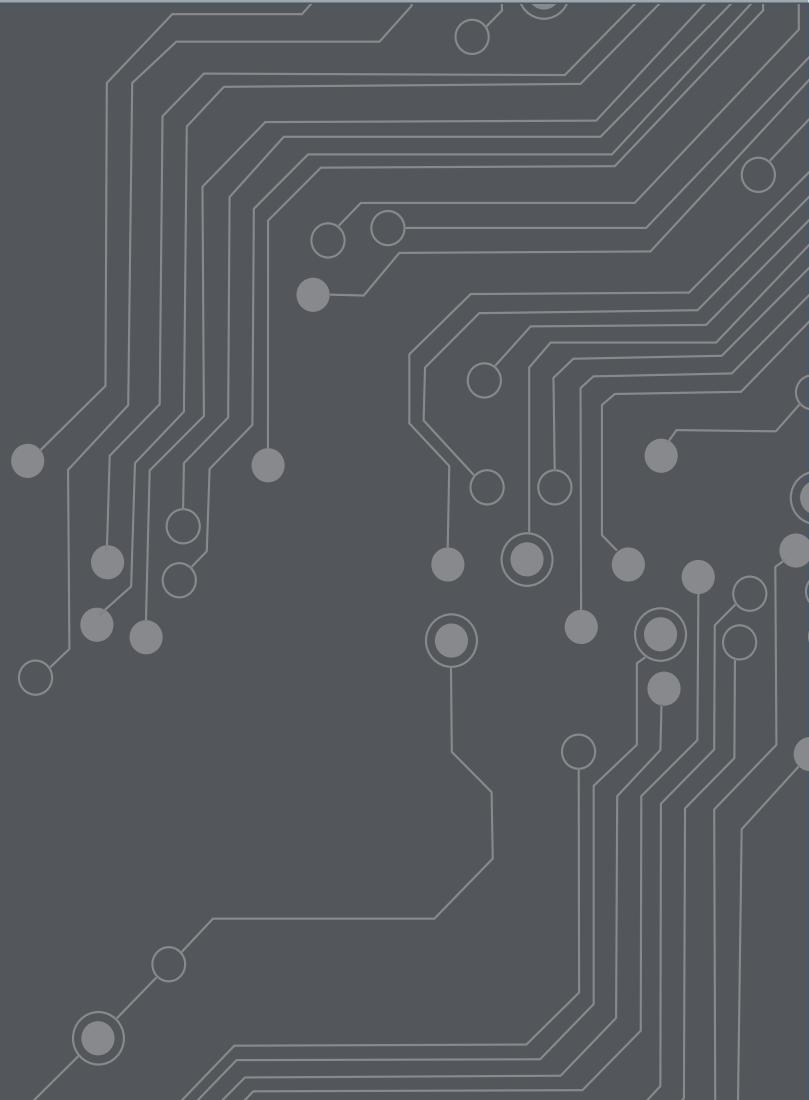


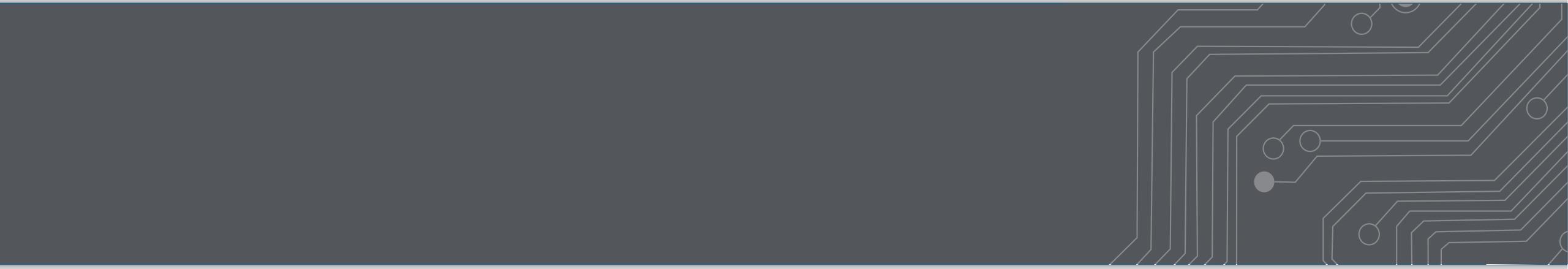


Dante Domain Manager™

Clocking

Visit Us Online:
www.audinate.com/ddm



A dark grey rectangular background at the top of the slide features a stylized white circuit board pattern on the right side. The pattern consists of several parallel vertical lines with various horizontal connections and small circular pads.

Introduction

Questions?

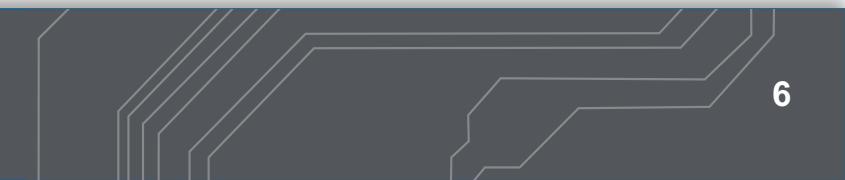
- Please ask any questions via the Q&A function
- We will try to get to as many relevant questions as possible
- There will be a short Q&A after each section and a longer Q&A at the end of the presentation

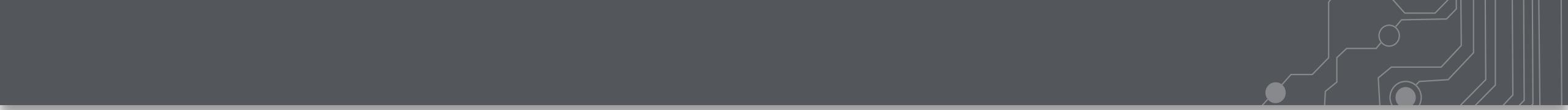




Post this webinar you will receive an email containing:

- PDF version of the presentation
- Recording of the presentation available for 90 days
- Link to Q&A



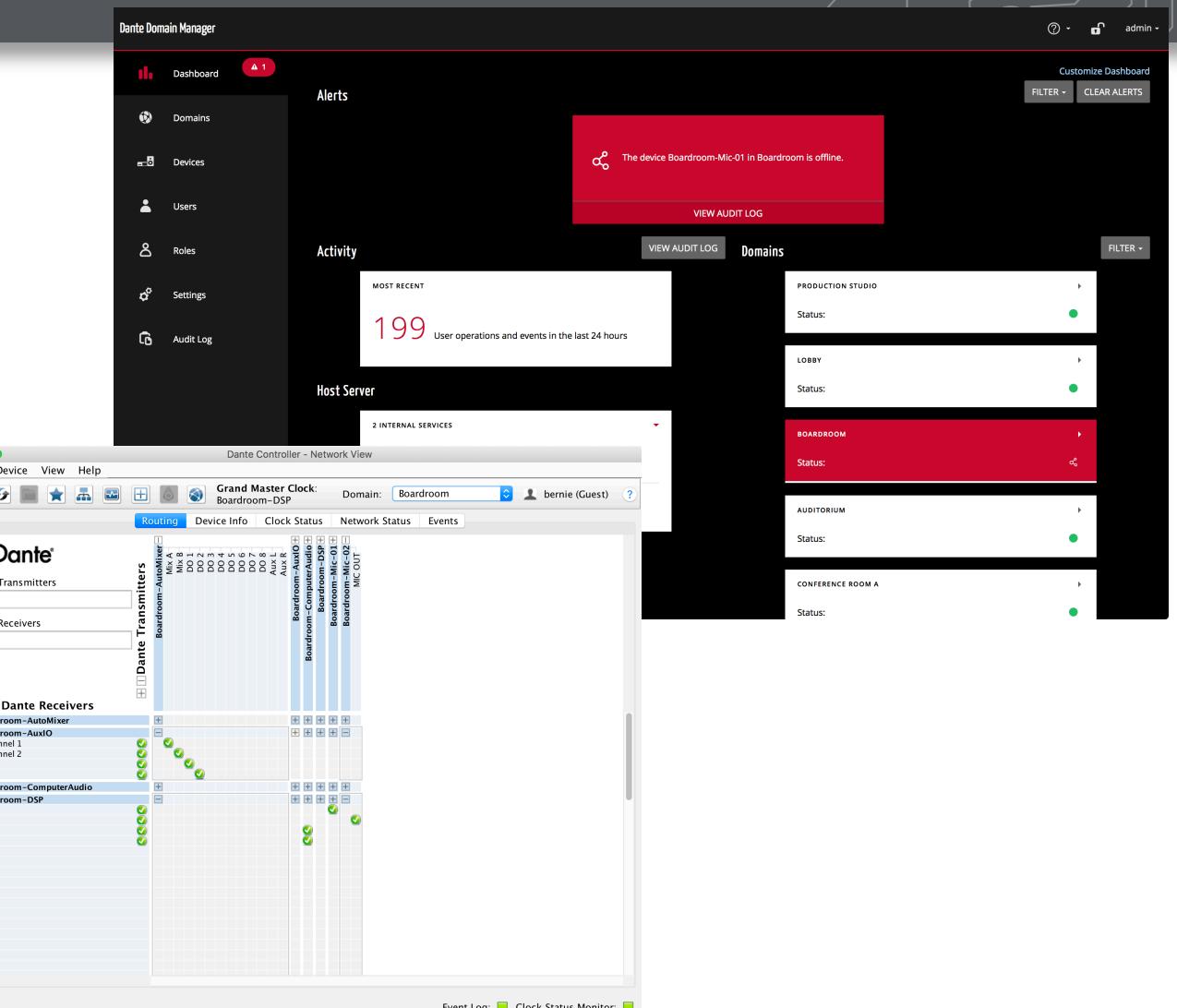


Where can I get a free trial of Dante Domain Manager?

audinate.com/contact/sales

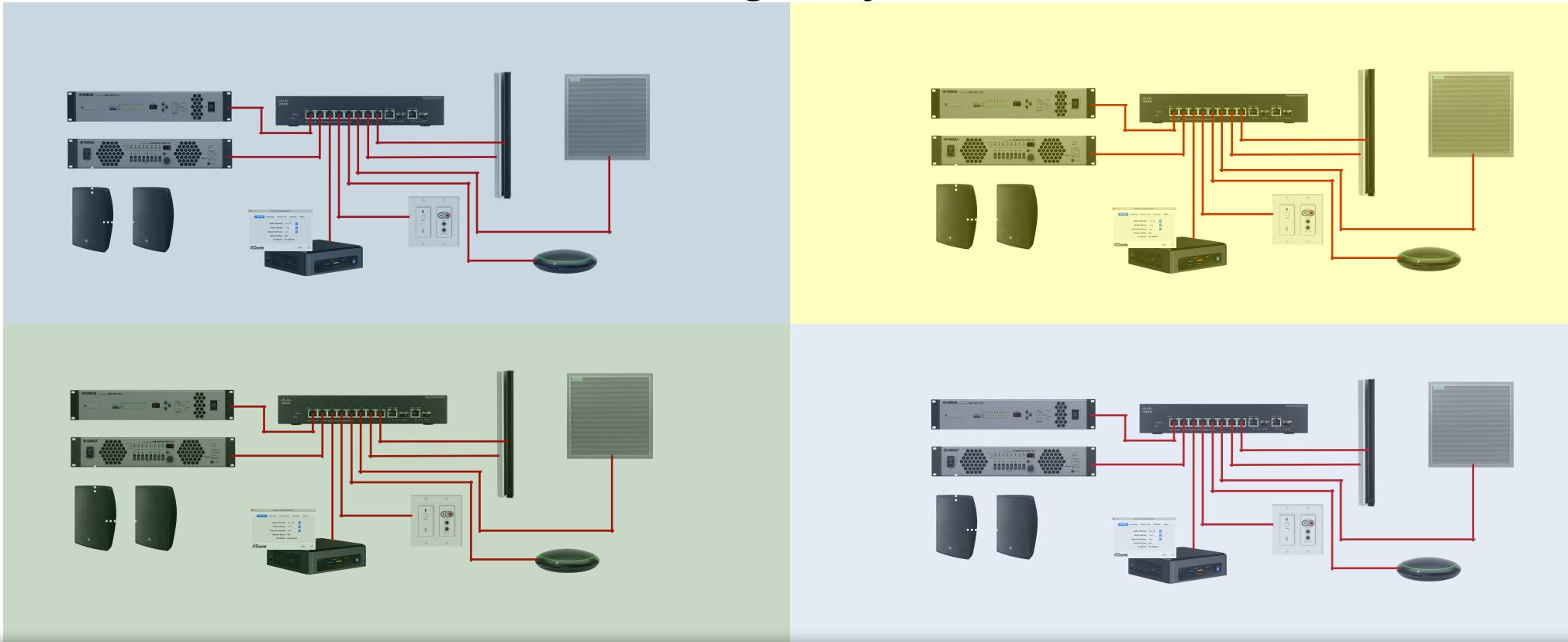
Dante Domain Manager

- Dante Domain Manager is a server application that **organizes, secures and enhances** Dante networks
- Affects control only - **does not pass audio**



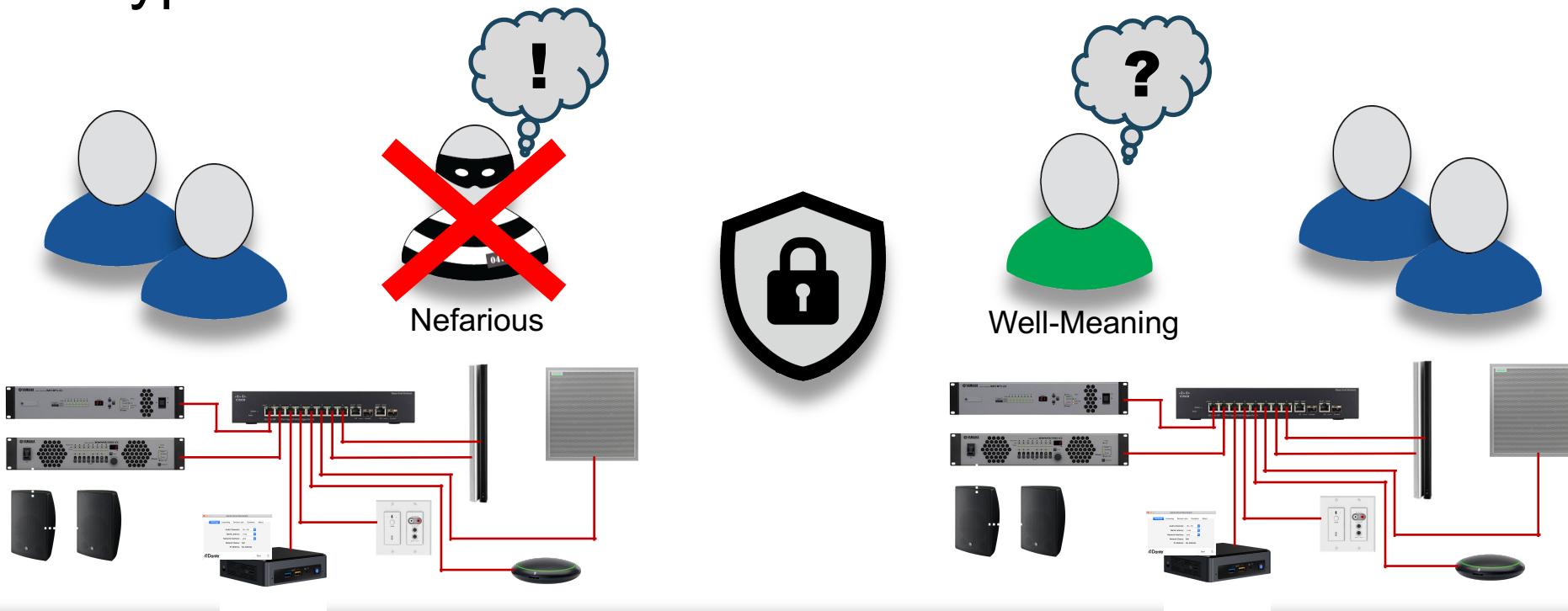
Do More With Dante Domain Manager

- **ORGANIZE:** Define domains (zones) of Dante devices
 - Correlate to rooms, buildings, systems etc.



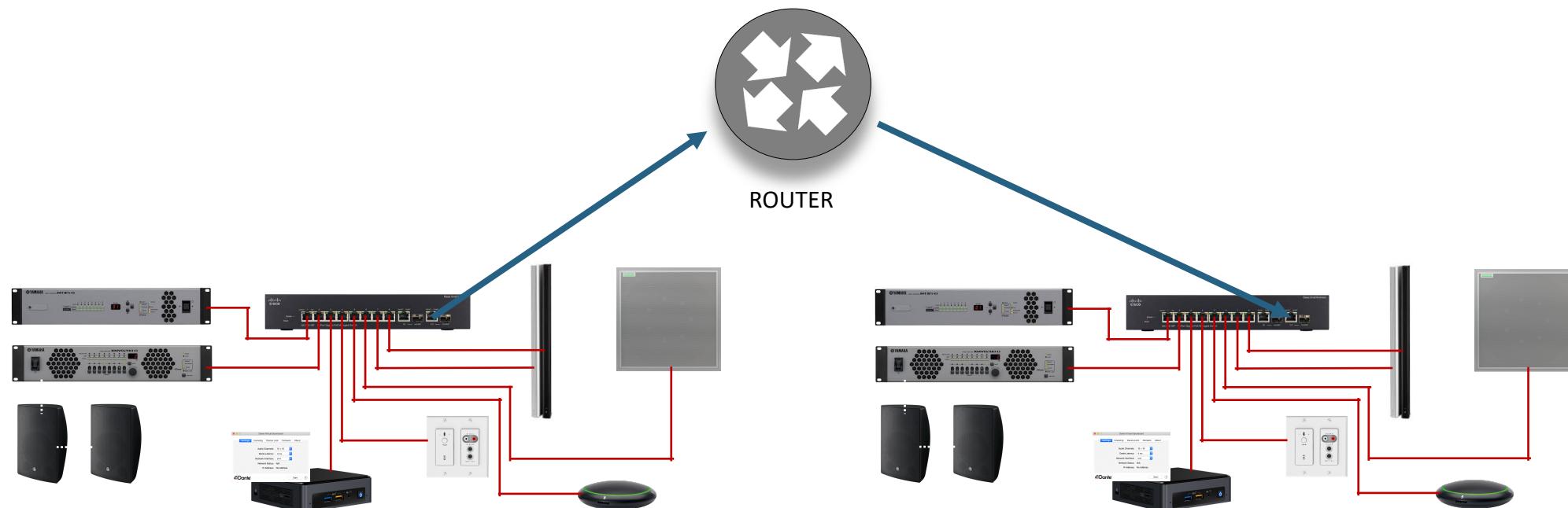
Do More With Dante Domain Manager

- **SECURE:** Control user access to each domain
 - Integrate with existing directory system
 - Encrypt control traffic



Do More With Dante Domain Manager

- **EXPAND:** Dante networks beyond single LAN operation
 - De-complicate installations that cross multiple rooms, floors or buildings



Do More With Dante Domain Manager

- **MONITOR:** Alerts and notifications about AV system health

The screenshot displays the Dante Domain Manager (DDM) web interface. The top navigation bar includes the DDM logo, a user icon, and the text "admin". The main content area is divided into several sections:

- Alerts:** A red box displays a critical alert: "The device Boardroom-Mic-01 in Boardroom is offline." with a "VIEW AUDIT LOG" button.
- Activity:** Shows "199" user operations and events in the last 24 hours, with a "VIEW AUDIT LOG" button.
- Host Server:** Lists "2 INTERNAL SERVICES": "Device Manager Service" (Manages connection to Dante devices) and "Dante Discovery Service" (Manages discovery of the DDM by unenrolled devices).
- Domains:** A list of domains with their status: PRODUCTION STUDIO (green), LOBBY (green), BOARDROOM (red, indicating an issue), AUDITORIUM (green), and CONFERENCE ROOM A (green).

At the bottom left, it says "Dante Domain Manager v1.0".

Do More With Dante Domain Manager

- **LOG:** Keep track of everything that happens with your Dante system

Dante Domain Manager

Audit Log

Search event details... Whole words only Match Case

CUSTOMIZE COLUMNS

Domain Name IS BOARDROOM REMOVE

SHOW 25 ENTRIES

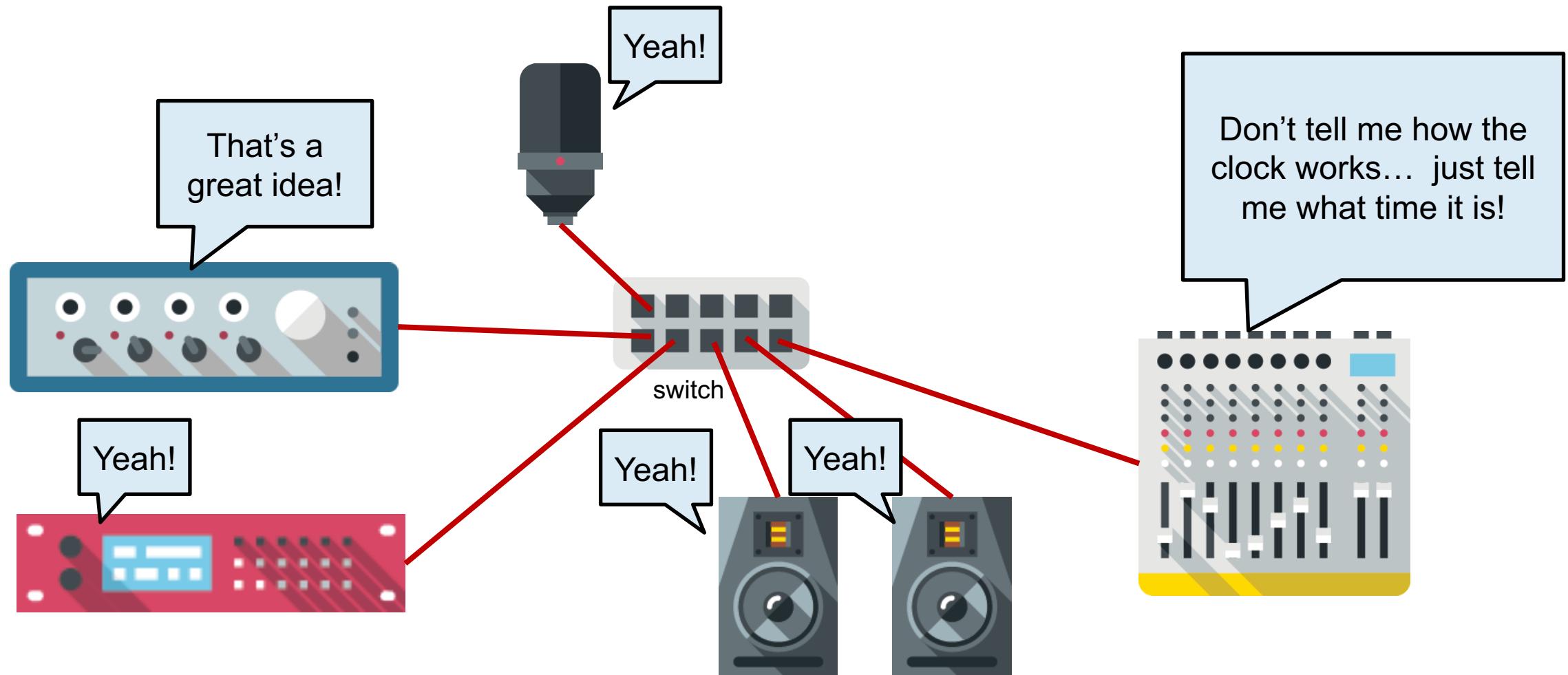
Showing 1 to 25 of 453 entries (filtered from 6,131 total entries)

TIMESTAMP	DOMAIN	DETAILS	SOURCE	SEVERITY	TYPE
Thu, Dec 20, 2018 2:28 PM	Boardroom	Configured device clocking - isPreferredMaster:1	admin	Info	User Action
Thu, Dec 20, 2018 2:22 PM	Boardroom	Subscriptions for device Boardroom-DSP restored	Boardroom-DSP	Info	Device Event
Thu, Dec 20, 2018 2:22 PM	Boardroom	Error in subscriptions for device Boardroom-DSP	Boardroom-DSP	Error	Device Event
Thu, Dec 20, 2018 2:21 PM	Boardroom	Device Boardroom-Mic-01 enrolled in Boardroom came back online	Boardroom-Mic-01	Info	Device Event
Thu, Dec 20, 2018 2:16 PM	Boardroom	Device Boardroom-Mic-01 enrolled in Boardroom went offline	Boardroom-Mic-01	Warn	Device Event
Thu, Dec 20, 2018 2:05 PM	Boardroom	Subscriptions for device Boardroom-DSP restored	Boardroom-DSP	Info	Device Event
Thu, Dec 20, 2018 2:05 PM	Boardroom	Subscriptions for device Boardroom-Speaker-R restored	Boardroom-Speaker-R	Info	Device Event
Thu, Dec 20, 2018 2:05 PM	Boardroom	Subscriptions for device Boardroom-Speaker-L restored	Boardroom-Speaker-L	Info	Device Event
Thu, Dec 20, 2018 2:05 PM	Boardroom	Error in subscriptions for device Boardroom-DSP	Boardroom-DSP	Warn	Device Event
Thu, Dec 20, 2018 2:05 PM	Boardroom	Subscriptions for device Boardroom-AuxIO restored	Boardroom-AuxIO	Info	Device Event

Dante Domain Manager v1.0

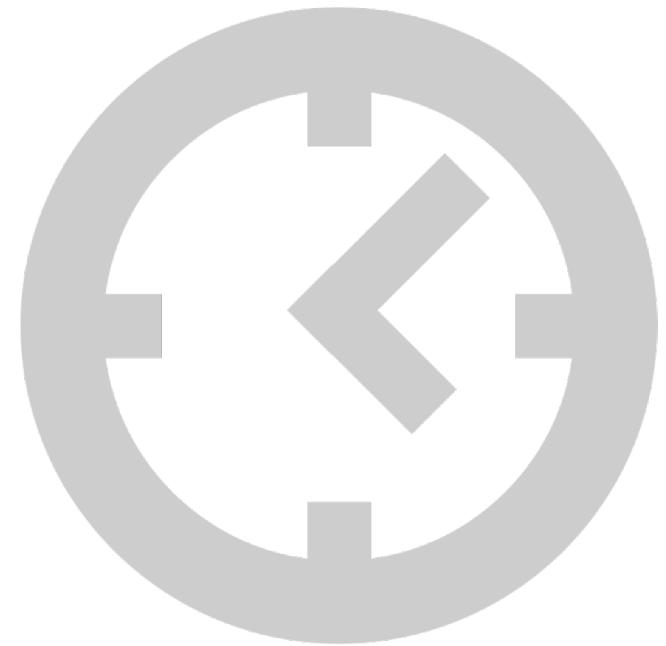
Review How Dante Does Clocking

Network Synchronization

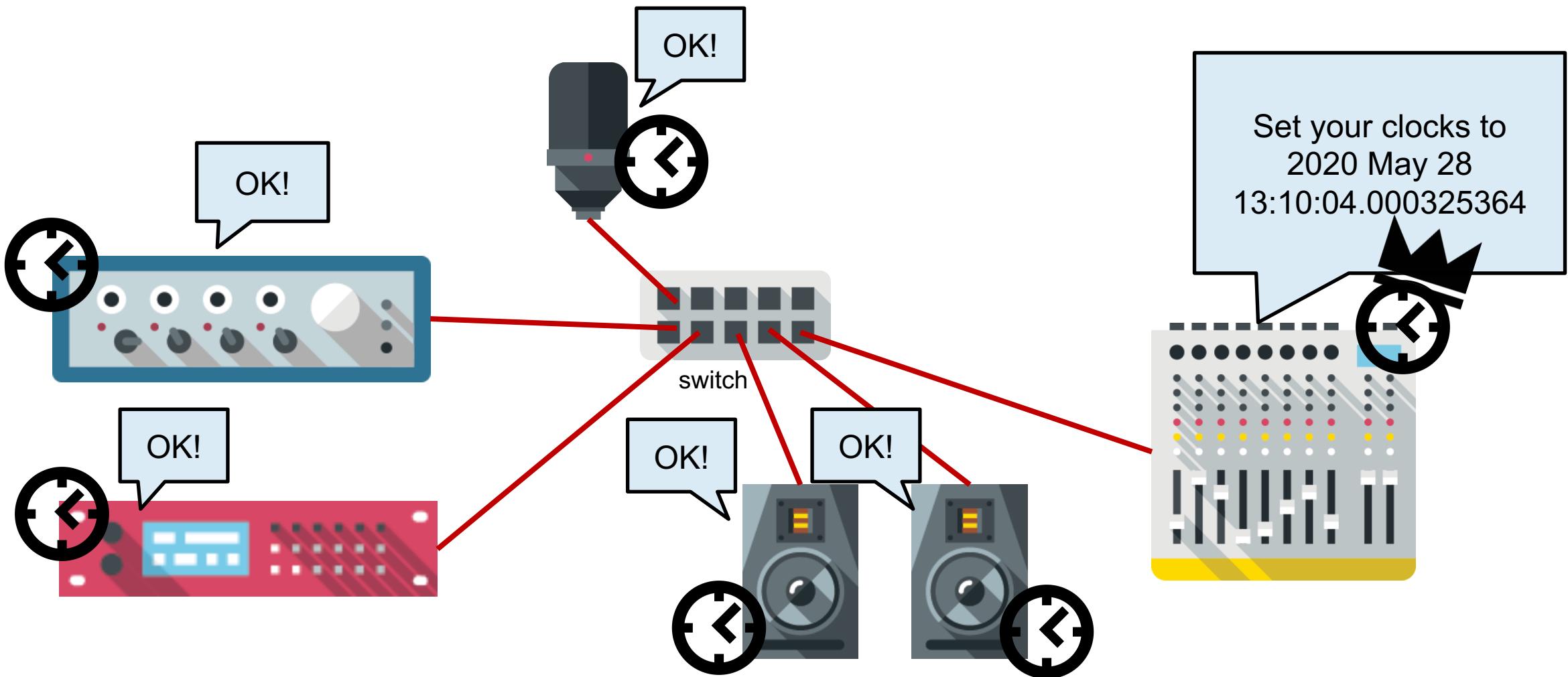


Dante Clocking

- Dante use PTP (IEEE 1588) for clocking
 - Resolution in nanoseconds
- One device gets elected as a Master clock
- Every device has a clock
- All devices get sync'd to Master

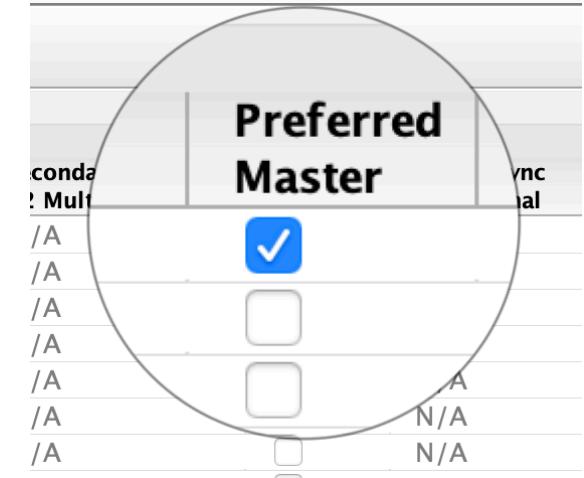


Network Synchronization



PTP Election Process

- Priority – User defined



PTP V2 PRIORITY 1

128

PTP V2 PRIORITY 2

128

PTP Election Process

- **Priority** – User defined
- **Quality** – most accurate



vs.



PTP Election Process

- **Priority** – User defined

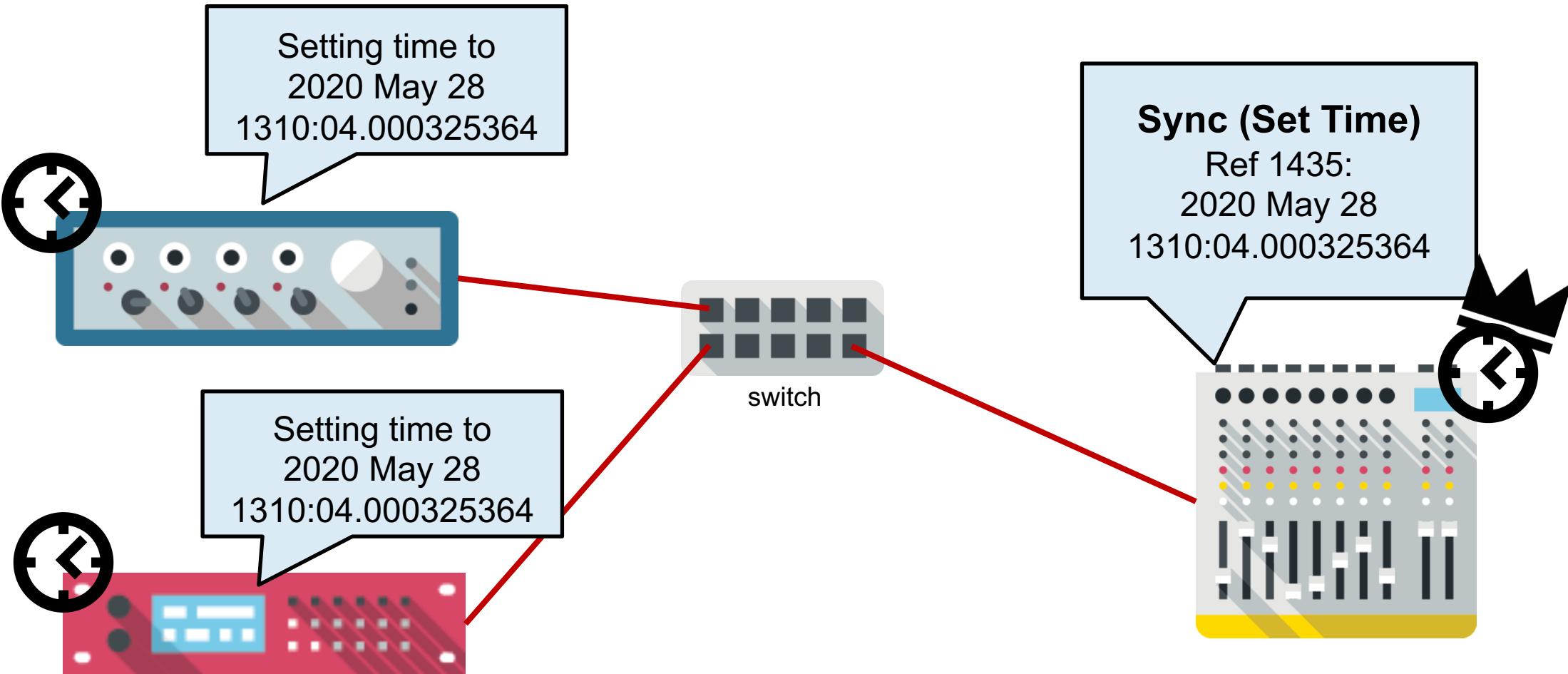
- **Quality** – most accurate

00:1D:C1:50:01:99

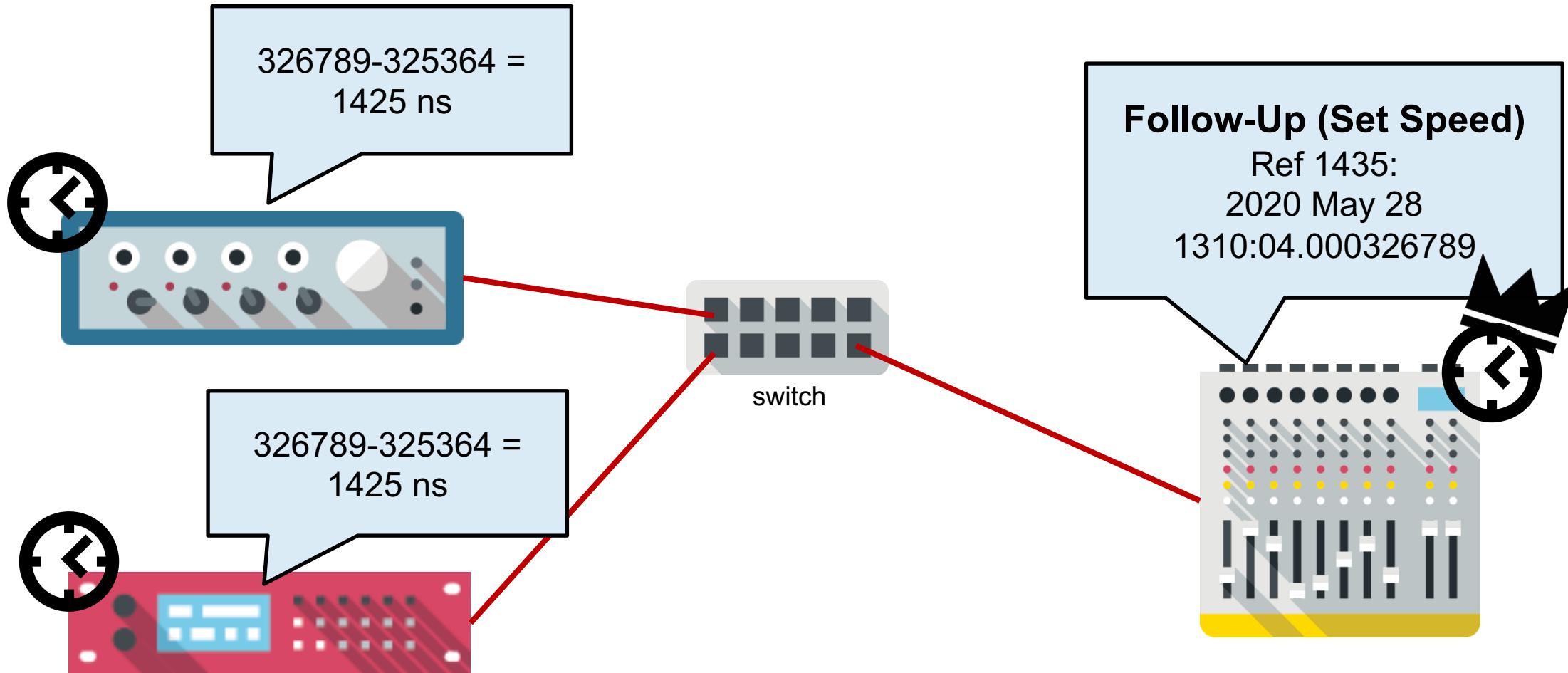
- **Unique Identifier** – MAC address

00:1D:C1:50:19:6F

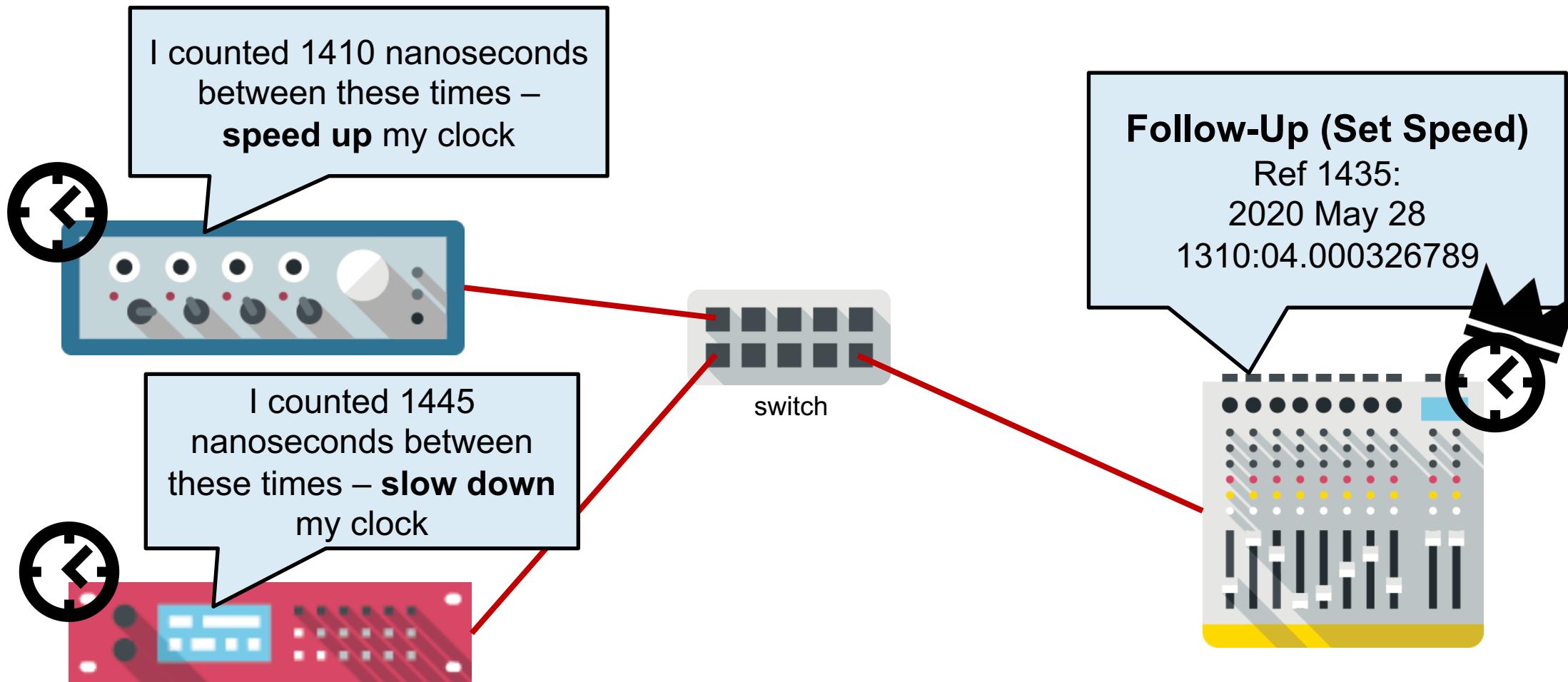
PTP: Sync (Time) and Follow-ups (Speed)



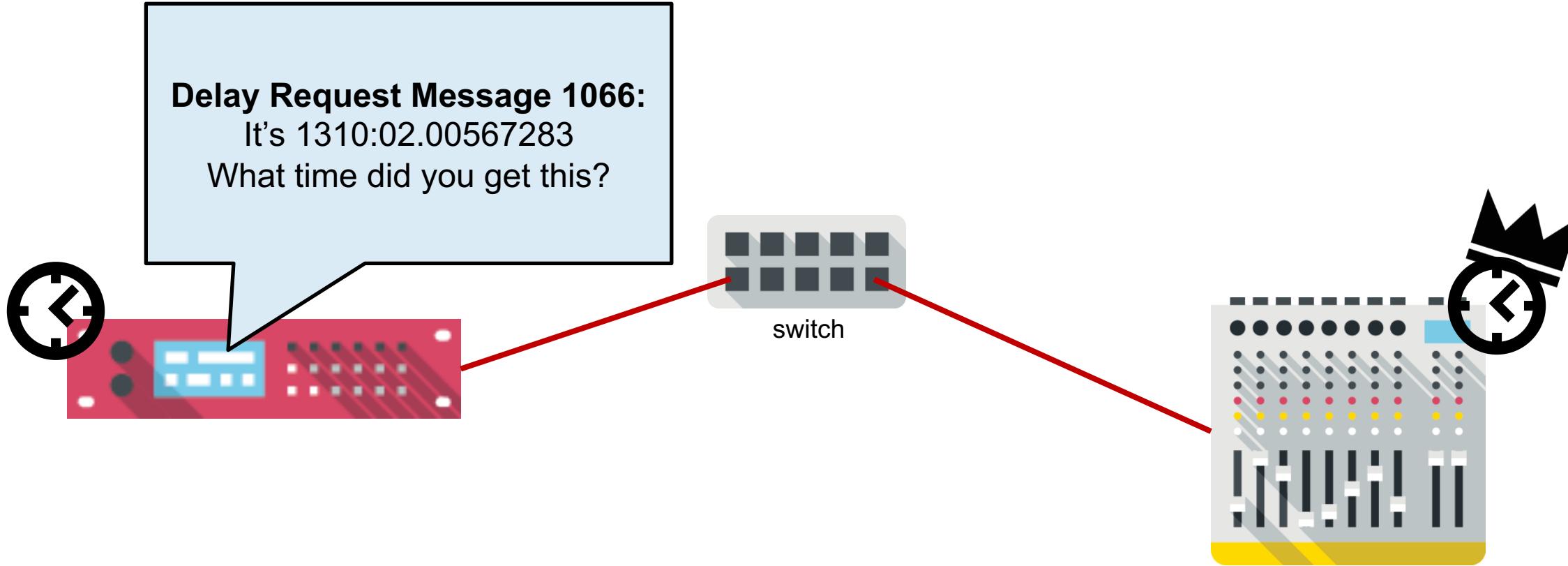
PTP: Sync (Time) and Follow-ups (Speed)



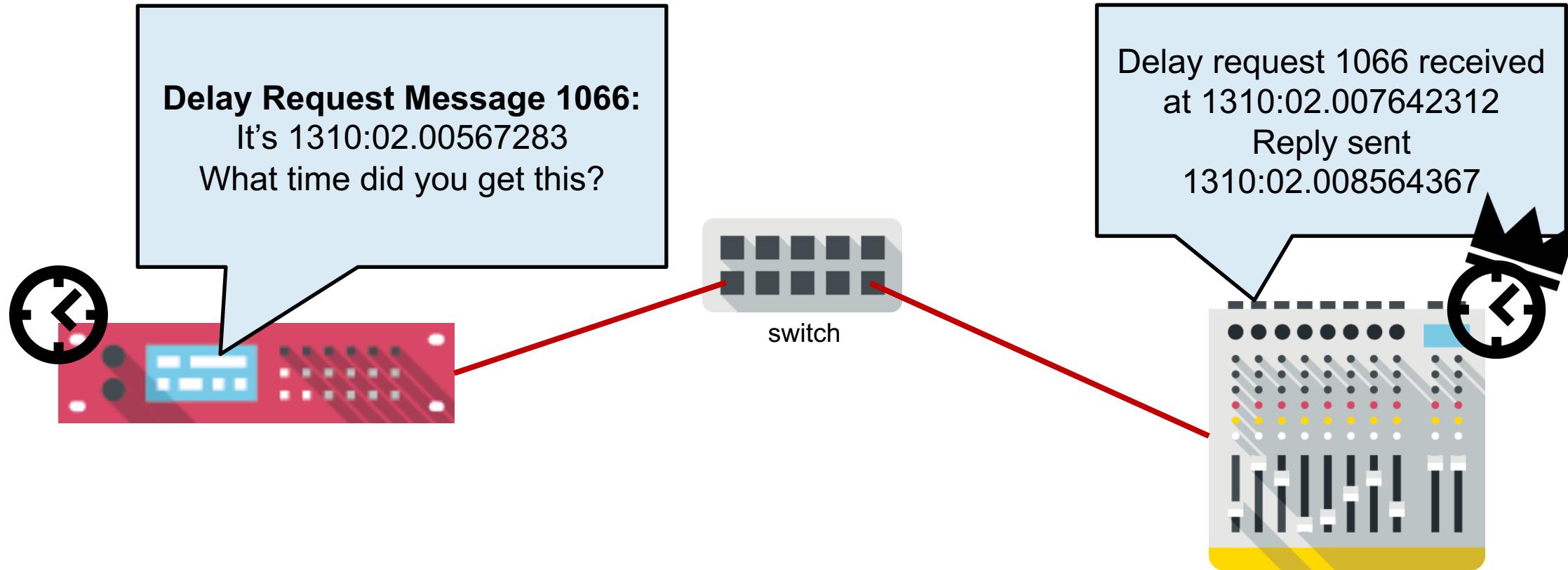
PTP: Sync (Time) and Follow-ups (Speed)



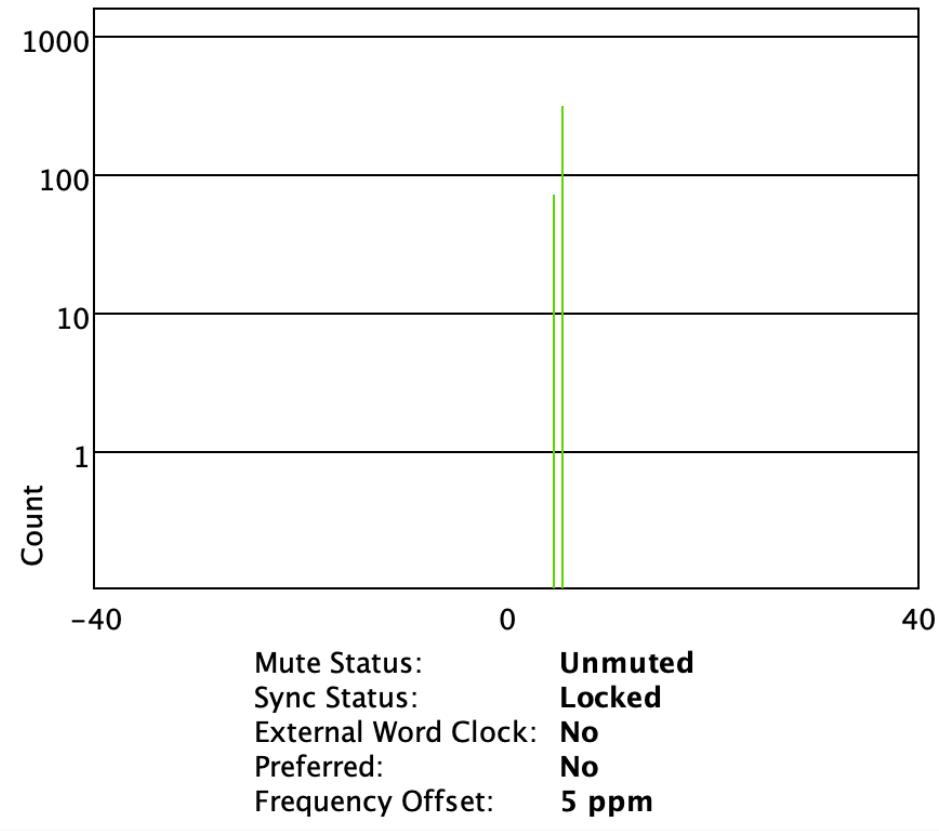
PTP Delay Requests (Propagation Delay)



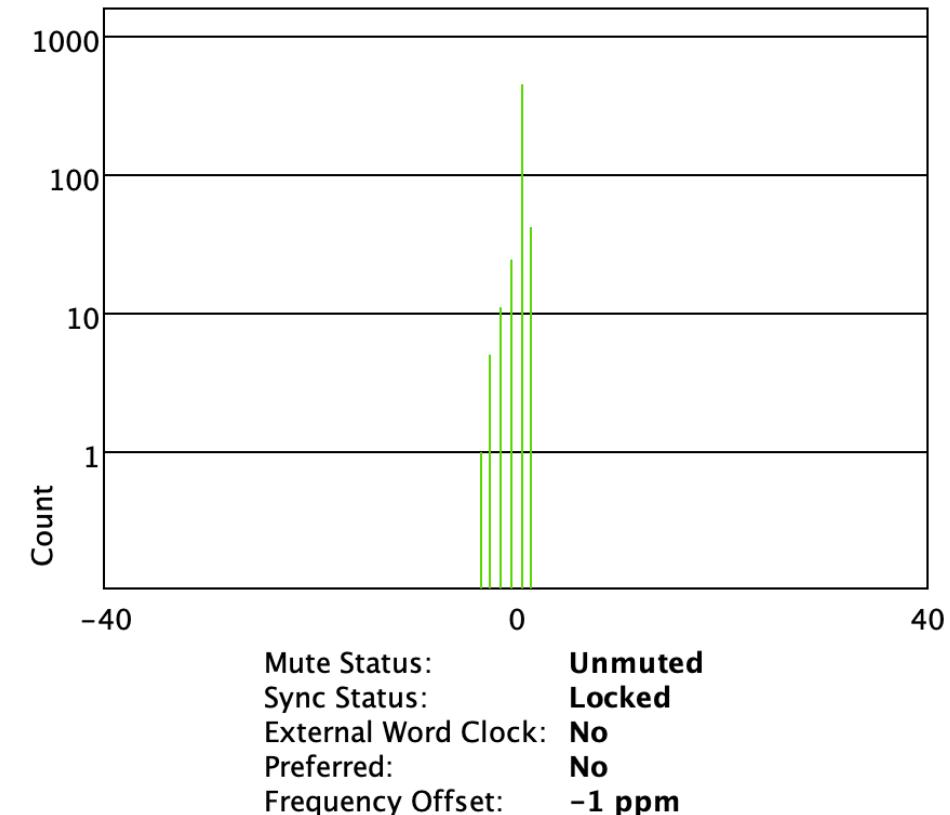
PTP Delay Requests (Propagation Delay)



Dante Controller Clock Histogram View - Good

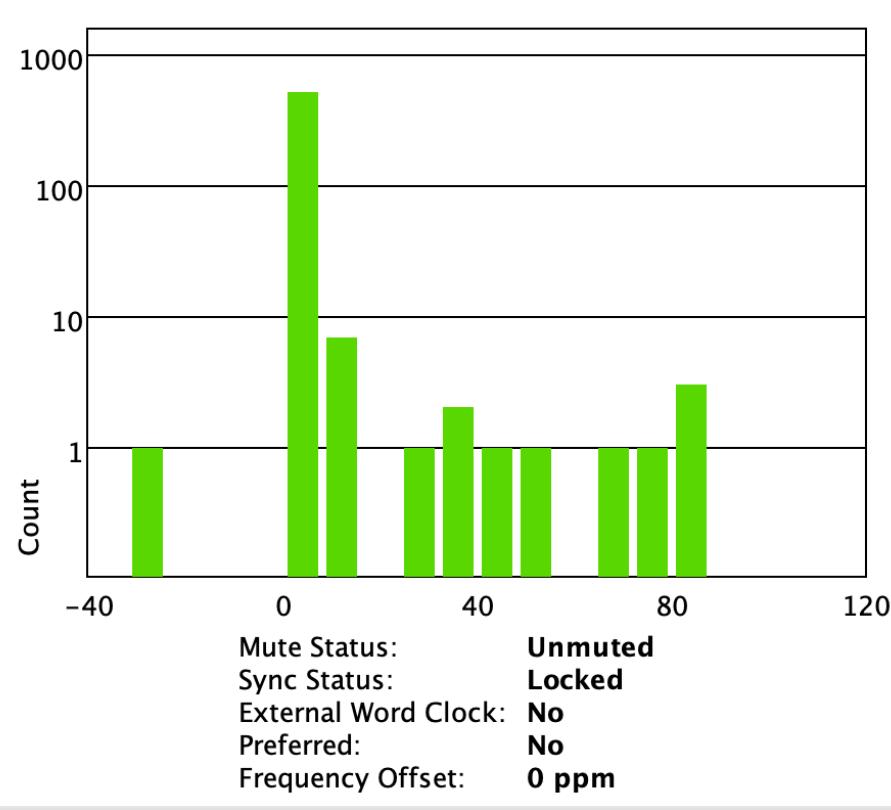


Great!

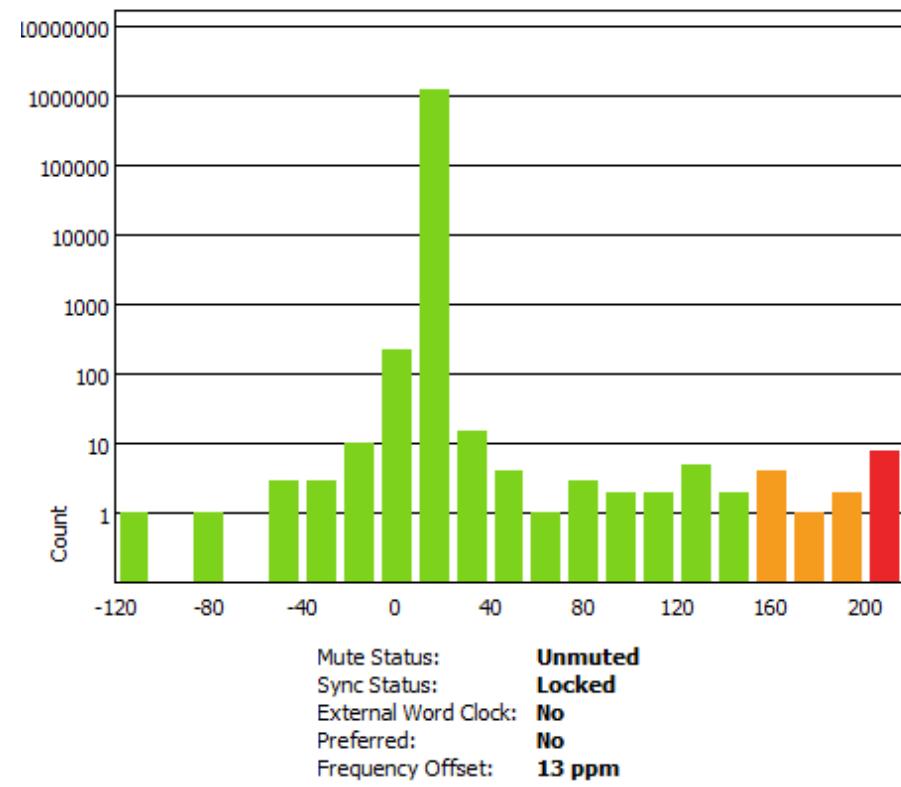


Fine

Dante Controller Clock Histogram View - Bad

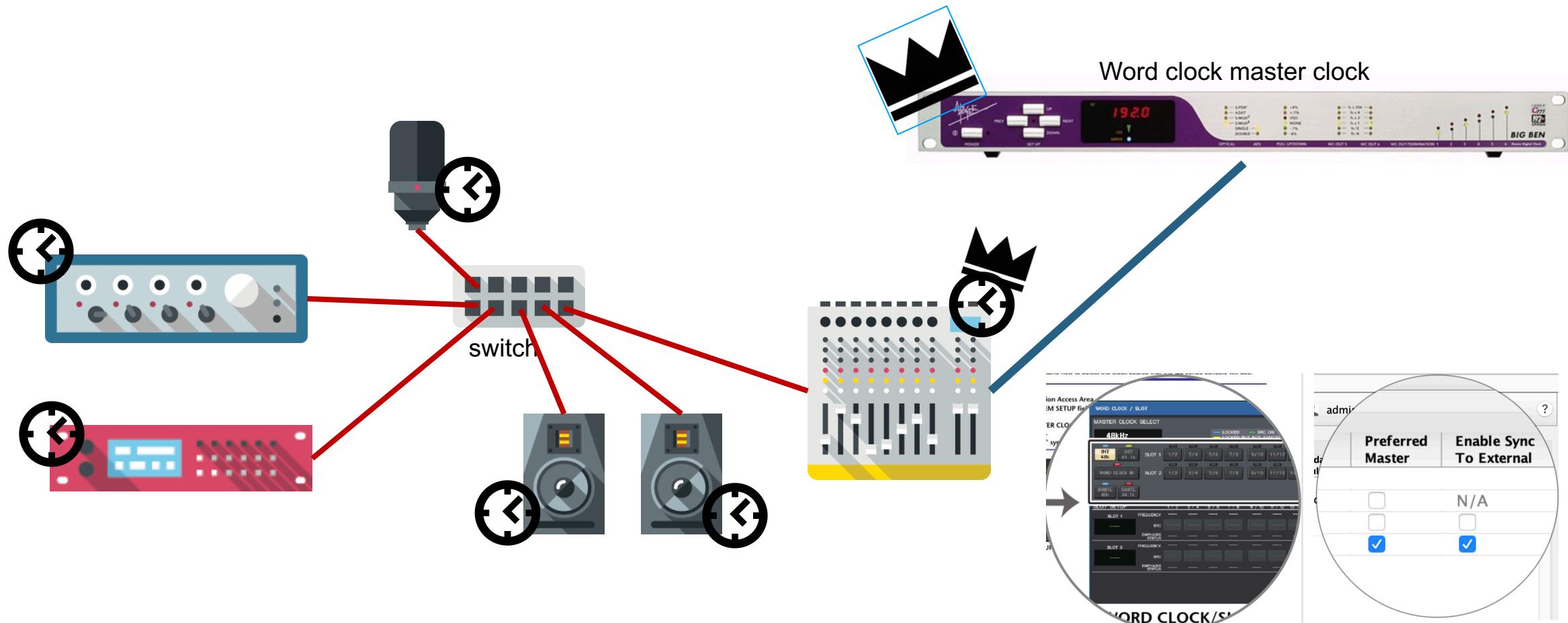


Interruptions in Audio Likely

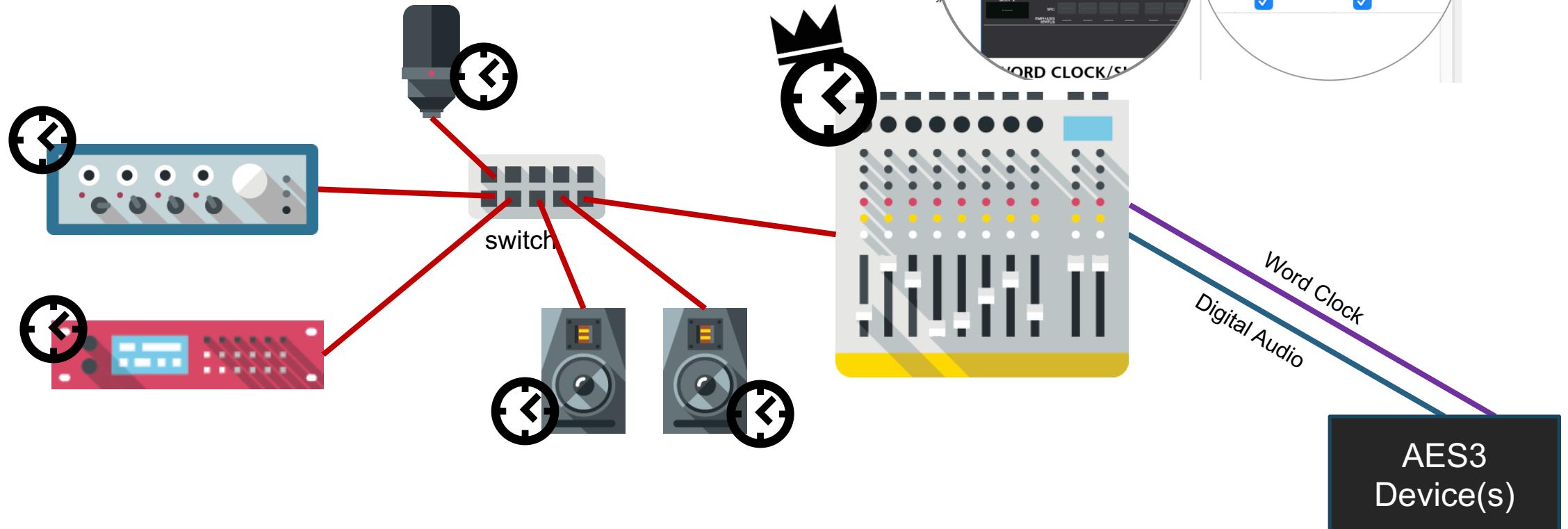


Oh no...

Syncing to External Word Clocks



Syncing to “External” Word Clocks



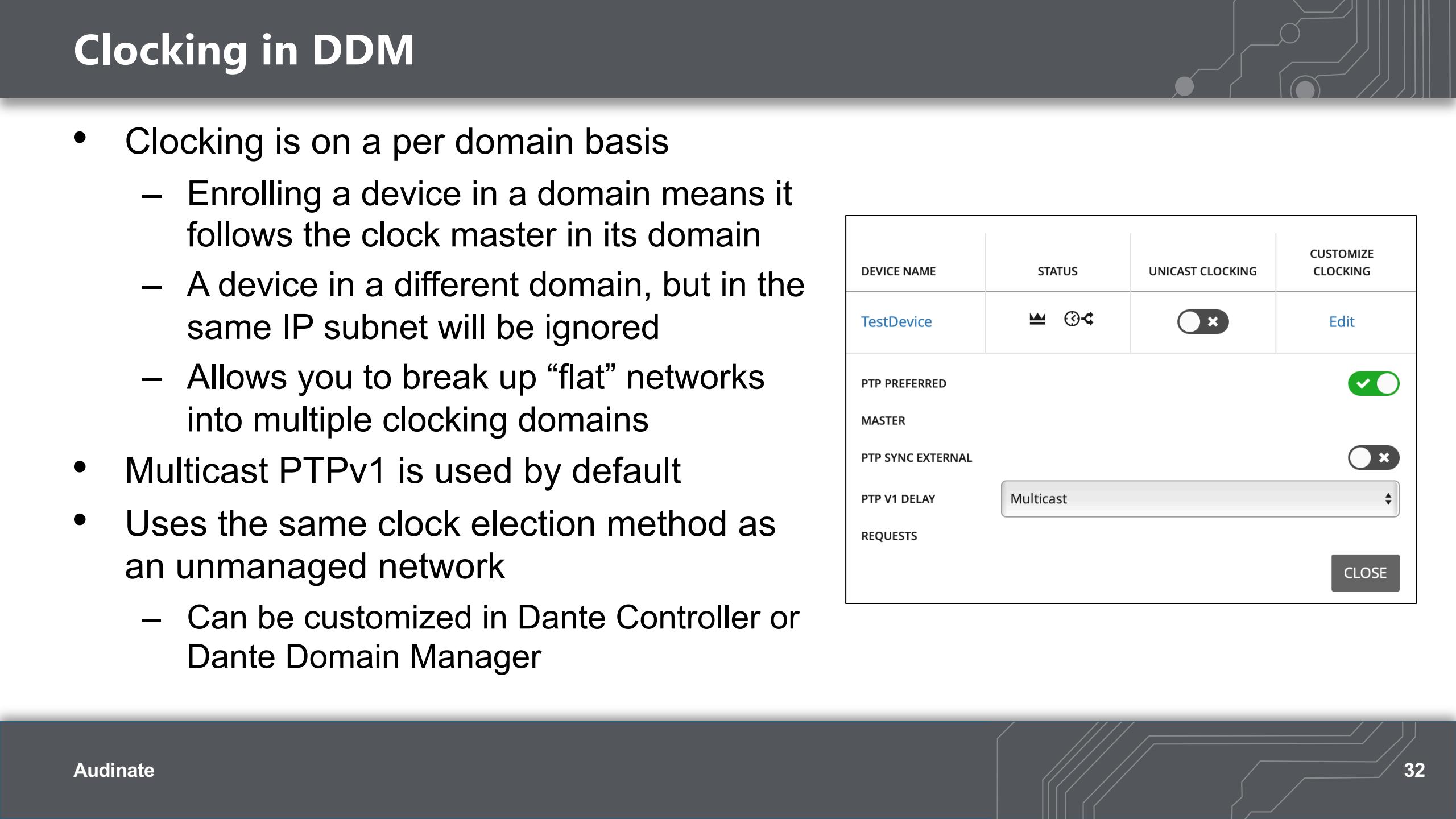
PTP v1 and PTP v2

- IEEE 1588-2002—PTP v.1
- IEEE 1588-2008—PTP v.2
 - Dante uses both!
- What does PTP v2 “Not Backward Compatible” really mean?
 - Synchronization between PTP v1 and v2 is accomplished using boundary clocks
- Is PTP v.2 more accurate?
 - Accuracy of $< 1 \mu\text{s}$ attainable by both versions.
- PTP v.2 additional features include: unicast messaging, additional sync message rates, transparent clock.

Dante Domain Manager Default Dante Clocking

Clocking in DDM

- Clocking is on a per domain basis
 - Enrolling a device in a domain means it follows the clock master in its domain
 - A device in a different domain, but in the same IP subnet will be ignored
 - Allows you to break up “flat” networks into multiple clocking domains
- Multicast PTPv1 is used by default
- Uses the same clock election method as an unmanaged network
 - Can be customized in Dante Controller or Dante Domain Manager

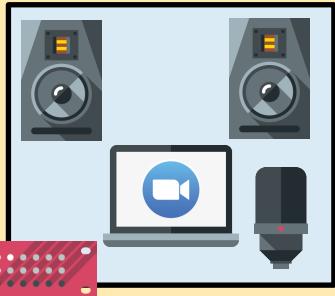


DEVICE NAME	STATUS	UNICAST CLOCKING	CUSTOMIZE CLOCKING
TestDevice	■ 	<input checked="" type="checkbox"/>	Edit
PTP PREFERRED			
MASTER			
PTP SYNC EXTERNAL			
PTP V1 DELAY			
REQUESTS			
<input type="button" value="Multicast"/>			
<input type="button" value="CLOSE"/>			

Single Subnet Domains



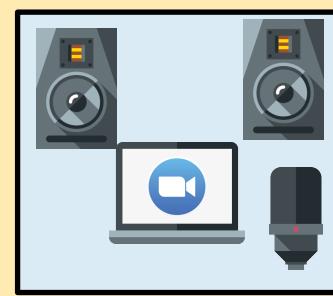
North Meeting Rooms



10



11

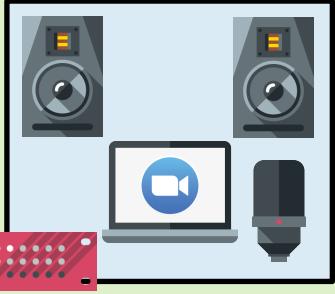


12



13

South Meeting Rooms



20



21



22



23

Atrium



Single Subnet Domains – Slide with DDM/Controller Views

Dante Controller - Network View

File Device View Help

Grand Master Clock: DSP Domain: Background Music admin (Site Administrator)

Routing Device Info Clock Status Network Status Events

Device Name	Sync	Mute	Clock Source	Domain Status	Primary v1 Multicast	Primary v2 Multicast	Secondary v1 Multicast	Secondary v2 Multicast	Prefe Mast	Enable Sync To External
192.168.2.0/24										
AVIOAES3-501b05	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	Dante	Disabled	Slave	N/A	N/A	N/A	<input type="checkbox"/>	N/A
Computer	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	Dante	Disabled	Slave	N/A	N/A	N/A	<input type="checkbox"/>	N/A
DemoSpeaker	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	Dante	Disabled	Slave	N/A	N/A	N/A	<input type="checkbox"/>	N/A
DSP	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	Dante	Disabled	Master	Disabled	N/A	N/A	<input type="checkbox"/>	N/A
InputAdapter	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	Dante	Disabled	Slave	N/A	N/A	N/A	<input type="checkbox"/>	N/A
PresenterMic	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	Dante	Disabled	Slave	N/A	N/A	N/A	<input type="checkbox"/>	N/A
Zone2Amp	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	Dante	Disabled	Slave	N/A	N/A	N/A	<input type="checkbox"/>	N/A

Background Music

Settings ADVANCED SETTINGS

CLOCKING TYPE Single-subnet AUTO-CONFIGURE

GRAND MASTER DSP

P:

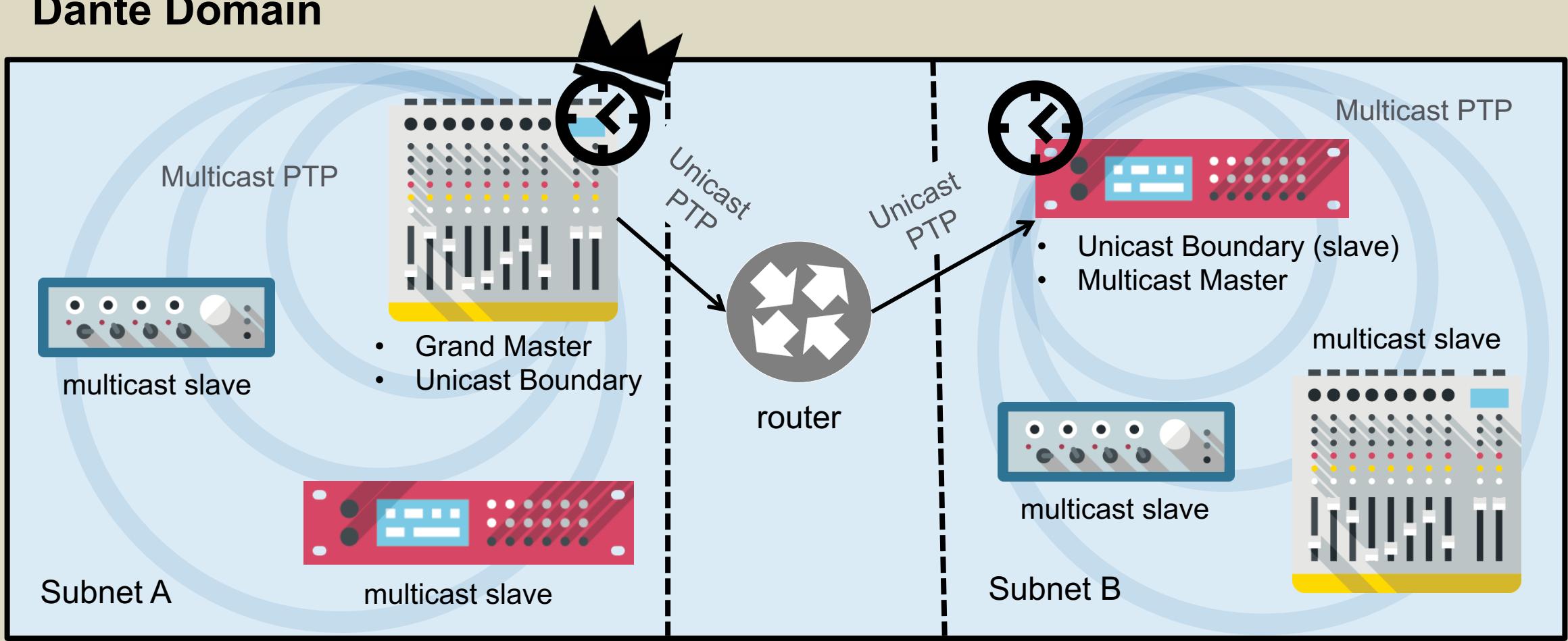
Domain Clocking

Subnet 192.168.2.0/24

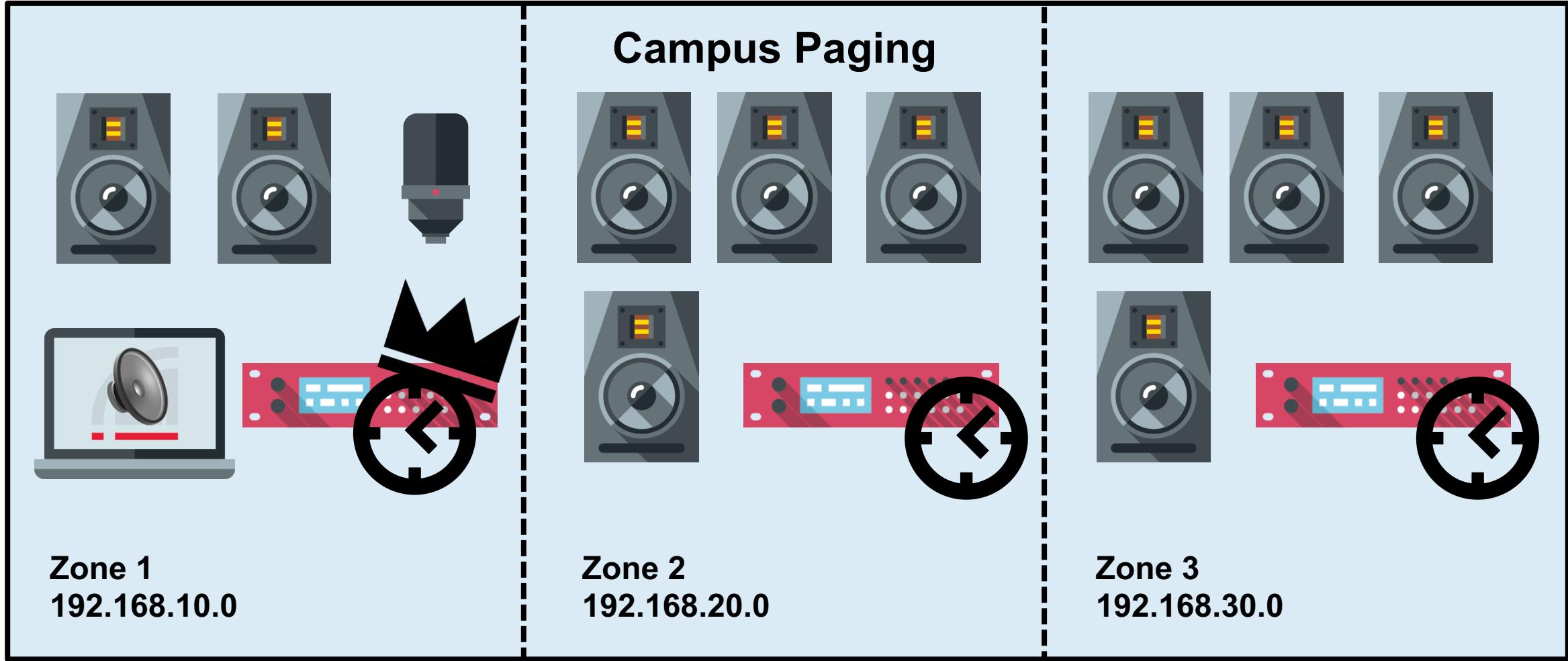
DEVICE NAME	STATUS	UNICAST CLOCKING	CUSTOMIZE CLOCKING
PresenterMic	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Customize
DemoSpeaker	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Customize
Computer	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Customize
Zone2Amp	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Customize
InputAdapter	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Customize
AVIOAES3-501b05	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Customize
DSP		<input type="checkbox"/>	Customize

Domains Spanning Multiple Subnets

Dante Domain



Domains Spanning Multiple Subnets



Domains Spanning Multiple Subnets

Dante Controller - Network View

File Device View Help

Grand Master Clock: Zone1-DSP Domain: Paging kat (Site Administrator)

Routing Device Info Clock Status Network Status Events

Device Name	Sync	Mute	Clock Source	Domain Status	Primary Status	Secondary Status
192.168.0.0/24						
Zone1-DSP			Dante	Master	Master	Link down
Zone1-Speaker-01			Dante	N/A	Slave	N/A
Zone1-Speaker-02			Dante	N/A	Slave	N/A
192.168.1.0/24						
Zone2-DSP			Dante	Slave	Master	N/A
Zone2-Speaker			Dante	Standby	Slave	N/A
192.168.5.0/24						
AnnoucementMic			Dante	N/A	Slave	N/A
PlaybackMonitor			Dante	Slave	Master	N/A
SystemPlayback			Dante	Standby	Slave	N/A
192.168.6.0/24						
Zone3-DSP			Dante	Slave	Master	N/A
Zone3-Speaker-01			Dante	Standby	Slave	N/A
Zone3-Speaker-02			Dante	Disabled	Slave	N/A

P:

Unmanaged Multicast Bandwidth: 0 bps

Dante Domain Manager v1.0 ADD DOMAIN DELETE DOMAIN

Dante Domain Manager

Dashboard Search

Domains

- Auditorium
- Boardroom
- Conference Room A
- Conference Room B
- Conference Room C
- Huddle Room
- Lobby

Devices

Subnet 192.168.0.0/24

DEVICE NAME	ENROLL STATE	CONNECTIVITY
Zone1-Speaker-01	Enrolled	
Zone1-Speaker-02	Enrolled	
Zone1-DSP	Enrolled	

Subnet 192.168.6.0/24

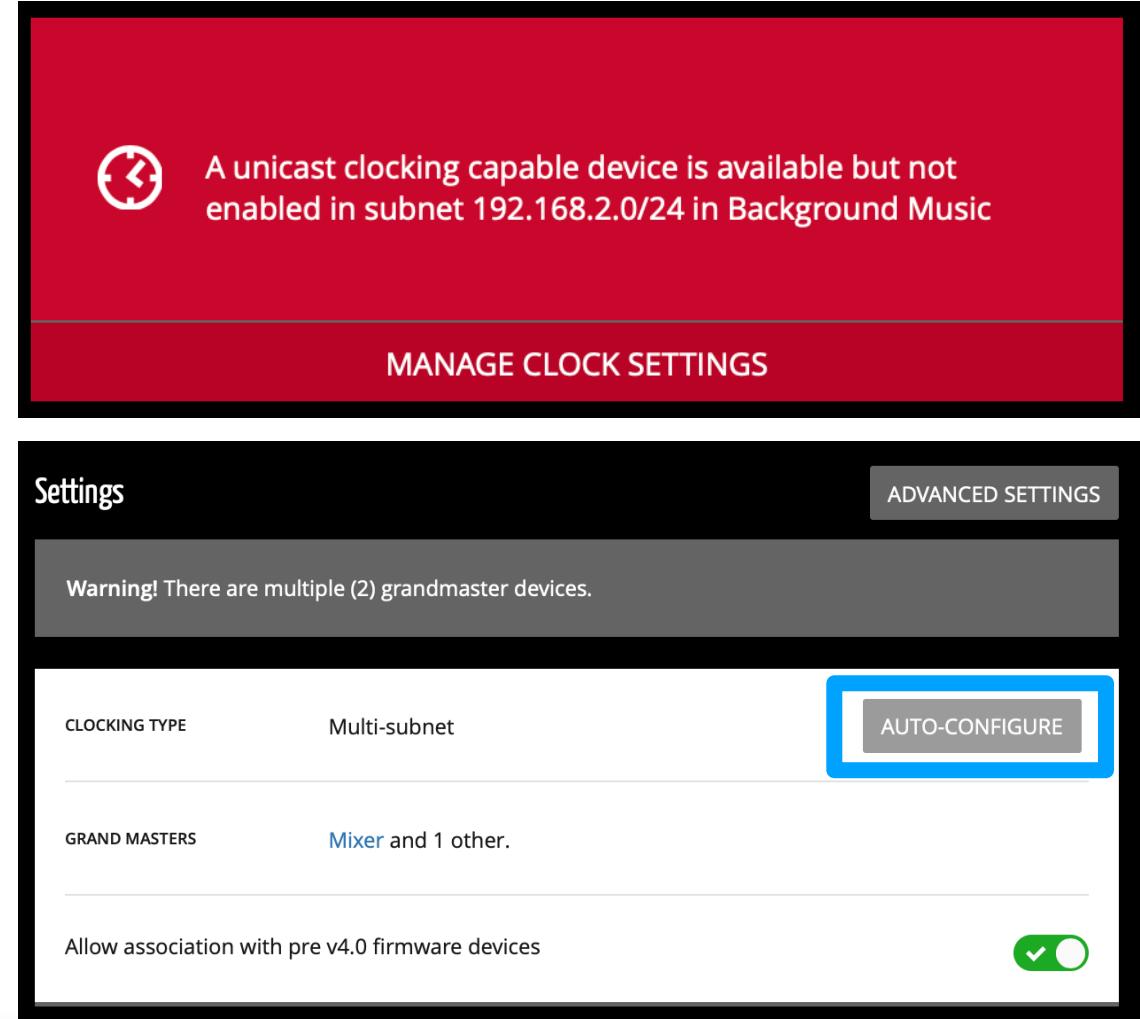
DEVICE NAME	ENROLL STATE	CONNECTIVITY
Zone3-Speaker-01	Enrolled	
Zone3-Speaker-02	Enrolled	
Zone3-DSP	Enrolled	

Subnet 192.168.5.0/24

DEVICE NAME	ENROLL STATE	CONNECTIVITY
SystemPlayback	Enrolled	
PlaybackMonitor	Enrolled	
AnnoucementMic	Enrolled	

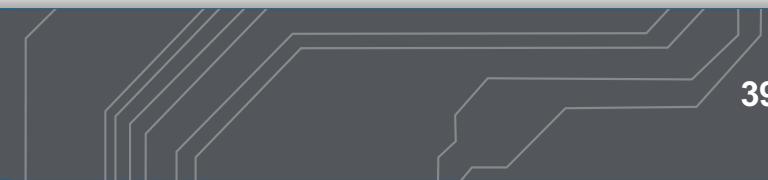
Auto Configure Clocking

- **When You Enroll a Device From a Different Subnet into a Domain:**
 - The DDM server will alert you clocking needs to be configured.
 - Navigate to the **Domain** page to adjust clocking.
 - You can click **Auto-Configure** to have DDM setup the clocking automatically
 - You can manually configure the clocking in **Advanced Settings**



Advanced Clocking Options – Default Dante

- You can define which devices you wish to act as subnet masters (boundary clocks) on the Advanced Clocking options page by enabling unicast clocking for those specific devices.
- A backup unicast clocking device is encouraged in each subnet.



Device Clocking

Subnet 192.168.1.0/24

ASSIGN ZONE

DEVICE NAME	STATUS	UNICAST CLOCKING	CUSTOMIZE CLOCKING
Mixer	► ⓘ ⓘ◄	<input checked="" type="checkbox"/>	Customise
MusicPlayback		<input checked="" type="checkbox"/>	Customise
AnnouncementMic		<input type="checkbox"/>	Customise
Zone2Amp		<input type="checkbox"/>	Customise

Subnet 192.168.2.0/24

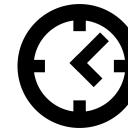
ASSIGN ZONE

DEVICE NAME	STATUS	UNICAST CLOCKING	CUSTOMIZE CLOCKING
DSP	▬ ⓘ ⓘ▬	<input checked="" type="checkbox"/>	Customise
Zone1Amp		<input checked="" type="checkbox"/>	Customise

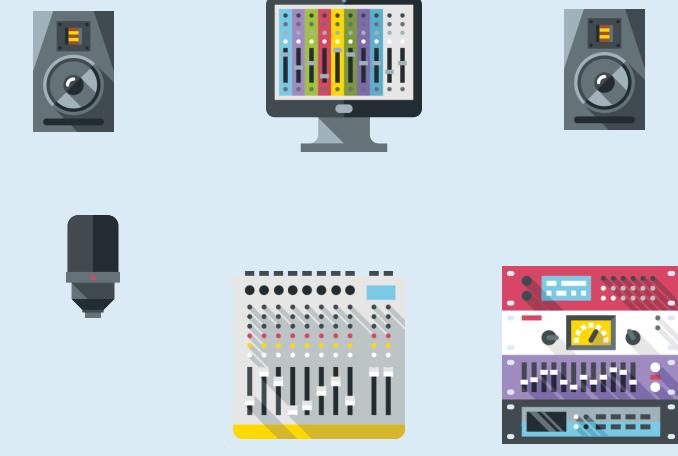
Shared Audio Groups



Shared Group



Studio



Theater



Shared Audio Groups

Dante Controller - Network View

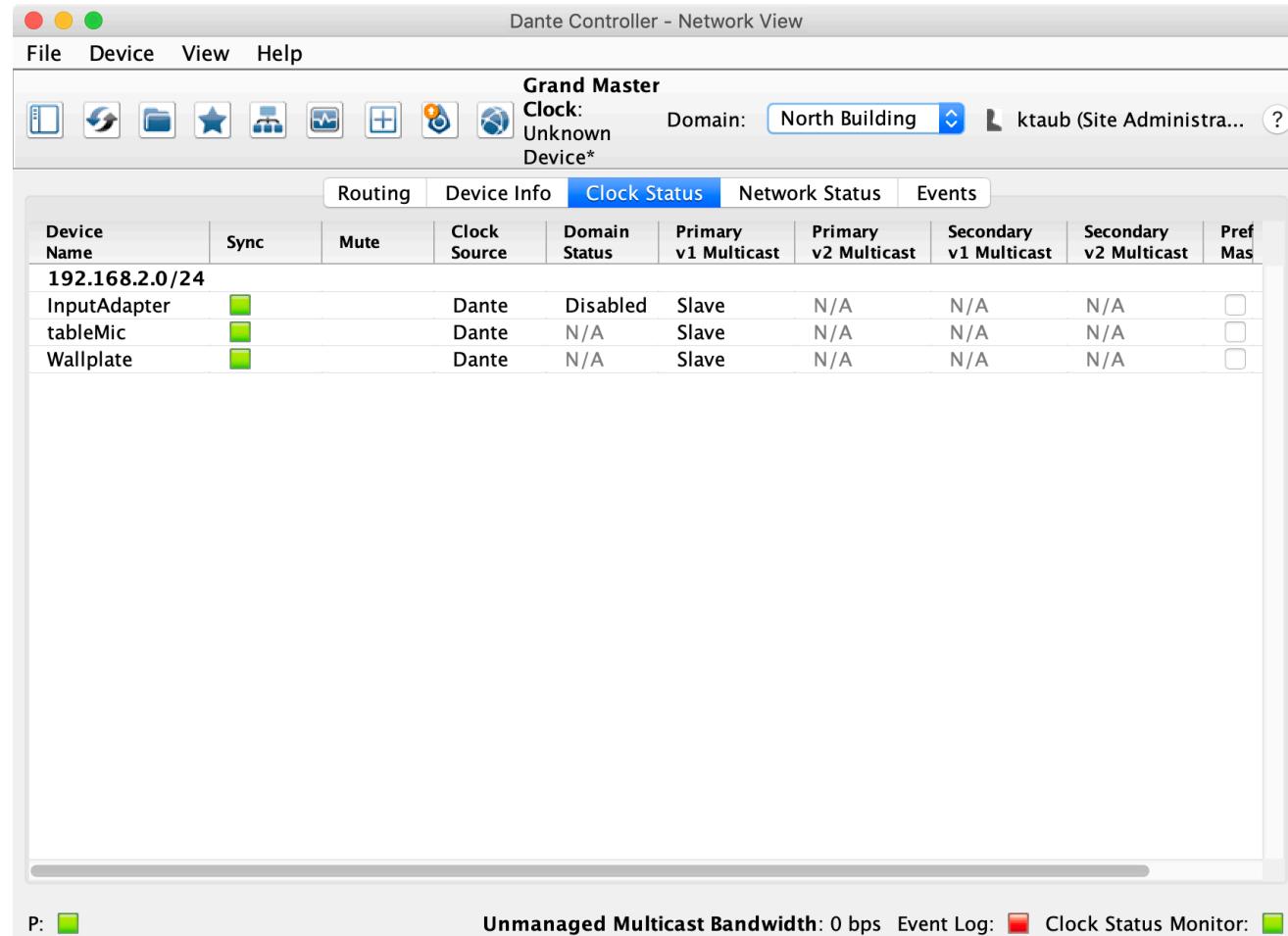
File Device View Help

Grand Master
Clock: Unknown Device* Domain: North Building ktaub (Site Administra... ?)

Routing Device Info Clock Status Network Status Events

Device Name	Sync	Mute	Clock Source	Domain Status	Primary v1 Multicast	Primary v2 Multicast	Secondary v1 Multicast	Secondary v2 Multicast	Pref Mas
192.168.2.0/24									
InputAdapter	■		Dante	Disabled	Slave	N/A	N/A	N/A	<input type="checkbox"/>
tableMic	■		Dante	N/A	Slave	N/A	N/A	N/A	<input type="checkbox"/>
Wallplate	■		Dante	N/A	Slave	N/A	N/A	N/A	<input type="checkbox"/>

P: ■ Unmanaged Multicast Bandwidth: 0 bps Event Log: ■ Clock Status Monitor: ■



Advanced Settings

 Auditorium (+1 other in shared)

Advanced settings can be used to configure interoperability, site-based clocking partitioning and unicast clocking device selection.

Warning! Changing settings may interrupt audio.

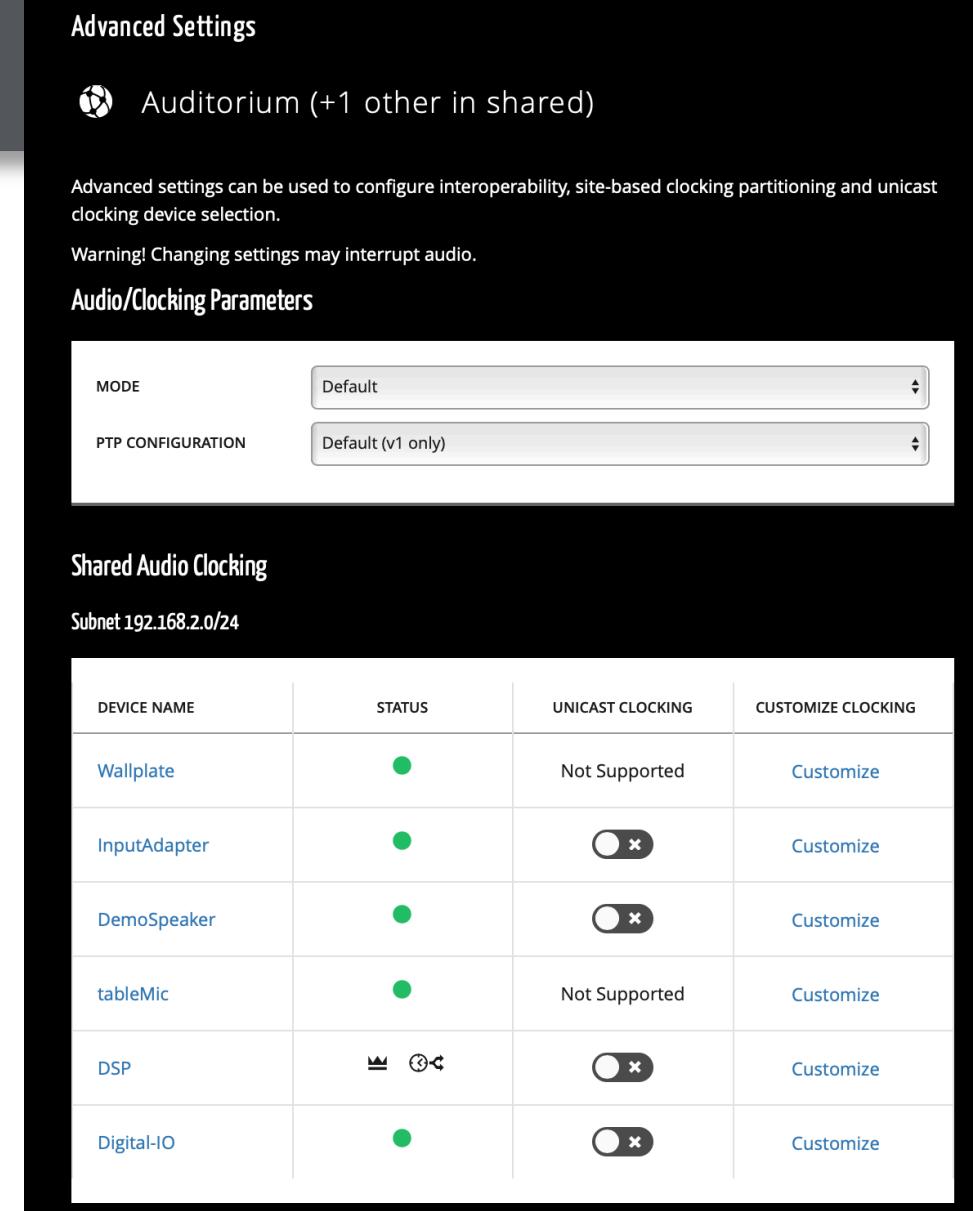
Audio/Clocking Parameters

MODE	Default
PTP CONFIGURATION	Default (v1 only)

Shared Audio Clocking

Subnet 192.168.2.0/24

DEVICE NAME	STATUS	UNICAST CLOCKING	CUSTOMIZE CLOCKING
Wallplate	■	Not Supported	Customize
InputAdapter	■	<input checked="" type="checkbox"/> x	Customize
DemoSpeaker	■	<input checked="" type="checkbox"/> x	Customize
tableMic	■	Not Supported	Customize
DSP	■ ③ ④	<input checked="" type="checkbox"/> x	Customize
Digital-IO	■	<input checked="" type="checkbox"/> x	Customize

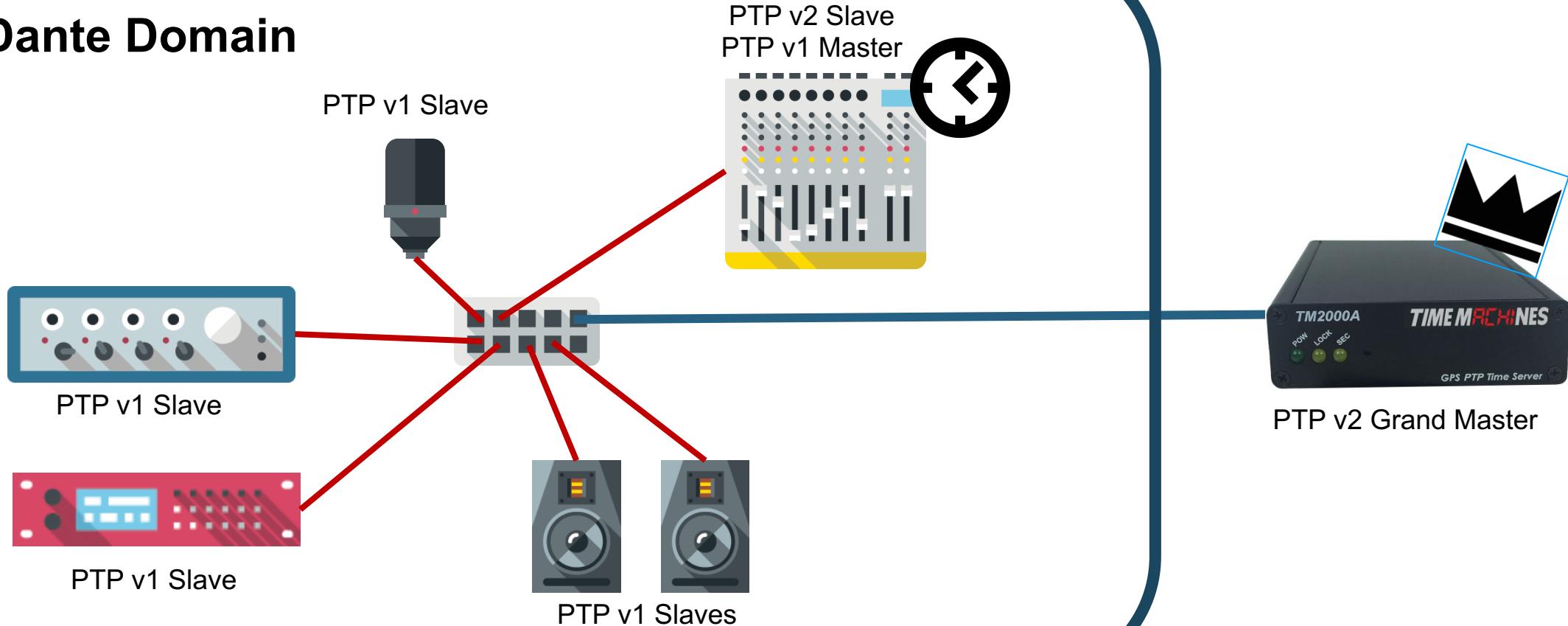


Dante Domain Manager Custom Dante Clocking

Sync to an External Network Clock



Dante Domain



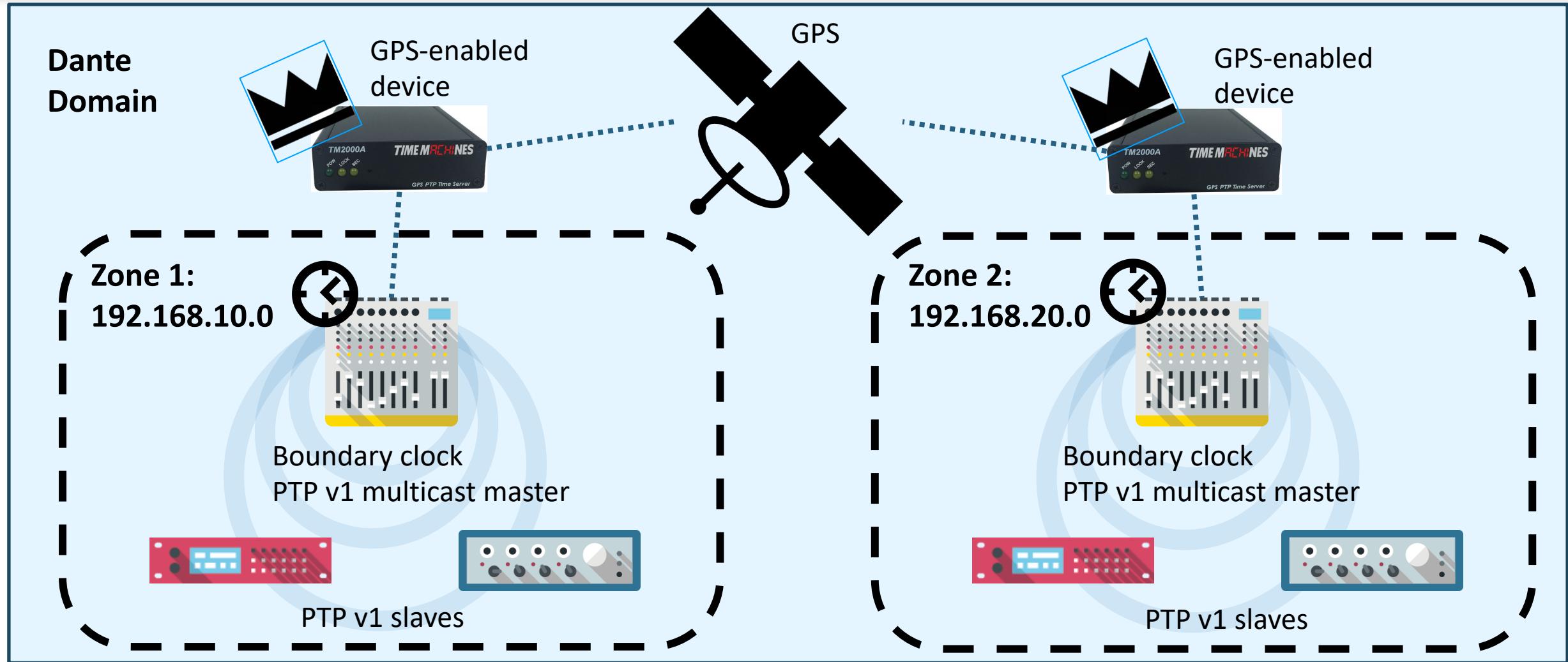
Sync to an External Network Clock

Audio/Clocking Parameters

MODE	Default
PTP CONFIGURATION	Custom (v1+v2)
PTP V2 DOMAIN NUMBER	3
PTP V2 PRIORITY 1	128
PTP V2 PRIORITY 2	128

Domain Clocking			
EXTERNAL GRANDMASTERS	1	ASSIGN ZONE	
Subnet 192.168.1.0/24			
DEVICE NAME	STATUS	UNICAST CLOCKING	CUSTOMIZE CLOCKING
SSL-SB-i16-Stagebox	●	<input checked="" type="checkbox"/>	Customize
AVIOAES3-504b8f	●	<input type="checkbox"/> *	Customize
ST-M5204-800a2b	●	<input type="checkbox"/> *	Customize
B2-PDK-Mixer	● 	<input checked="" type="checkbox"/>	Customize
Studio-ControlRoom-Monitoring	●	Not Supported	Customize
Music-Playback-Computer	●	Not Supported	Customize
lyo3232M-1462be	●	<input type="checkbox"/> *	Customize
unDNEMO-07b25b	●	Not Supported	Customize

Clocking Zones



Clocking Zones

- Zones must be separate subnets
- External Grandmasters must be synced
- At least one device with 4.2 Dante firmware required if syncing to PTPv2

The screenshot displays the Audinate Central interface, specifically the Clocking Zones section. It is divided into two main sections: -New York- and -Boston-. Each section shows a list of external grandmasters and their status.

-New York-

Subnet 192.168.1.0/24

DEVICE NAME	STATUS	UNICAST CLOCKING	CUSTOMIZE CLOCKING
Symetrix-0ed884	●	<input checked="" type="checkbox"/>	Customize
FoH- VirtualSoundcheck	●	Not Supported	Customize

ASSIGN ZONE

-Boston-

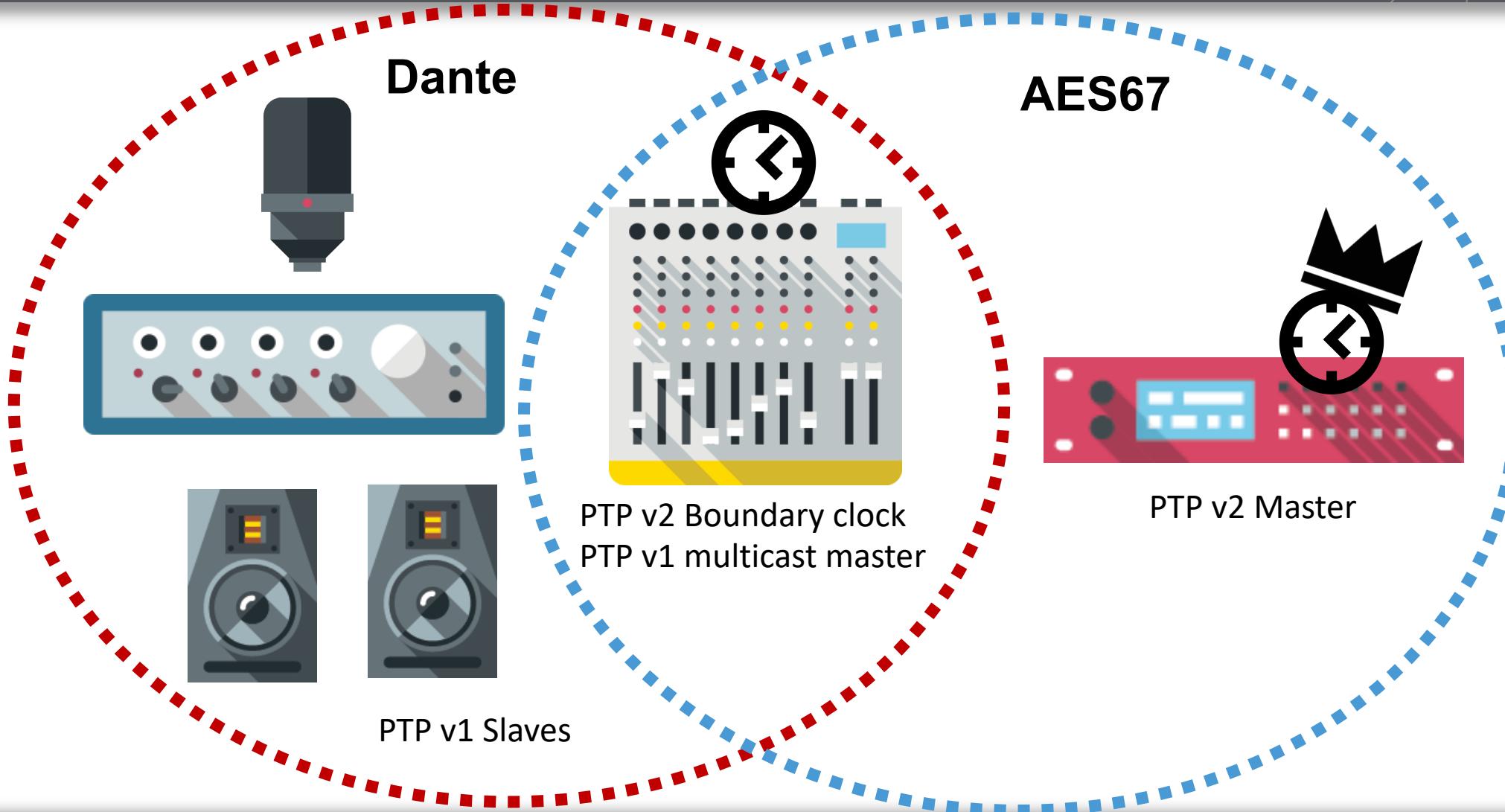
Subnet 192.168.2.0/24

DEVICE NAME	STATUS	UNICAST CLOCKING	CUSTOMIZE CLOCKING
BKN2-102996	●	<input checked="" type="checkbox"/>	Customize
Booth-Intercom-IO	●	Not Supported	Customize

ASSIGN ZONE

AES67 & SMPTE 2110 Clocking

Unmanaged AES67



Unmanaged AES67

Dante Controller - Network View

File Device View Help

Routing Device Info Clock Status Network Status Events

Grand Master Clock: Unknown Device*

?

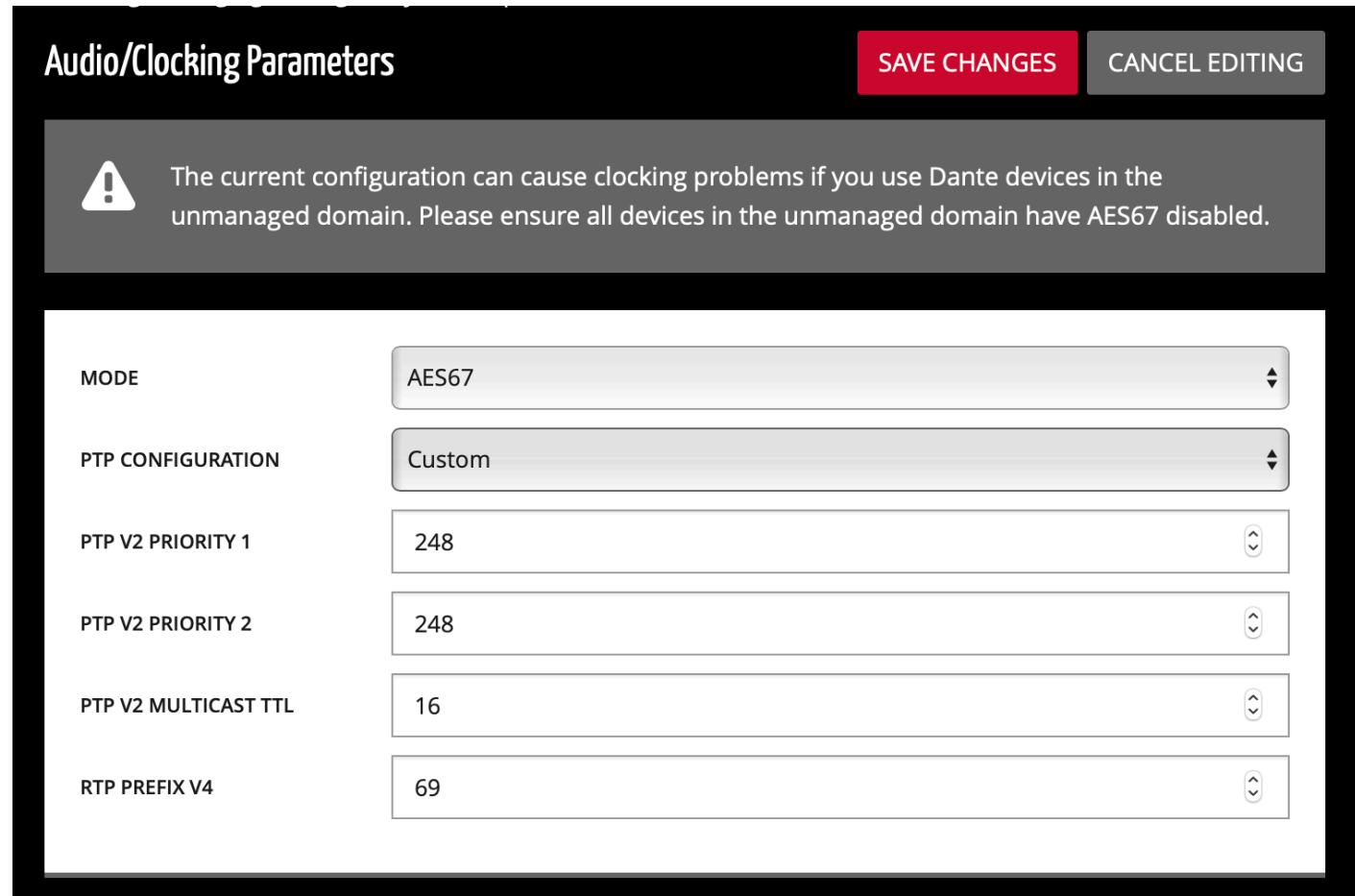
Device Name	Sync	Mute	Clock Source	Domain Status	Primary v1 Multicast	Primary v2 Multicast	Secondary v1 Multicast	Secondary v2 Multicast	Preferred Master	Enable Sync To External
ARC-8-Ch-7			Dante	N/A	Slave	N/A	N/A	N/A	<input type="checkbox"/>	N/A
AVIO-USB-Laptop			Dante	N/A	Slave	N/A	N/A	N/A	<input type="checkbox"/>	N/A
AVIOAO1-501c02			Dante	N/A	Slave	N/A	N/A	N/A	<input type="checkbox"/>	N/A
Dante-Bridge-Truck			Dante	N/A	Slave	N/A	N/A	N/A	<input type="checkbox"/>	N/A
Glensound-AOIP44			Dante	N/A	Slave	N/A	N/A	N/A	<input type="checkbox"/>	N/A
M-Audio-Spk-Left			Dante	N/A	Slave	N/A	N/A	N/A	<input type="checkbox"/>	N/A
M-Audio-Spk-Right			Dante	N/A	Slave	N/A	N/A	N/A	<input type="checkbox"/>	N/A
PCIe-080350-Desktop			Dante	N/A	Master	Slave	Link down	N/A	<input type="checkbox"/>	N/A
Wohler-Monitor-Left			Dante	N/A	Slave	N/A	N/A	N/A	<input type="checkbox"/>	N/A
Wohler-Monitor-Right			Dante	N/A	Slave	N/A	N/A	N/A	<input type="checkbox"/>	N/A

P: S:

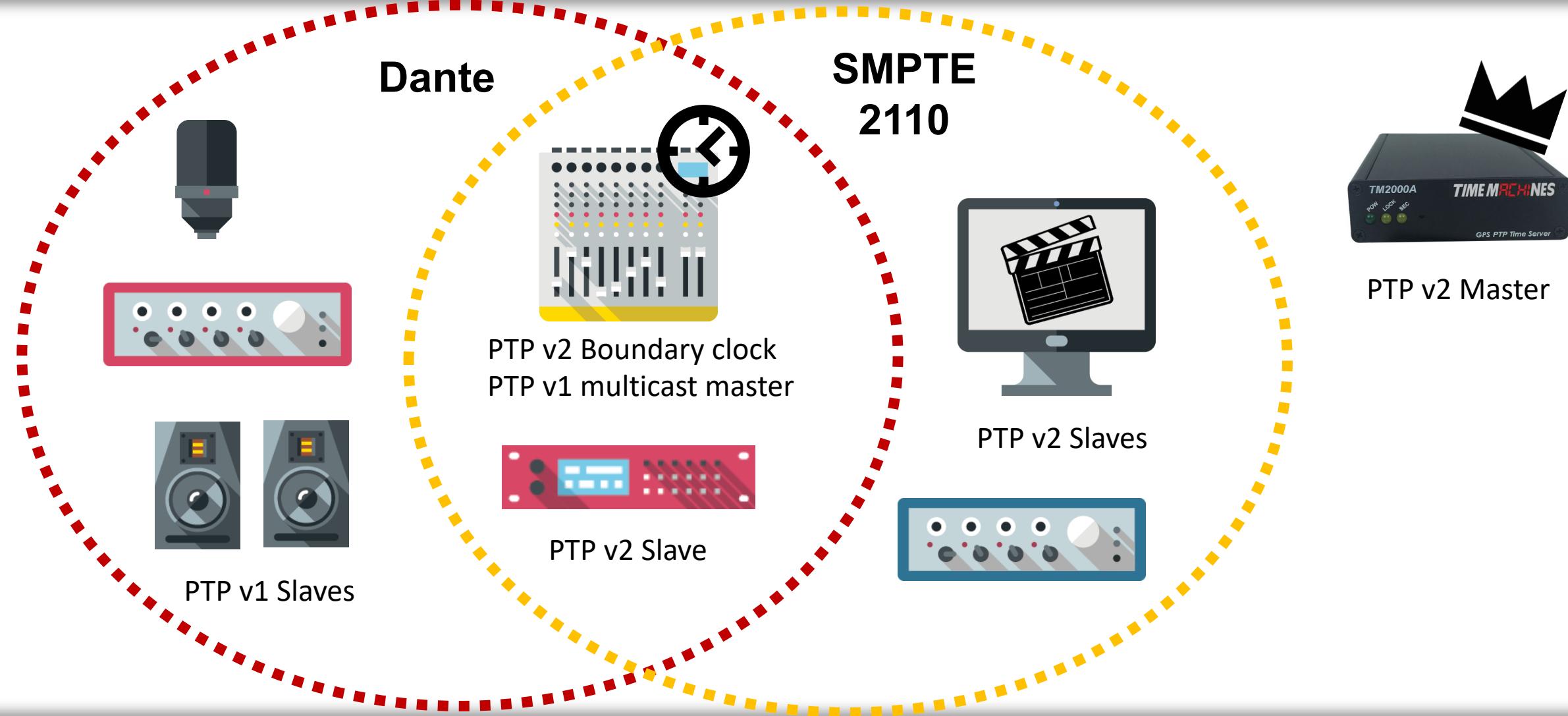
Unmanaged Multicast Bandwidth: 32Mbps Event Log: Clock Status Monitor:

AES67 with Dante Domain Manager

- Change the domain's clocking mode to **AES67** in ***Advanced Settings***
- Requires DDM 1.1
- Devices in interop mode require version 4.2 Dante firmware
- PTP Domain Number is always 0 for AES67 meaning **ONLY 1 AES67 Domain!**



SMPTE 2110 Clocking



SMPTE 2110 Clocking

- Change the domain's clocking mode to **SMPTE** in **Advanced Settings**
- Requires DDM 1.1
- Devices in interop mode require version 4.2 Dante firmware

Audio/Clocking Parameters

MODE	SMPTE
PTP V1 MULTICAST	<input checked="" type="checkbox"/>
PTP V2 DOMAIN NUMBER	127
PTP V2 PRIORITY 1	128
PTP V2 PRIORITY 2	128
PTP V2 SYNC INTERVAL	-3
PTP V2 ANNOUNCE INTERVAL	-2
PTP V2 MULTICAST TTL	16
PTP SLAVE ONLY	<input type="checkbox"/>

Q&A



Dante Domain Manager™

Clocking

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