BGP Data-Plane Benchmarking Applicable to Modern Routers

Rajiv Papneja

Ilya Varlashkin

Bhavani Parise

Dean Lee

Sue Hares

Background/ Current Status

- Terminology for Benchmarking BGP Device Convergence in the (RFC 4098) / June 2005
- Two complementing BGP Methodology drafts in progress
- Draft-1 focusing on the BGP Data Plane convergence was posted prior IETF 80
  - draft-papneja-bgp-basic-dp-convergence-03
    - Author team: Rajiv Papneja, Bhavani Parise, Sue Hares, Ilya Varlashkin
    - Contributors: Deal Lee, Eric Brendal, Mohan Nanduri, Jay Karthik
- Draft-2 focuses on Data-plane convergence on modern routers, which have local restoration capability was posted prior to IETF 82
  - draft-varlashkin-router-conv-bench-00
    - Author Team: Ilya Varlashkin, Rajiv Papneja, Bhavani Parise, Dean Lee
    - Reviewer: Tara Van Unen

Summary

(draft-papneja-bgp-basic-dp-convergence-02)

- BGP Data plane FIB convergence for both IPv4 and IPv6
- Limited to Basic BGP convergence (RFC 4271 functionality with Multi-Protocol BGP (MP-BGP) for IPv6)
- BGP Failure/Convergence Events
- Considers dependencies on factors impacting convergence:
  - Number of peers,
  - Number of routes/peers
  - Policy Processing/Reconfiguration
- Data Traffic characterization – offered load
- Various test cases that covers iBGP, eBGP and failure convergence events
- Topologies – Several 3 node, and 4 node setups

Summary
(draft-varlashkin-router-conv-bench-00)

- Metrics derived from packets, not from clock
- Single test procedure, 5 failure scenarios
  - Loss of Signal on the link attached to DUT
  - Attached link failure without LoS
  - Non-direct link failure
  - Best route withdrawal
  - BGP next-hop failure
- Background topological noise for realistic result
- Large topology scenario

Complimenting Drafts at a Glance

draft-papneja-bgp-basic-dp-convergence-02	draft-varlashkin-router-conv-bench-00
This document defines the methodology for benchmarking data plane FIB convergence performance of BGP in router and switches for simple topologies of 3 or 4 nodes.	This document specifies methodology for benchmarking convergence of routers without making assumptions about relation and dependencies between data- and control-planes.
Methodologies applicable in a BGP enabled setup. For IGP setup readers are encouraged to refer IGP convergence work	Provided methodology is primary intended for testing routers running BGP and some form of link-state IGP with or without MPLS
Tests discussed: RIB-IN Convergence, RIB-OUT Convergence,. eBGP Convergence, iBGP Convergence, eBGP multihop convergence	Initialization time, generic data-plane failure test
Convergence Events: Physical link failure on DUT/Remote end, ECMP Link failure on DUT end, BGP session failure, BGP hard reset, BGP soft reset, BGP route withdrawal, BGP Path attribute change, BGP Graceful restart	Convergence Events: LOS of signal, link failure without LOS, Non-direct link failure, Best route withdrawal and iBGP next hop failure

Current Status & Action Items from IETF82

- Obtained feedback from multiple Service Providers. Various tests from the draft termed as ‘Valuable’ and ‘Important’ by the Providers
- Performed Proof of concept benchmarking tests based on the methodology from the draft.
  - Results very encouraging
- Posted revised draft addressing comments from IETF82 and comments from WG list
  - http://tools.ietf.org/html/draft-papneja-bgp-basic-dp-convergence-03

Current Status & Action Items from IETF82

- Soliciting feedback from IDR
- Current draft includes basic convergence for IPv4 & IPv6.
- Other Address Families, RRs need to be covered in same or new draft?

Action Items

- Posted revised:
  - http://tools.ietf.org/html/draft-papneja-bgp-basic-dp-convergence-03
- Posted new draft:
  - http://tools.ietf.org/html/draft-varlashkin-router-conv-bench-01
- Can we agree on approach?
- Agree on WG-item readiness
  - Authors request acceptance as a formal WG document
- Inputs welcome!