

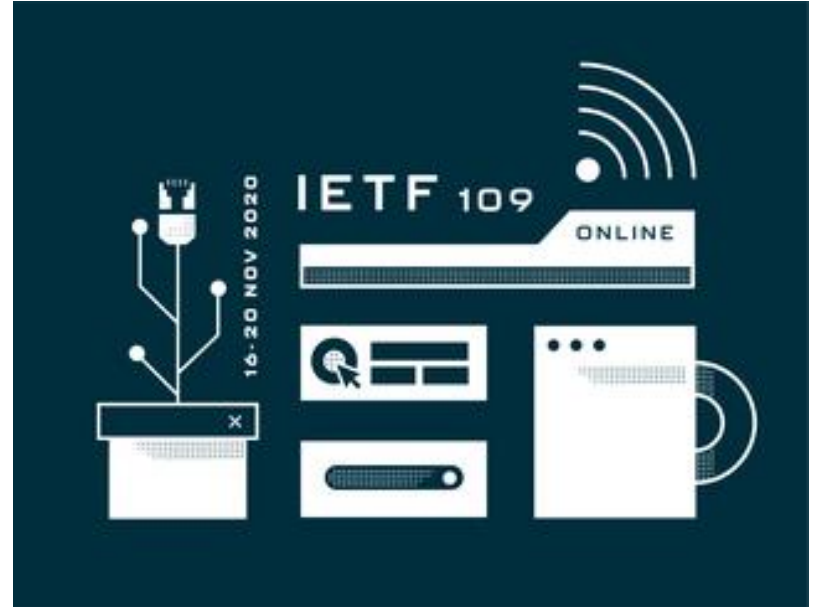
# BMP & YANG

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

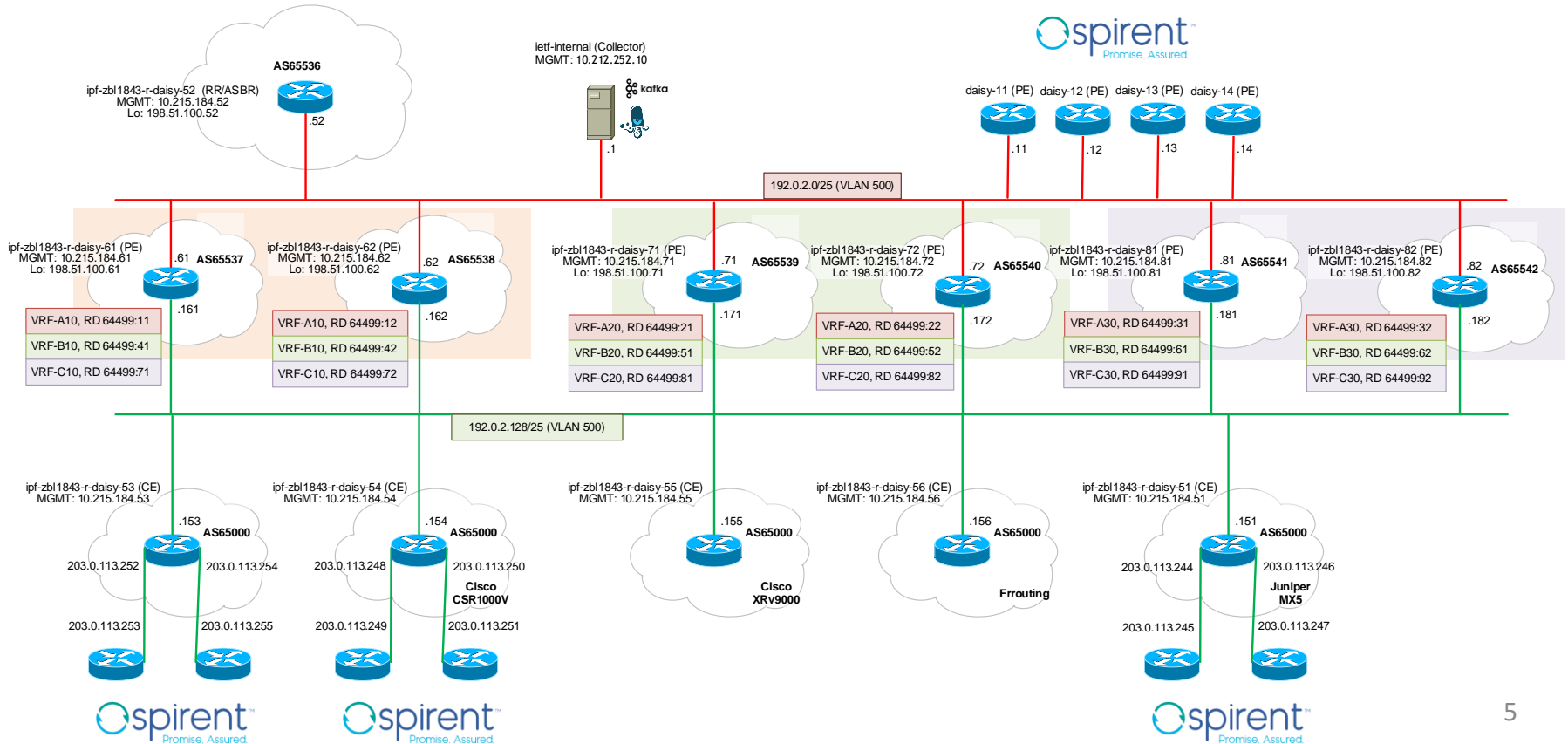
## Software

- [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 VPnv4/6 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

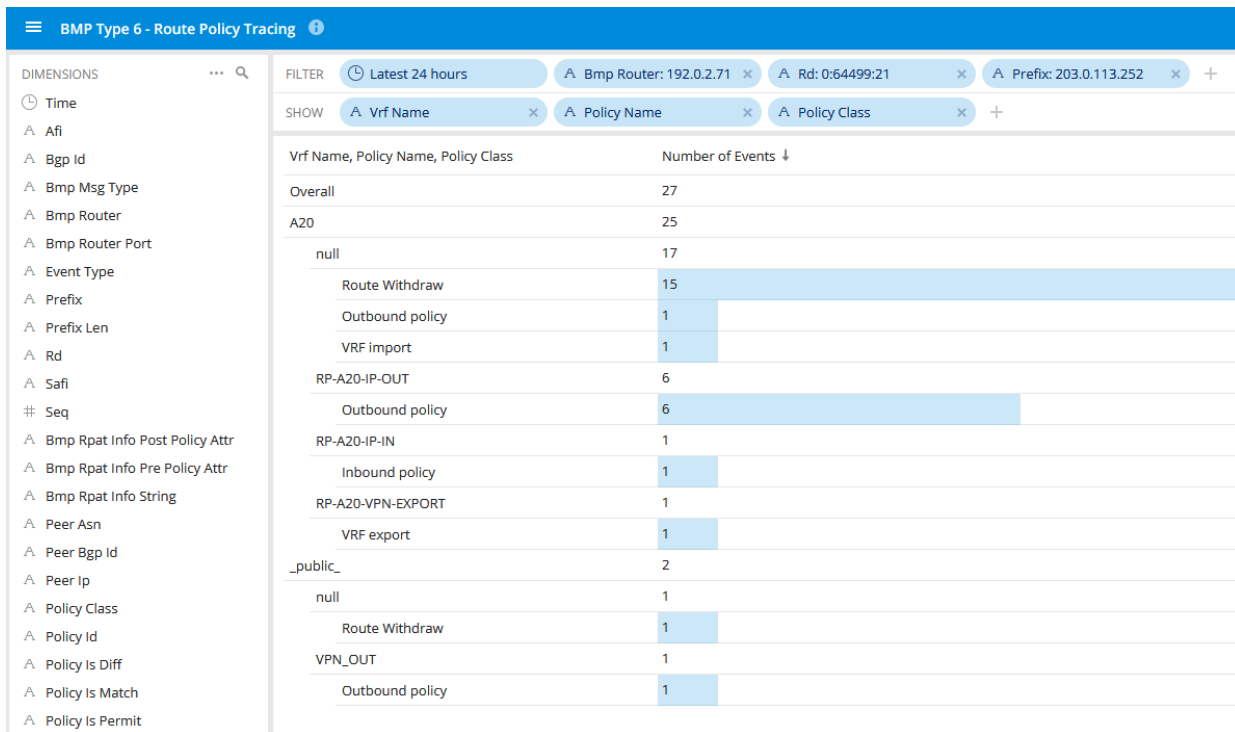
- 3 of 5 TLV's decoded of [draft-xu-grow-bmp-route-policy-attr-trace](#)
- 1 of 1 TLV decoded of [draft-cppy-grow-bmp-path-marking-tlv](#)
- BMP BGP Local RIB to IPFIX data correlation with IPFIX IE90 (BGP route-distinguisher) attribute.

## 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

IPFIX Flow Aggregation

FILTER Latest day Peer Ip Src: 192.0.2.71 Ip Proto: udp Comms: 64497:1

SHOW Peer Ip Src Mpls Vpn Rd Ipflix Rd Net Dst Comms

Peer Ip Src, Mpls Vpn Rd, Ipflix 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*

# BMP BGP Local RIB with Path Marking

The screenshot shows a network monitoring interface for 'BMP Type 0 - Routemonitor'. The left sidebar lists dimensions: Time, Afi, As Path, As Path Id, Bgp Nexthop, Bmp Msg Type, Bmp Router, Bmp Router Port, Comms, Ecomms, Event Type, Ip Prefix, Is Filtered, Is Loc, Is Out, Is Post, and Label. The main area has a filter section with 'Latest 5 minutes' and filters for 'Bmp Router: 192.0.2.71', 'Is Loc: 1', 'Rd', 'Ip Prefix', 'Bgp Nexthop', and 'Path Status'. The table below shows the number of events for various dimensions.

Rd, Ip Prefix, Bgp Nexthop, Path Status	Number of Events ↓
Overall	4
0:64499:21	2
203.0.113.10/32	2
198.51.100.44	2
Best	2
Primary	2
0:64499:51	2
203.0.113.50/32	2
192.0.22.153	2
Best	2
Primary	2

*On a MPLS PE router for a particular VPNv4 prefix  
how it is installed in the RIB in a VRF*

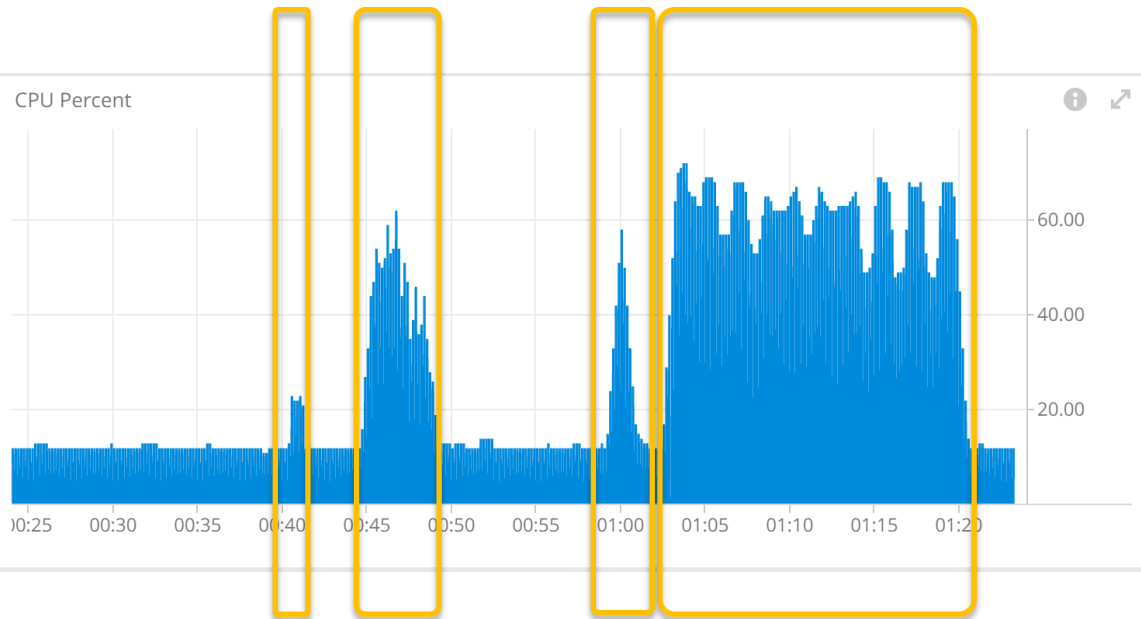
# Huawei - VRP

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

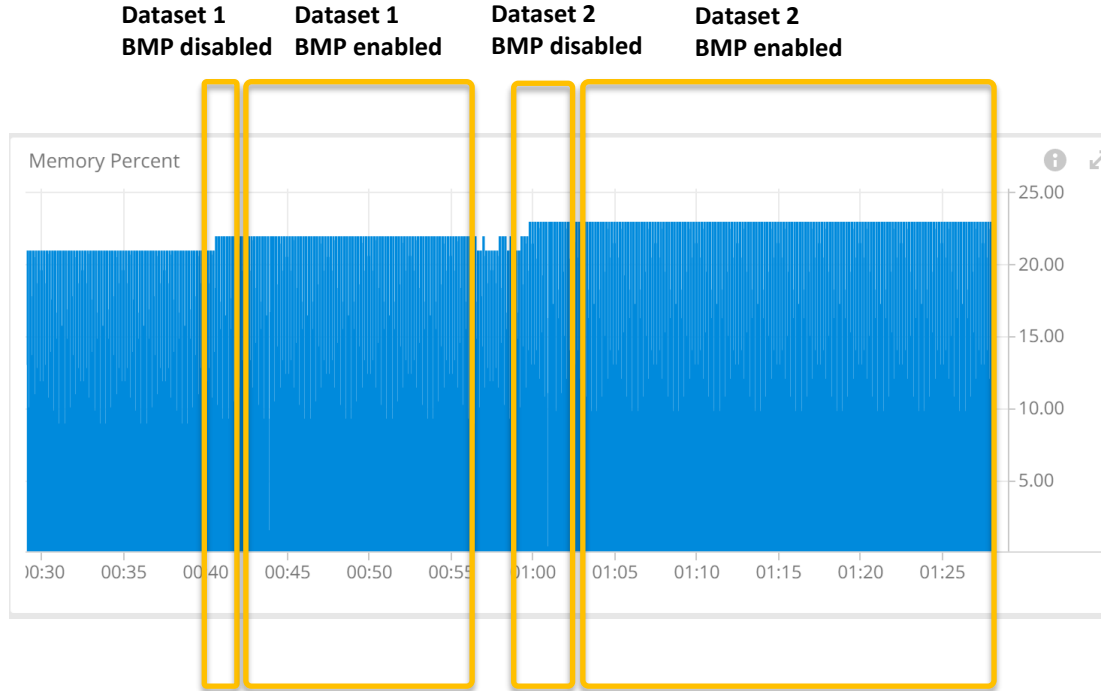


Dataset:

- 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 4<sup>th</sup> 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
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- Matthias Arnold - Swisscom
- Thomas Graf - Swisscom

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