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](https://datatracker.ietf.org/doc/draft-ietf-netconf-udp-notif/) (UDP-based Transport for Configured Subscriptions)
  
  • [draft-ietf-netconf-distributed-notif](https://datatracker.ietf.org/doc/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.
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"}
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.
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 **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 5\textsuperscript{th} 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
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- Thomas Graf - Swisscom

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