AV-over-IP and Network Solutions
Purpose Built for the US Federal Government

Government agencies want AV (audio visual) and IT infrastructures that are simple to deploy, intuitive to operate, and provide consistently excellent user experience. Further, solutions that are flexible, manageable, scalable, secure, and easily deployed reduce the total cost of ownership.

Over the past two decades, virtually every piece of office technology that required separate cabling has moved onto the Ethernet data network; a convergence that has drastically simplified deployment and reduced costs. Audio and video distribution are the last remaining enterprise systems.

AV-over-IP (Internet Protocol) describes the distribution of audio, video and control signals over the LAN (local area network) using standard Ethernet/IP network interfaces and protocols. With the arrival and rapid advancement of AV-over-IP technology traditional AV distribution is being replaced with IP-based transport.

Extreme Networks AVB-enabled Ethernet switches unify data, audio, and video traffic on a single network for professional audio-video applications. IT managers and AV integrators alike benefit from Extreme Networks powerful management capabilities, simplified deployments, network convergence for all media, and standards-based designs for simplified integration. From 8-port, PoE powered, fanless models for lecterns or mobile kits to high density 40/100 GbE aggregation switches, Extreme Networks has models right sized to support your AV-over-IP deployment.

Our TAA-compliant and Department of Defense Approved Product List (APL) certified solutions deliver enterprise-class capacity, security, and reliable transport for encoders and other AVoIP endpoints enabling digital signage at the agency HQ, video walls at a strategic operation centers, or training classrooms for military service members.

WWW.EXTREMENETWORKS.COM
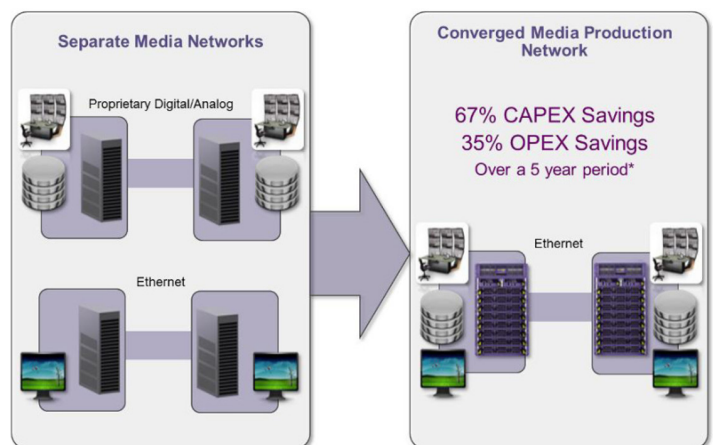
Design Considerations

Audio Video Bridging

As a part of many AV-over-IP deployments, AVB introduces four major improvements to standard Ethernet architectures, including precise synchronization, traffic shaping for media streams, admission control, and identification of nonparticipating devices. AVB delivers cost savings through simplified integration, ease of use, and added functionality and control. Much as IP changed the telephony landscape from circuit-switched analog to Unified Communications seemingly overnight, so too does AVB provide AV professionals a bridge to the unassailable benefits of Ethernet.

Power over Ethernet

Extreme Networks AVB capable Ethernet switches support up to 90W per port of Power over Ethernet (PoE), enabling the network to provide power to Crestron DM NVX with AV-over-IP components, endpoints and displays.

Extreme also offers an 8-port switch model that draws all of its required power from an upstream switch. This eliminates the need for power at the switch location, while still enabling the delivery of up to 100W of downstream PoE power to AV infrastructure endpoint devices.

Latency

When the user is controlling interactive content, such as through a keyboard or mouse, performance drastically decreases when latency is higher than 50ms but also has effects as low as 16ms. For live performances, where the user can hear and see the original content (the image magnification scenario) latency should be less than 25ms.

Bandwidth, Cabling, and Compression

High definition video streams would generate untenable bandwidth requirements without compression. For example, the data rate of a 1080p60 video stream is about 4.5 Gbps uncompressed, and 4K60 4:4:4 (resolution of video) steps this up to 18 Gbps. The most widely used CODEC (COder/DECoder) in the AV-over-IP industry is JPEG2000. It's been used for many years by the entertainment industry, but is being phased out for newer technologies such as DSC, Tico, JPEG-XS, and Pixel Perfect Processing.

While some may argue that 10 Gbps is the future since it provides a path to 8K, Extreme Networks provides AVB capable switches that deliver 2.5 GbE over existing cabling.

The chart below shows how far each compression technology will be able to compress video to fit into a given network technology.

Network Bandwidth Compatibility by Video Format Based on CODEC Compression Ratios

Video Format Name	Date Rate				
		2 to 1	5 to 1	20 to 1	20 to 1
	Uncompressed	DSC compression	JPEG-XS compression	JPEG2000 compression	Pixel Perfect Processing compression
1080p	4.48	2.24	.90	.22	.22
4K30	8.96	4.48	1.79	.45	.45
HDMI 2.0 (4K60 - 4:2:0)	8.96	4.48	1.79	.45	.45
2160 (4K60 - 4:4:4)	17.92	8.96	3.58	.90	.90
HDMI 2.1 (8K60 - 4:2:0)	35.83	17.92	7.17	N/A	1.79

Minimum required network type and corresponding cabling

■ 40Gb (Fiber)   ■ 10Gb (Cat6a)   ■ 5Gb (Cat6)   ■ 2.5Gb (Cat5e)   ■ 1Gb (Cat5e)

Conclusion

With Extreme Networks switches, professional AV installations that previously required extensive time and resources to connect proprietary or non-interoperable network elements now benefit from simplified infrastructures, reduced implementation costs, unified management, and the ability to provide delivery of next generation video and audio applications. Benefits include larger channel capacities, automated tuning via the network, smoother migrations to new applications, and lower implementation and ongoing costs.

Products

For AV-over-IP applications, we recommend our ExtremeSwitching X435 Series, as well as our new 5520 Series Universal Switch platforms. More information can be found at:

https://www.extremenetworks.com/product/x435/

https://www.extremenetworks.com/product/5520-series/

Please reach out to us at https://www.extremenetworks.com/contact-sales/ for more information

ExtremeSwitching™ X435 Series

ExtremeSwitching™ 5520 Series

http://www.extremenetworks.com/contact