Switch Benefits for AV over IP Solutions

NETGEAR®
B U S I N E S S

With digital technology advancing faster than ever before, users expect higher quality, more detailed, seamless, and glitch-free streaming of audio and visual media of all forms. Presently, many audiovisual (AV) systems use HDBaseT technology requiring a point-to-point connection using separate cabling with limited distances. This separate setup results in more devices, longer installation times, and higher maintenance costs. Furthermore, technologies such as 4K and Virtual Reality (VR) require higher bandwidth than existing 1GbE networks can provide.

NETGEAR's powerful 10GbE switches for AV over IP solutions. Some of the main benefits from NETGEAR 10GbE Switches as the backbone for AV over IP convergence include:

- **10GbE to support AV on the same network infrastructure as your regular network** – Network throughput, up to 10Gbps, can be contained on the same network infrastructure without losing data quality or choking the network.

- **Simpler topology, easier to manage** – Software Defined Video over Ethernet (SDVoE) provides a programmable interface to easily manage AV devices and configurations on a simple topology; encoders at one end, then to a 10G network as backbone, and decoders at the other end. No more bulky devices and complicated configurations needed for a reliable and quality AV over IP experience.

- **Preconfigured AV over IP features** – For example, a range of multicast features are factory enabled with NETGEAR IGMP Plus™ to support an easy installation.

- **Flexibility and room for expansion/growth** - Modular slots can be populated, replaced or upgraded for higher speeds, different types, and port count to allow for network growth.

- **Power your PoE devices** - PoE power is supported on selected ports and with flexibility to switch from the regular power supply unit to a redundant power supply (RPS) to provide more PoE power as needed.

Basic AV over IP terms

TERM	DEFINITION
1.92Tbps	1.92 Terabits per second.
10GbE	Ethernet Network able to support bandwidth up to 10Gigabit per second (10Gbps).
1GbE	Ethernet Network able to support bandwidth up to 1Gigabit per second (1Gbps).
2800 Mpps	2800 Million packets per second.
2RU, 2U	Two Rack Unit, 3.5 inches height of a standardized rack size for servers and networking equipment.
40GbE	Ethernet Network able to support bandwidth up to 40Gigabit per second (40Gbps).
4:4:4	Representation of the amount of chroma subsampling on a video signal. 4:4:4 represents full luminance (brightness) and chrominance (color) so no subsampling occurs.
4:2:2	Indicates some chroma subsampling occurs on the video signal resulting in approximately 1/3 reduction in bandwidth with slight degradation in perceived video quality.
4:2:0	Indicates more chroma subsampling occurs on the video signal resulting approximately 1/2 reduction in bandwidth with observable degradation in perceived video quality.
4K/UHD	Technically 4K refers to a video resolution of 4096x2160 pixels and UHD refers to 3840x2160 pixels. However, 4K is often used to indicate UHD resolution.
8K	Emerging video resolution of 7680x4320 pixels which is double UHD.
AV-over-IP (AVoIP)	AVoIP, also known as networked AV, uses networking equipment, such as Netgear switches, to transmit audio video signals between a source (video player, set top box) and a display.
Bandwidth	Maximum data transfer rate of a network path in Gigabits per second (Gbps).
CAT5e	Ethernet Cable able to transport up to 1Gigabit of data through it up to a distance of up to 100meters without losing any of the data.
CAT6	Ethernet Cable able to transport up to 10Gigabit of data through it up to a distance of up to 100meters without losing any of the data.
Chroma Subsampling	Compression method that reduces the color information in a video frame to reduce the bandwidth required to stream or play the video file.
Circuit-switched	Type of signal transmission used by traditional AV matrix switchers that uses a point-to-point methodology. A wired connection is made from the source signal to a destination.
Codec	Short for coder / decoder, a codec encodes electronic data, typically audio/video signals, for storage or transmission across a network for later decoding. Compression is often used to reduce the file size.
Converged Networks	One network infrastructure used for both AV and IP traffic that is configured to deliver high quality AV with less congestion.
Decoder	Converts electronic data from IP into an audio/video stream. The decoding method must match the encoding method.
Default (VLAN 1)	The management VLAN a NETGEAR switch comes with out of the box, before a user defines their preferred one.
Encoder	Converts electronic data from an audio/video signal into an IP stream. The decoding method must match the encoding method.
Ethernet	The technology system that enables connection of electronic devices using cables in a network.
Fiber optics	Transporting data in the form of light through glass or plastic threads.
Fixed-port switch	Switches with built-in non-removable ports.
fps	An abbreviation for frames per second which is the number of visual pictures (frames) displayed per 1 second of video. The higher the frame rate or refresh rate, the smoother the video will appear.
Full Duplex mode	Simultaneous transmission of data to and from a point A to a point B.
H.264 (AVC)	Standardized Advanced Video Codec (AVC) format, also known as H.264, to allow bandwidth intensive video signals to be sent to a destination. While bandwidth is reduced, image quality is reduced and latency is increased.
HD	Technically refers to 1280x720 video resolution but is often used to describe 1920x1080, or simply 1080p, resolution which is officially defined as Full HD (FHD).
HDBaseT	Point-to-point signal transport protocol used to extend video, audio, control, Ethernet, and power over a single category cable for up to approx 100m (330ft). While Ethernet cabling is used, this system can not use Ethernet switches or other standard networking gear.
HDCP	High bandwidth Digital Content Protection (HDCP) refers to the copyright protection method used to prevent copying audio/video files. Digital keys are passed and negotiated between the player and the display to ensure compliance.
HDMI	High Definition Multimedia Interface (HDMI) is a type of video signal developed for the consumer market, but now used throughout the enterprise market as well. Signals up to 4K can be transmitted up to approximately 15 feet.

Basic AV over IP terms

TERM	DEFINITION
HDR	High dynamic range (HDR) is a video format enabling a wider range of brightness and color information. HDR requires at least a 10-bit color video signal.
High Efficiency Video Coding (HEVC)	H.265 or High Efficiency Video Coding (HEVC) was designed as a successor to H.264 compression format. H.265 allows a much higher resolution video quality at increased frame rates with lower latency.
IGMP Snooping and Querier	Internet Group Management Protocol (IGMP), keeps track of whether a device joins or leaves a multicast group and prevents devices from receiving traffic they did not ask for.
Intra-Frame Compression	Method of compression that optimizes each frame individually.
KVM Switch	Device that allows the control of multiple computers from a single Keyboard, Video monitor, and Mouse (KVM).
Latency	Amount of elapsed time from when a signal is encoded to when it is decoded and displayed again.
Lossless Compression	Method of compressing data where no information is thrown away such that the image or video stream can be fully reconstructed.
Lossy Compression	Compression method that results in a much smaller file size, but is obviously lower in quality than the original file.
MAC Address	Media Access Control (MAC) Address, unique and consistent ID burned on each hardware meant to be connected to other devices.
Matrix switcher	Hardware-based device used to route sources to destinations. All sources and destinations are connected to one device.
Modular switch	Switches with the ability to add or replace modules of a similar or different functionality. Allows for mixing and matching types of modules to suit a particular installation or to allow for expansion when needed.
Multicast Address	One IP address representing a select group of devices within a network (Group address). Most commonly used when streaming AV content over a network.
Multicast	Transmission of data to a select group of recipients within a network simultaneously.
Non-blocking switch	A switch capable of actually handling the theoretical bandwidth of all of its ports combined.
Open Flow	A programmable software defined network management standard where the software controlling network devices is separated from the various hardware it is controlling to enhance consistency in traffic management.
Packets	Data broken down into smaller pieces for easier transportation.
Parallel Networks	Separate networks - one for AV systems and one for regular IP traffic. Mainly used for 1GbE networks to help reduce congestion and improve performance.
Plug-and-Play	Capable of working as intended after simply plugging in with no further configuration needed.
PoE	Power over Ethernet. An Ethernet networking device also functioning as a source of power for devices with the PoE feature. Several types of PoE power exist that provide varying levels of power.
Port expansion cards	Modules that can added to modular switches to increase bandwidth or port count.
PSU	Power Supply Unit.
Real Time Transport Protocol (RTP)	RTP is a protocol for sending audio and video over a network.
Resilience	Measure of speed or ease of recovery from difficulties .
RPS	Redundant Power Supply, a power supply unit (PSU) that can be added for redundancy.
SDVoE	Software Defined Video over Ethernet (SDVoE) Alliance is a nonprofit consortium of technology providers collaborating to standardize the adoption of Ethernet to transport AV signals in professional AV environments. NETGEAR is a founding member.
Serial port	Communication port developed for control of devices. While supplanted by USB in many cases, serial ports are still used on some devices for control.
SFP port	Small Form Factor Pluggable port. A port that allows for optical fiber connection through an SFP adapter supporting up to 10Gbps.
Shared Bandwidth	Bandwidth of a network expected to be used to transfer all of data on that network.
Transceiver	A device that functions as both a transmitter and receiver.
Unicast	Transmission of data to a single recipient within a network.
USB	Universal Serial Bus (USB) is an interface allowing plug-and-play connection a wide range of devices including keyboards, mice, cameras, and storage media. Newer USB implementations include the ability to transmit audio, video, and power through the interface.
Visually Lossless	Data compression method where some information is discarded that is imperceptible to the human eye.