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Zafar Ali
Reshad Rahman
Danny Prairie
Cisco Systems
D. Papadimitriou
Alcatel

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Node ID based RSVP Hello: A Clarification Statement

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Abstract

Use of Node-ID based RSVP Hello messages is implied in a number of cases, e.g., when data and control plan are separated, and when TE links are unnumbered. Nonetheless, this implied behavior is unclear

and this document formalizes use of Node-ID based RSVP Hello session in some scenarios. The procedure described in this document applies to both Multi-Protocol Label Switching (MPLS) and Generalized MPLS (GMPLS) capable nodes.

When link level failure detection is performed by some means other than exchanging RSVP Hello messages, use of Node-ID based Hello session is optimal for detecting signaling adjacency failure for Resource reSerVation Protocol-Traffic Engineering (RSVP-TE). The use of Node-ID based Hello session is optimal in the sense that as long as there is IP reachability to the nieghbor (node-id), the signalling adjacency will remain up.

Conventions used in this document

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 RFC 2119 [RFC2119].

1. Terminology

Node-ID: TE Router ID as advertised in the Router Address TLV for OSPF [OSPF-TE] and Traffic Engineering Router ID TLV for ISIS [ISIS-TE]. For IPv6, the Node-ID refers to the Router_IPv6_Address for OSPFv3 [OSPFv3-TE] and the IPv6 TE Router_ID for IS-IS [IS-ISv6-TE].

Node-ID based Hello Session: A Hello session such that local and remote Node-IDs are used in the source and destination fields of the Hello packet, respectively.

Interface bounded Hello Session: A Hello session such that local and remote addresses of the interface in question are used in the source and destination fields of the Hello packet, respectively.

2. Introduction

The RSVP Hello message exchange was introduced in [RFC 3209]. The usage of RSVP Hello has been extended in [RFC 3473] to support RSVP Graceful Restart (GR) procedures.

More specifically, [RFC 3473] specifies the use of the RSVP Hello messages for GR procedures for Generalized MPLS (GMPLS). GMPLS introduces the notion of control plane and data plane separation. In other words, in GMPLS networks, the control plane information is carried over a control network whose end-points are IP capable, and which may be physically or logically disjoint from the data bearer links it controls. One of the consequences of separation of data

bearer links from control channels is that RSVP Hello messages are not terminated on data bearer links' interfaces even if (some of) those are numbered. Instead RSVP Hello messages are terminated at the control channel (IP-capable) end-points. The latter MAY be identified by the value assigned to the node hosting these control channels i.e. Node-ID. Consequently, the use of RSVP Hello messages for GR

applications introduces a need for clarifying the behavior and usage of Node-ID based Hello sessions.

Even in the case of packet switching capable end-points, when link failure detection is performed by some means other than RSVP Hello messages (e.g., [BFD]), the use of Node-ID based Hello sessions is also optimal for detection of signaling adjacency failures for GMPLS-/RSVP-TE when there is more than one link between a pair of nodes. Similarly, when all TE links between neighbor nodes are unnumbered, it is implied that the nodes will exchange Node-ID based Hello messages for detection of signaling adjacency failures. This document also clarifies the use of Node-ID based Hello message exchanges when all or a sub-set of TE links are unnumbered.

3. Node-ID based RSVP Hello Messages

A Node-ID based Hello session is established through the exchange of RSVP Hello messages such that local and remote Node-IDs are respectively used in the source and destination fields of Hello packets. Here, Node-ID refers for IPv4 to the TE router-id as defined in the Router Address TLV for OSPF [OSPF-TE] and the Traffic Engineering router ID TLV for ISIS [ISIS-TE]. For IPv6, the Node-ID refers to the Router_IPv6_Address for OSPFv3 [OSPFv3-TE] and the IPv6 TE Router_ID for IS-IS [IS-ISv6-TE]. This section formalizes a procedure for establishing Node-ID based Hello sessions.

If a node wishes to establish a Node-ID based RSVP Hello session with its neighbor, it sends a Hello message with its Node-ID in the source IP address field of the Hello packet. Furthermore, the node also puts the neighbor's Node-ID in the destination address field of the IP packet.

When a node receives a Hello packet where the destination IP address is its local Node-ID as advertised in the IGP-TE topology, the node MUST use its Node-ID in replying to the Hello message. In other words, nodes MUST ensure that the Node-IDs used in RSVP Hello messages are those derived/contained in the IGP-TE topology. Furthermore, a node can only run one Node-ID based RSVP Hello session

per IGP instance (i.e., per Node-ID pair) with its neighbor.

Even in the case of packet switching capable end-points, when link failure detection is performed by some means other than exchanging RSVP Hello messages, use of Node-ID based Hello sessions is also optimal in detecting signaling adjacency failures for GMPLS-/RSVP-TE when there is more than one link between a pair of nodes. Similarly, if all interfaces between a pair of nodes are unnumbered, the optimal way to use RSVP to detect signaling adjacency failure is to run Node-ID based Hello sessions. Furthermore, in the case of optical network with single or multiple, numbered or unnumbered control channels, use

of Node-ID based Hello messages for detecting signaling adjacency failure is also optimal. Therefore, when link failure detection is performed by some means other than exchanging RSVP Hello messages, or if all interfaces between a pair of nodes are unnumbered, or in GMPLS network with data and control plane separation, a node MUST run Node-ID based Hello sessions for detection of signaling adjacency failure for RSVP-TE. Nonetheless, if it is desirable to distinguish between signaling adjacency and link failures, Node-ID based Hello sessions can co-exist with the exchange of interface bound Hellos messages. Similarly, if a pair of nodes share numbered and unnumbered TE links, Node-ID and interface based Hello sessions can co-exist.

4. Backward Compatibility Note

The procedure presented in this document is backward compatible with both [RFC3209] and [RFC3473].

Per [RFC 3209], the Hello mechanism is intended for use between immediate neighbors and Hello messages are by default sent between direct RSVP neighbors. This document does not modify this behavior as it uses as "local node_id" the IPv4/IPv6 source address of the sending node and as "remote node_id" the IPv4/IPv6 destination address of the neighbor node. TTL/Hop Limit setting and processing are also left unchanged.

Moreover, this document does not modify the use of Hello Processing for State Recovery as defined in Section 9.3 of [RFC 3473] (including definition and processing of the RESTART_CAP object).

5. Security Considerations

As this document does not modify or extend the RSVP Hello messages exchange between immediate RSVP neighbors, it does not introduce new

security considerations.

The security considerations pertaining to the original [RFC3209] remain relevant. RSVP message security is described in [RFC2747] and provides Hello message integrity and authentication of the Node-ID ownership.

6. Acknowledgements

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7. IANA Considerations

This draft makes no requests for IANA action.

8. Reference

8.1 Normative Reference

[RFC2205] Braden, R., et al., "Resource ReSerVation Protocol (RSVP) - Version 1, Functional Specification", RFC 2205, September 1997.

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

[RFC2747] Baker, F., Lindell B., and Talwar, M., "RSVP Cryptographic Authentication", RFC 2747, January 2000.

[RFC3209] Awduche, D., et al., "Extensions to RSVP for LSP Tunnels", RFC 3209, December 2001.

[RFC3471] Berger, L., et al., Generalized Multi-Protocol Label Switching (GMPLS) Signaling Functional Description, RFC 3471, January 2003.

[RFC3473] Berger, L., et al., "Generalized Multi-Protocol Label Switching (GMPLS) Signaling Resource ReserVation Protocol-Traffic Engineering (RSVP-TE) Extensions", RFC 3473, January 2003.

[RFC3667] Bradner, S., "IETF Rights in Contributions", BCP 78, RFC

3667, February 2004.

[RFC3668] Bradner, S., Ed., "Intellectual Property Rights in IETF Technology", BCP 79, RFC 3668, February 2004.

8.2 Informative Reference

[OSPF-TE] Katz, D., Yeung, D., Kompella, K., "Traffic Engineering Extensions to OSPF Version 2", RFC 3630, September 2003.

[ISIS-TE] Li, T., Smit, H., "IS-IS extensions for Traffic Engineering", RFC 3784, June 2004.

[BFD] Katz, D., and Ward, D., "Bidirectional Forwarding Detection", draft-katz-ward-bfd, work in progress.

9. Author's Addresses

Zafar Ali
Cisco Systems Inc.

100 South Main St. #200
Ann Arbor, MI 48104, USA.
Phone: (734) 276-2459
Email: zali@cisco.com

Reshad Rahman
Cisco Systems Inc.
2000 Innovation Dr.,
Kanata, Ontario, K2K 3E8, Canada.
Phone: (613)-254-3519
Email: rrahman@cisco.com

Danny Prairie
Cisco Systems Inc.
2000 Innovation Dr.,
Kanata, Ontario, K2K 3E8, Canada.
Phone: (613)-254-3519
Email: dprairie@cisco.com

Dimitri Papadimitriou (Alcatel)
Fr. Wellesplein 1,
B-2018 Antwerpen, Belgium
Phone: +32 3 240-8491
Email: dimitri.papadimitriou@alcatel.be

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