Enhancements to BMP implementation in FRRouting

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Getting Visibility into BGP RIBs with BMP

Border Gateway Protocol (BGP) and BGP Monitoring Protocol (BMP)

Internet Network

Swisscom Core Network
Getting Visibility into BGP RIBs with BMP

BGP Monitoring Protocol (BMP)

- Allows to monitor the BGP behaviour of a router
  - Received Paths (BMP Adj-RIB-In) -- RFC 7854
  - Best Path (BMP Loc-RIB) -- RFC 9069
  - Advertised Paths (BMP Adj-RIB-Out) -- RFC8671
  - Statistics

- FRRouting
  - Basic support of BMP

- Project
  - Support all RFC’s
  - Support of ongoing GROW WG items
  - Wireshark dissectors
BMP in FRRouting
Initial status

- **RFCs**
  - Adj-RIB-In
    - No Add-Path Support
  - Loc-RIB
    - No Support
  - Adj-RIB-Out
    - No Support

- **Drafts**
  - BMPv4
    - No Support
  - Path Marking
    - No Support
BMP Adj-RIB-In -- RFC 7854

- Added Add-Path support
- Add-Path RX ID in Adj-In NLRI
- VRF Identification
Best Path (BMP Loc-RIB) -- RFC 9069

- Now supported
- Supports BGP Multipath
- Supports VRF identification
Now supported
  ○ Supports BGP Add-Path
  ○ Supports VRF identification

Advertised Paths (BMP Adj-RIB-Out) -- RFC8671
BMP v4 TLV
draft-ietf-grow-bmp-tlv

- Added TLV for BGP PDUs in Route Monitoring Messages
- Added Group TLV code, not leveraged by a feature
- Added Capability TLV code, not leveraged by a feature
BMP Path Marking
Path status and Reason codes

- Added most status and all reason codes
- Missing
  - Invalid ROV
  - Backup
  - Best-external
Wireshark

- BMP Path-Marking  
References
FRRouting Links

- BMP Local-RIB Pull Request [https://github.com/FRRouting/frr/pull/11800](https://github.com/FRRouting/frr/pull/11800)
- BMP Adj-RIB-Out [https://github.com/mxyns/frr/tree/bmp-riboutmon](https://github.com/mxyns/frr/tree/bmp-riboutmon)
- BMP Multi-Path [https://github.com/mxyns/frr/tree/bmp-multipath](https://github.com/mxyns/frr/tree/bmp-multipath)
- BMP v4 TLV [https://github.com/mxyns/frr/tree/bmp-draft-tlv](https://github.com/mxyns/frr/tree/bmp-draft-tlv)
- BMP Path-Marking [https://github.com/mxyns/frr/tree/bmp-draft-path-marking](https://github.com/mxyns/frr/tree/bmp-draft-path-marking)
- BMP Fix Per-Peer Header Ports [https://github.com/FRRouting/frr/pull/13198](https://github.com/FRRouting/frr/pull/13198)
Thanks!

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Best Path (BMP Loc-RIB) -- RFC 9069

Main Challenge

- **Collection issue**
  - Received Add-Path IDs are unique for a BGP peer
  - RFC9069 does **not** provide the Peer Address

- **Possible solutions**
  - Regenerate Path-IDs unique for BMP but lose correlation with BGP
  - Provide Peer Address with draft-francois-grow-bmp-loc-peer
Advertised Paths (BMP Adj-RIB-Out) -- RFC8671

Implementation challenges

- FRRouting does not retain RIB-out Pre-Policy paths

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- Some statistics are not possible without relevant resource impact