

Designing an IP Network to Support ST 2110

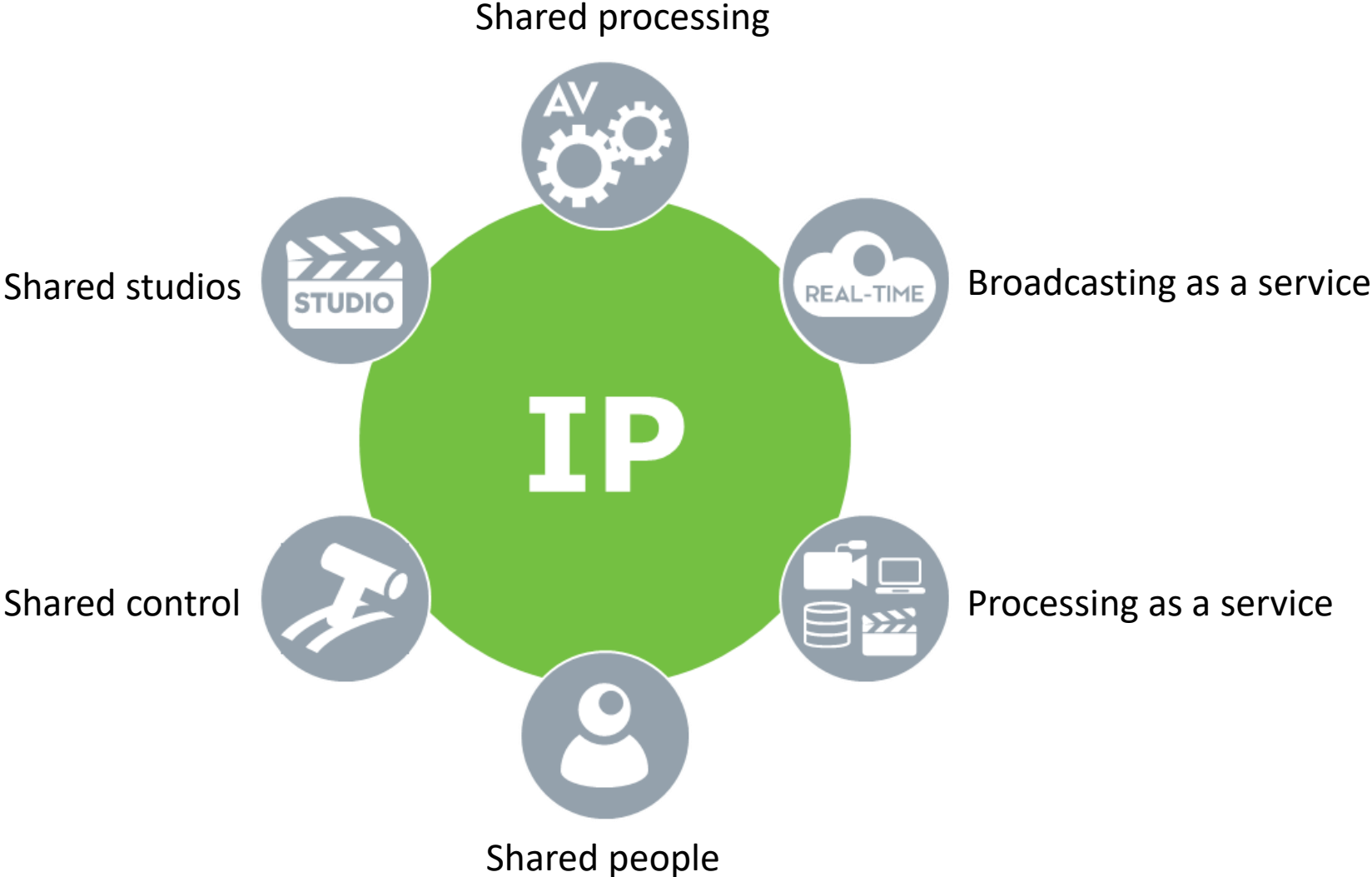
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LAN / WAN convergence



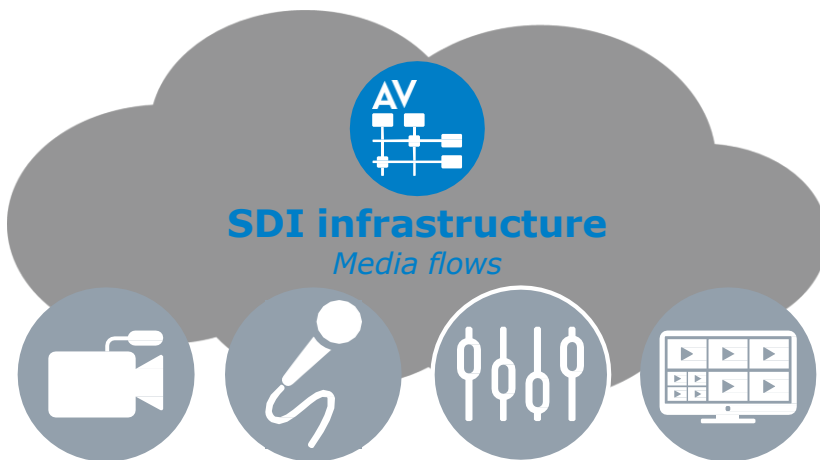
Driving new opportunities



Meeting the live broadcast challenge



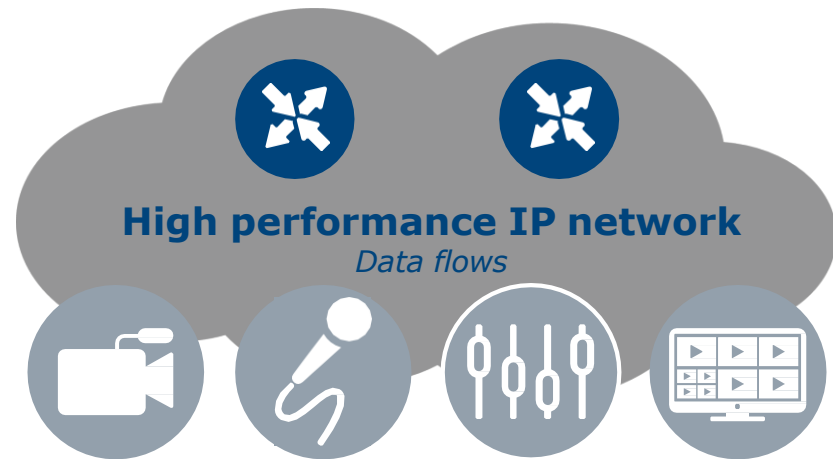
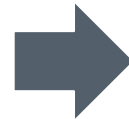
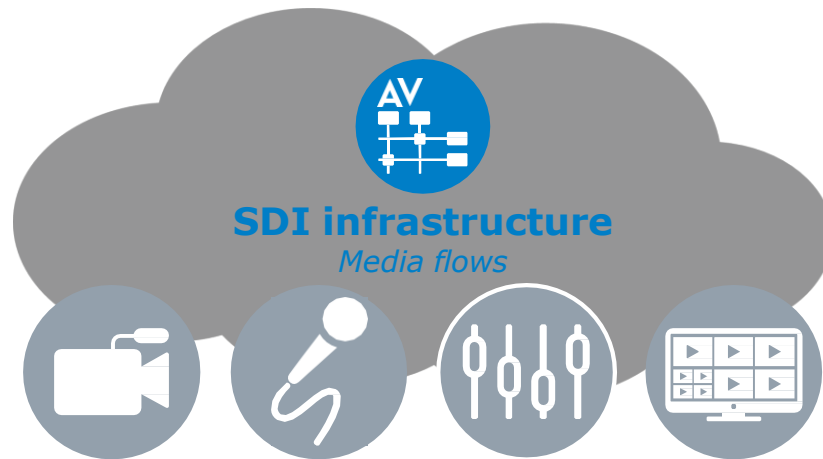
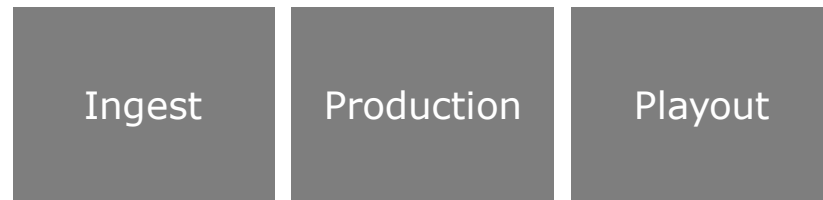
Broadcast control



SDI infrastructure is
**optimized for
broadcast**

*Media-centric, high performance,
deterministic routing, low
latency, fast switching, etc*

Architecting a high performance IP network



Broadcast media transport facts



The benchmark for performance: specialized & dedicated baseband (SDI) networks

Some challenges



Exceptionally **dynamic and scalable** architecture needed

Thousands of multicast flows needing to be live-switched

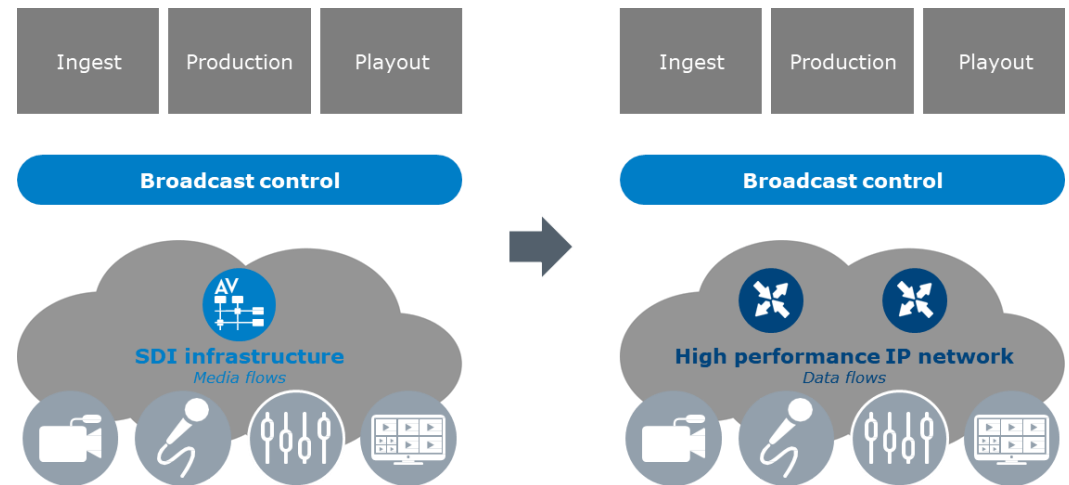
PTP is mission critical

Mix of very **high and low** bitrate flows

Which applications can run on the same network?



- Realtime audio/video for TV production
- Realtime audio for Radio production
- Playout
- File based applications
- Office applications
- Management
- Data Center applications
- Wide area networking
-

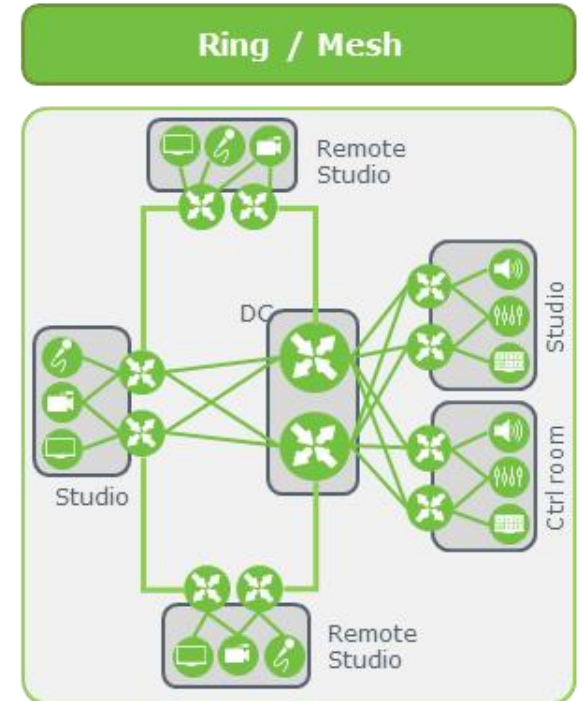
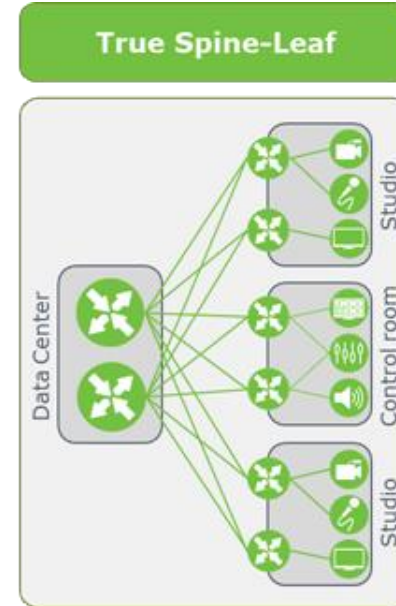
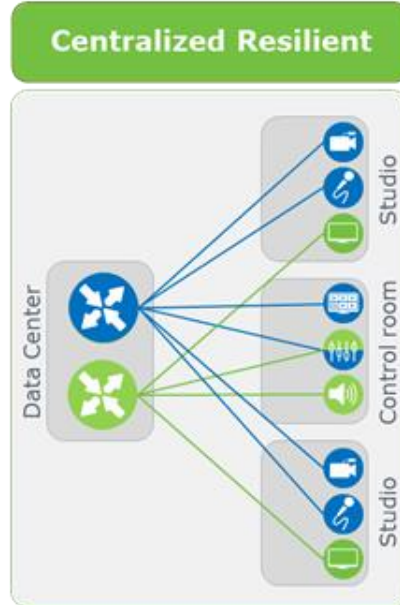
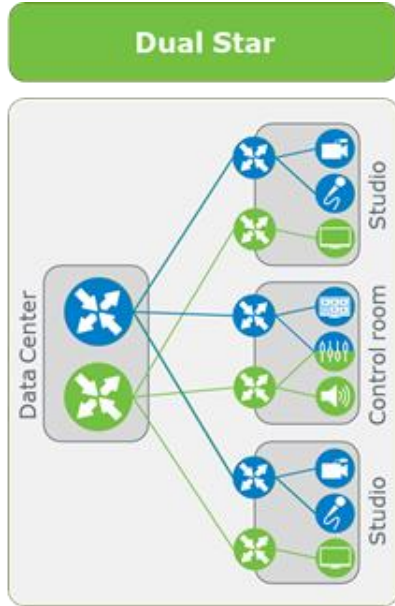
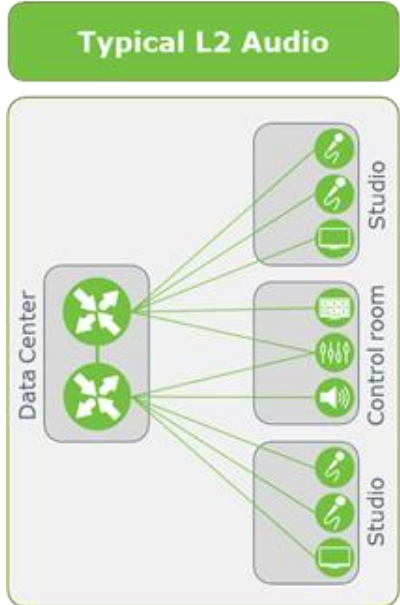


Enterprise & broadcast networks are different



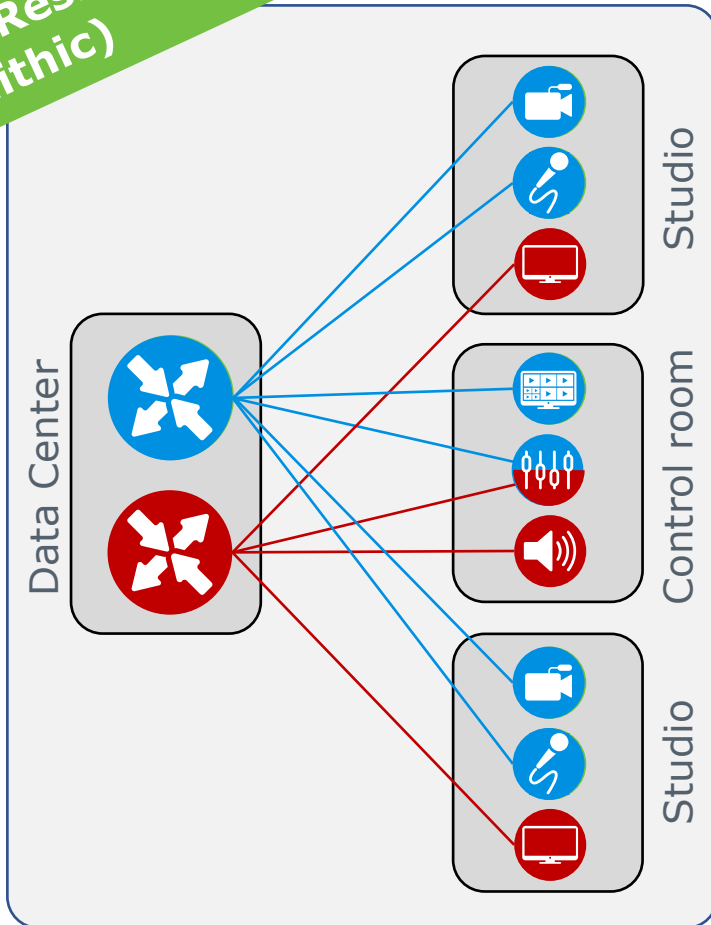
	Enterprise networks	Live broadcast networks
Payload	Data	Video + audio + data
Streams	Mostly < 10Mbps	Up to 12Gbps (4K video), many over 1.5Gbps
Access interface	1Gbps	10/25Gbps
Connection	Client-server	Peer-to-peer
Transmission	Unicast	Multicast (> 10,000 flows)
Profile	Variable and bursty	Constant
Protocol	TCP	UDP
Timing	Often not required	PTP (media flow synchronization) is mission critical

Architecture options



Architecture options

Centralized Resilient (Monolithic)



Advantages:

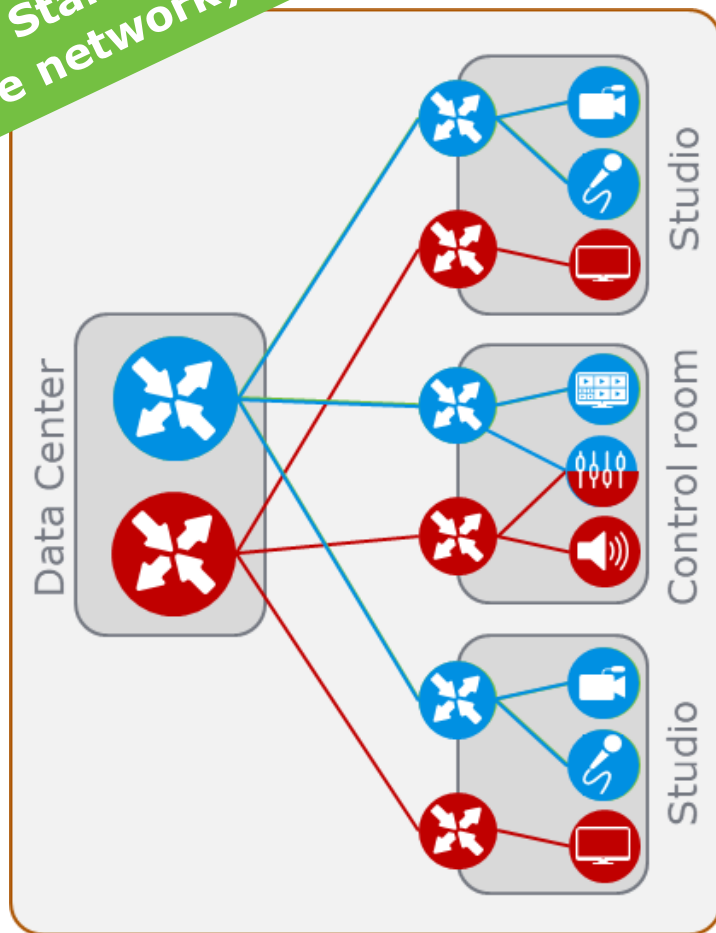
- Similar to traditional MCR
- Non-blocking network
- No signal routing overhead
- No SDN / Broadcast Controller

Challenges:

- Fiber management
- Redundancy must be handled by edge devices

Architecture options

Dual Star (Red-blue network)



Advantages:

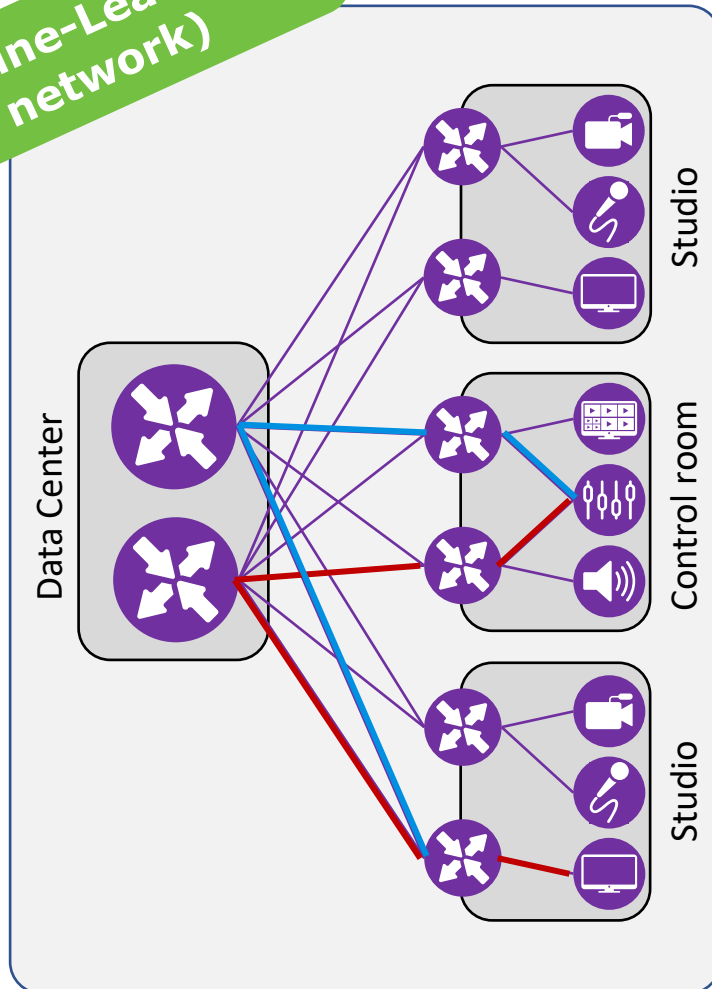
- Similar to traditional MCR
- Simple signal routing

Challenges:

- No signal aggregation
- Fiber management
- Expensive for low bandwidth ports
- Tie-line management
- Redundancy must be handled by edge devices

Architecture options

True Spine-Leaf (Purple network)



Advantages:

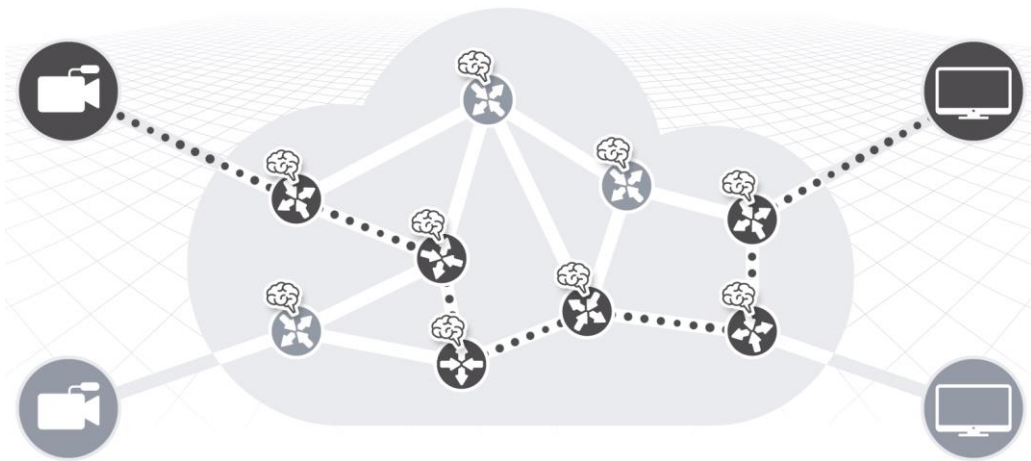
- Signal aggregation at the Leaf
- Simpler fiber management
- Cost effective edge ports for all bandwidths
- Built-in network redundancy (red/blue per stream)
- No endpoints blocked due to loss of single Spine

Challenges:

- Blocking/Non-blocking depends on
- Utilization of Leaf-Spine links
- More complex signal routing
- Scalability dependent on amount of
- Uplink interfaces on Leaf

- **Automatically routed IP networks**

Routing intelligence is built in to the network components



Automatic routing (IGMP)

- **Software Defined Networking**

Routing intelligence is centralized



Software Defined Networking (SDN)

Choosing the right switch depends on the required combination of features



A few examples of features to consider (although not all strictly required for 2110):

NAT – Network Address Translation

Allowing to intergrade any 3rd party non-controlled device
Securely interconnect to external networks

Ingress bandwidth policy per multicast flow

Securing network from unwanted bandwidth overprovisioning

Flow loss monitoring

Ability to detect loss of bandwidth for individual streams and raising service alarms for affected connections

Flow duplication

Ability to create protected ST2022-7 stream from a single flow

IGMP snooping host-join

Interconnecting SDN network with unmanaged PIM/IGMP network

PTP support

Transparent and/or boundary clock? How many PTP clients per port and per switch?

Any Questions?

IP SHOWCASE™

