BGP Data-Plane Benchmarking Applicable to Modern Routers

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Background/ Current Status

- Terminology for Benchmarking BGP Device Convergence in the (RFC 4098) / June 2005

- Methodology draft focusing on the BGP Data Plane convergence was posted prior IETF 80

  http://tools.ietf.org/html/draft-papneja-bgp-basic-dp-convergence-01

  - Not addressed (Missing item): Data-plane convergence on modern routers, which have local restoration capability

  - Probable solution to address missing item: Proposing additional draft (may merge later) to be submitted prior to IETF 82

Elaborating Missing Item

- Assumption *was*: packet flow restored – protocol converged

  - This may NO LONGER be true – modern routers can restore traffic *before* protocols converge

  - May not be applicable when mapped to modern routers

Proposed Solution!

- Measure data-plane convergence at DUT (not behind) and do NOT call it BGP convergence

    - Relevant to modern world

    - By definition can be measured at data-plane

- Measure BGP convergence only behind DUT, not at

    - Still relevant even today

    - Capture protocol packets rather than data-plane

    - Use same reference clock for all timestamps

Key points of methodology
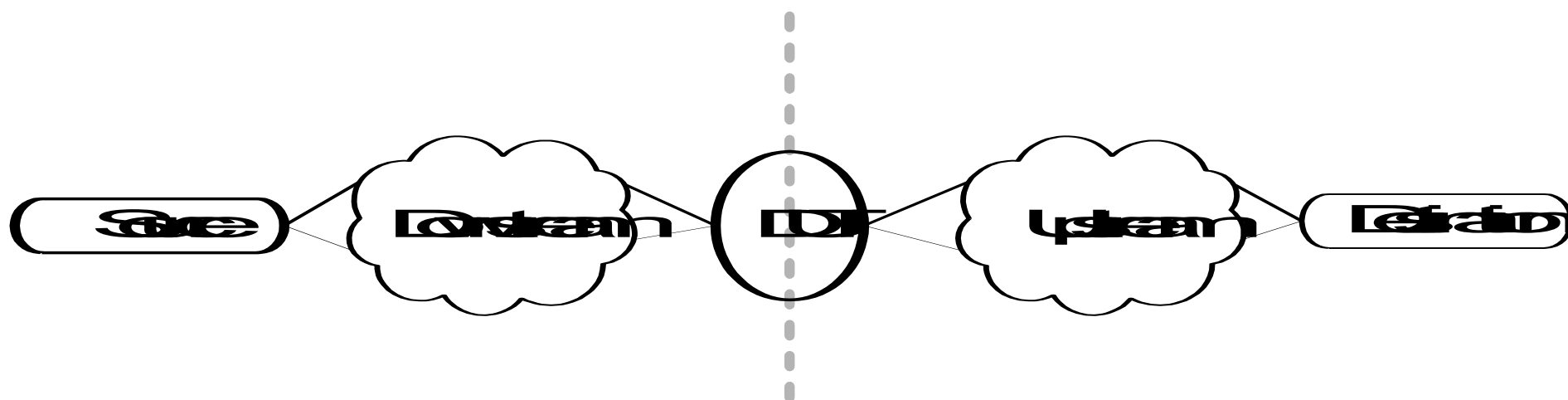
- Eliminate or minimize dependence on non-DUT
- DUT Detection time
- DUT Reaction time
- DUT Propagation time

Two drafts

- DUT ability to tell routers, which depend on it, about new network topology

  - Revised draft-papneja-bgp-basic-dp-convergence
  - Either exact but in control plane,
  - Or leveraging results from the new draft

- DUT ability to send packets that already arrived to it

  - New draft (pending upload to ietf.org)
  - Strictly data-plane

Current Draft Summary
(draft-papneja-bgp-basic-dp-convergence-01)

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

New draft summary

- 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

Next Steps

- Current draft will be revised to focus only on "behind DUT"

- Probably NOT data-plane

  - Metrics obtained directly, not derived

- Still data-plane

  - Use results from new draft

Action Items

- Can we agree on approach?

- Post revised old draft and new draft before IETF82

- Aim for WG-item readiness by IETF82

- Inputs welcome!