Timing planes in IP production

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The VSF YouTube video channel
- lots of exciting diversified content!

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Surely not Rayner talking about time ***again***!

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Timing planes in IP production

- The current situation
- The need
- The solution
- Call to arms!

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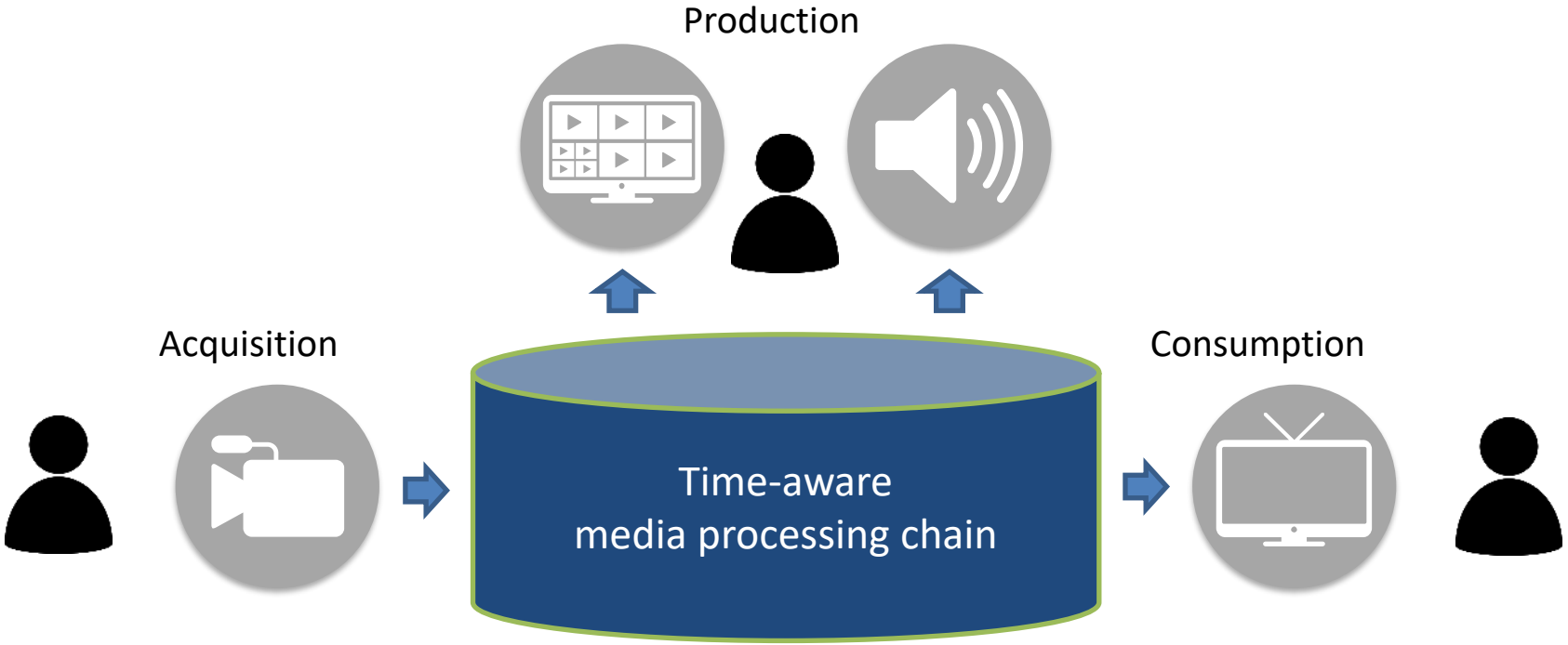
The broadcast end game



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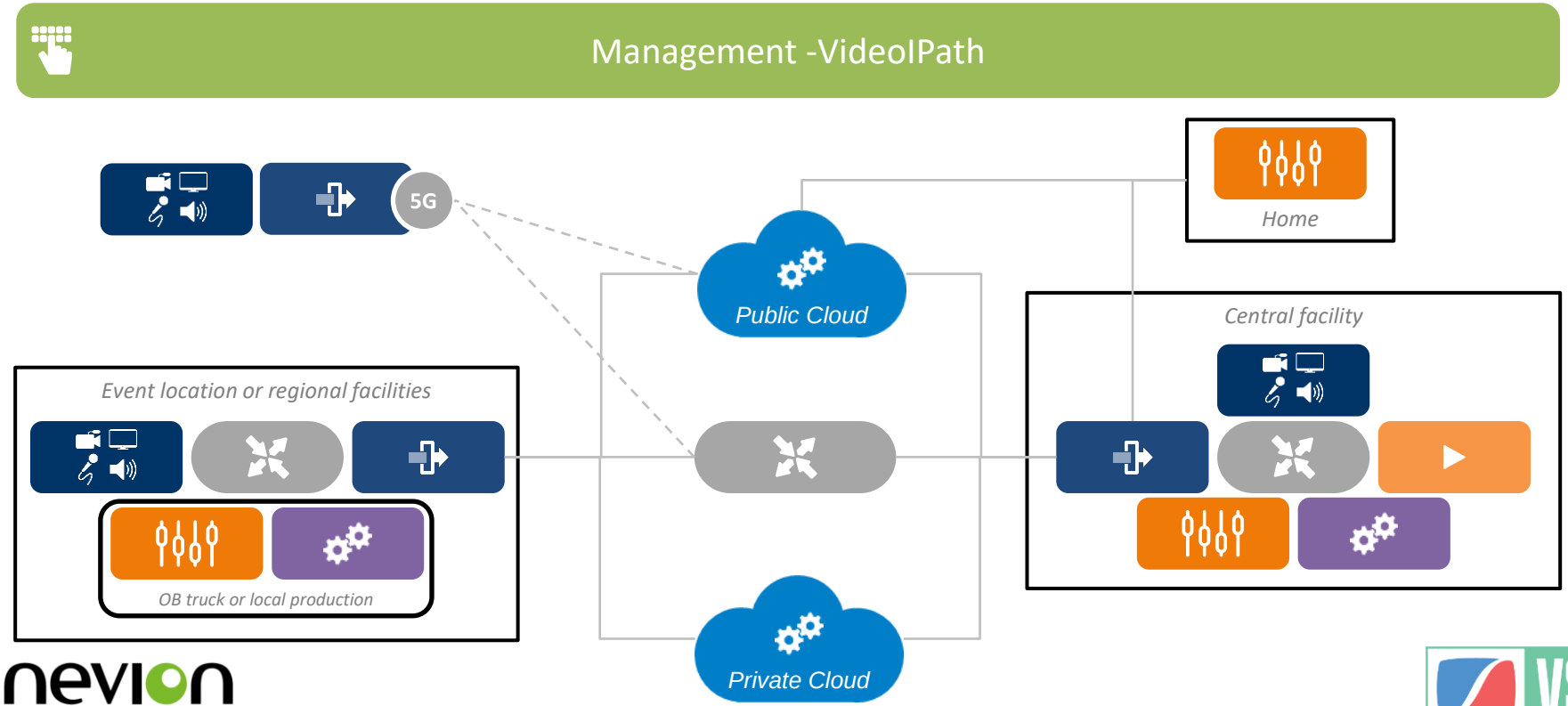
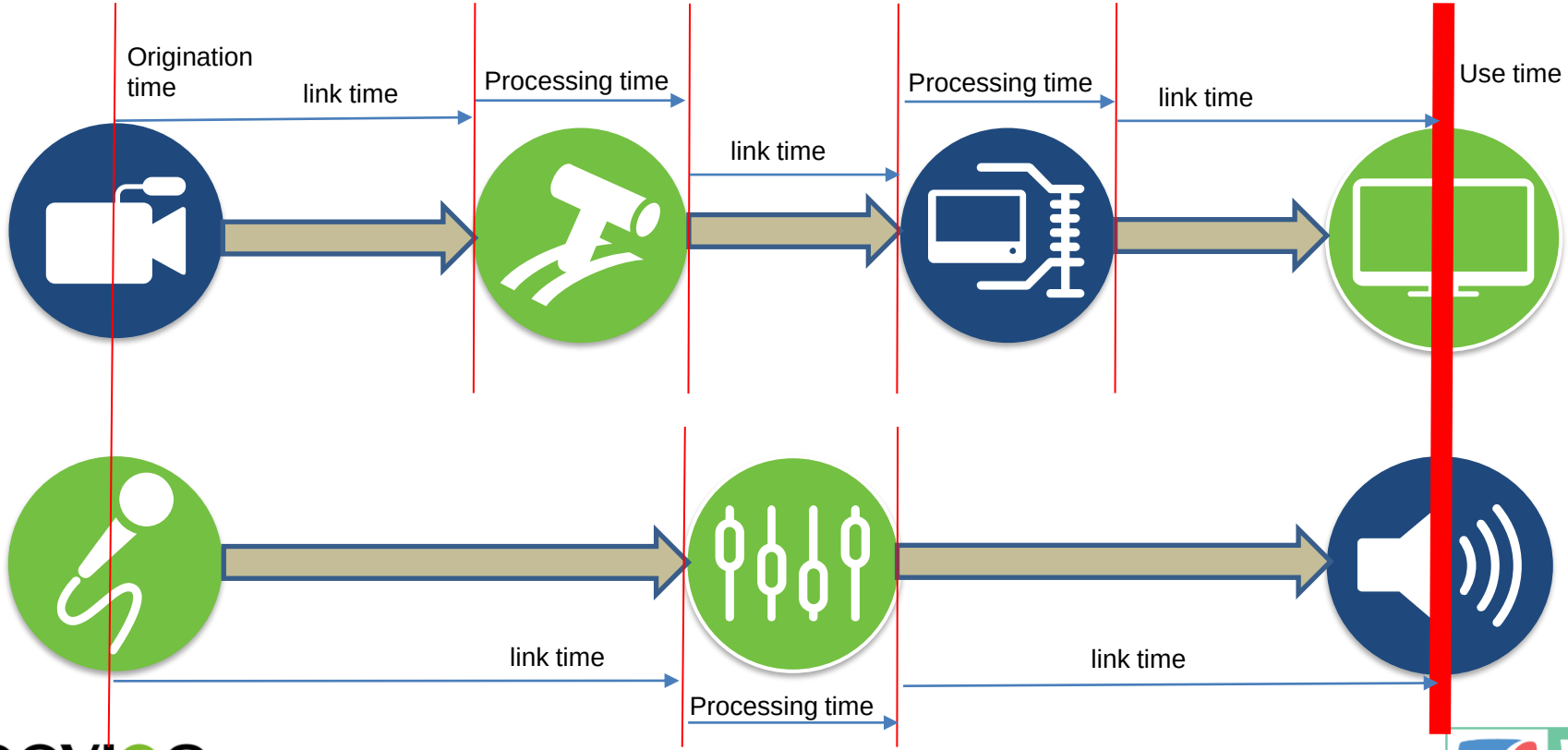
Towards **distributed production**



Reconciling essence timings for use



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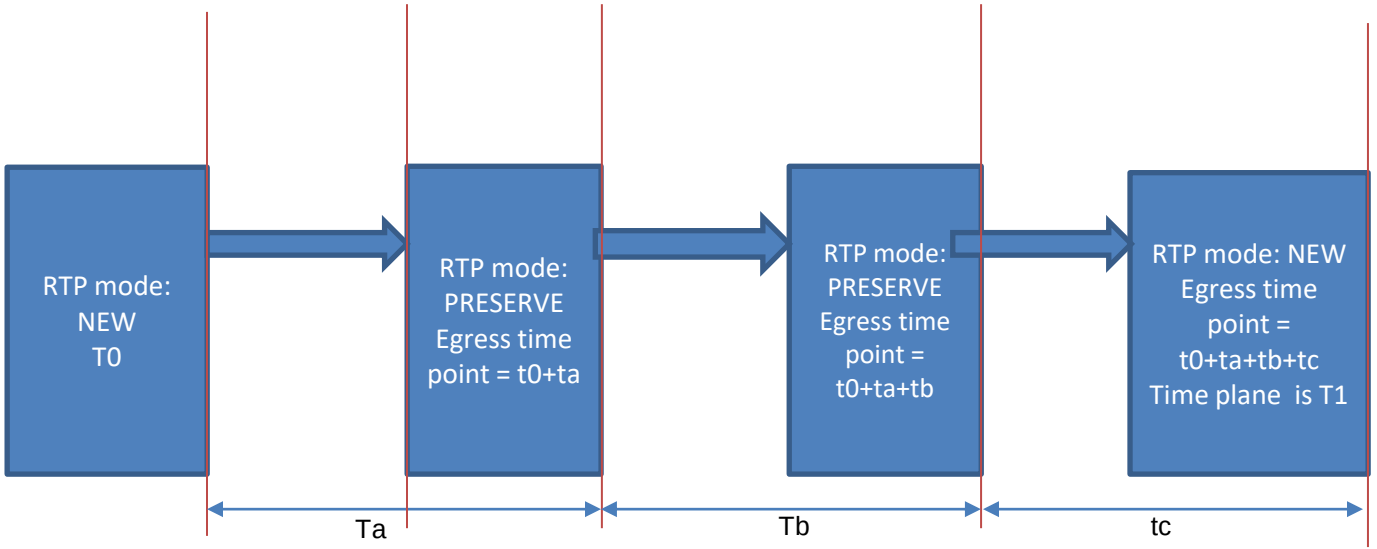
Timing propagation through system



$T1-T0 = T_{NEWRTP} - T_{RTP}$

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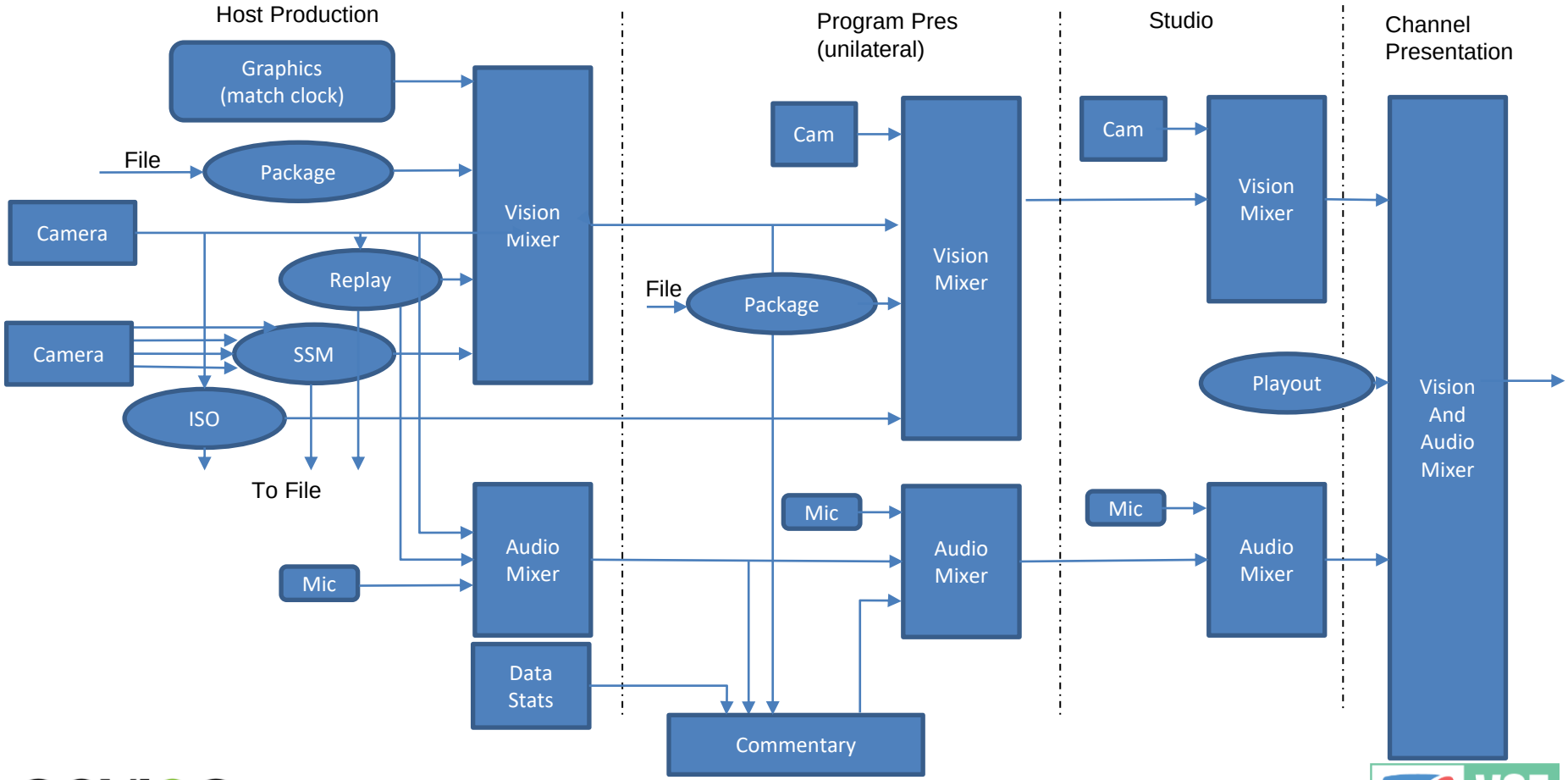

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Drawing by Prin Boon, Phabrix

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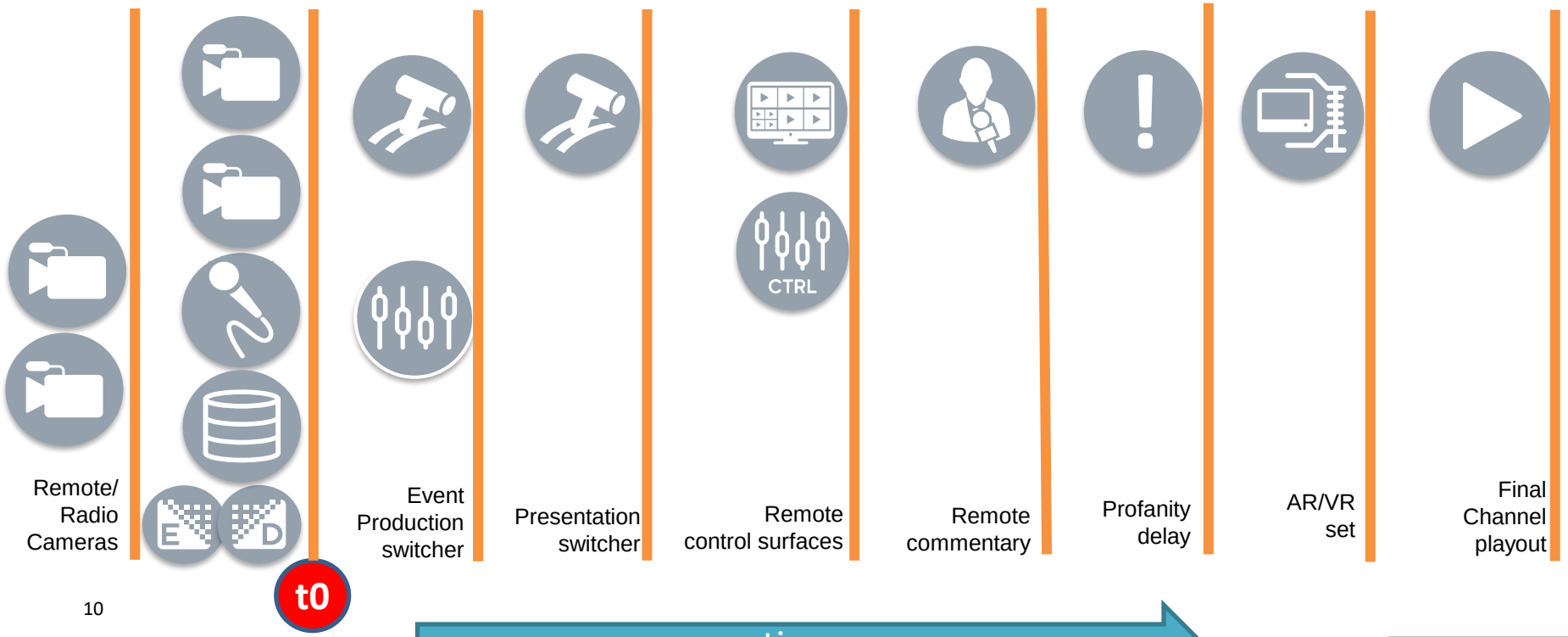
Example production timing planes



Remote/ Radio Cameras

Event Production switcher

Presentation switcher

Remote control surfaces

Remote commentary

Profanity delay

AR/VR set

Final Channel playout

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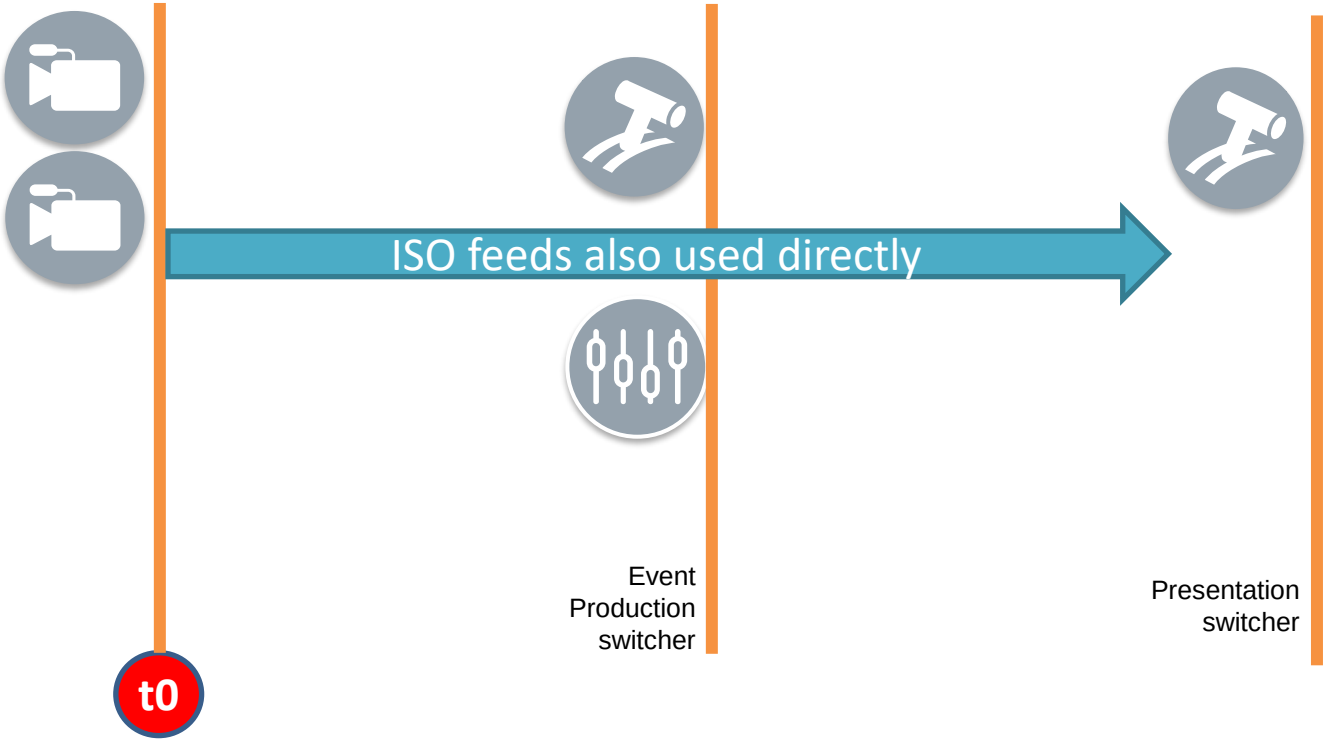
Example of sources that cross timing planes



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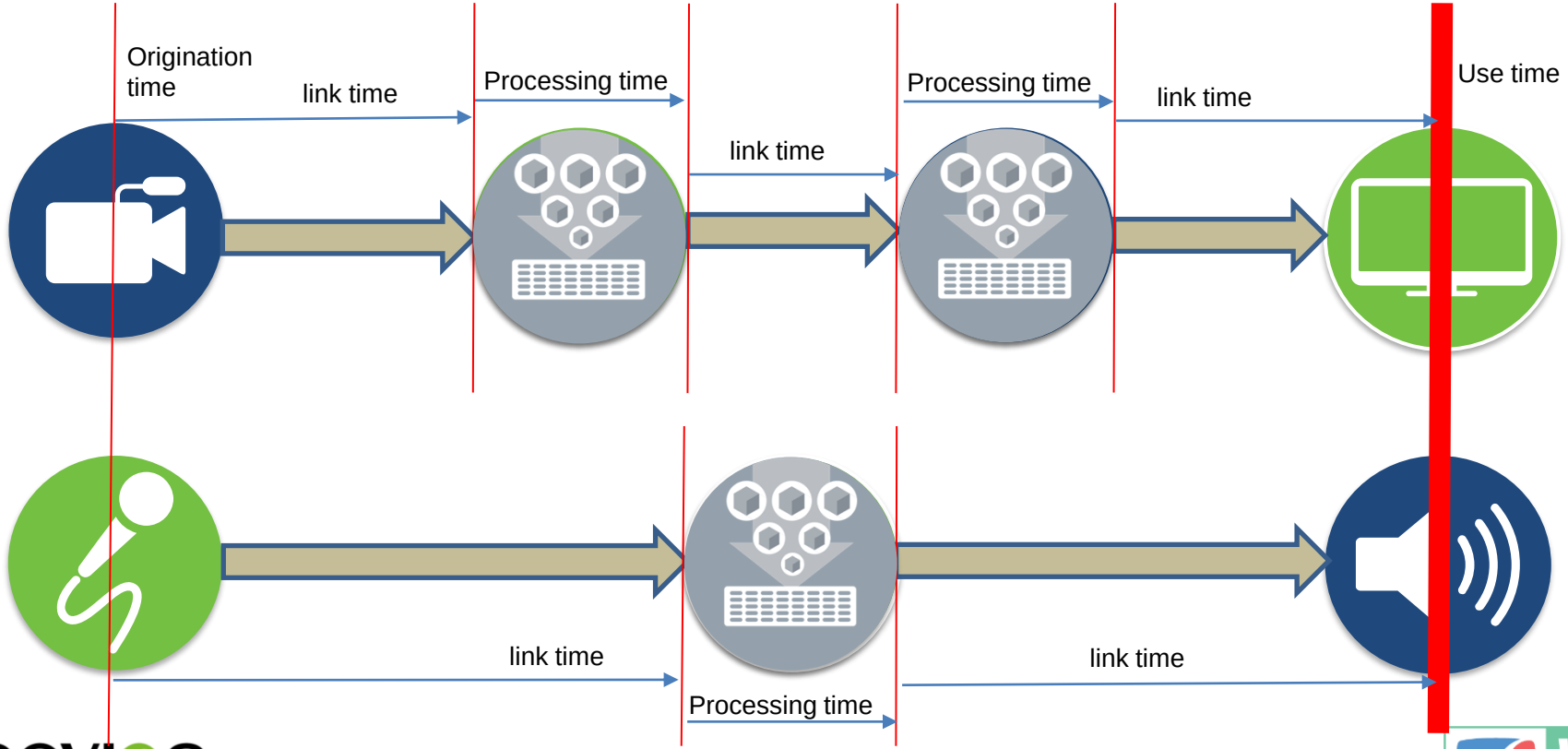
Same principles apply in virtualized world



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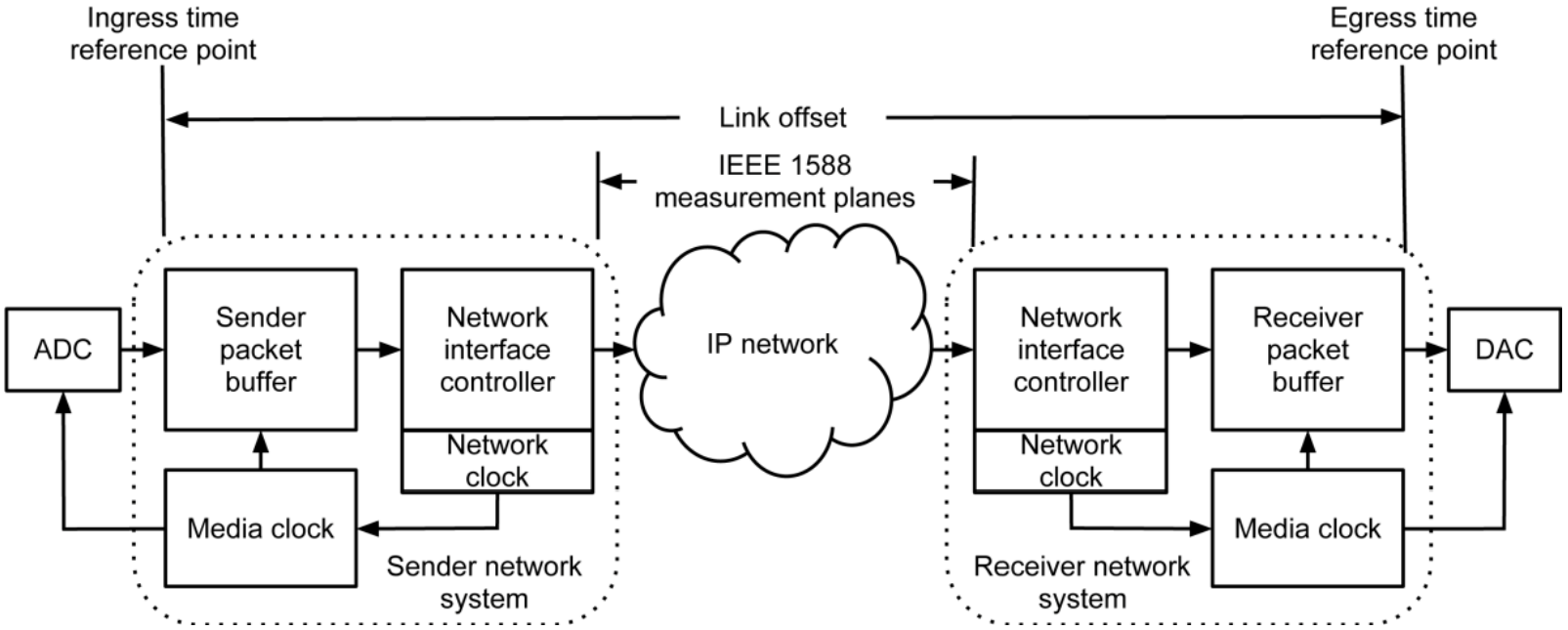
AES67 link timing



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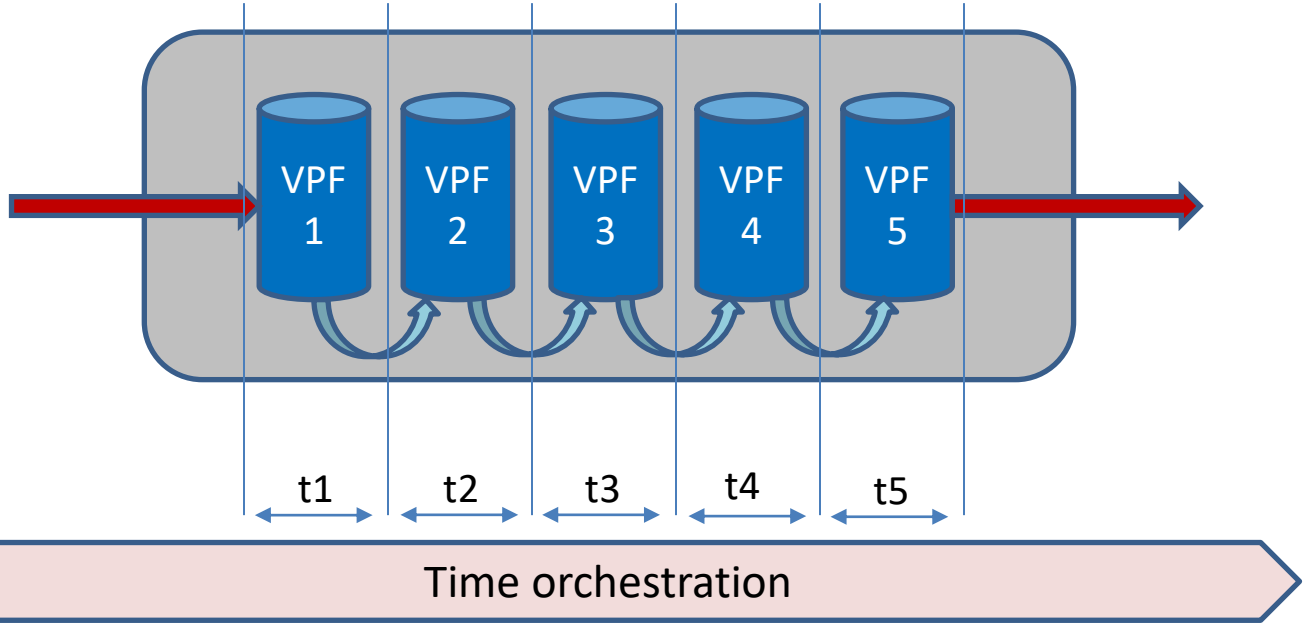
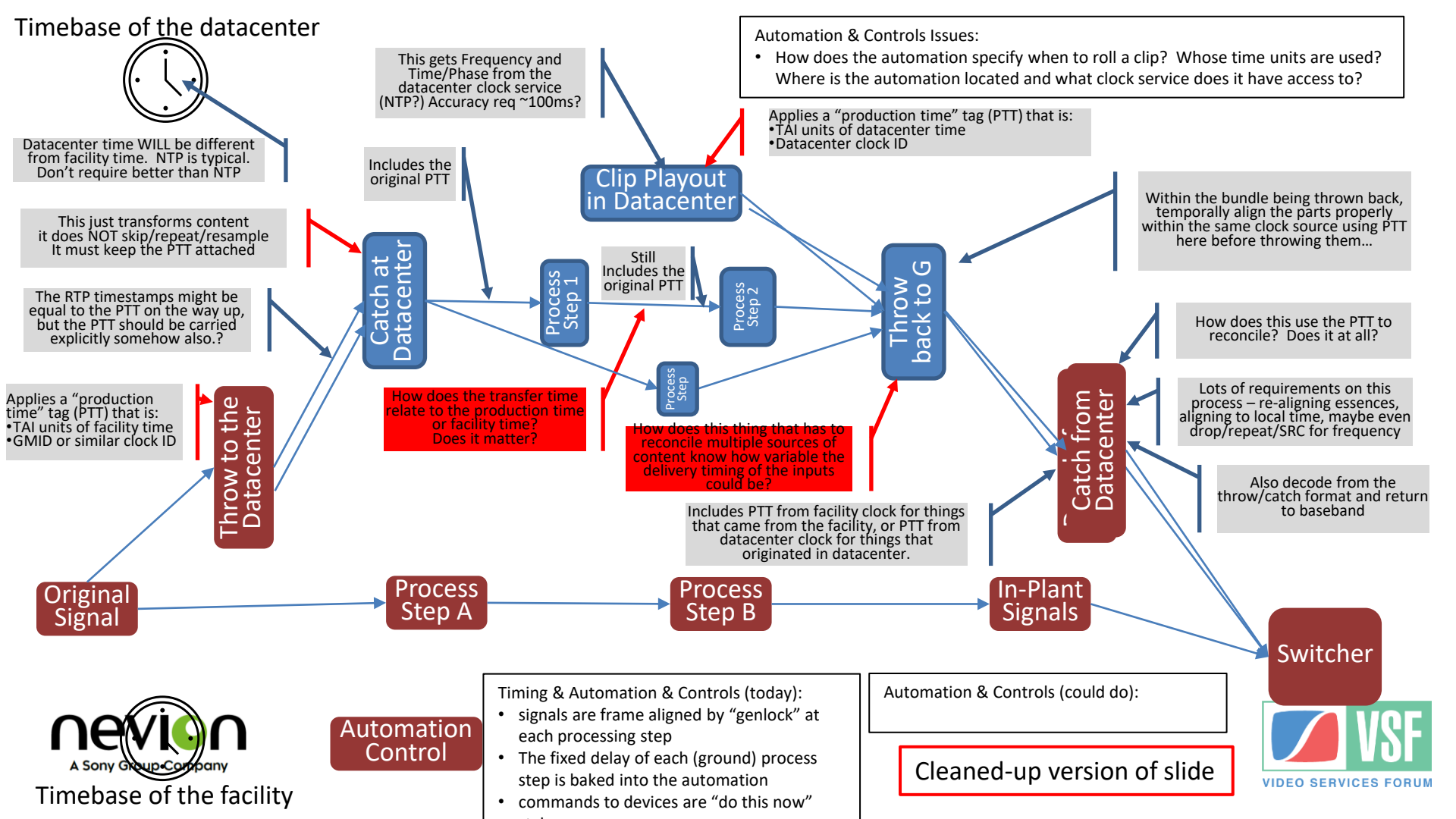
Concatenated virtual processing functions, each with defined (max) execution time




Timebase of the datacenter
Automation & Controls Issues:
• How does the automation specify when to roll a clip? Whose time units are used? Where is the automation located and what clock service does it have access to?
This gets Frequency and Time/Phase from the datacenter clock service (NTP?) Accuracy req ~100ms?
Applies a "production time" tag (PTT) that is:
•TAI units of datacenter time
•Datacenter clock ID
Datacenter time WILL be different from facility time. NTP is typical. Don't require better than NTP
Includes the original PTT
Clip Playout in Datacenter
Within the bundle being thrown back, temporally align the parts properly within the same clock source using PTT here before throwing them…
This just transforms content it does NOT skip/repeat/resample It must keep the PTT attached
Catch at Datacenter
Process Step 1
Still Includes the original PTT
Process Step 2
Throw back to G
The RTP timestamps might be equal to the PTT on the way up, but the PTT should be carried explicitly somehow also.?
How does this use the PTT to reconcile? Does it at all?
Process Step
Applies a "production time" tag (PTT) that is:
•TAI units of facility time
•GMID or similar clock ID
Throw to the Datacenter
How does the transfer time relate to the production time or facility time? Does it matter?
How does this thing that has to reconcile multiple sources of content know how variable the delivery timing of the inputs could be?
Catch from Datacenter
Lots of requirements on this process – re-aligning essences, aligning to local time, maybe even drop/repeat/SRC for frequency
Also decode from the throw/catch format and return to baseband
Includes PTT from facility clock for things that came from the facility, or PTT from datacenter clock for things that originated in datacenter.
Original Signal
Process Step A
Process Step B
In-Plant Signals
Switcher
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Timebase of the facility
Automation Control
Timing & Automation & Controls (today):
• signals are frame aligned by "genlock" at each processing step
• The fixed delay of each (ground) process step is baked into the automation
• commands to devices are "do this now"
Automation & Controls (could do):
Cleaned-up version of slide
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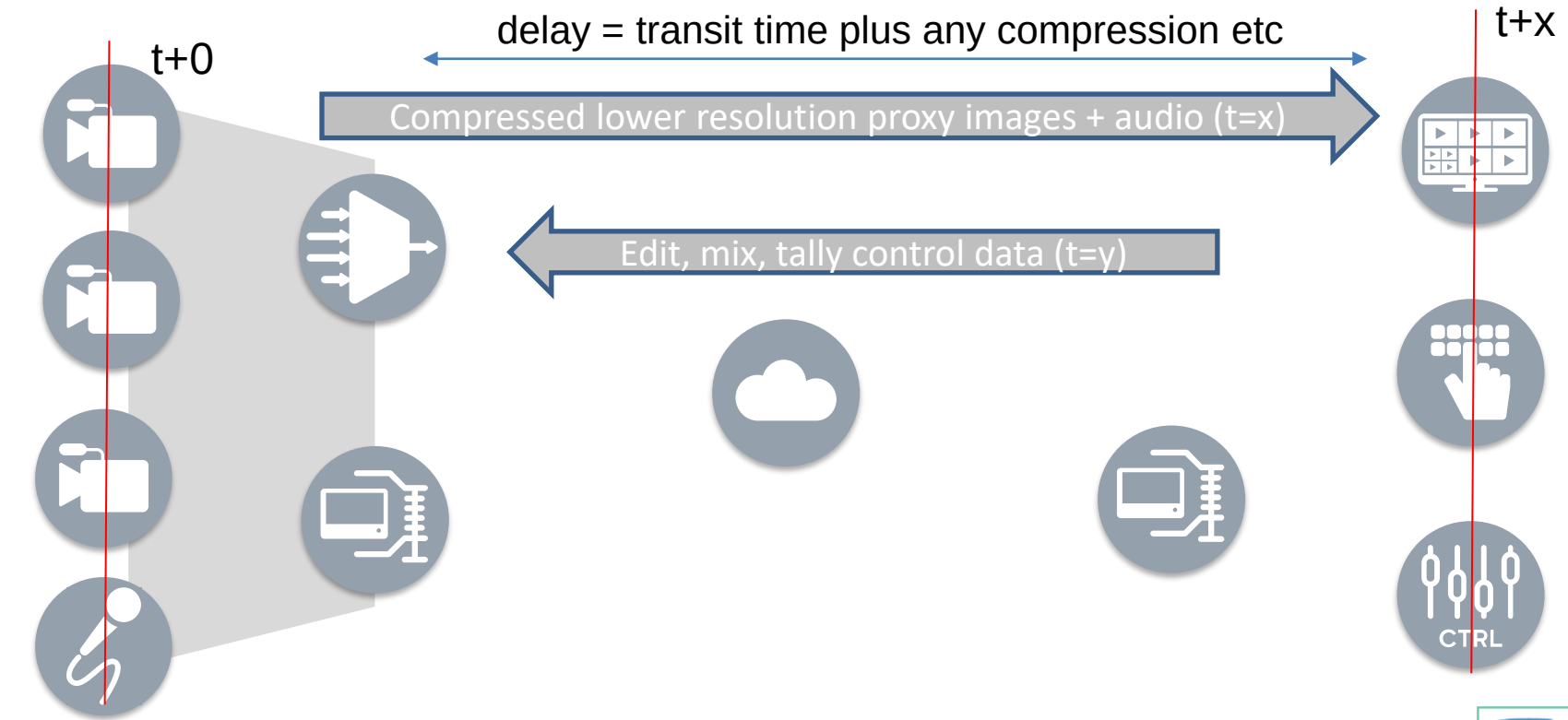
Proxy remote production timing



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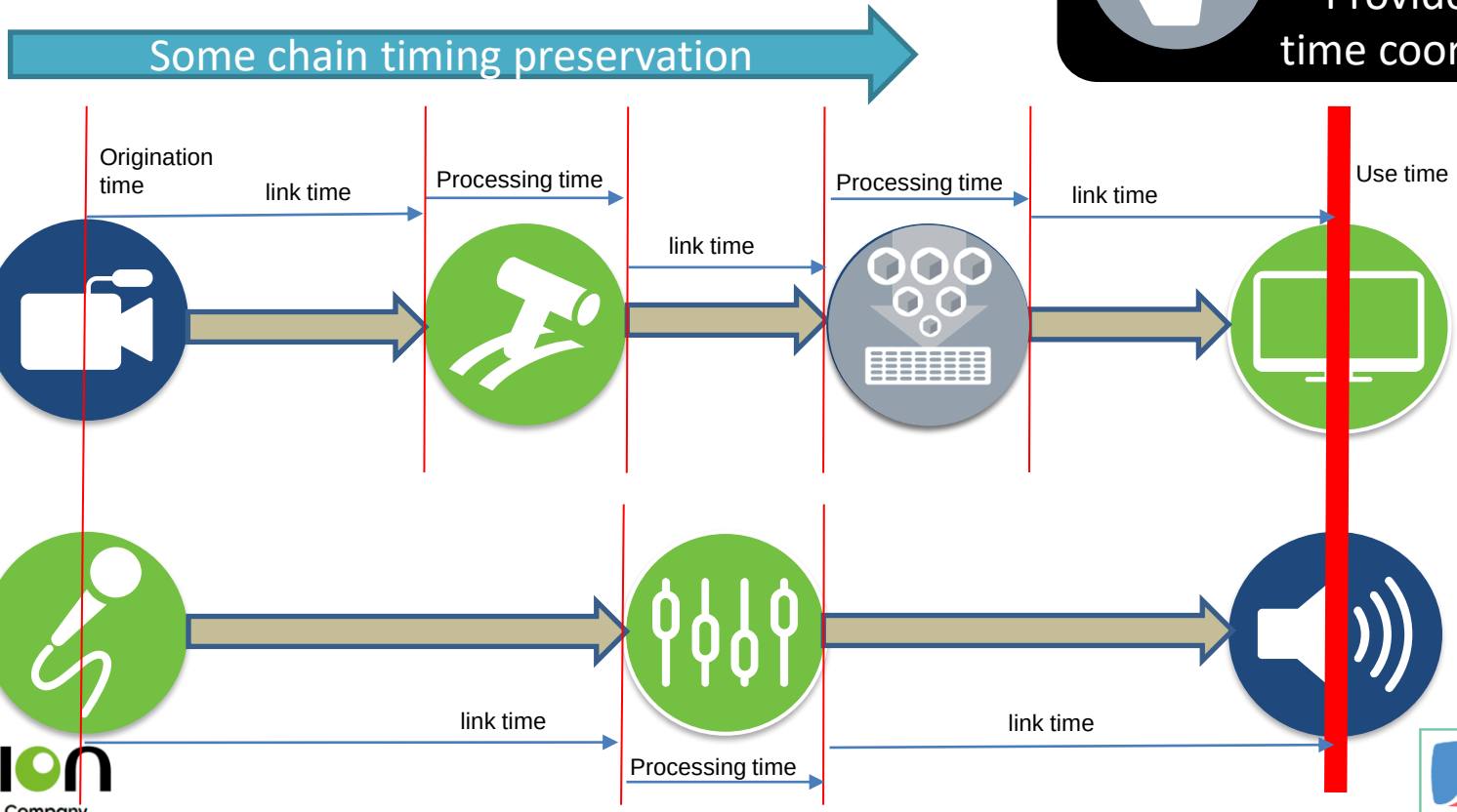
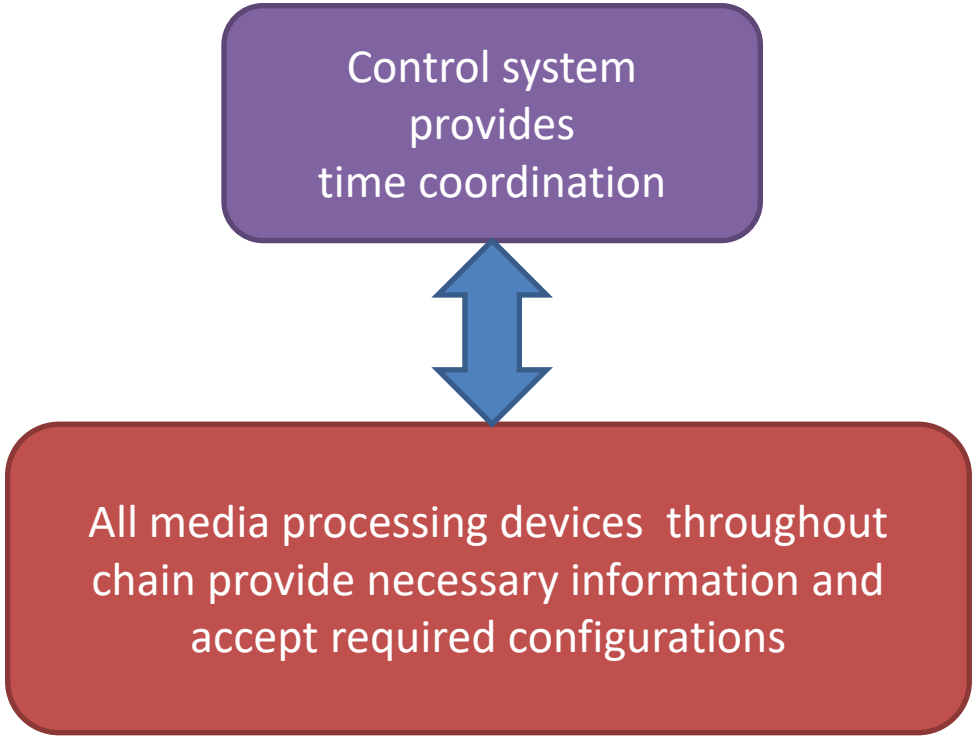
Hybrid timing reconciliation



What is needed to make this work



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Proposed wording of aim of RP/EG:

Draft an Recommended Practice document that defines a workable ecosystem to provide ‘automatic’ reconciliation of media essence timing at any point along a production chain.

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Do consider getting involved

- Send a ‘user story’ for requirements
- Send in any ‘gotchas’
- Join the team!

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Thank you!

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