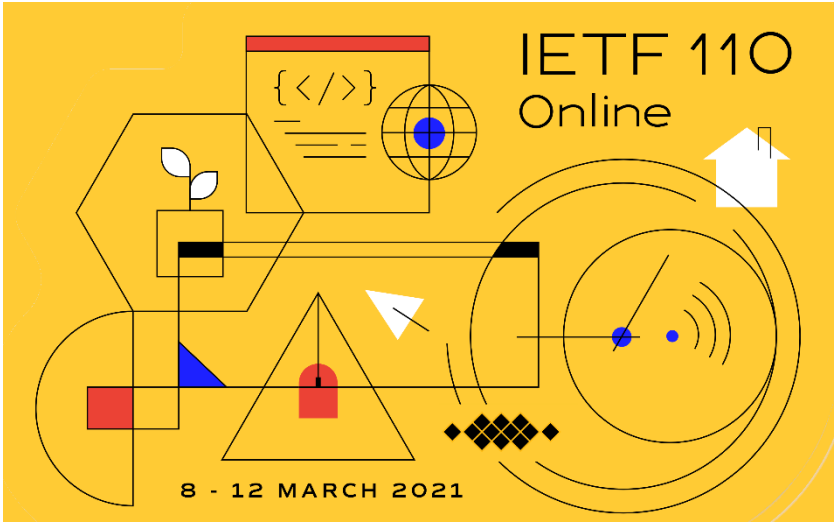
BMP & YANG

GROW and NETCONF WG



IETF 110

March 1-5th, 2021

Virtual Hackathon

BMP Hackathon - Plan

Performance

- Measure CPU and memory consumption of BGP process when BMP Adj-RIB IN, OUT and Local-RIB with path-marking TLV is enabled and BMP session is flapping.
  - draft-ietf-grow-bmp-local-rib (BGP Local RIB)
  - draft-grow-bmp-tlv (TLV support for BMP Route Monitoring and Peer Down Messages)
  - draft-cppy-grow-bmp-path-marking-tlv (Path Marking TLV)
- Verify if with BMP route-monitoring mirrored BGP RIB state under BGP congestion is always accurate. Perform loss analysis if loss is present.
- Verify possible BGP route-propagation delay impact when BMP is enabled on a transit node. Perform delay analysis if delay is present.

YANG Push Hackathon - Plan

Functionality

- Finalize development of open-source UDP-based Transport for Configured Subscriptions data collection library and mockup publisher.
    - draft-ietf-netconf-udp-notif (UDP-based Transport for Configured Subscriptions)
    - draft-ietf-netconf-distributed-notif (Subscription to Distributed Notifications)
- Integrate udp-notif library into pmacct open-source network data-collection.

Performance

- Test efficiency and throughput with various packet sizes on one core.

Hackathon – Software

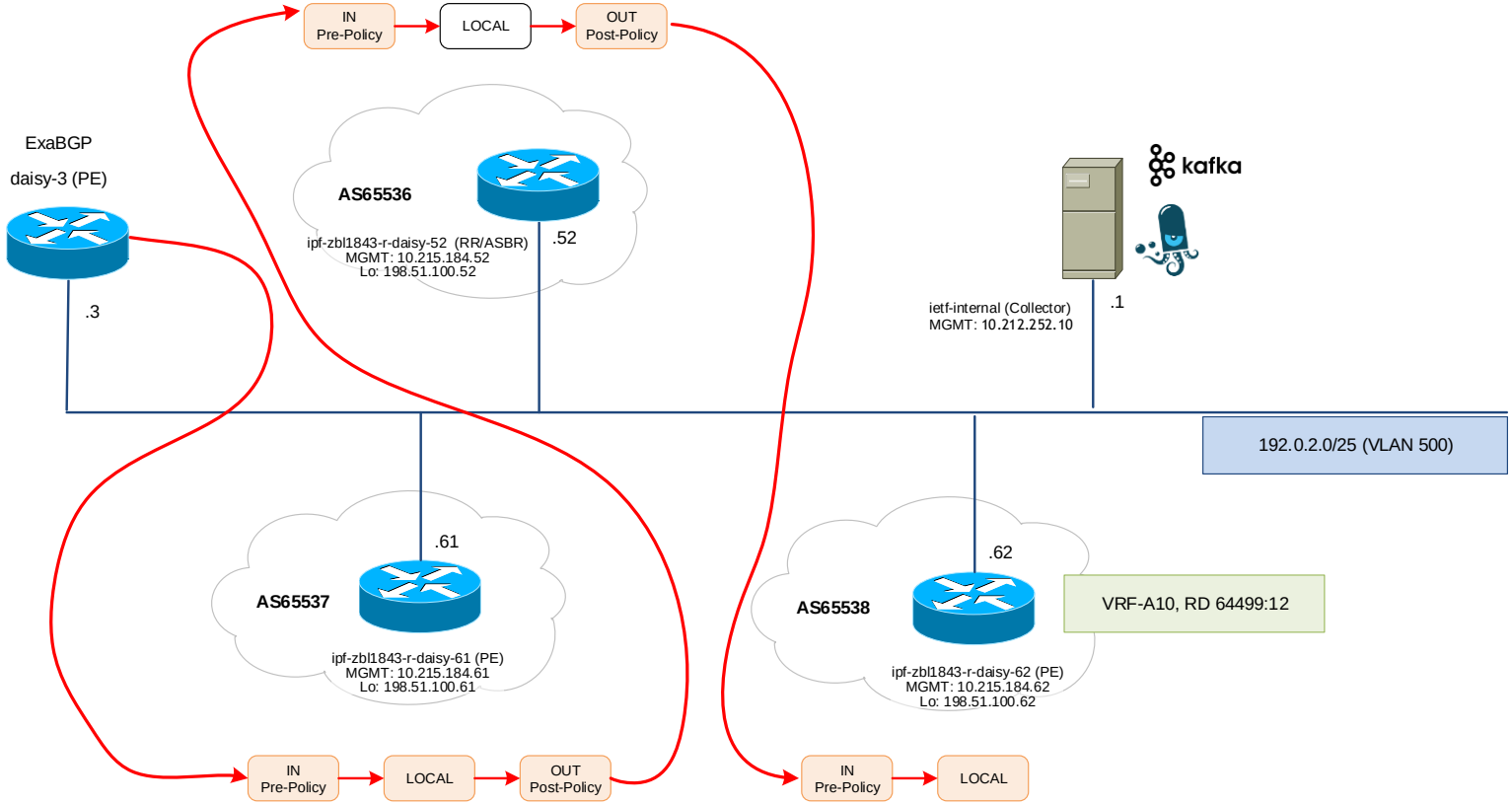
Software

- pmacct nfacctd for IPFIX and BMP data collection
- pmacct udp-notif for YANG push data collection
- Apache Kafka as message broker
- Apache Druid as timeseries DB
- Pivot as user interface
- Wireshark BMP dissector for packet analysis
- ExaBGP for BGP VPnv4/6 route generation

Tutorial

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

Hackathon - Network



Swisscom – lab environment

Achievements

- Test automation contains ExaBGP for sequenced BGP VPNv4 unicast route generation, BMP state initialization, BMP metric and YANG push cpu and memory process usage data collection.
- BMP route-monitoring prefix loss and delay can be automatically measured.
- CPU and memory usage now monitored on BGP process level.

Next Steps

- Redo same tests with Cisco IOS XR and Juniper JunOS and compare results.
- Redo same tests with improved timestamping on Huawei VRP.

Pmacct & INSA – nfacctd/udp-notif

Achievements

- C Implementation of a collector for draft-ietf-netconf-udp-notif-01
- C Implementation of a producer API, part of the library
- Segmentation option supported
- Integrated as a library in pmacct

https://github.com/pmacct/pmacct/

```
{
  "node_id_str": "ipf-zbl1843-r-daisy-81",
  "subscription_id_str": "DAISY3",
  "sensor_path": "huawei-debug:debug/cpu-infos/cpu-info",
  "proto_path": "huawei_debug.Debug",
  "collection_id": "11480",
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  "msg_timestamp": "1614900107660",
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          }
        }
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      "generator_id": "0",
      "generator_sn": "0",
      "generator_sync": false
    }
  },
  "software_version": "V800R013C00SPC006T"
}
```


Pmacct & INSA – nfacctd/udp-notif

Test Setup

- i7-7700HQ, 2x8G@2400 MHz, x86_64 Linux 5.4.0-66-generic
- Collector affinity set to one core
- Sample traffic sent from the other cores using Producer API
- Average performance on 10 runs with 500K messages sent (not much variance observed

Throughput

- 200B messages: 431Mbps
- 1500B MTU : 3,5Gbps
- 9000B MTU : 11,5Gbps

Huawei - VRP

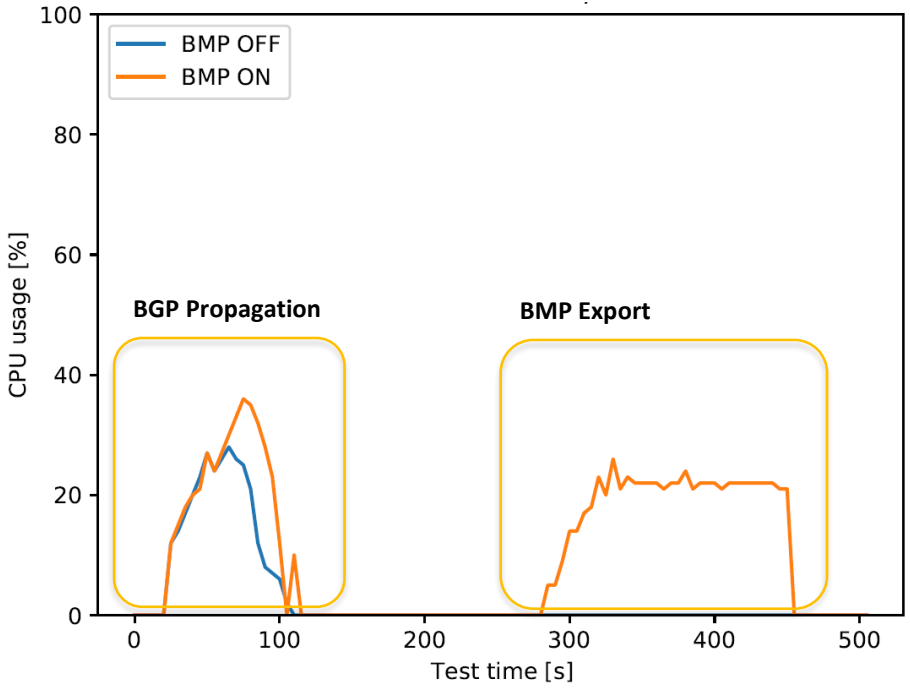
Achievements

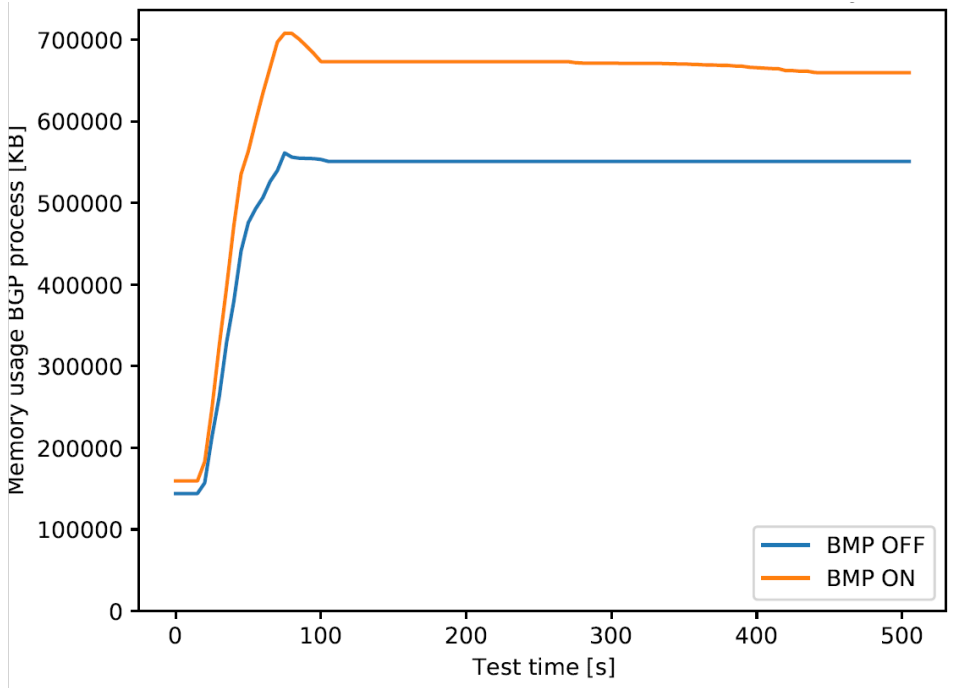
- BMP enabled on route-reflector and provider edge routers for Adj-RIB In pre-policy, Local RIB and Adj RIB Out post policy with path marking support.
- CPU increased **after** BGP converged when BMP is enabled. Slight overall increase of memory consumption observed.
- At the end of all the tests, BMP exported **RIB state** with route-monitoring always **matched** with RIB state on routers. **Impressed!**
- The BGP propagation delay, compare when BMP is enabled/disabled in transit, could not be measured accurate enough to draw final conclusions.

Next Steps

- Improve BMP time stamping accuracy.

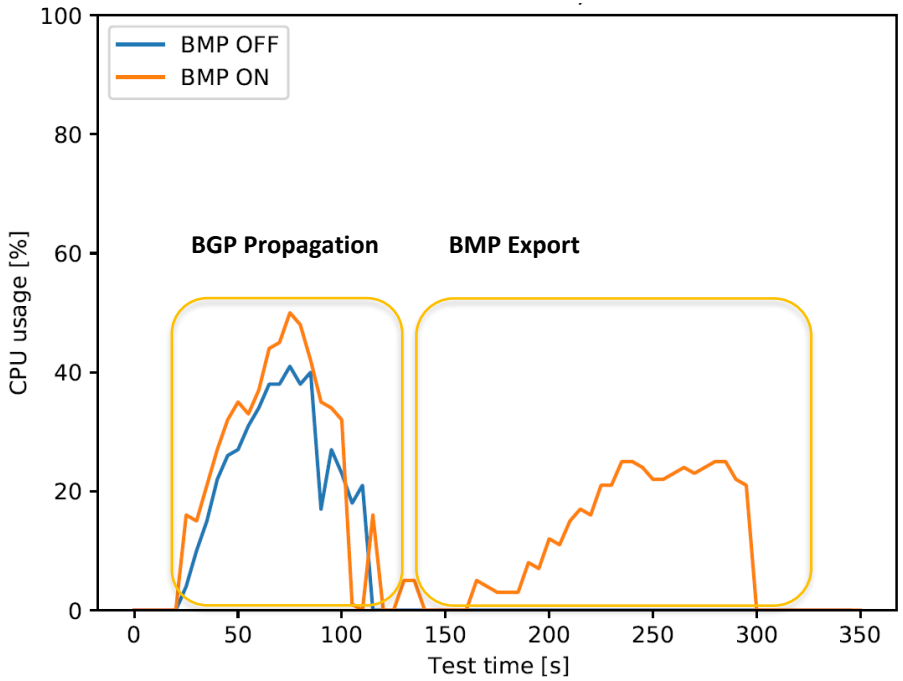
BMP ON/OFF Test – Route Reflector

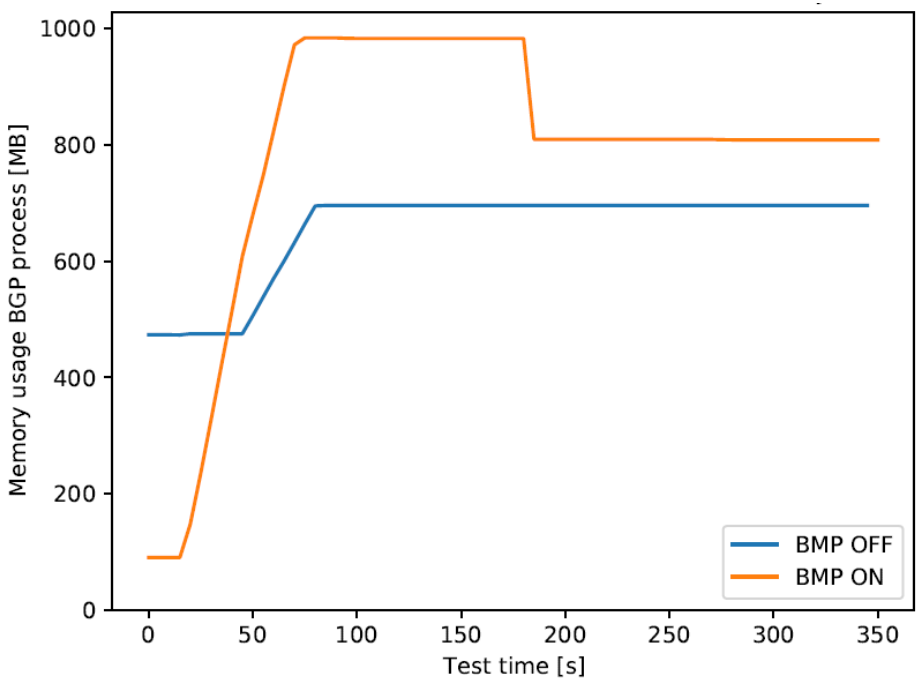




1'000'000 BGP VPNv4 unicast paths advertised as fast as possible to 10 peers.
BMP session **on/off**, enabled on 1 Adj-RIB In pre-policy and 1 Adj-RIB Out post-policy peer each.

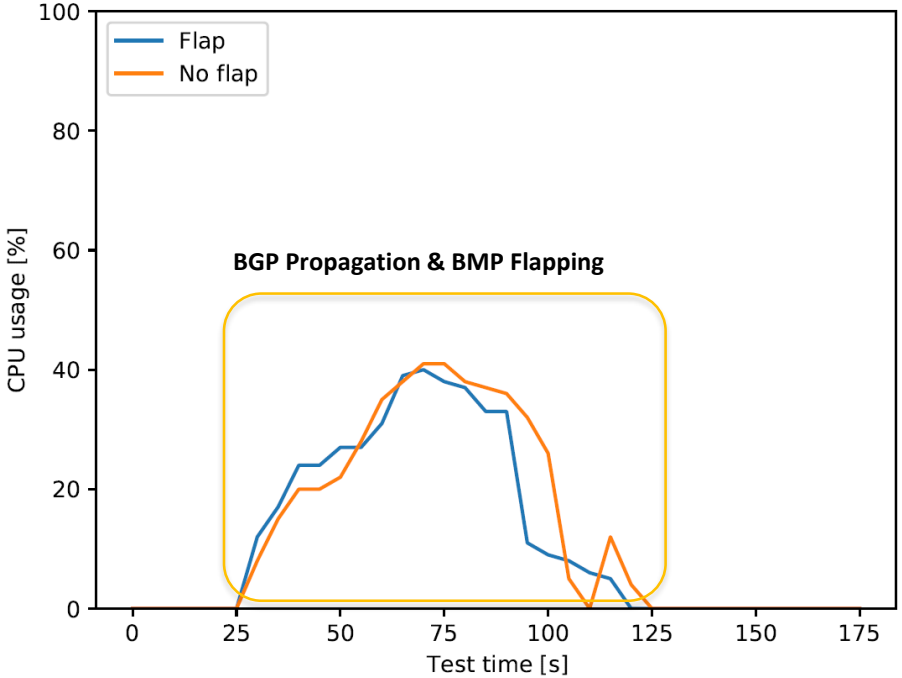
BMP ON/OFF Test – Provider Edge

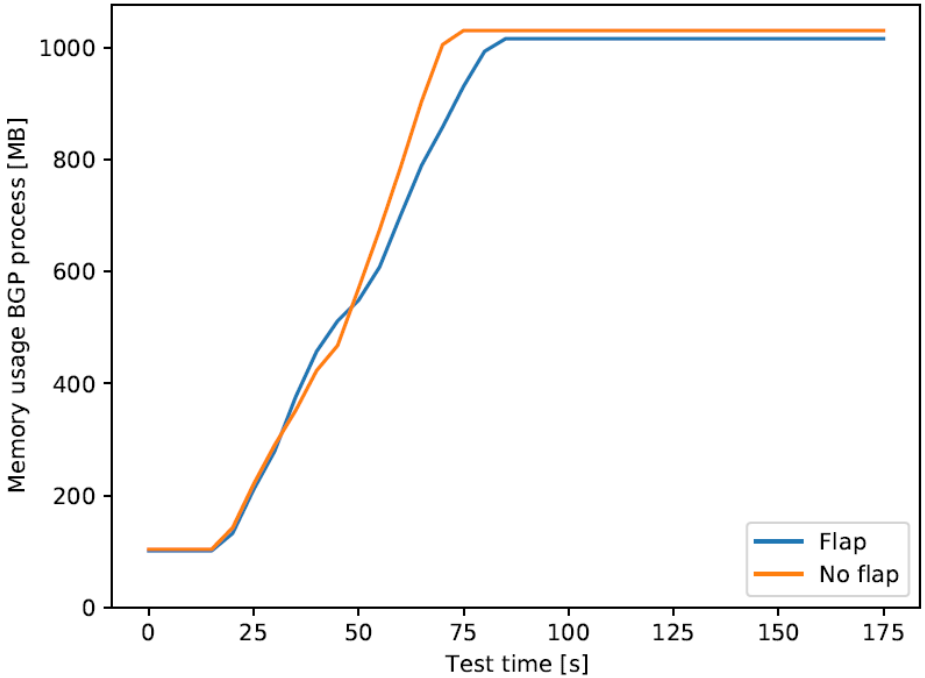




1'000'000 BGP VPNv4 unicast paths advertised as fast as possible to 10 peers.
BMP session **on/off**, enabled on 1 Adj-RIB In pre-policy and 1 Adj-RIB Out post-policy peer each.

BMP Flapping Test – Route Reflector





1'000'000 BGP VPNv4 unicast paths advertised as fast as possible to 10 peers.
BMP session **flapping**, enabled on 1 Adj-RIB In pre-policy and 1 Adj-RIB Out post-policy peer each.

What we learned

- Good
  - With the 5th hackathon, we know the drill. Consistency more and more pays off.
  - Good preparation, planning with test automation was gold.
  - Slack and MS teams helped to stay connected.
- Bad
  - Yet again, missing beers and cocktails after ☺

Thanks to…

- Alex Huang Feng – INSA
- Pierre Francois – INSA
- Yunan Gu - Huawei
- Binyang Huang – Huawei
- Shuanglong Chen - Huawei
- Paolo Lucente – NTT
- Marco Tollini - Swisscom
- Matthias Arnold - Swisscom
- Thomas Graf - Swisscom

…Imply for providing us the big data,
Huawei for the network environment and support,
and Cisco for the test cases.