High-quality, low-latency IP-based audio routing via Ethernet

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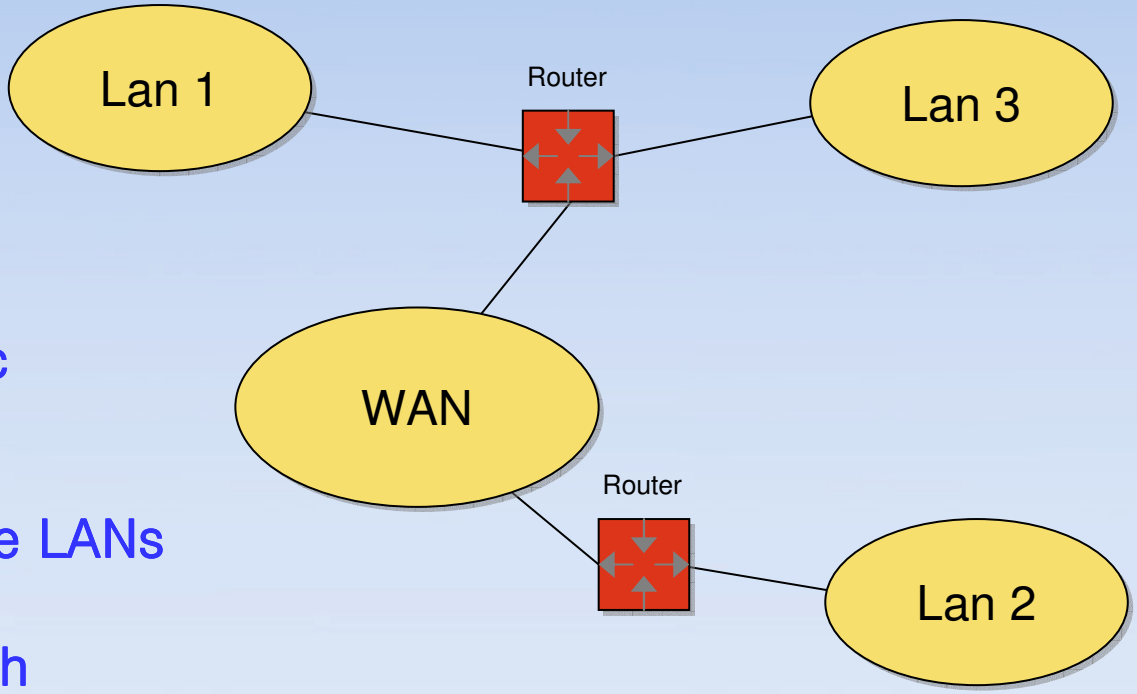
The bandwidth of IP-based Ethernet has increased radically in recent years, enabling networks to handle large data capacity at high speed using standard Gigabit switches and routers.

For radio and TV broadcasters this is an opportunity to consider new IP audio routing infrastructures based on Ethernet, providing more flexible and less costly network systems than the traditional AES/EBU, AES50 or MADI point-to-point based infrastructure technology.

For sound studios it offers benefits as a more flexible and distributed audio signal structure where new types of signal flows enables more efficient way of working.

Network scenario



- Performance, Sync Latency, QoS
- Routability, multiple LANs
- Easy migration path

Currently active standards

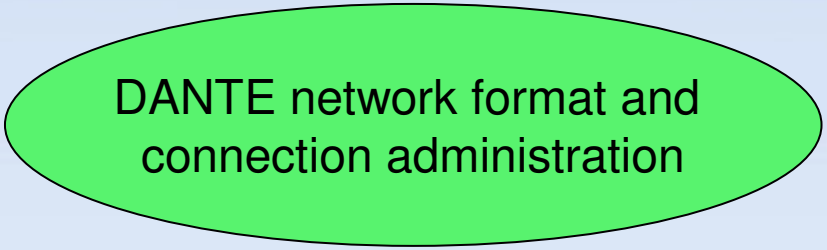
AV networking standards are undergoing rapid development

- Core AVB Standards (sync, QoS)
- AVB and IEEE 1722 FireWire transport
- AVB and RTP transport (e.g. IEEE 1733)
- AES X192 (Ravenna, LiveWire etc.)

Dante is using existing standards

- IEEE 1588 (RTP)
- Diffserv QoS
- TCP and UDP I/P unicast and multicast
- MDNS (Bonjour)
- Committed to supporting, AVB and IEEE 1722, 1733 and RTP and AVB

IP–based audio routing via NTP IP audio/DANTE



NTP IP Audio is based on Dante

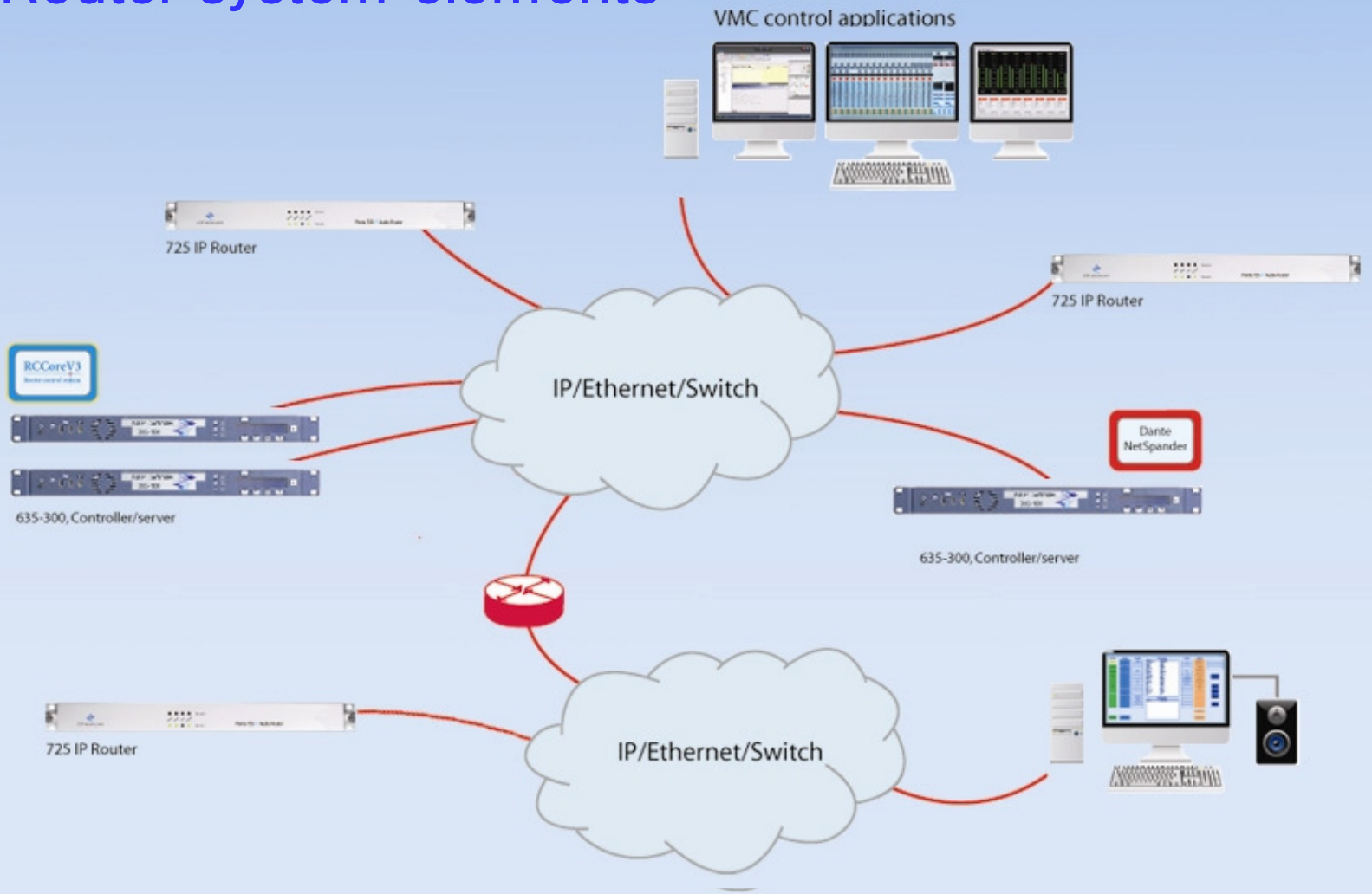
NTP IP Audio is based on the Dante™ Ethernet Layer 3 protocol developed by Audinate Ply Ltd. The system ensures very low latency using Quality of Service and sample accurate inter channel synchronisation. The Ethernet protocol is prepared for AVB interoperability.

NTP Router Control System RCCoreV4 handles the administration of logical connections of inputs and outputs in the router system on a higher level than the physical connections and back-bone/network structure
Providing a simple and practical user operation. Based in the Dante control commands etc.

NTP IP Audio connection administration

DANTE network format and device administration

IP Router system elements



Features

- Low latency, tightly synchronised transport of 24/32bit uncompressed audio with sample rates of 48kHz or higher on a Gigabit (1Gbps) IP based Ethernet
- Gigabit Ethernt routing Backbone
- Using off the shelf Gigabit Ethernt switches
- Redundant topologi
- Routable in more sub nets
- Not on the www

Benefits

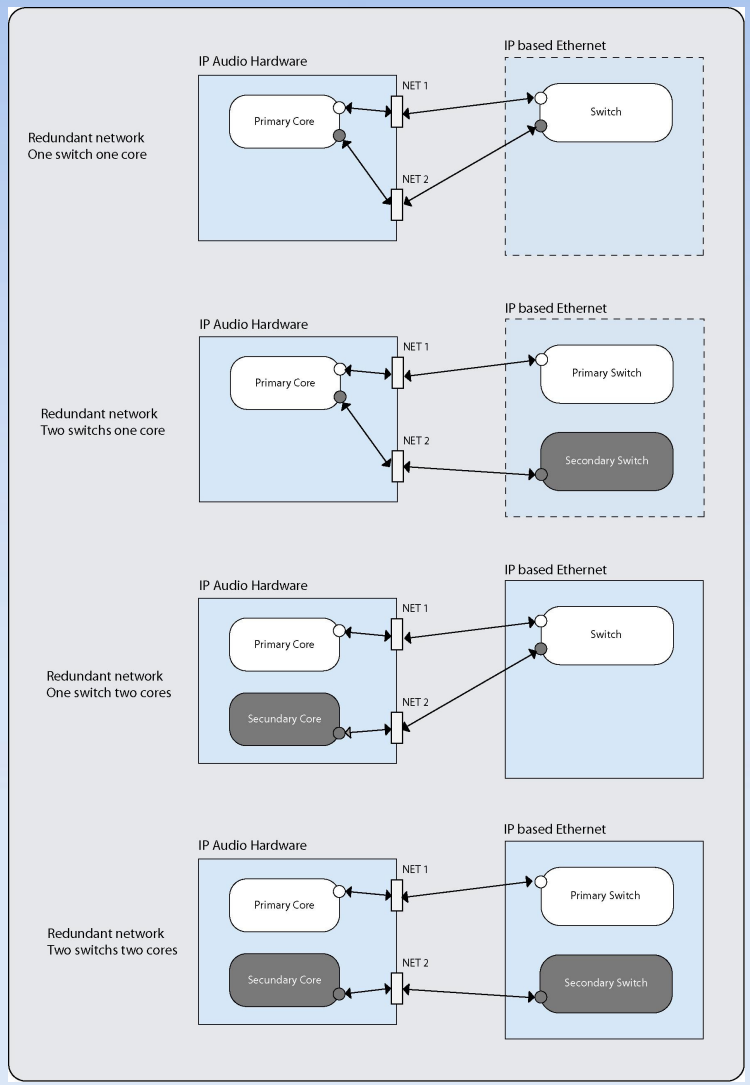
- More flexible and less costly network systems than traditional TDM-based router technology
- Works on a non-audio-dedicated network backbone via standard Ethernet service provider
- Expandable network size
- Routing connection management on a high ”logical” level
- Router Control of both IP routing and TDM matrix

Specifications

- Point–to–point via UDP and Point–to–multipoint via UDP/Multicast
- Latency typ. 100–300 micro sec. < 1ms
- No of channels@48kHz in one Gigabit link approx. 800
- No of channels in a Gigabit network = ”unlimited”…
- Gigabit switch delay typ. 5 micro sec.
- Robust against loss of UDP packages
- TCP/IP control via NTP Router Control System

NTP IP Audio redundancy

- Dual network on each core
- Dual core for full redundancy



Adopters with products on the market

- Yamaha
- Bosch
- Peavy, Media Matrix
- Lab gruppen
- Soundcraft
- Digico
- Midas
- Tannoy
- NTP/DAD
- Focusrite
- DHD
- Stage Tec
- Shure
- And more..
- Currently 74 adopters

IP Router system elements

Optional

- Dante ”Netspander” Audio sub–net manager
- Dante Ethernet / Virtual sound card for PC audio I/O
- 3rd part Dante audio I/O device
- Dante controller – Not 100% compatible
- NTP 615 HW control panels

Large and flexible audio network using NTP IP Audio

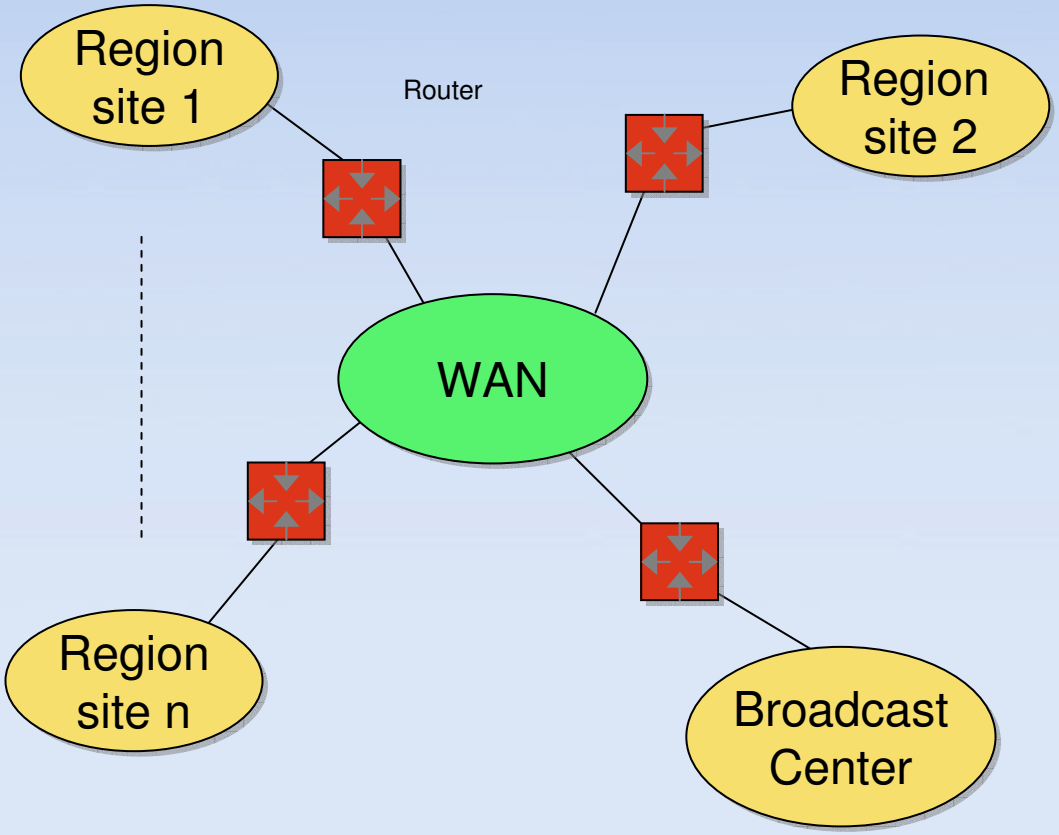
The Dante Technology has sub millisecond latency and a capacity of more than 500 channels in the network, limited only by the scale of the network.

Point-to-point and point-to-multipoint routing over one or more sub nets conforming to the 'Quality of Service' delineation can be established by simple user interaction with the control software.

NTP Router Control System RCCoreV4 software determines the logical inputs and outputs of the router system, letting the router control and the network nodes handle the routing and configuration of the network.

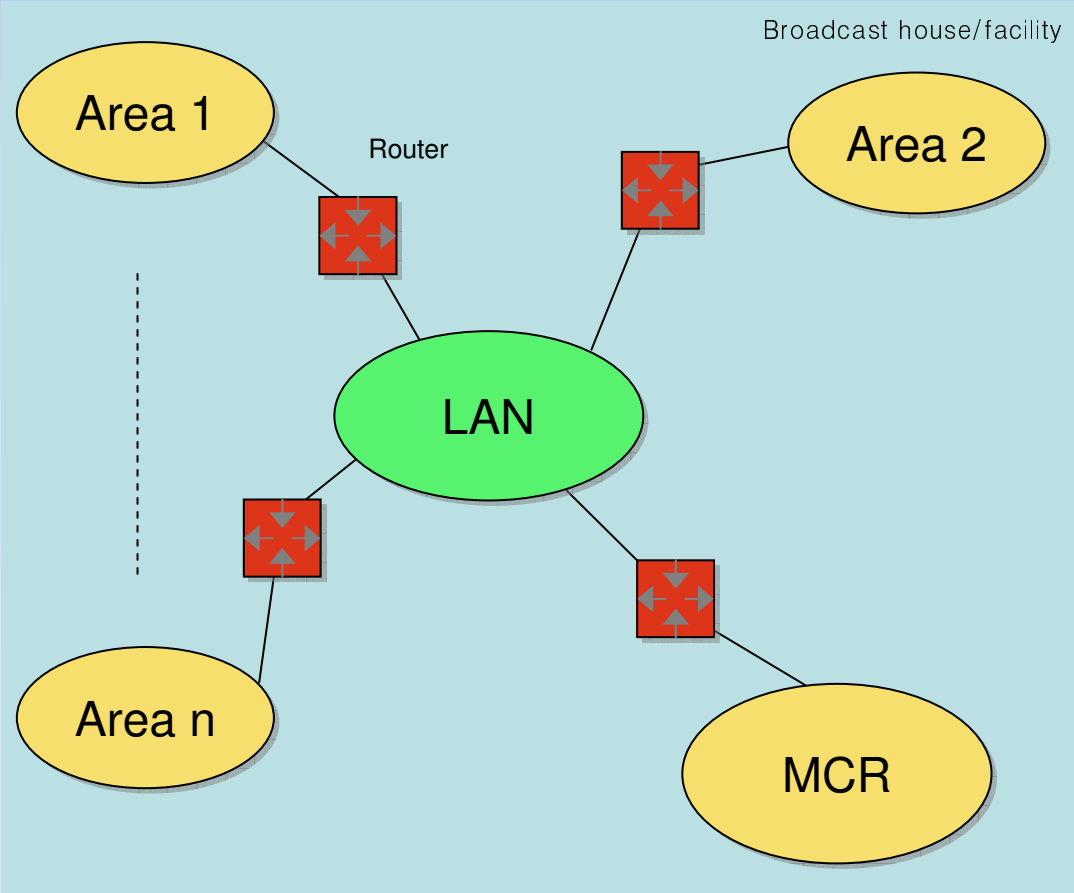
The router system is able to pass real-time audio and clock synchronization also between more sub-nets, via Gigabit routers in large networks, while preserving an error free audio distribution though out the network.

Network scenario 1
Radio Broadcast Network, Nation-wide



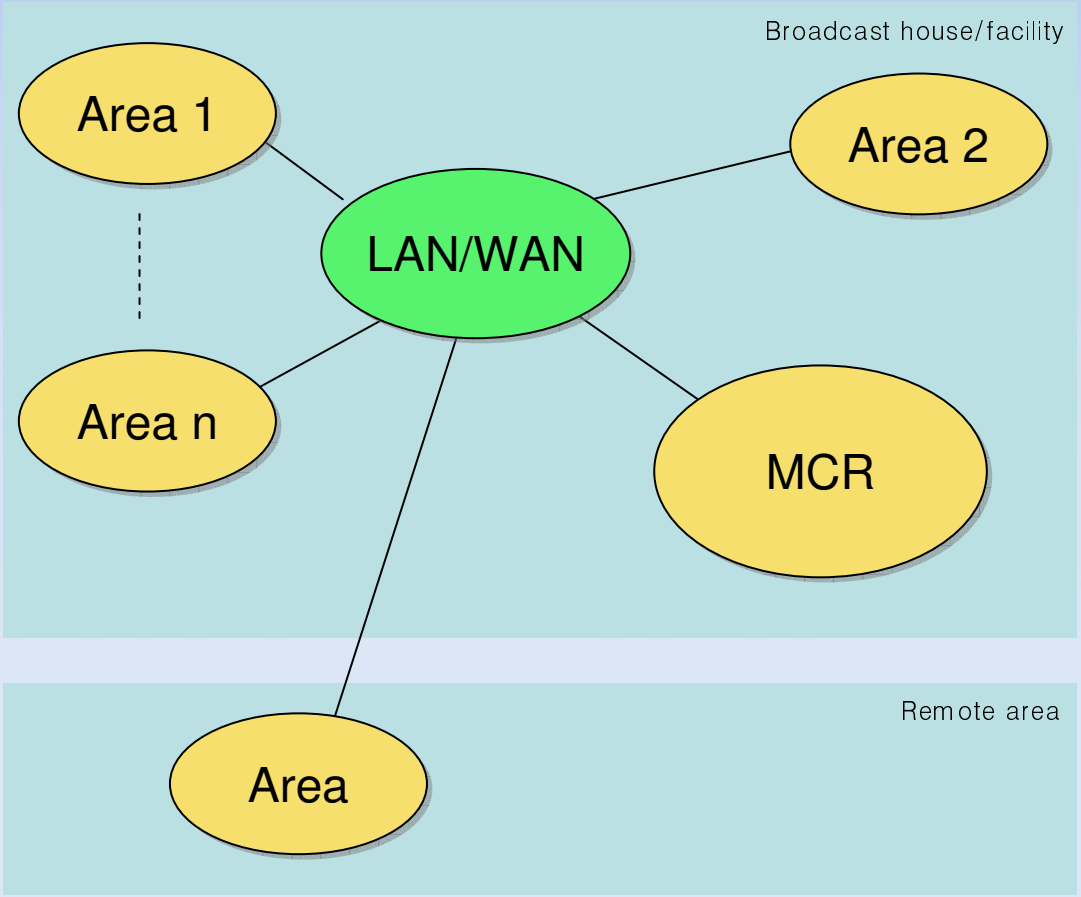
- Dedicated nation-wide WAN
- Routed network structure, multiple subnets
- Audio program contribution
- "Direct" routing between all regions
- Network – not a star topology

Network scenario 2
Audio network extention, Broadcast house



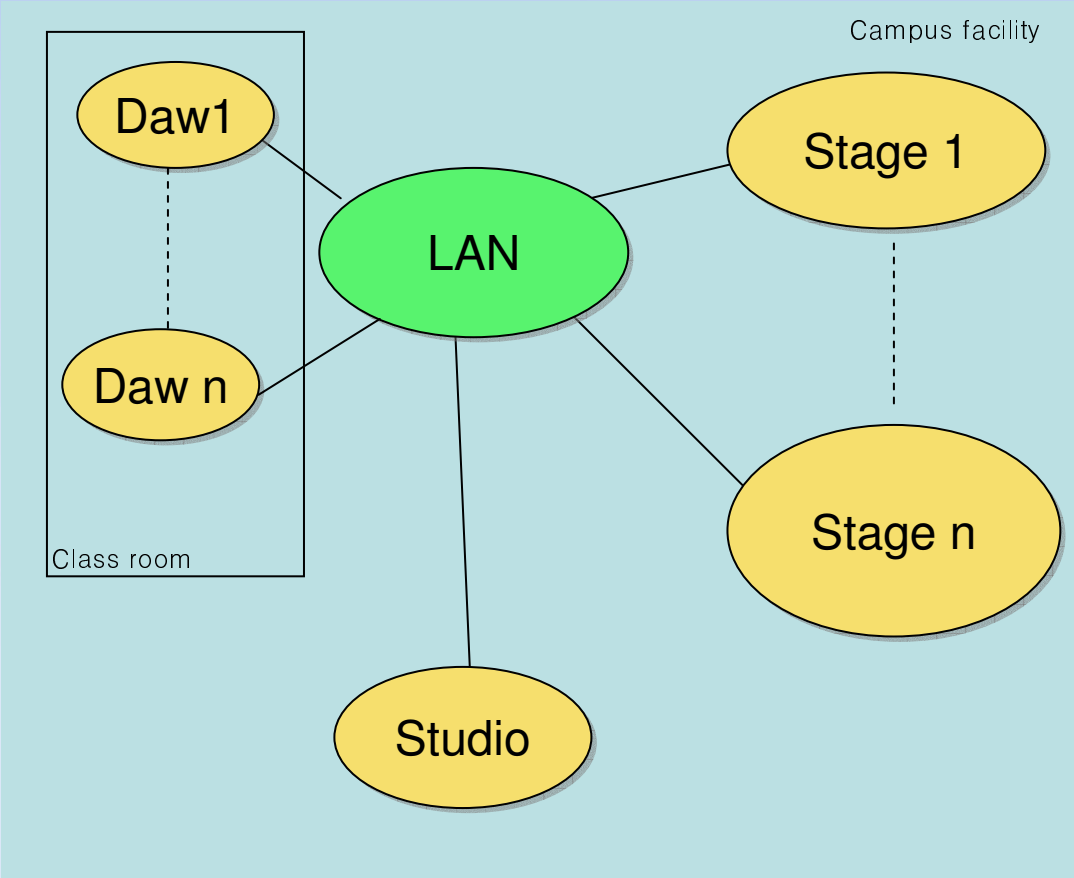
- In-house dedicated LAN
- Routed network structure, multiple subnets
- Audio program contribution/exchange
- “Direct” routing between all areas
- Networked Extension to central TDM audio router

Network scenario 3
Audio network extention, State Broadcaster



- In/out–house dedicated LAN
- One network structure, one subnet
- Audio program contribution/exchange
- Extension to central TDM audio router
- Network – on a star topology

Network scenario 4
Campus Audio Network



- In-house dedicated LAN
- One network structure, one subnet
- Audio program contribution/exchange
- Network of audio for educational purposes
- Network – flexible education platform

Questions

Thank you for your attention

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