OSPF Adjacency Suppression

draft-cheng-ospf-adjacency-suppress-00

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Introduction

• When a router is restarting from unplanned outage, copies of LSAs generated in its previous incarnation may exist in the link-state databases of other routers.

• These copies are likely to appear "newer" than LSAs initially generated by the starting router due to the reinitialization of LSA sequence numbers by the starting router. So, the neighbors of the starting router may transition to "Full" state and route the traffic through the starting router.

• This may cause temporary blackholes to occur until the starting router regenerates its own LSAs with higher sequence numbers.
1. Router A restarts from unplanned outage and the loopback address has been deleted;

2. **Router B reaches the full state earlier** (B advertises adjacency B->A and route the traffic to 10.1.1.1 through A);

3. Temporary blackhole occurs;

4. **Router B receives the re-originated LSA later**;

5. Temporary blackhole disappears.

*Especially when B has many more LSAs than A, the time between Step 2 and Step 4 will be prolonged.*
Key Points to Resolve the Problem

• Change the order of step 2 and step 4.

1. Delay step 2

• 1) Router B suppress advertising the adjacency with A, A send signal to indicate this situation.

• 2) Block the neighbor state machine through some special processing, e.g. the restarting router suppresses DD packet with More-bit unset.


• If Router B does not need to request LSAs from A, It will immediately get into the full state after finishing the DD exchange.

• Under this extreme scenarios, it is difficult to move step 4 ahead of step 2. It can be treated as 2) above.
Router B suppress advertising the adjacency with A, A send SA-Bit to signal it through LLS

Router A (Restarting)

- Loopback 10.1.1.1/32
- Down

Router B

- Full

Exstart

- 1-way Hello (set LLS SA-Bit Flag, start timer T-SA)
- 2-way Hello

Exchange

- 2-way Hello
- DD
- Request
- Update
- Request (Seq: N)
- Update (Seq: N, with the stub link 10.1.1.1)

Loading

- Self, re-originate (Seq: N+1, without the stub link 10.1.1.1)

Full

- Timer T-SA expires:
  - Hello (clear LLS SA-Bit Flag)

- Advertise B->A

10.1.1.1 is still unreachable through A
OSPF Extensions

**SA-bit** is defined for the LLS block included in Hello packets. It indicates the receiver to suppress advertising an adjacency to the sender.

There are two possible positions to carry the SA-bit Flag:

- **Option A: Extended Options and Flags TLV [RFC5613]**

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  | Extended Options and Flags |
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  **Extended Options Bit:**
  
  0x00000001: LR-bit
  0x00000002: RS-bit
  0x00000004: I-bit
  0x00000008: F-bit
  0x00000010: B-bit
  0x00000020: FR-bit
  **TBD** : SA-bit

- **Option B: Reverse Metric TLV [RFC9339]**

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  **Flags:**
  
  0x00000001: H-bit
  0x00000002: O-bit
  **TBD** : SA-bit
It is difficult to determine the conditions for entering the suppression state.
Being too strict may cause deadlock between two restarting neighboring routers, such as for all the restart routers.
Being too loose may not work, such as for the routers received the newer self-originated LSA in DD packet, because the start router may have finished the dd packet sending.
Comparison

• 1) The LLS SA-Bit Flag *(Proposed Solution)*

  Simple

  *no influence to other features.*

  *similar to the SA bit of Restart TLV in IS-IS [RFC8706].*

• 2) **Block the neighbor state machine**

  Complex

  *Changing the main flow of the database sync. Big challenge to the state machine.*
Next Steps

• Any questions or comments are welcome.
Thanks