IP production – space and time

Andy Rayner, Chief Technologist

Nevion

arayner@nevion.com 07711 196609

Let's go on a journey…….

nevion

VSF
VIDEO SERVICES FORUM

nevion

VSF
VIDEO SERVICES FORUM

Space & Time

Scale & Time

IP facilities are fast becoming business-as-usual

Panel session later today

nevion

VSF
VIDEO SERVICES FORUM

Ever-increasing scale in recent deployments

>100,000 end points

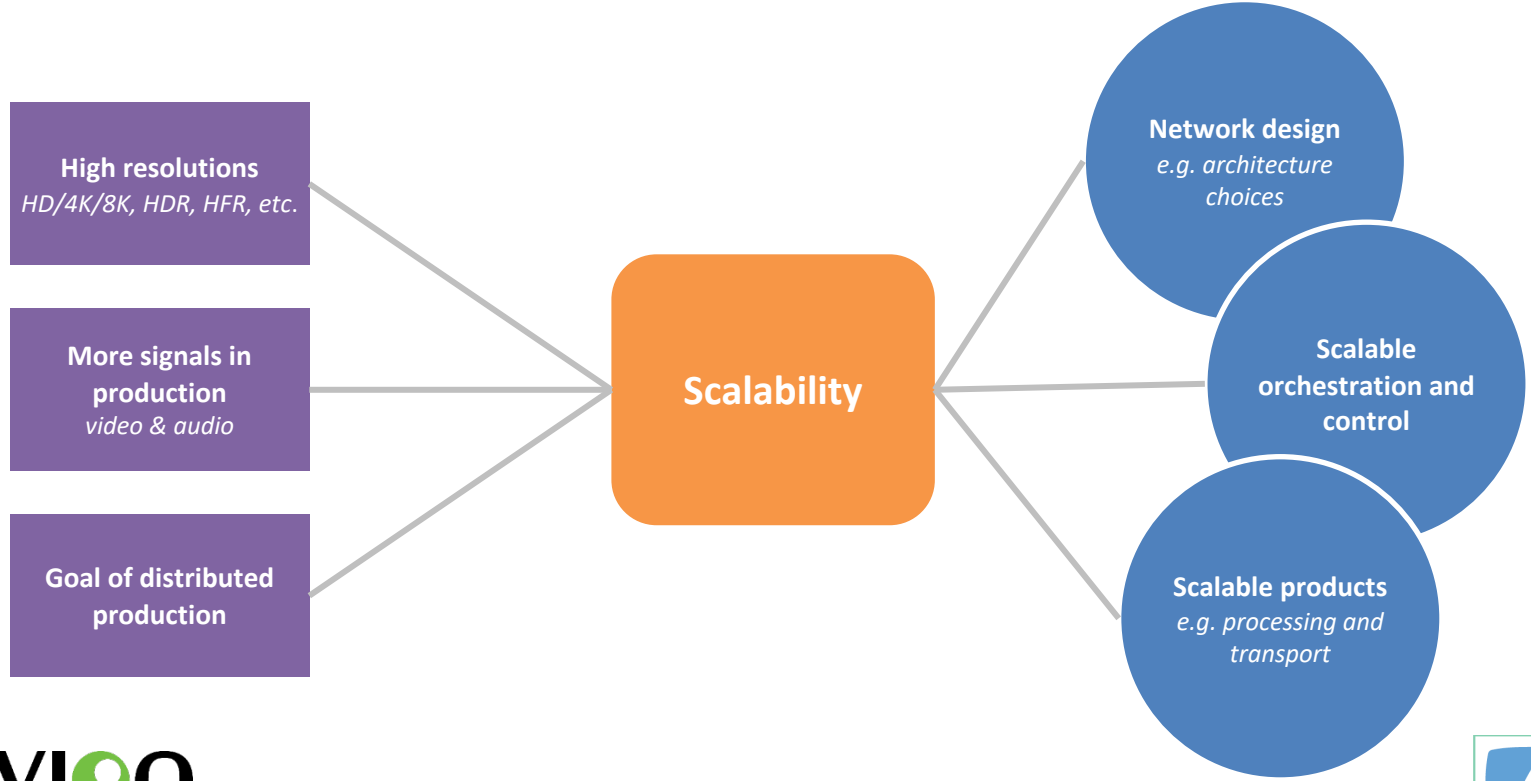
>100,000 media flows

Full technology-abstraction is absolutely necessary!

nevion

VSF
VIDEO SERVICES FORUM

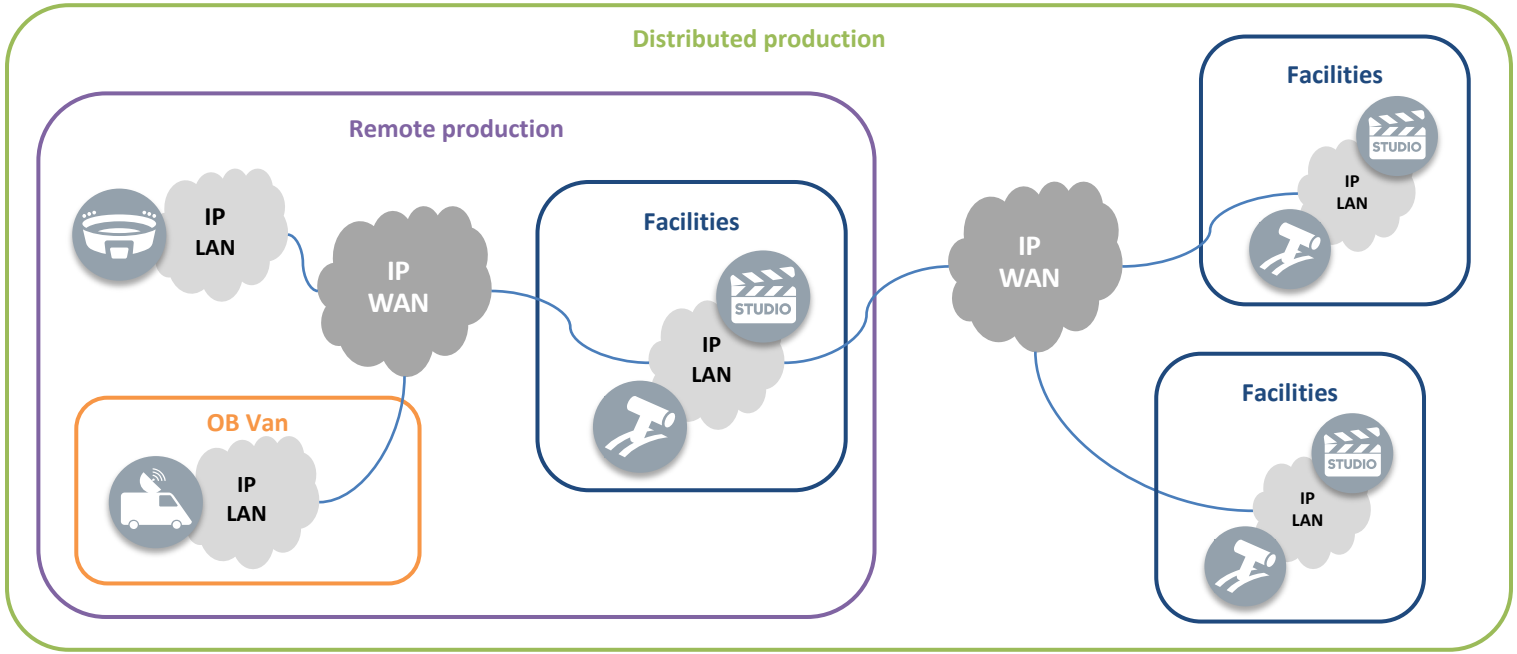
Drive and requirements for **scalability**



nevion

VSF
VIDEO SERVICES FORUM

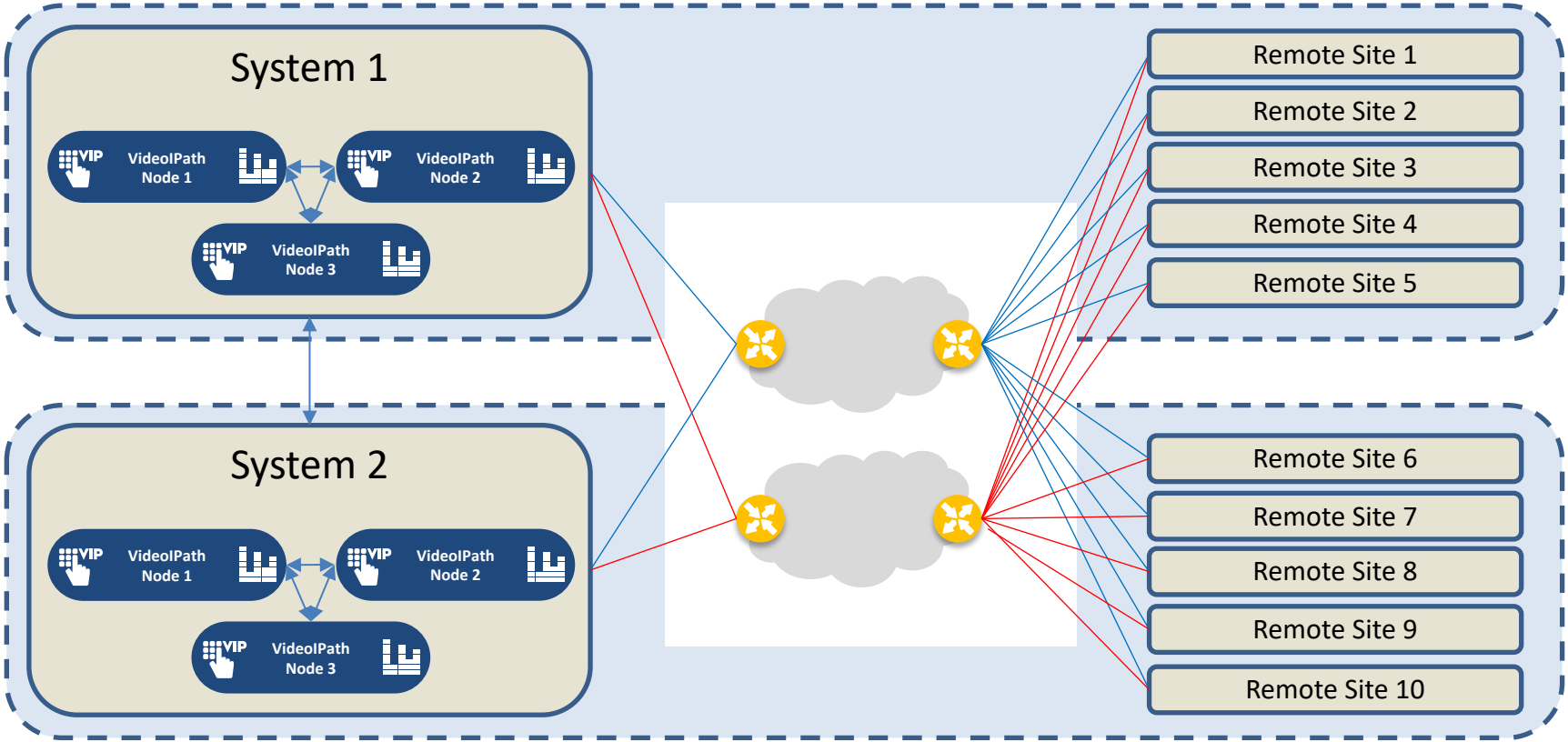
Scale in federation – distributed production



nevion

VSF
VIDEO SERVICES FORUM

Distributed systems



nevion

VSF
VIDEO SERVICES FORUM

Unifying the control plane

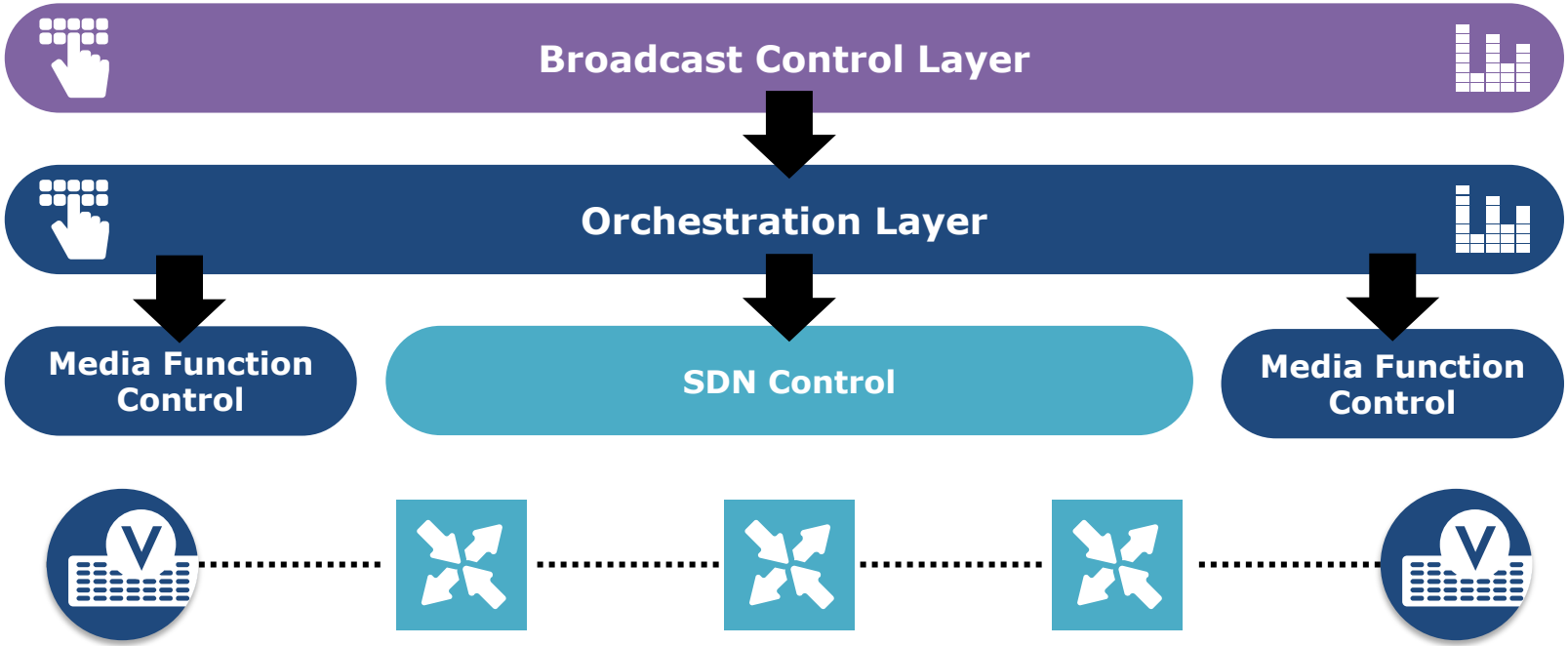
Bespoke device drivers

Proprietary Audio Control

nevion

VSF
VIDEO SERVICES FORUM

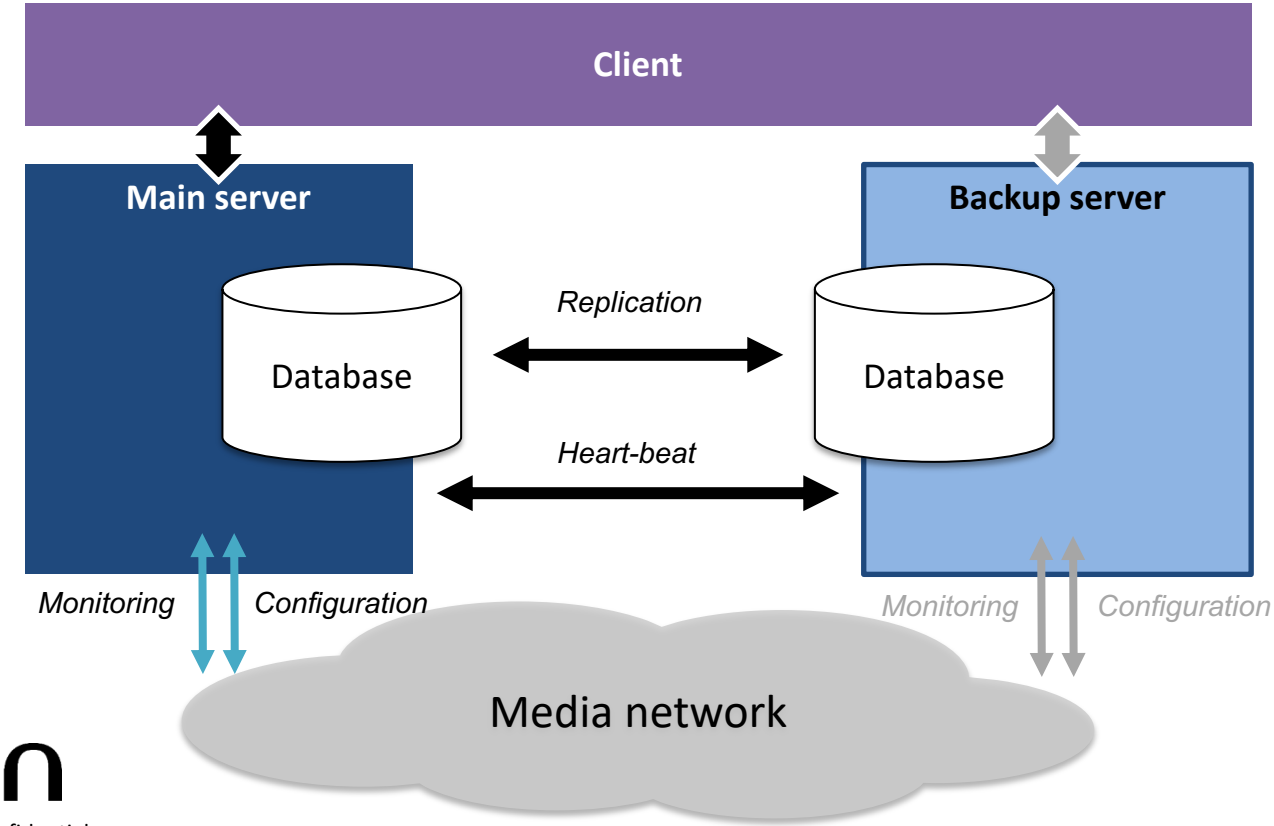
Scalable control architecture needed



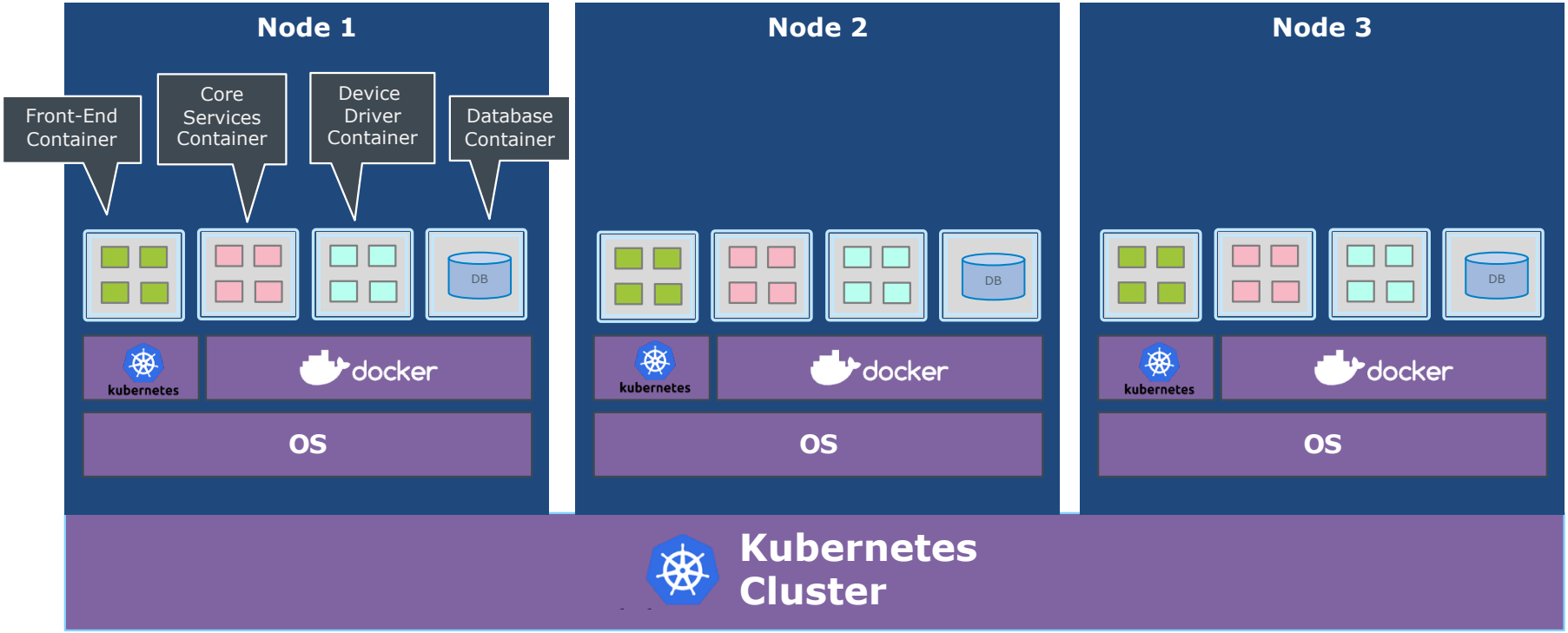
nevion

VSF
VIDEO SERVICES FORUM

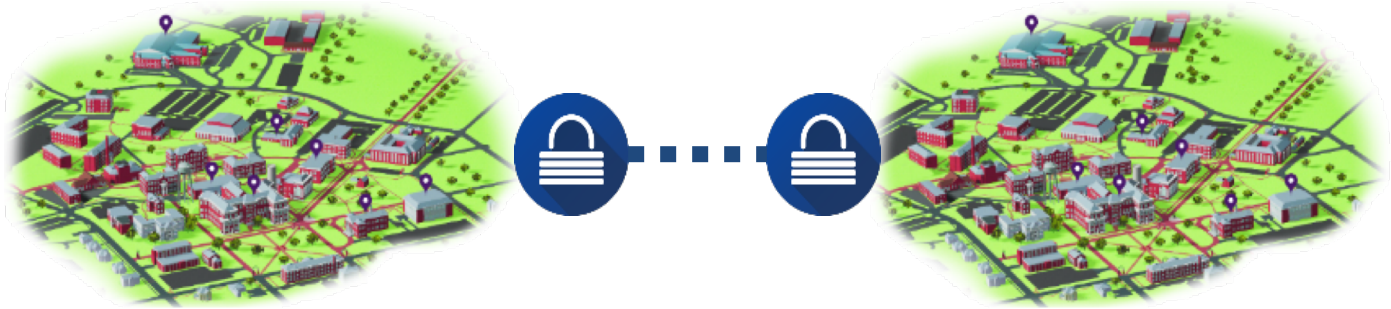
Traditional **HA** system



Scalable cluster architecture



What level of federation control needed?



nevion

VSF
VIDEO SERVICES FORUM

MADI

AES3

ST2110-30/1

AES67

SDI embedded

2022-6 embedded

Analogue!

Lots of audio…

… of different types…

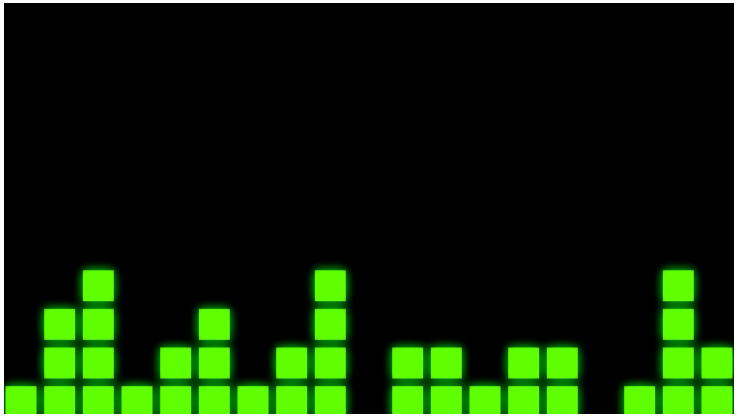
… + control plane…

1 / 2 / 6 / 8 / 16 / 64 channels

1ms / 125us packet period

16 / 24 / 32 bit resolution

44.1 / 48 / 96 / 192 kHz



Sample Rate Conversion

Full channel shuffling

Gain & delay per channel

All IP connectivity……

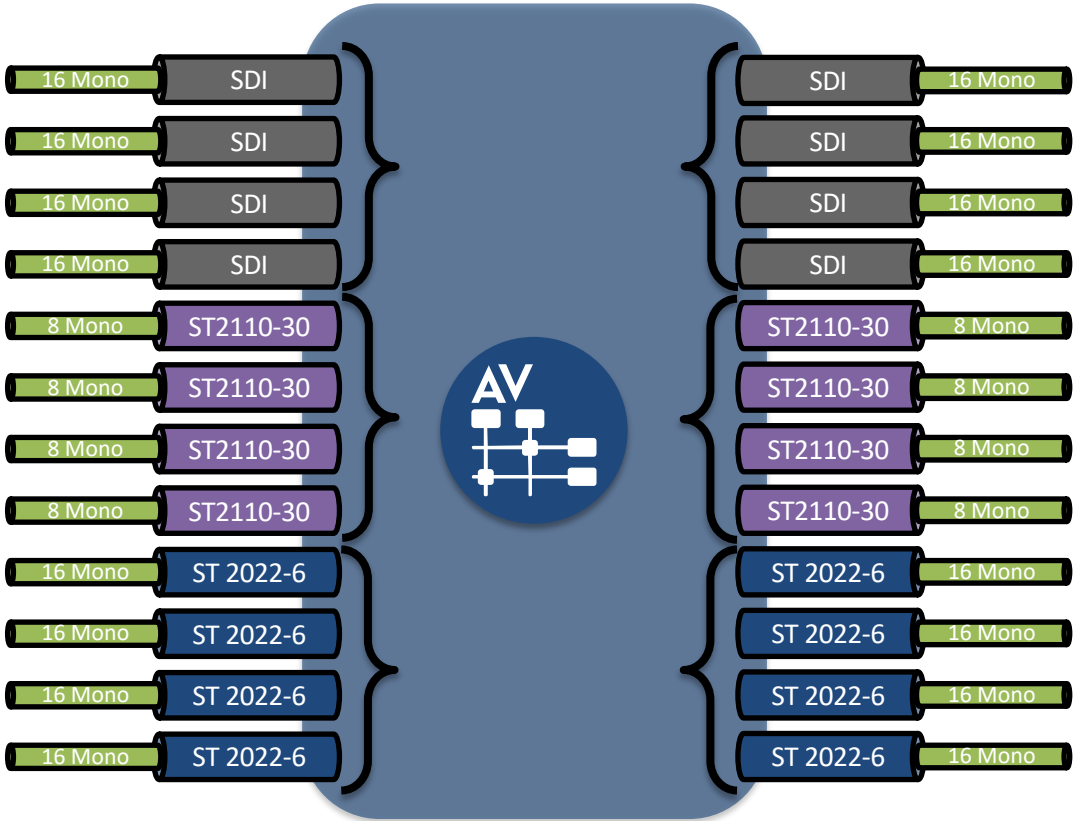
nevion

NMOS

VSF

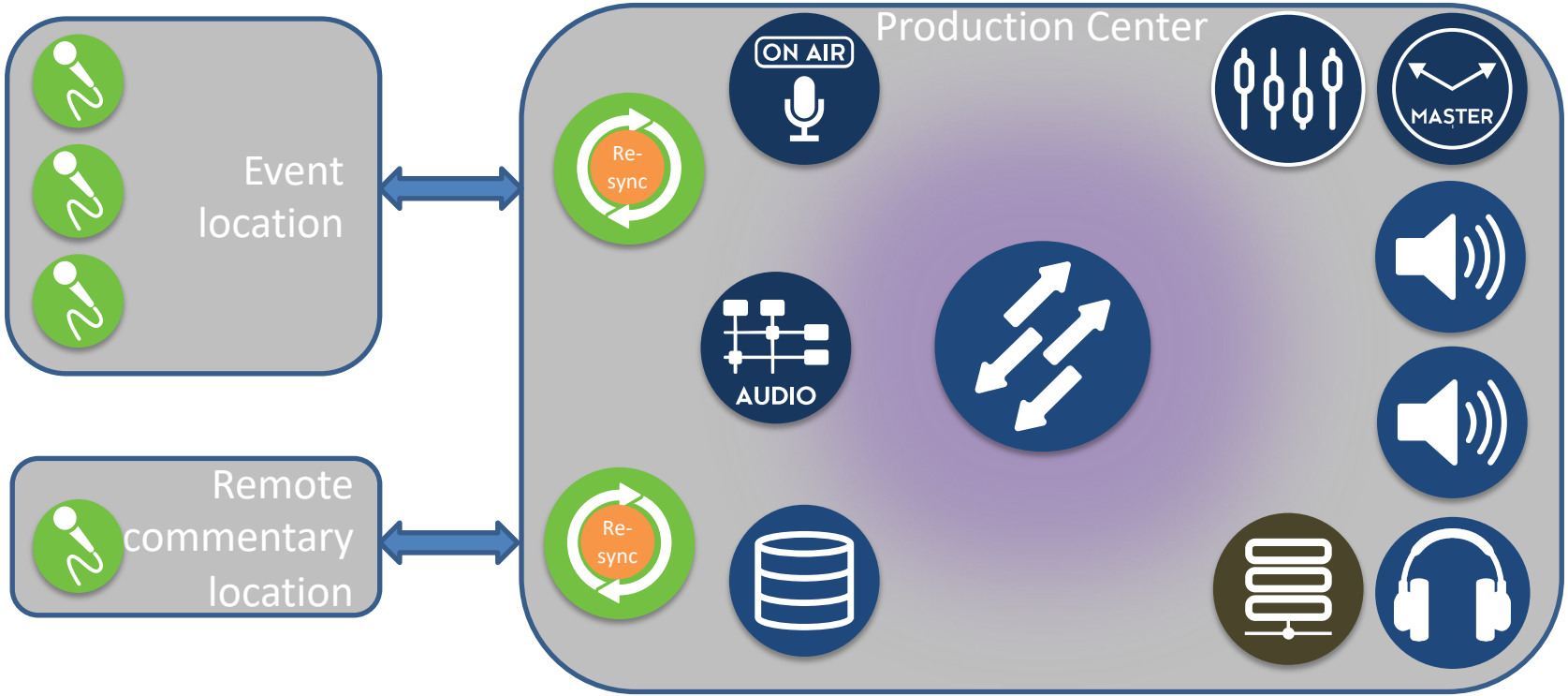
VIDEO SERVICES FORUM

Audio Manipulation as as Service



Audio Manipulation as as Service

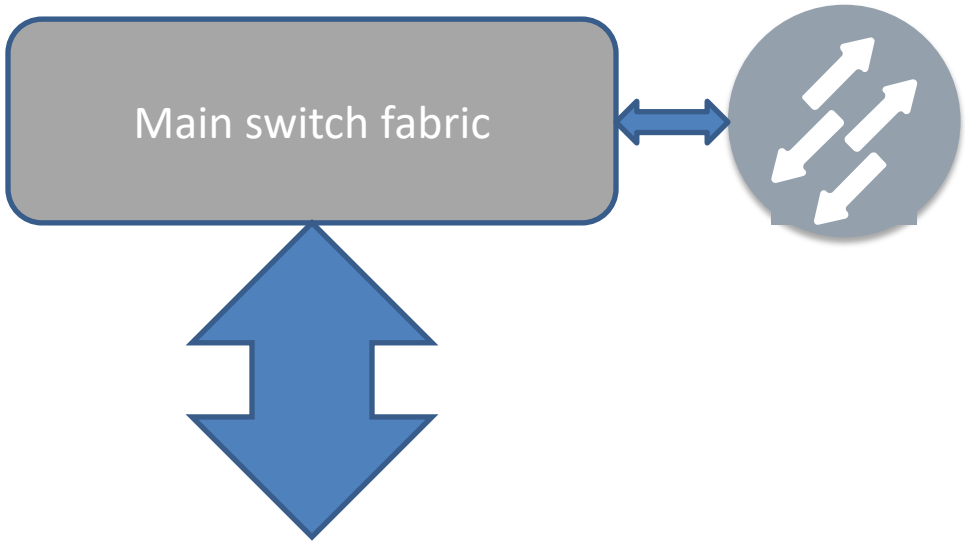
Audio facility interconnects



Moving outside campus-based audio production islands

- WAN connectivity involved
- Longer latencies
- (Potentially) Asynchronous sources
- Layer 2 too limiting
- Layer 3 (routed) needed for larger and multi-campus networks

NAT as a Service



nevion

VSF
VIDEO SERVICES FORUM

Space & Time

Time moving on!

Andy: almost 42 billion frames (25fps) since his epoch!
[Just 53 years]

Esther: >1 billion frames!
[16 months]

nevion

VSF
VIDEO SERVICES FORUM

Time security

GNSS

GPS GALILEO GLONASS

TaaS

Ministers spend £36m to make UK time 'hack-proof' February 2020

A report found that the UK would lose £5.2 billion if the time network went down for five days
JANE BARLOW/PA

UK National Timing Centre
Deliver a resilient UK national time infrastructure through the building and linking of a new atomic clock network distributed geographically in secure locations.

nevion

VSF
VIDEO SERVICES FORUM

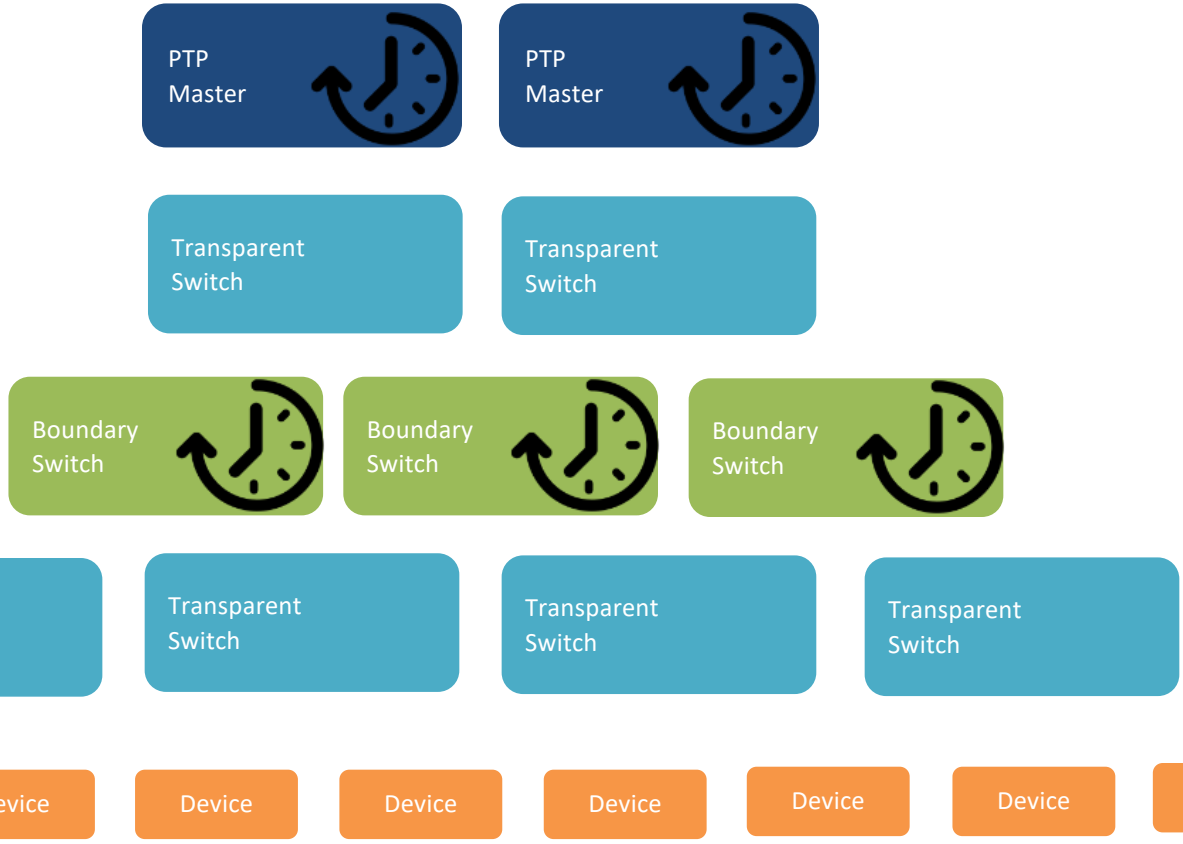
PTP

→ scalability

→ security

→ resilience

→ dependability



nevion

VSF
VIDEO SERVICES FORUM

PTP holdover is capable of being very long – let's make it so!

nevion

VSF
VIDEO SERVICES FORUM

Scalability in timing distribution

nevion

ANNOUNCEMENT

The practice of calling upon telephone operators for information as to the time of day has grown to the point of interfering with the efficiency of telephone service.

For such information 100,000 calls are made daily in New England, the bulk of such calls coming naturally at times when it is most difficult to handle them.

Service efficiency now demands that the work of the operating force should be relieved of unnecessary burdens, and that all energies be directed toward the furnishing of effective telephone service, and to that alone.

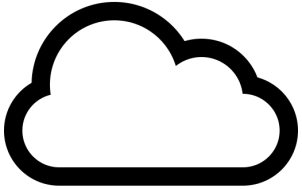
Prompted by these considerations, **the practice of giving information as to the time of day will be discontinued beginning June 3, 1918.**

New England Telephone
and Telegraph Company

W. R. Driver, Jr.
General Manager.

VSF
VIDEO SERVICES FORUM

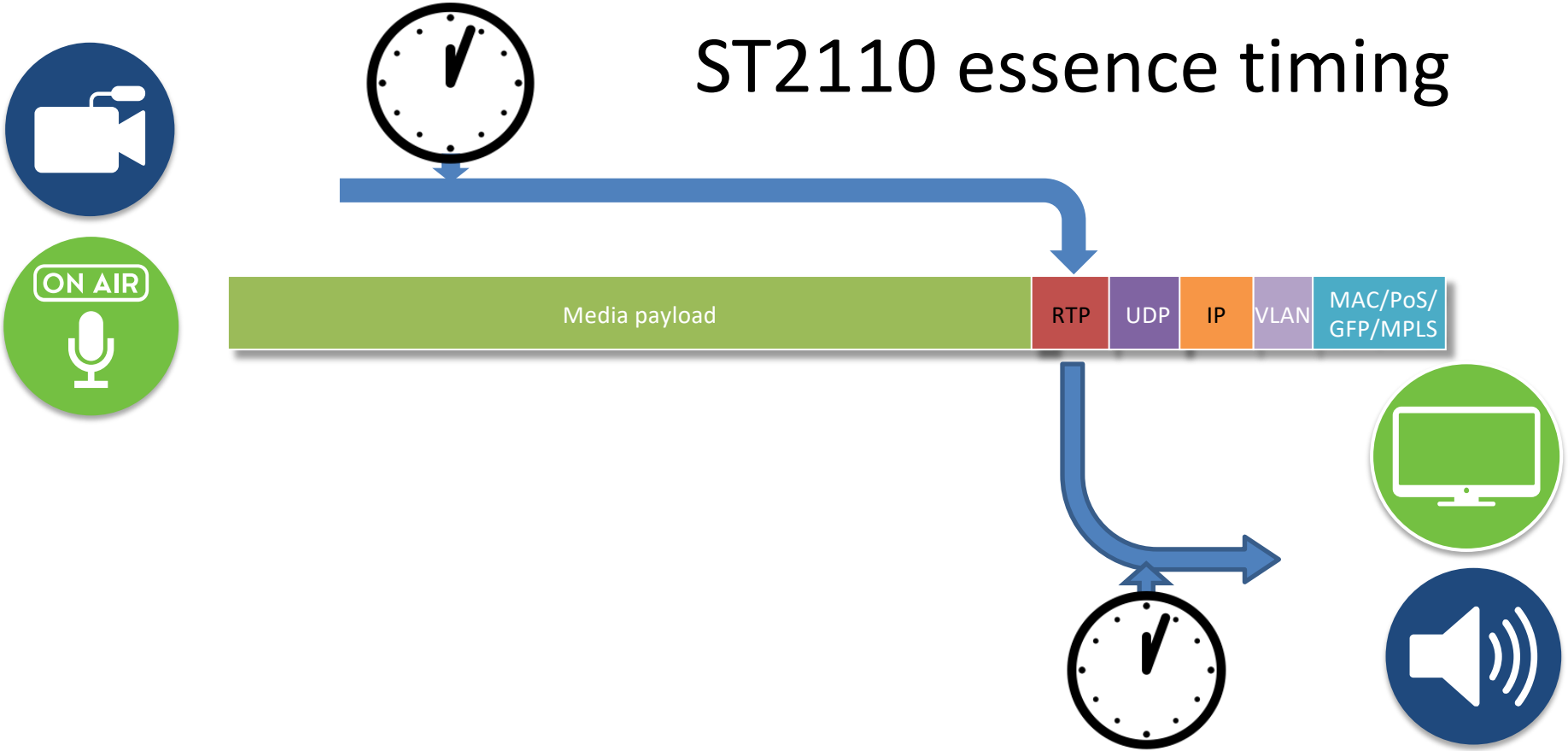
When you lose track of time…



nevion

VSF
VIDEO SERVICES FORUM

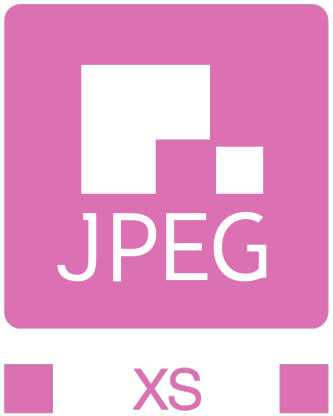
ST2110 essence timing



nevion

VSF
VIDEO SERVICES FORUM

Compression – a further time cost?

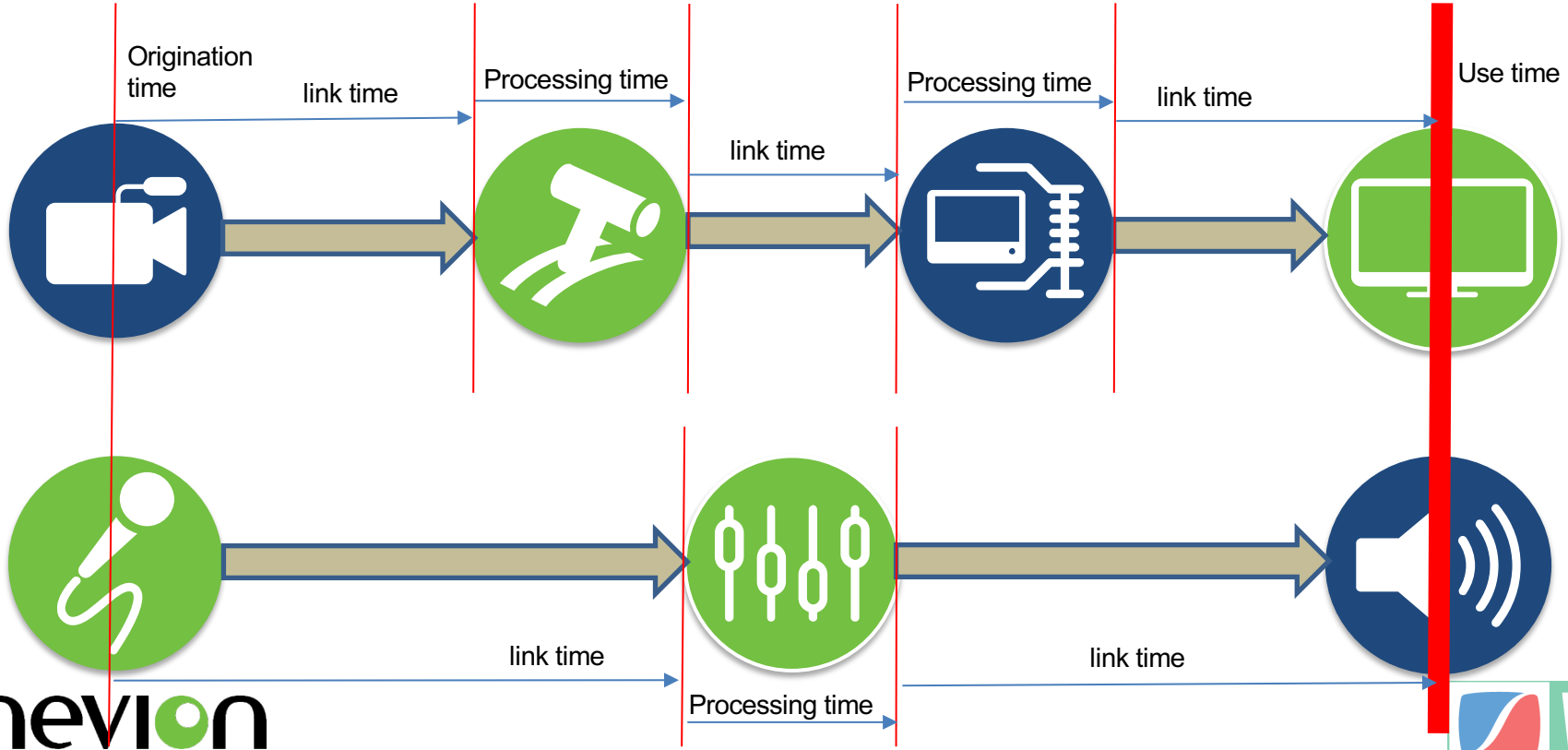


- ST2110-22
- Minimal latency when implemented correctly!
- Up to 10:1 usable compression ratio
- Large scale deployments out there already
- Insignsignificant time c/w transit latency in WAN (=== <100km encoder& decode)
- Will be needed for 5G

nevion

VSF
VIDEO SERVICES FORUM

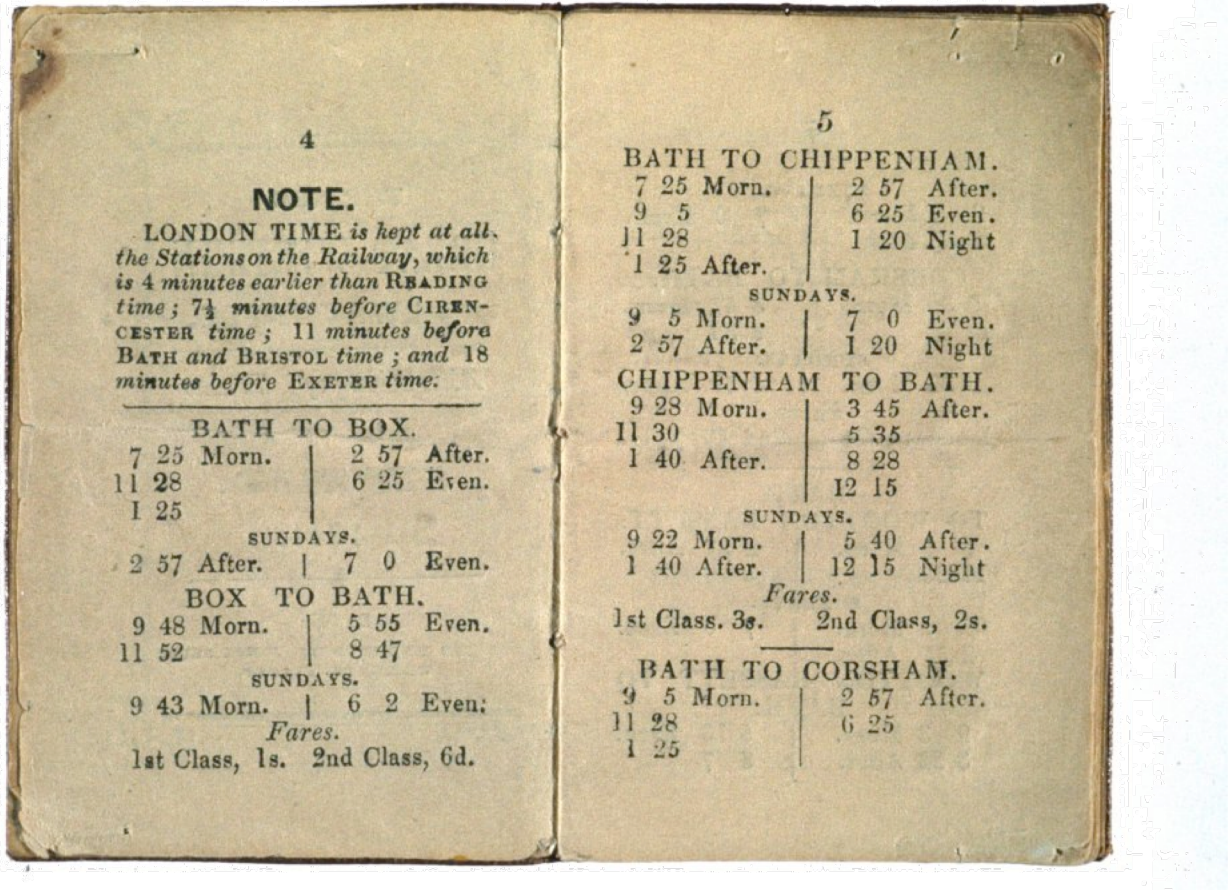
Reconciling essence timings for use



nevion

VSF
VIDEO SERVICES FORUM

1840 – coordinated railway time → GMT



4

NOTE.

LONDON TIME *is kept at all the Stations on the Railway, which is 4 minutes earlier than* READING *time; 7½ minutes before* CIRENCESTER *time; 11 minutes before* BATH *and* BRISTOL *time; and 18 minutes before* EXETER *time.*

BATH TO BOX.

7 25 Morn.	2 57 After.
11 28	6 25 Even.
1 25	

SUNDAYS.

2 57 After.	7 0 Even.

BOX TO BATH.

9 48 Morn.	5 55 Even.
11 52	8 47

SUNDAYS.

9 43 Morn.	6 2 Even.

Fares.

1st Class, 1s. 2nd Class, 6d.

5

BATH TO CHIPPENHAM.

7 25 Morn.	2 57 After.
9 5	6 25 Even.
11 28	1 20 Night
1 25 After.	

SUNDAYS.

9 5 Morn.	7 0 Even.
2 57 After.	1 20 Night

CHIPPENHAM TO BATH.

9 28 Morn.	3 45 After.
11 30	5 35
1 40 After.	8 28
	12 15

SUNDAYS.

9 22 Morn.	5 40 After.
1 40 After.	12 15 Night

Fares.

1st Class. 3*s*. 2nd Class, 2*s*.

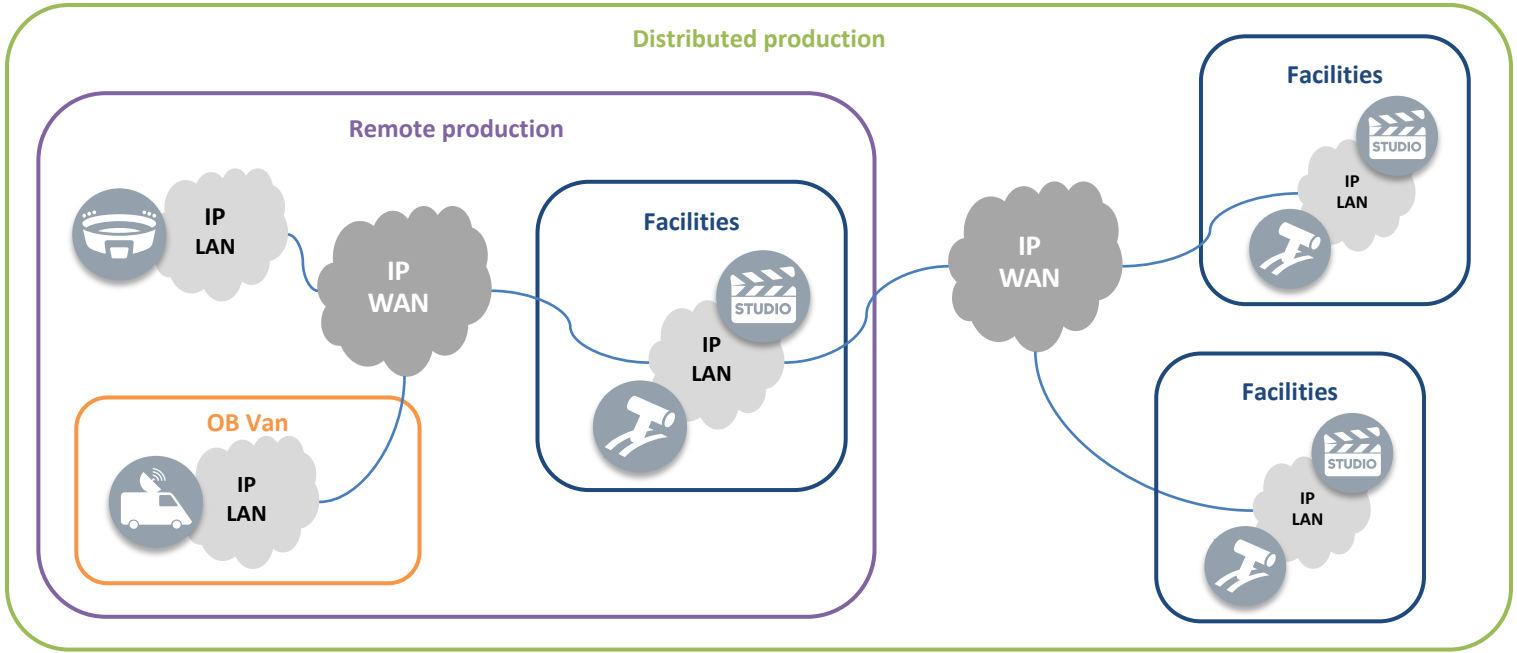
BATH TO CORSHAM.

9 5 Morn.	2 57 After.
11 28	6 25
1 25	

nevion

VSF VIDEO SERVICES FORUM

ST2110 over WAN



update session this afternoon

nevion

VSF
VIDEO SERVICES FORUM

Switching at the right time – no longer such an issue?

nevion

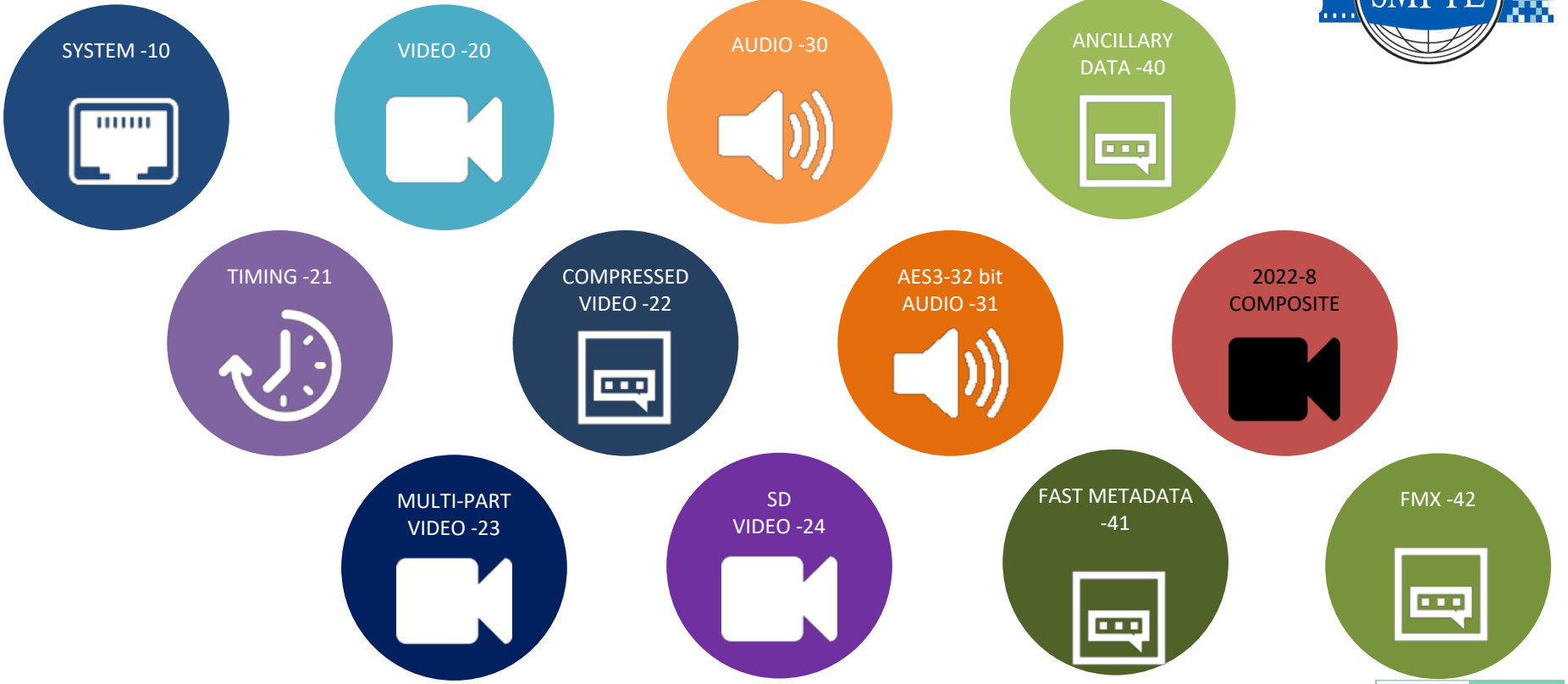
VSF
VIDEO SERVICES FORUM

Security

nevion

VSF
VIDEO SERVICES FORUM

SMPTE ST 2110 tidying up



nevion

VSF
VIDEO SERVICES FORUM

nevion

VSF
VIDEO SERVICES FORUM

Thank You

Andy Rayner, Chief Technologist, Nevion

arayner@nevion.com *+44 7711 196609*

nevion

VSF
VIDEO SERVICES FORUM