STREAMING THE FUTURE

visual engineering
LIGHTWARE

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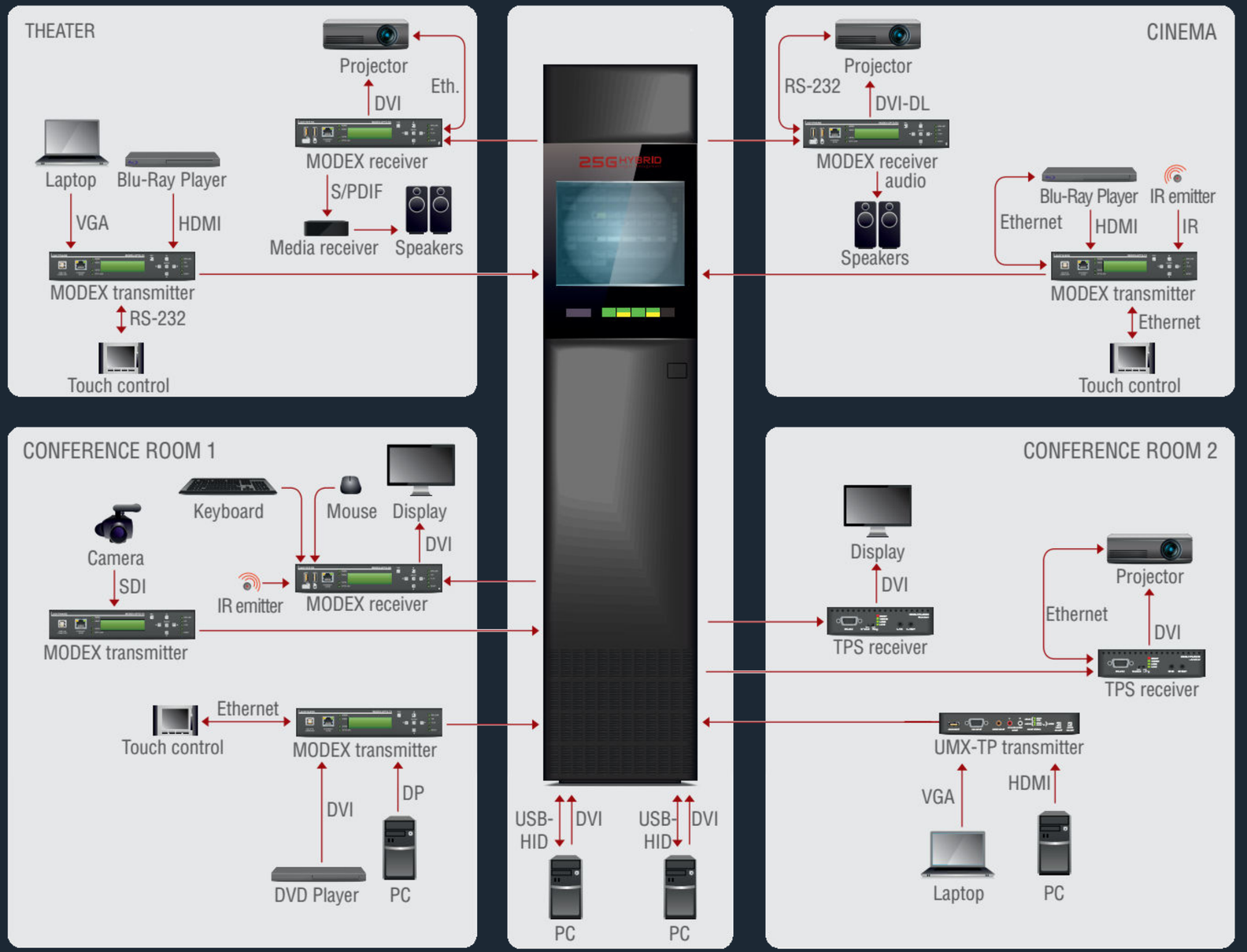
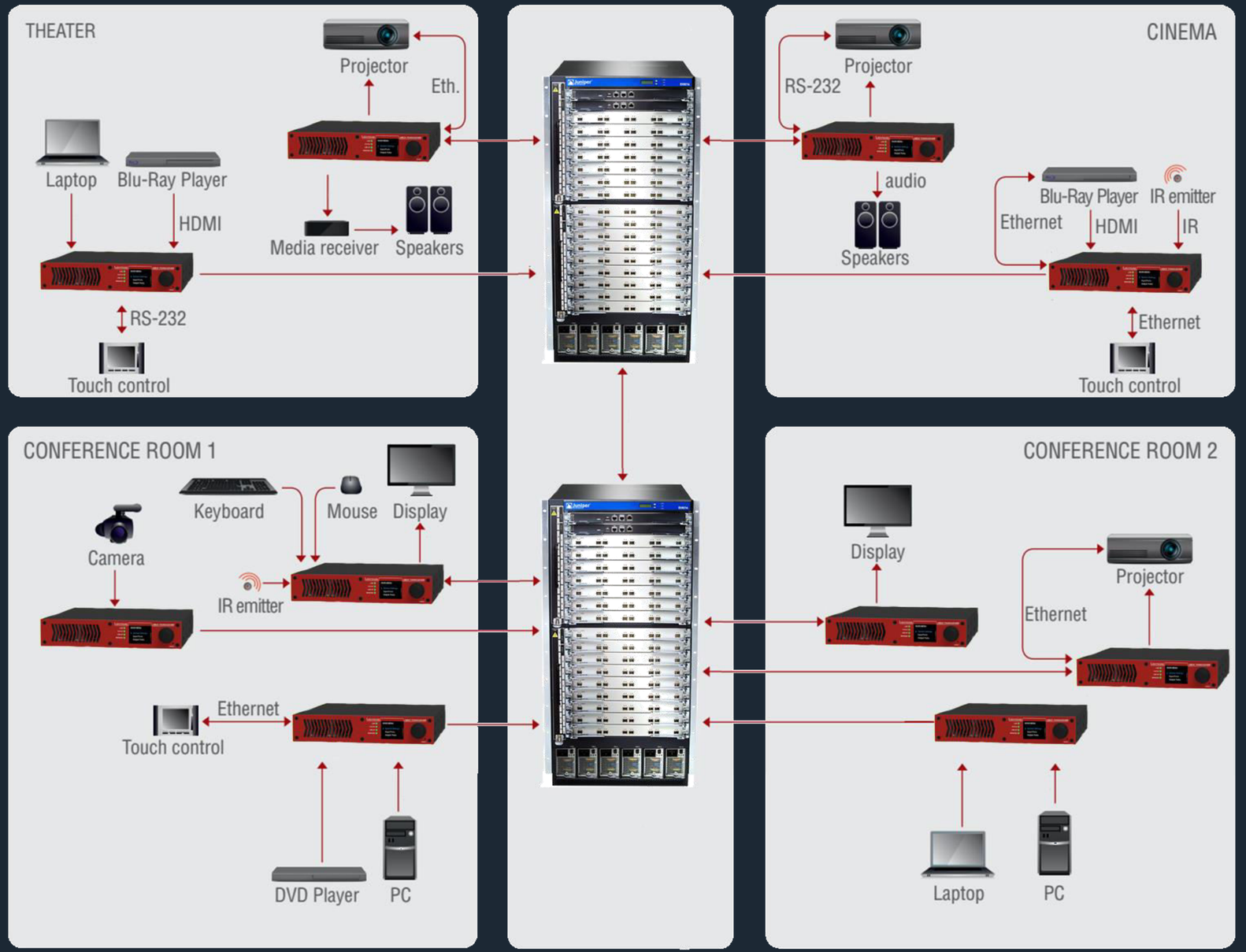
MAXIM STEPANOV

Traditional AV solution

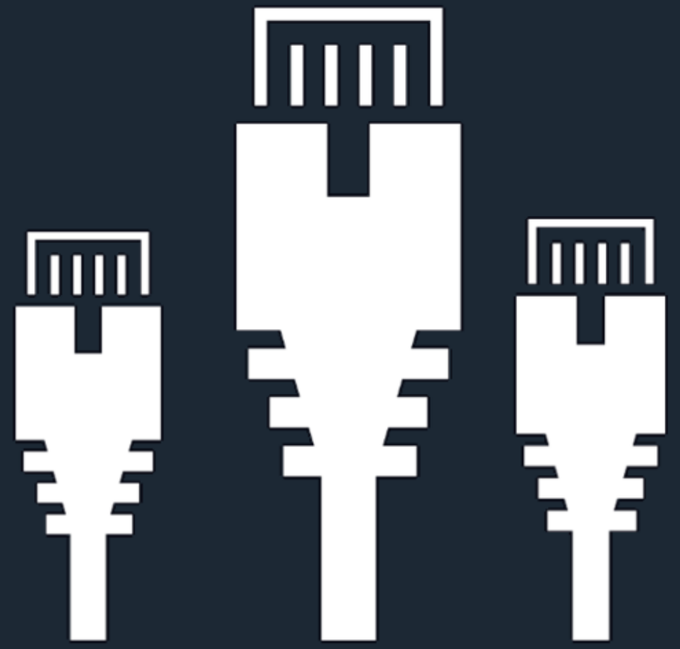


AV-over-IP solution

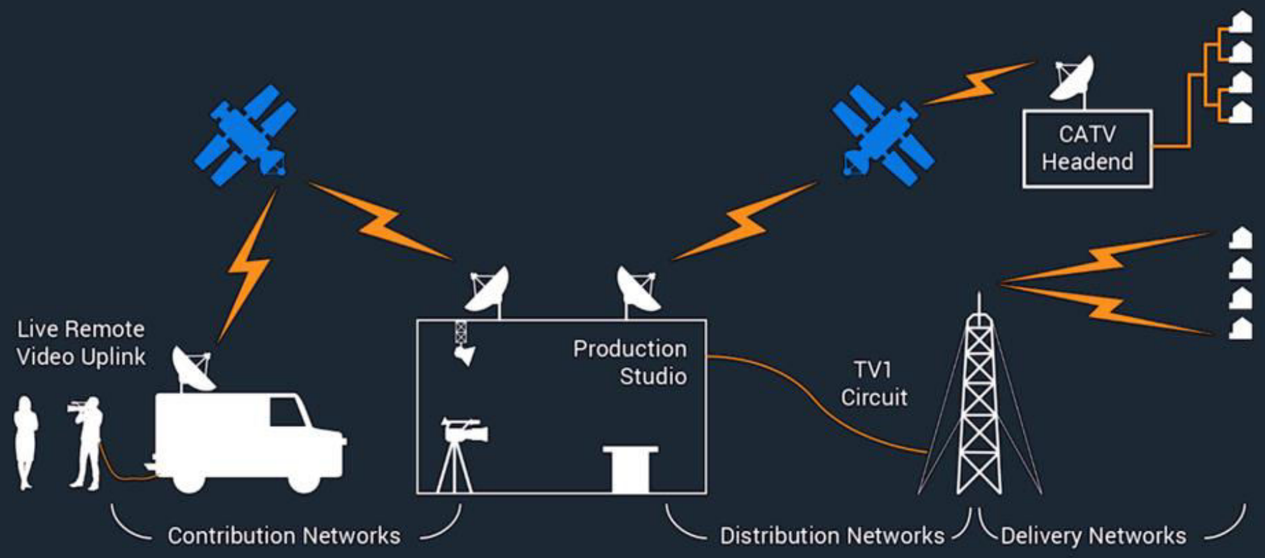


Driving factors for transitioning to IP

- Standard IT infrastructure
- Unlimited scalability and flexibility
- High video quality (4K and beyond)
- Ability to aggregate multiple signals



Broadcasting and IP



Traditional broadcasting scenario

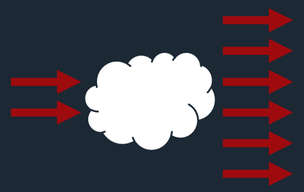
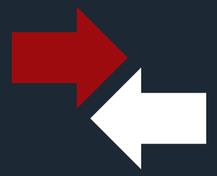
- IP technology has already appeared in broadcasting.
- IP transmission has already gained solid ground in contribution applications, distribution networks and content delivery to users.
- As of today, production is still a stronghold that heavily relies on non-IP based solutions (mostly SDI).
- However, from 2015, several options have been developed that allow the transition from SDI to an all-IP infrastructure within production facilities.

Comparison

Traditional AV vs. AV-over-IP

Traditional AV		AV-over-IP
Up to 160×160	System size	Virtually unlimited
By 8-port I/O boards	Expansion	By endpoints
Non-blocking	Crosspoint architecture	Possible bandwidth limitations and packet congestions

Traditional AV	vs.	AV-over-IP
No latency ✓	 Latency	✓ Low latency
High with scaling/seamless switching ✗		✗ High with compression
Direct connection ✓	 Connectivity	
But conversion is needed ✗ when extending		✗ IP conversion is always needed
5m to 10km ✓	 Max. distance	✓✓ 100m to 80km

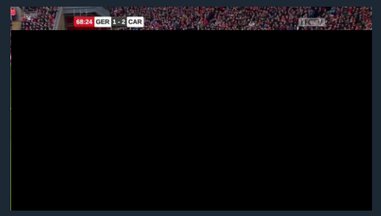
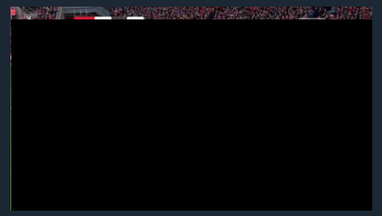
Traditional AV	vs.	AV-over-IP
Symmetric ? (8×8 .. 160×160)	 I/O symmetry	Asymmetric (8×5, 56×118, etc)
Fixed signal direction	 Port flexibility	Selectable IN or OUT or bidirectional with Lightware TRX
AV	 Required knowledge	AV + IT

Traditional AV	vs.	AV-over-IP
Always available	 Bandwidth	Shared
Centralized	 Layout	Decentralized

How much is ZERO?

Latency demystified

Delay

	1080p60	4K30	4K60
1 millisec delay:	 148 500 pixels 67 lines	 297 000 pixels 67 lines	 594 000 pixels 135 lines
10 millisec delay:	 670 lines 2/3 of a frame	 670 lines 1/3 of a frame	 1350 lines 2/3 of a frame
20 millisec delay:	 1.5 frames	 2/3 of a frame	 1.5 frames

So which technology is better?

Pixel accuracy

Total cost
of ownership

System flexibility
and scalability

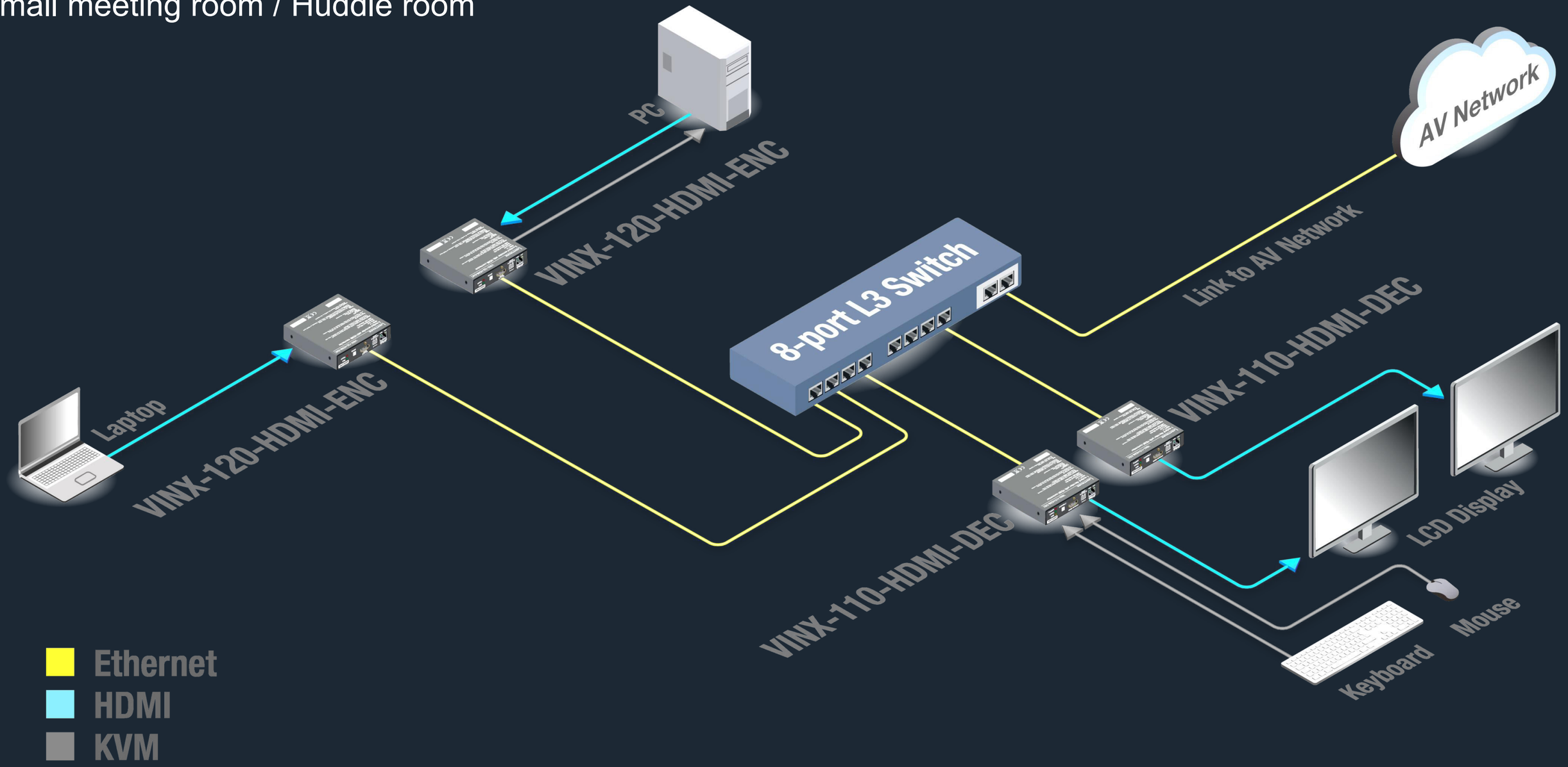
	Traditional AV	1G video-over-IP	10G video-over-IP
Latency	Few pixels	1-2 frames	0 frames in source locked mode 1 frame in free run mode
System size Nr. of endpoints	16×16, 32×32 … 80×80, 160×160	1×1 … 100×100	1×1 … 1000×1000
Video connectors on extenders	VGA, DVI, HDMI, DP, 3G-SDI	HDMI1.4 / DVI	HDMI2.0 / DP1.2 / 12G-SDI
Video connectors on switch	VGA, DVI, HDMI, 3G-SDI	none	none
Extension connectivity	HDBaseT MM fiber, SM fiber	1G Ethernet over CAT5	10G Ethernet over SM or MM fiber (SFP+) 10G Ethernet over CAT6a (planned)
Extension distance	100-150m for HDBaseT 300-2500m for MM fiber 10km for SM fiber	100m for Ethernet (standard)	100m for Ethernet with CATx 400m with MM SFP+ 10km or 80km with SM SFP+
System scalability expansion options	Expandable depending on frame size with 8-port IO boards	Expandable depending on Ethernet switch size, port-by-port	Expandable depending on Ethernet switch size, port-by-port

	Traditional AV	1G video-over-IP	10G video-over-IP
Bandwidth per video channel	9G with HDMI 1.4 18G with HDMI 2.0	1G	10G..20G..40G
Compression	Uncompressed	Compressed	Configurable Compressed or uncompressed

Use cases

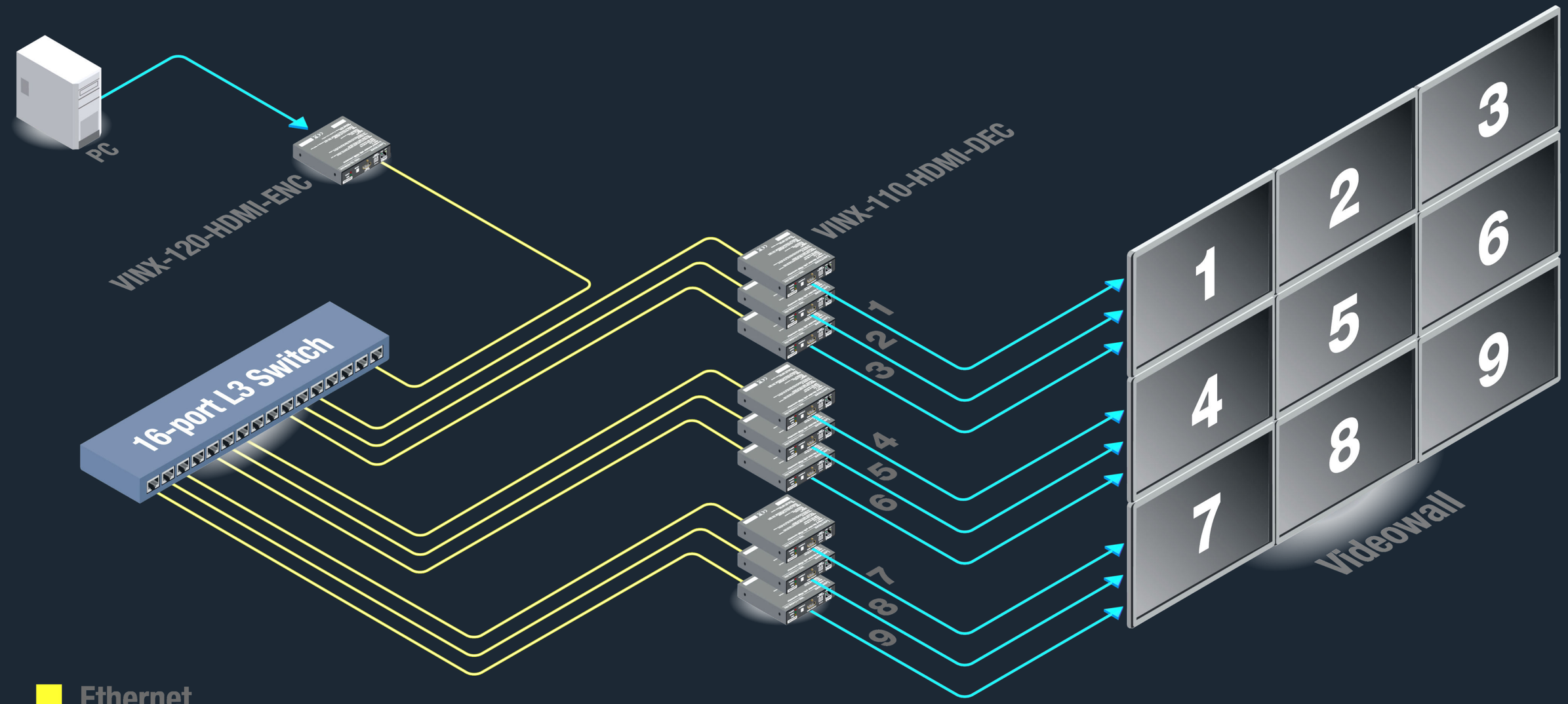
Use cases

Small meeting room / Huddle room



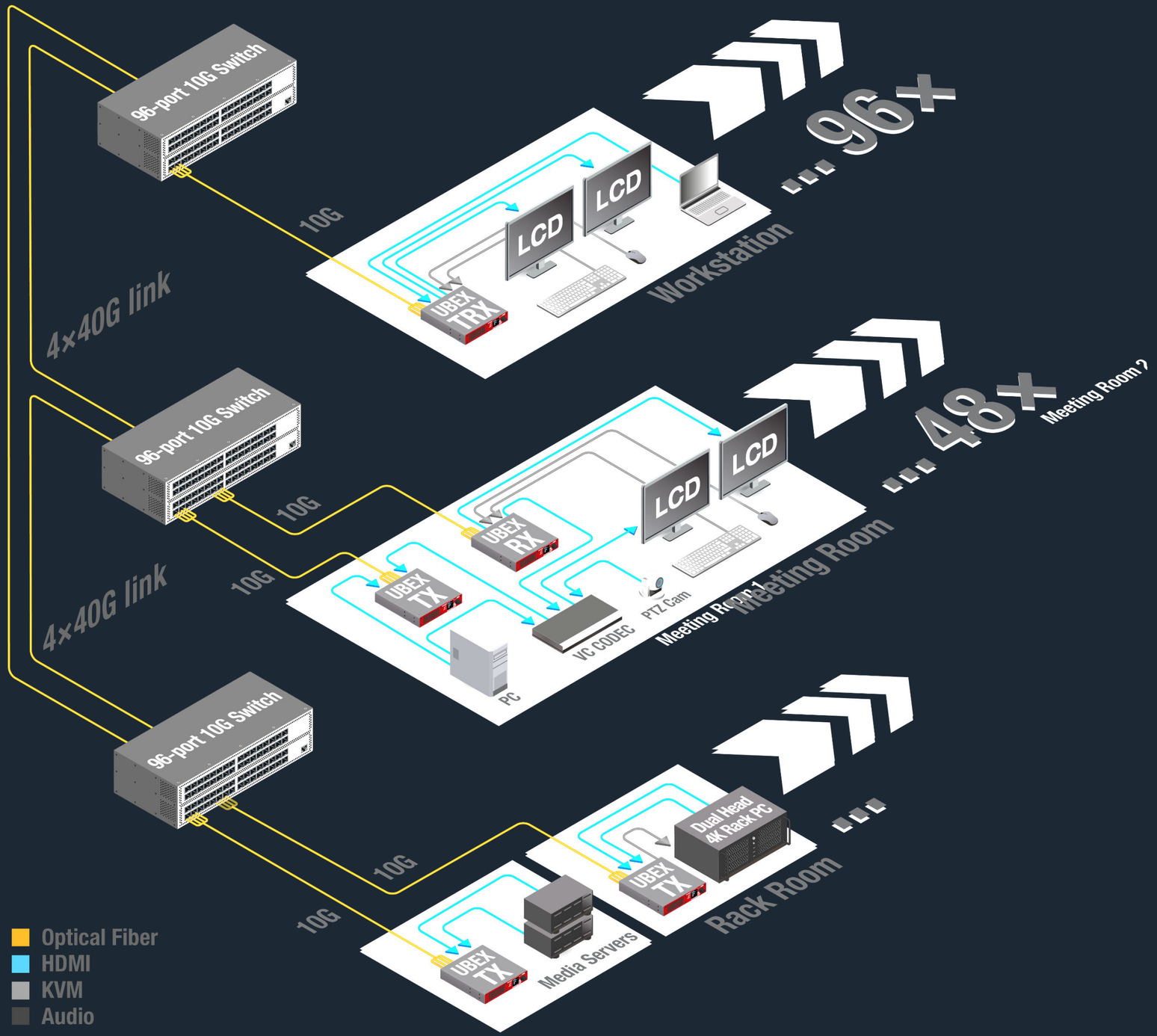
Use cases

Video wall



Use cases

Corporate



Questions

For more information visit
Mast Trade booth D2.2

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