Requirements for the graceful shutdown of BGP sessions

draft-ietf-grow-bgp-graceful-shutdown-requirements-01

Bruno Decraene
Pierre Francois
Cristel Pelsser
Zubair Ahmad
A. J. Elizondo Armengol
Tomonori Takeda

France Telecom
UCL
IIJ
Orange Business Services
Telefonica I+D
NTT
Problem statement

- Currently, shutting down or setting up a BGP session creates loss of connectivity even when a redundant session/path exist in the AS.

- Some applications require tighter SLA, especially regarding network availability.
  - e.g., VoIP, online gaming, corporate mission critical applications

- This document defines requirements for procedures to gracefully set up or shutdown BGP session(s).
  - E.g make-before-break
Graceful shutdown?

- Graceful shutdown is not something new in general:
  - Link state IGP: link max metric, node overload (IS-IS), loop free convergence (draft-ietf-rtgwg-lf-conv-frmwk)
  - MPLS, GMPLS: "Graceful Shutdown in MPLS and Generalized MPLS"
    - draft-ietf-ccamp-mpls-graceful-shutdown-12.txt

- Currently no agreed procedure for BGP
  - although BGP is widely used: Internet, BGP/MPLS VPN services
  - although BGP routing convergence could be "long"
    - Path vector protocol, back up paths may be hidden, number of routes (RIB, FIB)
  - more difficult as it requires bi/multi lateral agreements between ASes
    - Cannot be done by an ISP on its own.
BGP Graceful shutdown requirements

- Minimal / no packet loss when shutting down a BGP session or an ASBR. (provided an alternate path is available in the AS)

- Idem when setting up a BGP session

- Should handle common iBGP topologies:
  - iBGP full mesh, iBGP Route Reflector, BGP confederation
  - combinations of above techniques

- Regarding eBGP topologies, the target use case is two ASes interconnected through multiple ASBRs
  - Typically a customer dual attached to a provider.
  - Out of scope: topologies involving BGP convergence in more than these 2 ASes (sharing the eBGP session)
Goals & metrics

Goals and metrics to design and evaluate solutions are:

1. Duration of loss of connectivity
2. Applicability to a wide range of networks, BGP topologies
3. Duration of transient forwarding loop
4. Additional load introduced in BGP
Next steps

- Comments on the requirement draft are welcomed
  - Please post on the GROW Mailing List
  - Draft is now quite old and stable so WG last call is expected soon

- Contributions on the solutions are welcomed
  - Graceful shutdown: draft-ietf-grow-bgp-gshut
  - Add path: draft-ietf-idr-add-paths, draft-vvds-add-paths-analysis, draft-pmohapat-idr-fast-conn-restore
  - ...
thank you
Back up
Applicability of Graceful Restart, Non Stop Routing, In Service Software Upgrade (ISSU)

- **Pro:**
  - applicable to single attached AS/customers

- **Con:**
  - not applicable when the forwarding plane / BGP session need to be shutdown
  - significant dependencies (software, possibly hardware, possibly peers' software).
Applicability BGP graceful shutdown solution

- **draft-ietf-grow-bgp-gshut:**
  - low local pref on iBGP, IANA FCFS BGP community on eBGP
  - BGP external best, tunnels between ASBRs

- **Pro:**
  - 0 packet loss achievable
  - incremental deployment with incremental benefits.
  - no new protocol extension

- **Con:**
  - requires configuration of BGP policies
  - delay maintenances for some 10s seconds
Applicability BGP add path

- **Pro:**
  - Also improve convergence time in case of failures
  - 0 packet loss achievable when shutting down eBGP session(s)
    - Provided the additional use of: BGP external best, right backup path advertised, tunnels between ASBRs

- **Con:**
  - shutdown of the whole ASBR probably still requires some g-shut procedure
  - no incremental benefits with incremental deployment
  - software dependency
  - currently not (widely) available
  - scalability to be studied.