

The Ficam logo, consisting of the word "Ficam" in a bold, white, sans-serif font on a dark blue rectangular background. To the right of "Ficam", the words "CINÉMA", "AUDIOVISUEL", and "MULTIMÉDIA" are stacked vertically in a smaller, white, sans-serif font.A large, stylized arrow graphic pointing to the right, filled with a sunset beach scene. The sun is low on the horizon, casting a golden glow over the ocean and the wet sand of the beach. The sky is a mix of orange, yellow, and light blue. The arrow's tail is on the left and its tip is on the right, creating a sense of forward motion.

SDI sur IP, enjeux et standards

Frédéric Guiot

*Sales Director, Production & Playout
EMEA*

Who we are

harmonic.

The Worldwide Leader

in video delivery infrastructure



Enabling amazing video experiences

Harmonic-at-a-Glance



403M\$

2018
Net Revenue

1 300

Employees

SILICON
VALLEY

Headquarters

>5 000

Media & Service
Provider Global
Customers

>90M\$

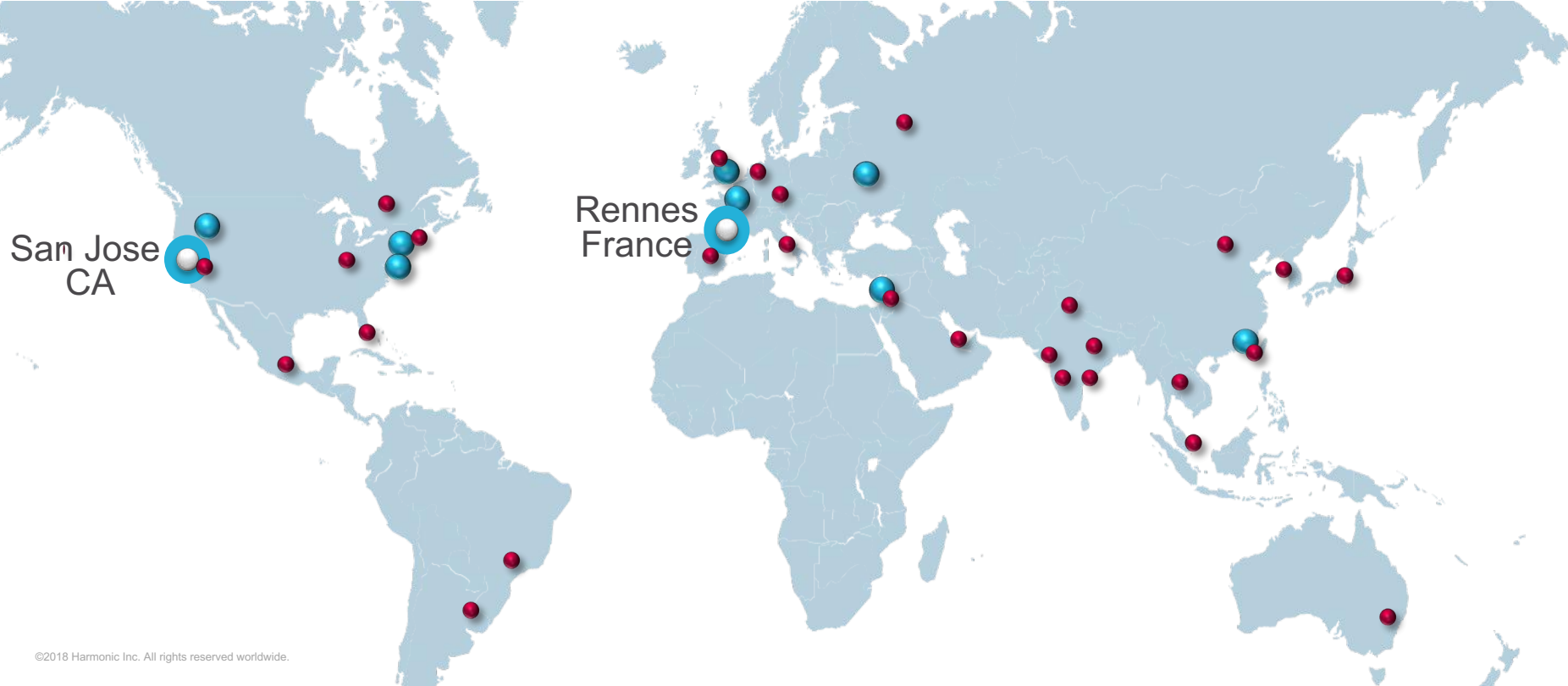
R&D Spend



Global Presence



● Corporate / Regional HQ / R&D Locations ● Sales & Services Support Centers



Our Customers

BROADCAST & MEDIA

arqiva

HBO

ESPN

BBC

Discovery

M7

TF1

bce

6 GROUPE

NDR

beIN MEDIA GROUP

RED BEE

STAR SPORTS Believe

CNN

NTK

TELCO

Singtel

TELECOM ITALIA

中華電信
Chungwa Telecom

vodafone

BT

Telefonica

orange

etisalat

swisscom

altice

CABLE

StarHub

J:COM

Charter COMMUNICATIONS

unitymedia

CABLEVISION

COM HEM

Virgin media

Shaw

telenet

vtr

COX

NOS

cablecom

COMCAST

歌华有线
BGCTV

SATELLITE

ECHOSTAR

SKY PerfecTV!

FOXTEL

SUN TV NETWORK

yes

Cignal

DIRECTV

Telstra

MULTI CHOICE
ENRICHING LIVES

MULTISCREEN

DIRECTV NOW

astro

youSee

GLOBECAST

MX1

MEDIASET

UUX

la telecom

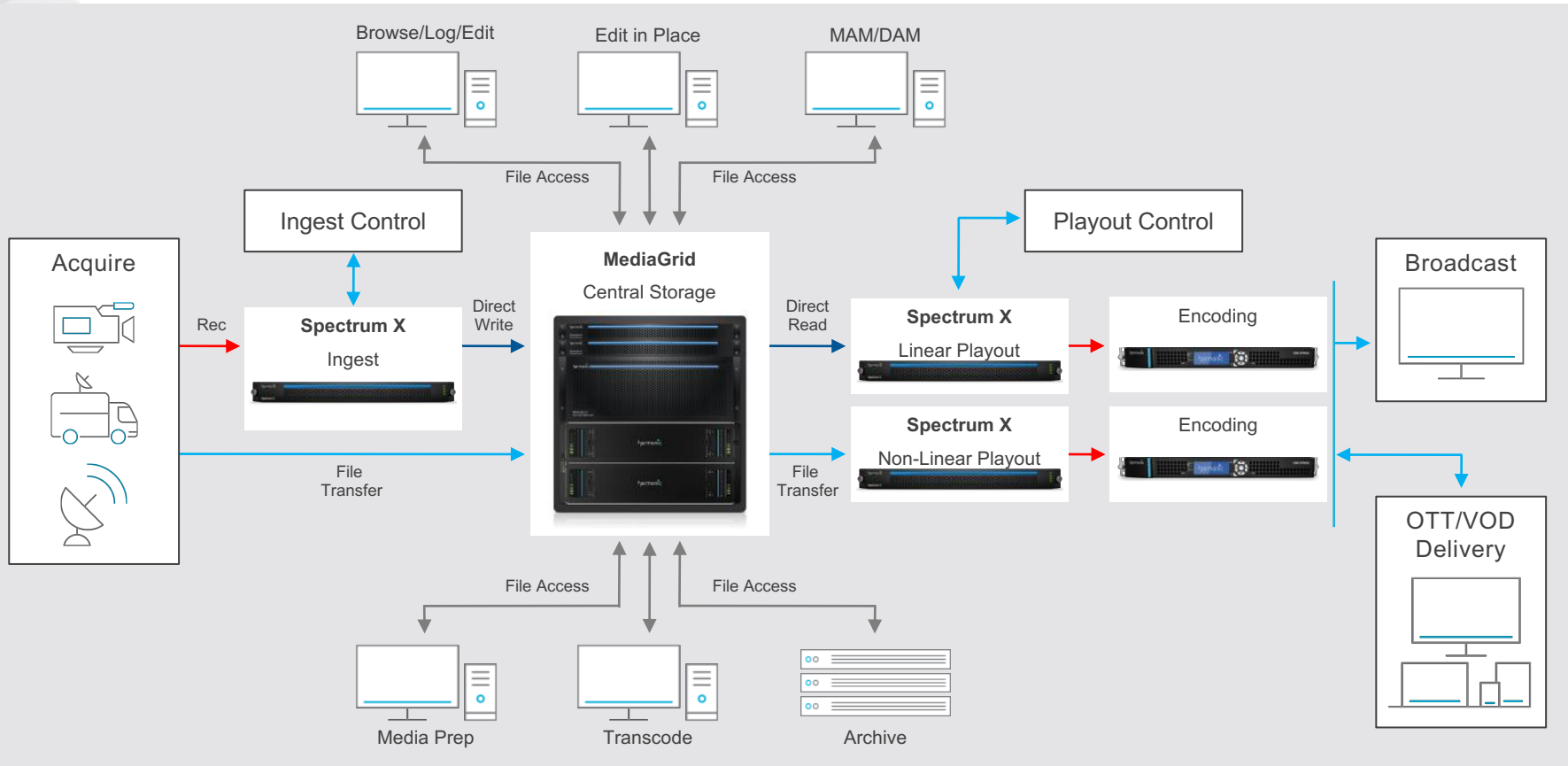
NEP

Televisa

A large, stylized graphic of a beach at sunset. The sun is low on the horizon, casting a warm orange and yellow glow across the sky and reflecting on the wet sand. Gentle waves are visible in the foreground. The entire scene is framed by a large, semi-transparent arrow shape pointing to the right, which is layered over the background image.

Les enjeux

Studio Production

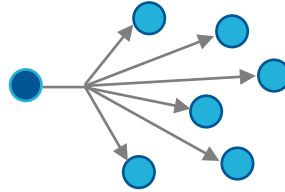




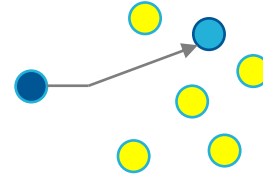
- Routes for signals are made by direct control of the crosspoint matrix
- Router tables help sub-divide the router

Multicast At A Glance

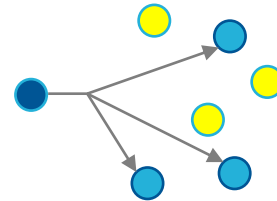
- Broadcast: One to all within the subnet



- Unicast: One to one, routable. Destination defined by sender

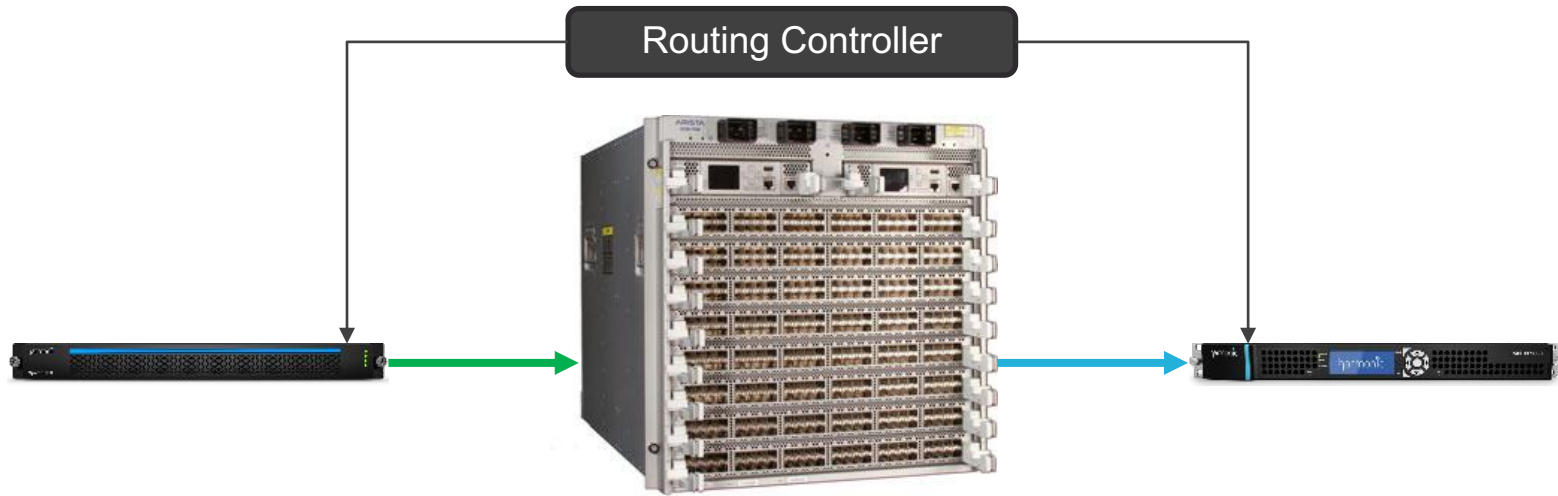


- Multicast: One to none, one or many, routable
 - Similar concept to SDI routers, BUT destination defined by receiver!



- Multicast is a good fit for live uncompressed media
 - Typically there is a one to many fan out
 - The senders do not know who needs to consume their output
 - More efficient for sending endpoints, and network infrastructure – no traffic redundancy
 - Receiver redundancy is easy to achieve





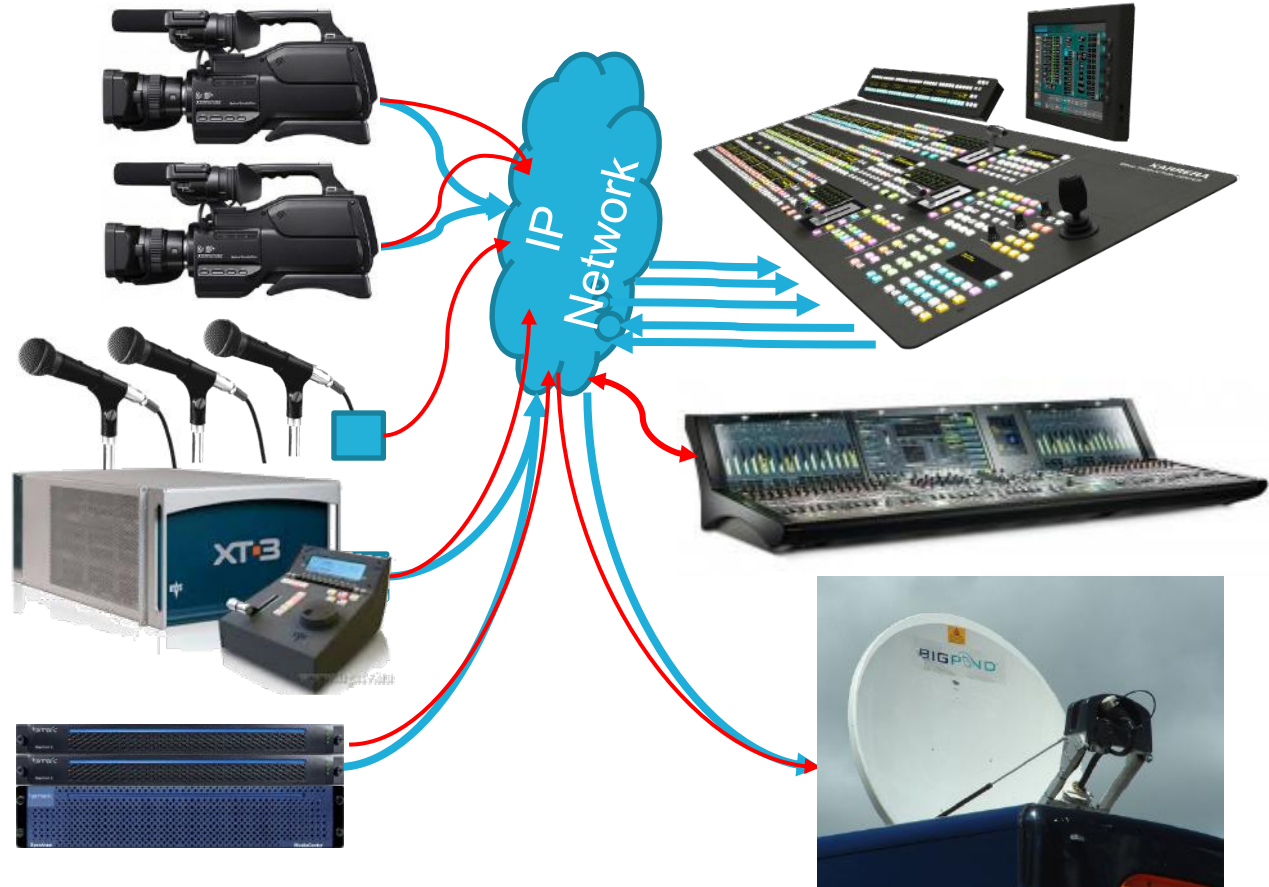
- Edge devices make the switch – receiver device switch for frame alignment
- The routing controller communicates with edge devices only – not with the router itself
- The routing controller tells a receiver to switch to a different multicast source

What is so Great About IP?

- IP lets you **scale and adapt** in rapidly changing environments
- **Single medium** for all media
- **Virtualized & Bare metal** environment

How Audio Breakaway Routing is Used in Production

- Cameras with sound
- Microphones
- Capture/playback
- Video switcher composes the video
- Audio mixer creates the audio mix
- Distribute the recombined signal





Many broadcasters are approaching a crossroads and are considering a transition to IP.

Which direction should they take as they prepare for the next generation of playout systems?

Spectrum X SMPTE ST 2110 Playout

Summary of Baseband Over IP Server Capabilities Per Chassis



GA Available September 2018

Live Inputs = 2 per chassis*

Up to 2 live inputs per chassis when in playout mode
SD, 720p, 1080i

Playout Channels = 4 per chassis*, XDCAM HD

720p, 1080i

Simulcast output for each playout channel
720p, 1080i; Consumes 1x playout channel per simulcast output

Graphic branding for each playout & simulcast channel
Static and animated, lower third, roll, crawl, full screen, RSS, DB etc

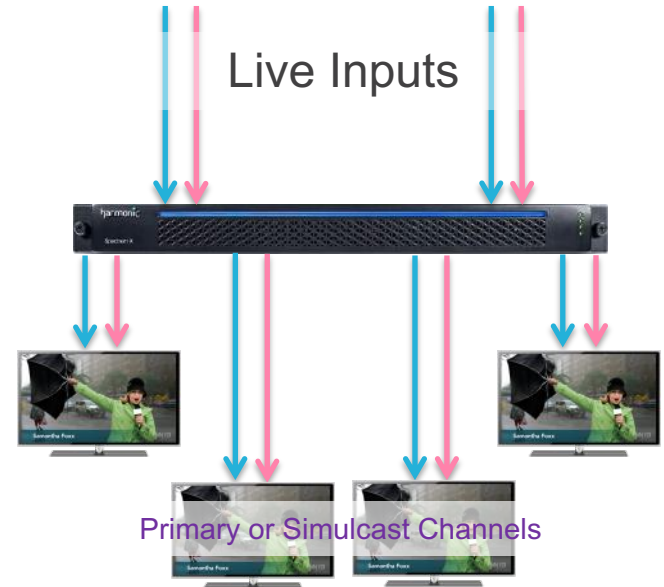
Switching for each playout & simulcast channel
Clip <-> live, video & audio effects, audio track management

SMPTE 2110 with and without SMPTE 2022-7

2022-7 seamless protection switching; choose simulcast OR 2022-7 to support 4 unique outputs



* Requires 10G IP input chassis

Note: No ingest channels can be running when configured for output



4 Outputs

Configure as primary / simulcast

 SMPTE ST 2110 with 2022-7 Flow "A" } 2022-7 is not
 SMPTE ST 2110 with 2022-7 Flow "B" } required, but
adds flow
redundancy as
a cost option

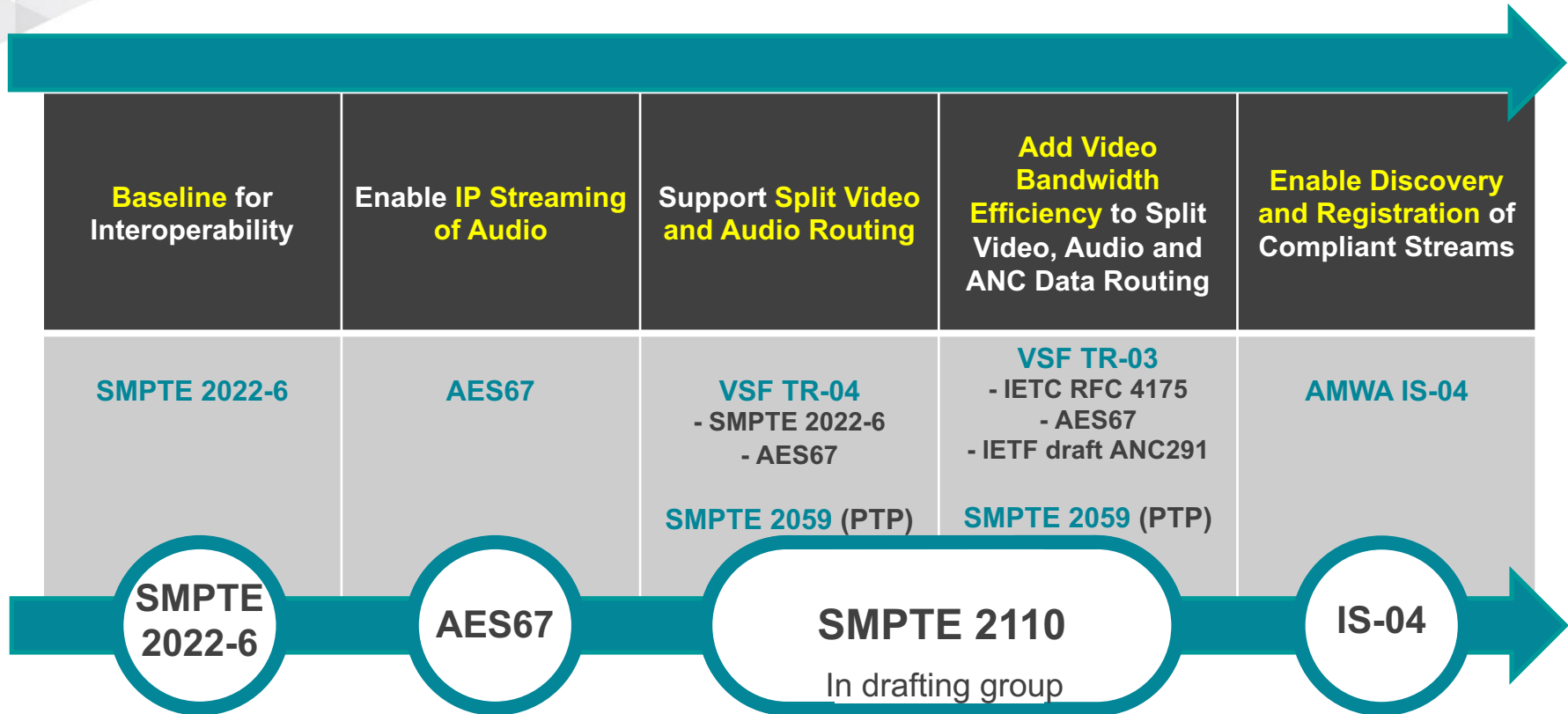
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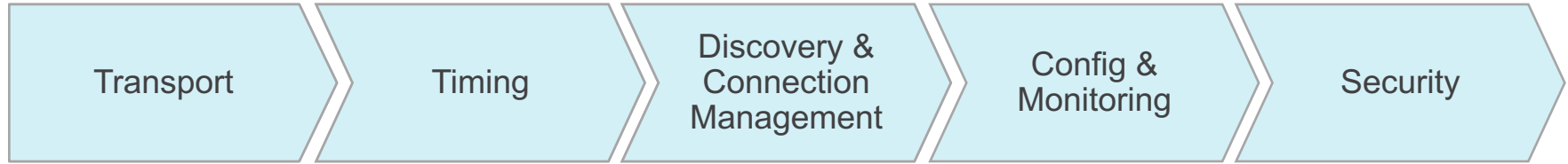
Standards & Organizations

What's Influencing the IP Transition



- Harmonic is **active in standards** that are driving the migration from SDI to IP
- AIMS approach to standardization **utilizes existing standards** and includes cooperation with AMWA NMI and VSF. This aligns with Harmonic's approach to the IP transition
 - Harmonic was an early member of AIMS, joining in December 2015
 - Harmonic was already active within AMWA NMI and VSF as well as SMPTE working on standardization and interoperability initiatives for IP I/O





The EBU has defined technologies needed for a fully functional IP-based media facility to function

Enables you to:

1. Buy new equipment
2. Connect it to your network
3. Configure it for use with a minimum amount of human interaction

“For the purposes of engineering, constructing and maintaining professional media facility infrastructures... the industry requires the ability to easily integrate equipment from multiple vendors into a coherent system”



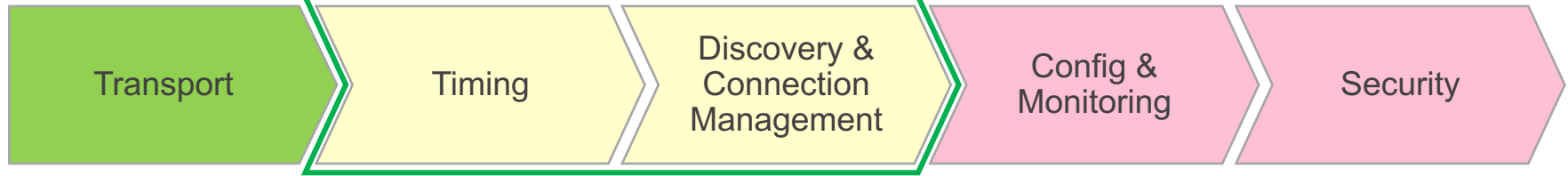
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Industry Development Focus



- 2110
- 2022-6
- 2022-7

- PTP (2059)

- IS-04
- IS-05
- IS-07
- IS-08
- LLDP

- DHCP
- API/CLI config
- SNMP

- HTTPS API calls
- EBU R 148
- EBU R 143

- **Transport** mostly resolved (compression and HFR not withstanding)
- **Timing** has some issues and complexity
- **Discovery & Connection Management** protocol adoption taking time
- **Config & Monitoring** not adopted and needs significant work
- **Security** not adopted and needs significant work

Progress So Far



- | | | | | |
|--|--|--|--|---|
| <ul style="list-style-type: none">• 2110• 2022-6• 2022-7 | <ul style="list-style-type: none">• PTP (2059) | <ul style="list-style-type: none">• IS-04• IS-05• IS-07• IS-08• LLDP | <ul style="list-style-type: none">• DHCP• API/CLI config• SNMP | <ul style="list-style-type: none">• HTTPS API calls• EBU R 148• EBU R 143 |
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Transport & Timing – JT-NM Tested

The FOX logo is displayed in a large, bold, blue font in the top right corner of the slide.

SMPTE ST 2110 Testing at FOX, Woodlands, Houston TX

- Event took place week of 18 March
- First event of its kind to test 2110 compliance
- Spectrum X tested with good results!
- Awarded a JT-NM Tested badge
- Spectrum X was featured in the IP Showcase booth at the 2019 NAB Show

JT-NM
Sponsor

EBU IRT
Test Administrators



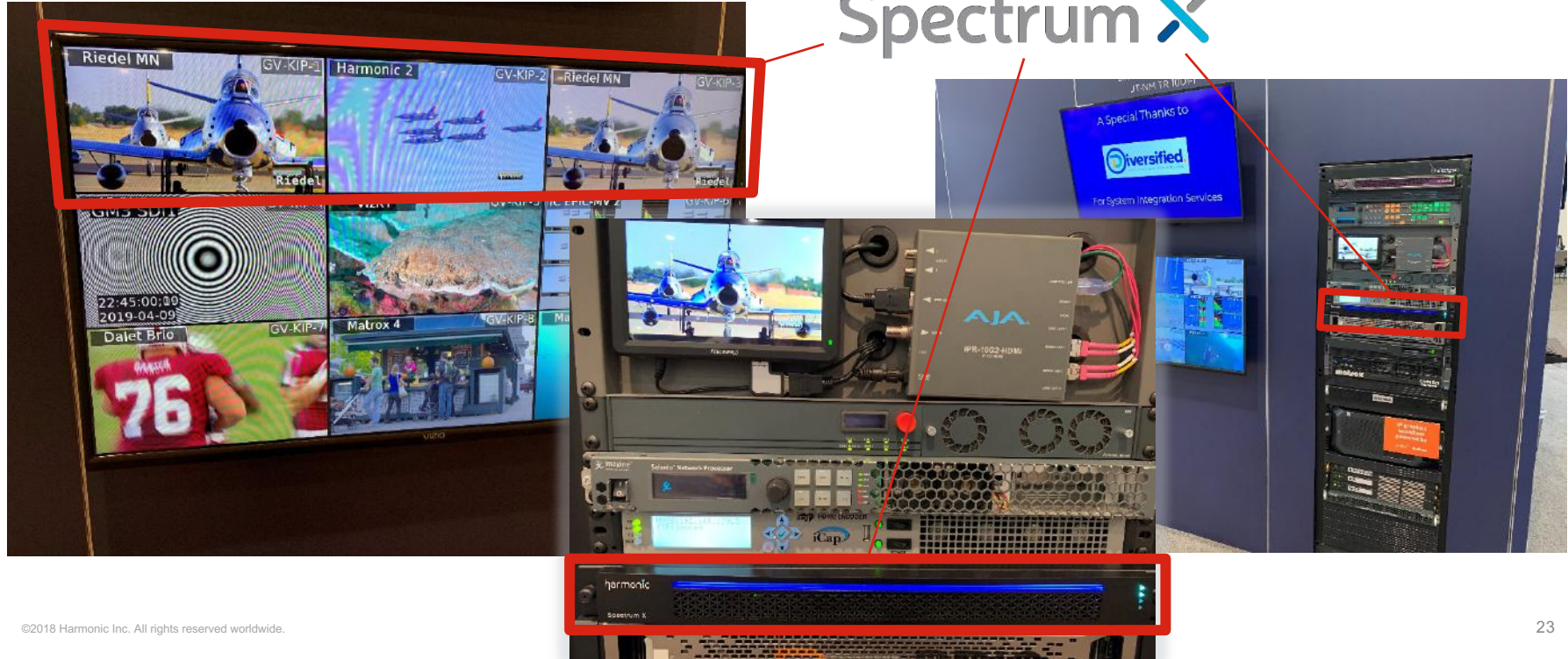
Discovery & Connection Management @ NAB 2019



Simplifying network configuration and flow routing with JT-NM TR 1001-1

Shows our support for AMWA IS-04 and IS-05

Spectrum X



The text "Q&A" is centered within a large, semi-transparent arrow shape that points to the right. The arrow is filled with a sunset beach scene, showing waves on a sandy shore under a bright, low sun. The text is in a bold, dark blue font.

Q&A

Frédéric Guiot

*Sales Director, Production & Playout
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