Enterprise-Class AVB Switching for Pro AV

WHY CHOOSE AVB?

AVB introduces four major improvements to standard 802 architectures, including precise synchronization, traffic shaping for media streams, admission control, and identification of non-participating devices. AVB delivers cost savings through simplified integration, ease of use, and added functionality and control. Benefits include larger channel capacities, automated tuning via the network, smoother migrations to new applications, and lower implementation and ongoing costs.

Unifying Data, Audio, and Video on Scalable and Reliable Standards-Based Ethernet

Driven by ever-escalating demands for high speed network services, Ethernet has provided organizations with fast, reliable, scalable, and cost-effective networking for over forty years.

Alternative protocols have appeared and disappeared, network domains have expanded from local to wide areas, data traffic has converged with audio and video – and through each stage, Ethernet has provided the common framework of innovation upon which individuals, organizations, and systems around the world connect, share, and exchange.

According to Vertical Systems Group, the global market for business Ethernet services will reach $45.1 billion by 2016, a growth rate more than twice that of legacy services. Increases in speed, scale, and performance have made Ethernet suitable for applications and markets once the domain of proprietary or mission-critical technologies like Fiber Channel, particularly as the cost of supporting such complex environments requires expansive ongoing investments.

This Solution Brief explores the role of Ethernet in one such emerging market, the professional AV industry, in which the 'AVB' (Audio Video Bridging) set of IEEE 802.1 standards is simplifying and lowering the cost of implementations that traditionally have been characterized by complexity, expense, and lack of interoperability.

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.

Streamlining AV Deployments

Professional Audio/Video environments have traditionally functioned without a widely-adopted set of networking standards. The extensive and unwieldy cabling systems required for even moderate productions are symptomatic of the connectivity complexity, and illustrate the challenge of coordinating audio, video, and data across separate networks.

Additionally, the protocols used in these environments were originally designed for large-scale specialized installations, such as stadiums, amusement parks and live sound applications, and rely on proprietary approaches to prioritizing traffic

EXTREME NETWORKS AND THE AVNU ALLIANCE

The AVnu Alliance is an industry forum dedicated to the advancement of professional quality audio and video converged over Ethernet at various link layers.

Extreme Networks® is a proud member of the AVnu Alliance and dedicated to ensuring our switches are interoperable with the products of other AVnu Alliance members to expand the use of AVB-powered solutions across markets.

To enable an complete ecosystem of compatible silicon and systems, the AVnu Alliance focuses on:

- Developing compliance and interoperability certifications for AVB standards
- Hosting plug-fests for member companies
- Providing certification for reference by other organization, as necessary, to provide end-to-end system interoperability
- Promoting awareness of the AVB technologies

More information and a listing of member organizations can be found at http://www.avnu.org.

streams. While suitable for quality, timing, and distance, these protocols generally serve closed communities, lack scale, and require gateways, adapters and extensive tuning.

Installed audio environments frequently require high levels of on-site expertise to adequately manage changes, integrate disparate systems, and support differing customer requirements. Collectively, these intangibles only serve to increase costs and compromise efficiency in an industry otherwise known for its innovation.

Clearly the need has existed for a universally-accepted standard that enables manufacturers, installers, and customers alike to benefit from economies of scale, lower barriers to entry, and predictable roadmaps for evolving AV without compromising existing investments.

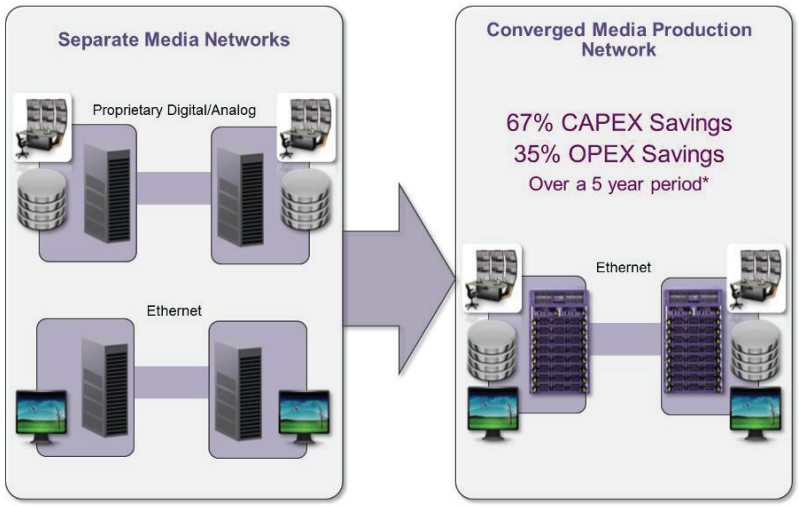
With the introduction of AVB, proprietary installations requiring multifaceted tuning of network elements are replaced by end-to-end networks that are easier to manage, simpler to deploy, interoperable with extended networks, and more cost effective.

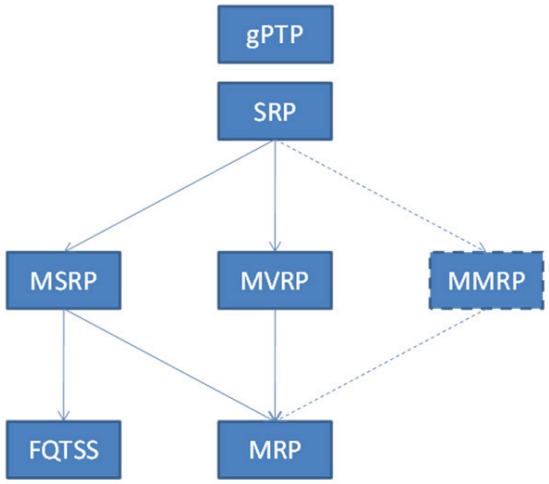
Fundamental Improvements

The primary advantage for AV integrators is simplicity. From the endpoint to the network core, AVB makes networks easier to manage, modify, and provision, and eliminates challenges presented by distance.

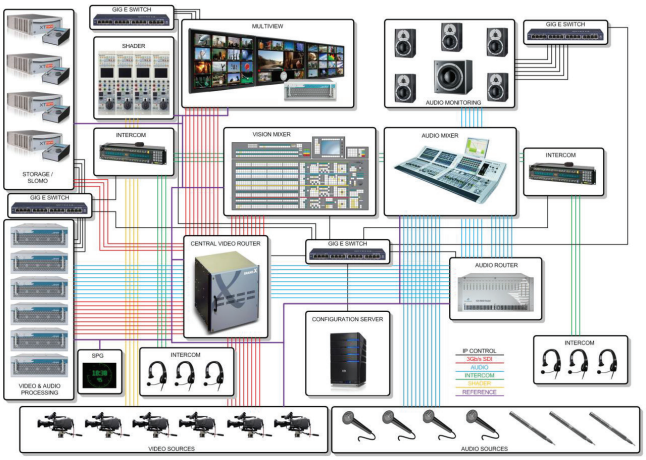
Additionally, while traditional AV installations use a single wire path for each media flow and require complex and expensive matrix switches to route each flow to a new destination, (resulting in a jungle of cables), with AVB, the network intelligently switches multiple media flows across a single cable while ensuring QoS , resource reservation, and precise synchronization of all network elements.

Legacy and AVB-enabled Production Network Comparison

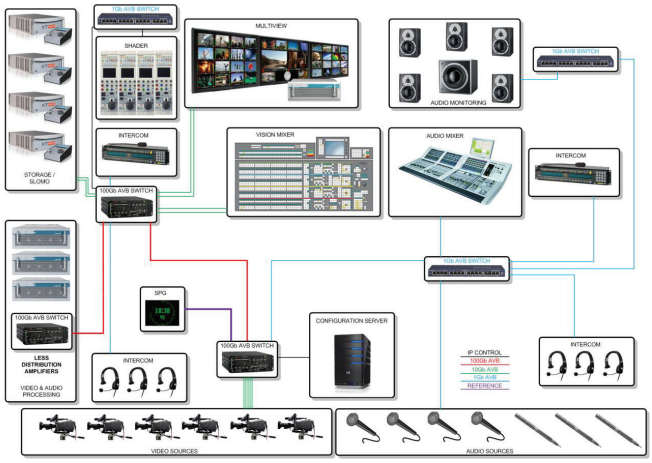




801.1 AVB Standards Elements



Before AVB, SDI resulted in complex wiring schemes



With AVB, wiring is greatly simplified. Source: Axon

The following are the IEEE 802.1 Audio/Video Bridging (AVB) standards:

- IEEE 802.1BA: Audio Video Bridging (AVB) Systems
- IEEE 802.1AS: Timing and Synchronization for Time-Sensitive Applications
- 802.1Q is QoS for AVB: IEEE 802.1Q: Multiple Registration Protocol (MRP) & Multiple VLAN Registration Protocol (MVRP)
- IEEE 802.1Q (was 802.1Qav): Forwarding and Queuing for Time-Sensitive Streams (FQTSS)
- IEEE 802.1Q (was 802.1Qat): Stream Reservation Protocol (SRP) / Multiple Stream Reservation Protocol (MSRP). This technology ensures audio and video can leverage a predefined amount of the bandwidth for AVB audio. This amount is 75% of the maximum data rate; the other 25% of bandwidth can be used for other data. (Note: These percentage allocations can be adjusted as required across all Extreme Networks AVB-enabled switches.)

Two additional draft standards rely on IEEE 802.1 AVB to provide professional quality Audio/Video.

- IEEE 1722 - Layer 2 Transport Protocol for Time-Sensitive Streams, which allows easier porting of applications currently IEEE 1394 (FireWire®) to AVB.
- IEEE 1733 - extends RTCP for RTP streaming over AVB-supported networks.

Extreme Networks Solutions for AVB

Extreme Networks AVB-enabled Ethernet switches unify data, audio, and video traffic on a single standards-based 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.

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.

Delivering enterprise-class capacity, scale, and reliability, Extreme Networks switches simplify complexity and connectivity across a variety of environments, including auditoriums, conference rooms, public spaces, amusement parks, stadiums, studios, telepresence rooms and more.

Simplify Deployments and Networks with Extreme Networks AVB-enabled Switches

Extreme Networks switches are deployed across many of the most demanding technical environments in the world, including high performance computing, energy, research and development, and data centers.

Our advanced designs provide superior scale, density, redundancy, and energy efficiency within reduced form factors, enabling organizations to leverage their investments over extended time periods without compromising execution.

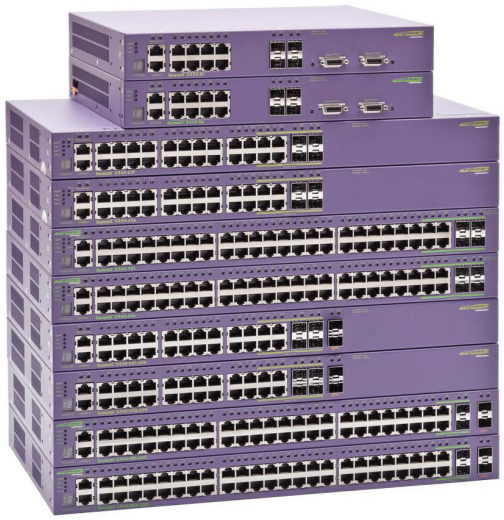
As AVB extends high quality audio and video into the consumer and mass markets, the Extreme Networks portfolio provides highly scalable, reliable and flexible solutions for emerging AVB applications. Unified on the foundation of ExtremeXOS®, our highly resilient OS that provides continuous uptime, manageability and operational efficiency, Extreme AVB-enabled switches scale from Gigabit to 10/40GbE, copper/fiber.

Extreme Networks Summit® X670 series switches are designed to support emerging 10 Gigabit Ethernet-enabled servers in enterprise and cloud data centers. Summit X670 optimize deployments with optional 40GbE uplink support and provide seamless support from existing Gigabit Ethernet-based servers to 10GbE-based high-performance servers as organizations transition to virtualized environments.

Extreme Networks Summit® X460 switches are suitable for campus edge environments and as aggregation switches within enterprise networks. The Summit X460 is also used as a top-of-rack switch for data center environments, with features such as high-density Gigabit Ethernet; XNV™ (ExtremeXOS Network Virtualization) for centralized Virtual Machine (VM) inventory, location history and provisioning; Direct Attach™ to offload VM switching from servers and improve performance; high-capacity Layer 2/Layer 3 scalability for highly-virtualized data centers; and intra-rack and cross-rack stacking with industry-leading flexibility.

Extreme Networks Summit® X440 switches extend high performance AVB to the converged edge, enabling fine grained Quality of Service (QoS), stacking, high availability features and identity aware security in a compact, cost effective switch. Standards-based Power Over Ethernet support (802.3af / 802.3at) allows the Summit X440 to support large-scale rollouts of converged network devices such as audio endpoints, video cameras, IP telephones, wireless access points as well as physical security devices.

Extreme Networks Ridgeline™ Management Suite is a full-feature management application that simplifies AVB configuration, troubleshooting, and status monitoring across networks. Ridgeline's open architecture accommodates a multi-vendor, service-rich environment that enables high availability and the enforcement of robust network policies.



Extreme Networks Summit® X440

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