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](https://imply.io/post/add-bgp-analytics-to-your-imply-netflow-analysis)
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",
"collection_start_time": "1614900107648",
"msg_timestamp": "1614900107660",
"collection_end_time": "1614900107660",
"current_period": 10000,
"except_desc": "OK",
"product_name": "NE40E",
"encoding": "Encoding_JSON",
"data_str": {
"row": [
{
"timestamp": "1614900107658",
"content": {
"debug": {
"cpu-infos": {
"cpu-info": [
{ "position": "3",
"overload-threshold": 90,
"unoverload-threshold": 75,
"interval": 8,
"index": 16973825,
"system-cpu-usage": 12,
"monitor-number": 48,
"monitor-cycle": 10,
"overload-state-change-time": "0000-00-00 00:00:00",
"current-overload-state": "Unoverload"
}
]
}
}
}
",
"delete": [],
"generator": {
"generator_id": "0",
"generator_sn": "0",
"generator_sync": false
}
},
"software_version": "V800R013C00SPC006T"
}
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.
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.
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.