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
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 5th building
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