

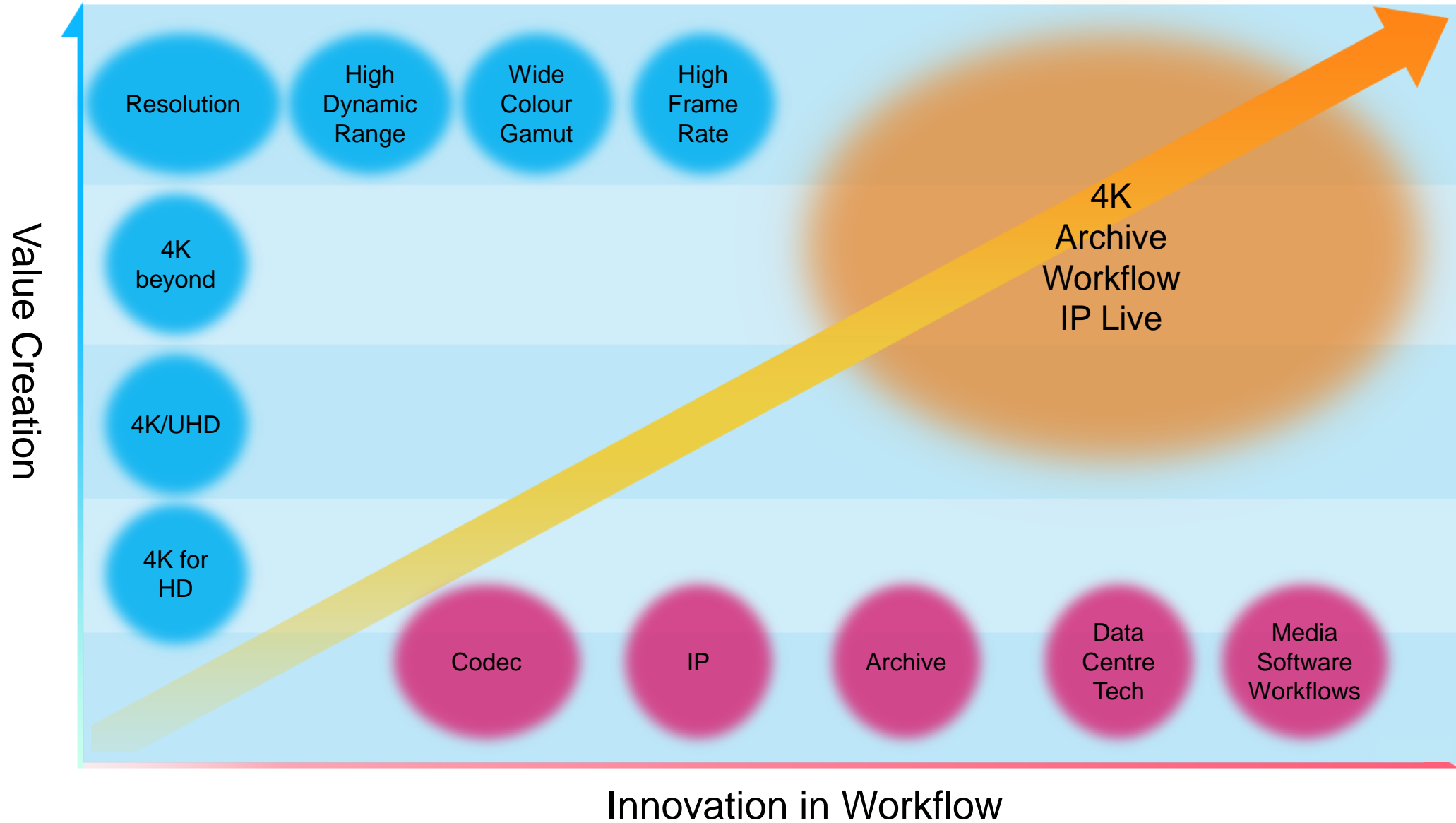
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Latest Developments in 4K/UHD & IP

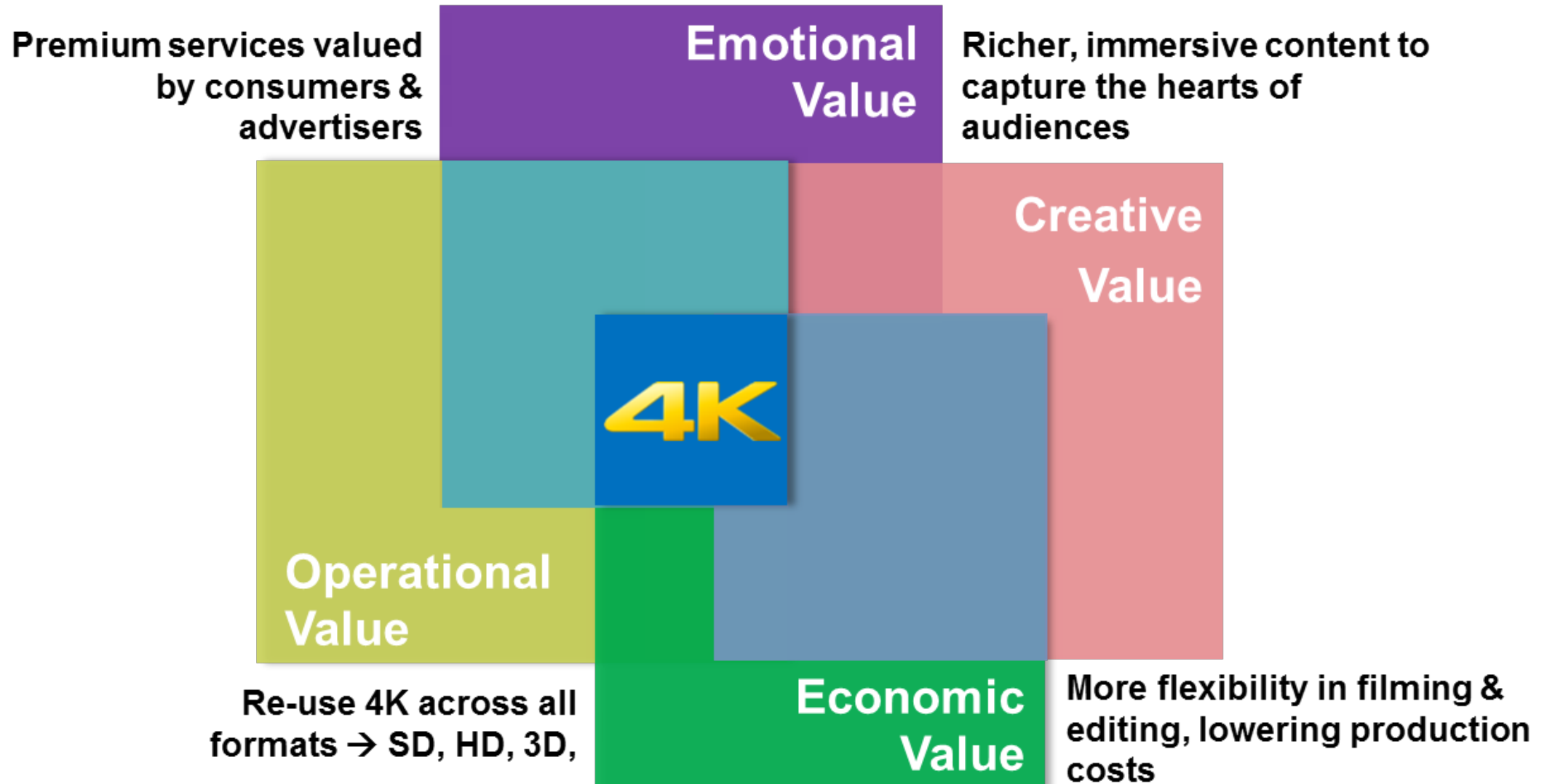
Norbert Paquet

Strategic Marketing Manager
Sony Professional Solutions Europe

Technology direction



The benefits of 4K



Shot with CineAlta

Cannes 2014, Palme d'Or Winner



Shot with CineAlta

“Dheepan”, Cannes 2015, Palme d’Or Winner



Shot in 4K Live

Chanel Fashion Show



Shot in 4K Live

Les vêpres à Versailles



Shot in 4K Live

UEFA Champions League Final 2014 & 2015



Shot in 4K for HD

Canal+ Talk Show

TRIMASTER EL

Virtual Camera

4K Frame



Shot in 4K HDR

Silverstone MotoGP

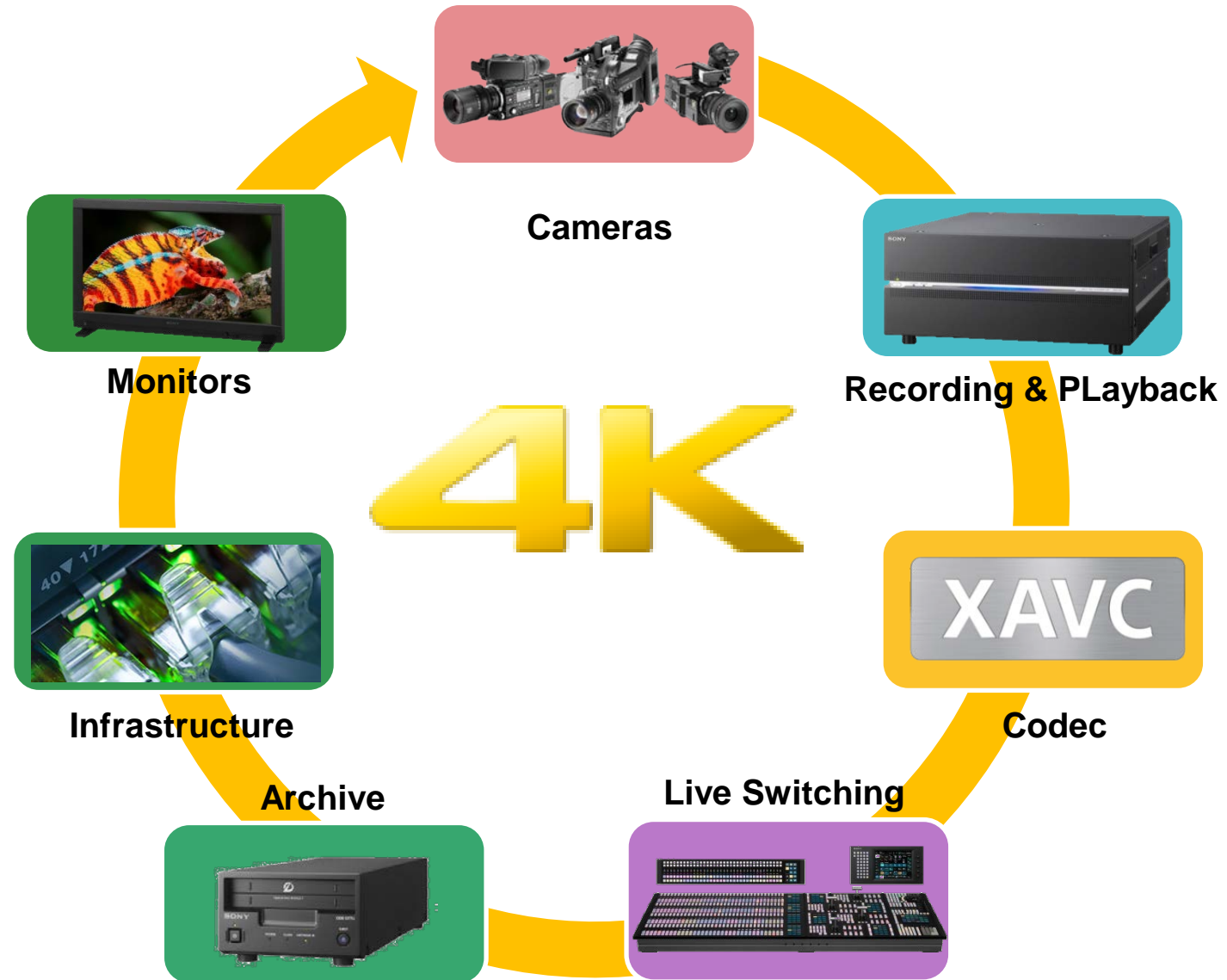


Industry situation

First 4K UHD services are appearing



Sony Professional Solutions for 4K & HD Productions



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The Infrastructure Challenge

IP for Live Production

Vision

Current BC infrastructure: Real-time & File-base

Live environment is SDI base

- For monitoring in real-time

Guarantee signal path/sync

- Seamless switching
- One-way, Constant bitrate, Constant latency

Limitation of Expandability

- Computer/format



BC
Station

Production is Network base

- Non-linear editing, File base
- Cost-down by COTS

Best effort type

- Not guarantee latency/sync

High expandability

- Adding low-cost IP switch & IT storage for easy expansion



Vision

Unified architecture using COTS for IP Live Production

Sony is OPEN to standards & LEADING "AV over IP" technology development in the industry.

Cover the workflows and operational practices of a conventional SDI-based Live production environment

Based on existing and draft standards and complemented new technology proposals

Develop in such a way as to maximize the benefits of IP-based technologies while carefully watching to ensure that nothing is lost by their adoption

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Approach

Approach: Joint-working with industry leading partners

Joint Taskforce on Networked Media



Core Technology Development



LSI & FPGA IP Core



Network Manager

3rd Party Alliance



Converters/Routers



Graphics



Multi-viewer



Servers

Adopting to all Sony products



Networked Media Interface Supporters

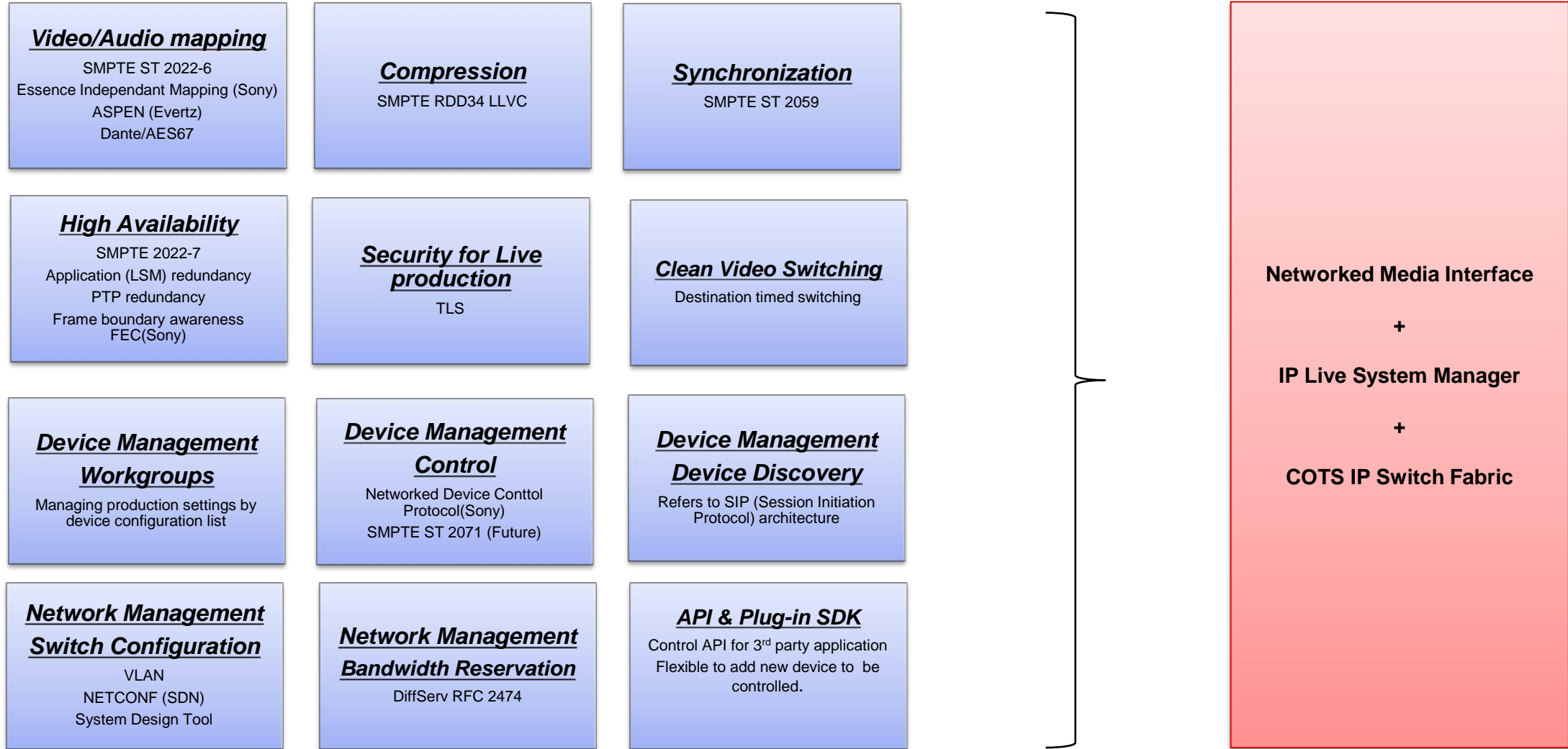
The following 36 leading companies support Sony's initiative



Key Technologies & Standards

Summary of key technologies required to achieve IP Live Production

An IP Live Architecture is:



SMPTE 2022

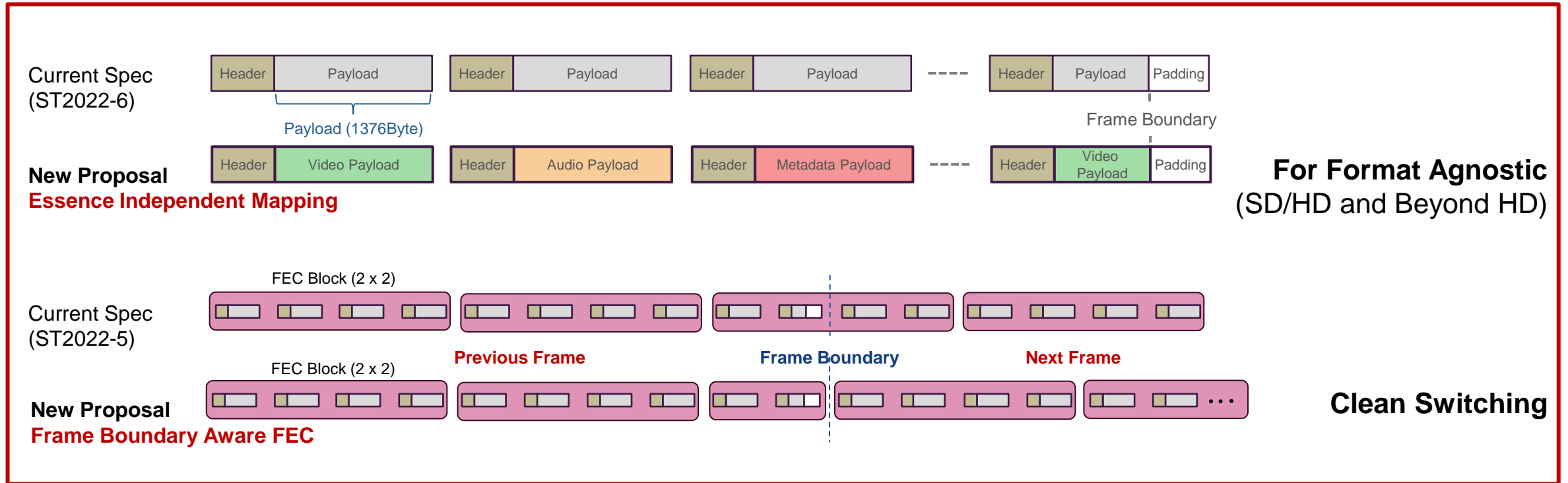
- SMPTE 2022-1 “Forward Error Correction for Real-Time Video/Audio Transport Over IP Networks” (for compressed TS)
- SMPTE 2022-2 “Unidirectional Transport of Constant Bit Rate MPEG-2 Transport Streams on IP Networks”

SMPTE 2022 is originally developed as a **contribution** standard
Only for SD & HD – **No 4K** Support
No Synchronization method
No compression can be used to optimize bandwidth

- SMPTE 2022-5 “Forward Error Correction for High Bit Rate Media Transport over IP Networks” (uncompressed only)
- SMPTE 2022-6 “High Bit Rate Media Transport over IP Networks”
- SMPTE 2022-7 “Seamless Protection Switching of SMPTE ST 2022 IP Datagrams”

Proposal to SMPTE

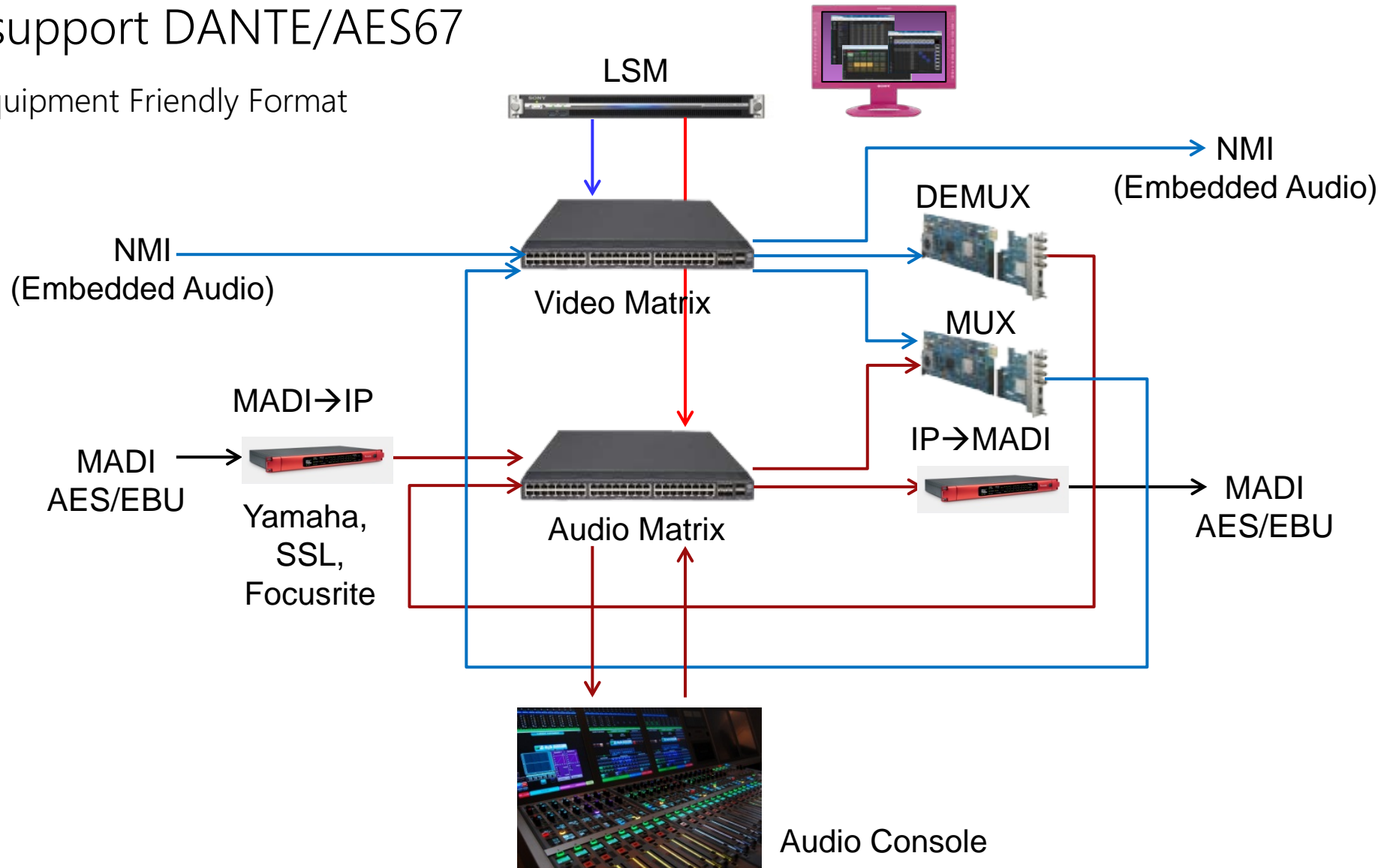
Proposed New Standard based on Sony's Networked Media Interface through VSF, SMPTE



About Audio IP

Sony will support DANTE/AES67

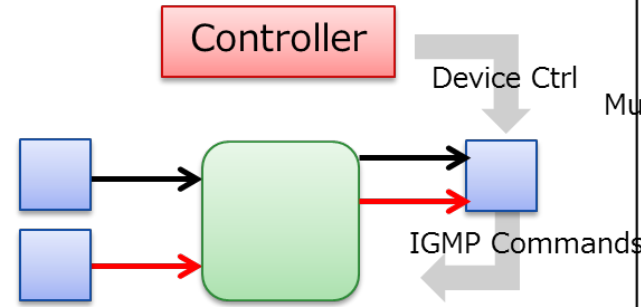
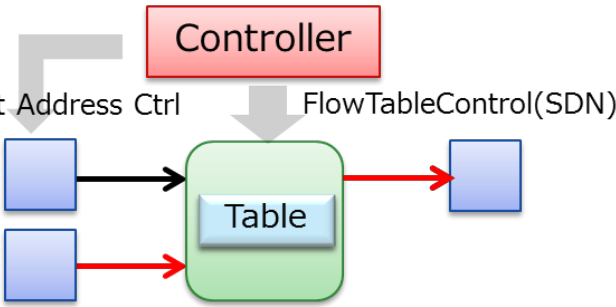
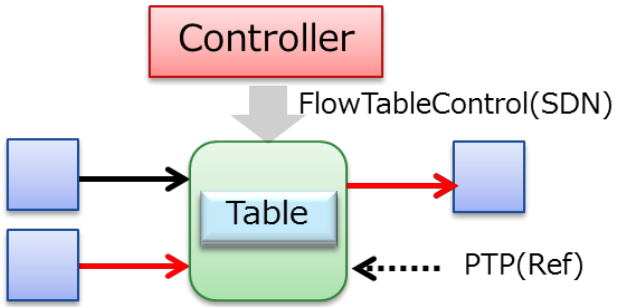
Audio Equipment Friendly Format



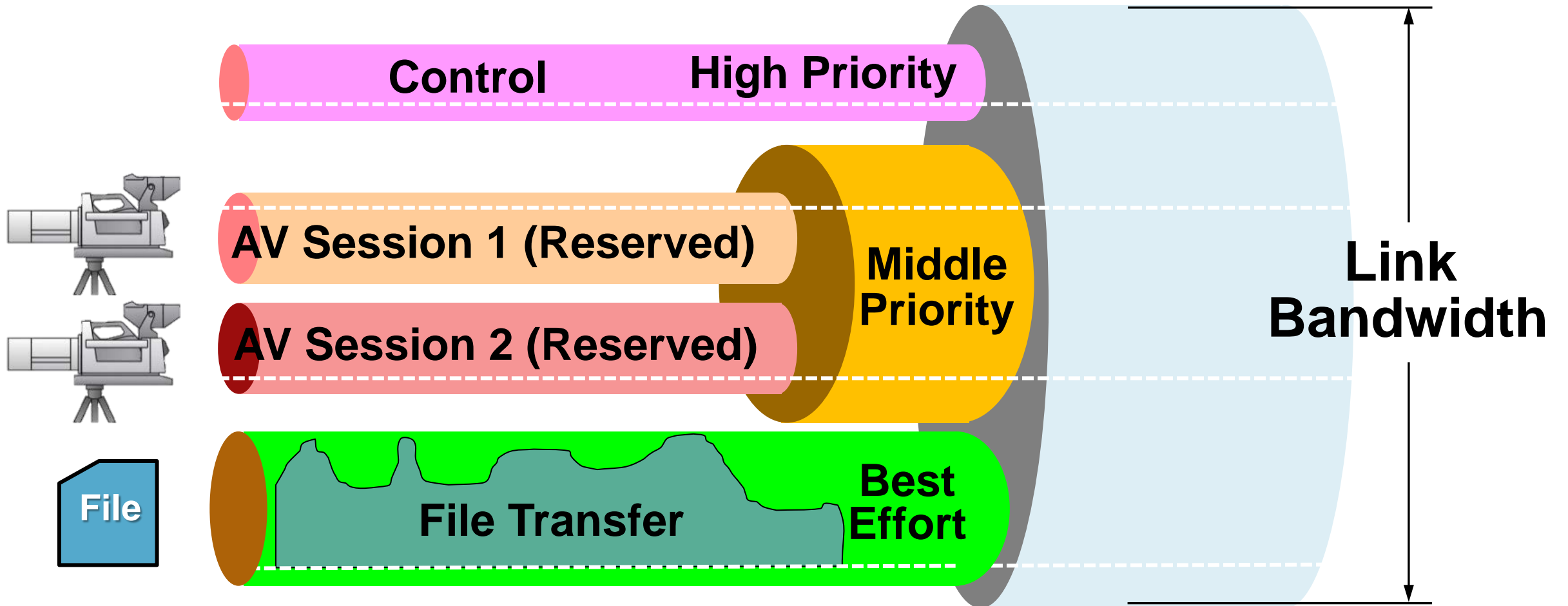
Control Plane - Clean Video Switching

Not only AV stream but also ...

- Switching Method
- Device Control Protocol

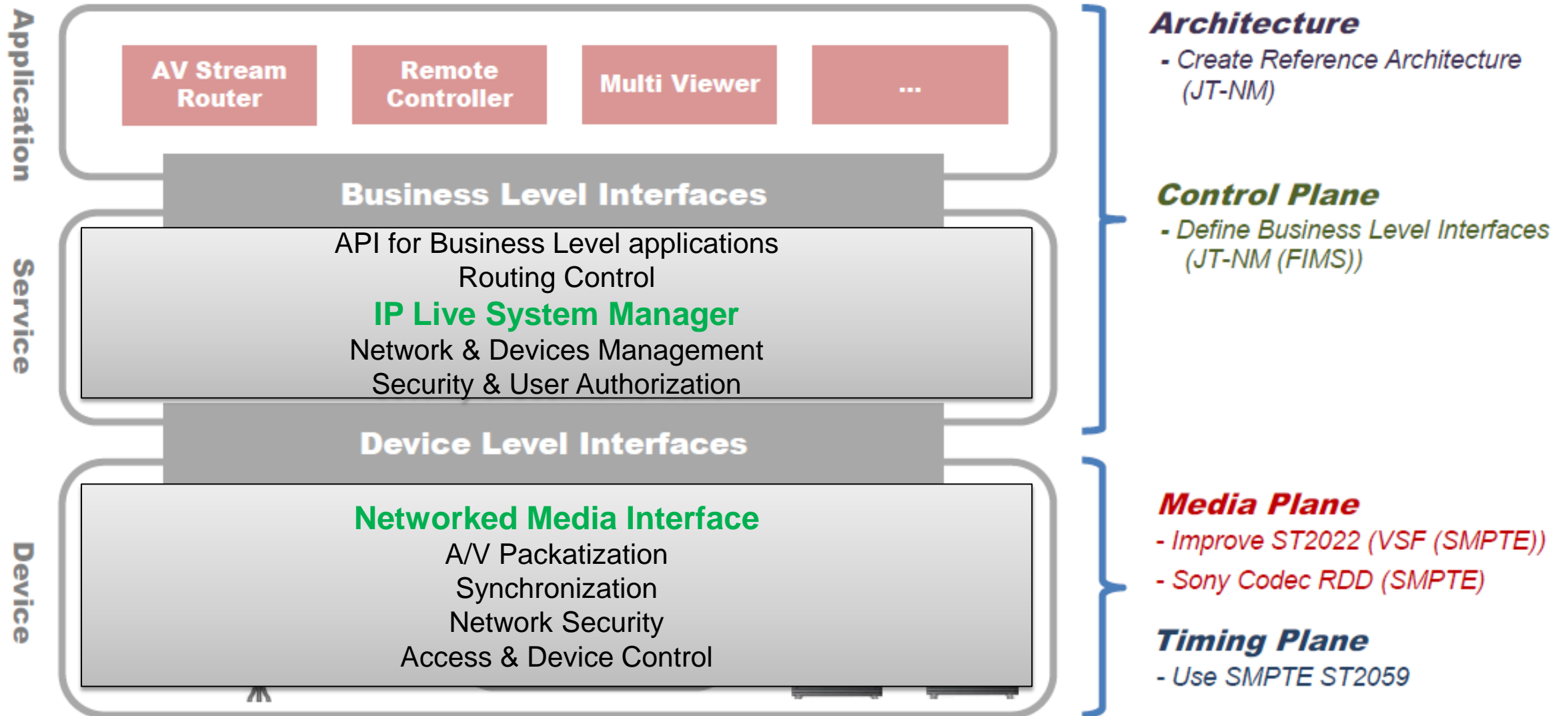
Destination Timed Switch	Source Timed Switch	Switch (Timed) Switch
Sony, Snell	Lawo/Arista	Evertz, Cisco/GV
 <p>Device COTS IP Switch</p>	 <p>Device Special IP Switch</p>	 <p>Device Special IP Switch</p>
<ul style="list-style-type: none"> • Clean Sw Control at Rx device • Double bandwidth is required at destination in overlap period • COTS IP Switch can be used 	<ul style="list-style-type: none"> • Clean Sw Control at Tx device • No double bandwidth penalty • Very accurate sync control is required for Tx device • System scalability issue (Under Development) 	<ul style="list-style-type: none"> • Clean Sw Control at IP Switch • No double bandwidth penalty • Special IP Switch is required (Under Development) • Clean switching is not adopted due to time reservation switch

Control Plane – Network Management



Reliable Streaming by Bandwidth
Reservation and Priority Setting

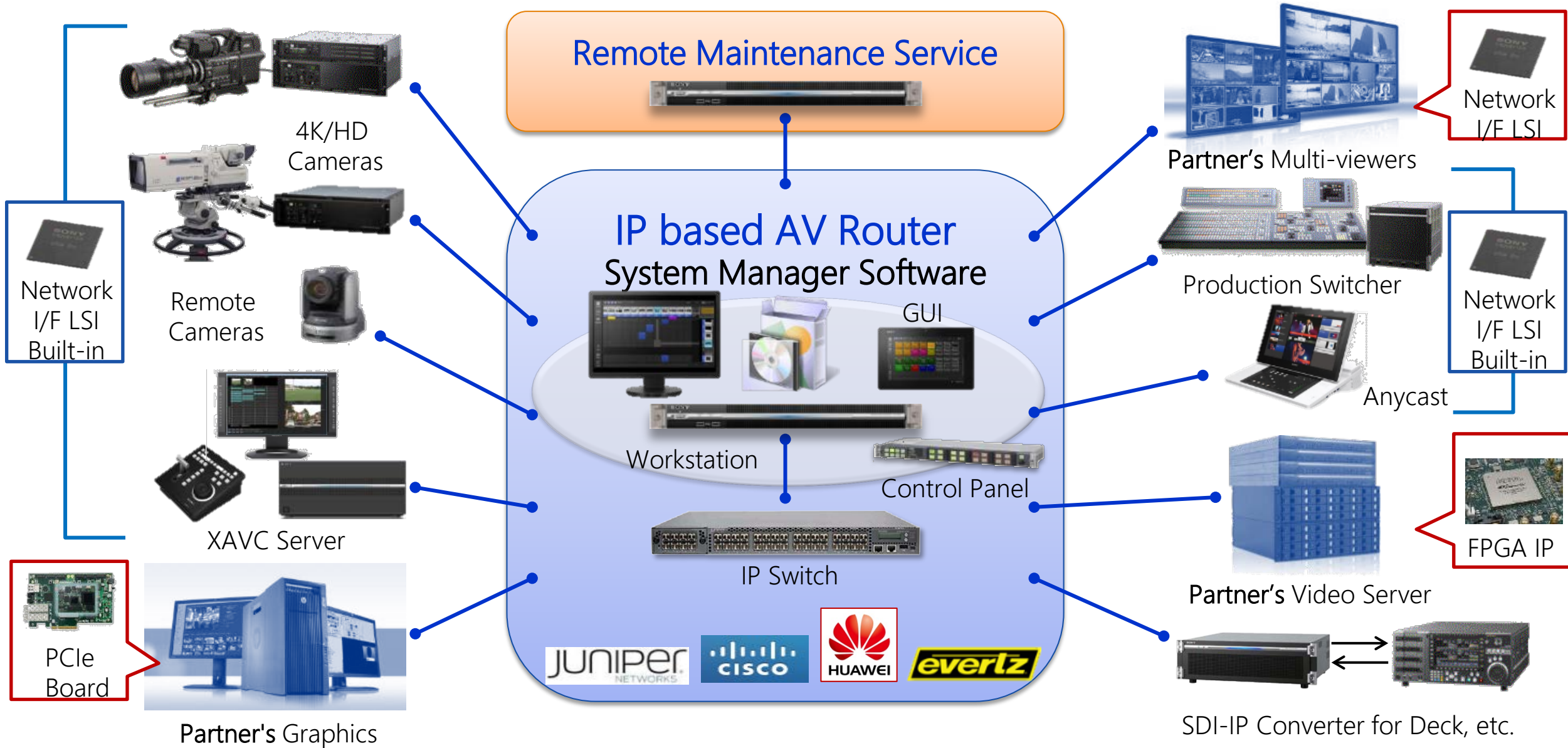
General Architecture



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Product Plan

IP Live Production Overview



Sony Products

E/November 2015

IP LIVE SYSTEM MANAGER

- Setup, Matrix Config. & Cross-point Switching, System Maintenance, SDK for Alliance Partners, Integration with    



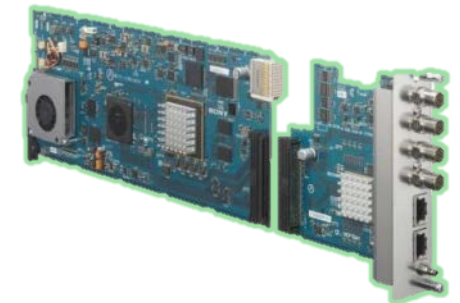
SIGNAL PROCESSING UNIT

- Rack mountable frame for Networked Media Interface Converter boards, 18 slots, Redundant PSU, 3RU



SDI-IP CONVERTER BOARDS

- Convert SDI from/to Networked Media Interface



Sony Products

E/December 2015

XVS-8000
HD/4K Switcher Processor



PWS-4500
HD/4K Video Server

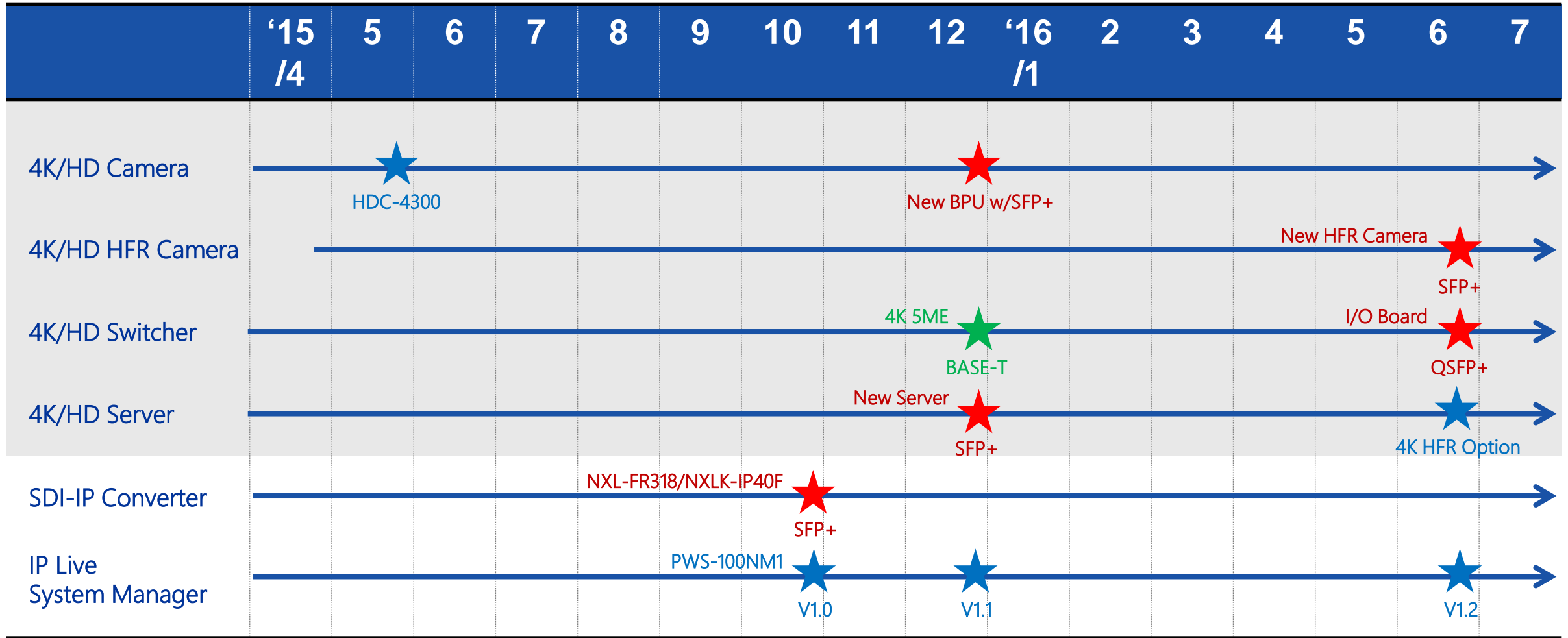


BPU-4500
HD/4K Camera Processor Unit



Networked Media Interface - Sony Products Roadmap

★
★
★
 Product Ex-Factory



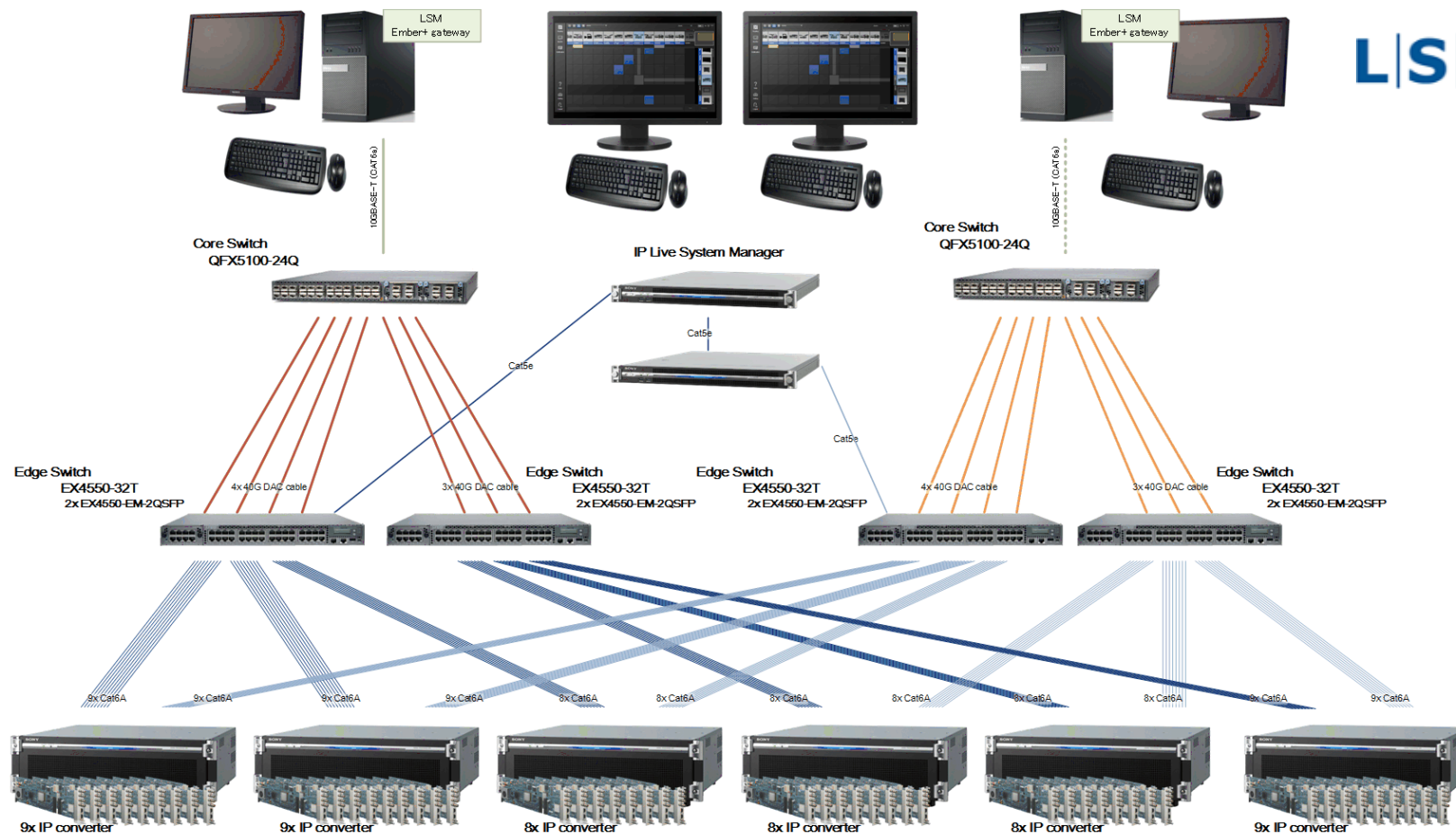
* More "IP Live" products are under planning for CY16.

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PoC Achievements

HD System POC (Proof of Concept) Test

Proof of Concept: 100x100 Uncompressed HD Routing, Hitless Failover, etc.



L|S|B

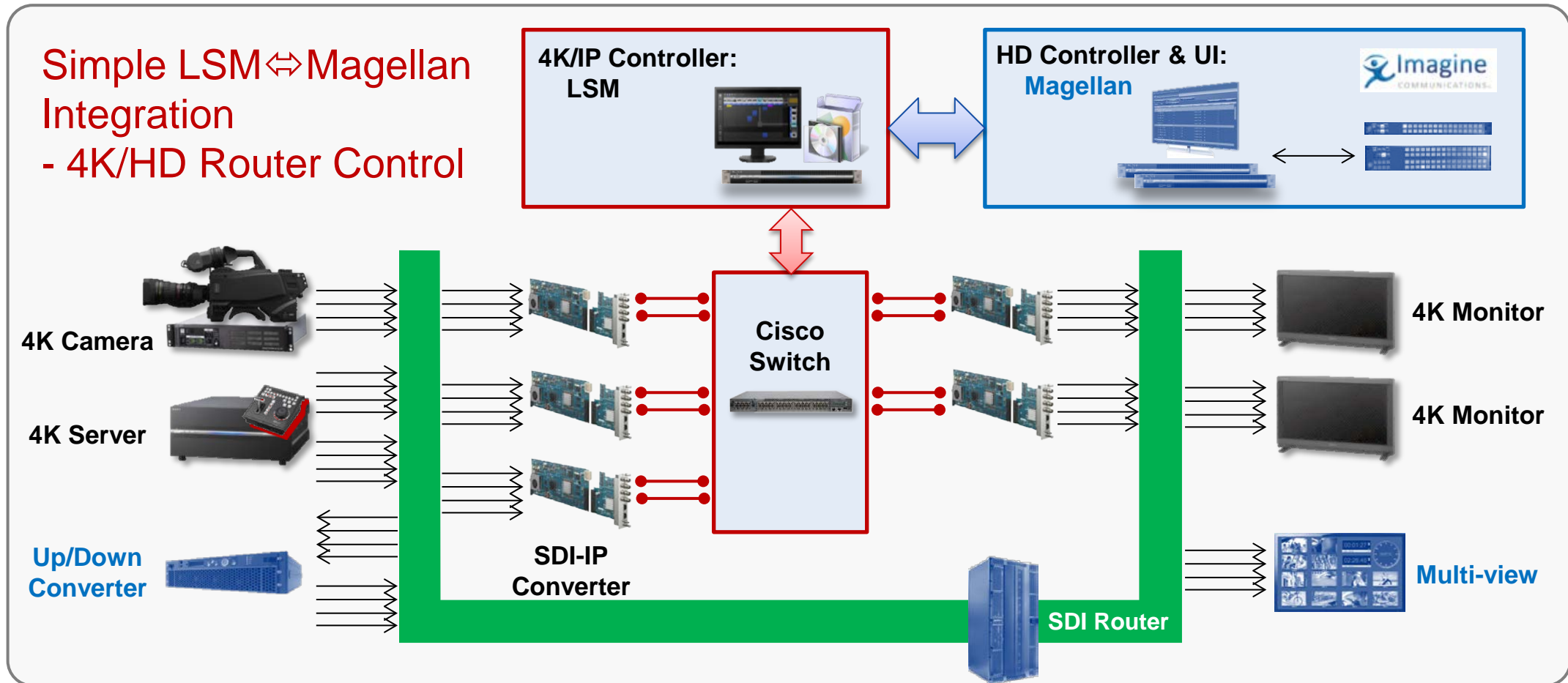
3rd Party UI Integration:
- VSM from L-S-B

COTS IP Switch Use:
- Juniper & Cisco

HD Middle Class IP
Router for OB Truck
and Studio

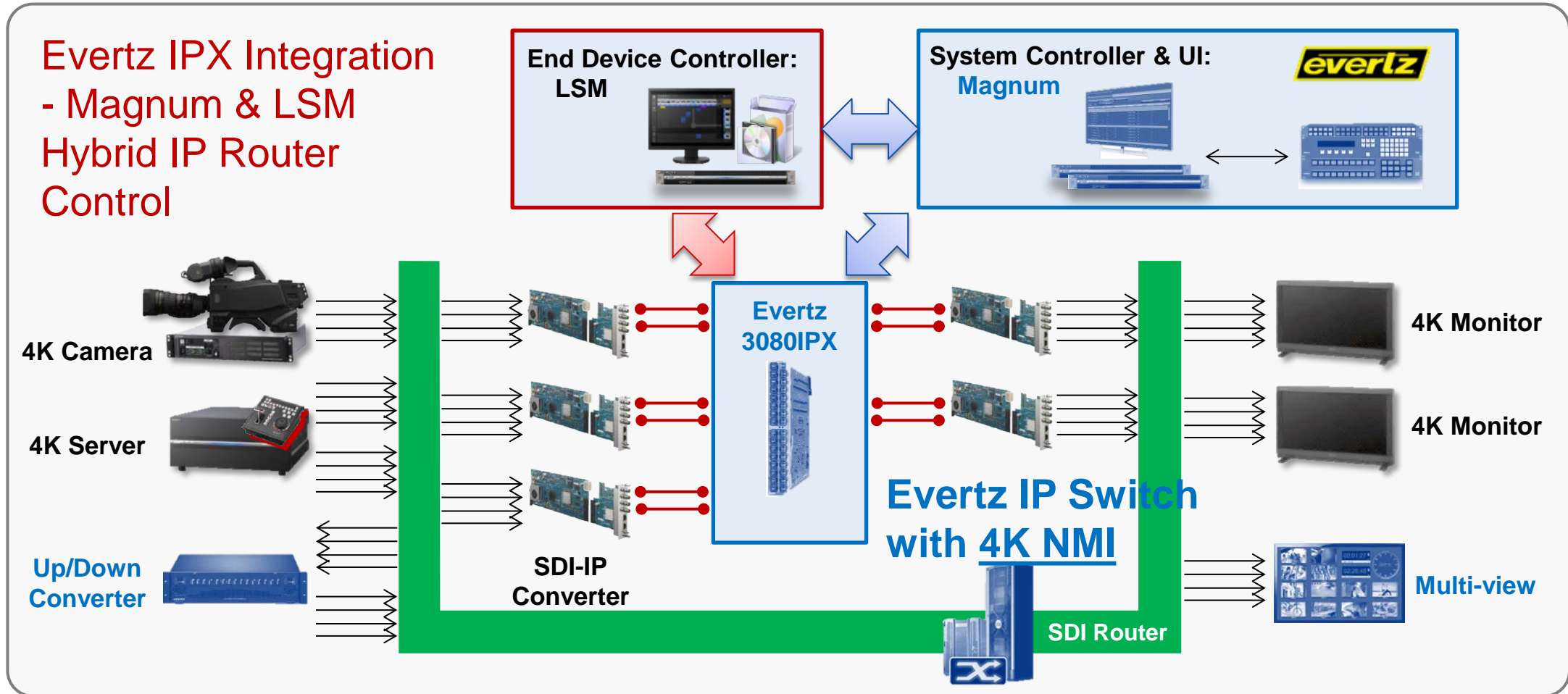
4K/HD System POC Test (1/2)

Proof of Concept: Collaboration with Imagine



4K/HD System POC Test (2/2)

Proof of Concept: Collaboration with Evertz



Update Summary

Standardization & Partnership: LLVC as SMPTE RDD & 36 Supporters
IP Interoperability with 3rd Party will be ready.

Product Update: Camera, Switcher, Server, LSM & Converter
Targeting deliverable at Beginning of 2016

Proof of Concept: 100x100 Uncompressed HD Routing, Hitless Failover, etc.
HD Middle Class IP Router for OB Truck and Studio

Proof of Concept: Collaboration with **Imagine**
4K/IP System for OB Truck and Studio

Proof of Concept: Collaboration with **Evertz**
4K/IP System for OB Truck and Studio

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