

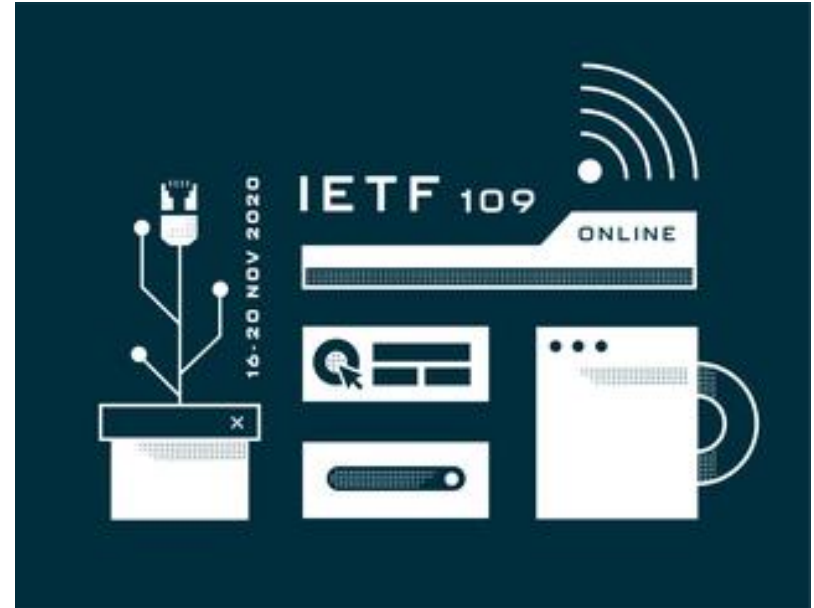
BMP & YANG

GROW and NETCONF WG

IETF 109

November 9-13th, 2020

Virtual Hackathon



BMP Hackathon - Plan

Functionality

- Test BMP BGP Local RIB to IPFIX metric correlation and interoperability between router and data-collection for peer and route monitoring for message type extensions defined in
 - [draft-ietf-grow-bmp-local-rib](#) (BGP Local RIB)
 - [draft-grow-bmp-tlv](#) (TLV support for BMP Route Monitoring and Peer Down Messages)
 - [draft-lucente-grow-bmp-tlv-ebi](#) (Support for Enterprise-specific TLVs)
 - [draft-cppy-grow-bmp-path-marking-tlv](#) (Path Marking TLV)
 - [draft-xu-grow-bmp-route-policy-attr-trace](#) (BGP Route Policy and Attribute Trace)
- Test BMP BGP Local RIB to IPFIX metric correlation with IE90 (BGP route-distinguisher).

Performance

- Test performance impact of BMP on router CPU/Memory resources and BGP route propagation with YANG push.

YANG Hackathon - Plan

Functionality

- Develop and test UDP-based Transport for Configured Subscriptions data export and collection.
- Collect the YANG schema tree of a YANG subscription, convert to JSON and register at Confluent JSON schema registry.
 - [draft-ietf-netconf-udp-notif](#) (UDP-based Transport for Configured Subscriptions)
 - [draft-ietf-netconf-distributed-notif](#) (Subscription to Distributed Notifications)

Hackathon – Software

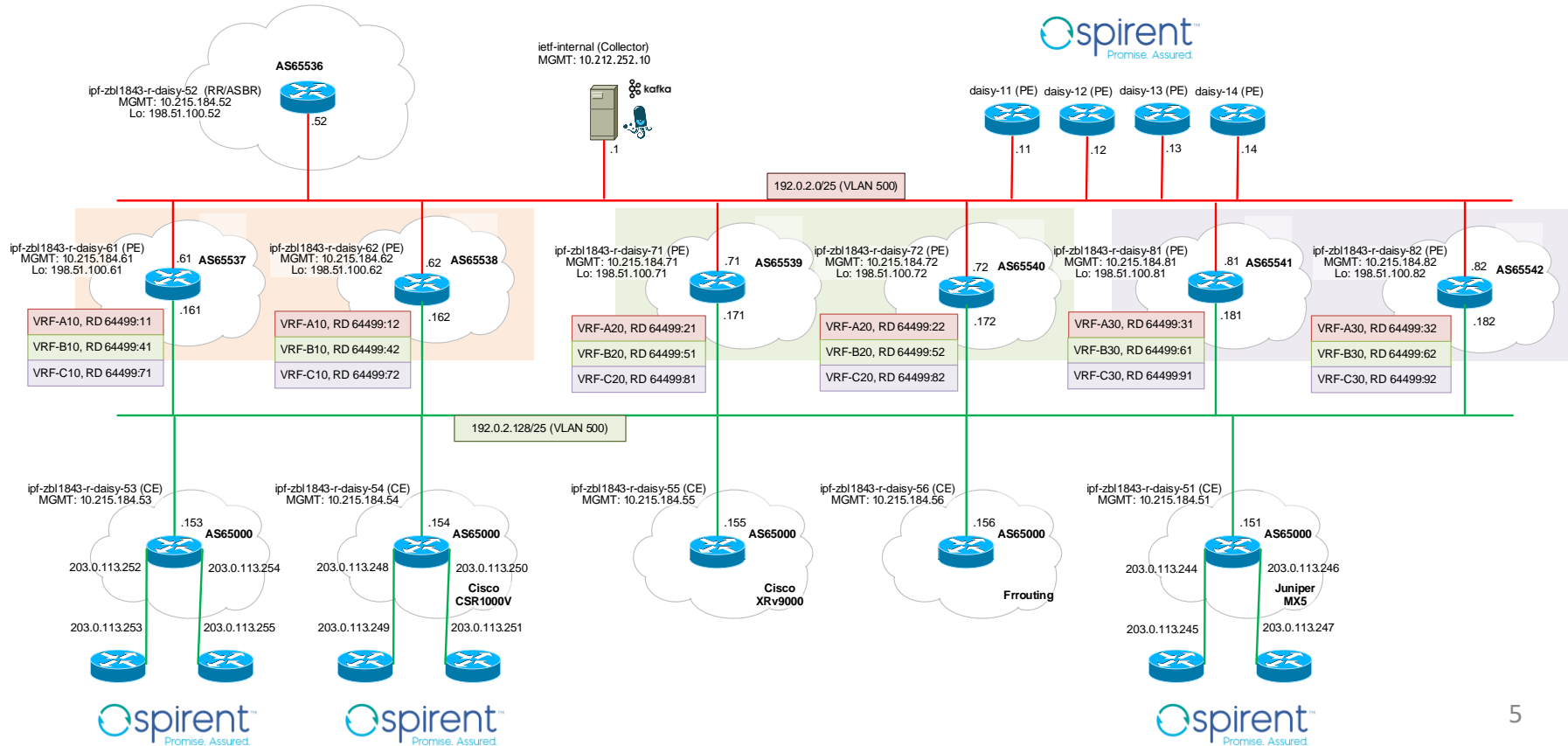
Software

- [pmacct](#) nfacctd for IPFIX and BMP data collection
- [pmacct](#) udp-notif for YANG push data collection
- [ncclient](#) to create subscription and collect YANG schema
- Apache [Kafka](#) as message broker
- Apache [Druid](#) as timeseries DB
- [Pivot](#) as user interface
- Wireshark [BMP dissector](#) for packet analysis
- Spirent [Testcenter](#) for BGP Vp4/6 route and IPV4/6 traffic generation

Tutorial

- <https://imply.io/post/add-bgp-analytics-to-your-imply-netflow-analysis>

Hackathon - Network



Swisscom – lab environment

Achievements

- Cisco IOS XR and XE, Juniper Junos and [frrouting](#) in the topology for IPFIX and BMP added
- YANG recursive schema collection with netconf <get-schema>, JSON conversion and schema registration.

Gaps Identified

- Big Data test setup needs to be scaled to accommodate peaks at BMP and YANG push stress tests.

Next Steps

- Optimize and increase the parallelization of time series data ingestion.

Pmacct – nfacctd/udp-notif

BMP Achievements

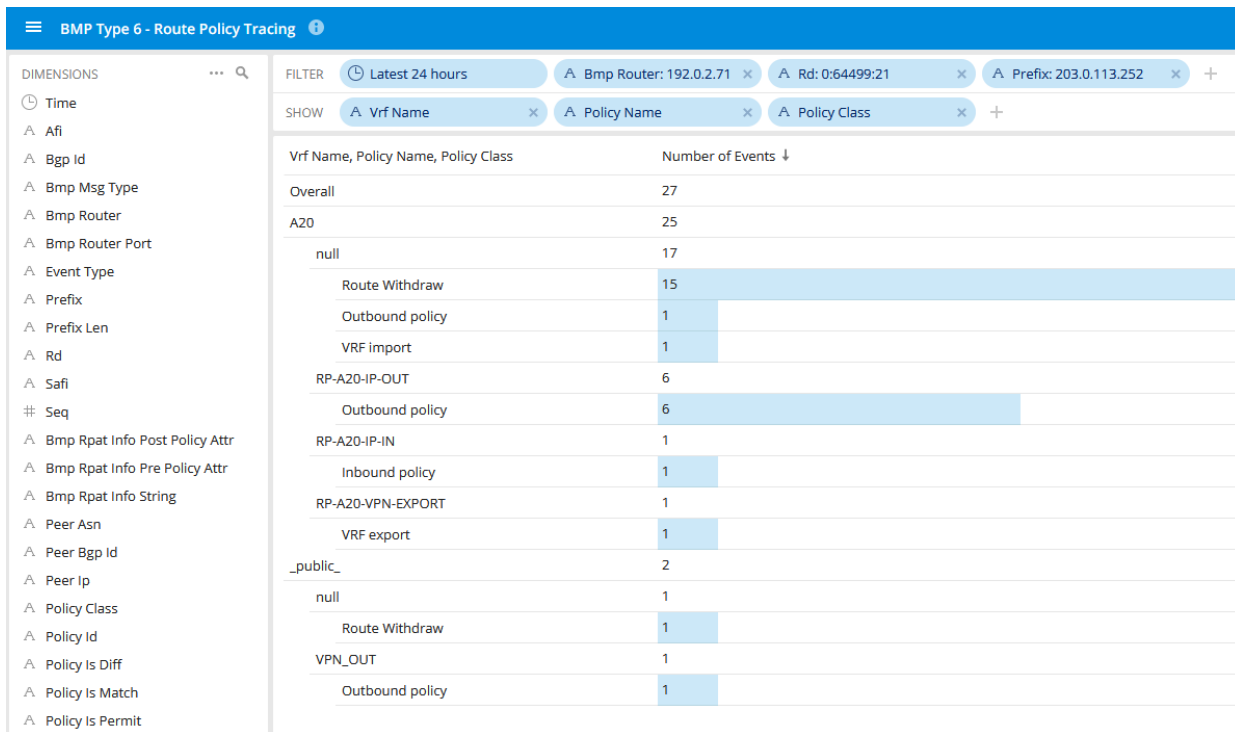
- 3 of 5 TLV's decoded of [draft-xu-grow-bmp-route-policy-attr-trace](#)
- 1 of 1 TLV decoded of [draft-cppy-grow-bmp-path-marking-tlv](#)
- BMP BGP Local RIB to IPFIX data correlation with IPFIX IE90 (BGP route-distinguisher) attribute.

YANG Achievements

- Support of [draft-ietf-netconf-udp-notif](#)

<https://github.com/pmacct/pmacct/>

BMP route-policy attribute tracing



*On a MPLS PE router for a particular VPNv4 prefix
which route-policies and attachment points were involved*

BMP BGP Local RIB with IPFIX Correlation

The screenshot shows the 'IPFIX Flow Aggregation' interface. On the left is a sidebar with 'DIMENSIONS' including Time, As Path, As Path Src, Bytes, Comms, Comms Src, Ecomms, Ecomms Src, Event Type, Forwarding Status, Iface In, Iface Out, Ip Dst, Ip Proto, and Ip Src. The main area has a 'FILTER' bar with 'Latest day' and three active filters: 'Peer Ip Src: 192.0.2.71', 'Ip Proto: udp', and 'Comms: 64497:1'. Below is a 'SHOW' bar with five active filters: 'Peer Ip Src', 'Mpls Vpn Rd', 'Ipfix Rd', 'Net Dst', and 'Comms'. The table below has two columns: 'Peer Ip Src, Mpls Vpn Rd, Ipfix Rd, Net Dst, Comms' and 'Number of Events ↓'. The data is hierarchical, starting with 'Overall' (151 events), then '192.0.2.71' (151 events), then '0:64499:21' (151 events), then '00-00-FB-F3-00-00-00-15' (151 events), then '203.0.113.252' (151 events), and finally a list of specific flow identifiers, each with 151 events. The last five rows are highlighted in light blue.

Peer Ip Src, Mpls Vpn Rd, Ipfix Rd, Net Dst, Comms	Number of Events ↓
Overall	151
192.0.2.71	151
0:64499:21	151
00-00-FB-F3-00-00-00-15	151
203.0.113.252	151
60633:1033	151
64496:1001	151
64496:299	151
64497:1	151
64499:10	151

*UDP Testflow between two IPv4 Addresses with
BMP BGP Local RIB dimensions measured on MPLS PE in a VRF*

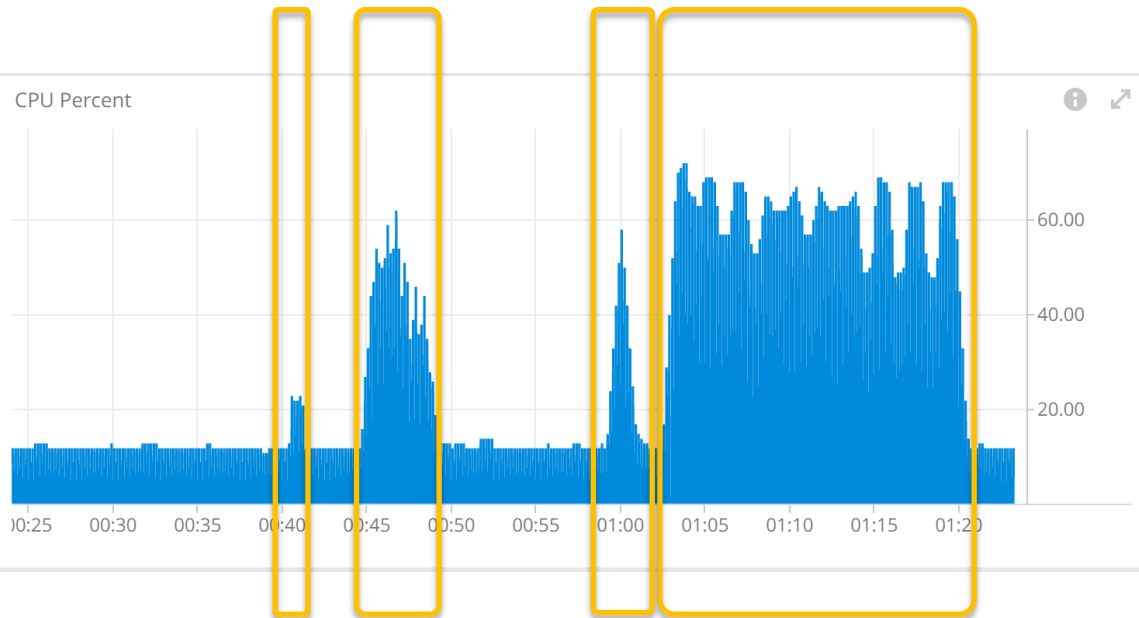
Huawei - VRP

Achievements

- Supporting latest path status of [draft-cppy-grow-bmp-path-marking-tlv-07](#)
- Supporting latest route-policy attribute tracing [draft-xu-grow-bmp-route-policy-attr-trace-05](#)
- Supporting [draft-ietf-netconf-udp-notif-01](#) and [draft-ietf-netconf-distributed-notif-01](#)
- Test and compare CPU and memory usage with and without BMP in stress tests with 100'000, 500'000 and 1'000'000 BGP VPNv4 routes.

BMP Stress Test – CPU usage

Dataset 1
BMP disabled **Dataset 1**
BMP enabled **Dataset 2**
BMP disabled **Dataset 2**
BMP enabled

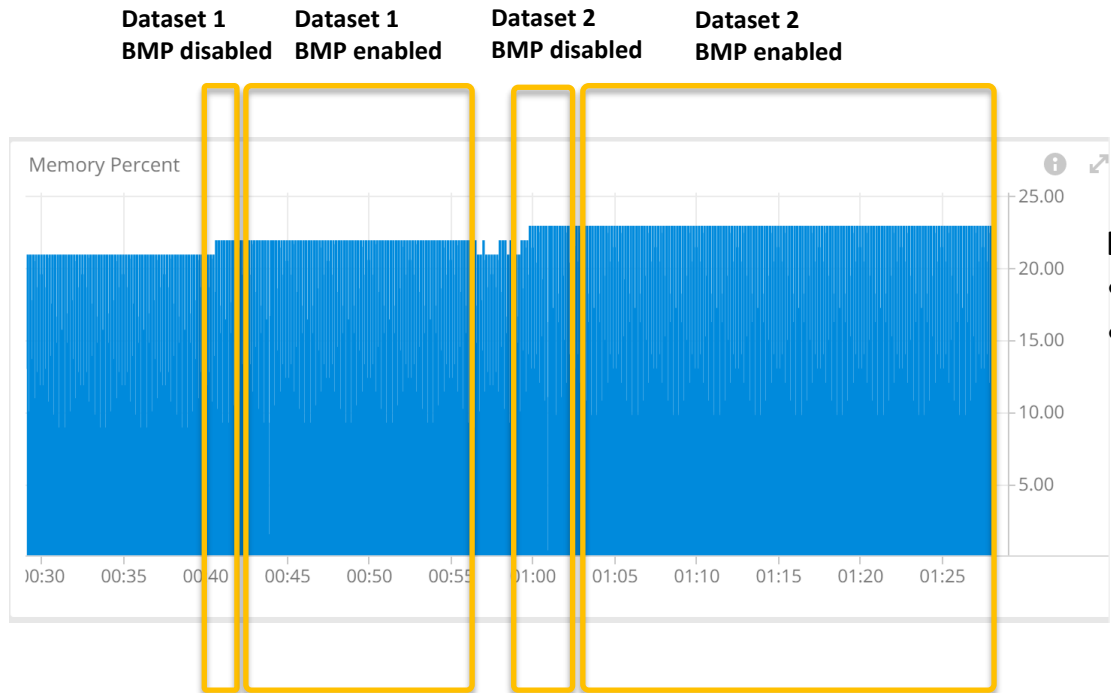


Dataset:

- Dataset 1: 100K routes from Spirent
- Dataset 2: 500K routes from Spirent

CPU usage monitoring of 192.0.2.52

BMP Stress Test – Memory Usage



Dataset:

- Dataset 1: 100K routes from Spirent
- Dataset 2: 500K routes from Spirent

Memory usage monitoring of 192.0.2.52

Wireshark – Dissector

Achievements

- Ongoing work on supporting [draft-cppy-grow-bmp-path-marking-tlv-07](#)
- Ongoing work on supporting [draft-ietf-netconf-udp-notif](#)

Next Steps

- Validate dissector and commit in next Wireshark release.

What we learned

- Good

- With the 4th hackathon, nice team collaboration and good spirit.
- Slack helped to keep connected through different time zones.

- Bad

- Yet again, missing beers and cocktails after 😊

Thanks to...

- Alexis La Goutte – Wireshark
- Uli Heilmeier – Wireshark
- Pierre Francois – INSA
- Stephane Frenot – INSA
- Tom Sampic – INSA
- Axel Rosennstiehl – INSA
- Anurag Prakash - Ciena
- Kian Jones - CENGN
- Yunan Gu - Huawei
- Binyang Huang – Huawei
- Tianran Zhou - Huawei
- Paolo Lucente – NTT
- Marco Tollini - Swisscom
- Raphaël Barazzutti - Swisscom
- Matthias Arnold - Swisscom
- Thomas Graf - Swisscom

...[ImPLY](#) for providing us the big data and Huawei for the network environment.