Border Gateway Protocol 4 (draft-ietf-idr-bgp4-12.txt)

Function: exchange network reachability information with other BGP systems.

- List of ASs the information traverses.

- AS connectivity graph constructed from this information.

- Routing loops may be pruned.

- AS-level policy decisions may be enforced.
BGP Operation

- Runs over a reliable transport protocol (TCP).

- Uses TCP port 179 to establish connections.
  - External links: connections between BGP speakers in different ASs.
  - Internal links: connections between BGP speakers in the same AS.
  - Resolve connection collisions if two BGP peers simultaneously try to open connection.
### Propagation of BGP Information

- Entire BGP routing table exchanged between peers, initially.
- Incremental updates to reflect changes, subsequently.
- No periodic refresh.
- Update carries sequence of ASs to the origin of the message.
- Keepalive sent to ensure liveness of connection.
- Route withdrawal:
  - Explicit withdrawal.
  - Advertise replacement route.
  - Break BGP-connection: all routes advertised by the two endpoints to each other are withdrawn.
BGP-OSPF Interaction

- Exporting OSPF routes into BGP
  - Multiple subnet routes collapsed into one network route.

- Importing BGP routes into OSPF
  - OSPF cost = 1
  - OSPF metric type = 2
BGP Route Flap Damping (RFC 2439)

- BGP router may fail due to high volume of routing update.

- Consequences:
  - Generates more updates for other routers.
  - Other routers may fail.
  - Sustained oscillations can occur.
Limiting BGP Route Advertisements

Fixed Timer recommendations

- Minimum Route Advertisement Interval
  - minimum time between route advertisements to a particular destination.
  - 30 seconds.

- Minimum AS Origination Interval
  - minimum time between updates originated by a BGP speaker.
  - 15 seconds.

- Jitter: random factor, uniformly distributed in the range 0.75 - 1.0
Stability Sensitive Suppression of Route Advertisements

- Figure of merit based on routing instability.

- Figure of merit:
  - Incremented each time a route is withdrawn.
  - Value decays exponentially while the route is unchanged.
  - Separate decay rates for reachable and unreachable routes: different decay half life parameters.

- Routes with high figure of merit are suppressed for longer time.