by a specified parameter that is configured for an event in the Morpheusautomation system.

Example

Given the following constraint configuration:

```
"MandatorySortCriteria":[

      {"Name": "StartTime"},

      {"Name": "Duration", "Descending"= true)

]
```

The constraints specified as **"MandatorySortCriteria"** above must not be specified in an HTTP request. If other criteria are configured as **"PermittedSortCriteria"**, and they are specified in the HTTP request, then they will be applied after the **"MandatorySortCriteria"** and in the order in which they appear in the HTTP request.

If, for example, the `&sort` criteria in the HTTP request is `"EventIdentifier","Endtime"`, then the results will be returned in the following order:

First = `"StartTime"` (**"MandatorySortCriteria"**)
Second = `"Duration"` (**"MandatorySortCriteria"**)
Third = `"EventIdentifier"` (criteria listed first in the HTTP request)
Fourth = `"EndTime"` (criteria listed second in the HTTP request)

With no additional qualifier for `"StartTime"`, `"EventIdentifier"`, and `"EndTime"` then the default of 'ascending' order applies, contrary to `"Duration"` which has 'descending' specified.

The following rules apply:

• Criteria configured in the **"MandatorySortCriteria"** constraint must also be configured in the **"PermittedSortCriteria"** constraint, unless **"PermittedSortCriteria": ["*"]**

• If **"MandatorySortCriteria"** are configured, it is not a requirement for an HTTP request to contain any matching **"PermittedSortCriteria"** expressed as a `&sort` parameter

• An HTTP request must not contain criteria that are configured as **"MandatorySortCriteria"**

• If no **"MandatorySortCriteria"** are configured, matching **"PermittedSortCriteria"**, expressed as `&sort` criteria in an HTTP request, must be specified

• **"MandatorySortCriteria"** are applied before any other **"PermittedSortCriteria"**, expressed as `&sort` criteria in an HTTP request

– **"MandatorySelectCriteria":**

Criteria that enforces the particular properties of an event that will be reported on. Any number of **"MandatorySelectCriteria"** can be configured, and if so will supplement those defined as **"PermittedSelectCriteria"** received in an HTTP request.

> IMPORTANT: When configuring time or date values, ensure that the Configuring Time and Date Values at the front of the User Guide have been read and understood.

"EventIdentifier"

A Morpheus event identifier.

"StartTime"

The on-air start time of the Morpheus automation event, specified as follows:

```
DD-MMM-YYYY HH:MM:SS:FF
```

"EndTime"

The on-air end time of the Morpheus automation event, specified as follows:

```
DD-MMM-YYYY HH:MM:SS:FF
```

"Duration"

The total duration of an event. In the case of an event being switched between an X and Y system following a fail-over, then the duration will include the time taken to switch the event, should it fall within the timeframe determined by **"OnAirChangeOverGraceFrames"** (refer to Global Configurations).

It is specified as follows:

```
HH:MM:SS:FF
```

"<ParameterName>"

Any parameter configured for an event in the Morpheus automation system.

Example

```
"MandatorySelectCriteria":[

   "EventName",

   "WhatsOnCategory"

]
```

The following rules apply:

- Criteria configured in the **"MandatorySelectCriteria"** constraint must also be configured in the **"PermittedSelectCriteria"** constraint, unless **"PermittedSelectCriteria": ["*"]**

- If **"MandatorySelectCriteria"** are configured, it is not necessary for an HTTP request to contain any matching **"PermittedSelectCriteria"**.

- If no **"MandatorySelectCriteria"** are configured, **"PermittedSelectCriteria"**, expressed as `&select` criteria in an HTTP request, must be specified

- Any **"MandatorySelectCriteria"** may also be contained within the HTTP request

"NamedConstraints":

Aside from containing a single set of **"DefaultConstraints"**, a group may be configured with one or more alternative collections of constraints known as **"NamedConstraints"**. When a named constraint is specified in an HTTP request, the **"DefaultConstraints"** are ignored.

URL: The identity of a named constraint is specified in an HTTP request as follows:

```
&profile=<named_constraint>
```

For further information, refer to The API Request: URL Query Syntax.

The **"NamedConstraints"** are configured using the same format and syntax as the **"DefaultConstraints"**, with the exception that each requires an individual profile name as shown in the example below:

```
"NamedConstraints":{

   "Profile1":{

      "Permitted...",

      "Mandatory..."

   },

   "Profile2":{

      "Permitted...",

      "Mandatory..."

   }

}
```

Note: Each group may be configured with any number of individual profiles in the "NamedConstraints", with the following limitations:

- All profiles within a single group must have unique names

- A profile name may be shared between two groups on the condition that their parameters are identical

Example PlayoutInformationAPI.json File

```json
{
   "MinimumDocumentRefreshMilliseconds": 100,
   "OnAirChangeOverGraceFrames": 50,
   "LongestEventMinutes": 120,
   "Users": {
      "playoutinformationclient1": {
         "Disabled": false,
         "Group": "Client1Group"
      }
   },
   "Groups": {
   "Client1Group": {
      "Disabled": false,
      "DefaultConstraints": {
         "Disabled": false,
         "PermittedChannels": ["*"],
         "PermittedRangeStartCriteria": ["*"],
         "PermittedRangeEndCriteria": ["*"],
         "PermittedFilters": { "*": [] },
         "PermittedSelectCriteria": ["*"],
         "PermittedSortCriteria": ["*"]
         }
      "NamedConstraints": {
         "C1Profile1": {
         "Disabled": false,

         "PermittedChannels": ["TestChannel1"],

         "PermittedRangeStartCriteria": ["OffsetFromCurrent"],

         "PermittedRangeEndCriteria": ["OffsetFromCurrent"],

         "PermittedFilters": {
            "ScheduledEventType": ["Scheduled"],
            "WhatsOnCategory": ["Commercial"]
         },

         "PermittedSelectCriteria": [
            "StartTime",
            "EventName",
            "ReconcileKey",
            "ScheduledEventType",
            "TransmissionID",
            "WhatsOnCategory"
         ],

         "PermittedSortCriteria": ["StartTime"],

         "MandatoryChannelName": "TestChannel1",

         "MandatoryRangeStartExpression": "-01:00:00:00",

         "MandatoryRangeEndExpression": "00:00:00:00",

         "MandatoryFilters": {
            "ScheduledEventType": ["Scheduled"],
            "WhatsOnCategory": ["Commercial"]
         },

         "MandatorySelectCriteria": [
            "StartTime",
            "EventName",
            "ReconcileKey",
            "ScheduledEventType",
            "TransmissionID",
            "WhatsOnCategory"
         ],
```

```
              "MandatorySortCriteria": [
                 { "Name": "StartTime", "Ascending": true }
              ]
           },
           "C1Profile2": {
              "Disabled": false,

              "PermittedChannels": ["TestChannel1", "TestChannel2"],

              "PermittedRangeStartCriteria": [
                 "OffsetFromCurrent",
                 "Specified"
              ],

              PermittedRangeEndCriteria": [
                 "Count"
              ],

              "PermittedFilters": {
                 "ScheduledEventType": ["*"],
                 "WhatsOnCategory": ["AddressableCommercial", "Commercial"]
              },

              "PermittedSelectCriteria": [
                 "StartTime",
                 "EventName",
                 "ReconcileKey",
                 "ScheduledEventType",
                 "TransmissionID",
                 "WhatsOnCategory"
              ],

              "PermittedSortCriteria": ["StartTime", "ReconcileKey", "WhatsOnCategory"],

              "MandatoryChannelName": null,

              "MandatoryRangeStartExpression": null,

              "MandatoryRangeEndExpression": "10",

              "MandatoryFilters": {
                 "ScheduledEventType": ["Scheduled"]
              },

              "MandatorySelectCriteria": [],

              "MandatorySortCriteria": []
           }
        }
     }
     !
     !A second client group (abridged)
     !
     "Client2Group": {
        "Disabled": false,
        "DefaultConstraints": {
        }
        "NamedConstraints": {
           "C2Profile1": {
           }
           "C2Profile2": {
           }
           "C2Profile3": {
           }
        }
     }
  }
```

The API Request: URL Quick Guide

This section provides a quick start guide to the required structure and options of a PlayoutInformationApi request. For extensive details, refer to The API Request: URL Query Syntax.

The URL must be formatted as follows:

```
<protocol>://<host>:<port>/api/PlayoutInformation/v1/queryEvents
?user=<username>
&role=Normal
&profile=<named_constraint>
&channel=<channel_name>
&start=<start_expression>
&end=<end_expression>
&filter=<filter_expression>
&order=<order_expression>
&select=<select_expression>
```

> IMPORTANT: The components in the URL must be ordered as shown, respecting the fact that some may be omitted as optional.

Constraint	Optional	Description	Notes
?**user**	No	VME login	Must match the following: - The username configured in the VME Store - The username configured in the PlayoutInformationAPI.json file - The username specified in the `Authorization` HTTP request header
&**role**	No	VME provider role	Must be `Normal`
&**profile**	Yes	One of the configured **"NamedConstraints"**	If specified then the **"DefaultConstraints"** are ignored
&**channel**	Yes	A Morpheus Channel name	Specify one channel
&**start**	Yes	Start of a search range	Specify one `&start` criteria
&**end**	Yes	End of a search range	Specify one `&end` criteria
&**filter**	Yes	Event parameters to report on	Comma separated key / value pairs
&**order**	Yes	Sorting of results	CSV of sort criteria
&**select**	Yes	Event parameter properties to report on	CSV of event properties

> WARNING: Some options are conditional. For detailed information, refer to The API Request: URL Query Syntax

The API Request: URL Query Syntax

A detailed review of the anatomy of the syntax required in an HTTP request.

The HTTP client must use the syntax and order described below when transmitting an HTTP request. Examples are provided.

The order is as follows (abridged):

```
<HTTP Request Header>
<Mandatory URL Path Prefix>?<Credentials>&<Role>&<Query>
```

The URL components after the question mark (?) form the HTTP request content that must conform to the constraints configured in the *PlayoutInformationAPI.json* file.

> Note: Whether API calls are made using either HTTP or HTTPS is dependent upon the DSC configuration for the deployment of VME [refer to View Model Engine (VME) Deployment].

Example HTTP request:

```
https://vmeserver:8081/api/PlayoutInformation/v1/queryEvents?user=apiclient1&role=Normal
&profile=permissive&channel=Motorsport&start=00:30:00:00&end=00:30:00:00
&filter=WhatsOnCategory=Commercial,WhatsOnCategory=AddressableCommercial&order=Duration,StartTime:desc
&select=StartTime,Duration,EndTime,EventIdentifier,WebPublicationKey,TransmissionId
```

> IMPORTANT: The response to an HTTP request is bound to the constraints configured for attributes in the *PlayoutInformationAPI.json* file. There are three types of constraint as follows:
>
> **Mandatory**
> Should a parameter, attribute, and / or qualifiers be configured as mandatory then their values <u>will</u> be used as input to the query even though they have not been specified in the HTTP request.
>
> **Permitted**
> Should a parameter, attribute, and / or qualifiers be configured as permitted then their values <u>may</u> be specified in the HTTP request.
>
> **Default**
> If a required attribute is missing from the HTTP request then the configured default <u>will</u> be applied.
>
> For detailed information, refer to PlayoutInformationApi JSON Syntax.

HTTP Structures

The HTTP structures that are applied by the PlayoutInformationApi.

> Note: For information relating to the HTTP Status Codes, refer to HTTP Status Codes

`<HTTP Request Header>`

The following request header fields are transmitted in an HTTP request:

`Authorization`

Specifies the credentials that will be used to authenticate with the VME Store in order to query the resource to which the HTTP request is transmitted.

Authorisation must be performed using an `Authorization` HTTP request header in each HTTP request from the client application, as follows:

`Authorization: Basic <username:password>`

Where `<username:password>` is base64 encoded.

Example

Given the username and password `ausername:apassword`, the base64 encoding results in the following:

`Authorization: Basic YXVzZXJuYW1lOmFwYXNzd29yZA==`

> Note: For additional information, refer to Authentication.

`If-None-Match`

The ETag received in the response from the previous request is transmitted in a new HTTP request thereby setting a condition that specifies that the resource must only respond if a new ETag has been generated.

Example

`If-None-Match: "b8132d431a4c429e"`

`<Response Headers>`

The following response header fields are transmitted in a response:

`ETag`

Identifies a specific version of the resource. The ETag is an SHA1 hexadecimal hash of the message body.

For details on the use of the ETag, refer to Testing, Troubleshooting, and Problem Resolution.

`Content-Type`

Indicates the media type in the message body returned by the resource. The VME Store will return the following to the PlayoutInformationApi:

`Content-Type: application/json; charset=utf-8`

`<Response Headers>`

`<Mandatory URL Path Prefix>`

Designation of the host system and the API that will facilitate the request.

`<protocol>://<host>:<port>/PlayoutInformation/v1/queryEvents`

Where:

`Protocol` defines how the data should be transmitted, i.e. HTTP or HTTPS.

`<host>:<port>` defines the server on which the API is running and the protocol port through which it can be reached.

`PlayoutInformation` is a service name denominating an API type, or family.

`v1` is the API version.

`queryEvents` is the name of the API that will be queried by the client application.

Each component must be separated by a forward slash (`/`).

`<Mandatory URL Path Prefix>`

`<Credentials>&<Role>`

The credentials and the role appear in the URL immediately after the question mark (?).

> Note: All components after the question mark (?) in the HTTP request are considered to belong to the query string.

`?user=<username>&role=<rolename>`

The `<username>` and `<rolename>` are expressed as strings.

Where:

`?user=<username>` is the username configured in the *PlayoutInformationAPI.json* file which must match to a VME User Account. It is preceded by a question mark (?).

> IMPORTANT: The `<username>` must be lower case.

> Note: Strictly for test purposes, any valid `user` credentials can be used to masquerade as that user if 'root' has been specified in the `Authorization` component of the <HTTP Request Header>.

`&role=<rolename>` is the role that is to apply to the user, as configured in the VME Provider, preceded by an ampersand (&).

> IMPORTANT: The `<rolename>` must have the value `Normal` in all cases.

`<Query>`

The query consists of one or more event parameters, attributes, and qualifiers, for which the values are required.

> Note: The `<query>` appears directly after `&role=<rolename>`, forming part of the query string.

The following components may be specified in the HTTP request - the content of the response, however, will be in accordance with the constraints configured into the *PlayoutInformationAPI.json* file loaded into the EventStream Aggregator.

Query components must be written into the HTTP request in the order shown below, (accounting for any components that may not have been specified):

1: **`&profile`**
2: **`&channel`**
3: **`&start`**
4: **`&end`**
5: **`&filter`**
6: **`&order`**
7: **`&select`**

Details for each of the query components starts over the page.

`<Query>`

- **&profile=named_constraint**

  [String - Case sensitive - Optional]

  Enter a named constraint. If one (or more) exists in the *PlayoutInformationAPI.json* file, they each define custom sets of constraints. Refer to "Named Constraints" in the section PlayoutInformationApi JSON Syntax. If one of the **"NamedConstraints"** are not specified then the **"DefaultConstraints"** will be applied.

  Note: The configuration structure of **"NamedConstraints"** are identical to those for **"DefaultConstraints"**, and the behaviour of the restrictions on an HTTP request that are defined by those constraints will be the same.

  Example

  &profile=Newschannel_Commercials

  The following rules apply:

  - If one or more **"NamedConstraints"** have been configured, one of which is specified in an HTTP request, then the **"DefaultConstraints"** are ignored

- **&channel=channel_name**

  [String - Case sensitive - Optional only if a **"MandatoryChannelName"** has been configured, otherwise a channel must be specified]

  Enter the name of a Morpheus channel that will be queried in the HTTP request.

  Example

  `&channel=News`

  The following rules apply:

  - Only one channel can be specified in the HTTP request

  - The specified channel must be configured as one of the **"PermittedChannels"**

  - If a **"MandatoryChannelName"** is configured and a `&channel` expression is specified in the HTTP request, then they must match

  - If **"PermittedChannels": ["*"]** then any `&channel` specified in an HTTP request is valid

- **`&start=Earliest | <number> | HH:MM:SS:FF | -HH:MM:SS:FF | DD-MMM-YYYY HH:MM:SS:FF`**

[String - Case sensitive - Optional]

An HTTP request for Event Parameters (configured in `&filter`) is based upon a range that can be specified in a number of different ways. Define the start of the range from the following options:

> IMPORTANT: When configuring time or date values, ensure that the Configuring Time and Date Values at the front of the User Guide have been read and understood.

`Earliest`

The oldest Event that is stored in the EventStream Database.

Example

`&start=Earliest`

`<number>`

The number of Events relative to `&end` (the value of which must not also be `<number>`).

Example

`&start=5`

`HH:MM:SS:FF`

A specific time ahead of the current time (according to the EventStream), i.e. in the future, where `00:00:00:00` denotes the current time (according to the EventStream).

Example

`01:30:00:00` (1 hour and 30 minutes ahead of the current time).

`-HH:MM:SS:FF`

A specific time behind the current time (according to the EventStream), i.e. in the past.

Example

`-02:00:00:00` (2 hours behind the current time).

`DD-MMM-YYYY HH:MM:SS:FF`

A precise time on a specific date.

Example

`07-FEB-2019 16:45:00:00` (16:45 on 7th February 2019).

The following rules apply:

- Only one `&start` criteria must be specified in an HTTP request

- It is not a requirement for `&start` criteria to be specified in an HTTP request if one is configured as a **"MandatoryRangeStartExpression"**

- If **"MandatoryRangeStartExpression"** criteria is configured then that specified in the HTTP request must match

- If an HTTP request includes `&start` criteria then it must match to one of the **"PermittedRangeStartCriteria"**

- If **"PermittedRangeStartCriteria": ["*"]** then any `&start` criteria specified in an HTTP request is valid

- **&end=Latest | <number> | HH:MM:SS:FF | -HH:MM:SS:FF | DDD-MMM-YYYY HH:MM:SS:FF**

[String - Case sensitive - Optional]

An HTTP request for Event Parameters (configured in `&filter`) is based upon a range that can be specified in a number of different ways. Define the end of the range from the following options:

> IMPORTANT: When configuring time or date values, ensure that the Configuring Time and Date Values at the front of the User Guide have been read and understood.

`Latest`

The last Event that is stored in the EventStream Database.

Example

`&end=Latest`

`<number>`

The number of Events relative to `&start` (the value of which must not also be <number>).

Example

`&end=9`

`HH:MM:SS:FF`

A specific time ahead of the current time (according to the EventStream), i.e. in the future, where `00:00:00:00` denotes the current time (according to the EventStream).

Example

`02:30:00:00` (2 hours and 30 minutes ahead of the current time).

`-HH:MM:SS:FF`

A specific time behind the current time according to the EventStream (i.e. in the past).

Example

`-00:30:00:00` (30 minutes in the past).

`DD-MMM-YYYY HH:MM:SS:FF`

A precise time on a specific date.

Example

`07-FEB-2019 17:45:00:00` (17:45 on 7th February 2019).

The following rules apply:

- Only one `&end` criteria must be specified in an HTTP request

- `&end` criteria does not have to be specified in an HTTP request if one is configured as a **"MandatoryRangeEndExpression"**

- If `&end` criteria is configured as a **"MandatoryRangeEndExpression"** then that specified in the HTTP request must match

- If an HTTP request includes `&end` criteria then it must match to one of the **"PermittedRangeEndCriteria"**

- If **"PermittedRangeEndCriteria": ["*"]** then any `&end` criteria specified in an HTTP request is valid

- **&filter=<event_parameter>=<value>**

  [String/value pairs - Case sensitive - Optional]

  Define a filter that specifies those Event Parameters and particular value matches that are to be reported on. Multiple Event Parameters can be specified in a filter, and if so they must be configured as CSV (as shown in the example below).

  Example

  `&filter=EventName=Food,EventName=Bvge,WhatsOnCategory=Commercial`

  The response will include all events that have an `EventName` of either `Food` or `Bvge`, and have a `WhatsOnCategory` type of `Commercial`.

  The following are examples of Event Parameters that may be used in a filter:

  ```
  CarrierLabel

  EventName

  ProductCode

  ReconcileKey

  ScheduledEventType

  TransmissionID

  WebPublicationKey

  WhatsOnCategory=Commercial

              =AddressableCommercial

              =Promo

              =Programme

              =Billboard
  ```

The following rules apply:

- Any `&filter` specified in an HTTP request will be supplemented by any configured **"MandatoryFilters"**

- A filter configured in the **"MandatoryFilters"** constraint must also be configured in the **"PermittedFilters"**, unless **"PermittedFilters": {"*"=[]}**

- If no `&filter` is included in an HTTP request and there are no configured **"MandatoryFilters"**, then no filtering will take place and results for all main events will be included in the response

- A `&filter` is optional in an HTTP request regardless of whether or not **"MandatoryFilters"** are configured

- If an HTTP request includes a `&filter` then it must match to one of the **"PermittedFilters"**

- The configured **"MandatoryFilters"** must not be included in an HTTP request

- If **"PermittedFilters": ["*"]** then any `&filter` specified in an HTTP request is valid

- **&order=<event_parameter>:asc|desc**

  [String - Case sensitive - Optional only if **"MandatorySortCriteria"** has been configured, otherwise an order must be specified]

  > Note: The &order parameter is associated with **"PermittedSortCriteria"** and **"MandatorySortCriteria"**

  Specify the sequence in which results should be returned following an HTTP request. Ordering in the response will be according to any configured **"MandatorySortCriteria"** first, then according to the sequence in which the &order criteria are written into the HTTP request. Multiple &order criteria must be configured as CSV (as shown in the example below).

  Sorting applies to both intrinsic and to custom Event Parameters. The following are the intrinsic parameters:

  StartTime

  Sort by the time at which the events started.

  EndTime

  Sort by the time at which the events ended.

  Duration

  Sort by the total duration of the events.

  EventIdentifier

  Sort by Morpheus event identifier.

  Additional parameters:

  <ParameterName>

  Sort by a specified parameter that is configured for an event in the Morpheus automation system, such as WebPublicationKey and TransmissionId.

  It is also possible for the results of each of the Event Parameters to be individually presented in either ascending or descending order, as shown in the example below (the default is ascending order).

Example

Given the following entry in the HTTP request:

`&order=Duration,StartTime:desc`

Accounting for any **"MandatorySortCriteria"**, the sequence of the results is then prioritised according to the order in which the sort criteria is written into the HTTP request. In this example the results will be returned ordered by `Duration` first and then by `StartTime` (for those events that have equal durations).

As there is no additional qualifier for `StartTime` then the default of 'ascending' order applies, contrary to `Duration` which has 'descending' specified.

The following rules apply:

- `&order` criteria contained in an HTTP request is executed subsequently to any that are configured as **"MandatorySortCriteria"**

- An HTTP request must contain one or more matching **"PermittedSortCriteria"** unless **"MandatorySortCriteria"** are configured

- By default, results are returned in ascending order, unless otherwise specified in the **"MandatorySortCriteria"** or in the HTTP request

- Criteria configured as **"MandatorySortCriteria"** constraint must not be specified in an HTTP request

- If an HTTP request includes `&order` criteria then it must match to one of the **"PermittedRangeSortCriteria"**

- If **"PermittedRangeSortCriteria": ["*"]** then any `&order` criteria specified in an HTTP request is valid

- **&select=<event_properties>**

  [String - Case sensitive - Optional only if **"MandatorySelectCriteria"** has been configured, otherwise select criteria must be specified]

  Select the criteria that specifies the particular properties of an event that are to be reported. Multiple criteria can be specified in a selection, and if so they must be configured as CSV (as shown in the example below).

  Selection applies to both intrinsic and to custom Event Parameters. The following are the intrinsic parameters:

  ```
  StartTime
  ```

  Selects the time at which the event started.

  ```
  EndTime
  ```

  Selects the time at which the event ended.

  ```
  Duration
  ```

  Selects the total duration of the event.

  ```
  EventIdentifier
  ```

  Selects the Morpheus event identifier.

  Additional parameters:

  ```
  <ParameterName>
  ```

  Selects the specified parameter that is configured for an event in the Morpheus automation system, such as WebPublicationKey and TransmissionId.

  Example

  ```
  &select=StartTime,Duration,EndTime,EventIdentifier,TranmissionId
  ```

The following rules apply:

- Any **"PermittedSelectCriteria"** specified in an HTTP request will be supplemented by any configured **"MandatorySelectCriteria"**

- An HTTP request must contain one or more matching **"PermittedSelectCriteria"** unless **"MandatorySelectCriteria"** are configured

- If an HTTP request includes `&select` criteria then it must match to one of the **"PermittedSelectCriteria"**

- If **"PermittedSelectCriteria": ["*"]** then any `&select` criteria specified in an HTTP request is valid

- Any **"MandatorySelectCriteria"** may also be contained within the HTTP request

Testing, Troubleshooting, and Problem Resolution

cURL

cURL can be used at the Command Prompt in order to test the communication paths using the following command line (example shown):

```
curl --user playoutinformationclient1:ApiPassword -v
"http://localhost:8081/api/PlayoutInformation/v1/queryEvents
?user=playoutinformationclient1&role=Normal&channel=TestChannel1&start=5&end=00:10:00:00
&filter=WhatsOnCategory=AddressableCommercial&order=Duration:asc,WebPublicationKey:desc
&select=StartTime,Duration,EventName,WebPublicationKey,CarrierLabel,WhatsOnCategory,TransmissionID"
```

The request and the expected response, reporting new data, are shown on the next page.

```
* About to connect() to localhost port 8081 (#0)
*    Trying 127.0.0.1... connected
* Server auth using Basic with user 'playoutinformationclient1'
>GET/api/PlayoutInformation/v1/queryEvents?user=playoutinformationclient1&role=Normal
&channel=TestChannel1&start=5&end=00:10:00:00&filter=WhatsOnCategory=AddressableCommercial
&order=Duration:asc,WebPublicationKey:desc
&select=StartTime,Duration,EventName,WebPublicationKey,CarrierLabel,WhatsOnCategory,TransmissionID
HTTP/1.1
> Authorization: Basic cGxheW91dGluZm9ybWF0aW9uY2xpZW50MTpBcGlQYXNzd29yZA==
> User-Agent: curl/7.23.1 (i386-pc-win32) libcurl/7.23.1 OpenSSL/1.0.0e zlib/1.2.5
> Host: localhost:8081
> Accept: */*
>
< HTTP/1.1 200 OK
< Content-Length: 1184
< Content-Type: application/json; charset=utf-8
< ETag: 16c611de23ea8c4c
< Vary: Origin
< Server: Microsoft-HTTPAPI/2.0
< X-XSS-Protection: 1; mode=block
< X-Content-Type-Options: nosniff
< Date: Tue, 09 Apr 2019 09:42:25 GMT
<
{
"Results": [{
                "StartTime": "07-MAR-2019 11:41:58:09",
                "Duration": "00:00:30:00",
                "EventName": "Brk33 Comm6",
                "WebPublicationKey": "",
                "CarrierLabel": "",
                "WhatsOnCategory": "AddressableCommercial",
                "TransmissionID": "TID-d5b08874-f918-4822-857d-99bbbcddfdf6"
        }, {
                "StartTime": "07-MAR-2019 11:39:58:09",
                "Duration": "00:00:30:00",
                "EventName": "Brk33 Comm2",
                "WebPublicationKey": "",
                "CarrierLabel": "",
                "WhatsOnCategory": "AddressableCommercial",
                "TransmissionID": "TID-cd883454-bec7-4f22-81c5-7d863705f725"
        }, {
                "StartTime": "07-MAR-2019 11:40:58:09",
                "Duration": "00:00:30:00",
                "EventName": "Brk33 Comm4",
                "WebPublicationKey": "",
                "CarrierLabel": "",
                "WhatsOnCategory": "AddressableCommercial",
                "TransmissionID": "TID-fa95953d-0a7d-4e3d-8691-935359241140"
        }, {
                "StartTime": "07-MAR-2019 11:42:58:09",
                "Duration": "00:00:30:00",
                "EventName": "Brk33 Comm8",
                "WebPublicationKey": "",
                "CarrierLabel": "",
                "WhatsOnCategory": "AddressableCommercial",
                "TransmissionID": "TID-20bb6141-634b-446f-9353-326ad2be0a93"
        }, {
                "StartTime": "07-MAR-2019 11:43:58:09",
                "Duration": "00:00:30:00",
                "EventName": "Brk33 Comm10",
                "WebPublicationKey": "",
                "CarrierLabel": "",
                "WhatsOnCategory": "AddressableCommercial",
                "TransmissionID": "TID-4506e77b-bf68-44bc-92b7-8adb3881f585"
        }
    ]}
```

The following cURL commands are used in the example shown:

`--basic`

> Use basic authentication with the remote service (VME Store). This is the default and is required unless used in order to override a previously set option.

`--user`

> Indicates that the username and password are specified next, separate by a colon (:). The username and password `scriptUser:scriptPwd` are used in the example shown.

`-v`

> Verbose. Indicates that information about cURL should be displayed (version, protocols, features).

`http://vme-server:8081`

> The destination machine name and the port number on which the API is listening for the transmitted HTTP request. For further detail refer to <Mandatory URL Path Prefix>.

`/api/PlayoutInformation/v1/queryEvents`

> Specifies the details of the API. For further detail refer to <Mandatory URL Path Prefix>.

Where:

`Content-Length: 1184`

> Example only.

`ETag: 16c611de23ea8c4c`

> Example only.

`Vary: Origin`

> Secure the response to the origin so it cannot be served from cache to any other origin.

`Server: Microsoft-HTTPAPI/2.0`

> Informational.

`X-XSS-Protection: 1; mode=block`

> Block pages from loading when reflected XSS attacks are detected.

```
         Date: Tue, 09 Apr 2019 09:42:25 GMT
```

The current date and time.

The following example displays a request / response with the `If-None-Match` condition set in an HTTP request; it specifies that the resource must only respond if it has changed, as indicated by the generation of a new ETag:

```
* About to connect() to localhost port 8081 (#0)
*   Trying 127.0.0.1... connected
* Server auth using Basic with user 'playoutinformationclient1'
>GET/api/PlayoutInformation/v1/queryEvents?user=playoutinformationclient1&role=Normal
&channel=TestChannel1&start=5&end=00:10:00:00&filter=WhatsOnCategory=AddressableCommercial
&order=Duration:asc,WebPublicationKey:desc
&select=StartTime,Duration,EventName,WebPublicationKey,CarrierLabel,WhatsOnCategory,TransmissionID
HTTP/1.1
> Authorization: Basic cGxheW91dGluZm9ybWF0aW9uY2xpZW50MTpBcGlQYXNzd29yZA==
> User-Agent: curl/7.23.1 (i386-pc-win32) libcurl/7.23.1 OpenSSL/1.0.0e zlib/1.2.5
> Host: localhost:8081
> Accept: */*
> If-None-Match: 16c611de23ea8c4c
>
< HTTP/1.1 304 Not Modified
< Content-Length: 0
< Vary: Origin
< Server: Microsoft-HTTPAPI/2.0
< X-XSS-Protection: 1; mode=block
< X-Content-Type-Options: nosniff
< Date: Tue, 09 Apr 2019 09:46:35 GMT
```

In this case, the status code 304 has been returned, indicating that the requested resource has not changed since the last HTTP request, therefore none of the requested data is reported.

For information relating to status codes, refer to HTTP Status Codes.

HTTP Status Codes

The HTTP status codes that can be returned by the 'PlayoutInformationAPI'.

Note: Additional information may also be provided in the 'Reason Phrase' or in the body of the response.

200 OK

A successful HTTP request. The response contains a message body that corresponds to the request. This is conditional according to the If-None-Match HTTP request header: this status code will only be returned if the requested resource has an ETag that does not match that of the previous request.

204 OK

For non-REST API calls, this code indicates that the requested data is currently unavailable. Once available, the data will be transmitted via an alternative channel. A subsequent request may have the data returned successfully.

304 Not Modified

The ETag of the requested resource is currently identical to that supplied in the previous response, indicating that there has been no change to the resource. No response is returned as it is conditional to the If-None-Match HTTP request header (i.e. the ETag must be different from that in the previous request in order for a response to be returned).

400 Confused Authorization

The authentication failed due to one of the following reasons:

- `?user` mis-match with the VME Store
- `&role` mis-match with the VME Store

400 Bad Request

The target server was unable to process the request due to invalid syntax.

- Missing `&channel` value
- Missing `&start` condition
- Missing `&end` condition
- Invalid `&filter`
- Missing `&order` criteria
- Missing `&select` criteria

401 Unauthorized

The authentication that is required in the request has either failed or was not supplied in the HTTP request.

403 Forbidden

The user is not entitled to a response following the HTTP request for one of the following possible reasons:

- **"DefaultConstraints"** are missing from the *PlayoutInformationAPI.json* file

- The specified constraint in the **"NamedConstraints"** is missing from the *PlayoutInformationAPI.json* file

- **"DefaultConstraints"** have been disabled

- The specified ?user does not exist

- The specified ?user is disabled

- The **"Group"** to which the specified ?user belongs is disabled

- The specified &channel is configured as a **"MandatoryChannelName"** in the PlayoutInformationAPI.json file and is therefore locked down

- The specified &channel is not configured as one of the **"PermittedChannels"**

- The specified &filter is either not configured as one of the **"PermittedFilters"**, or one of the **"MandatoryFilters"** has been included in the HTTP request (an invalid action)

- The value of &filter is invalid

- The specified &select criteria is invalid

- The &order has not been specified and does not exist as **"MandatorySortCriteria"**

- The specified &order is either missing from the list of **"PermittedSortCriteria"**, or one of the **"MandatorySortCriteria"** has been specified in the HTTP request (an invalid action)

- The specified &start value is in violation of the configured **"MandatoryRangeStartExpression"**

- The specified &start is not included in the list of **"PermittedRangeStartCriteria"**

- The specified &end value is in violation of the configured **"MandatoryRangeEndExpression"**

- The specified &end is not configured as a **"PermittedRangeEndCriteria"**

404 Not Found

The resource detailed in the request was not found or is not available.

405 Method Not Allowed

Only the GET method is supported - any other method used in an HTTP request will return this message.

408 Request Timeout

An unexpected delay has resulted in a failure to produce any results following the HTTP request. A subsequent HTTP request may be successful.

500 Internal Server Error

The API host device has not been able to process and fulfill the HTTP request due to an internal error.

408 Request Timeout

Grass Valley Technical Support

For details of our Regional Customer Support Offices please visit the Grass Valley website and navigate to Support> Contact Support.

https://www.grassvalley.com/support

UK Office

The department is staffed from 9.00am to 5:30pm Monday to Friday (excluding UK public holidays.

Outside these times, calls will be delivered to voicemail for follow up on the next working day.

Additional support is available outside these hours by purchasing a support contract, details of which are available from the Grass Valley website and through the account manager.

Customers with an existing support contract should call their personalised number, which can be found in the contract, and be ready to provide the contract number and details.