Programmability, Integration and Visibility for Media Networks

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**The visibility challenge**

- Physical
- Coding
- Baseband
- Single essence per BNC
- Single duplex
- Direct measurement
- Synchronous transport

7 layer OSI model --
More to keep an eye on! --

Multiple essence per Fiber --
Full duplex --
Indirect measurement --
Asynchronous transport --
We need more visibility

Network monitoring is all about:
- Transforming data into actionable information
- Spotting trends
- Preventing service outage pro-actively
- Managing performance as the network:
  - Expands
  - Evolves
  - Gets upgraded
  - Supports new functionality

• Physical health – PSU/Fans/Temp
• CPU - load, memory, processes
• Connectivity - optics, optical strength, BER
• Logical links, topology, host presence
• Bandwidth use – host and link
• CRC errors, dropped packets, multicast paths, congestion
• PTP / SDN / IGMP / PIM / BGP / STP...
• sFlow, latency analysis, buffer usage...
• Status of High Availability components in the network
• Flow credentials (TTL, L2/L3 addressing)
• New device introduction
• Security....
• NONE of this is about baseband video

For more visibility we need a rich data set

• Rich data
• Timely
• Fine grained

• SNMP – is it timely or fine grained?

Polled Data == Missing Data
Beyond SNMP

- Streaming telemetry is the future!
- Timely + fine grained: Events are streamed when they happen
- No more 30-60s SNMP sampling cycles
- Redundant data eradicated: lower processing load and network bandwidth

**OPENCONFIG**

- User Driven
- Vendor-neutral
- Configuration & Streaming Telemetry

- Model-based
  - Common data model for management and operations
  - Multiple transports available
Empowered by streaming telemetry..

• Real-time network health insight provided across an entire networking estate
• Device - device & time - time comparisons uncover trends, outliers and anomalies

Empowered by streaming telemetry..

• Map multicast flows through a complex network
• Identify ingress, replication and egress points
• Network data converted to Broadcast Information
Port Mirroring

- **Port mirroring**: The switch sends a copy of all network packets seen on one or more ports to another port, where the packets can be analyzed.

- **For Broadcast**: Non-invasive tool access, no need for SDN or IGMP.

- **Focused visibility**: Filter, truncate, and timestamp flows for more insight into the network.

Virtualizing your Toolkit

- **Tap(Span) Aggregation**: Aggregate out of band monitoring into a single scalable fabric creating a tool ecosystem.

- **Virtualised**: Tap any point in your network, virtualize your toolset.

- **Visibility Focused**: Manipulate, steer, slice, and timestamp flows for maximum insight across the network.

- **Automation**: Build powerful automated monitoring workflows maximizing visibility and minimizing OPEX / TCO.
Programmability

- Network visibility tools can give us a detailed and timely view into the network
- Now we need the tools to act on that information
- OpenConfig, programmatic CLI access, SSH etc provides secure switch access
- 3rd Party applications can bring Broadcast knowledge and business logic to the analysis of this network status
- COTS switches are typically Linux servers attached to the forwarding silicon
  - Leverage this Linux infrastructure
  - Python, bash, yum ...
  - Close coupling to both the information source and the point of influence (the switch!)

3rd Party programmability example

- Highly integrated; sFlow, interface counters, multicast flow information, automated mirroring and Tap Aggregation
- Network info is reconciled against the Broadcast Controllers view of requested flows
3rd Party programmability example

- A rich view of the network traffic status
- ... is transformed through a Broadcast lens
- Network knowledge is fed back into media IP routing
- Cloud scale routing techniques applied to ST2110!

Visibility leads to flexibility, enabling choice

- IP installations for Live Production and Playout are getting more complex
- Rich, timely and fine grained data leads to information, which leads to insight
- Tight integration with the network fabric enables innovative SDN applications – in the broadest sense!
- SDN (in the broadest sense) drives improved performance and reduced OPEX
- With the right tools, the network becomes the solution, not the problem
Thank You

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