Enhancements to BMP implementation in FRRouting

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

Challenges

- ECMP Diff in Local-RIB
  - Comparison of two sets of paths in the FRRouting DP code…

- Collection issue
  - Leave Path-ID same as Rx-ID in NLRI
    - Ambiguous without draft-francois-grow-bmp-loc-peer vs.
    - Regenerate Path-ID
    - Losing link with Adj-RIB-In
Advertised Paths (BMP Adj-RIB-Out) -- RFC8671

- Now supported
  - Supports BGP Add-Path
  - Supports VRF identification
Advertised Paths (BMP Adj-RIB-Out) -- RFC8671

Implementation challenges

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

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- Unchanged out pre-policy paths may be “updated” after a DP run
- Some statistics are not possible without relevant resource impact
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
- No e-bit needed for FRR at the moment
- Missing
  - Invalid ROV
  - Backup
  - Best-external
Wireshark

References
FRRouting Links

- BMP Local-RIB Pull Request https://github.com/FRRouting/frr/pull/11800
- BMP Adj-RIB-Out https://github.com/mxyns/frr/tree/bmp-riboutmon
- BMP Multi-Path https://github.com/mxyns/frr/tree/bmp-multipath
- BMP v4 TLV https://github.com/mxyns/frr/tree/bmp-draft-tlv
- BMP 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
Thanks!

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