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Audio Video Bridging

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What is Audio Video Bridging?

Audio Video Bridging (AVB) is the common name for the set of technical standards developed by the IEEE Audio Video Bridging Task Group of the IEEE 802.1 standards committee. IEEE 802.1 defines a set of standards that provide the means for highly reliable delivery of low-latency, time-synchronized audio and video streaming services through Layer 2 Ethernet networks.

The set of IEEE 802.1 standards consists of the following:

- IEEE 802.1AS: Generalized Precision Time Protocol (gPTP)
- IEEE 802.1Qat: Multiple Stream Reservation Protocol (MSRP)
- IEEE 802.1Qav: Forwarding and Queuing for Time-Sensitive Streams (FQTSS)
- IEEE 802.1BA: an umbrella standard for the other three IEEE 802.1 standards

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What are the benefits of Audio Video Bridging?

Audio and video equipment deployments have traditionally been analog single-purpose point-to-point one-way links. This dedicated connection model resulted in a mass of cabling in professional and consumer applications that was hard to manage and operate. With the AVB standard, the audio video streams are transmitted across Ethernet infrastructure to anywhere over a long distance. Instead of one-to-one streams, the network transport enables many-to-many transparent plug-and-play connections for multiple audio and video endpoints, including talkers and listeners. This helps corporations lower Total Cost of Ownership (TCO) through reduced CapEx (less cables) and reduced OpEx (no license fees for any proprietary technologies). It also provides higher quality, time-synchronized audio and video with more scalability, including more efficient deployment, installation, and management, to enable new capabilities.

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What Cisco Catalyst® switches support Audio Video Bridging?

AVB standard is supported on Cisco Catalyst 9300 Series and on select Cisco Catalyst 9500, 3850, and 3650 Series Switches.

Q **Is Audio Video Bridging supported on all Cisco® Catalyst 3850 and 3650 Switches?**

A No. Audio Video Bridging is supported on select Cisco Catalyst 3850 and 3650 Series Switches. The models follow:

Cisco Catalyst 3850	Cisco Catalyst 3650
WS-C3850-12XS	WS-C3650-24PDM
WS-C3850-24XS	WS-C3650-48FQM
WS-C3850-48XS	WS-C3650-8X24PD
WS-C3850-16XS	WS-C3650-8X24UQ
WS-C3850-32XS	WS-C3650-12X48FD
WS-C3850-12X48U	WS-C3650-12X48UQ
WS-C3850-24XU	WS-C3650-12X48UR
	WS-C3650-12X48UZ

Q **What is the first version of software code on a Cisco Catalyst 3850 Switch to support Audio Video Bridging?**

A The first software code version on a Cisco Catalyst 3850 is Cisco IOS® XE Software Release 16.3.1. Note that on the WS-C3850-12x48U, Audio Video Bridging is supported only on the 1 Gigabit Ethernet port for Cisco IOS XE Software 16.3.1. Audio Video Bridging is supported on multigigabit ports starting with Cisco IOS XE Software 16.3.2. Audio Video Bridging is supported on Cisco Catalyst 3650 Series Mini Switch starting with Cisco IOS XE Software 16.3.2.

Q **Is Audio Video Bridging supported on all Cisco Catalyst 9300 and 9500 Switches?**

A AVB is supported on all Cisco Catalyst 9300 Series Switches.

AVB is supported on the following select Cisco Catalyst 9500 Switches: Cisco Catalyst 9500-12Q, 9500-24Q, 9500-40X, and 9500-16X.

Q **Are there any limitations on the uplink or downlink ports?**

A The only limitation is on the downlink ports of Catalyst 9300-48UXM and 9300-48UN models. AVB is supported on first 16 downlinks of 9300-48UXM and first 36 downlinks of 9300-48UM modles. There are no restrictions on uplinks for the Catalyst 9300 or 9500 series switches.

Q **What is the first version of software code on a Cisco Catalyst 9000 Series to support Audio Video Bridging?**

A The first software code version on the Cisco Catalyst 9000 Series is Cisco IOS XE Software Release 16.8.1.

Q **Have Cisco Catalyst Audio Video Bridging switches passed Avnu certifications?**

A The Avnu certification tests with Cisco Catalyst Audio Video Bridging switches are being carried out.

Q **What are the license requirements for Audio Video Bridging?**

A Audio Video Bridging requires IP Base or IP service license software on the Cisco Catalyst 3850 and 3650 and Network Advantage license software on the Cisco Catalyst 9300 and 9500 Switches.

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Q **Is Audio Video Bridging supported on switch stacking?**

A No. Audio Video Bridging is supported on standalone switches. The feature is not supported on stacked systems.

Q **Is Audio Video Bridging supported on switch uplink ports?**

A Yes. Audio Video Bridging is supported on all switch uplink ports.

Q **Is Audio Video Bridging supported on Etherchannel ports?**

A No. We recommend you use it in a Spanning Tree Protocol (STP)– enabled network.

Q **Does Audio Video Bridging have a limit to the number of hops in the AVB network?**

A As per standard, AVB guarantees a latency of 2 ms for Class A traffic and 50 ms for Class B traffic over a maximum of 7 hops.

Q **Does Audio Video Bridging support traffic routing between Audio Video Bridging endpoints in different VLANs?**

A No. Audio Video Bridging is a Layer 2 technology. AVB traffic cannot be routed across different VLANs.

Q **Do I have to enable Multiple VLAN Registration Protocol (MVRP) on the switch in order to run the Audio Video Bridging feature?**

A No. MVRP is not a mandatory requirement on the switch in order to run the Audio Video Bridging feature. Without MVRP, you can enable VLANs to run AVB.

Q **Does Audio Video Bridging use IEEE1588v2 PTP for clock synchronization?**

A No. The timing profile used by Audio Video Bridging is IEEE802.1AS Generalized Precision Time Protocol (gPTP). gPTP is an IEEE standard defined based on IEEE1588v2 PTP.

Q **Can IEEE802.1AS and IEEE1588v2 PTP profiles work together?**

A IEEE802.1AS and IEEE1588v2 PTP profiles are mutually exclusive. Only one profile can be enabled on a switch at a time. AVB does not use IEEE1588v2 PTP for its clock synchronization. Support for PTP default profile for IEEE1588v2 PTP has been introduced in Cisco IOS XE Software 16.8.1.

Q **Does gPTP use a boundary clock or a transparent clock?**

A IEEE802.1AS gPTP combines a few features of boundary clocks and transparent clocks as defined in IEEE1588v2. It uses the Best Master Clock Algorithm (BMCA) of boundary clocks and the peer delay mechanism of transparent clocks.

Q **Do I need to have an external GrandMaster clock in the AVB network?**

A No. The BMCA will automatically select the GrandMaster clock from the AVB switches and AVB endpoints based on configurations such as PTP priority and so on.

Q **What can be done if the peer delay value between the switch links is greater than the default value of 800ns and the gPTP stays down?**

A Use the configurable PTP neighbor propagation delay threshold command to change the threshold value to greater than 800ns.

Q **Can I have a converged network that passes audio, video, control, and regular data traffic?**

A Yes, the same port on a switch can be used for both AVB and non-AVB (regular data) traffic. But keep in mind that the Audio Video Bridging standard is designed to give higher priority to the audio/video traffic. Audio/video traffic may use up to 75 percent of the port bandwidth, hence causing data traffic to be dropped. On ports where no AVB client is attached, all 100% bandwidth is available for regular data traffic.

Q **What is the maximum number of AVB streams supported on a Cisco Catalyst switch?**

A The maximum number of AVB streams supported on a single switch is 200.

Q **How many ports on a single switch can be used for AVB simultaneously?**

A AVB can be enabled on all ports of the platforms that support the feature. There is no general restriction for the number of ports that can run AVB traffic simultaneously on a switch.

Q **Does AVB only work on 1G Ethernet ports?**

A No. AVB is supported and tested on other types of port speed (100Mbps, 1G, 10G, 40G) for the AVB Cisco Catalyst switches.

Q **What kind of connectors and cabling do Cisco Catalyst AVB switches use?**

A AVB doesn't have a specific requirement on types of connectors and cabling. For supported connectors and cabling, refer to the Cisco Ethernet Transceiver Compatibility Matrix for the specific switches.

Q **If I have a Cisco Catalyst WS-C3850-12XS 10G fiber switch, can I use an SFP-GE-T/GLC-GE-T transceiver to connect to a copper port AVB endpoint?**

A Yes.

Q **Is AVB traffic multicast traffic?**

A Yes. There can be one talker and multiple listeners. The AVB traffic is replicated by the network with multicast manner. After the AVB feature is enabled, the MSRP feature is automatically run, and the AVB talker and listeners exchange MSRP declaration messages, reserve bandwidth, and program the corresponding QoS policy and Layer 2 mroute on all the switches along the path.