O1Stream AVoIP Series

Q & A Booklet

HDMI 2.1 over IP Multicast System

with Transceiver and USBoIP support

REV 250304

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1 Product Overview

The O1Stream AVoIP Series HDMI 2.1 over IP Multicast System is a cutting-edge solution designed to extend the transmission distance of video/audio signals up to 100 meters (330 feet) in UHD 4K2K format, catering to a variety of professional and commercial needs. Whether you are transmitting content from DVD players, Blu-ray Disc players, PS5, PCs, or other HDMI sources, it ensures a reliable and high-quality broadcasting to distant display monitors including HDMI-enabled TV sets or LCD PC monitors.

1.1 Key Highlights

- **High-Quality Transmission:**

  Supports a maximum resolution of 4K@144 4:4:4 / 8K@60 4:2:2 DSC, delivering ultra-high-definition video quality over extended distances. With O1Stream technology, it ensures unparalleled precision and efficiency in synchronization and data handling.

- **Flexible Broadcasting Architectures:**

  Adapt to different broadcasting needs with Point to Point, Point to Many, and Multi-Casting architectures. Multi-Casting is based on a Managed Gigabit Switch with 802.1Q VLAN function which allows remote control and support for multiple video sources.

- **Video Wall Support:**

  Easily create impressive video wall setups, making it an ideal solution for digital signage, entertainment venues, and command centers. O1Stream technology provides precise synchronization and efficient data handling to ensure high-quality display output.

- **Comprehensive Connectivity:**

  In addition to video and audio, it supports full-frequency IR signals, bi-directional IR paths, full-duplex RS-232 control, and USB connectivity over IP, offering a robust solution for a wide range of audiovisual and control applications.

- **PoE, IR and RS-232 pass-through Path:**

  These features add to the ease of setup and the flexibility in various installation scenarios, reducing cabling complexity and ensuring a streamlined setup.

- **Robust and Easy Installation:**

The wall-mountable design facilitates easy and secure installation, while intuitive software or hardware controls allow for quick multi-casting group configuration.

1.2 Applications

The O1Stream AVoIP Series is well-suited for a multitude of applications including but not limited to:

- **Digital Signage:**

  Broadcast high-quality video content across a network of displays for advertising, information dissemination, or entertainment purposes in retail, hospitality, or public spaces. Advanced capabilities enhance performance, especially in AV over IP setups.

- **Education and Training Facilities:**

  Enable real-time video broadcasting to multiple rooms or even buildings, enhancing the learning experience.

- **Corporate Environments:**

  Facilitate seamless video communication and presentations across various meeting rooms or premises.

- **Entertainment Venues:**

  Deliver live or pre-recorded video content to multiple screens ensuring a captivating viewer experience.

- **Command and Control Centers:**

  Enable monitoring and management of multiple video feeds in real-time for security and surveillance applications, ensuring timely and accurate decision-making.

The O1Stream AVoIP Series leverages O1Stream's advanced capabilities to enhance its performance, especially in AV over IP setups.

2 Getting Started

The O1Stream AVoIP Series HDMI 2.1 over IP Multicast System is engineered for straightforward installation and configuration, ensuring you can quickly set up your video broadcasting network. This section walks you through the essential steps to get your system up and running.

2.1 Installation

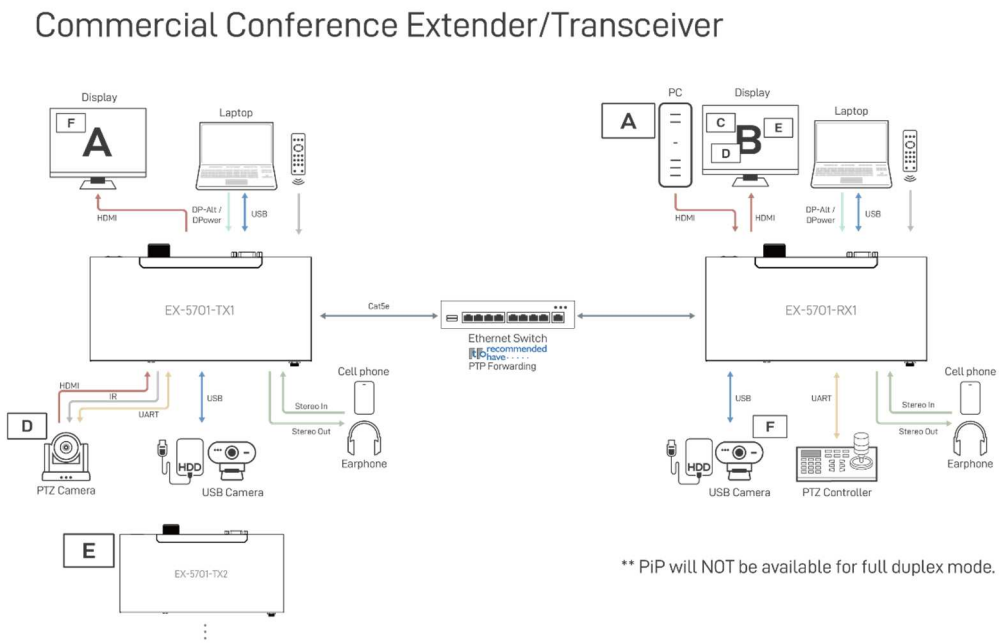
(1) Unpacking the Box:

- Carefully unpack the unit from the box.
- Ensure all components are included as per the checklist in the user manual.
- Inspect the unit for any visible damages that might have occurred during shipping.

(2) Placement:

- Decide on a suitable location for the unit that is near your HDMI sources and display devices.
- Ensure the location is well-ventilated, free from excessive dust, and away from direct sunlight.

(3) Connecting the Cables:



- Connect the HDMI source(s) to the HDMI input port on the transmitter.
- Connect the display device(s) to the HDMI output port on the receiver.
- Use high-quality Ethernet cables to connect the units to the Gigabit Ethernet switch. Make sure the switch supports IGMP and jumbo frames for optimal performance.
- If utilizing the PoE feature, ensure that your network switch supports PoE or use a PoE injector to provide power to the units.

(4) Powering On:

- If not using PoE, connect 12V power adapters to the units and plug them into an electrical outlet.

- Power on the units along with your HDMI sources and display devices.

2.2 Configuration

(1) IP Address Configuration:

- Assign IP addresses to the units using the broadcasting management software.
- Ensure that the IP addresses are correctly set to avoid IP conflicts on your network.

(2) Video Wall Setup:

If utilizing the Video Wall function, follow the instructions in the user manual to set up and configure the video wall layout using the broadcasting management software.

(3) Testing the Setup:

- Once everything is connected and configured, conduct a test by broadcasting video from your source to the display devices.
- Check the quality of the video and audio transmission, ensuring that there are no disruptions or quality issues.

(4) Adjusting Settings (if necessary):

Using the broadcasting management software, adjust settings like video resolution, audio settings, or other preferences as per your requirements.

(5) Finalizing the Setup:

- Secure all cables and ensure that the setup is organized.
- Document your setup, noting down the IP addresses and other essential settings for future reference.

Your O1Stream AVoIP Series HDMI 2.1 over IP Multicast System should now be successfully installed and configured, ready to deliver high-quality video and audio broadcasting across your network.

3 Key Features

The O1Stream AVoIP Series HDMI 2.1 over IP Multicast System is packed with advanced features designed to deliver a powerful, scalable, and high-quality video broadcasting solution. This section highlights some of the key capabilities of the system. With O1Stream technology, the system offers unmatched precision and efficiency in synchronization and data management.

3.1 Resolution Support

Video resolutions up to 4K@144 4:4:4 and 8K@60 4:2:2 DSC are supported, ensuring ultra-high-definition video broadcasting over IP networks. This resolution capability enables sharp, clear, and vibrant video transmission for an enhanced viewing experience.

3.2 High Dynamic Range (HDR)

With HDR support, video contrast and color are enhanced, delivering deeper blacks and brighter whites. HDR significantly improves visual quality by preserving details in both the darkest and brightest areas of the image.

3.3 HDMI 2.1a and HDCP 2.3 Compliance

Compliant with HDMI 2.1a and HDCP 2.3 standards, reliable high-speed transmission of video and audio signals is ensured while adhering to the latest copyright protection protocols. This compliance guarantees compatibility with a wide range of modern HDMI-enabled devices.

3.4 Flexible and Scalable Video Broadcasting

With its Gigabit Ethernet LAN/Switch compatibility, the system provides a flexible and scalable solution for UHD video broadcasting in various architectures including one to one, one to many, and multi-casting broadcasting.

3.5 Multi-Casting and Video Wall Functionality

Multi-casting is enabled through a Managed Gigabit Switch with 802.1Q VLAN functionality, allowing for controlled remote access and supporting multiple video sources. Additionally, video wall functionality makes it an ideal solution for creating large-scale displays.

3.6 Full Frequency IR Signal and Bi-directional IR Path

The system supports full-frequency IR signals from 20KHz to 60KHz and a bi-directional IR path, facilitating remote control of source and display devices from either end of the transmission setup.

3.7 Full Duplex RS-232 Control

The full duplex RS-232 control up to 115,200 bps through connector allows for robust and reliable communication between devices, further enhancing the system's flexibility and control capabilities.

3.8 USB over IP Support

Supports USB flash drive (USBoIP) and keyboard/mouse (KMoIP), USB webcam, and USB audio device over IP functionality, allowing for additional device connectivity and interaction over the network.

3.9 Wall Mounting Housing Design

The wall-mounting housing design ensures a simple and efficient installation process, streamlining deployment and maximizing space utilization.

These features collectively render the O1Stream AVoIP Series HDMI 2.1 over IP Multicast System a comprehensive solution for an array of video broadcasting needs, be it for digital signage, education, corporate, or entertainment environments.

4 Broadcasting Architectures

The O1Stream AVoIP Series HDMI 2.1 over IP Multicast System facilitates different broadcasting architectures to cater to various distribution and display needs. This section elaborates on the primary broadcasting architectures supported by the system.

4.1 Point to Point

In a Point to Point broadcasting setup, a direct connection is established between a single source and a single display device. This configuration is ideal for extending HDMI signals from the source to a display located at a significant distance—up to 100 meters—within the same network. It offers a straightforward and efficient solution for setups with a single source and display, ensuring UHD 4K2K video transmission.

4.2 Point to Many

The Point to Many architecture enhances the Point to Point setup by allowing one source to broadcast to multiple display devices over the network. This configuration is especially useful for applications such as digital signage, training rooms, or any scenario where identical content needs to be shown on multiple screens simultaneously. With the assistance of a Gigabit Ethernet network switch, the system can distribute UHD video and audio signals to multiple displays within the network.

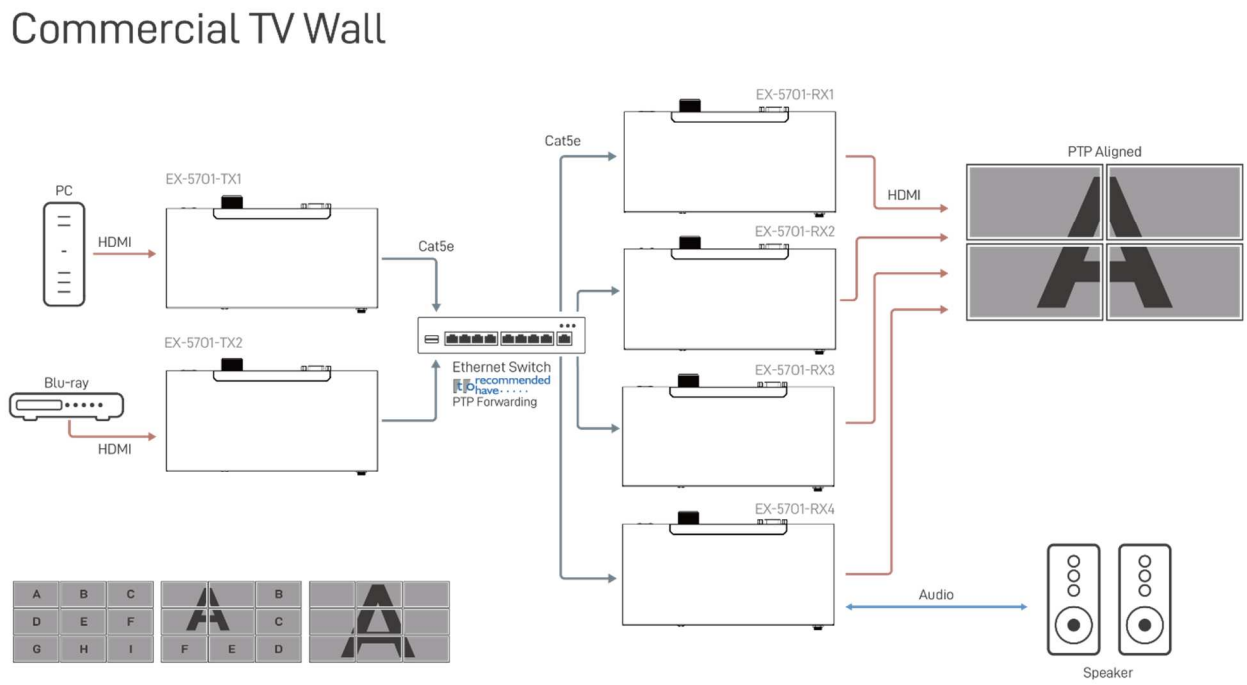
4.3 Multi-Casting

Multi-Casting is a key feature of the system's broadcasting capabilities, enabling multiple sources to broadcast to multiple display devices at the same time. By utilizing a Managed Gigabit Switch with 802.1Q VLAN support, this architecture provides remote control and accommodates multiple video sources, making it a powerful solution for complex video distribution needs. The system supports up to 255 multicast groups, offering extensive broadcasting options. This setup is ideal for large-scale installations, such as corporate communications, entertainment venues, or educational institutions, where diverse content distribution is essential.

Each of these broadcasting architectures offers unique advantages and flexibility, making the O1Stream AVoIP Series a versatile solution for a plethora of video broadcasting and display scenarios.

5 Video Wall Functionality

The O1Stream AVoIP Series HDMI 2.1 over IP Multicast System shines in its ability to support video wall configurations. This function allows users to create large-scale video wall displays utilizing multiple screens, catering to various commercial and professional environments. Here's an overview of the video wall functionality:



5.1 Scalability

The system allows for the creation of video walls with theoretically unlimited displays. This scalability makes it an attractive solution for varied setups, from smaller video walls in retail spaces to expansive multi-screen displays in control rooms or event venues.

5.2 Image Rotation

Supporting 90, 180, and 270-degree clockwise image rotation, this feature provides flexibility in designing video walls with different orientations. It is particularly useful for installations focused on creativity or aesthetics where unique display arrangements are desired.

5.3 High-Resolution Support

With 4K@144 4:4:4 and 8K@60 4:2:2 DSC resolution support, video walls display crisp, clear, and vibrant images and videos, maintaining high visual fidelity across all screens.

5.4 Multi-Casting Groups

Up to 255 multi-casting groups can be created, allowing for complex video wall setups with multiple sources. This feature enables users to manage and control various video walls within the same network efficiently.

5.5 Seamless Integration

The system is designed to work seamlessly with Gigabit Ethernet LAN/Switch, ensuring smooth video transmission and synchronization across all displays in the video wall. The integration is streamlined, minimizing latency and ensuring real-time display of the content.

5.6 Remote Management

With broadcasting management software, remote management and control of video wall configurations are possible, allowing for easy adjustments of settings, source switching, or layout changes as needed.

The O1Stream AVoIP Series's video wall functionality is a robust feature that greatly enhances the system's appeal for various applications, providing a comprehensive solution for those looking to create impactful visual displays.

6 USB, KM, and Webcam over IP

The O1Stream AVoIP Series HDMI 2.1 over IP Multicast System extends its versatility through its support for USB, keyboard/mouse (KM), and webcam functionalities over IP. Here's a breakdown of these features:

6.1 USB over IP (USBoIP)

- **Flash Drive Support:**

  Users can connect a USB flash drive to the system and access its contents over IP. This feature enables remote access to files and documents, facilitating content sharing and management.

- **USB Device Extension:**

  The USBoIP feature also allows for the extension of other USB devices over IP, ensuring seamless connectivity within the network.

6.2 Keyboard/Mouse over IP (KMoIP)

- **Remote Control:**

  With the KMoIP feature, users can control source devices remotely using a keyboard and mouse. This remote control capability is crucial for managing systems in different locations within a network.

- **Interactive Operations:**

  The KMoIP functionality enhances interactive operations, allowing users to perform actions on remote systems as if they were locally present.

6.3 Webcam over IP

- **Remote Video Capture:**

Users can connect a webcam to the system and capture video over IP. This feature is beneficial for monitoring, conferencing, and various other applications requiring remote video capabilities.

- **Audio Support:**

  In addition to video, the system supports USB audio devices over IP, allowing for comprehensive audio-visual solutions.

6.4 Hardware Support for USB Webcam and Audio (HW-USBoIP)

- **Dedicated Hardware Support:**

  The HW-USBoIP feature ensures that the USB, webcam, and audio functionalities are handled efficiently, guaranteeing stable and reliable performance.

- **Expanded Connectivity:**

  With hardware support, users can expect better response times and smoother operations when utilizing USB, KM, and webcam features over IP.

6.5 Ease of Setup and Use

- **Plug-and-Play:**

  The features are designed to be plug-and-play, ensuring easy setup and use. Users can quickly get started with minimal configuration required.

- **Wall Mounting Design:**

  A wall-mounting housing design ensures robust installation, making it easier to set up USB, KM, and webcam functionalities in various environments.

The integration of USB, KM, and Webcam over IP functionalities within the O1Stream AVoIP Series significantly enhances its capability to serve as a comprehensive solution for digital signage, monitoring, and interactive applications.

7 Troubleshooting

Dealing with technical glitches can be a common occurrence while operating sophisticated systems like the O1Stream AVoIP Series HDMI 2.1 over IP Multicast System. Here is a guide to help troubleshoot some common issues you might face:

7.1 No Video/Audio Output

- **Check Connection:**

  Ensure all cables are securely connected, including the HDMI, Ethernet, and power cables.

- **Check Power:**

  Ensure the system is powered on and the indicator lights are functioning as expected.

- **Check Resolution:**

  Ensure the video source is set to a supported resolution.

- **Check Network Switch:**

  Ensure the network switch supports IGMP and has jumbo frame enabled if multicasting.

7.2 Poor Video/Audio Quality

- **Check Cable Quality:**

  Use high-quality cables to connect the system. Poor quality or damaged cables can cause video/audio degradation.

- **Check Bandwidth:**

  Ensure the network has adequate bandwidth to handle the UHD video streaming.

- **Check Network Congestion:**

  Excess network traffic might cause video/audio lag or quality issues.

7.3 USB/KM/Webcam Functionality Not Working

- **Check USB Connection:**

Ensure the USB devices are properly connected.

- **Check Network Configuration:**

  Ensure the network is configured correctly to support USBoIP, KMoIP, and Webcam over IP functionalities.

- **Restart the System:**

  If the USB/KM/Webcam functionality is still not working, try restarting the system.

7.4 Video Wall Functionality Issues

- **Check Configuration:**

  Ensure the video wall configuration is set up correctly according to the instructions provided in the manual.

- **Check Network:**

  Ensure the network settings are correctly configured to support video wall functionality.

7.5 Network Configuration Issues

- **Check IP Addresses:**

  Ensure all devices in the network have unique IP addresses to avoid IP conflicts.

- **Check VLAN Configuration:**

  Ensure the VLAN configuration is correct if using a managed network switch.

7.6 Failed to Connect to Broadcasting Management Software

- **Check Network Connectivity:**

  Ensure the network connectivity is stable.

- **Check Software Configuration:**

  Ensure the software is configured correctly as per the user manual.

- **Check Firewall/Antivirus Settings:**

  Ensure your firewall or antivirus software is not blocking the connection.

7.7 General Troubleshooting Tips

- **Consult the Manual:**

  The user manual contains detailed troubleshooting steps for various issues.

- **Update Firmware:**

  Ensure the system is running the latest firmware to fix known bugs and improve performance.

- **Contact Support:**

  If issues persist, contact the technical support team for further assistance.

8 Technical Specifications

Here is a detailed listing of the technical specifications and comparison for the O1Stream AVoIP Series HDMI 2.1 over IP Multicast System:

8.1 Specifications

Video	Resolution Support	Up to 4K@144 4:4:4/ 8K@60 4:2:2 DSC
	High Dynamic Range (HDR)	Supported (HDR10)
	Video Compatibility	HDMI 2.1a, HDCP 2.3 compliant USB-C (DP Alt Mode)
Audio	Audio Transmission	Embedded audio over IP
	Audio Compliance	Compatible with HDMI audio standards
Network	Transmission Distance	Up to 100m (330ft) over CAT6/7
	Network Interface	Gigabit Ethernet
	Multicast Groups	Up to 255
	Protocol	IGMP (for Multicast), requires a managed Gigabit Ethernet switch with IGMP and VLAN function
USB/KM/Webcam Over IP	USB Support	USB flash drive, keyboard/mouse (KMoIP), and USB webcam/audio device (HW-USBoIP)
	USB Interface	USB 3.1 Gen 2 (Type B), USB 3.1 Gen 1 (Type A) and USB 2.0 Hub (Type A)
Control	IR	Bi-directional IR path, supports full frequency IR signal from 20KHz to 60KHz
	RS-232	Full Duplex RS-232 control up to 115,200 bps
Video Wall Functionality	Rotation Support	Supported (rotation/flip)
	Video Wall Configuration	Customizable via broadcasting management software

Power	Power Over Ethernet (PoE)	Supported
	Power Consumption	TBD

8.2 Comparison

Model	EX-58O1	EX-57O1-C	EX-57O1
Ethernet	1G	1G	1G
HDMI/HDCP	2.1(4K)/2.3	2.1(4K)/2.3	2.1(8K)/2.3
Video Codec	AV1/(H264 or MJ)	AV1/H264/MJ	AV1/H264/MJ
AV1 Video Quality (PSNR)	~ 42 dB	~ 42 dB	~ 42 dB
Video Bandwidth	~ 400Mbps	~ 400Mbps	~ 400Mbps
Video Latency	< 1 frame	< 1 frame	< 1 frame
USB	USB	USB3	USB3
eARC/ARC	Y	Yes	Yes
Bi-Dir IR/RS232	Yes	Yes	Yes
Line Audio	Yes	Yes	Yes
Audio MIC/HP/SPDIF	Yes	Yes	Yes
USBC(DPRX1.4 ALT)	Yes	Yes	Yes
Image Compositing(PIP)	Yes, x1	Yes, xN	Yes, xN
Video Wall	No	Yes	Yes
PTP (Precise Time Protocol)	Yes	Yes	Yes
Transceiver (Full duplex)	No	No	Yes

9 Q&A for Enhanced Understanding of O1Stream AVoIP Series

9.1 Video/Audio

Q: What is the maximum resolution supported by O1Stream AVoIP Series?

ANS: The maximum resolution supported is 4K@144 4:4:4/ 8K@60 4:2:2 DSC ensuring ultra-high-definition video quality.

Q: How does the HDR feature enhance the video quality?

ANS: High Dynamic Range (HDR) provides a higher level of contrast between light and dark images on the screen to create a much more realistic image.

Q: Is there any difference in quality between the original video and the video transmitted by the O1Stream AVoIP Series?

ANS: The O1Stream AVoIP Series utilizes compression technology to enable the efficient transmission of high-definition video over the network. While this technology allows for the extension of UHD video over long distances with lower bandwidth requirements, there may be a slight difference in quality compared to the original video.

Q: How significant is the distortion in the transmitted video?

ANS: The distortion is typically very minimal and may not be noticeable to most viewers, especially in real-world usage scenarios. The O1Stream AVoIP Series is designed to maintain a high level of video quality, ensuring that the viewing experience remains engaging and satisfactory.

Q: Is there a feature to prevent frame tearing?

ANS: No, there is no specific feature to prevent frame tearing. Frame tearing may occur when the video feed frame rate doesn't match the display's refresh rate. You might need to look for alternative solutions or external hardware to address frame tearing issues in your setup.

Q: Why is compression required in the O1Stream AVoIP Series?

ANS: Compression technology is used to manage the high bandwidth demands of UHD video, allowing for efficient transmission over the network. This means users can experience high-definition video broadcasting over longer distances without requiring excessively high bandwidth, making it a practical solution for various broadcasting needs.

Q: What measures have been taken to minimize the distortion caused by compression?

ANS: Advanced compression algorithms are used to optimize the balance between quality and bandwidth. These algorithms preserve as much of the original quality as possible while ensuring efficient use of network resources, allowing for robust and reliable video transmission.

Q: Is the slight distortion a common characteristic in similar video broadcasting systems?

ANS: Yes, slight distortion due to compression is a common characteristic in many video broadcasting systems, especially those designed to transmit high-definition video over IP networks. The O1Stream AVoIP Series, with its advanced compression algorithms, strives to minimize this distortion while providing a cost-effective and practical broadcasting solution.

Q: Why is Quality of Service (QoS) significant in AV over IP?

A: QoS settings prioritize AV over IP traffic, ensuring low latency and minimal jitter for real-time AV transmissions which is crucial for maintaining good quality audio and video.

Q: Why is bandwidth management necessary in AV over IP?

A: Adequate bandwidth and bandwidth management techniques prevent network congestion, ensuring smooth AV over IP traffic flow especially between routers.

9.2 Control

Q: What kind of USB functionality does the O1Stream AVoIP Series support?

ANS: The O1Stream AVoIP Series supports USB flash drives, keyboard/mouse operations, USB webcam, USB audio devices over IP, and USB-C input. These features enable a variety of interactive capabilities and data transmission across the network.

Q: What kind of control does the Full Duplex RS-232 provide?

ANS: The Full Duplex RS-232 control allows for bidirectional communication at speeds up to 115,200 bps through a connector, facilitating efficient device control and monitoring.

Q: What kind of IR functionality is offered?

ANS: Full frequency IR signals ranging from 20KHz to 60KHz are supported, with bidirectional IR paths, allowing for remote control of source or display devices.

9.3 Setup

Q: Can I broadcast to multiple display monitors?

ANS: Yes, with O1Stream AVoIP Series, you can broadcast to multiple display monitors. You can utilize Point to Point, Point to Many, and Multi-Casting broadcasting architectures based on your needs.

Q: How do I configure the Video Wall function?

ANS: (This would need detailed instructions possibly with step-by-step guides and illustrations.)

Q: How many groups can be multicast with this system?

ANS: Up to 255 groups can be multicast, enabling a wide range of broadcasting configurations.

Q: How do I manage the broadcasting groups for Multi-Casting?

ANS: Managing multi-casting groups is simplified through software control, allowing you to configure the group settings directly. Ensure that your Gigabit Ethernet network switch supports IGMP and jumbo frames for optimized performance.

Q: Does the O1Stream AVoIP Series support bezel compensation for video wall configurations?

ANS: Yes, bezel compensation for video wall configurations is supported. It allows you to set the bezel and gap of the RX video wall to achieve seamless splicing of display screens, which is a feature commonly used to create visually continuous video walls with minimal disruptions at the edges of individual screens. This functionality will be updated in a future release.

9.4 Power

Q: Does the O1Stream AVoIP Series support Power over Ethernet (PoE)?

ANS: Yes, it supports Power over Ethernet (PoE), allowing the system to receive power directly through the Ethernet cable, eliminating the need for a separate power source.

Q: Can the O1Stream AVoIP Series be powered by an external power supply unit (PSU) if PoE is not available?

ANS: Yes, it can also be powered using an external power supply unit (PSU) if PoE is not available or preferred. This flexibility ensures that the device can be powered in different setups according to the availability of PoE.

Q: Is there any advantage in using PoE over an external PSU or vice versa?

ANS: Utilizing PoE can reduce cable clutter and simplify installation since it requires only one cable for both power and data transmission. On the other hand, an external PSU might be a preferred option in environments where PoE is not available or in setups that already have dedicated power supply arrangements.

Q: How does the device switch between PoE and external PSU, is it automatic or manual?

ANS: The switch between PoE and external PSU is typically automatic. The device will draw power from the PoE when available, and switch to the external PSU when PoE is not available or insufficient.

Q: Are there any specific PoE standards that the O1Stream AVoIP Series adheres to?

ANS: The O1Stream AVoIP Series is designed to comply with specific PoE standards to ensure safe and reliable power transmission. It's advisable to refer to the technical specifications or contact the manufacturer for detailed information on the PoE standards supported by the O1Stream AVoIP Series.

9.5 Network

Q: How do I ensure optimal performance of the O1Stream AVoIP Series in my network?

ANS: To ensure optimal performance of the O1Stream AVoIP Series, your network infrastructure (including switches and routers) must be capable of supporting at least **Gigabit Ethernet** with **IGMP Snooping**, an active **IGMP Querier**, **jumbo frames** up to 9KB (**9000 bytes**), and **Fast Leave**. Adhering to the recommended installation and configuration procedures outlined in the product manual is also essential for achieving the best results.

For enhanced video wall performance and accurate timing, it is recommended to enable **PTP packet forwarding** (often referred to as "**transparent clocking**"), rather than requiring full PTP support. This allows PTP timing messages to be passed through the network without being blocked or altered, aiding in more precise synchronization across devices.

Q: What speed of router is required for operation?

ANS: A dedicated 1G router is required for optimal performance. It is designed to work on an independent 1G router to ensure optimal performance and reliability during video/audio transmission.

Q: Are there any specific network switch requirements for operation?

ANS: Yes, it's recommended to use a Managed Gigabit Switch with 802.1Q VLAN and IGMP functionality for achieving the full capabilities of Point to Point, Point to Many, and Multi-Casting broadcasting architectures.

Q: What specific network features are required for optimal operation?

ANS: A network environment that supports Jumbo Packet size and IGMP (Internet Group Management Protocol) is required for optimal operation. These features are crucial for ensuring smooth video/audio transmission and multi-casting capabilities.

Q: Why is Jumbo Packet size necessary for the O1Stream AVoIP Series?

ANS: Jumbo Packet size allows for the transmission of larger packets of data, which is essential for handling the high-resolution video/audio data efficiently. This feature reduces the overhead of data transmission, thereby enabling better performance and lower latency, which is crucial for UHD video broadcasting.

Q: Why is IGMP support necessary for the O1Stream AVoIP Series?

ANS: IGMP (Internet Group Management Protocol) support is vital for managing multicast data transmissions effectively. With IGMP, the O1Stream AVoIP Series can efficiently manage multicast

group memberships, ensuring that data is sent only to designated groups or devices. This feature is critical for achieving reliable multi-casting performance and reducing network congestion.

Q: What might happen if my router does not support Jumbo Packet size and IGMP?

ANS: Without support for Jumbo Packet size and IGMP, performance issues may arise, including increased latency, data loss, network congestion, and ineffective multi-casting. This might result in poor video/audio quality and a less reliable broadcasting experience.

Q: How can I ensure my router supports Jumbo Packet size and IGMP?

ANS: To ensure compatibility, it's advisable to refer to your router's technical specifications or contact the manufacturer. Additionally, you might need to configure your router to enable Jumbo Packet size and IGMP features, following the router's user manual or getting assistance from your network administrator.

Q: What considerations should I have if there's a hardware firewall in place?

ANS: When using the O1Stream AVoIP Series with a hardware firewall:

- Ensure that the firewall forwards any necessary ports required for the operation.
- Configure the firewall to allow multicast addresses and ports needed for communication.
- Allow IGMP traffic to pass through the firewall.
- If the firewall supports Quality of Service (QoS), prioritize the relevant traffic.
- Review security policies to ensure they do not interfere with proper functionality.
- Monitor firewall logs after setup to detect any potential issues.
- Verify that the firewall is compatible with the operational requirements.
- Regularly update the firewall firmware to maintain security and compatibility.

Q: Are there specific firewall brands or models recommended?

A: While the device is designed to be compatible with most modern firewalls, it's always a good idea to consult with the device's documentation or the manufacturer's support to ensure full compatibility.

Q: Can I use the O1Stream AVoIP Series with my existing data router used for daily work operations?

ANS: Technically, it's possible, but it's not recommended for a number of reasons. However, if you wish to proceed, consider the following:

1. Router Speed Requirements:
   Ensure your router supports Gigabit Ethernet or faster. Many standard work routers might not support this speed adequately.

2. Multicast Support:
   The router must handle IGMP Snooping, IGMP v2 Snooping (multicast), IGMP Querier, and IGMP Snooping Fast Leave. These are often beyond the capabilities of typical work routers.
3. Multicast Forwarding/Filtering:
   The router should be capable of multicast forwarding or filtering. Without proper handling, multicast traffic can disrupt other operations on the network.
4. Jumbo Frames:
   It should support jumbo frames up to 9KB, which is not standard for many general-purpose routers.
5. Bandwidth Management:
   - The O1Stream AVoIP Series can adjust AVoIP bandwidth usage when sending A/V signals.
   - To share the existing router effectively, reduce the total bandwidth consumption of the O1Stream AVoIP Series to 500 Mbps or less, including A/V and side signals like USB. This allows other data transmissions to continue without excessive strain on the network.
   - Lowering bandwidth usage also minimizes the chance of Ethernet packet collisions, which can otherwise degrade overall network performance.
6. Network Traffic Monitoring:
   Regularly monitor network traffic to identify and prevent bottlenecks, which adds another layer of management complexity.
7. QoS Settings:
   Utilize Quality of Service (QoS) settings to prioritize traffic. However, this may negatively affect other critical activities using the same router.

Although the O1Stream AVoIP Series can be used with an existing data router, reducing its bandwidth usage to below 500 Mbps is crucial for sharing the router effectively. Despite this adjustment, a dedicated router is still recommended to ensure optimal performance and avoid potential disruptions to daily work operations.

Q: What could happen if I attempt to use the O1Stream AVoIP Series on my daily work data router?

ANS: If you are considering connecting the O1Stream AVoIP Series to your daily work data router, you should exercise caution. Here are some situations to consider:

1. Bandwidth Issues:
   Broadcasting high-definition content can consume significant bandwidth, which may slow down other network activities, causing delays in tasks such as file transfers or video conferencing.
2. Multicast Traffic Disruption:

If the router is not properly configured for multicast traffic, this could lead to disruptions or failures in video streaming.

3. Network Instability:
   Incorrect IGMP settings could lead to network instability, affecting not only the device in question but also other devices connected to the network.
4. Incompatibility with Firewall:
   If a firewall is in place, it may block necessary ports or traffic types, preventing the device from functioning correctly or causing intermittent issues.
5. Overloading of Router:
   If the router is not capable of handling the high data rates, especially when many other devices are connected, it may become overloaded, leading to dropped connections or reboots.
6. Security Concerns:
   Without proper configuration, introducing new devices into the network could expose vulnerabilities if not properly secured.
7. Impact on Other Services:
   Services such as VoIP or other critical applications could experience interruptions or reduced quality due to the additional load on the network.

For optimal performance and to prevent potential disruptions to daily work operations, it's crucial to ensure that your router is compatible with the O1Stream AVoIP Series's requirements and that the network is correctly configured to handle its traffic.

Q: Are there any special configurations required to utilize the independent routers?

ANS: There are no special configurations required on the part of the user to utilize the independent routers. The O1Stream AVoIP Series is designed to automatically manage the routing of different data types, ensuring a hassle-free setup and operation.

Q: Does the independent routing feature require additional hardware or is it built in?

ANS: The independent routing feature is fully integrated and does not require any additional hardware. It is part of a robust design aimed at providing a comprehensive solution for various data transmission needs.

Q: Does the O1Stream AVoIP Series provide separate routers for different types of data?

ANS: Yes, it incorporates independent routers for handling different data types such as audio, video, infrared (IR), USB, and UART, ensuring a streamlined and efficient data transmission for each type of data.

Q: What are the advantages of having independent routers for different data types?

ANS: Having independent routers for different data types allows for optimized data transmission, reducing the chance of data interference and ensuring the integrity and quality of the transmitted

data. This segregated routing structure ensures that each type of data is handled in a manner that maximizes its transmission efficiency and quality.

Q: Does my router need to support PTP to be compatible?

ANS: PTP (Precision Time Protocol) is used for precise time synchronization between network devices. While PTP support is not strictly required for compatibility, having this capability can offer benefits.

There are two levels of PTP support:

8. PTP Forwarding (Transparent Clock):
   This means the router or switch can forward PTP packets (used for time synchronization) with minimal jitter and delay without actively participating in the PTP protocol. This level of support is typically sufficient for most applications and ensures smooth PTP message transmission.
9. PTP-Capable (Full PTP Participation):
   In this case, the router or switch can act as an active PTP clock, such as a Grandmaster Clock or Boundary Clock, to directly participate in synchronization and timing distribution. This level of support is typically required only in specialized setups where the router/switch itself must manage timing.

PTP-capable switches are typically more expensive and less common than those that only support PTP forwarding. For most use cases, PTP Forwarding is sufficient for network synchronization. If you are considering a PTP-capable switch, it's worth verifying whether the model uses Broadcom silicon, as that often indicates strong PTP support. Implementing PTP support can improve overall performance and ensure seamless integration into the network setup.

Q: How does PTP forwarding work with AES67 or Dante audio?

ANS: PTP forwarding plays a critical role in ensuring time synchronization in AES67 and Dante audio networks, where accurate timing is essential for low-latency and high-quality audio transport.

Role of PTP in AES67 and Dante:

- AES67: Relies on IEEE 1588-2008 PTPv2 for time synchronization. All devices synchronize to a Grandmaster Clock to maintain precise timing for audio streams.
- Dante: Uses a proprietary version of PTP (compatible with AES67 in AES67 mode) to synchronize devices to a common clock for seamless multi-device audio playback and recording.

How PTP Forwarding Works:

- Forwarding PTP Packets:
  Switches recognize and forward PTP packets (e.g., Announce, Sync, Delay_Request, Delay_Response) to allow devices to synchronize their clocks.

- Transparent Clock Functionality:
  PTP-forwarding switches measure and adjust for the delay caused by the switch itself, adding a correction factor to PTP packets. This ensures predictable delays across the network.
- QoS (Quality of Service):
  PTP packets are marked with high-priority tags (e.g., DSCP or VLAN priority) to ensure they are not delayed by other traffic in the network.

Compatibility with AES67 and Dante:

- Transparent clocks forward PTP packets seamlessly without requiring the switch to participate as a PTP clock, ensuring minimal interference and stable synchronization.
- Boundary clocks are sometimes used in advanced setups with multiple PTP domains but are not necessary for most AES67 or Dante networks.

Key Requirements for PTP Forwarding with AES67/Dante:

- Low Latency: Switches must forward PTP packets with minimal latency.
- Consistency: Switch delay should be predictable to maintain clock stability.
- QoS Support: Prioritizing PTP and audio traffic ensures seamless operation.

PTP forwarding via transparent clocks is typically sufficient for integrating AES67 and Dante devices, ensuring precise timing and high-quality audio transport without the need for full PTP-capable functionality.

Q: How does PTP enhance video wall performance with O1Stream technology, and how does it compare to other solutions?

ANS: PTP (Precision Time Protocol) is a key feature in video wall setups using O1Stream technology to ensure precise synchronization and an excellent visual experience. Here's how it works and how it compares to other video wall-over-IP solutions:

PTP and O1Stream Technology:

- Each panel in the video wall is equipped with an RX (receiver) that uses O1Stream technology.
- PTP ensures all receivers synchronize their clocks to a Grandmaster Clock, enabling precise alignment of frame rendering across panels.
- This avoids synchronization issues like video tearing and ensures smooth, visually cohesive playback across the entire video wall.

Other Video Wall-over-IP Solutions:

- Many other solutions do not support PTP. Instead, their receivers dynamically add appropriate latency to compensate for network jitter and ensure frame alignment.
- While this approach can also eliminate video tearing, it relies heavily on the receiver's ability to manage latency effectively, which might not guarantee synchronization as precise as PTP in highly demanding setups.

Why PTP with O1Stream is Superior:

- Precision: PTP ensures nanosecond-level synchronization, critical for avoiding even minor discrepancies across panels.
- Consistency: PTP provides a deterministic timing model, reducing variability in frame rendering compared to solutions relying solely on latency adjustments.
- Scalability: PTP is better suited for large-scale video walls with numerous panels, as it maintains synchronization regardless of network complexity.
- Enhanced Experience: The combination of PTP and O1Stream ensures smoother transitions, perfect frame alignment, and an overall superior visual experience.

While other video wall-over-IP solutions rely on latency adjustments to avoid tearing, O1Stream technology with PTP provides a more robust and precise solution. This ensures perfect synchronization and an excellent visual experience, even in the most demanding video wall configurations.

Q: How does the independent routing feature impact the overall performance of the O1Stream AVoIP Series?

ANS: The independent routing feature greatly improves performance by ensuring each data type is transmitted efficiently and reliably. This leads to higher quality audio and video transmission, precise handling of IR, USB, and UART data, and an enhanced overall user experience.

Q: For a router supporting IGMP, does this imply it also support IGMP snooping?

ANS: No, supporting IGMP and supporting IGMP Snooping are two different things. While they are related, they serve different purposes and require different support in network hardware:

1. IGMP (Internet Group Management Protocol):
   - IGMP is a protocol used between IP multicast hosts and adjacent multicast routers to establish multicast group memberships.
   - IGMP allows a host to signal its interest in receiving multicast traffic for specific multicast groups.
2. IGMP Snooping:
   - IGMP Snooping is a feature on switches (and some routers with switching capabilities) that allows them to listen in on IGMP conversations between hosts and routers.

- This feature helps the switch understand which of its ports have hosts interested in receiving multicast traffic for specific multicast groups.

A router can support IGMP to facilitate multicast group membership without supporting IGMP Snooping. Conversely, a switch (or a router with switching capabilities) can support IGMP Snooping to optimize multicast traffic delivery on its local network segments without being able to participate in IGMP multicast group membership negotiations itself.

For IGMP Snooping to be beneficial, it's typically enabled on network switches. Routers, on the other hand, participate in IGMP group membership negotiation but don't necessarily have to support IGMP Snooping unless they also have switching capabilities and you want to optimize multicast traffic delivery within the local network.

In a typical setup, a router would support IGMP to manage multicast group memberships, and the switches in the local network would support IGMP Snooping to optimize the delivery of multicast traffic based on the IGMP messages they observe.

Q: Is there any IGMP level or version?

ANS: Yes, IGMP (Internet Group Management Protocol) has different versions. Here are the three versions of IGMP:

10. IGMPv1 (RFC 1112):
    - This is the original version of IGMP.
    - Provides basic multicast group membership functions.
11. IGMPv2 (RFC 2236):
    - This version added the capability for a host to signal its departure from a multicast group, thus allowing for faster recovery of resources.
    - Includes Leave Group messages, Group-Specific Query messages, and version 2 Membership Reports.
    - Reduced the time to wait for response to queries.
12. IGMPv3 (RFC 3376):
    - This version added the capability to listen to multicast traffic from specific source addresses, not just traffic sent to a specific multicast group.
    - Supports source filtering which allows a multicast receiver to signal interest in receiving packets from specific source addresses, or from all sources except for specific source addresses.
    - Includes Group-and-Source-Specific Query messages.

Each version of IGMP provides enhancements over the previous version. The network equipment, such as routers and switches, as well as hosts, need to support the same IGMP version to communicate multicast group membership information effectively. IGMPv3 is the most recent and feature-rich version, allowing for the most precise multicast traffic control.

Q: Compare two video compression technologies for AV over IP: MJPEG vs. AV1.

ANS: The two codecs, MJPEG (Motion JPEG) and AV1, serve different purposes and have different characteristics in handling video compression for AV over IP (Audio Visual over Internet Protocol). Here's a comparison based on various factors:

1. Compression Efficiency:
    - MJPEG: MJPEG is a lossy compression codec that compresses each frame independently as a JPEG image. It doesn't take advantage of the similarities between frames, which results in a lower compression ratio and higher bandwidth usage compared to more modern codecs.
    - AV1: AV1 is a highly efficient codec that compresses video by taking advantage of the similarities between frames (inter-frame compression) as well as within frames (intra-frame compression). It provides better compression efficiency, which leads to lower bandwidth usage compared to MJPEG.
2. Complexity:
    - MJPEG: It has lower computational complexity, which means it requires less processing power to encode and decode. This can lead to lower latency which can be beneficial in real-time applications.
    - AV1: AV1 is more complex and requires significantly more computational power to encode and decode. This can lead to higher latency.
3. Latency:
    - MJPEG: Generally offers lower latency due to its simpler compression algorithm and the lack of inter-frame compression.
    - AV1: May have higher latency due to its complex encoding and decoding processes.
4. Quality:
    - MJPEG: The video quality can degrade significantly with high compression settings, and it doesn’t handle motion as well as more modern codecs.
    - AV1: Preserves video quality better even at lower bit rates and handles motion well.
5. Royalty Fees:
    - MJPEG: Generally, there are no royalty fees associated with using MJPEG.
    - AV1: AV1 is promoted as a royalty-free codec by the Alliance for Open Media, which is a significant advantage for widespread adoption.
6. Support and Compatibility:
    - MJPEG: MJPEG has been around for a long time, and there's broad support for it across a wide range of hardware and software.
    - AV1: AV1 is relatively new, and while support is growing, it might not yet be as widely supported as MJPEG.
7. Use Cases:

- MJPEG: Often used in scenarios where low latency and simplicity are prioritized, such as real-time video streaming in certain industrial or surveillance applications.
- AV1: Suited for a wide range of higher-quality streaming applications including consumer streaming services, video conferencing, and other scenarios where bandwidth efficiency and video quality are prioritized.

In conclusion, the choice between MJPEG and AV1 would largely depend on the specific requirements of the use case, such as whether low latency, low complexity, or high compression efficiency is the priority.

Q: The multicast source is connected to Switch 1. Receiver 1 is connected to Switch 1, and Receiver 2 is connected to Switch 2. There is a Layer 2 link, either access or trunk, between Switch 1 and Switch 2. In this setup, Receiver 1, which is on the same switch as the source, gets the multicast stream without problems. However, Receiver 2 does not get any multicast traffic. Is the potential problem IGMP?

ANS:

It could be a problem with how IGMP (Internet Group Management Protocol) and multicast traffic are being handled between the two switches. Here are a few potential problems and solutions:

1. IGMP Snooping:
   If IGMP snooping is enabled on both switches, it should allow the switches to listen to IGMP messages and make intelligent decisions about where to send multicast traffic. However, if IGMP snooping is misconfigured or not supported on Switch 2, it might not be able to receive and forward multicast traffic to Receiver 2.
2. IGMP Querier:
   Without an IGMP Querier in the network, IGMP snooping switches may not have the necessary information to manage multicast traffic properly. Make sure that an IGMP Querier is configured and operational within the network to maintain the multicast group memberships.
3. Multicast Routing:
   While your setup mentions a Layer 2 link, ensuring that any necessary multicast routing configurations are correct is crucial if there's any Layer 3 processing involved.
4. VLAN Configuration:
   If the link between Switch 1 and Switch 2 is a trunk link, ensure that the VLAN carrying the multicast traffic is allowed on the trunk and that Receiver 2 is configured in the correct VLAN.
5. Switch Port Configuration:
   Ensure that the ports on Switch 2 are configured correctly to receive multicast traffic, and that there aren't any port security settings blocking multicast traffic.
6. Hardware Limitations:

Ensure that the hardware of Switch 2 and its firmware/software versions support the necessary multicast and IGMP features.

7. Multicast Group Membership:
   Ensure that Receiver 2 is correctly configured to join the necessary multicast groups and that there are no firewall or security settings on Receiver 2 or Switch 2 blocking multicast traffic.

To diagnose and fix the problem, you might need to:

- Check the configurations for IGMP, IGMP snooping, and multicast on both switches.
- Use network monitoring and diagnostic tools to check for multicast traffic and IGMP messages on the link between Switch 1 and Switch 2.
- Check the logs on both switches for any multicast-related errors or warnings.

Addressing the issue might require reconfiguring the switches, updating firmware/software versions, or modifying the network design to better support multicast traffic.

Q: Should the multicast router port of switches be identified through static assignment or dynamic detection upon receiving IGMP queries?

ANS: The multicast router port of switches can be identified by static assignment or dynamic detection on IGMP query receiving. We suggest to configure static multicast router port because not all of switches correctly and completely implement IGMP querier.

Static Configuration of Multicast Router Ports:

1. Predictability:
   By statically configuring the multicast router ports, you eliminate the uncertainties that may arise from dynamic detection mechanisms. This is especially beneficial in environments where the behavior of multicast traffic needs to be known and controlled.
2. Simplicity:
   Static configurations can simplify troubleshooting since the network behavior is set and known in advance, whereas dynamically detected configurations might change over time or based on network conditions.
3. Compatibility:
   As you pointed out, not all switches implement IGMP querier functionality correctly or completely. By statically assigning the multicast router ports, you can avoid potential compatibility issues or bugs related to IGMP querier functionality.
4. Performance:
   Static configurations can also lead to better performance since the switch does not have to spend processing resources on dynamic detection mechanisms.

However, there are some considerations to keep in mind:

1. Maintenance:

Static configurations might require more upfront setup and maintenance over time, especially if the network topology changes.

2. Scalability:
   As the network grows or changes, additional manual configurations might be needed to maintain the desired multicast routing behavior.
3. Documentation:
   It's important to have clear documentation of the static configurations to help with troubleshooting and future network modifications.

Ultimately, the choice between static and dynamic configurations may depend on the specific network environment, the expertise of the network administrators, and the requirements for multicast traffic management within the network.

Q: What configurations are essential to ensure seamless communication between transmitters and receivers in an AV over IP scenario across different routers?

ANS: To ensure seamless communication in an AV over IP scenario, proper IP routing configurations are vital between the routers to allow necessary routing of AV over IP traffic.

Q: How does VLAN configuration impact AV over IP performance?

AMS: VLAN configurations are crucial to correctly segregate and route AV over IP traffic in a network. Correct VLAN setup on routers and the link between them ensures that AV over IP traffic is carried accurately.

Q: What role does IGMP play in an AV over IP setup?

A: IGMP, especially when configured with IGMP snooping, manages multicast traffic in AV over IP scenarios, ensuring that multicast streams reach only the necessary receivers efficiently.

Q: How does multicast routing impact AV over IP performance?

A: Multicast routing, when properly configured with protocols like PIM, ensures efficient delivery of multicast streams across the network, significantly impacting AV over IP performance.

Q: How do firewall and security settings affect AV over IP traffic?

A: Firewall and security settings need to be configured to allow AV over IP traffic to pass through, ensuring uninterrupted communication between transmitters and receivers.

Q: What is the significance of enabling jumbo frames in an AV over IP scenario?

A: Enabling jumbo frames, if supported by the AV over IP solution, can improve network efficiency and performance by allowing larger packets of data to be sent at once.

Q: Why is latency optimization crucial in real-time AV over IP applications?

A: Minimizing network latency is crucial for real-time AV over IP applications to ensure synchronous audio and video playback.

Q: How can redundancy techniques benefit an AV over IP setup?

A: Implementing redundancy techniques like STP or LAG provides failover and load-balancing, ensuring continuous AV over IP operation even in case of network failures.

Q: How do firmware/software updates impact the performance of AV over IP across routers?

A: Keeping routers updated with the latest firmware/software helps address bugs or issues that might affect AV over IP performance.

Q: Why is it important to have monitoring and troubleshooting tools in an AV over IP setup?

A: Utilizing network monitoring and troubleshooting tools helps in identifying and resolving any issues affecting AV over IP performance across routers, ensuring optimal operation.

9.6 Others

Q: How do I seek technical support if I encounter issues with the O1Stream AVoIP Series?

ANS: You can reach out to our technical support team via email at support@O1Stream.com. Additionally, you can visit our support portal at support.example.com for online assistance and resources.