OSPF Stub Router Advertisement
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Abstract

   This memo describes a backward-compatible technique that may be used
   by OSPF (Open Shortest Path First) implementations to advertise
   unavailability to forward transit traffic or to lower the preference
   level for the paths through such a router. In some cases, it is
   desirable not to route transit traffic via a specific OSPF router.
   However, OSPF does not specify a standard way to accomplish this.

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1. Motivation

In some situations, it may be advantageous to inform routers in a
network not to use a specific router as a transit point, but still
route to it. Possible situations include the following:

o The router is in a critical condition (for example, has very high
   CPU load or does not have enough memory to store all LSAs or build
   the routing table).

o Graceful introduction and removal of the router to/from the
   network.

o Other (administrative or traffic engineering) reasons.

Note that the proposed solution does not remove the router from the
topology view of the network (as could be done by just flushing that
router's router-LSA), but prevents other routers from using it for
transit routing, while still routing packets to the router's own IP
addresses, i.e., the router is announced as a stub.

It must be emphasized that the proposed solution provides real
benefits in networks designed with at least some level of redundancy
so that traffic can be routed around the stub router. Otherwise,
traffic destined for the networks reachable through such a stub
router will be still routed through it.

2. Requirements Language

The key words "MUST", "MUST NOT", "REQUIRED", "SHALL", "SHALL NOT",
"SHOULD", "SHOULD NOT", "RECOMMENDED", "MAY", and "OPTIONAL" in this
document are to be interpreted as described in [RFC2119].

3. Proposed Solution

The solution described in this document solves two challenges
associated with the outlined problem. In the description below,
router X is the router announcing itself as a stub.

1) Making other routers prefer routes around router X while
    performing the Dijkstra calculation.

2) Allowing other routers to reach IP prefixes directly connected to
    router X.

Note that it would be easy to address issue 1) alone by just flushing

router X's router-LSA from the domain. However, it does not solve
problem 2), since other routers will not be able to use links to
router X in Dijkstra (no back link), and because router X will not
have links to its neighbors.

To address both problems, router X announces its router-LSA to the
neighbors with the costs of all non-stub links (links of the types
other than 3) set to LSInfinity (16-bit value 0xFFFF, rather than 24-
bit value 0xFFFFFF used in summary and AS-external LSAs).

The solution above applies to both OSPFv2 [RFC2328] and OSPFv3
[RFC5340].

4. Compatibility issues

Some inconsistency may be seen when the network is constructed of the
routers that perform intra-area Dijkstra calculation as specified in
[RFC1247] (discarding link records in router-LSAs that have
LSInfinity cost value) and routers that perform it as specified in
[RFC1583] and higher (do not treat links with LSInfinity cost as
unreachable). Note that this inconsistency will not lead to routing
loops, because if there are some alternate paths in the network, both
types of routers will agree on using them rather than the path
through the stub router. If the path through the stub router is the
only one, the routers of the first type will not use the stub router
for transit (which is the desired behavior), while the routers of the
second type will still use this path.

5. Security Considerations

The technique described in this document does not introduce any new
security issues into the OSPF protocol.

6. Acknowledgements

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originality of the ideas described. Among other people, we would
like to acknowledge Henk Smit for being part of one of the initial
discussions around this topic.

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Tomohiro Yamagata for reminding us of the need to document the OSPFv3
behavior.

7. References

7.1. Normative References

   [RFC2119] Bradner, S., "Key words for use in RFCs to Indicate
              Requirement Levels", BCP 14, RFC 2119, March 1997.

7.2. Informative References

   [RFC1247] Moy, J., "OSPF Version 2", RFC 1247, July 1991.

   [RFC1583] Moy, J., "OSPF Version 2", RFC 1583, March 1994.

   [RFC2328] Moy, J., "OSPF Version 2", STD 54, RFC 2328, April 1998.

   [RFC5340] Coltun, R., Ferguson, D., Moy, J., and A. Lindem, "OSPF
              for IPv6", RFC 5340, July 2008.

Authors' Addresses

   Alvaro Retana
   Hewlett-Packard Co.
   2610 Wycliff Road
   Raleigh, NC 27607
   USA

   Email: alvaro.retana@hp.com

   Liem Nguyen
   Cisco Systems, Inc.
   3750 Cisco Way
   San Jose, CA 95134
   USA

   Email: lhnguyen@cisco.com

   Russ White
   Cisco Systems, Inc.
   7025 Kit Creek Rd.
   Research Triangle Park, NC 27709
   USA

   Email: russwh@cisco.com

Alex Zinin
Cisco Systems, Inc.
Capital Tower, 168 Robinson Rd.
Singapore, Singapore 068912
Singapore

Email: azinin@cisco.com

Danny McPherson
Verisign, Inc.
21345 Ridgetop Circle
Dulles, VA 20166
USA

Email: dmcpherson@verisign.com