

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 950 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:

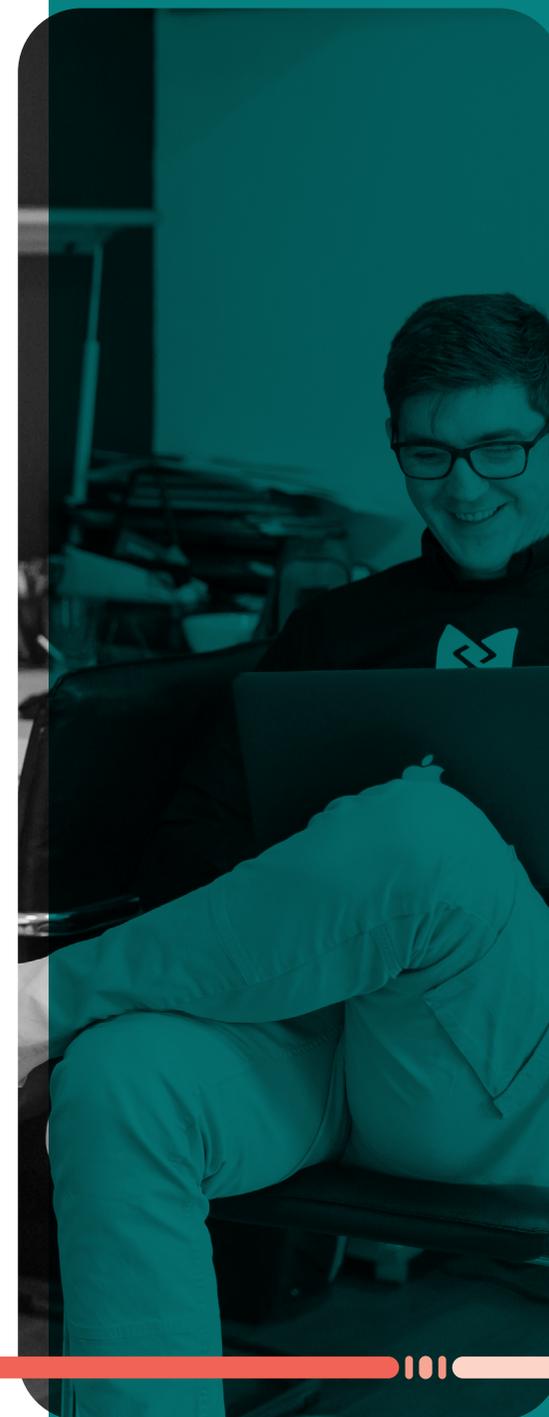
External

| Address | Port | Usage | Type |
|-----------------|--------------|----------------------------------|-----------|
| 224.0.0.230-233 | DP 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: getdante.com/support/faq/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.
- Dante video devices must not rely on link-local addresses, and instead should use routable IP addresses via DHCP or static assignment to ensure proper operation.

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.

