Dante Information for Network Administrators

Dante AV-over-IP is based on common IT standards, enabling Dante to run alongside data traffic on networks comprised of readily available conventional switches and cabling.

Addressing Dante Devices

Dante devices use DHCP for addressing when available or will auto-assign an IP address in the 169.254.0.0/16 range on the primary network and 172.31.0.0/16 on the secondary network if DHCP is not available. Dante devices continue to look for a DHCP server even after auto-assigning an IP address. Most Dante devices support static IP addressing.

Audio Transport and Expected Bandwidth:

The majority of audio used in professional settings is PCM (uncompressed), sampled at 48 kHz and a bit depth (word length) of 24 bits. Dante audio is unicast by default but can be set to use multicast for cases of one-to-many distribution.

- Dante packages audio into flows to save on network overhead.
- Unicast Audio flows contain up to 4 channels. The samples-per-channel can vary between 4 and 64, depending on the latency setting of the device. Bandwidth usage is about 6 Mbps per typical unicast audio flow.
- Bandwidth for multicast flows is dependent on the number of audio channels used. Bandwidth is about 1.5 Mbps per channel.
- Dante audio cannot be sent over Wi-Fi.

Address	Port	Usage	Type
Device IP	UDP 14336-14591	Unicast Audio/Video	Unicast
239.255.0.0/16	UDP 4321	Multicast Audio/Video	Multicast

Video Transport and Expected Bandwidth

Dante video is optimized to run on Gigabit Ethernet and has a bandwidth cap of 700 Mbps. Video bandwidth is impacted by resolution, frame rate, chroma sampling, color bit depth, compression codec used, and varies with content shown. Dante video flows must be multicast if video is being sent to more than one destination.

Device Discovery

mDNS and DNS-SD are used for discovery and enumeration of other Dante devices including Dante Controller.

Address	Port	Usage	Type
224.0.0.251	5353	mDNS	Multicast

Synchronization

Digital audio requires synchronization for accurate playback of audio samples. Dante uses Precision Time Protocol (PTP version 1, IEEE 1588-2002) by default for time synchronization. This generates a few small packets, a few times per second. One clock leader is elected on a per subnet basis that sends multicast sync and follow up messages to all followers. Follower devices send delay requests back to the leader to determine network delay.

- Follower devices can be configured to send unicast delay requests to cut down on multicast traffic.
- Dante does not require PTP aware switches. In most cases Dante does not benefit from enabling boundary clock or transparent clock on switches.

Address	Port	Usage	Type
224.0.1.129-132	UDP 319, 320	PTP	Multicast
239.254.3.3	UDP 9998	PTP Logging (if enabled)	Multicast

Control and Monitoring Traffic

Dante monitoring and control traffic uses the following ports:

External

Address	Port	Usage	Type
224.0.0.230-233	UDP 8700-8708	Multicast Control and Monitoring	Multicast

Internal

Protocol	Port	Usage	Type
UDP	4440, 4444, 4455	Audio Control	Unicast
UDP	8751	Dante Controller metering port	Unicast
UDP	8800	Control & Monitoring	Unicast

A full list of ports used by Dante is available at: www.audinate.com/learning/faqs/which-network-ports-does-dante-use

QoS

Dante as a real time media streaming service benefits from low latency and jitter on the network. QoS should be used for prioritization of Dante clock and audio on mixed-use networks (including those with Dante Video). It is only a requirement for Dante audio only networks if using 100 Mbps or mixed 1 Gbps/100 Mbps network infrastructure and devices.

- Dante can make use of DiffServ QoS where needed.
- Dante will tag packets, and its tags can be integrated into an existing IT network QoS scheme.
- When used, QoS must be configured with strict priority queueing.

Priority	Usage	DSCP Label	Hex	Decimal	Binary
High	Time critical PTP events	CS7	0x38	56	111000
Medium	Audio, PTP v2	EF	0x2E	46	101110
Low	(reserved)	CS1	0x08	8	001000
None	Other traffic	Best effort	0x00	0	000000

Note: the QoS DSCP values can be re-marked, provided that the PTP packets still receive high priority.

Multicast Management

When Dante resides in mixed networks, those where IP video is on the same network segment, or a significant amount of multicast audio is in use, IGMP should be used to assist with multicast management. IGMP is not a requirement for Dante audio only networks with few or no multicast audio flows.

- Dante implements IGMP v2 or v3
- One IGMP Querier should be elected per VLAN
- Query intervals should be short, and time out values long.

Energy Efficient Ethernet

Energy Efficient Ethernet (EEE) or 'Green ethernet' (IEEE 802.3az) should be disabled on all ports used for Dante traffic. EEE can result in poor synchronization performance and occasional audio dropouts.