The (AV)olution

AV Technology Trends and Drivers

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TECHNOLOGY TRENDS

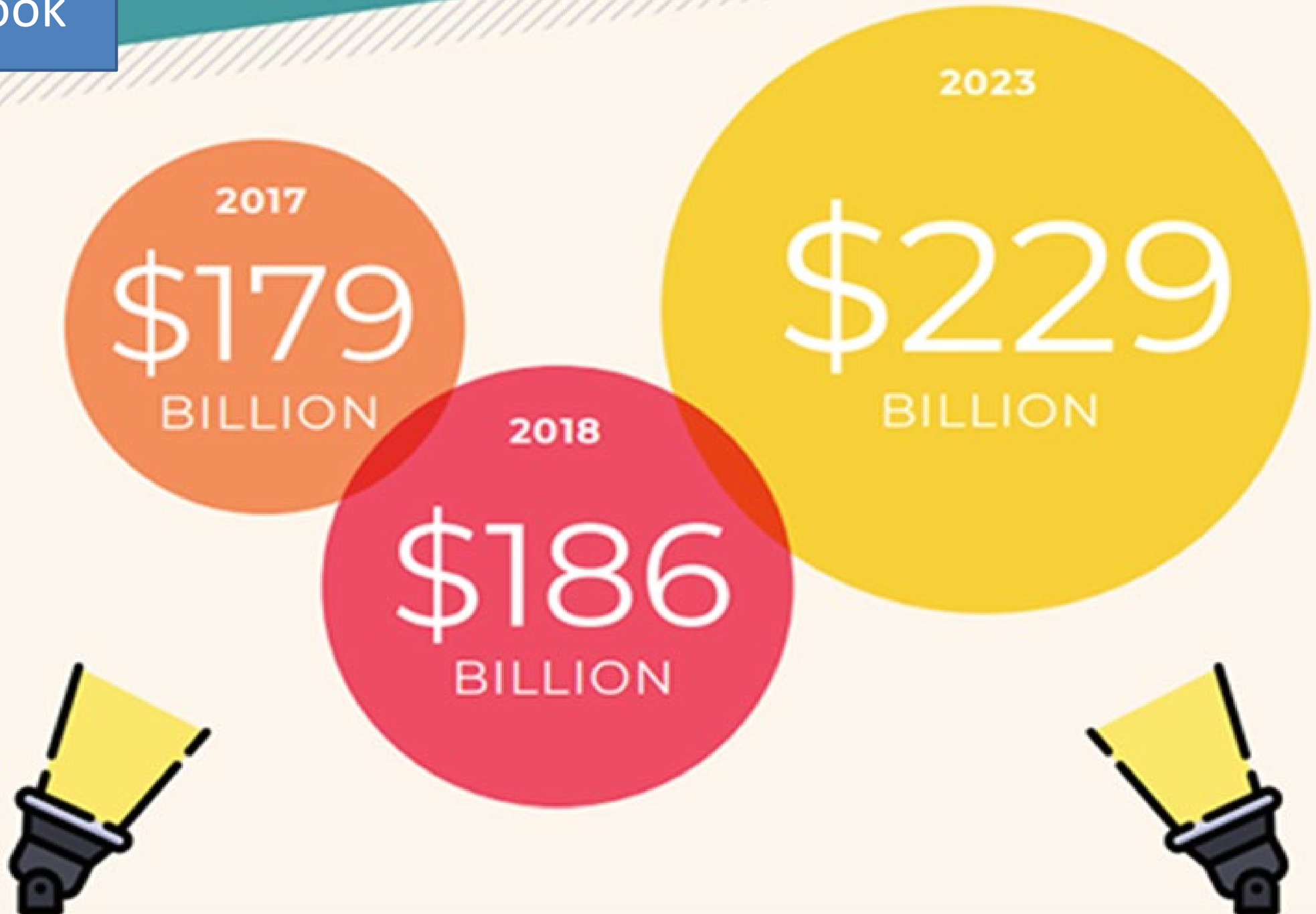
Emerging Trends

- Audio Enhancements
- Advance Future Display Technologies – Mixed Reality, VR, AR
- IoT for Smart Buildings
- Cloud Centric Management
- Artificial Intelligence

Industry Outlook

SIZE & GROWTH

The total pro-AV industry was $179 billion in 2017. This will swell to $186 billion in 2018 and then more than $229 billion in 2023, representing almost a 4.3% compound annual growth rate (CAGR) and $43 billion in additional value.



Paradigm Shift

- InfoComm International, the trade association representing the $178 billion commercial audiovisual industry, changed its name to AVIXA™, the Audiovisual and Integrated Experience Association.

What we understood

- Convergence had happened
- AV Endpoints had already transitioned to the network
- It’s now all about the network ; Networked AV
- Its all about providing an *Integrated Experiences* (IX)


What do you see?

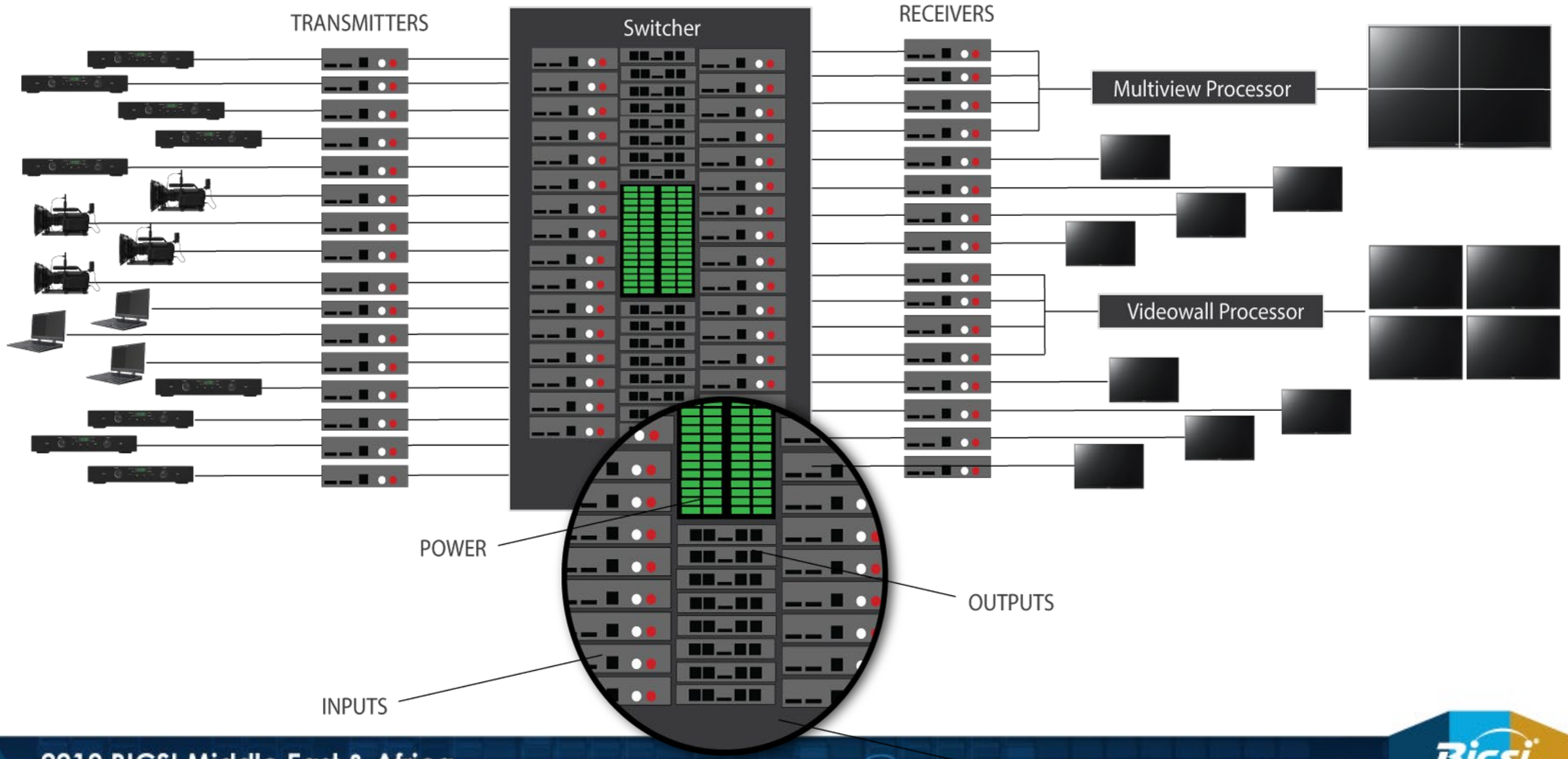
What we foresee

- Niche AV players to either evolve into IT domain or become obsolete
- General connectivity, or the Internet of Things, is driving sweeping change.
- More IT Centric Companies taking on a bigger role by providing Integrated, Converged Experiences
- Clients want full control of their network
- Security is of paramount importance
- Experiences cannot be compromised

The Technology Driver

AV OVER IP

Legacy Matrix Deployment



The Caveman – AV Matrix Switches

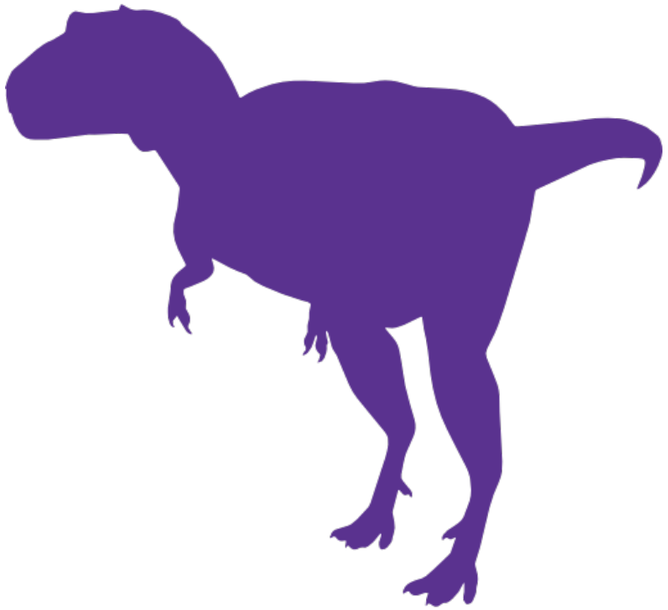
Fixed Sizes
Only come in fixed sizes like8x8, 16x16, 32x32, etc., lacking scalability and flexibility

Expensive
To purchase, install, and support

Custom Programming
Required for installation, modification, and maintenance

Proprietary components
Requires transmitters, receivers, extenders, switchers, control processors and input/output control devices

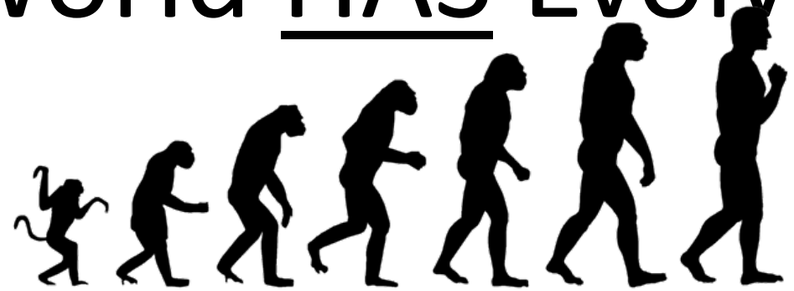
The “Old” Way



Going the Way of the Dinosaur

Matrix switches don’t meet today’s AV demands – with a lack of standards, flexibility, and scalability they demand a higher cost and vendor lock-in

The AV World HAS Evolved



Video Over IP technologies have matured

MPEG1 | MPEG2 | MPEG-4 | MJPEG | H.264 | 4K ULTRA HD | 4K *uncompressed*

IP Network speeds have increased exponentially

10mbps → *100mbps* → *1000mbps* → ***10000mbps***

IP Network equipment costs have decreased exponentially

$$$

Over $10,000 in 2010

$$

$7,999 in 2013

$

Over $1799 in 2017

BUT NOT EVERYTHING IS EVOLVING

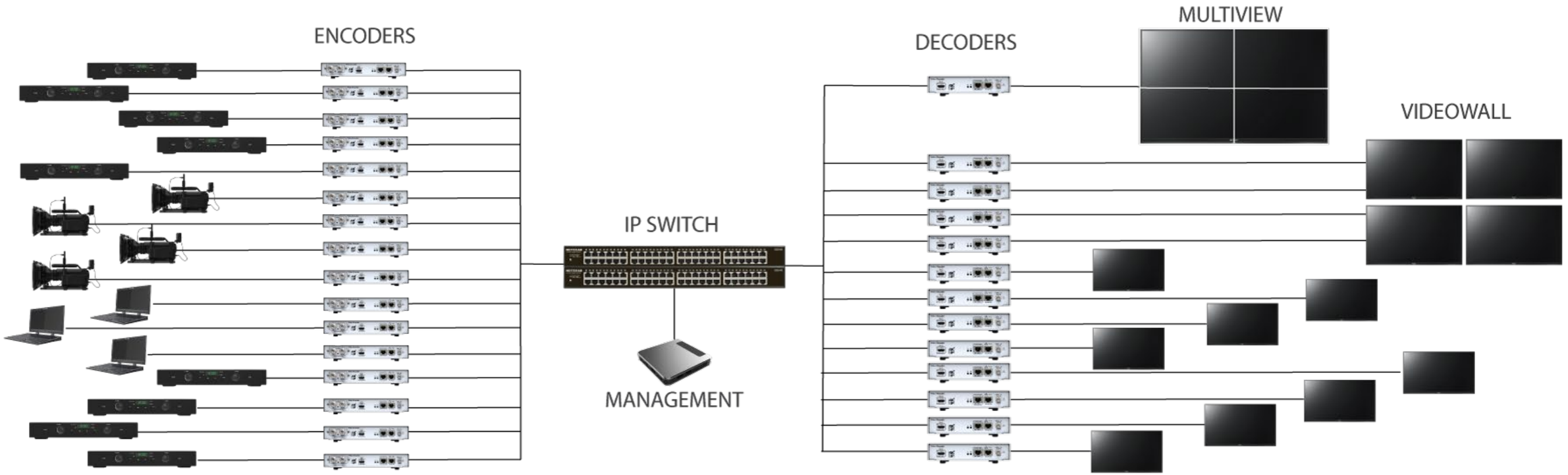
Matrix switches still continue to be expensive while facing independent infrastructure requirements and scalability issues

In 2013
16x16
~$9800 + Blades

In 2017
16x16
~$8800 + Blades

You Need to Evolve With It

AV over IP Deployment



Today – AV over IP

Scalable
Support any size configuration with no constraints

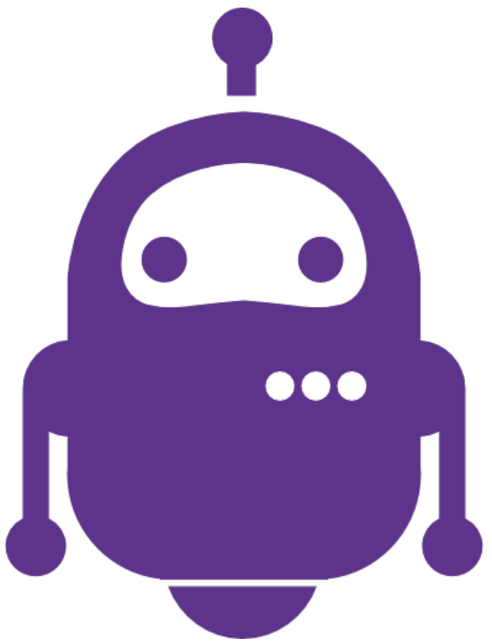
Cost-Effective
Runs on Standard IP network and requires fewer components

Controlling, Not Programing
Easier to install, configure, and maintain and does not require specialized training

Standards-Based
Increased interoperability and integration options

AV over IP requires a mindset change

- Stop thinking about stand alone rooms
  - Not an effective use of AV over IP
- Think central switch linking multiple rooms
  - Delivers cost savings and true benefits



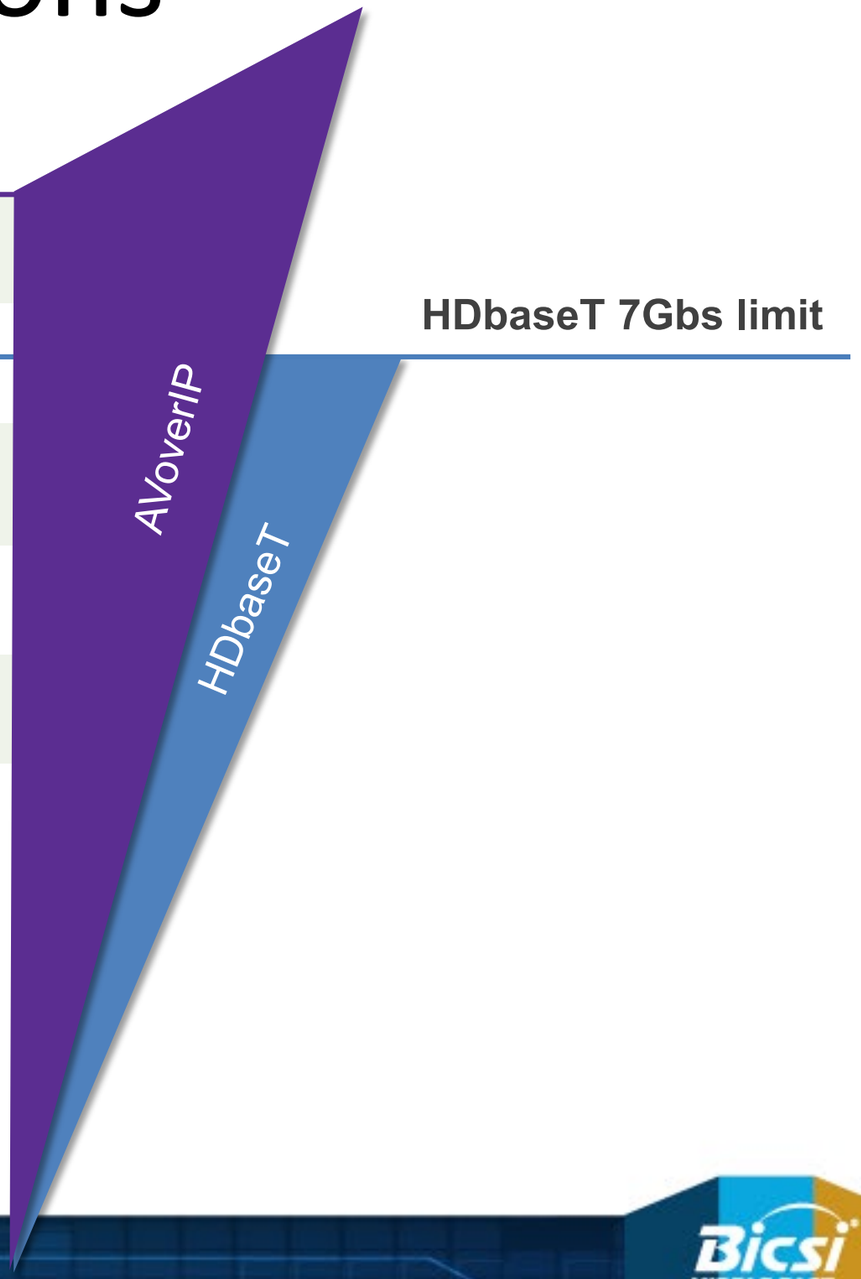
The Future is Now

The AV world is moving they way other communications industries have – leveraging IP networking to gain scale, flexibility, and affordability

Bandwidth Considerations

AV over IP – No Upper Limit

HDMI 2.0 (level a)	4K	60 fps	4:4:4	8 bit	**= 12.7 Gbps**
HDMI 2.0 HDR	4K	60 fps	4:2:0	10 bit	**= 8 Gbps**
HDMI 1.4 / HDMI 2.0 (level b)	4K	60 fps	4:2:0	8 bit	**= 6 Gbps**
HDMI 1.4	4K	30 fps	4:4:4	8 bit	**= 6 Gbps**
HDMI 1.4	1080P	60 fps	4:4:4	8 bit	**= 3.2 Gbps**

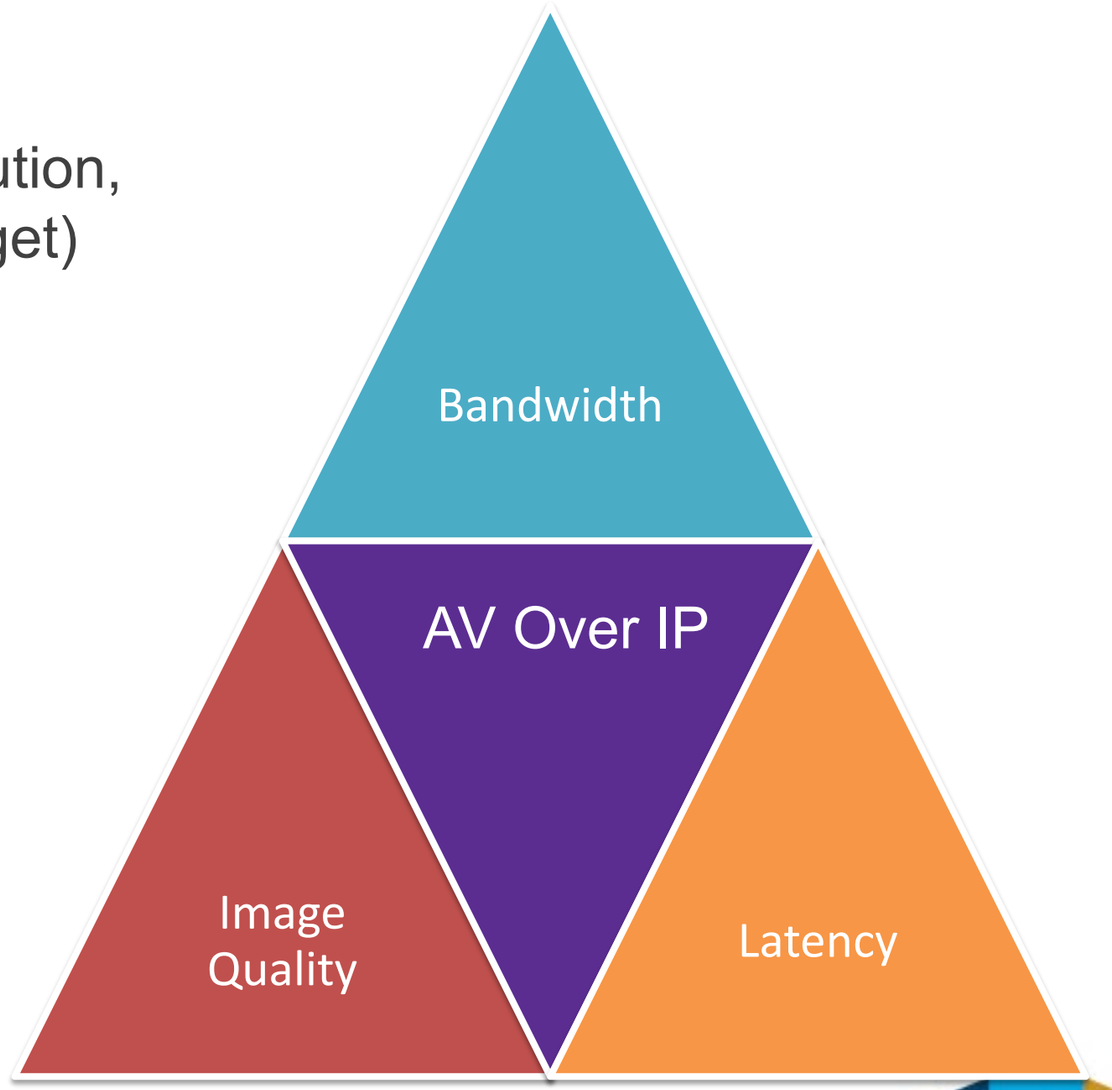


AV over IP Provides More Flexibility

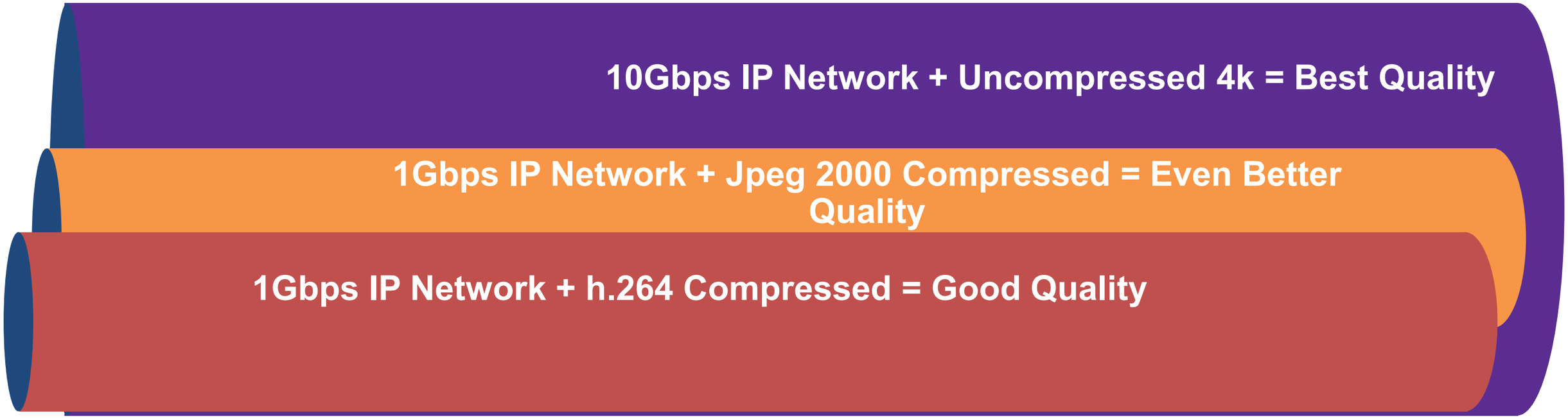
Future-proofing AV distribution

Triangle of Considerations

Available bandwidth, desired quality/resolution, and latency requirements (along with budget) influence which products are the best fit.



Network/Quality Comparison



Industry Challenge

- Current Networks are on 1G or 10G backbone
- Most Networks are 1G but 4K requires compression on 1G
- Requirement to have uncompressed 4K Signals on 1G or 10G?
- On 10G, it is lossless and uncompressed

Question

Can you imagine a world where we need systems capable of managing less bandwidth? Not a chance.

Important – Sizing Network is Important

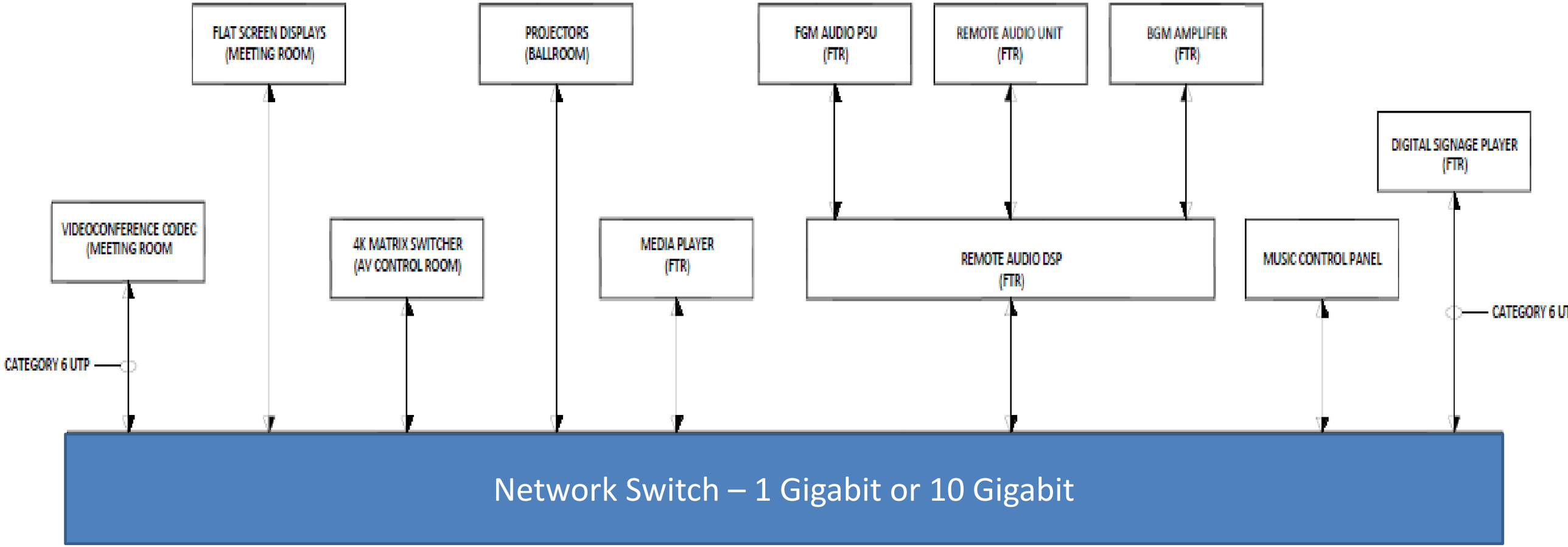
Higher-bandwidth IP like 25, 40, or 100Gb, will be required

Network Design is crucial

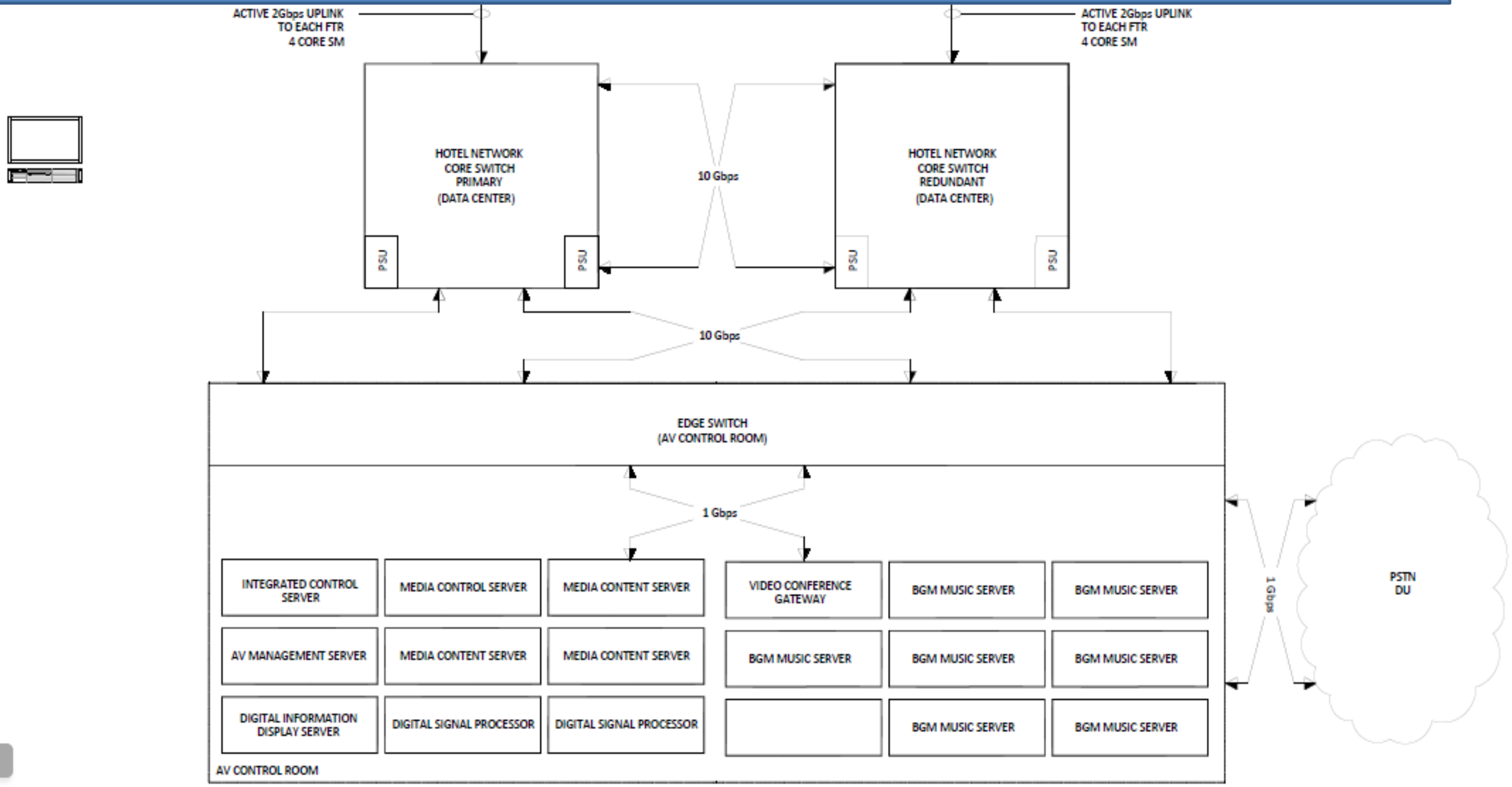
Switches are everywhere

Going forward – The IT Approach

INTEGRATED AV/ IT ARCHITECTURE APPROACH


FLAT SCREEN DISPLAYS (MEETING ROOM)
PROJECTORS (BALLROOM)
FGM AUDIO PSU (FTR)
REMOTE AUDIO UNIT (FTR)
BGM AMPLIFIER (FTR)
DIGITAL SIGNAGE PLAYER (FTR)
VIDEOCONFERENCE CODEC (MEETING ROOM
4K MATRIX SWITCHER (AV CONTROL ROOM)
MEDIA PLAYER (FTR)
REMOTE AUDIO DSP (FTR)
MUSIC CONTROL PANEL
CATEGORY 6 UTP
CATEGORY 6 UT
Network Switch – 1 Gigabit or 10 Gigabit

Network Switch – 1 Gigabit or 10 Gigabit



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SDVOE – SOFTWARE DEFINED VIDEO OVER ETHERNET

What is SDVoE

The SDVoE Alliance to standardize the adoption of Ethernet to transport AV signals in professional AV environments

Provide an ecosystem around SDVoE technology allowing software to define AV applications

Initial members Semtech, Aquantia, Christie Digital, NETGEAR, Sony and ZeeVee.

Very Soon

- Standardize Ethernet to transport AV signals
- Unified hardware/software UI providing Integrated Experiences
- System architecture that is more flexible, reliable, and cost-effective than point-to-point connectivity and circuit switches – conventional AV
- AV Data networks sharing a SINGLE infrastructure
- Bring ecosystem partners – equipment manufacturers, software developers, chipset designers, and system integrators — together under ONE Umbrella

THE CONCLUSION

What AV Users Want

- Cost effective solutions for AV
- To avoid stranded investment in expensive AV switching platforms
- THE standard platform – Ethernet
- One platform for IT and AV
- Can be managed by IT team (true convergence)
- Ease of deployment
- Huge flexibility
- Future proofing

QUESTIONS?