Improved OSPF Database Exchange Procedure

draft-hegde-lsr-better-idbx

IETF 120

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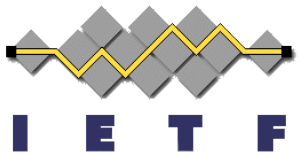
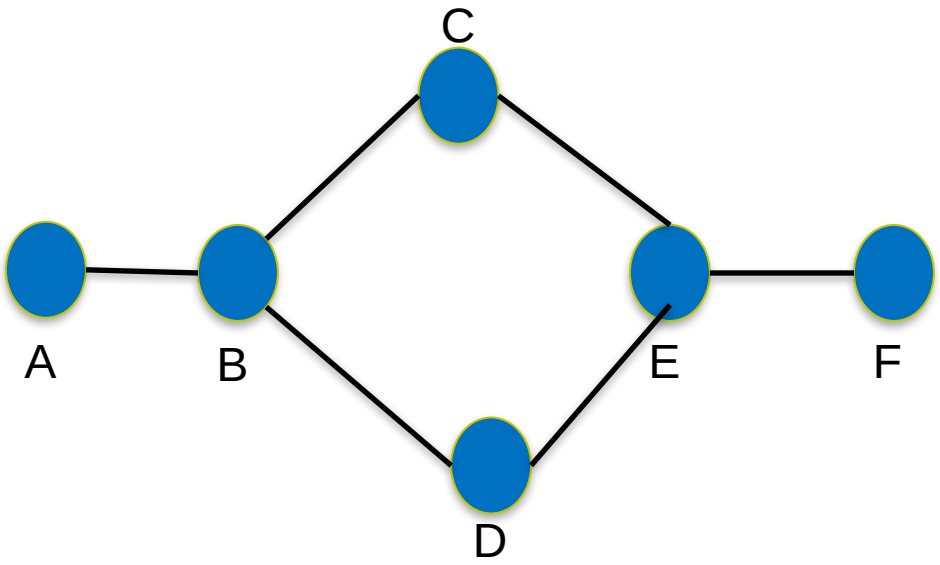


Problem



- When C Restarts, it will leave stale LSAs in other nodes which have full adjacencies to B & E
- When C comes-up, B and E use old LSAs and assume adjacency with C is bi-directional

Changes from Prior Version

- Previously, stale LSAs were discovered during database exchange process.
  - Stale LSAs that were not included in the restarting router's Database Exchange packets were not identified as stale.
- In current version, neighbors of the restarting router will build a list of stale LSAs at the same time it builds its Database Summary List.
  - New list is referred to as Stale Database Exchange List – includes all the restarting routers previous LSAs
  - Link for adjacency is not advertised by restarting router's neighbors until the all the LSAs on the State database exchange list have either been refreshed (with a higher sequence number) or purged.

Changes from Prior Version

- LSAs are removed from Stale Database Exchange List when same or more recent version of the LSA is found in restarting neighbor's Database Exchange packet.
- LSAs are also removed from the Stale Database Exchange List when the LSA is updated (with higher sequence number) or when it is purged.
- No Stale LSAs are missed.
- Draft includes additions to OSPF Database Exchange and LSA reception.

Possible Optimizations

- Limit Stale Database Exchange List to restarting neighbors.
  - Stale LSAs that were not included in the restarting router's Database Exchange packets were not identified as stale.
- Only put Router-LSAs and Network-LSAs with links to local router on the Stale Database Exchange list.
  - These are the only stale LSAs one really needs to worry about due to the bi-directional check in the OSPF SPF computation.
  - Once these LSAs are refreshed or purged, the restarting router WILL NOT advertise a link to the neighbor until it is has completely synchronized its Link State Database (LSDB) with its neighbor (which will include updating or purging any stale LSAs in its neighbor LSDB).

LSR List Concern

- OSPF routers somewhere in the area will use the stale LSAs.
  - Restarting router's neighbors will not advertise an adjacency until LSAs on Stale Database Exchange list have been updated or purged.
  - This implies that the stale LSA updates or purges have been flooded by the restarting neighbor prior to the Router-LSA or Network-LSA containing a link to the restarting router.
  - The only way the stale LSAs could persist on the same flooding path is if some LSA updates are dropped and other are received.
  - Other suggested solutions, i.e., adjacency suppression signaling have no solution for this as well (other than suppressing the adjacency for a very long time – retransmission interval).

Data Plane Update Delay

- Restarting router can advertises links prior the updating its data plane.
  - Adjacency Suppression signaling isn't necessary since restarting router can simply not advertise the link until the routes corresponding to the neighbor are updated.
  - Requires OSPF SPF calculation on restarting router to compute routes with the newly formed adjacencies without advertising them first (implementation dependent).
  - Completely local to the restarting router and will converge faster than signaling with neighbors.