



University  
of Idaho

# PRECISION TIME PROTOCOL PUTS NEW DEMANDS ON CONVERGED CAMPUS NETWORK

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# PRECISION TIME PROTOCOL ARRIVED ON OUR CAMPUS IN THE FORM OF A SIMPLE NETWORK REQUEST

“We are moving to Dante enabled audio equipment for five new Video Classrooms. Please supply a common VLAN between the buildings.”

- October 2016

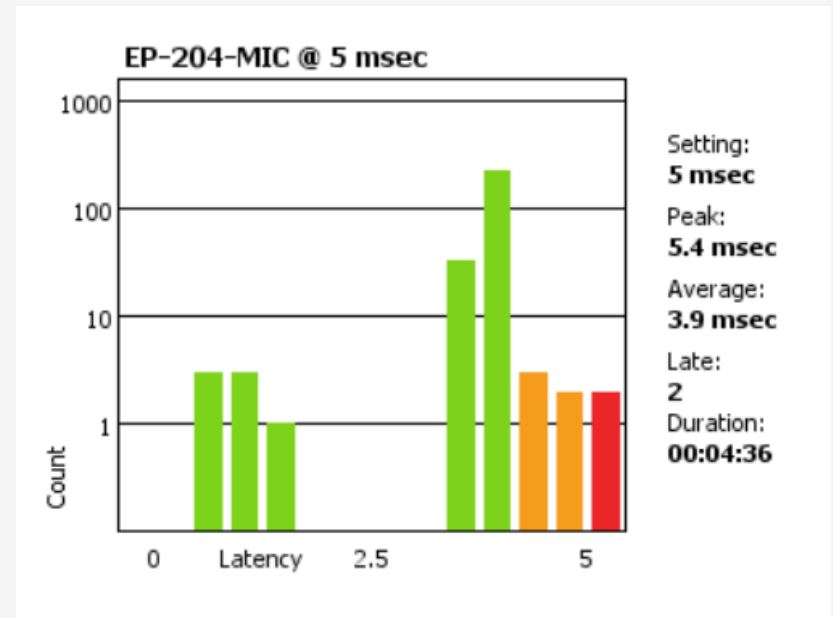
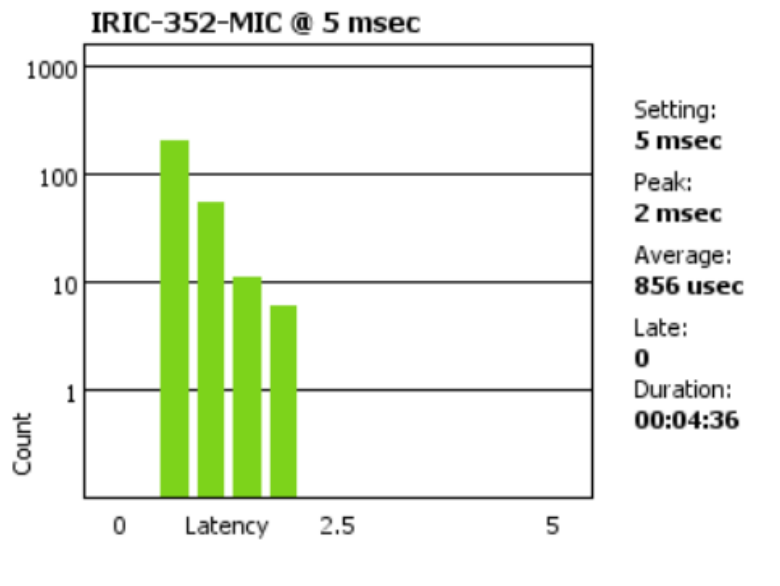
Lesson 1: Dante requires IP Multicast on the local subnet, but everything worked fine after adding:

- IGMP Querier
- PIM Sparse mode



# MAJOR PROBLEMS: CLASSROOM AUDIO IS CUTTING OUT

- Lesson 2: Every Dante device has a clock and there can be only one PTP master clock on a VLAN.
- Latency > 5msec triggers a PTP master clock election
- Microphones mute themselves during election process





# WORKAROUND: SEGMENT THE TRAFFIC

We resolved the classroom audio problems by adding a VLAN ACL in the campus core switches:

- Drop all UDP port 319 and 320 (PTP) traffic.
- Dante devices elect five separate PTP master clocks
  - One PTP master clock in each building.

The workaround created a new problem:

- Inter-building audio no longer works



# SOLUTION: QUALITY OF SERVICE

Lesson 3: Add a priority queue to building uplinks for traffic matching on:

- DSCP 56 and COS 7 for the Dante VLAN

Current Status: Down to 2 PTP master clocks

- Added QoS to 3 buildings with 1GE uplinks
  - Building with multiple 10GE uplinks stable without QoS
- Soon: 1 PTP master clock, when add QoS to 5<sup>th</sup> building

The screenshot shows the Dante Controller Network View interface. The title bar reads "Dante Controller - Network View" and "PTP Master Clocks". Below the title bar, there is a menu bar with "File", "Device", "View", and "Help". A toolbar contains several icons. The main content area has tabs for "Routing", "Device Info", "Clock Status", "Network Status", and "Events". The "Clock Status" tab is active, displaying a table of PTP Master Clocks. The table has columns for "Device Name", "Sync", "Mute", "Clock Source", "Domain Status", and "Primary Status". The "Primary Status" column shows two "Master" entries, which are highlighted with red arrows. The "Grand Master Clocks" are listed as "AG-NIC202MIC-d" and "IRIC-352-MIC".

Device Name	Sync	Mute	Clock Source	Domain Status	Primary Status
AG-NIC202MIC-d	<input checked="" type="checkbox"/>		Dante	N/A	Master
AG-NIC202RX-d	<input checked="" type="checkbox"/>		Dante	N/A	Slave
AG62MIC	<input checked="" type="checkbox"/>		Dante	N/A	Slave
AG62RX	<input checked="" type="checkbox"/>		Dante	N/A	Slave
CTS-EP204-MIC-d	<input checked="" type="checkbox"/>		Dante	N/A	Slave
CTS-TLC-132-RX	<input checked="" type="checkbox"/>		Dante	N/A	Slave
CTS-TLC132Mic-d	<input checked="" type="checkbox"/>		Dante	N/A	Slave
EP-202-MIC	<input checked="" type="checkbox"/>		Dante	N/A	Slave
EP202-DA02	<input checked="" type="checkbox"/>		Dante	N/A	Slave
EP204-DA02	<input checked="" type="checkbox"/>		Dante	N/A	Slave
IRIC-352-MIC	<input checked="" type="checkbox"/>		Dante	N/A	Master
IRIC-352-RX	<input checked="" type="checkbox"/>		Dante	N/A	Slave



# ALTERNATIVES AND MORE INFO

Alternatives considered:

- Build separate Dante network on dedicated switches
- Put Dante devices in separate subnets per building

Dante Reference Documents:

<https://www.audinate.com/resources/technical-documentation>