

# JPEG XS in Action for IP Production

The world's first full JPEG-XS deployment!

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# Overview of customer requirements

- Large sports broadcaster
- Pan-European operation
- Intra-facility (campus) and inter-facility (Wide area) connectivity
- Lowest latency possible
- Optimized use of finite WAN resources
- ST2110 based
- ST2022-7 protection in WAN and LAN
- Short timescales!

# Mezzanine compression options

- JPEG 2000 – TR-01 2013 60ms + buffering + transit
- JPEG 2000 ULL – TR-01 2018 15ms + buffering + transit
- JPEG XS <1ms\* + buffering + transit

Typical mid-west-European transit delay of 10ms (2000km fibre)

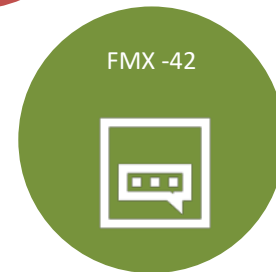
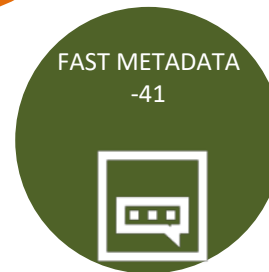
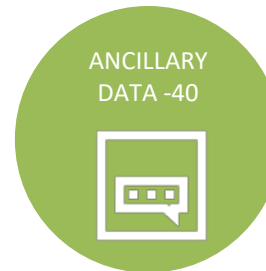
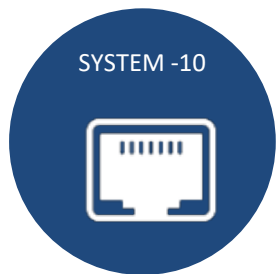
\* See comment on ST2110 timing later!

# JPEG XS (ISO/IEC 21122)

- Wavelet based
- Intra-frame
- Fixed latency
- Adjustable compression ratio – typically up to 10:1
- CBR (constant bit rate)
- Supports 4:4:4, 4:2:2 & 4:2:0
- Supports any colour space (RGB, YCbCr, YUV, XYZ)
- Supports bit depth: 8, 10, 12
- Supports Interlaced & Progressive frame
- Supports SD, HD, 2K, 4K spatial resolutions
- Supports all main frame rates



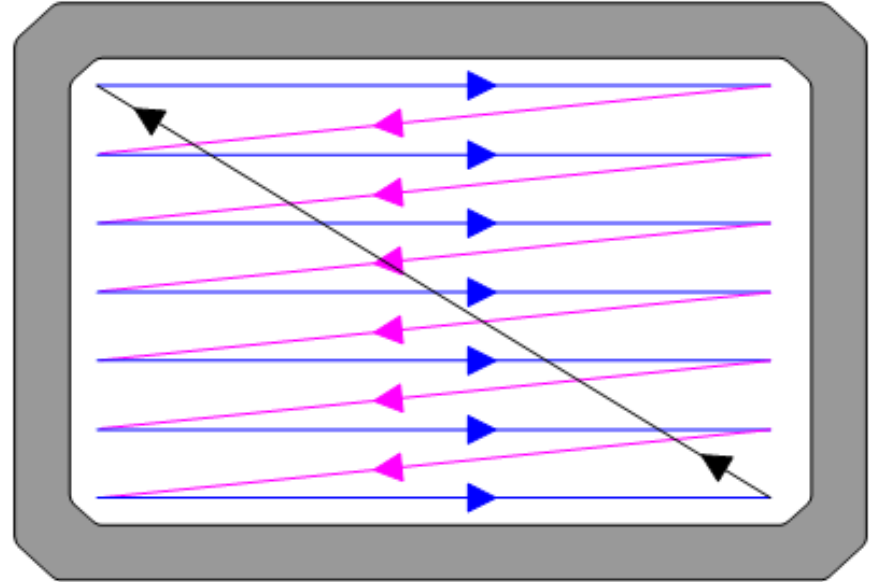
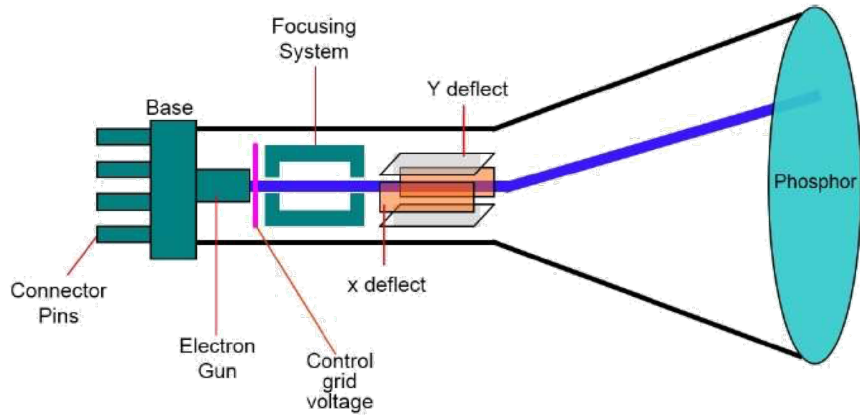
# SMPTE ST 2110 suite



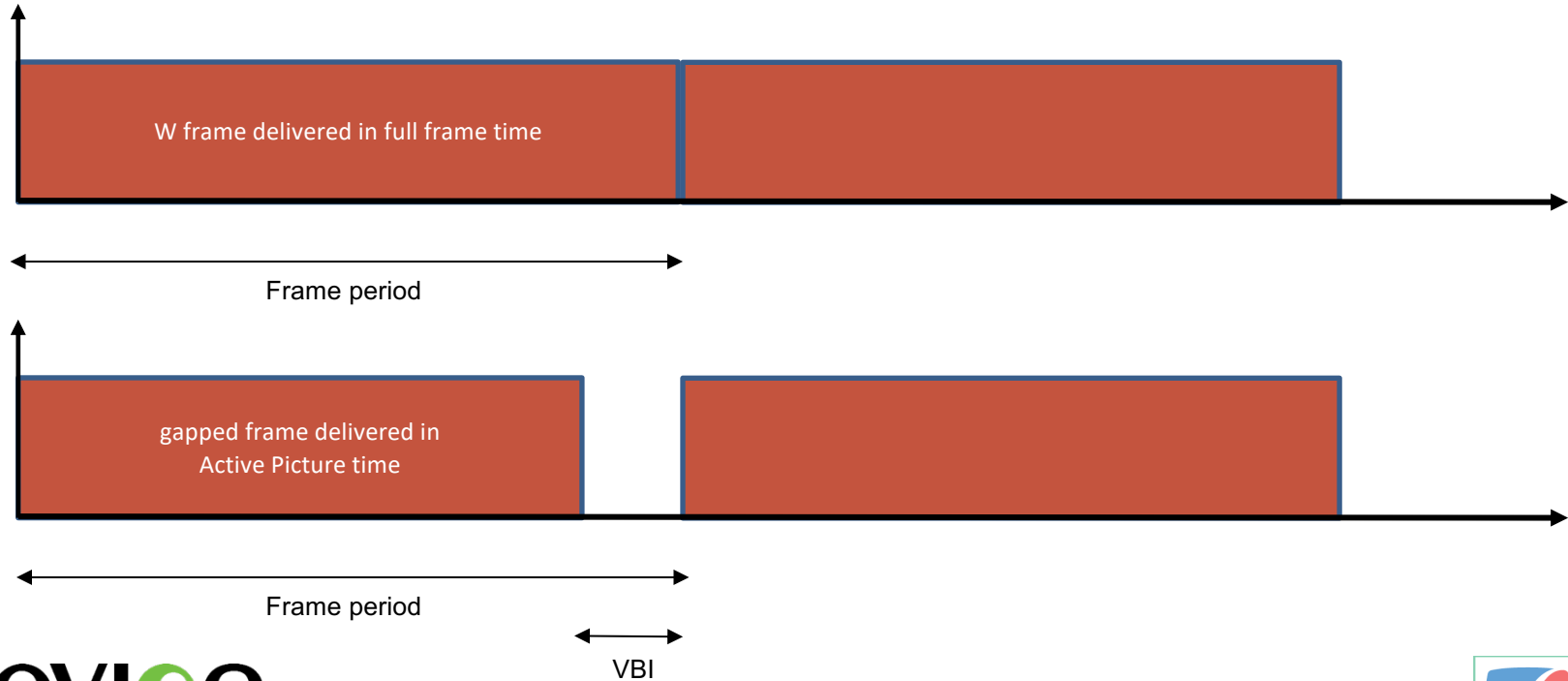
nevion



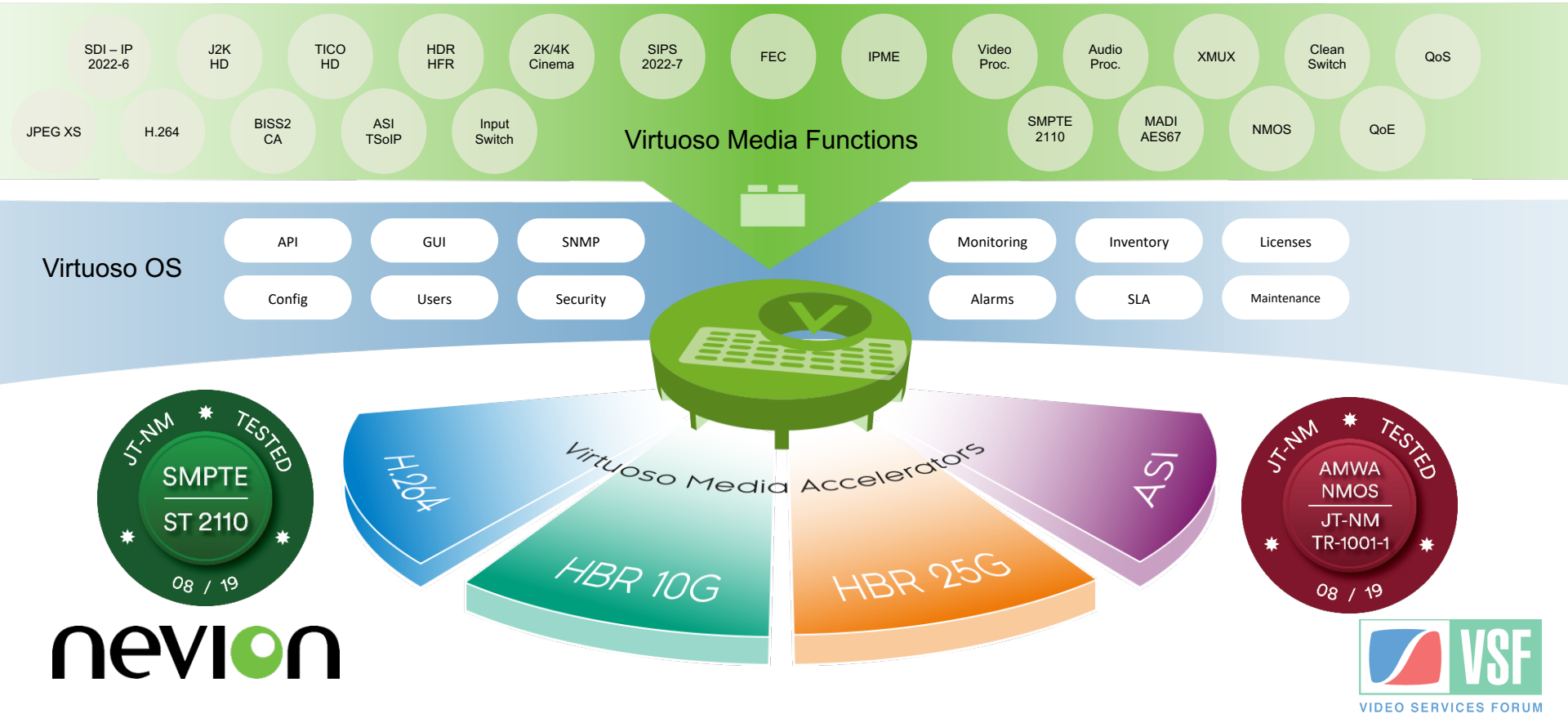
# The legacy of the raster scan



# Linear and gapped sender behaviour – ST2110 -20 and -22 timing specifications

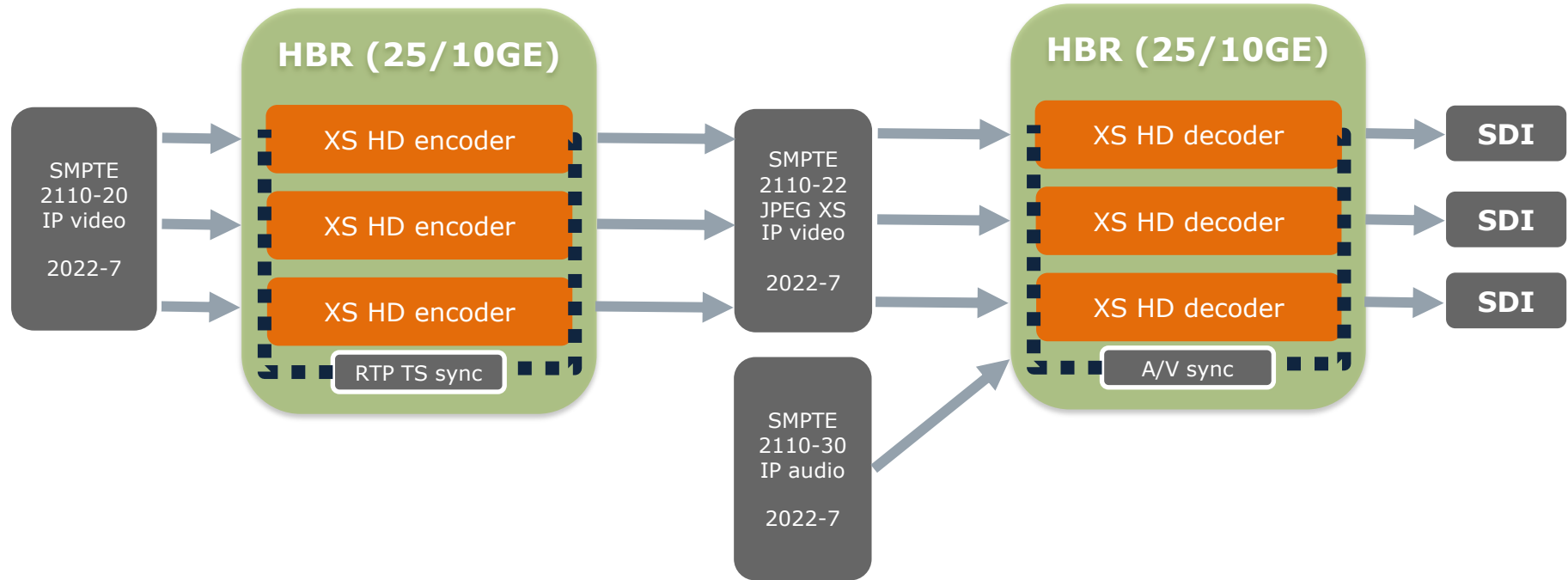


# VIRTUOSO

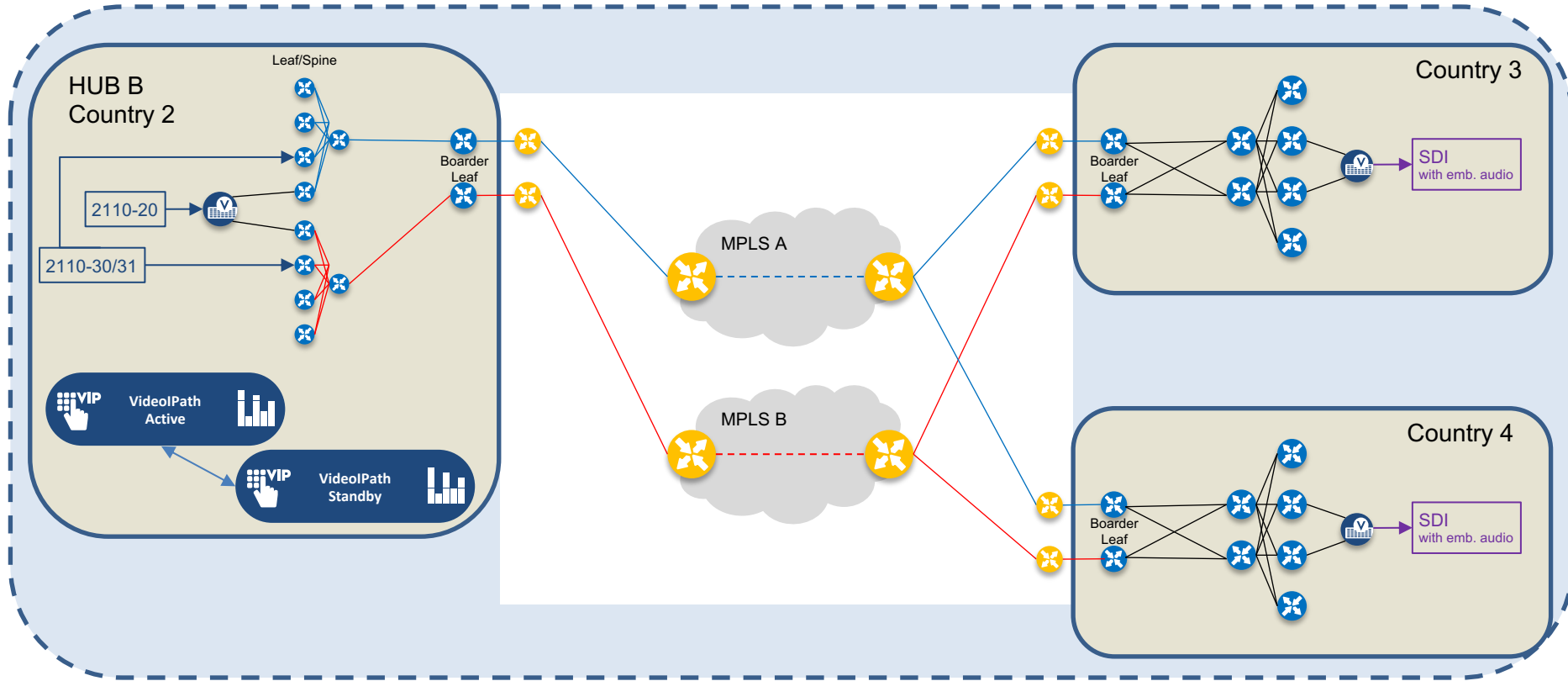




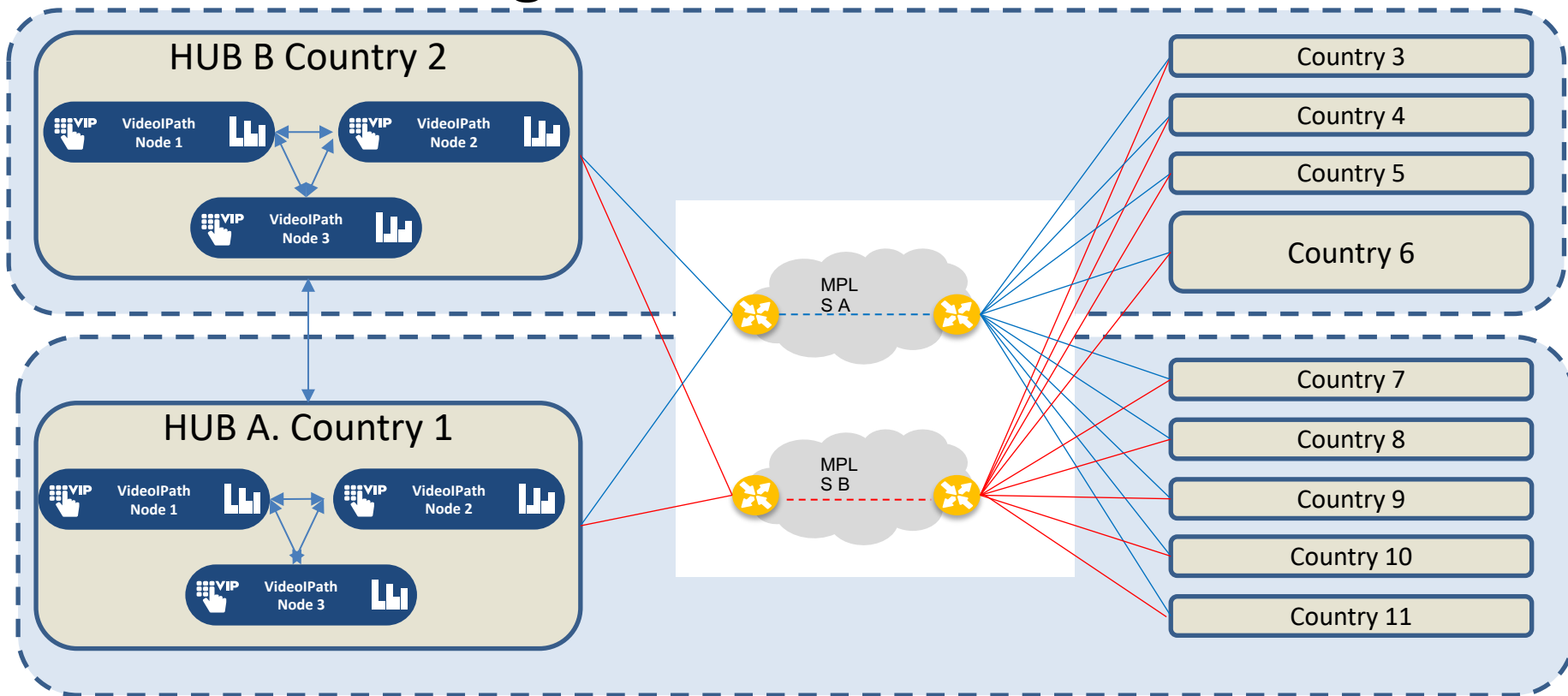
# JPEG-XS implementation



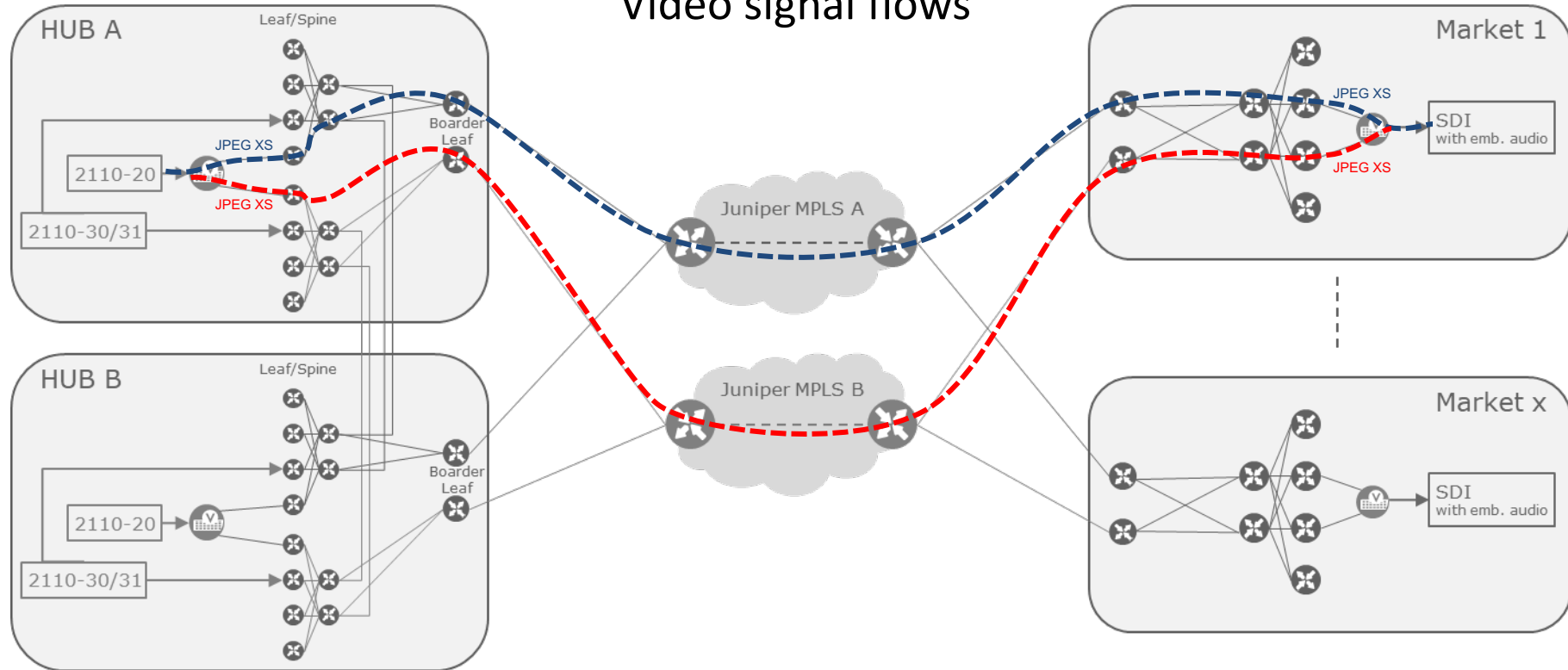
# Deployment Phase 1 – July 2019



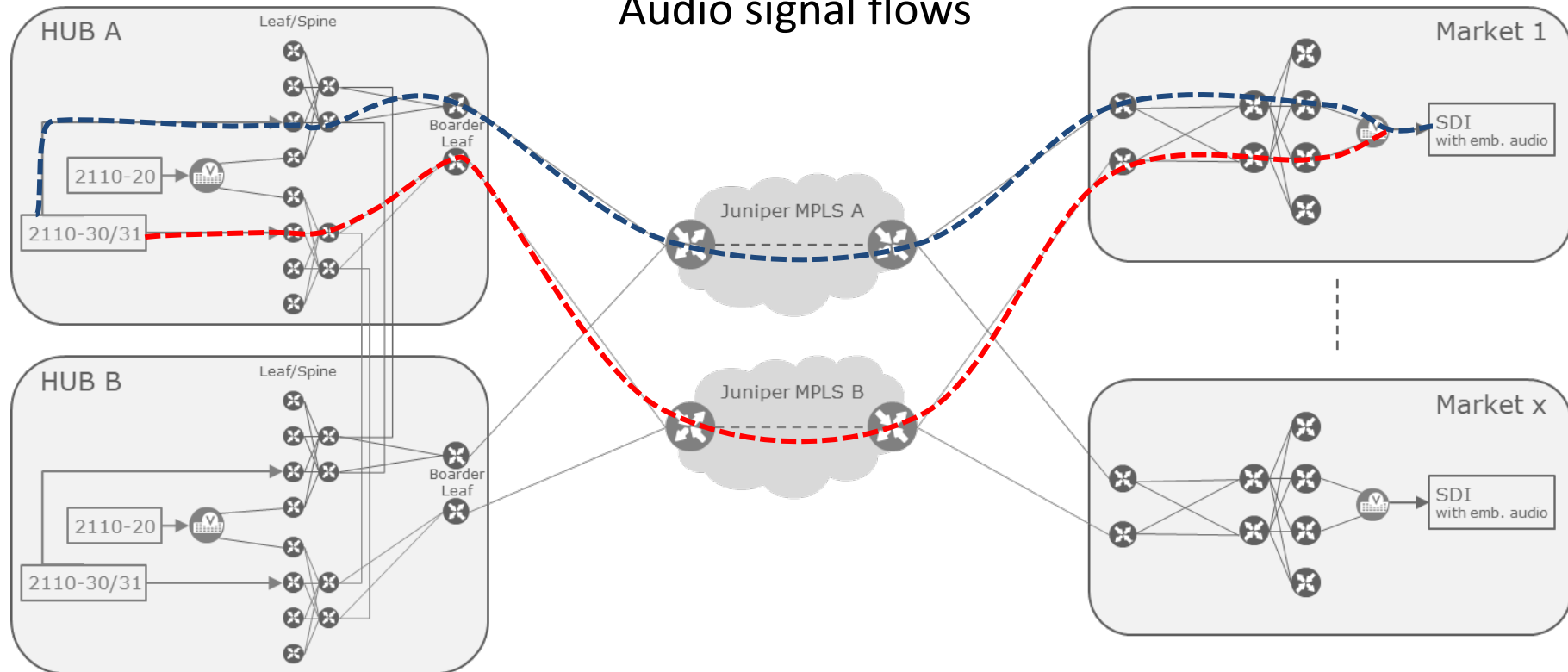
# High level architecture



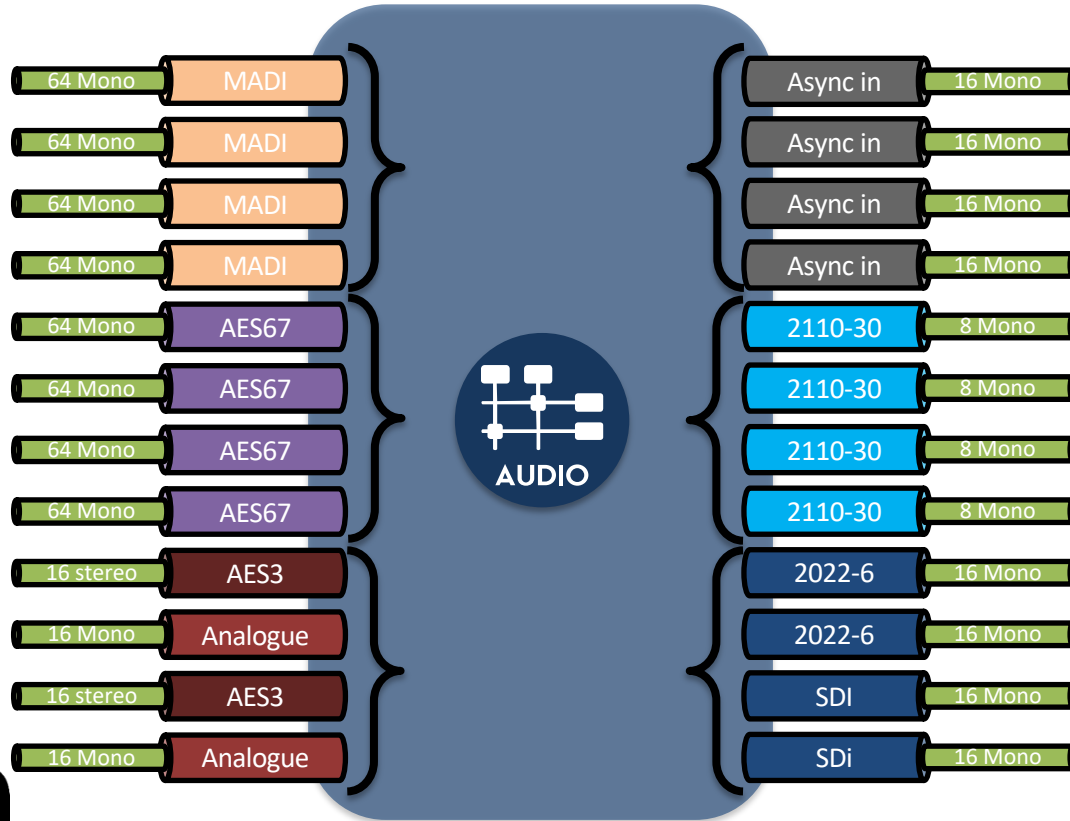
## Video signal flows



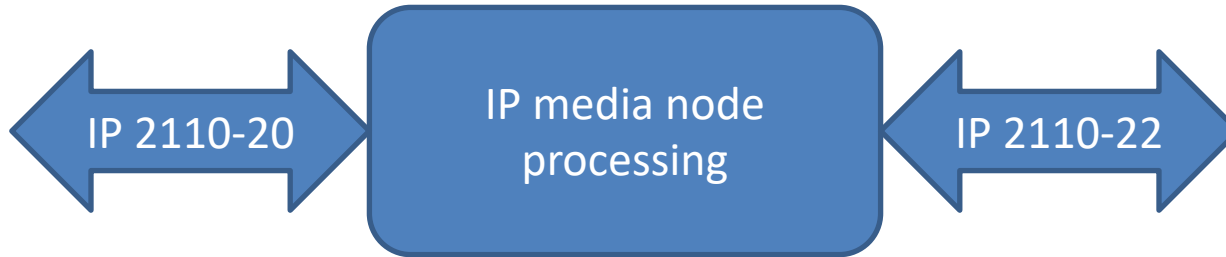
## Audio signal flows



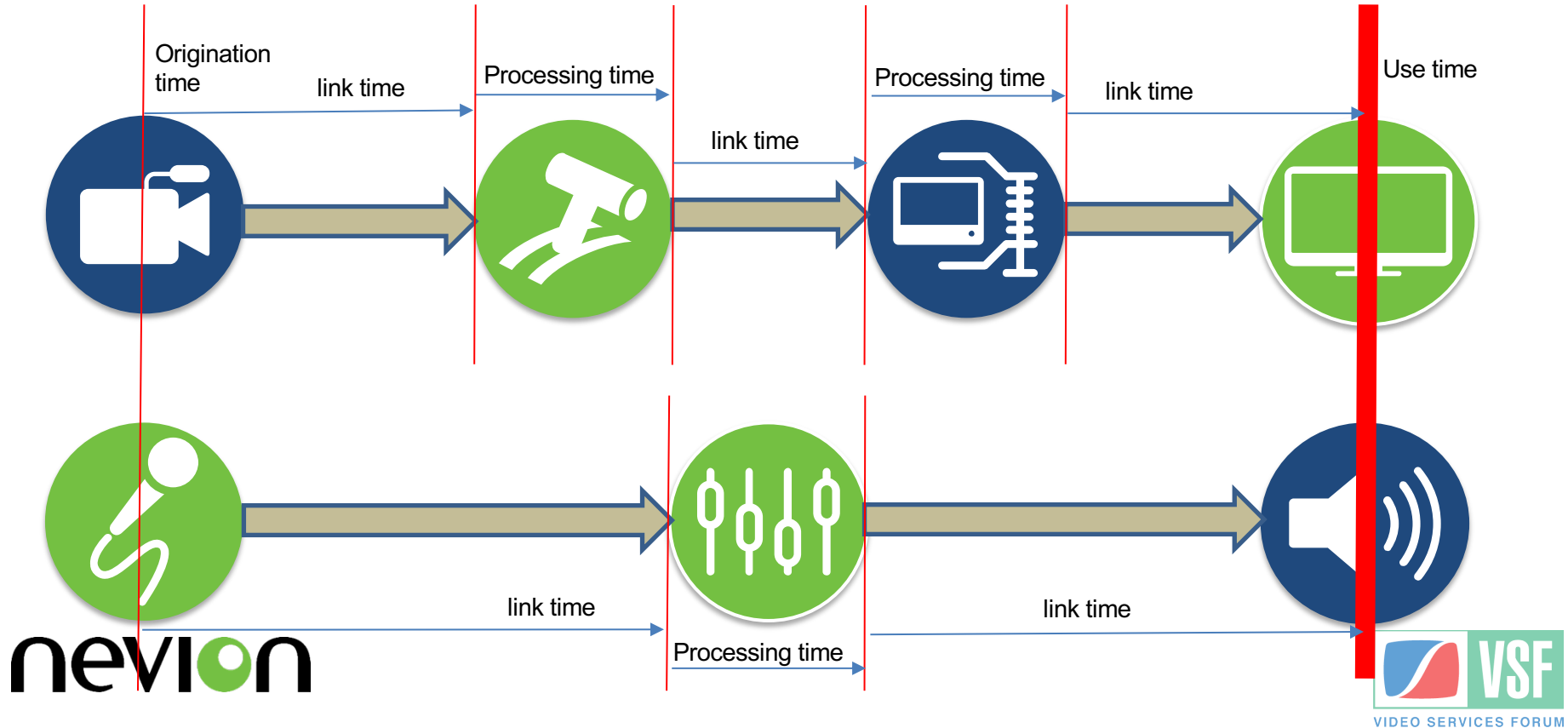
# Don't forget the audio!



# The IP-IP processing world

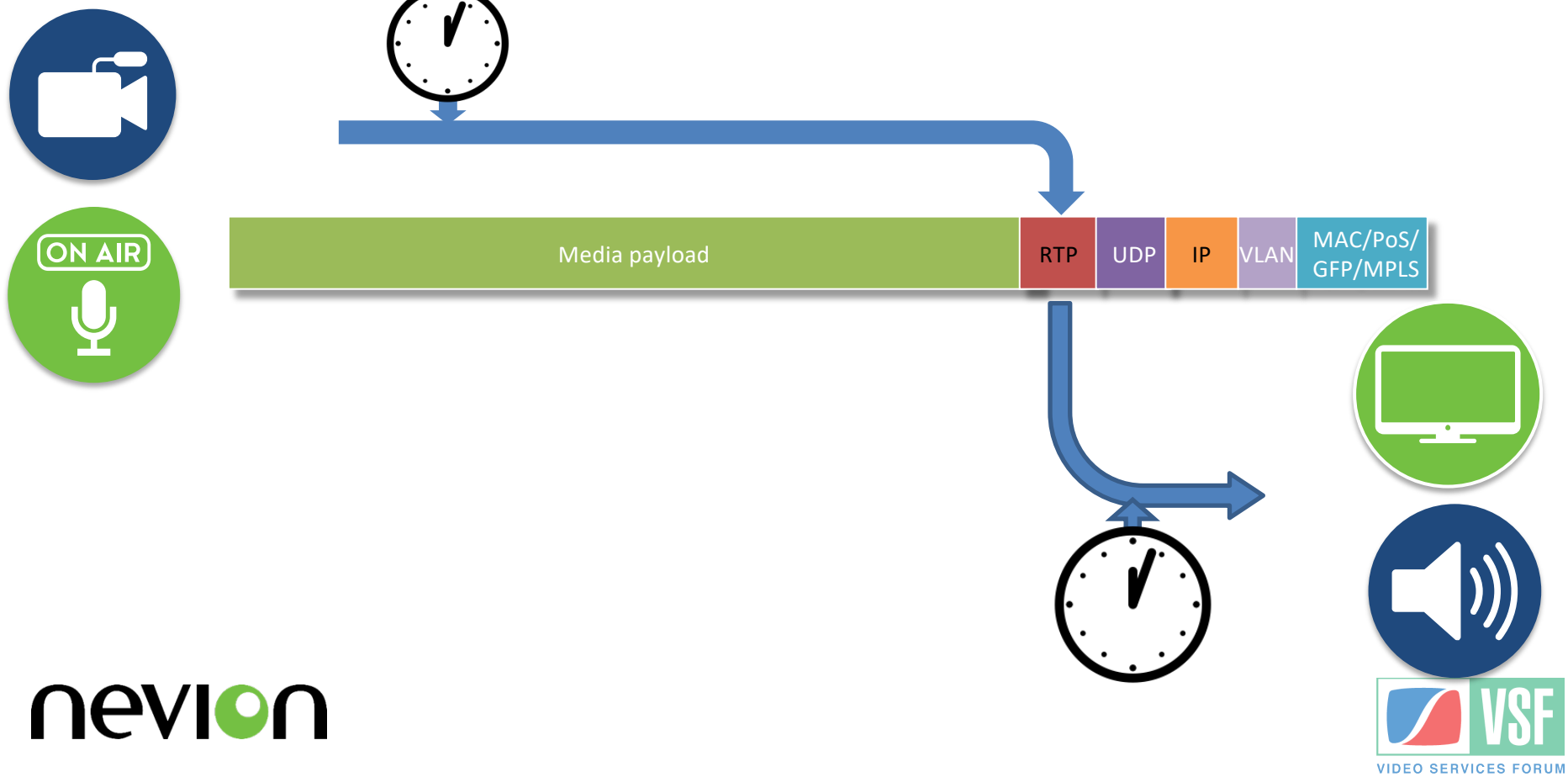


# SMPTE2110 – time tracking potential

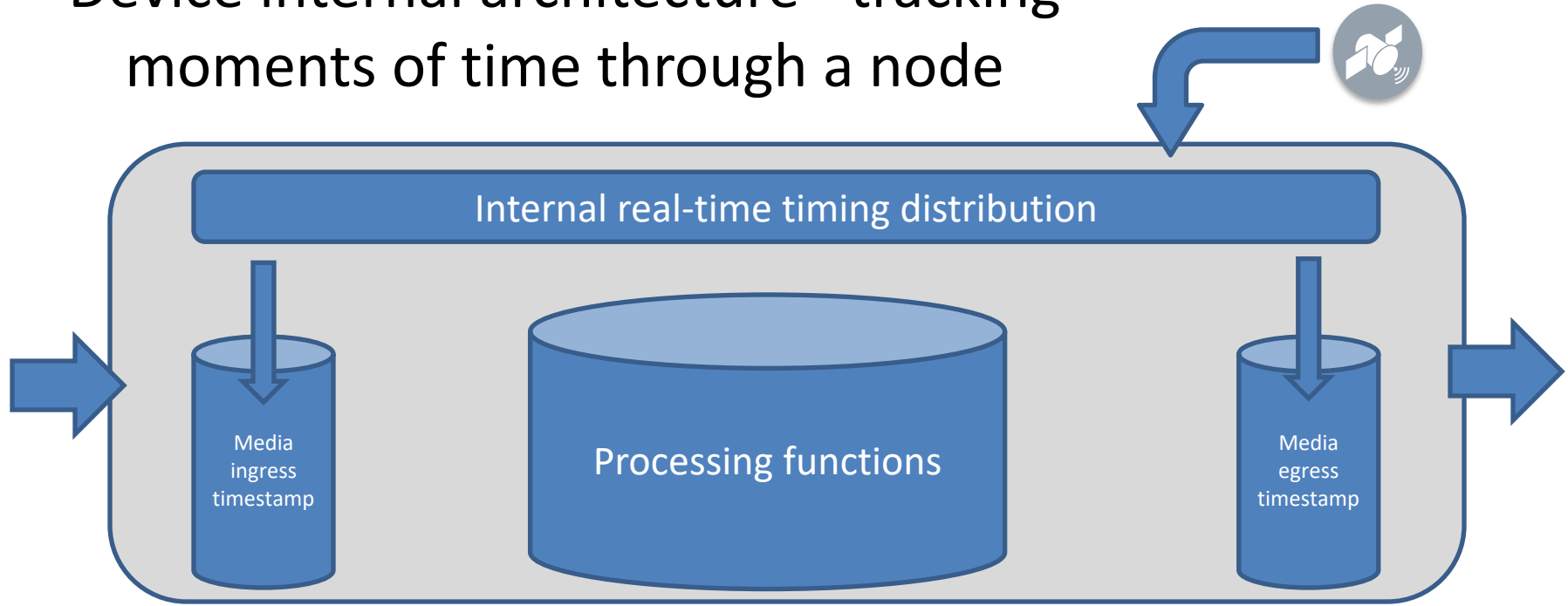




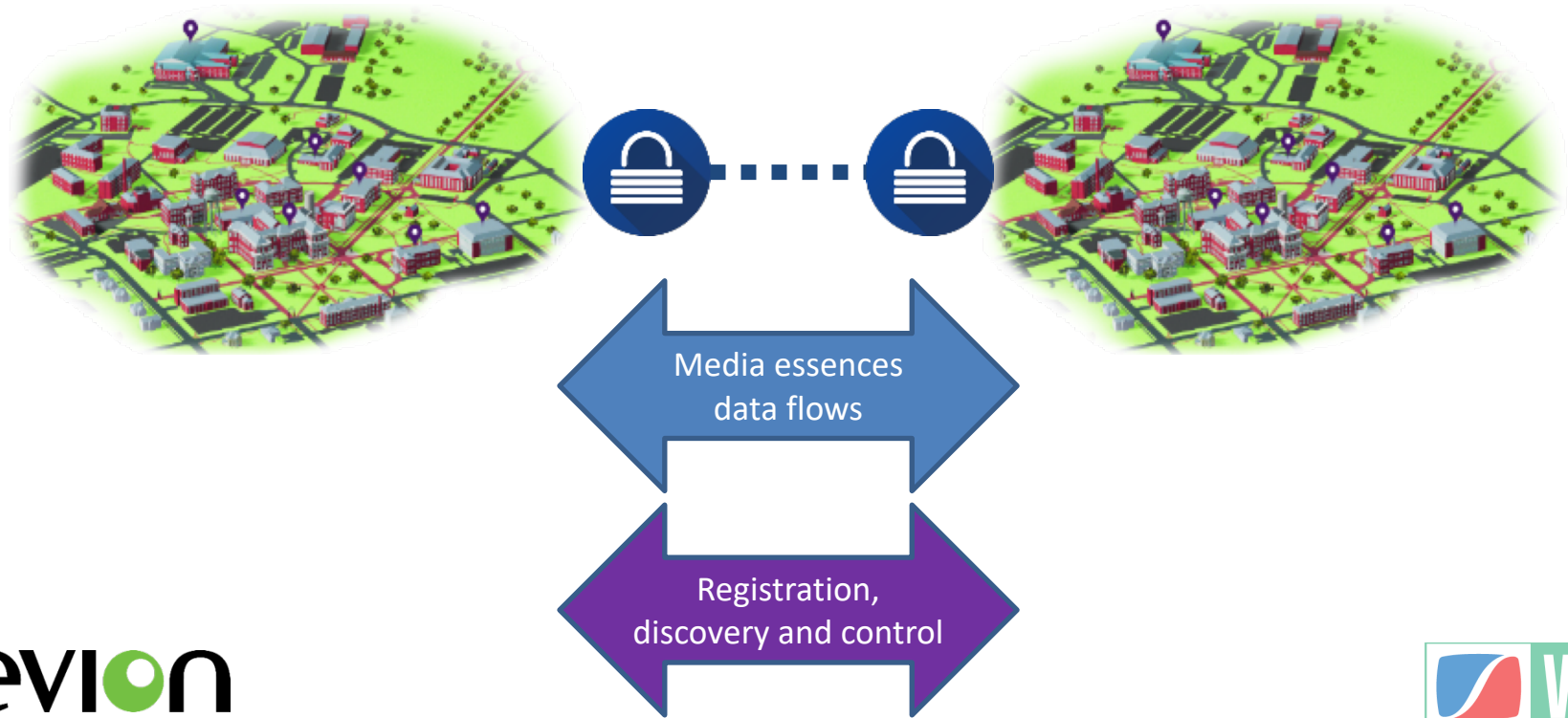
# Absolute time of origination is captured in ST2110-20



# Device internal architecture - tracking moments of time through a node



# See yesterday's TWG ST2110 over WAN update



# Summary

- JPEG-XS is working
- Low latency distributed production is possible
- ST2110-22 is a great addition to the 2110 suite
- Timing specifications potentially need revisiting
- Ongoing work on ST2110-WAN is important
- Delivered in short time to customer requirements

You are welcome to come to the UK  
for a really great cup of tea 😊



# Thank you!

JPEG-XS in action for production

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