

Traditional vs streaming telemetry: A high-speed monitoring example

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Introduction

- There are many sources of telemetry data
- Measuring / monitoring different properties
- Some active, some passive
- Traffic levels, flow information, performance test results, ...
- This talk covers the specific case of gathering data from network devices, in particular comparing
 - Polling-based approaches – traditional SNMP
 - Push-based approaches – streaming telemetry

Polling with SNMP

- BRIAN is a good example
 - <https://public-brian.geant.org/>, <https://brian.geant.org>
 - We heard more about this earlier today
- Typically provides interface utilisation overtime
 - Very useful to see general traffic levels
 - Can help with capacity planning
- Polling generally periodic at 5 min intervals
 - The data plotted is thus usually a 5-minute average / sample
- Can sample more frequently
 - Has implications for polling systems and data retention

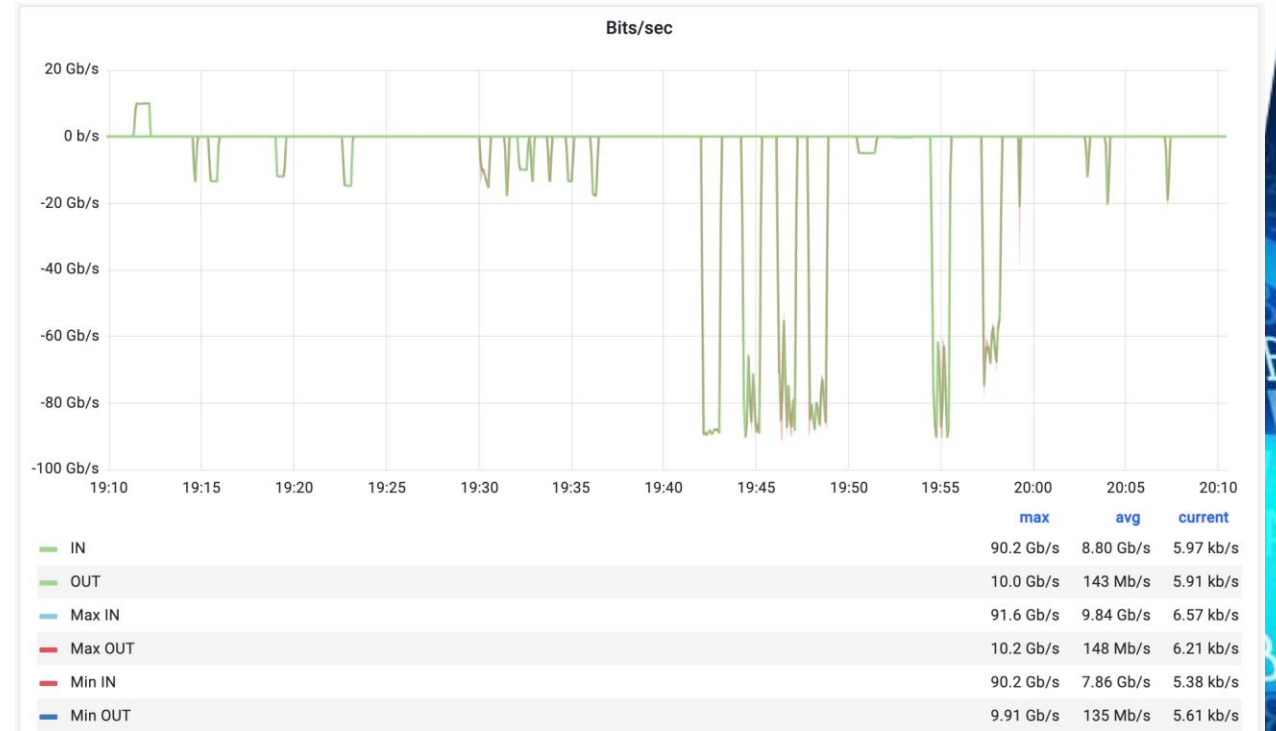
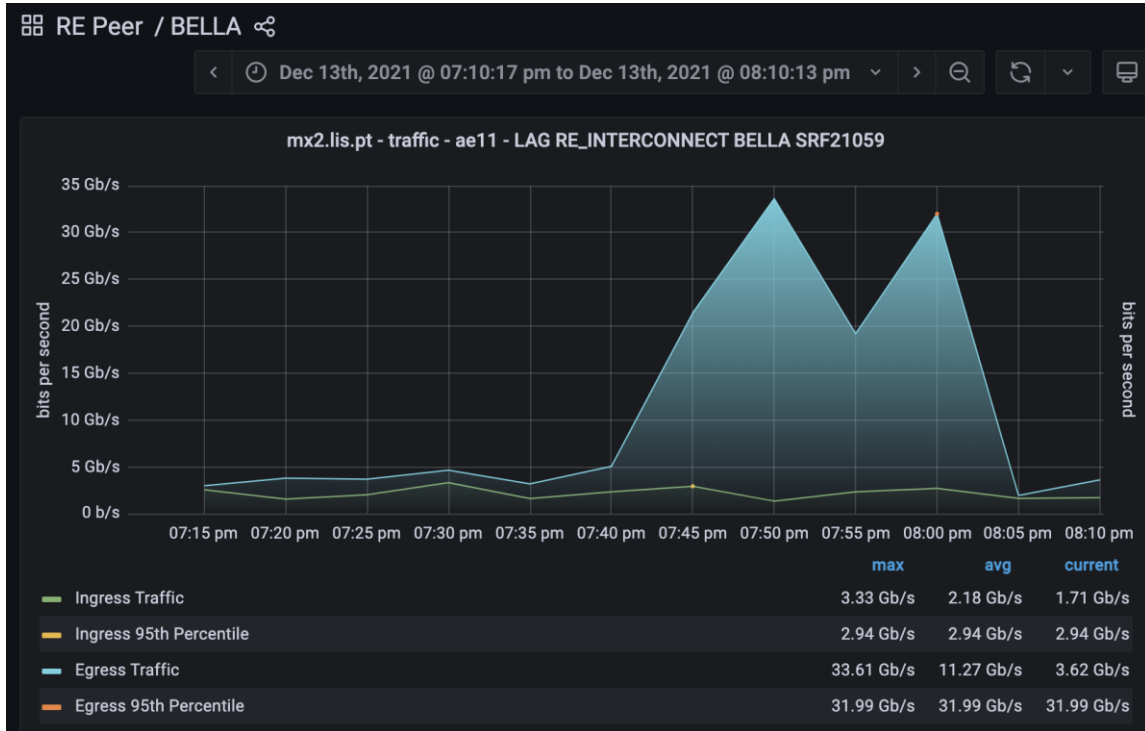
Pushing data with streaming telemetry

- A newer approach
- Data streamed continuously from the device
 - Device configured with data to be sent, where to, frequency
- Can provide (effectively) real-time information, to a fine level of detail
- Various ways to stream the data
 - Uses YANG, JSON, XML formats
 - gRPC looks to be the winning 'open' method
- Can/will generate a lot of data
 - Implications for the collection infrastructure

High-speed monitoring example

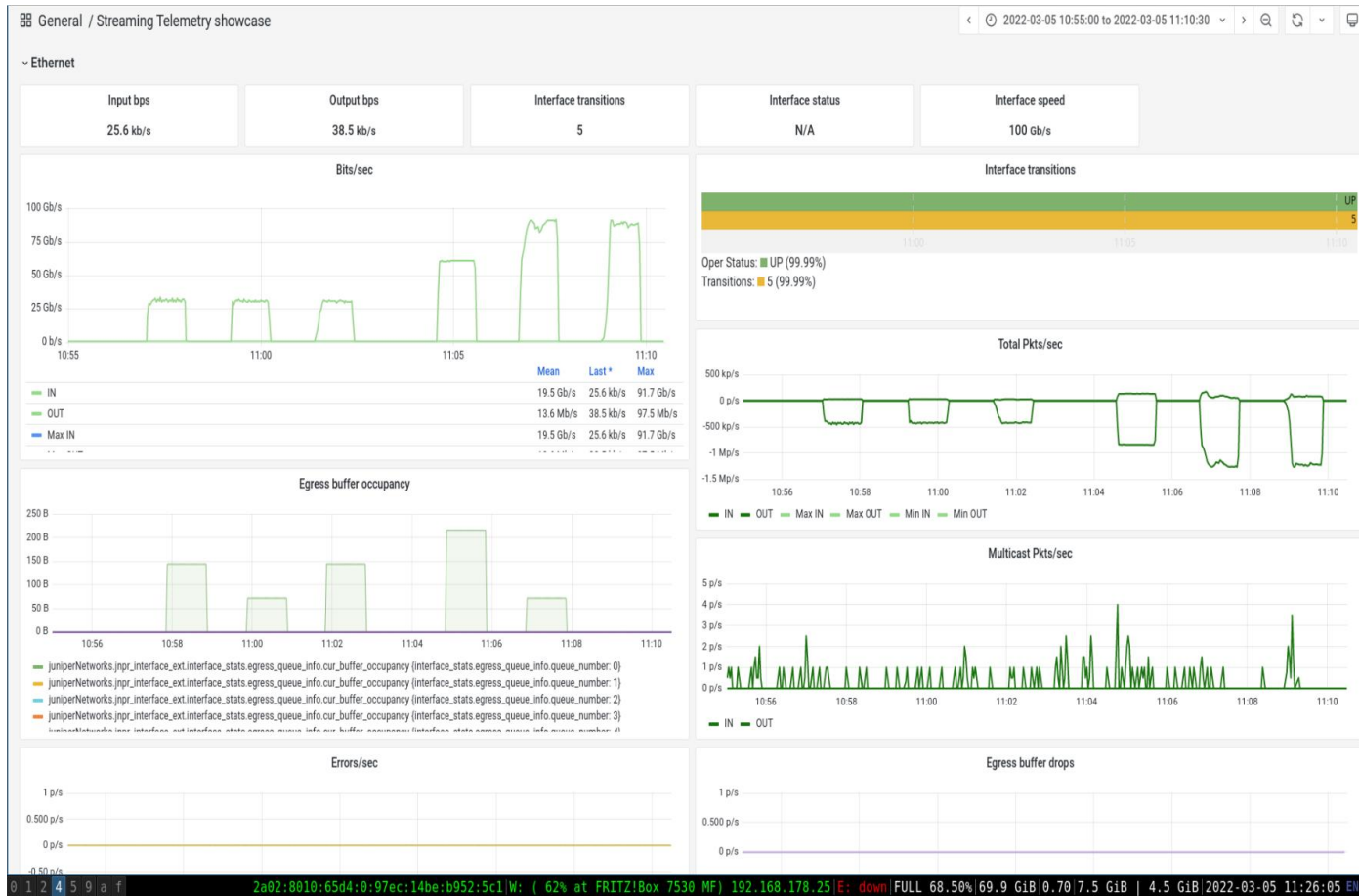
- My colleague Raul Lopes ran tests between SURF and RNP over new 100G BELLA link, reported at 2nd Performance Management Workshop
 - <https://events.geant.org/event/1084/>
 - <https://events.geant.org/event/1084/contributions/985/attachments/667/943/RaulLopes-WP6-final-1.pptx>
- Kindly assisted by SURF and RNP
- Tests run for short durations to minimize disruption
- Achieved over 90Gbps
- Tests visible to BRIAN and SURF's (experimental) streaming telemetry system

Views: BRIAN and SURF streaming telemetry



BRIAN shows a lower peak (due to the 5-minute sample) and less detail
It would probably be better shown as a bar chart than a continuous plot

Another ST example, comparing 6 stream iperf3 vs iperf2



Left: iperf 3
Right: iperf 2

TCP algorithms:
reno, htcp, cubic

More detailed views

- As shown a moment ago, the streaming telemetry visualisation helps us see important properties in fine detail
 - Throughput, bps
 - Packets per second
 - Egress buffer occupancy
 - Egress buffer drops
 - Errors
- Buffer occupancy is interesting when considering specifying buffer sizes for equipment
 - The Edgecore Wedge used in GN4-3 WP6 for RARE has 16MB

Thoughts on ST

- ST can produce a lot of data
 - May not be practical to keep full detail for a long time
- We (Jisc) see it as very useful for our network performance testing facility
 - The fine detail of traffic patterns can be very helpful
 - Complementing perfSONAR, flow data, etc
- Might be a useful tool to run 'surgically' elsewhere
 - If problems are observed, turn it on (where supported)
- Doesn't give full view like In-band Network Telemetry (INT)
 - More on this after the break

Streaming telemetry testing at Jisc

- Currently setting up our ST testbed
 - Raul is configuring it with David Richardson to export from an EX4600 running Junos 19.4R3
 - Collector is on a VM behind the EX4600
 - Using gRPC (not Juniper proprietary), Telegraf, influxDB, grafana
- Status:
 - Have run into some bugs, e.g.
 - <https://github.com/influxdata/telegraf/issues/9939>
 - Plugin that works only without SSL - inputs.jti_openconfig_telemetry
 - Working to address these, hope to be running soon

Your thoughts?

- BRIAN is clearly useful
- As is streaming telemetry

- Where do you see the use cases of interest for streaming telemetry?
- Can we share experiences, configurations, etc?
- What would you like to see the current and next GÉANT project do in this area?

Thank you

Any questions?

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