INTERMEDIATE DANTE CONCEPTS

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LEVEL 2 TOPICS

Clocking options in Dante

Understanding latency in networks

Dante Flows and Multicast

Creating backup devices with Dante names

Dante redundancy

Dante Virtual Soundcard*

Dante Via*

*presented on Audinate table

CLOCKING

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HOW DOES DANTE CLOCKING WORK?

Dante handles clocking automatically via election

- IEEE1588 PTP
- All devices sync'd to Master
- Each device has a clock
- New Clock Master elected as needed

CLOCK MASTERS

Clock Master determined by election in accordance with IEEE1588

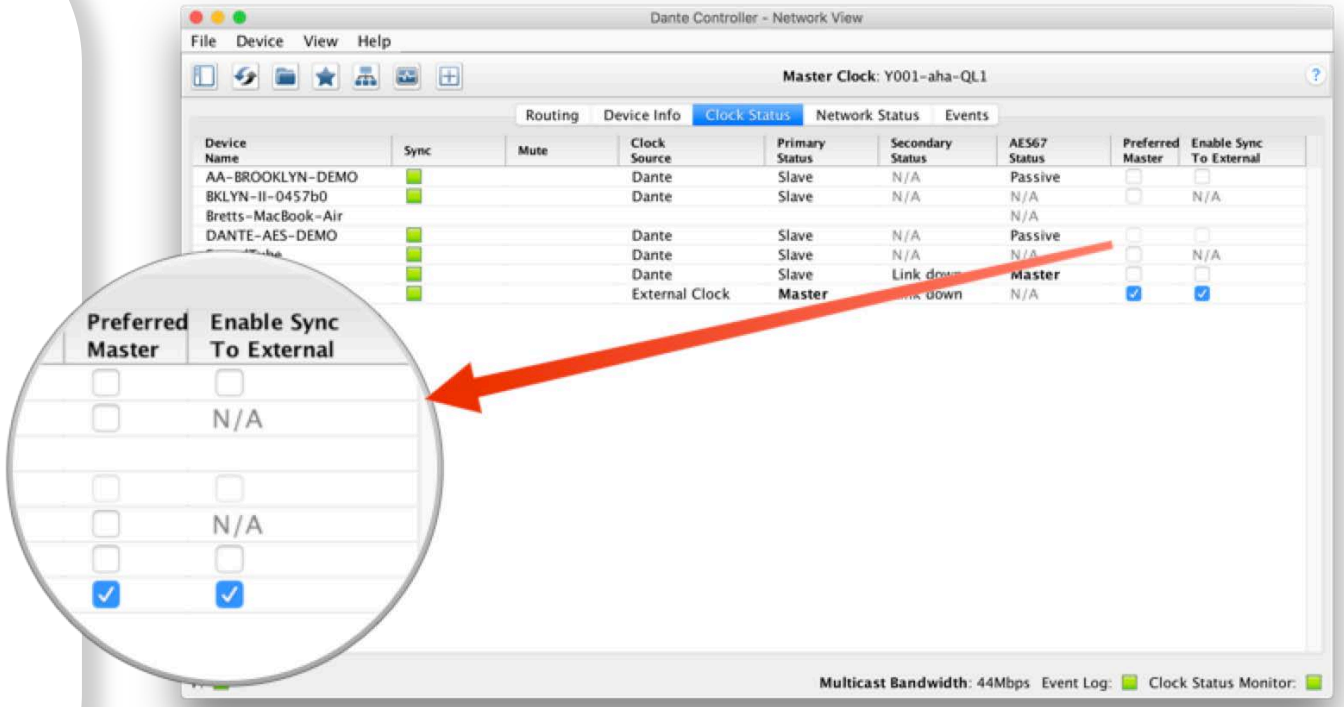
- Rig Election with “Preferred Master” and “Enable Sync to External” settings
- Understanding the election process

Preferred Master	Enable Sync To External
☐	☐
☐	N/A
☐	☐
☐	N/A
☐	☐
☑	☑

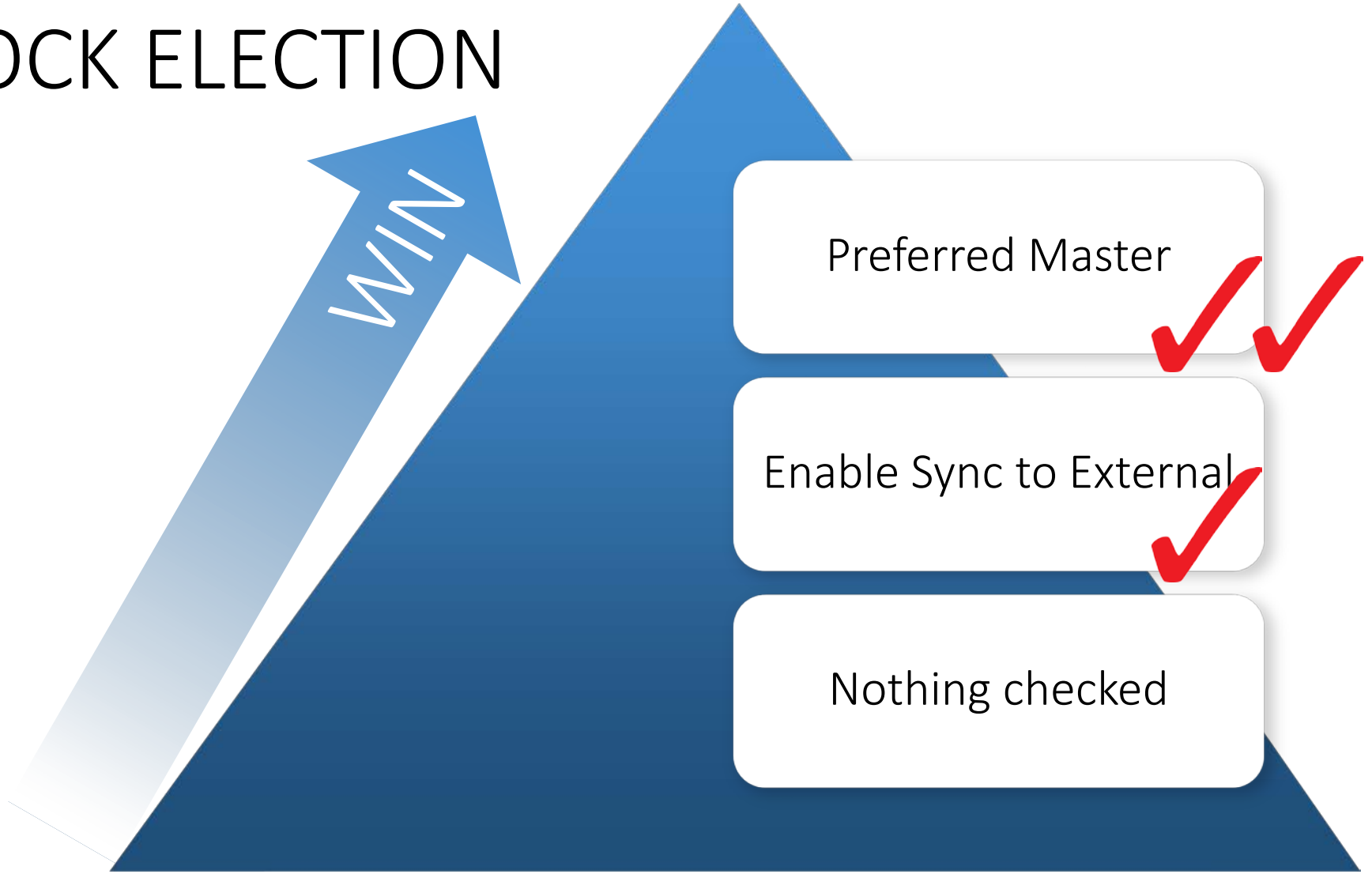
ADJUSTING CLOCKS

Clock Status tab in Dante Controller

- Checkboxes for Preferred Master and Enable Sync to External



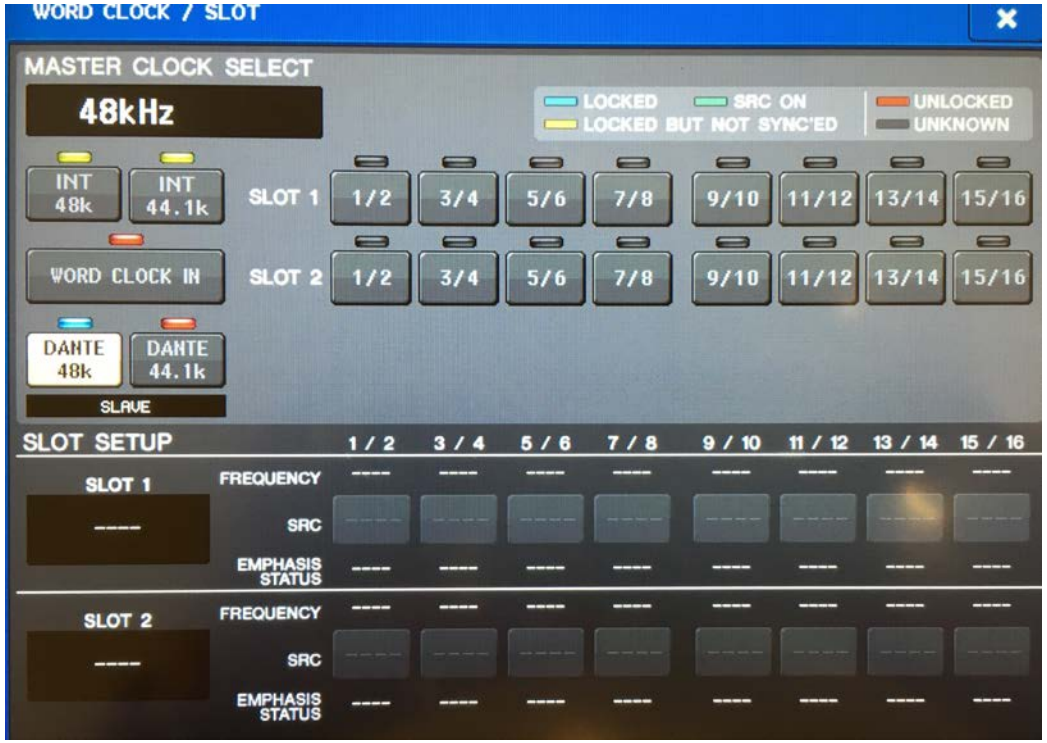
CLOCK ELECTION



USING EXTERNAL CLOCKS

"Enable Sync to External" allows use of console (or other) clock

- Configure in console
- Enable in Dante Controller
- Check "Preferred Master"
- Mismatch may result in pops and clicks



EXTERNAL CLOCK BEST PRACTICES

If using an external clock, configure in both device and Dante Controller (Enable Sync to External)

- Always check Preferred Master on the device using Enable Sync to External

- Symptom: clicks and pops

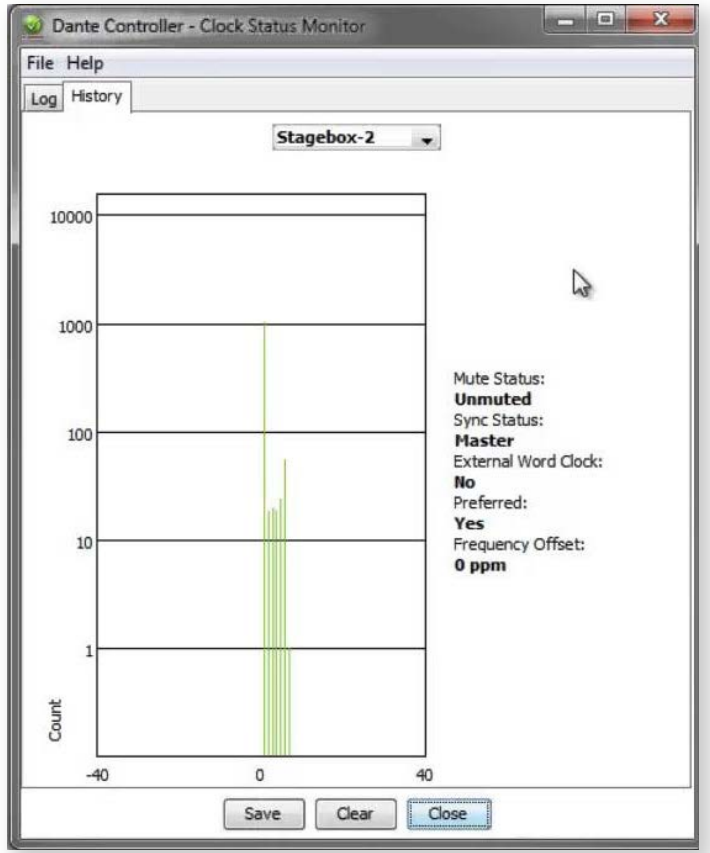
CLOCK STATUS MONITORING

Passive: always on

- Clock Master changes only

Active: select in toolbar to turn on

- Looks for instability
- Useful for troubleshooting external clocks
- Accumulates data over time
- Displays spread of clock frequency



LATENCY

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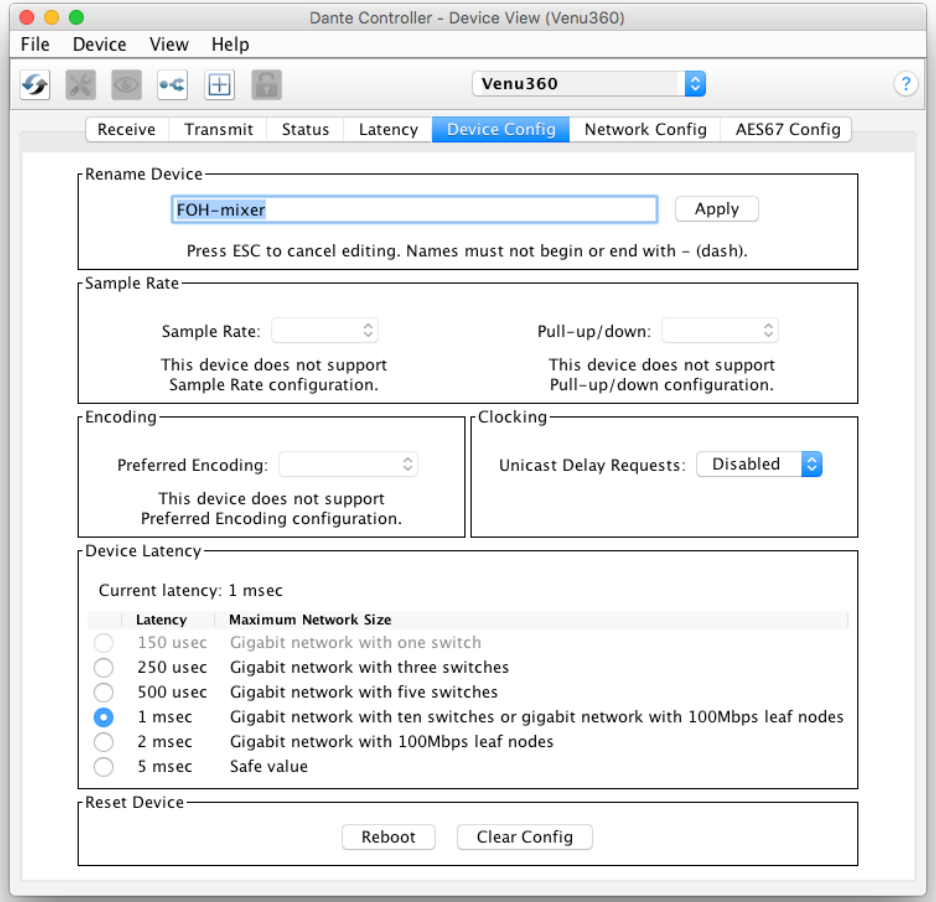
SETTING AND MONITORING LATENCY



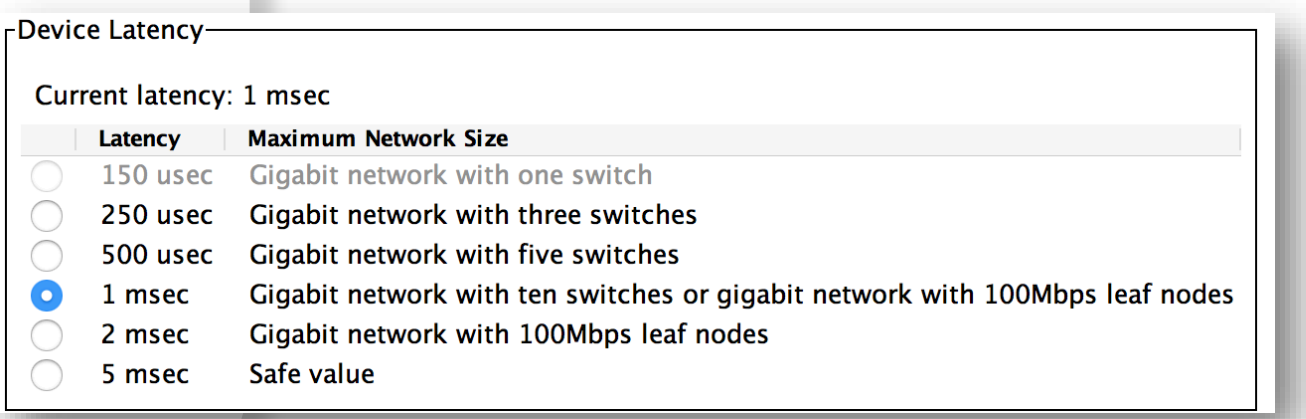
Double click any device in routing view to open the Device View

Set latency in Device Config tab

Monitor latency in Latency tab

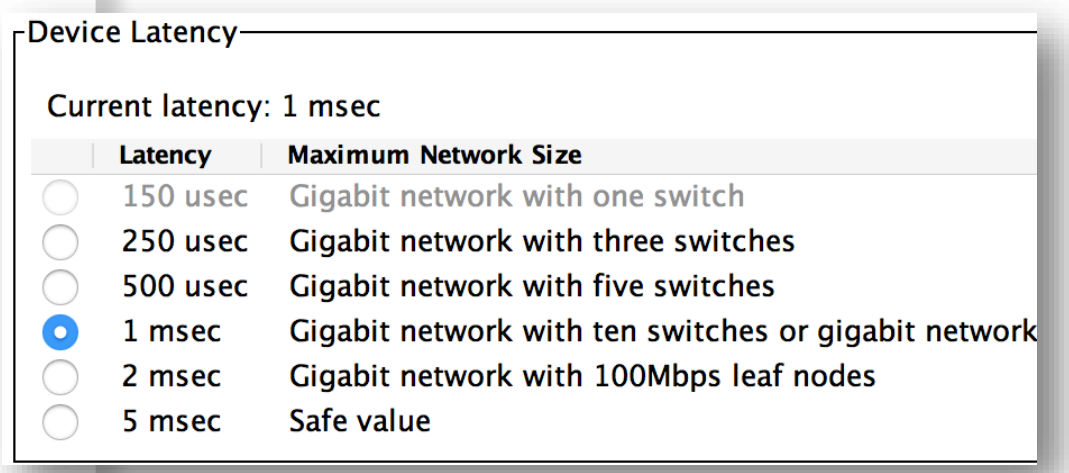
LATENCY IN DANTE

- 100% deterministic – always well-defined
- Default Dante latency 1ms – suitable for large networks
- Adjustable to suit needs
  - Minimum 150µs
  - Maximum 5ms
- Set per Device



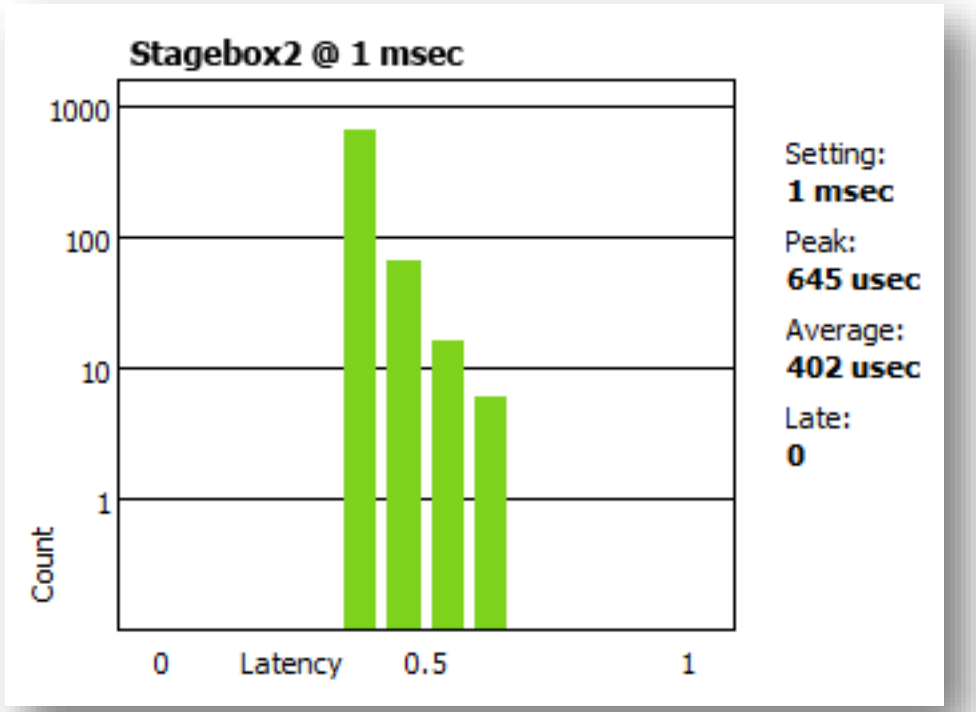
LATENCY - LOWER BOUNDS

- If only 1 switches, Dante latency can be set to 150µs
- 3 switches, 250µs
- 10 switches, 1ms (Dante default)
- Simple rule: Dante latency settings must be larger than network latency
- Recommended values are based upon worst-case scenarios

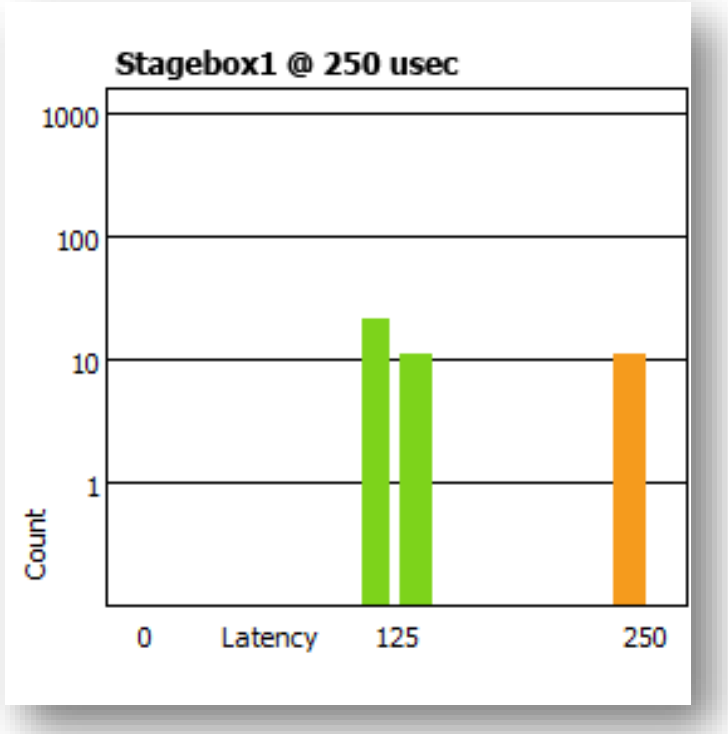


MONITORING LATENCY – GOOD EXAMPLE

- Visualize actual latency in Latency Tab of Device View
- Example:
  - 3 switches
  - 1ms latency setting
- All packets safely inside window
- Try lower values and see what happens



MONITORING LATENCY – BAD EXAMPLE



Example:

- 250µs latency setting
- Some packets are dangerously close to the edge of the window

Solutions:

- Increase latency
- Improve network performance (QoS, etc.)
- Replace faulty equipment

FLOWS AND MULTICAST

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UNICAST AND MULTICAST

Unicast

One to one traffic

- ”Private conversation” – data sent uniquely from transmitter to each receiver
- Data duplicated for each receiver

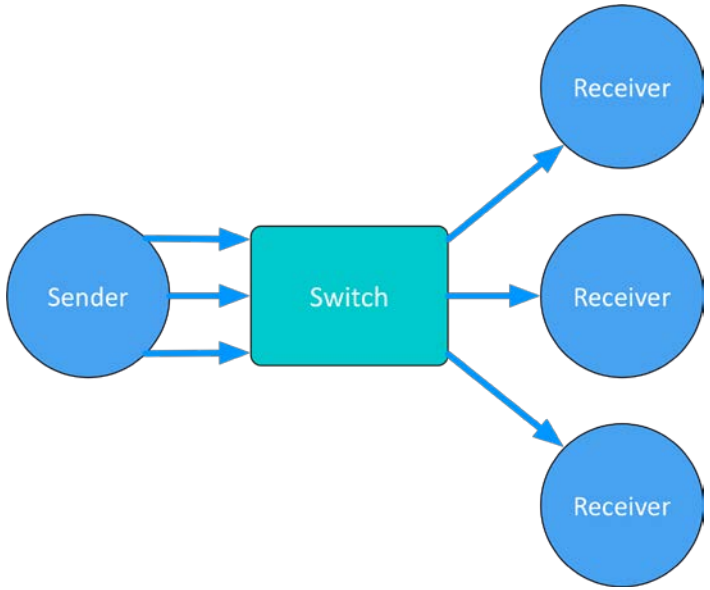
Multicast

One to many traffic

- “Public announcement” – messages sent to everybody on the network
- Data sent at once to all receivers

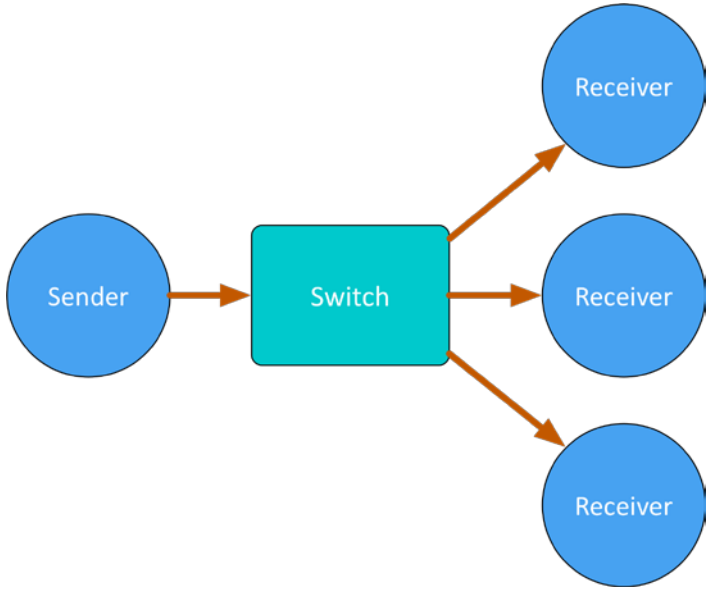
UNICAST AND MULTICAST

Unicast



1 data stream per receiver

Multicast



1 data stream for all receivers

DIFFERENCES: BROADCAST AND MULTICAST

If unmanaged, both send data to all members of a LAN

- Multicast traffic can be organized to send data only to requesters (receivers)
- Organization of receiving groups is done with managed switch
- IGMP Snooping – traffic only goes to requesters

DO I NEED TO CONTROL MULTICAST?

On gigabit networks, multicast traffic is unlikely to be a problem

- Consider: 64 channels of multicast (that's a lot) is less than 100mbits/sec of traffic

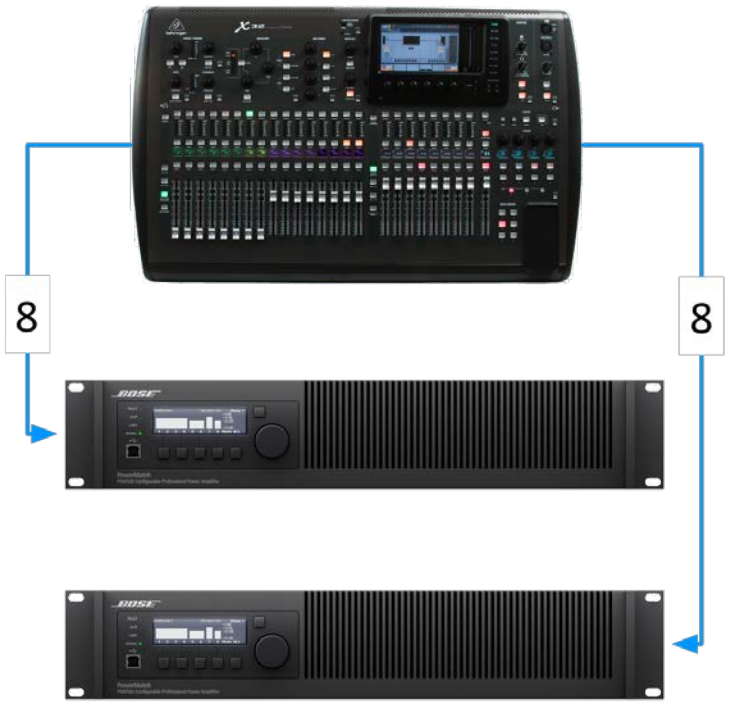
- Use multicast selectively!

DANTE AND UNICAST FLOWS

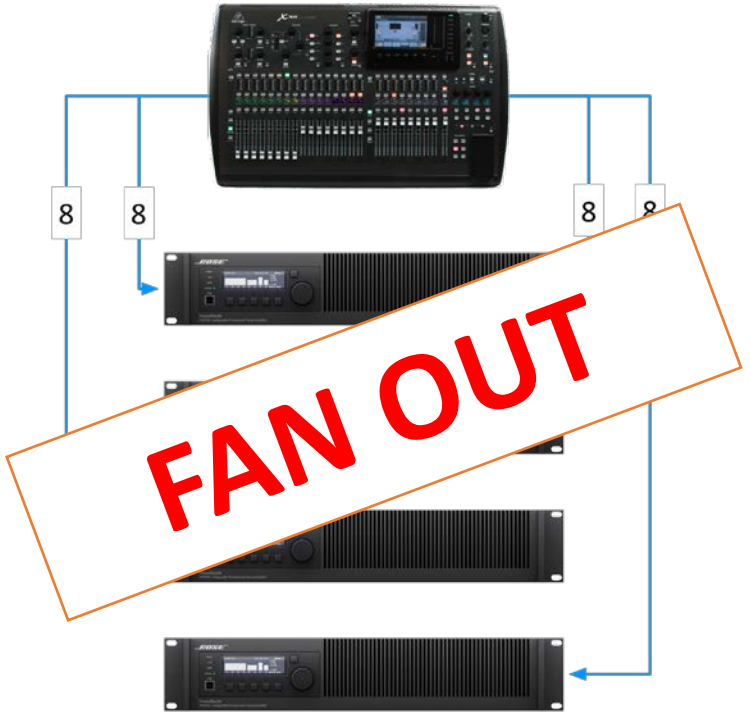
Default audio transport is unicast

- One-to-one traffic
- More receivers -> more traffic
- Each unique receiver gets its own flow(s)

DANTE AND UNICAST FLOWS

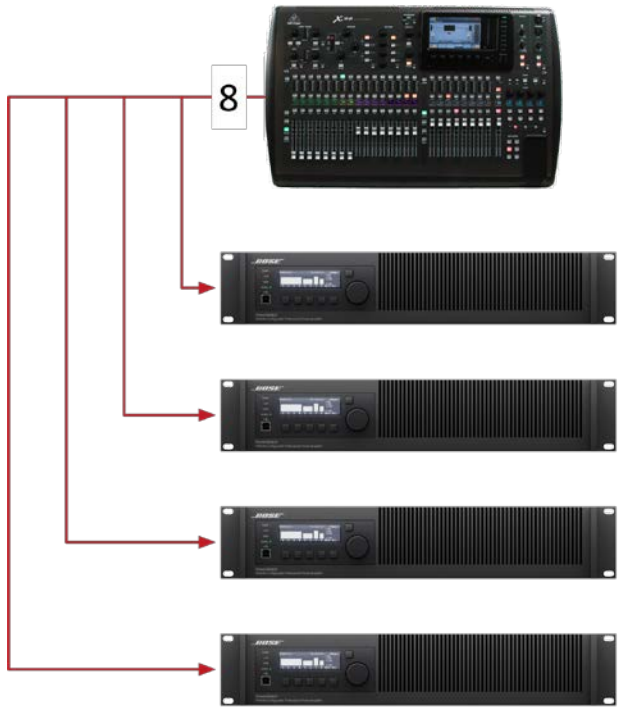


8 channels each -> 2 flows each -> 4 flows



8 channels each -> 2 flows each -> 8 flows

DANTE AND MULTICAST FLOWS



8 channels -> 1 multicast flow

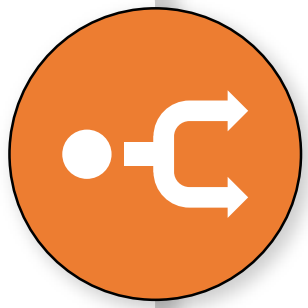
Multicast solves “fan out” condition

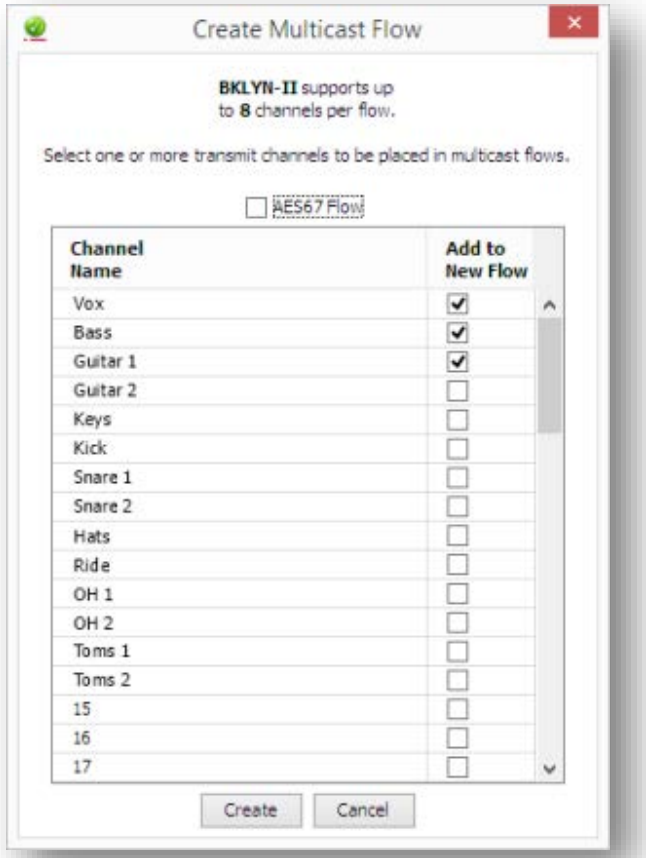
- Up to 8 audio channels in 1 multicast flow
- Configured in Dante Controller

CONFIGURING MULTICAST FLOWS

Open Device View

- Click “Create Multicast Flow” button in toolbar
- Choose up to 8 channels for a single multicast flow
- You may create more multicast flows if needed





SUMMARY

- Dante uses unicast by default
- Dante audio is packaged into multi-channel flows
- Number of flows is limited (typical 32)
- Each receiver requires at least 1 flow
- Multicast sends data to all devices
- Multicast is useful for conserving flows in one-to-many situations
- Explicit management of multicast often not necessary

DEVICE LOCK

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WHAT IS DEVICE LOCK?

Prevents tampering with Dante routes and settings

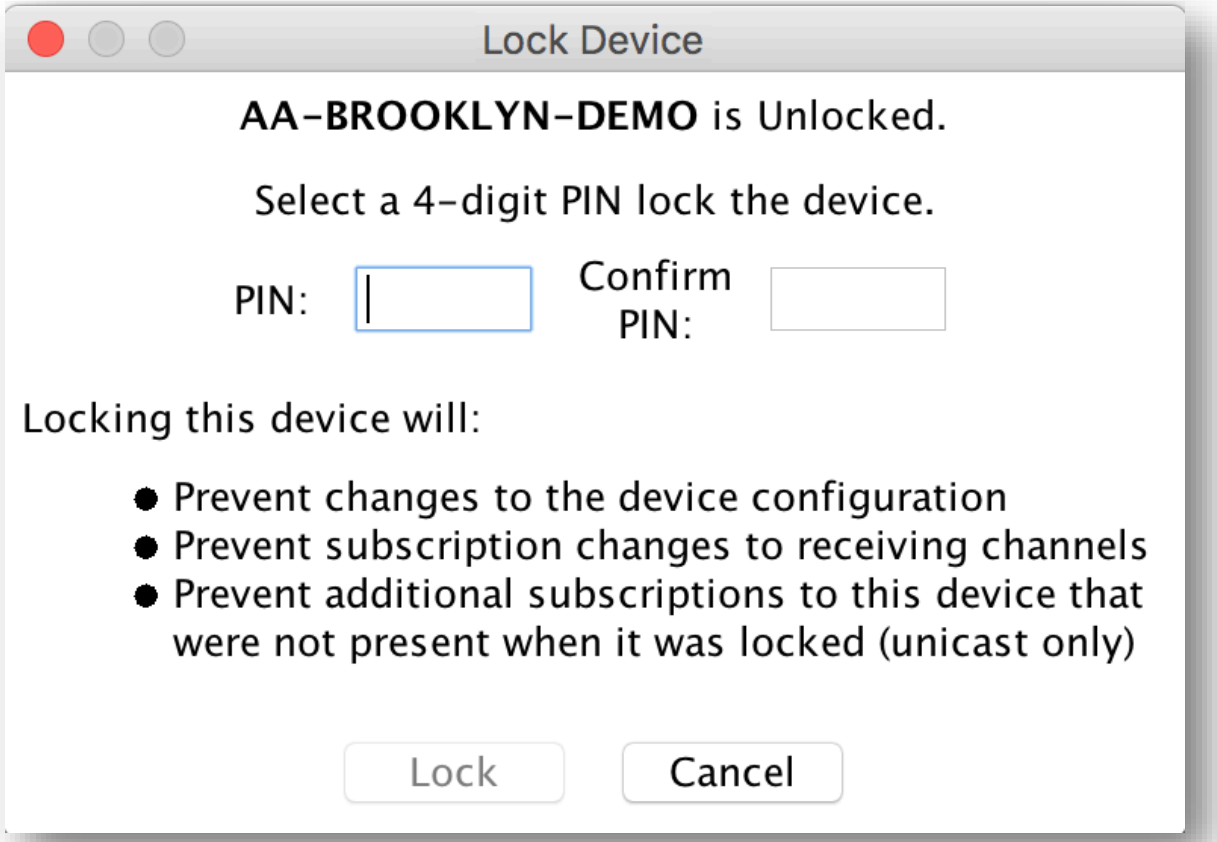
Requires Dante Controller 3.10 and firmware update for hardware

Supported in Dante Virtual Soundcard and Dante Via

Only affects devices as seen through network interface

Changes from inside products are not locked

ENABLING DEVICE LOCK



Check to see which devices support locking

Click Lock button in Device View or check Device lock checkbox in Device Info

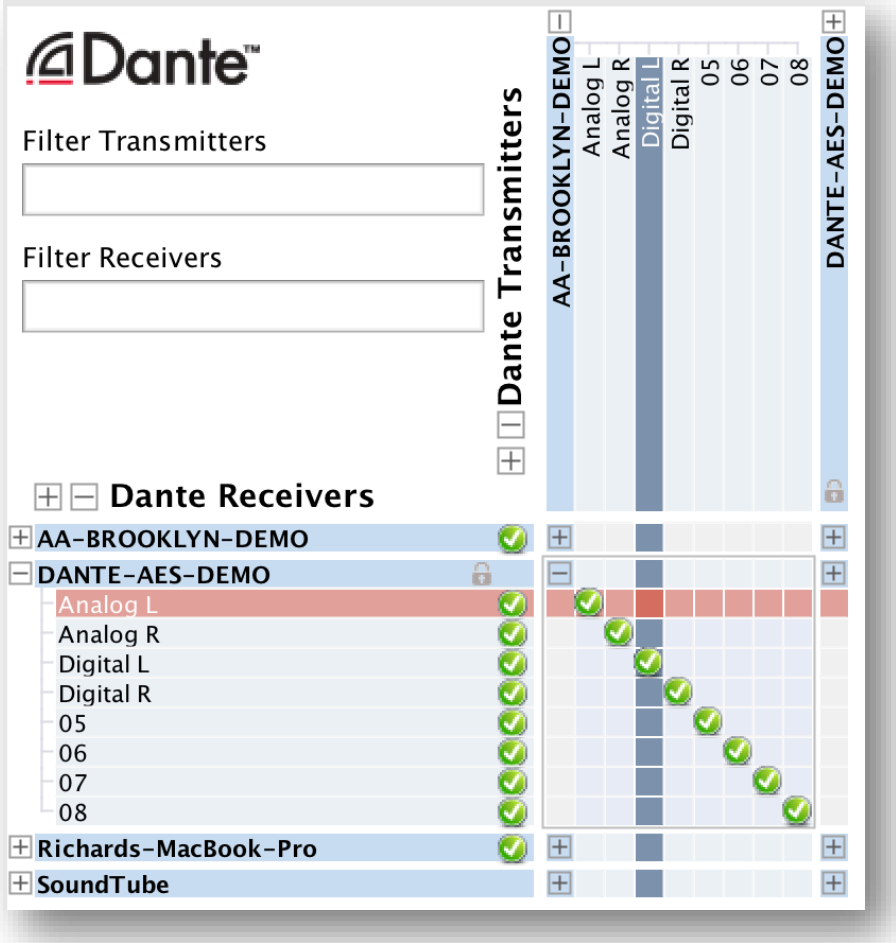
Select PIN in dialog box

Done

WORKING WITH DEVICE LOCK

Locked devices have a lock icon in the name bar

- When a locked channel is selected, highlight is red
- Attempts to change routes result in no action



UNLOCKING A DEVICE

- Open Device View
- Click “Lock” button
- Select PIN in dialog box
- Unlock device
- Old PIN is forgotten
- Yes, there is a recovery scheme!

DEVICE LOCK IN MIXED ENVIRONMENTS

Best when both Transmitter and Receiver support feature
Lock both for maximum security

- A Locked Receiver prevents changes to its subscriptions
- A Locked Transmitter can prevent transmitting to other devices only
- Lockable and unlockable devices can be mixed

PRESETS

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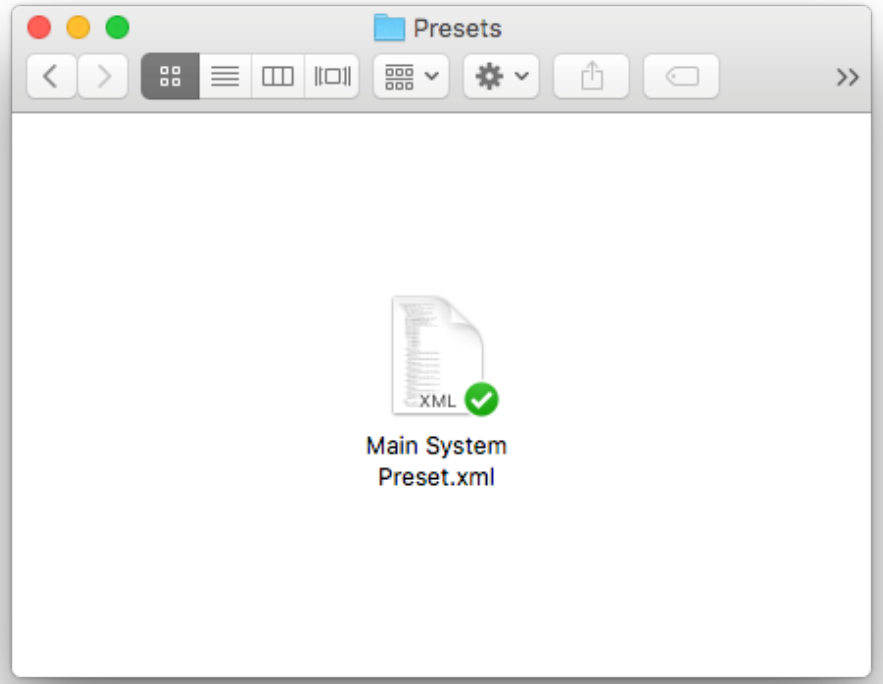
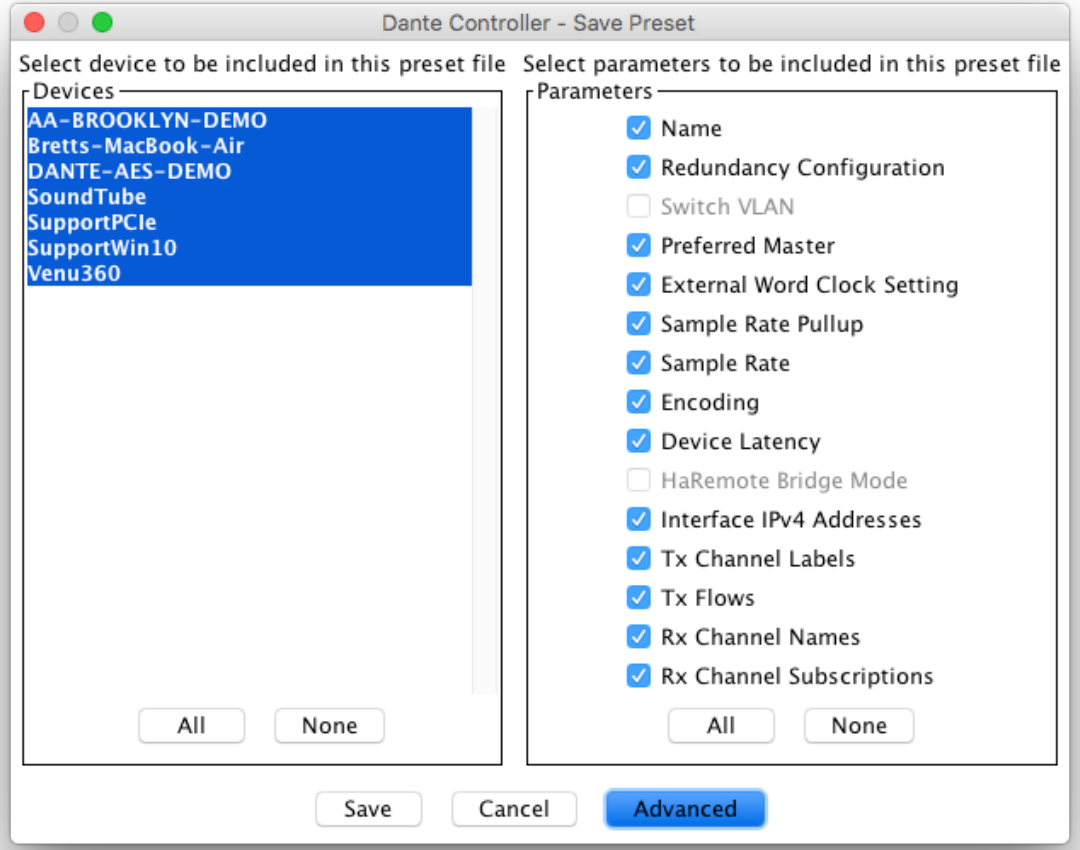
DANTE PRESETS

Dante network configuration can be saved in a local file

- Preset may include device names and roles
- Quickly reconfigure a Dante system to a known state



CAPTURING A PRESET

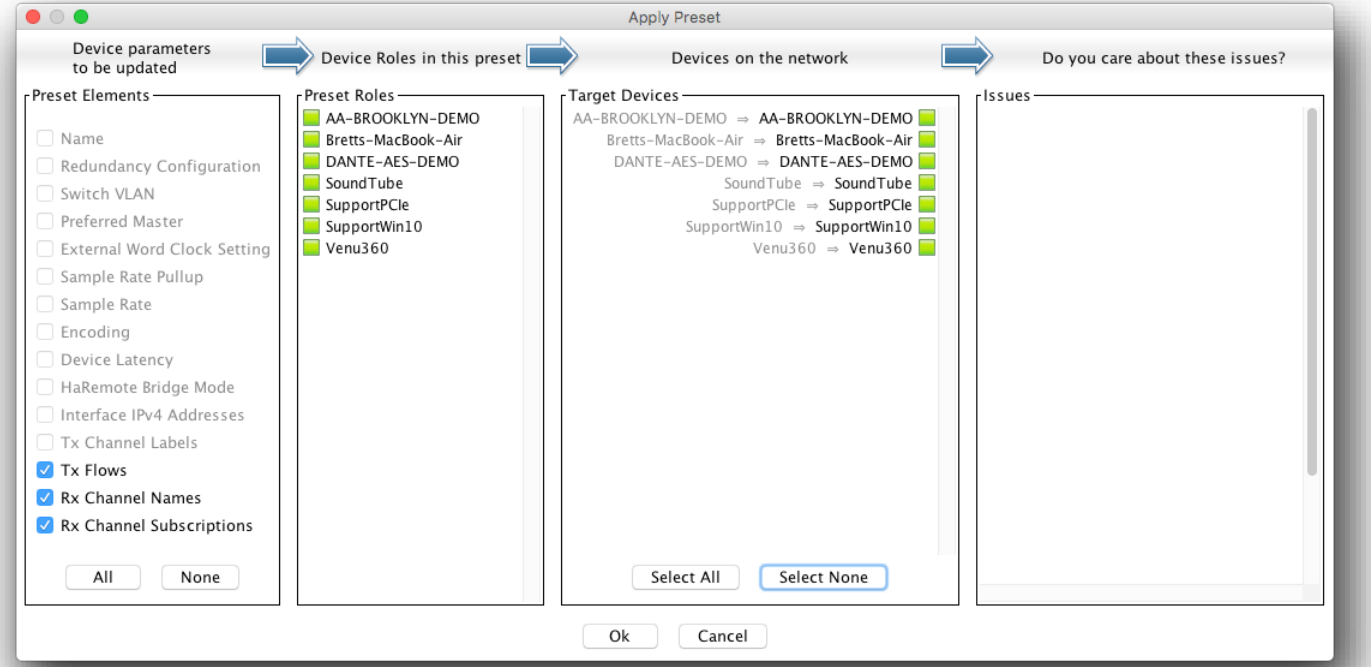


- Click the ‘Save Preset’ button in the main toolbar 
- Select devices that you wish to include in the preset
- Select parameters to save
- Save the file in any local folder on your computer

DEPLOYING A PRESET

Choose “Load preset”

- Select preset file
- Check elements to apply (names, sample rates, etc.)
- Apply



REDUNDANCY

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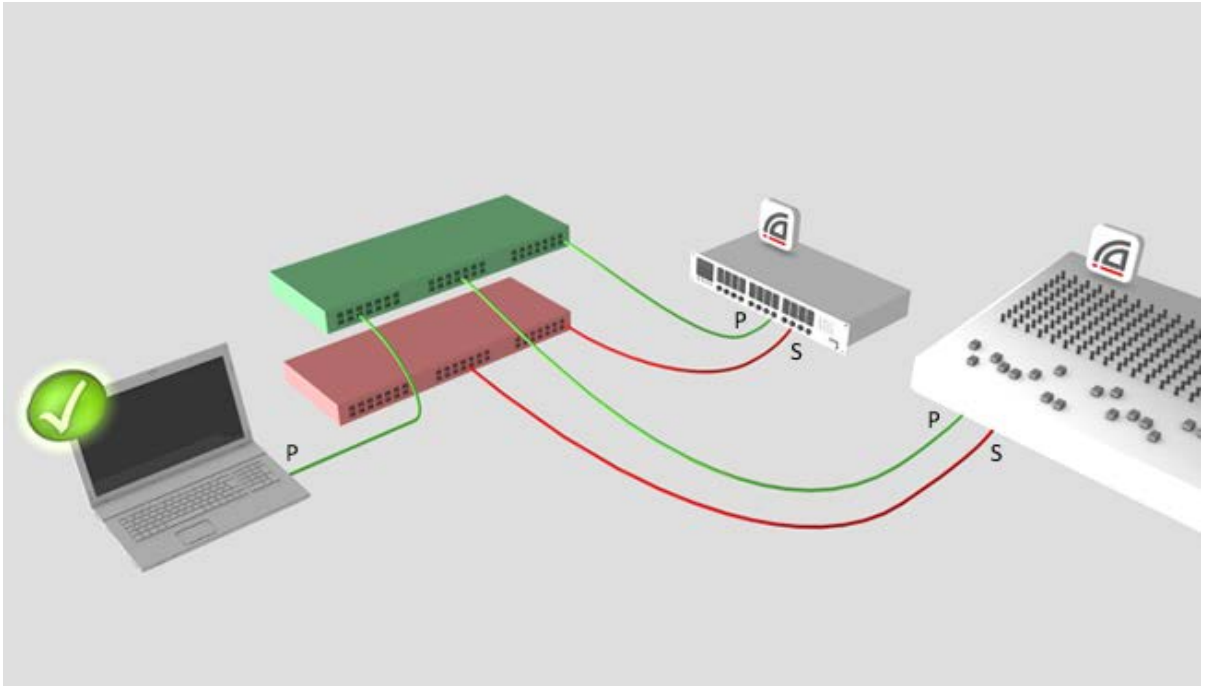
WHAT IS DANTE REDUNDANCY?

Create two physically independent networks using Primary and Secondary Dante ports

- Audio flows on both networks at once, no failover
- No clicks or pops
- Completely automatic setup
- For mission critical systems

SETTING UP REDUNDANCY



Setup Primary network first

Separate set of cables & switches connected to Secondary ports

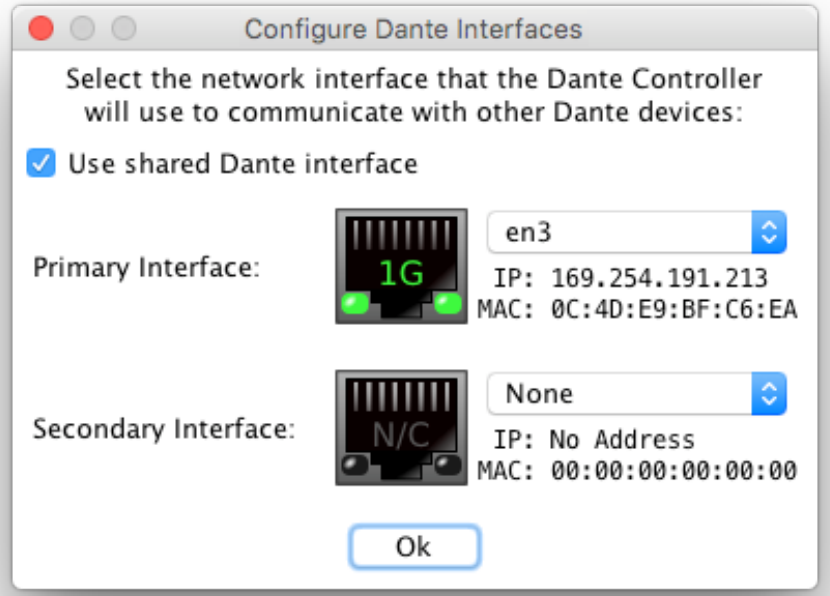
No other interaction required

OK if not all devices supported

REDUNDANCY AND DANTE CONTROLLER

Dante Controller can be connected to both Primary and Secondary interface

- Control is passed from one network to the other
- If Primary fails, Dante Controller can be connected to Secondary



THANK YOU