



harmonic.

Harmonic  
НОВИНКИ ВЫСТАВКИ IBC-2019



# IBC2019 Demo Locations



## Main location – our Harmonic booth

### 4 main demo walls:

- Production & Playout
- OTT & Broadcast Delivery
- Content Monetization
- Future Zone



VOS (on GCP) for unified broadcast-OTT multi-stream Low Latency solution for Google's Android TV



VOS for unified broadcast-OTT Multi-stream Low Latency CMAF to both STB & Mobile devices



VOS for Low Latency HLS over Akamai CDN



viaccess-orca

Harmonic's VOS & VO solution for Client-Side Ad Insertion running on Android TV



VOS for Low Latency CMAF



Spectrum X Demo

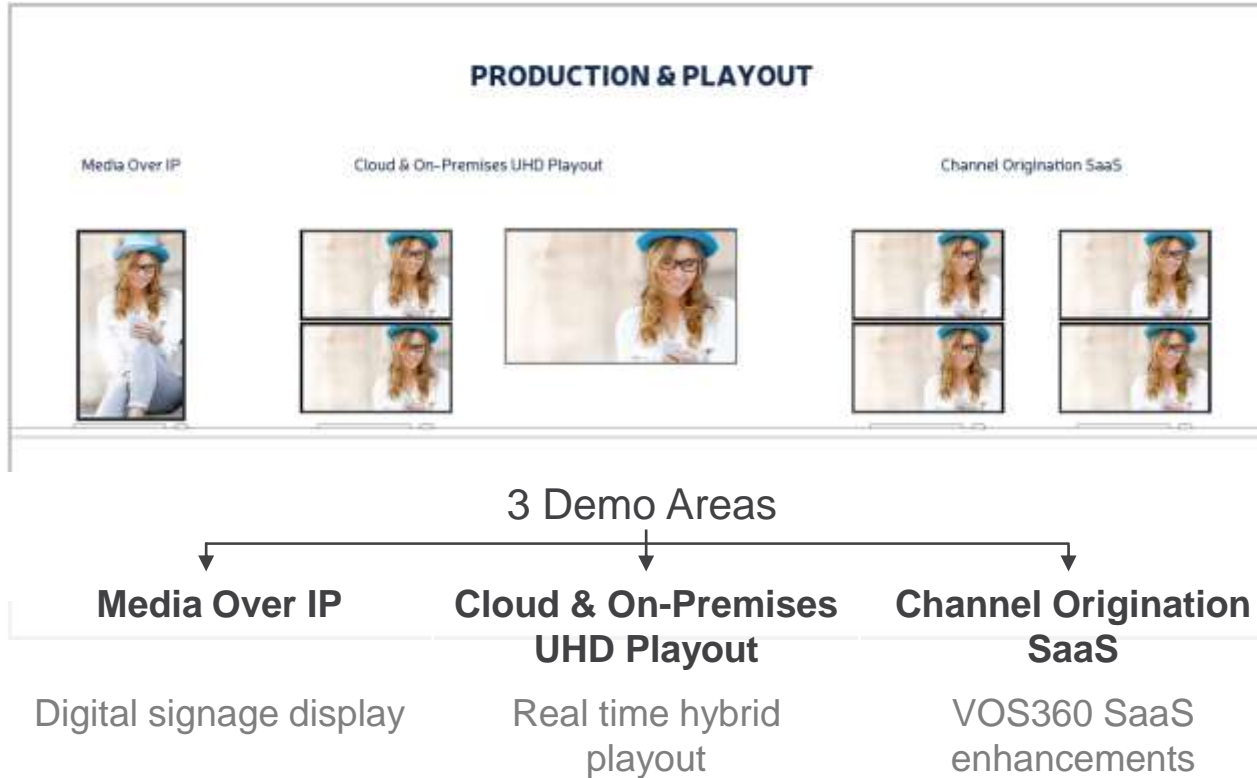


Spectrum X + VOS360 SaaS Hybrid On-Prem & Cloud playout Demo



VOS Encoded 8K at 65Mbps via satellite using DVB-S2

# Production and Playout – Overview



# Production and Playout – Demo Partners



SMPTE ST 2110 to HDMI conversion for SMPTE ST 2110 demo

Media Over IP switch for SMPTE ST 2110 demo

Hybrid on-prem and cloud playout control

PTP clock for SMPTE ST 2110 demo

## PRODUCTION & PLOUT

Media Over IP



Cloud & On-Premises UHD Playout

### Digital Signage Display

- The new Virtualized Spectrum X support for SMPTE ST 2110 input and output for UHD running on the new 2-RU HPE chassis
- How Spectrum X is the perfect solution for progressively migrating infrastructures from SDI to SMPTE ST 2110
- Spectrum X plug and play for media over IP deployment, with AMWA IS-04 Discovery & Registration and IS-05 Connection Management
- MediaGrid storage solutions & ingest and playout with Spectrum

Channel Origination SaaS

### Virtualized Spectrum X

UHD Over IP

SD HD UHD  
SDI and SMPTE ST 2110 Input  
With SMPTE ST 2022-7 redundancy



SDI and SMPTE ST 2110 Output  
With SMPTE ST 2022-7 redundancy  
SD HD UHD

Mix SDI and IP in the same chassis

Full SD to UHD over IP support with SMPTE ST 2110

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# Production and Playout – Cloud & On-Prem UHD Playout



- Aveco automation control of the Virtualized Spectrum X and VOS360 Channel Origination SaaS for hybrid on prem & cloud deployments
- Shows how customers to retain the same automation systems
- Highlights the VOS API Channel Origination Partner Program designed to encourage proactive integration with VOS via automation, traffic and MAM system vendors
- Featuring Virtualized Spectrum X UHD playout with UHD over IP & CIAB features and VOS360 channel origination with branding

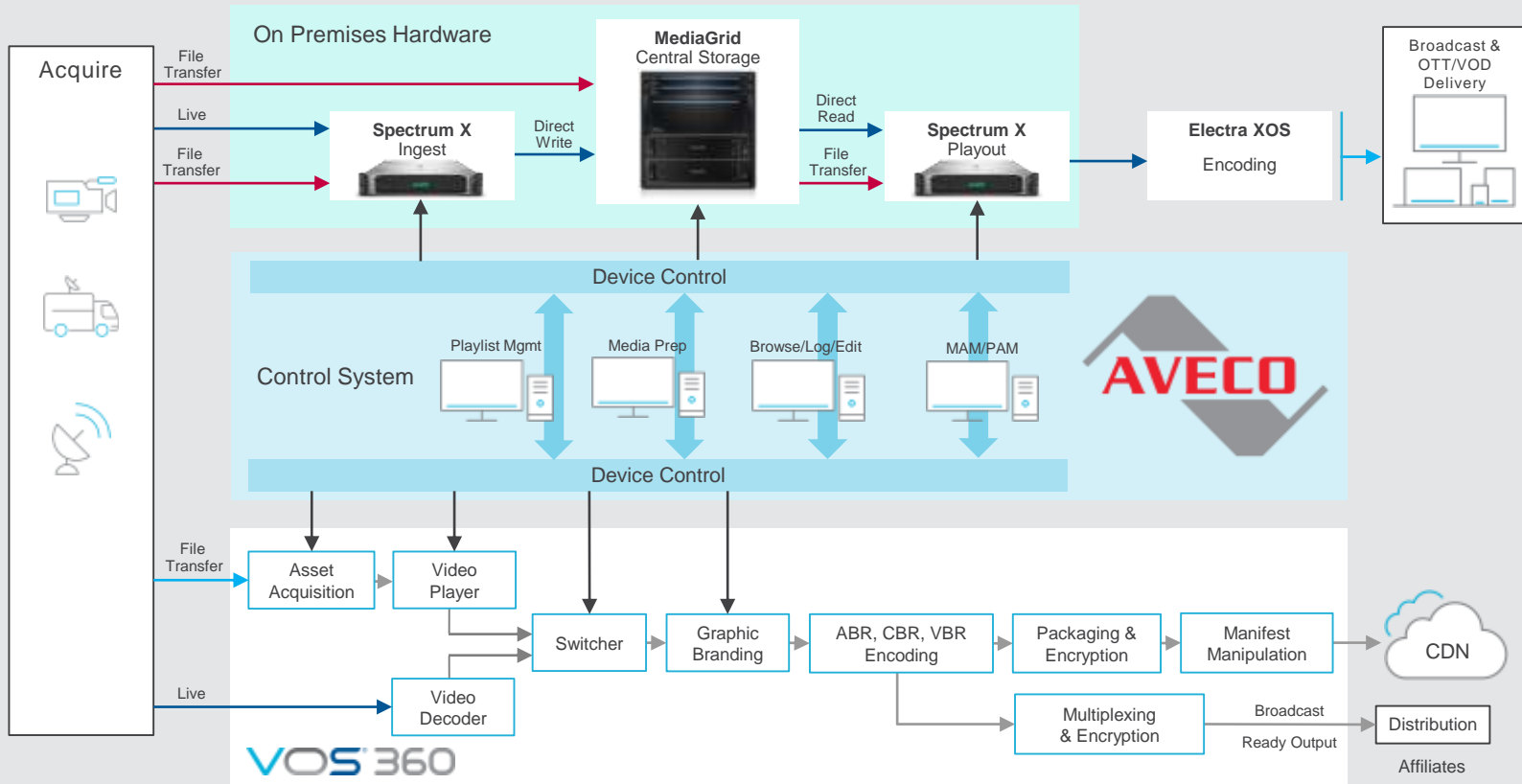
**VOS**  
API Partner Program  
Harmonic Open API Development Initiative

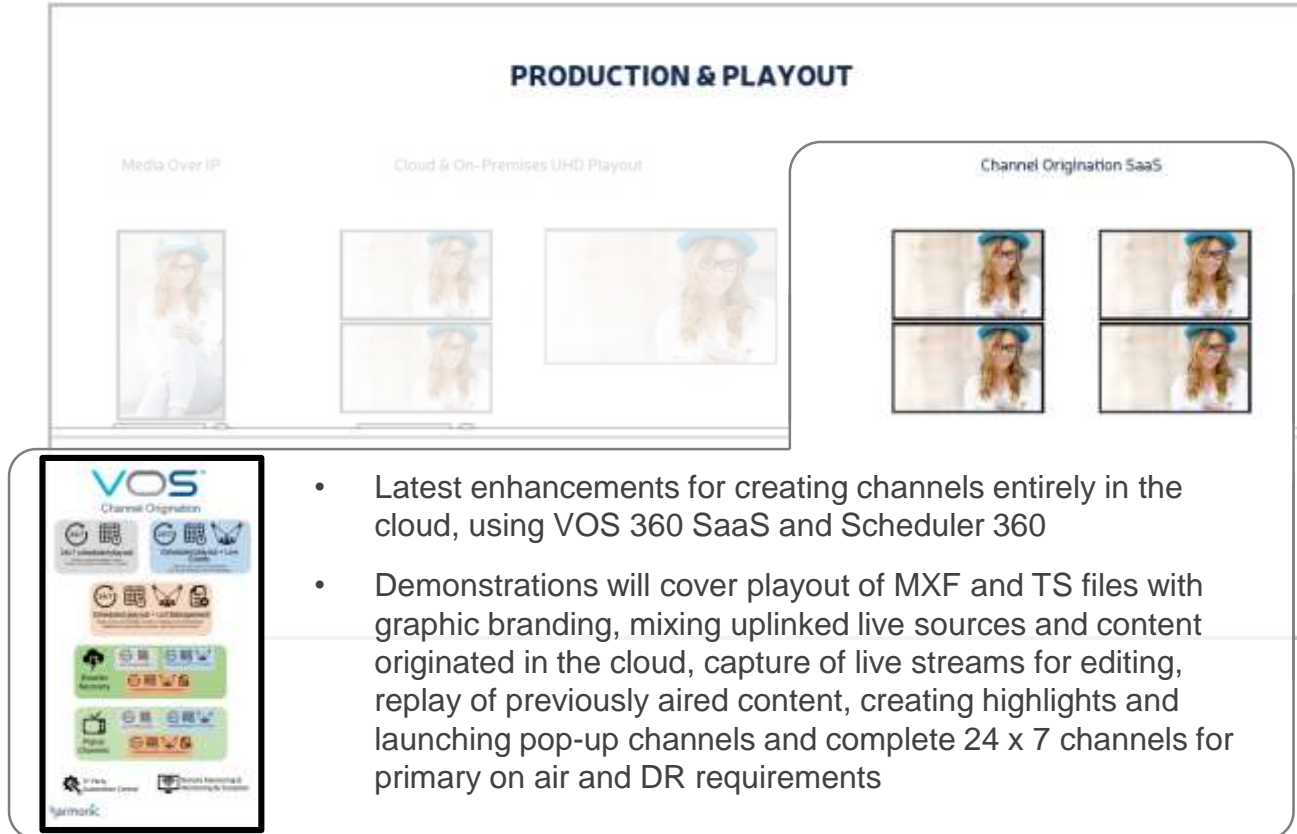
Develop solutions for content delivery services in private and public cloud

Leverage a constantly evolving Cloud native software platform with open API

Open to 3<sup>rd</sup> party technology providers and end users

# Hybrid Cloud Channel Origination & On Premises Payout





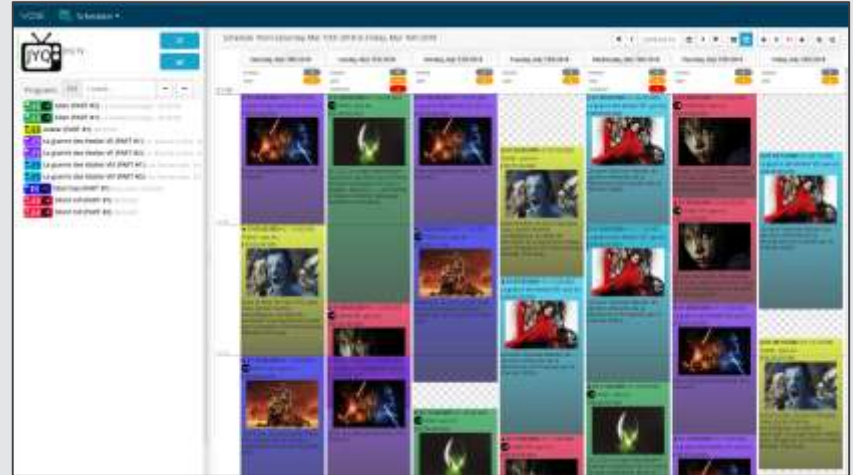


## Harmonic Scheduler Service

- Manual scheduling and traffic import
- Natively SaaS
- Scalable as needed

## Use Cases

- Channel origination preparation
- Affiliate with ad insertion/content replacement
- OTT rights management



# OTT & Broadcast Delivery Demo Wall

## OTT & BROADCAST DELIVERY

Primary  
Distribution SaaS



Cloud & On-Premises Video Processing



Live Sports Streaming

Android TV



Low Latency



Optimized Live Video Delivery



VOS™ 360



XOS Edge

Scheduler 360

VOS™



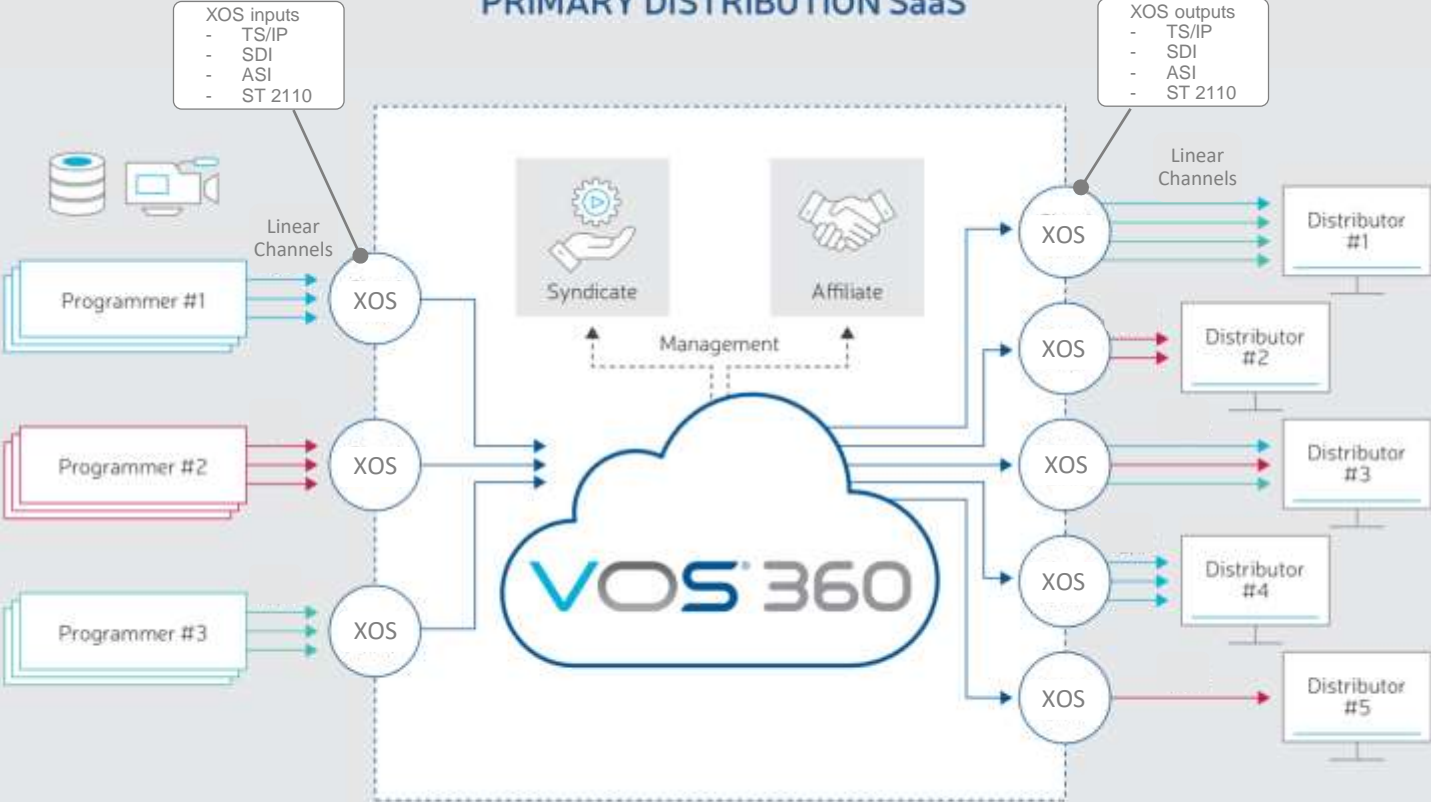
NMX  
Electra XOS  
ProStream X

CP 9000  
RD 9000

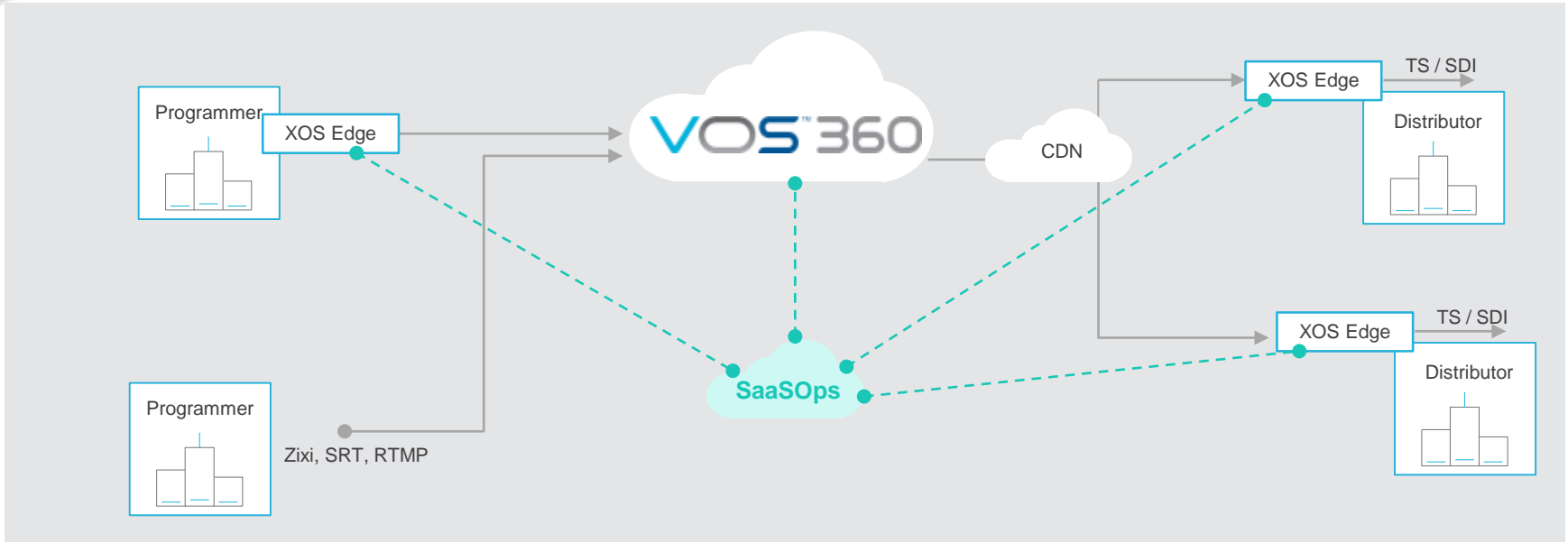
VOS™ 360

VOS™  
Delivery Service

### PRIMARY DISTRIBUTION SaaS



# Primary Distribution SaaS with XOS Edge



- **VOS360 uplink methods**

- XOS Edge (managed endpoint)
- External source (unmanaged): Zixi, SRT, RTMP

- **VOS360 downlink method**

- XOS Edge (managed endpoint)

# Cloud & On-Premises Video Processing

- Cloud & On-Prem Video Processing – This demo area will showcase **unified Broadcast-OTT** solutions for both cloud and on-prem data centers highlighting:
  1. Latest **VOS** developments in statmux and multiplexing
  2. Latest developments and technologies in **NMX** based headend solution, such as:
    - UHD/HD, HEVC-AVC, SDR/HDR **mixed statmux** based on new **AI Dynamic Encoding Style** algorithms
    - Latest **ProStream X** DVB-T/T2 SFN capabilities
    - The successful **CP9000** and **RD9000** UHD contribution platforms highlighting SMPTE ST 2110 and SRT for supporting the transition to all IP and cloud.

## OTT & BROADCAST

Cloud & On-Premises Video Processing



# Premium Broadcast with Statmux up to UHD in VOS



- Statistical Multiplexing with VOS

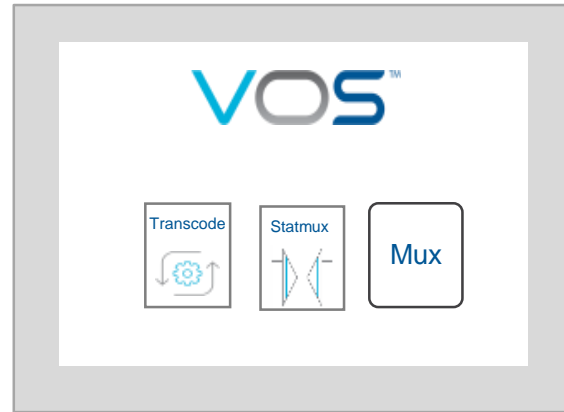
- MPEG-2, H.264 and HEVC
- SD, HD and UHD
- VOS Cluster & VOS360

- Multiplexing

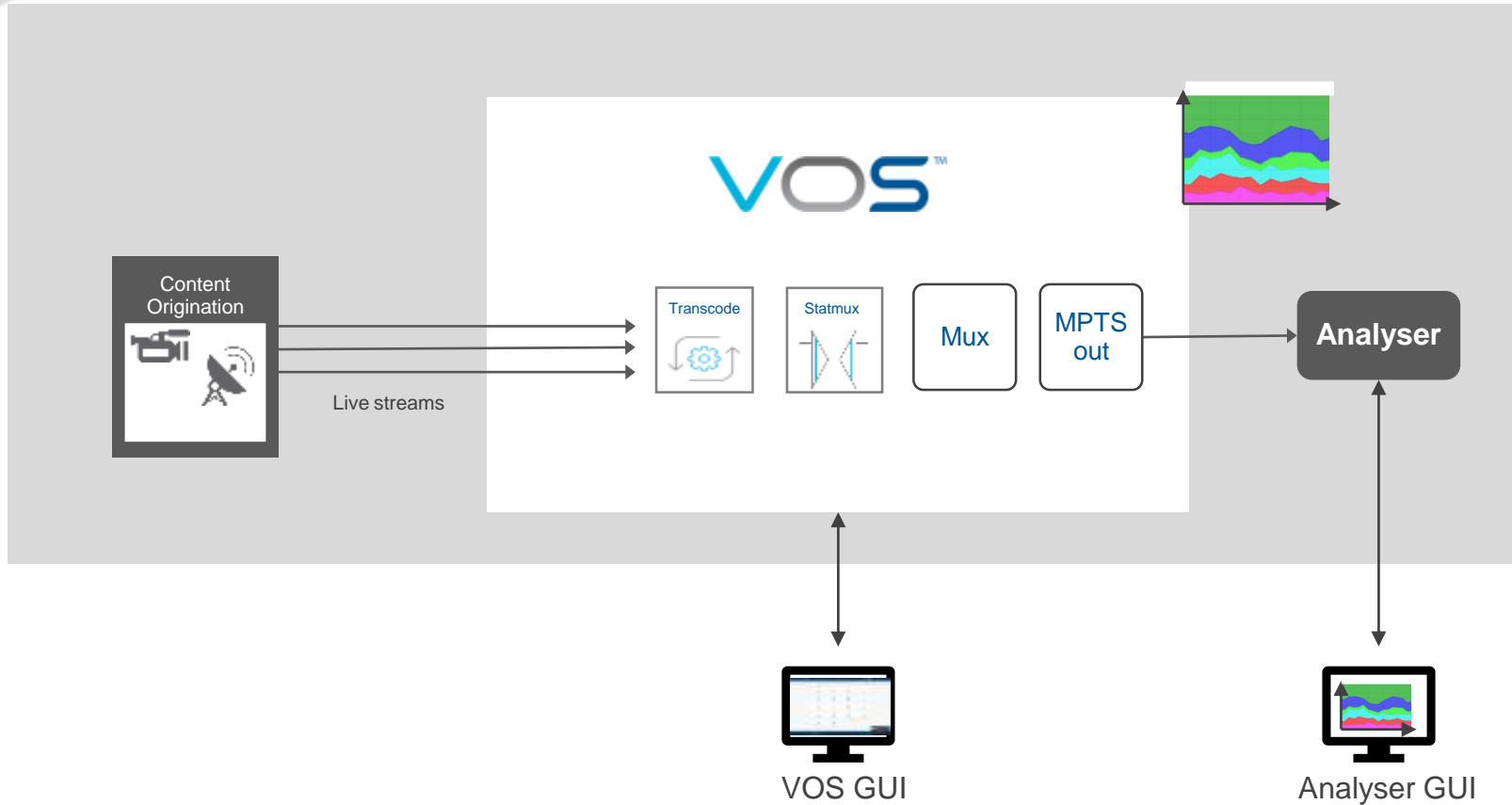
- PSI/DVB-SI Tables
- Descriptors

- Unified headend solution

- VOS can generate both Broadcast MPTS, IPTV & Multiscreen services



# Statmux & Multiplexing in VOS Demo



# Appliance Broadcast – UHD mixed Statmux /AI



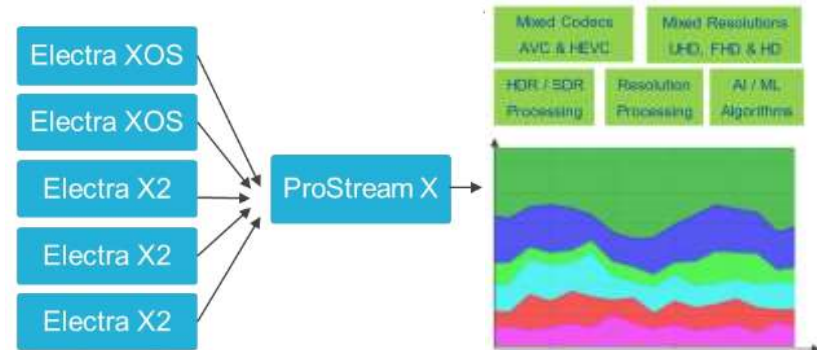
- Demo: 1 mixed statmux
  - 1 mosaic
  - 1x UHDp50 HDR HEVC
  - 1x 1080p50 HDR HEVC sport content
  - 1x 1080p50 HDR HEVC up-scaled from 1080i SDR
  - 3x 1080i25 AVC
  - Remote access to NMX + bitrate monitoring

- Highlighted Products

- Electra XOS + Electra X2
- ProStream X

- Key Messages

- DiviTrack: a complete, flexible, agile statmux solution to face any broadcast situation
- Hybrid SD/HD/UHD, SDR/HDR, AVC/HEVC, XOS/X2
- AI Dynamic Encoding Style algorithm to improve VQ at reduced BW.
- Deliver UHD from HD with HDR tone expansion and upscale HD to UHD

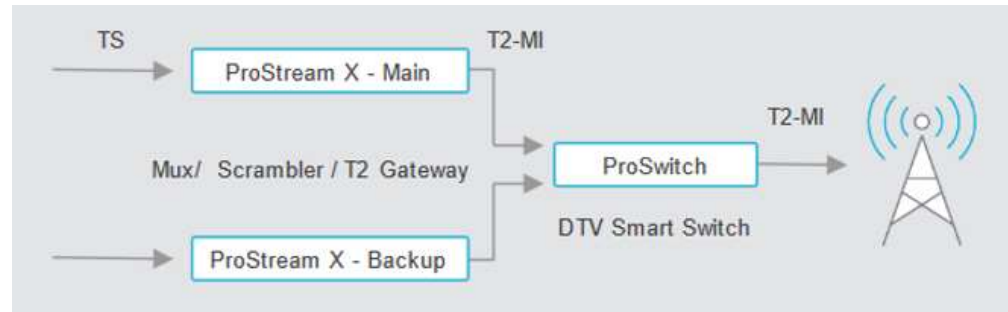




# DVB-T/T2 Gateway and SFN Seamless Switch

- Demonstration
  - Remote access to a ProStream X running T2 Gateway – single and multiple PLP
  - Monitoring of the T2-MI streams
- Highlighted Products
  - ProStream X
    - SW opt for DVB-T2 Gateway and DVB-T SFN adaptation – 8 per unit
    - GPS sync with 1 PPS (BNC) and PTP (IP)
  - ProSwitch smart switch
    - Manage 1+1 ProStream X with seamless SFN switch – 8 per unit

- Key Messages
  - Replacement solution of NetProcessor as T2 Gateway and DVB-T SFN MIPs inserter
  - 2x the density of NetProcessor
  - Simplify the T2 workflow, improve the GM
  - Fit a full IP workflow with PTP sync



# HD/UHD HEVC Contribution and Primary Distribution

- Demonstration

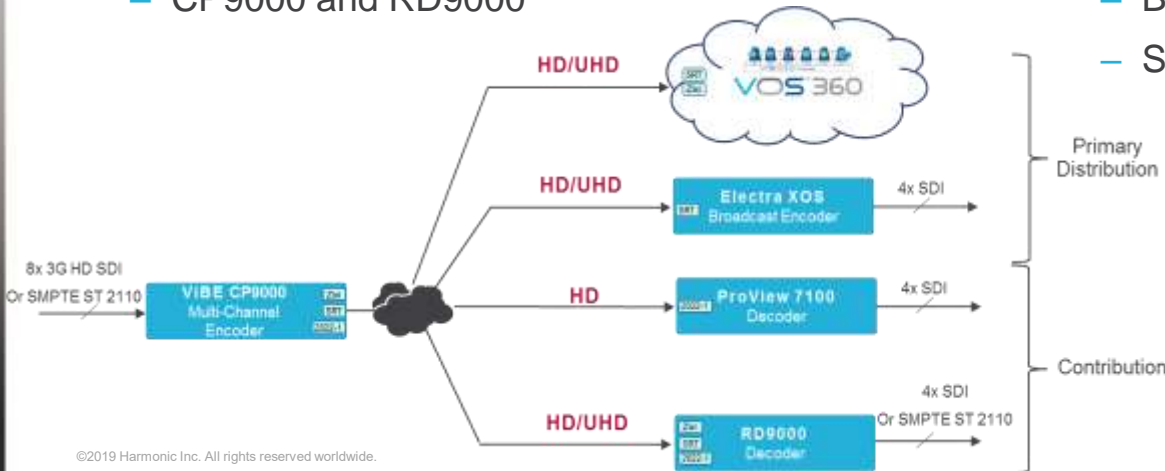
- Remote access to CP9000 and RD9000
- Access to configuration GUI of new features

- Highlighted Products

- CP9000 and RD9000

- Key Messages

- *The CP9000 / RD9000 fit all needs for HD/UHD Contribution and Primary Distribution including Cloud uplink.*
- Support of SRT<sup>New</sup> for transport over Internet, open source replacement of Zixi
- BISS-2<sup>New</sup>.
- SMPTE 2022-6/ST 2110<sup>New</sup>, 2022-7



# Live Sports Streaming Demo Wall



- This demo area will focus on Live Sports Streaming and how VOS has been expanding to better serve this high demanding application through 3 different demonstrations:
  1. Harmonic's cooperation with **Google and Android TV** to showcase a hybrid broadcast & OTT 'multi-view' delivery solution that is perfectly suitable for premium Sport events. (same demo will be on Google booth)
  2. World's first showcase of **Live Low Latency** OTT for both **DASH** and **HLS** devices.
  3. The **new delivery capability** added to **VOS** that provides access network operators, (telco, cable and mobile service providers) with real-time scalability for mission-critical, high-demand live video streaming services such as sport for their on-net requirements.

## DELIVERY



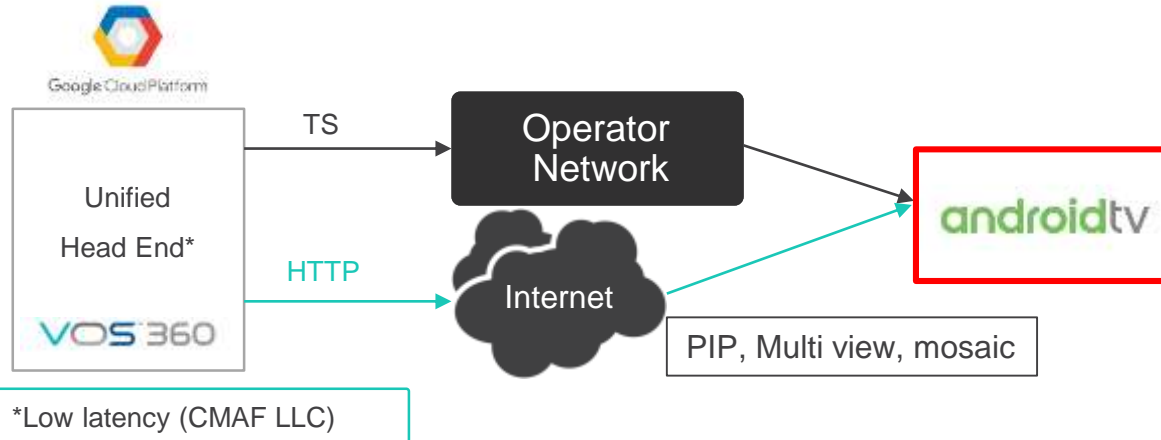
# Live Sports Streaming - Android TV

## Demonstration

- Hybrid broadcast & OTT Multi stream demo on Android TV
- Support PIP, Multi view, mosaic over HTTP
- VOS360 based running in Google Cloud
- E/E demo with Google & partners (Technicolor, 3SS)
- Powerpoint presentation

## Messages

- Harmonic powers next generation Live sports experience on ATV
- Strategic partnership with Google (demo on their booth also)
- Deployable now with VOS/VOS 360
- Any CMS partner in VOS can be added

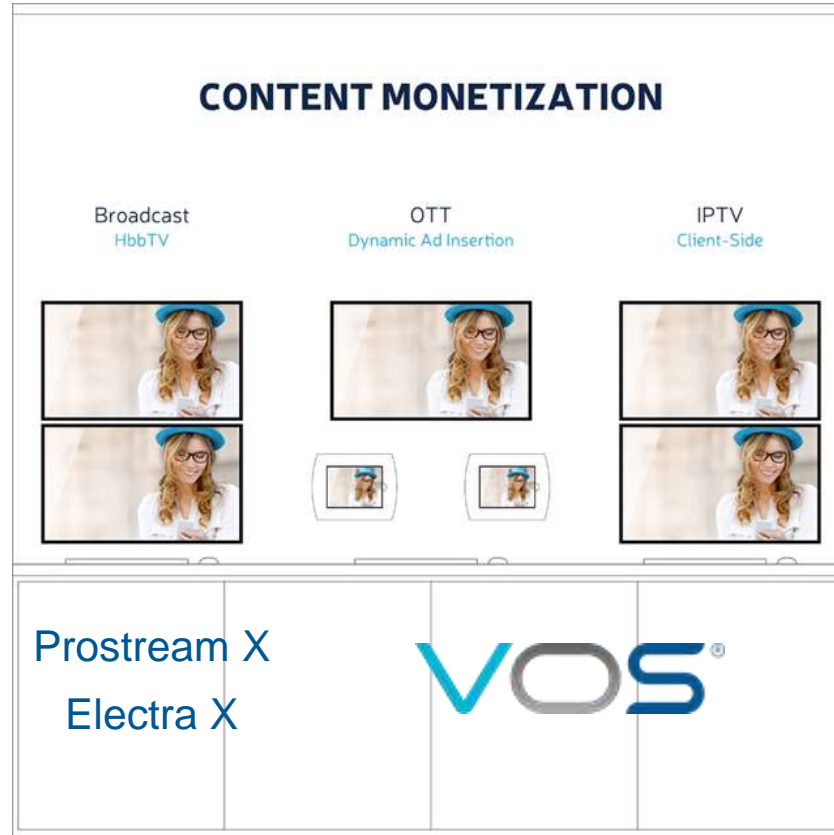


## DELIVERY

Android TV



# Content Monetization Demo Wall



# Unified Targeted Advertising for OTT-IPTV

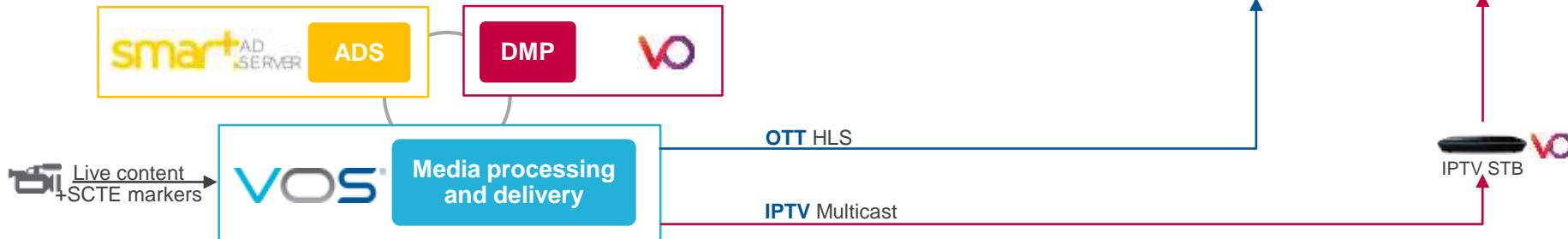
## Demonstration

- Targeted advertising on OTT and IPTV
- OTT DAI on VOS360, Live
- IPTV client-side insertion on VO Player
- Smart ADS and Ad campaign management
- VO provides Operator Data Management Platform (DMP), and video player
- Changing user segment from “young parent” to “sport fan” in VO GUI will change the ad

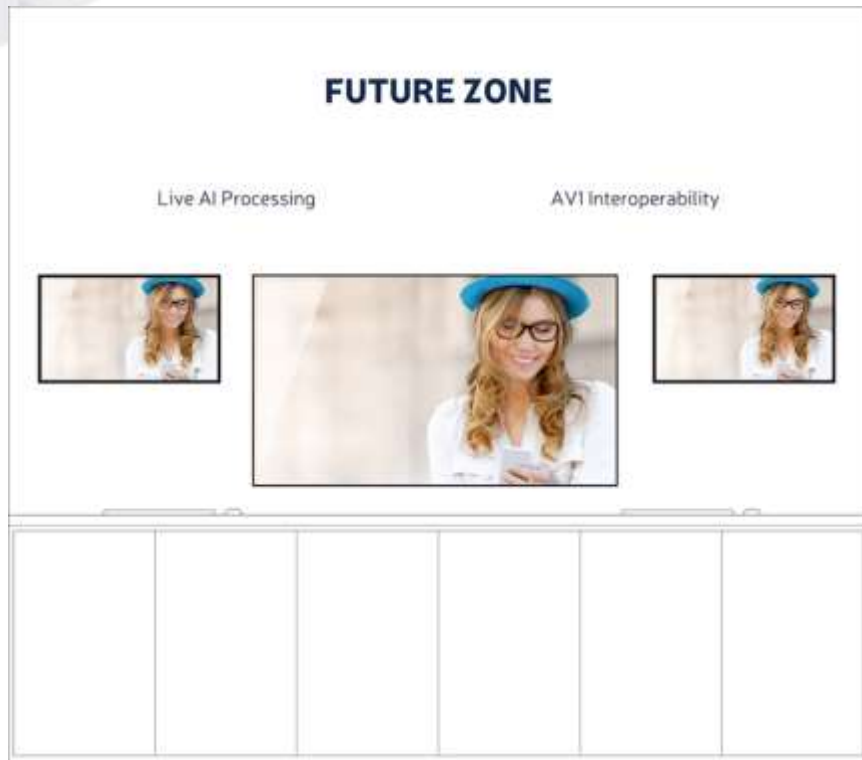
## Messages

- VOS supports OTT DAI, IPTV conditioning, and ad delivery
- VOS + VO + SMART pre-integrated E2E solution for OTT/IPTV monetization
- Single solution for OTT/IPTV make ad-campaign easier to sell
- Optimized ad revenue on Operators owned channels
- Operators data monetization for third party channels

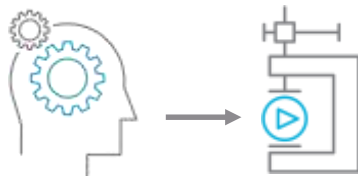
## CONTENT MONETIZATION



# Future Zone 2 Demo Walls



# Live AI Video Processing



Deployed for DTH

## Dynamic Encoding Style

AI chooses encoding parameters depending on video input

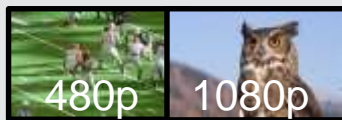


- Goal is to reduce ABR, CBR and VBR **bitrate**

Any application

## Dynamic Resolution Encoding

AI chooses best resolution depending on video input



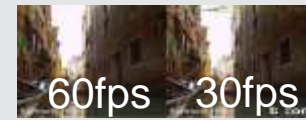
- Goal is to improve **QoE** and **encoding density**

OTT

- Application to Mobile (zero rating)
- Application to IPTV 2.0 (enable HD on SD lines)
- Application to OTT streaming on Main screen

## Dynamic Frame Rate Encoding

AI chooses a lower frame rate depending on video input



- Goal is to improve **encoding density** and **bitrate reduction**

Any application



## FUTURE ZONE

Live AI Processing

AV1 Interoperability



- AV1 interoperability
  - STB (Broadcom)

## Demo

AVC 1080p60  
Mezz Source

Harmonic Real Time  
AV1 Encoder

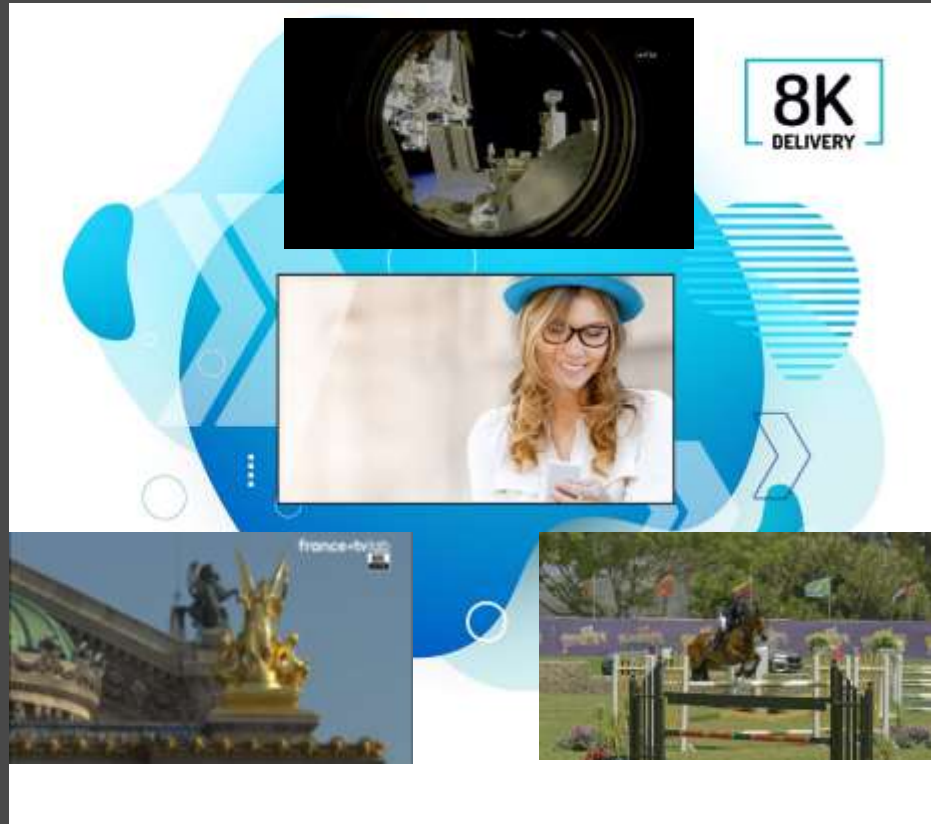
STB  
Decoder

AV1 Enc @ 4-8Mbps  
Medium Quality  
Settings



## Messages

- **CODEC Agnostic:** Harmonic is CODEC agnostic and can support all codecs on PURE, including AV1
- **Time-to-Market:** Showing that Live AV1 1080p60 encoding can be implemented on a SkyLake server
- **Partnership:** Harmonic partners with INTEL on their AV1 Open Source initiative
- **Key Products:** XOS/VOS when market requires it. File 360 in the roadmap
- **Performance:** on par with HEVC compression efficiency (Objective/subjective), still 4x more complex (can improve)
- **AV1 progress:**
  - NAB '18, Reference Model codec comparison with HEVC & VVC
  - IBC '18, off-line encoding solution with INTEL
  - NAB '19, major density improvement in 12 months
  - IBC '19, Live interop with STB, major web browsers support

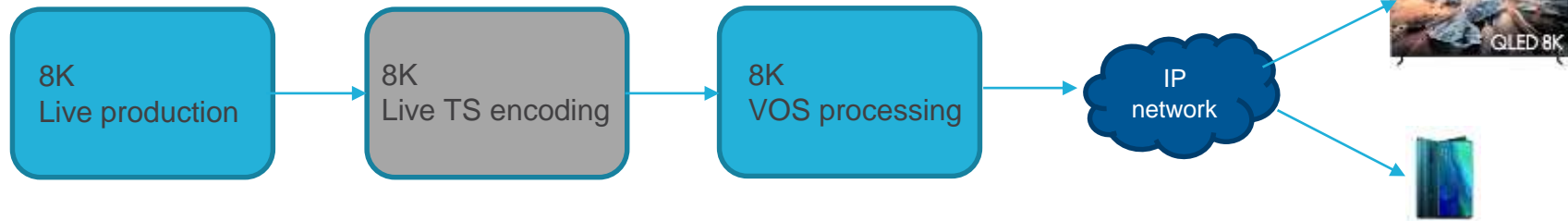


## Demonstration

- 8K HDR production: NASA, Jumping (HLIT), French Open (France TV)
- VOS Media processing: live packaging, catch up, VOD and off line ABR transcoding
- Streaming to Samsung TV
- Encoding using VOS & EyeQ <30M/s
- Powerpoint presentation

## Messages

- 8K Live VOS system deployed for French Open using 5G
- 8K CAE with EyeQ game changer
- Harmonic is taking the challenge to power FIRST 8K services Live (w/ partner), catch-up, VOD to any IP connected devices
- First streaming 8K demo on Samsung TV



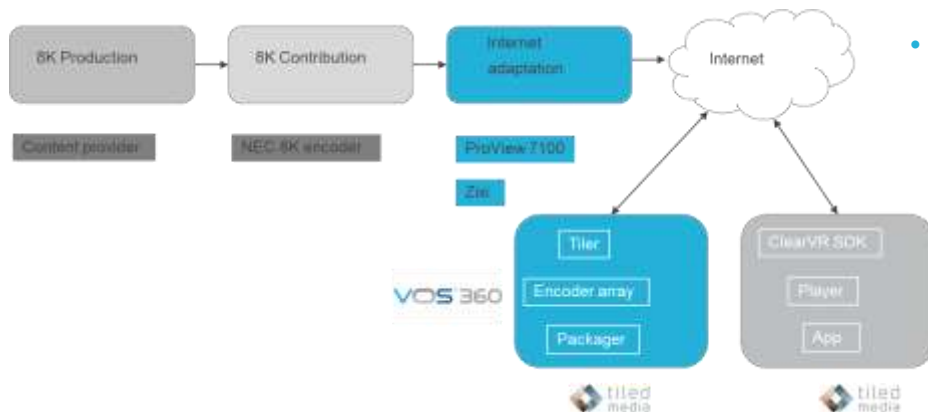
# 8K Personalized Streaming to Mobile

## Demonstration

- Playback of 2D 8K Tiled content locally from device on tablet and STB.
- End application is at the stadium with 5G connection or at home using Fiber (<20M/s only needed per user)
- System being trialed in 2019 at French Open and PCCW over 5G
- Powerpoint presentation

## Messages

- 8K production is getting used for HD/UHD broadcast now also for 8K live (NHK Japan)
- Sport fans want a more personalized experience, esp. in the stadium, 5G brings the scalability to serve a personalized session per user at very high QoE
- Harmonic and its partner Tiledmedia (Tiling), have adapted tiling technology developed for VR and is showcasing a 8K personalized broadcast to Mobile device
- **Sport is mostly event-based and a SaaS offering is the best approach.**
- VOS360 will be adapted to support Tiling applications (VR, 8K).



# IBC2019 – Highlights of New Capabilities



- Virtualized Spectrum X
  - SMPTE ST 2110 input and output for UHD
- Scheduler 360
- VOS API Channel Origination Partner Program
- XOS Edge
- Multiplexing in VOS
- AI dynamic encoding style statmux and HEVC
- DVB-T/T2 SFN Gateway in ProStream X
- Low Latency OTT for HLS, and DASH
- VOS360 with Delivery Service
- DAI (dynamic ad insertion), and VOS unified IPTV/OTT solution.
- EyeQ for 8K delivery (PoC)



Thank You