AMPP Edge provides the on-premise I/O and compute resources for AMPP applications as part of the GV Media Universe workflows.

AMPP Edge is a turnkey server perfect for AMPP customers requiring signal contribution and transmission in and out of the AMPP SaaS platform, securely and with the lowest latency possible across any network.

In addition, AMPP Edge offers the ability to host various AMPP applications such as Flow Monitors, Clip Players, Multiviewers, Recorders, Master Control, Replay, Switchers and more, enabling production and broadcast operations from anywhere.

AMPP Edge enables remote viewing using the AMPP Flow Monitors to stream sources anywhere to an internet browser on a PC. This allows for low latency and secure streaming of multiviewer outputs from truck/venue, or camera feeds to producers in remote locations.

AMPP Edge is available in three models: GVAMPP-HW-HD, GVAMPP-HW-UHD and GVAMPP-HW-MINI. All models offer similar features and functions, and they differ only in their compute capacity and hardware specifications.

The HD and UHD versions are rackmount servers for installation in facilities, trucks and flypacks equipped with racks, and they offer redundant power supplies and RAID-0 SSDs. The MINI version is a desktop form factor for @home, stadium and venues where rackmount servers are not suitable for the application.

AMPP Edge offers SDI and SMPTE ST 2110/ST 2022-6/7 IP I/O options for signal acquisition and transmission up to UHD formats. IP routing is compliant with NMOS IS-04 and IS-05.

Key Features

- Turnkey servers for AMPP customers managed by Grass Valley DevOps team
- 1 RU rackmount or standalone versions
- Available with redundant power supplies and RAID file system
- SDI and IP interfaces for signal contribution or transmission
- Supports UHD and HDR
- IP interface compliant to SMPTE ST 2110, ST 2022-6/7 and NMOS IS-04/IS-05
- Low latency and secure streaming to and from AMPP SaaS platform
- Supports RIST and SRT ARQ streaming
AMPP Edge Use Cases

AMPP Edge for Remote Monitoring
In the context of remote working, a simple use case of an AMPP Edge is to stream local sources, from a venue or an outside broadcast (OB) truck, to a tablet or PC with just a web browser and an internet connection. For example, multiviewer outputs are acquired from the OB truck and streamed to production staff members anywhere in the world, which allows them to participate in the production without being physically present.

- Production-grade monitoring experience:
  - High quality (full HD resolution)
  - Low latency (as low as 2–3 frames)
- Accessible via standard home internet connection:
  - Low bandwidth (~5 Mb/s)
  - Secured with encryption and authentication

AMPP Edge for Global Routing
Once a signal is acquired locally using an AMPP Edge, it can be routed to any other AMPP Edge anywhere in the world, or to an AMPP cloud instance running on cloud infrastructure providers. Once the signal reaches its destination, it is delivered back locally as an SDI or IP source. This easily accomplished using the AMPP routing service. Local signals can be acquired and delivered in SDI or IP (SMPTE ST 2110, SMPTE ST 2022–6/7, NDI, MPEG-TS and more).

- Intelligent timing: outputs from multiple locations all co-timed
- Low latency: Edge-Cloud-Edge round trip in less than 1 second
- Easy connectivity: automatically routes streams across multiple networks
- Streams include video, all audio channels and the complete ancillary data
**AMPP Edge for Contribution**

AMPP supports all common local input and output formats including SMPTE ST 2110, NDI and SDI for easy connecting to your existing devices. Global inputs and outputs allow you to stream between different AMPP fabrics and lets you choose the best possible transport for low-latency and high-quality streaming. Supporting RIST and SRT for reliable transport even over public Internet, AMPP gives you a wide variety of profiles to fit your needs.

**Spin Up AMPP Processing Applications**

In addition to signal I/O and contribution, an AMPP Edge offers on-premise compute resources to run AMPP Applications: master control or live production switcher, audio mixer, graphics and more!

Easily configure and spin up a complete media workflow, including built in live monitoring with flow monitors and multiviewers.
Specifications

I/O
SDI with EC9730/EC9732 expansion options:
- 8 SD/HD/3G-SDI configurable input or output DIN 1.0/2.3 connectors
- SD-SDI: SMPTE ST 259, ITU R601, 525/625 line, 10-bit
- HD-SDI: SMPTE ST 292, 10-bit
- 3G-SDI: SMPTE ST 424, 10-bit

IP with EC9733/EC9734 IP expansion option:
- Dual 10G/25G SFP (EC9733) or Dual 100G QSFP (EC9734)
- SMPTE ST 2022-6
- SMPTE ST 2022-7
- SMPTE ST 2110-20 uncompressed video over IP
- SMPTE ST 2110-30 PCM audio over IP
- SMPTE ST 2110-40 ancillary data over IP
- NMOS IS-04 and IS-05 discovery, registration and connection management
- SMPTE ST 2059 PTP synchronization

WAN/LAN transport:
- SMPTE ST 2022-2/MPEG-TS
- RIST/TR-06 Basic and Main Profile
- SRT
- RTMP(S)
- NDI

Encryption and protection:
- Flex-FEC
- DTLS-SRTP encryption

Video codecs:
- AVC/H.264: 4:2:0 or 4:2:2, 8- and 10-bit
- HEVC/H.265: 4:2:0 8- and 10-bit

Audio codecs:
- AAC
- Opus

Video Formats
Resolution: 480 (NTSC), 576 (PAL), 720 (HD), 1080 (full HD), 2160 (UHD)
Scan: Interlaced or progressive
Frame Rate (Hz): 23.97, 24, 25, 29.97, 50, 59.94
SDI I/O:
- (3G Level A) 1080p50/59.94
- (UHD quad-link) 2160p59.94 and 2160p50

Audio
SDI and SMPTE ST 2110/ST 2022-6: Up to 16 tracks per channel
Input: 48 kHz, 16- or 24-bit digital audio
Reference Genlock (with EC9730/EC9732 options)
- Blackburst analog and tri-level sync
- Single DIN 1.0/2.3 connector

Power Requirements
GVAMP-HW-HD and GVAMP-HW-UHD: Dual redundant 750W – hot swappable
GVAMP-HW-MINI: Single 600W

Dimensions
GVAMP-HW-HD and GVAMP-HW-UHD: 43 mm (1.7 in.) x 437 mm (17.2 in.) x 683 mm (27 in.)
GVAMP-HW-MINI: 109 mm (4.3 in.) x 267 mm (10.5 in.) x 406 mm (16 in.)

Supported on-premise I/O formats:
- SDI (with SDI expansion option)
- SMPTE ST 2110 with NMOS IS-04/05 support (with IP expansion option)
- SMPTE ST 2022-6/7 (with IP expansion option)
- NDI, including fill & key

Codes and wrappers:
- H.264, H.265
- SRT
- RIST
- Zixi
- And more!

Model Comparison

<table>
<thead>
<tr>
<th></th>
<th>MINI</th>
<th>HD</th>
<th>UHD</th>
</tr>
</thead>
<tbody>
<tr>
<td>#CPU (Xeon)</td>
<td>Single Xeon</td>
<td>Dual Xeon Silver</td>
<td>Dual Xeon Gold</td>
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<td>CPU clock</td>
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<td>2.1 GHz</td>
<td>2.6 GHz</td>
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<td>#Cores per CPU</td>
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<td>18</td>
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<tr>
<td>Total cores</td>
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<td>24</td>
<td>36</td>
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<tr>
<td>RAM</td>
<td>64 GB</td>
<td>96 GB</td>
<td>192 GB</td>
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<td>HDD</td>
<td>1 x 480 GB SSD</td>
<td>2 x 480 GB SSD in RAID</td>
<td>2 x 480 GB SSD in RAID</td>
</tr>
<tr>
<td>PSU</td>
<td>Single 600W</td>
<td>Dual – Redundant (750W)</td>
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</tr>
</tbody>
</table>
**AMPP Edge Nodes**

**GVAMPP-HW-HD**
AMPP Edge — GV turnkey rack server for HD AMPP I/O and edge processing workflows. Includes NVIDIA P2200 graphics card. Requires either EC9730 for SDI workflows or EC9733 for SMPTE ST 2110 IP workflows.

**GVAMPP-HW-UHD**
AMPP Edge — GV turnkey rack server for HD/UHD AMPP I/O and edge processing workflows. Includes NVIDIA P4000 graphics card. Requires either EC9730 for SDI workflows or EC9733 for SMPTE ST 2110 IP workflows.

**GVAMPP-HW-MINI**
AMPP Edge — GV turnkey desktop PC for HD AMPP I/O and edge processing workflows. Includes NVIDIA P2200 graphics card. Requires either EC9730 for SDI workflows or EC9733 for SMPTE ST 2110 IP workflows.

**AMPP Edge I/O Options**

**EC9730**
SDI expansion card — AJA Corvid 88 video card (PCI-express). Provides 8 SDI ports independently configurable as input or output. Accommodates up to 8 inputs or 8 outputs for recorder or player channels according to your intended use. Includes Rivermax license and silver 1 year support.

**EC9732**
SDI expansion card — for GVAMPP-HW-MINI. AJA Corvid 88 video card with tall bracket and HD-BNC to BNC adapters. Provides 8 SDI ports independently configurable as input or output for recorder or player channels according to your intended use.

**EC9733**
IP expansion card — ConnectX-6 NIC — Dual 10G/25G NVIDIA/Mellanox IP interface card with SFP+ interfaces. Requires SFP-10G or SFP-25G (Must use 25G SFP for UHD). Includes Rivermax license and silver 1 year support.

**EC9734**
IP expansion card — ConnectX-6 NIC — Dual 100G NVIDIA/Mellanox IP interface card with QSFP interfaces. QSFPs not included. Includes Rivermax license and silver 1 year support.

**SFP-10G**
Two (2) 10 GbE SFP modules required for EC9733 card

**SFP-25G**
Two (2) 25 GbE SFP modules required for EC9733 card

**Disk Space Expansion**

**SSD-1920R5**
Internal SSD storage (1.92 TB drives) — Provides ~7.6 TB RAID-5 (~157 hours @ 100 Mb)

**SSD-960R5**
Internal SSD storage (960 GB drives) — Provides ~4 TB RAID-5 (~79 hours @ 100 Mb)

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This product may be protected by one or more patents. For further information, please visit www.grassvalley.com/patents

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