

OSPF MaxAge LSA Flushing Problem Statement and Mitigation Solution

draft-dong-ospf-maxage-flush-problem-statement-01

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Motivation

- Typical cases of OSPF MaxAge LSA flushing
 - LSA naturally reaches MaxAge
 - Originator of the LSA is not reachable
 - Premature Aging
 - Sequence number wrapping
 - DR changes to non-DR
 - Withdrawal of routes
- Experience of improper MaxAge LSA flushing
 - All LSAs are flushed by some misbehaved router
 - Continuous MaxAge flushing has severe impact to the network and services

Consequence of LSA Flushing

- MaxAge LSA flushing can be initiated by any router
 - This is allowed by OSPF
- MaxAge LSA is flooded in the routing domain/area, replaces the old LSA instance on each router and triggers route calculation and installation
- Originator of LSA advertises a new LSA instance with (Seq# +1)
- Continuous LSA flushing brings a lot of pain to the network
 - Overhead of flooding, route calculation & installation
 - All protocols relying on IGP would flap
 - All services are interrupted

Requirements on Solutions

- Solution for impact mitigation
 - Alleviate the impact of the problem before the root cause can be identified
 - Improve the robustness of OSPF
 - Should not slow down normal route convergence
 - Incremental deployment is needed
- Solution for problem localization
 - Need to identify the misbehaved router and fix the problem
 - Backward compatibility should be considered
 - Something similar to IS-IS POI TLV does not apply to OSPF legacy LSAs

Changes in v-01

- Revise the problem statement according to comments received

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- Provide a solution to mitigate the impact of LSA flushing
 - Improve robustness of OSPF
 - Do not slow down normal route convergence
 - Can be deployed incrementally

Principle of Solution

- MaxAge router-LSA should be treated more carefully
 - In normal case, it means the originator is no longer reachable, which is a significant change to network, and
 - Removal of a node can also be informed by LSA updates of its adjacent routers
- Consequent LSA flushing of the same originator should be checked
 - As the state of the originator is questionable

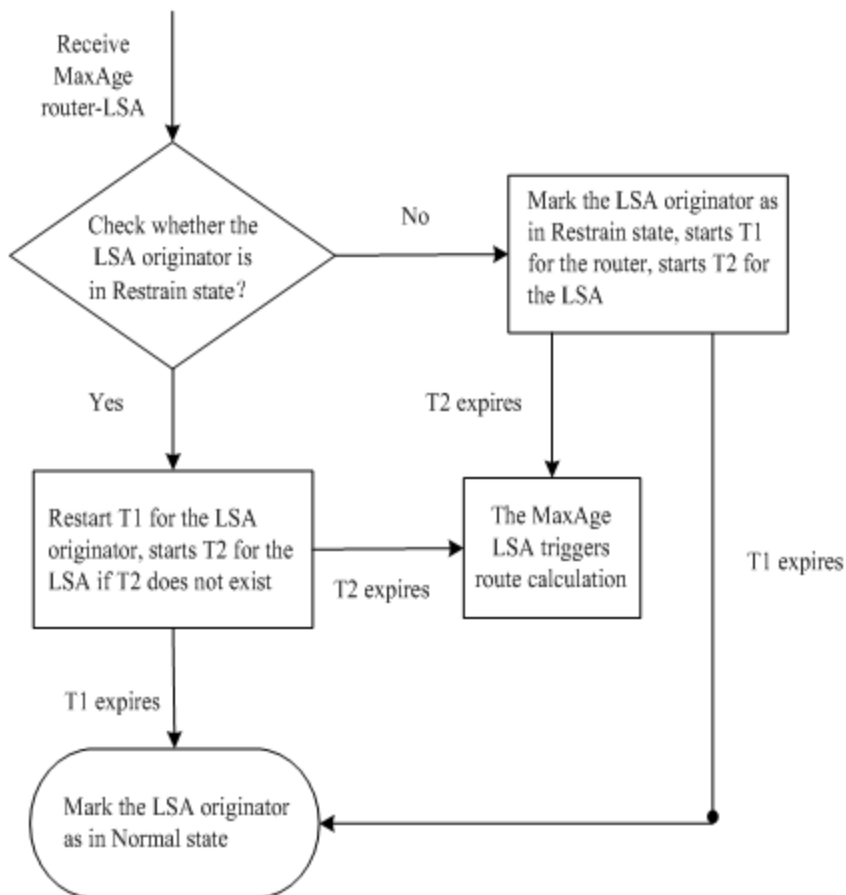
Proposed Mechanism

- Two types of timers
 - T1: examination time of suspicious LSA flushing of a particular router. When a MaxAge router-LSA is received, the originator of the router-LSA is marked as in Restrain state, and for T1 time subsequent MaxAge LSAs of the same originator are further checked.
 - T2: examination time of a received MaxAge LSA when the originator is in Restrain state. The LSA would not trigger route calculation until T2 expires or stops.
- MaxAge LSAs would still be flushed in the network, while route calculation for LSAs in examination is delayed

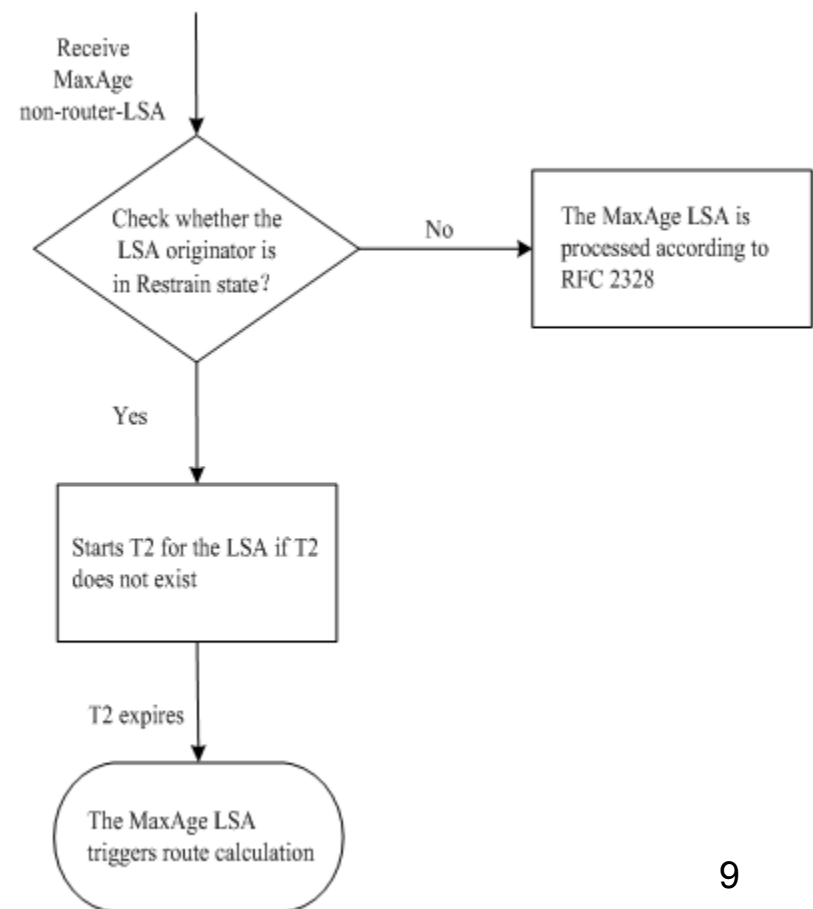
Proposed Mechanism (cont.)

- Detailed procedures

MaxAge router-LSA



MaxAge non-router-LSA



Deployment Considerations

- The proposed mechanism can be incrementally deployed into the network
 - Avoid impacts to the deployed routers
- When deployed on all routers in the OSPF domain, the impacts to network and services can be eliminated

Conclusions

- LSA flushing may cause severe impact to network and services
- A solution for impact mitigation is proposed
- Solution for problem localization needs further study
- Solicit comments on both the problem statement and the solutions