Node-ID Based Resource Reservation Protocol (RSVP) Hello: A Clarification Statement

Status of This Memo

   This document specifies an Internet standards track protocol for the
   Internet community, and requests discussion and suggestions for
   improvements. Please refer to the current edition of the "Internet
   Official Protocol Standards" (STD 1) for the standardization state
   and status of this protocol. Distribution of this memo is unlimited.

Abstract

   Use of Node-ID based Resource Reservation Protocol (RSVP) Hello
   messages is implied in a number of cases, e.g., when data and control
   planes are separated, when TE links are unnumbered. Furthermore,
   when link level failure detection is performed by some means other
   than exchanging RSVP Hello messages, use of a Node-ID based Hello
   session is optimal for detecting signaling adjacency failure for
   Resource reSerVation Protocol-Traffic Engineering (RSVP-TE).
   Nonetheless, this implied behavior is unclear, and this document
   formalizes use of the 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.

1. Introduction

   The RSVP Hello message exchange was introduced in [RFC3209]. The
   usage of RSVP Hello has been extended in [RFC3473] to support RSVP
   Graceful Restart (GR) procedures.

   More specifically, [RFC3473] 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
   that 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 interfaces, 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 and 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.

2. 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 in which 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 in which local and
   remote addresses of the interface in question are used in the source
   and destination fields of the Hello packet, respectively.

2.1. 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].

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, for IPv4, Node-ID refers 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 interfaces, 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
   and 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 an
   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 a 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 [RFC3209], 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 [RFC3473] (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

   We would like to thank Anca Zamfir, Jean-Louis Le Roux, Arthi
   Ayyangar, and Carol Iturralde for their useful comments and
   suggestions.

7. Reference

7.1. Normative References

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