



NETGEAR Switch Benefits to AVoverIP convergence

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BUSINESS

With digital technology advancing faster than ever before, users now expect higher quality, clearer, more detailed, seamless, and glitch-free streaming of audio and visual media of all forms. Presently, most audiovisual systems use HDBaseT setup on a separate 1GbE network from the regular network infrastructure because they cannot co-exist without bandwidth problems. This separate setup, however, means more devices, higher installation and maintenance costs. Furthermore, newer audiovisual systems such as 4K, 3D, VR displays require higher bandwidth that is becoming more difficult to contain without choking a 1GbE network.

NETGEAR's unveils powerful 10GbE switches for AVoverIP convergence solution. Some of the main benefits from NETGEAR 10GbE Switches as backbone for AVoverIP convergence are as follows:

- 1. 10GbE to support AV on the same network infrastructure as your regular network** - both audiovisual data and regular network throughput can be contained up to 10Gbps on the same network infrastructure without losing data quality or choking the network.
- 2. Simpler topology easier to manage** - They are SDVoE-ready. 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 10G network as backbone, and decoders at the other end. Therefore no more bulky devices and complicated configurations needed for reliable and quality AVoverIP experience.
- 3. Features supporting AVoverIP are already enabled for ease of installation** - Plug and Play as features such as IGMP snooping required for multicast for example are already enabled on VLAN 1 so that no further or tedious configuration required for AV connections to work.
- 4. Flexibility and room for expansion/growth** - Their modular slots that can be populated, replaced or upgraded with port expansion cards of higher speeds and port count to allow for network growth.
- 5. Power your PoE devices** - PoE power is supported on selected ports and with flexibility to switch from regular Power Supply Unit to Redundant Power Supply (RPS) more PoE power can be provided as needed.

Basic AVoverIP terms

TERM	DEFINITION
AV Over IP	Audio-Video over Internet Protocol. Audio and Video data is fed into an input/source e.g. 4K video players, then relayed through IP network and IP devices e.g. NETGEAR 10G Switch, and finally delivered at output for viewing, e.g. HD monitor and sound system.
AVoIP & regular IP networks in parallel	IP network for Audio Visual (AV) systems separate from IP network for regular end devices to reduce 1GbE network congestion and poor performance.
AVoIP & regular IP network convergence	Audio Visual (AV) systems sharing the same IP network with regular end devices while keeping high AV quality and less congestion.
Circuit-switched	A communication where an available channel is picked up and dedicated to one communication only as long as that current communication is ongoing, and dropped at the end of the communication for the next communication need. For example in old analog phones, one had to wait for the next available line if all lines are busy.
Codec	Tool that packs data into packets for transportation, and then unpacks it at the end of transportation for use.
Decoder	Tool that converts e.g. electronic data from network devices to visible/audible video and music.
Encoder	Tool that converts e.g. visible/audible video and music to electronic data for network devices.
fps	Frames per second (video refresh rate). Videos are just successive picture frames being flash quickly to bring the illusion of moving pictures. The more frames flashed in one second, the smoother the video.
H.264/MPEG 4 AVC	High Efficiency Video coding in Blu-ray discs, internet videos e.g. YouTube, HDTV broadcasts. Supports up to 4K, 60 fps but with heavy compression and added latency.
H.265/HEVC	Same but Supports up to 8K, 300 fps with heavy compression and added latency.
HD	High Definition: 1920 by 1080 pixels/dots on (x, y) display screen.
4K/UHD	Ultra High Definition: 4096p (or 3840) by 2160p.
4K60	4096p by 2160p at 60 frames per second.
Chroma Subsampling	Signal data compression method where color info on pixels of a picture is reduced so that it can be transmitted faster and easier through the limited 1GbE path.
4K60 4:4:4	No compression color, info on 4K60 signals not reduced, can be transmitted faster and easier only on 10GbE path but not 1GbE. Image quality remains same as original.
4K60 4:2:2	Signal data compression where color info on pixels of a picture is reduced by 2/3 so that it can be transmitted faster and easier on 1GbE or 10GbE. Image quality is slightly/unnoticeably poorer than original.
4K60 4:2:0	Signal data compression where color info on pixels of a picture is reduced by 1/2 so that it can be transmitted faster and easier on 1GbE or 10GbE. Image quality is poorest.
HDR	High Dynamic Range. Technology alongside 4K60 offering more colors beyond RGB screens by increasing contrast between brighter colors and darker colors, therefore increasing image depth and reality.
8K	7680p by 4320p.
HDBaseT	Proprietary technology allowing transportation of video signals over 1Gbps channel with heavy compression and added latency when larger than 1080p.
HDCP	High-bandwidth Digital Content protection, protects against copying of media while in transit through links.
HDMI	High Definition Multimedia Interface capable of 4K HDR in its latest versions.
Intra-Frame Compression	Looks at and compresses one frame at a time.
Inter-Frame Compression	Looks at a group of frames and frame sequence, then compresses all at once.
Pixel pipeline Codec	Encode and decode a few pixels or line at a time.
Latency	Time difference between input and output, e.g. length of lag/delay between live camera feed end to corresponding live video streaming on display screen.
Total Latency	The sum of; time taken by codec to pack & unpack data, and time taken to transport that data.
Lossless Compression	No info lost in the process of data compression, and original data can be extracted in full.
Visually Lossless	Info is lost in the process of data compression, and difference not easily noticed by human eye.
Lossy Compression	Info is lost irreparably in the process of data compression, and difference can be seen e.g. broken/scratchy video.
Real Time Transport Protocol (RTP)	Guidelines governing how real-time audio and video is transferred from one application to another.
Matrix switchers	Basically router, but for directing video signals from source to destination e.g.
SDVoE	Software Defined Video over Ethernet Alliance is a group of companies from different angles of AV over IP technology collaborating to create standardized platform for nextgen AV applications.
ZeeVee, DVI-Gear	Other companies vending AV product side of AV over IP networking.
KVM Switch	Keyboard, Video and Mouse Switch. A device that connects multiple input devices to control one or more computers from multiple desks.
USB	Universal Serial Bus. Standard connectivity method for modern computers and peripherals like cameras, scanners, printers etc...
Analog	Information from a stream of comparable physical/mechanical changes e.g. record player.
Digital	Information from estimation of analog data in terms of ones and zeros e.g. cd player.
Infrared	Light emitted when certain elements are heated, but not visible to human eye. E.g. remote control for older TVs.
Serial port	Ports used in older computers to connect mice, keyboards, controllers etc. transmitting data one bit at a time, replaced by USB which are faster.

NETGEAR terms related to AV over IP

TERM	DEFINITION
Bandwidth	Maximum data transfer rate of a network path in Gigabits per second (Gbps)
1GbE	Ethernet Network able to support bandwidth up to 1Gigabit per second (1Gbps)
10GbE	Ethernet Network able to support bandwidth up to 10Gigabit per second (10Gbps)
100GbE	Ethernet Network able to support bandwidth up to 10Gigabit per second (100Gbps)
1.92Tbps	1.92 Terabits per second
Shared Bandwidth	Bandwidth of a network expected to be used to transfer all of data on that network
Unicast	Transmission of data to a single recipient within a network
Broadcast	Transmission of data to all recipients within a network simultaneously
Multicast	Transmission of data to a select group of recipients within a network simultaneously
Multicast Address	One IP address representing a select group of devices within a network (Group address)
Dynamic Multicasting	Assigns ports to groups and forwards data to that group
Ethernet	The technology system that enables connection of electronic devices using cables in a small network e.g. Office,
MAC Address	Media Access Control Address, Unique and consistent ID burned on each hardware meant to be connected to other devices
Full Duplex mode	Simultaneous transmission of data to and from a point A to a point B
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
Transceiver	A device that functions as both a transmitter and receiver
IGMP Snooping and Querier	Internet Group Management Protocol, decides whether a device joins or leaves a multicast group, prevents devices from receiving traffic they did not ask for
Resilience	Measure of speed or ease of recovery from difficulties
2RU, 2U	Two Rack Unit, 3.5 inches height of a standardized rack size for servers and networking equipment
SFP port	Small Form Factor Pluggable port. A port that allows for optical fiber connection through an SFP adapter supporting up to 10Gbps
Packets	Data broken down into smaller pieces for easier transportation
2800 Mpps	2800 Million packets per second
PoE	Power over Ethernet. An Ethernet networking device also functioning as a power outlet for PoE Devices connected to it.
PSU	Power Supply Unit
RPS	Redundant Power Supply, a power supply unit (PSU) that can be added if a higher PoE wattage than the standard one is needed
Fiber optics	Transporting data in the form of light through glass or plastic threads
Fixed-port switch	Switches with built-in non-removable ports
Modular switch	Switches with openings or modules that can be replaced or upgraded with supported preferences
Port expansion cards	Port modules that can added to modular switches to increase bandwidth or port count
Non-blocking switch	A switch capable of actually handling the theoretical bandwidth of all of its ports combined
Plug-and-Play	Capable of working as intended after simply plugging in and no further configuration needed.
Default (VLAN 1)	The management VLAN a NETGEAR switch comes with out of the box, before a user defines their preferred one.
Open Flow	A programmable software defined network management where the software controlling network devices is separated from the various hardware it is controlling to enhance consistency in traffic management.