

Network Working Group
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Exclude Routes - Extension to RSVP-TE
<[draft-lee-rsvp-te-exclude-route-00.txt](#)>

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Abstract

The current RSVP-TE specification [[RSVP-TE](#)] and GMPLS extensions [[GMPLS-RSVP-TE](#)] allow abstract nodes and resources to be explicitly included in a path setup, but not to be explicitly excluded.

In many systems this is fine because exclusions can be specified through a management system and passed to an offline computation engine which can generate a route that is sufficiently explicit to ensure that the exclusions are avoided.

Other systems, however, rely on the use of loose routes or partially specified abstract nodes. These routes are resolved within the network as the hops of the explicit route are evaluated. In these cases exclusions cannot currently be communicated to the nodes that will evaluate the routes.

This draft specifies ways to communicate route exclusions during path setup using RSVP-TE.

1. Overview

We identified two main types of exclusions to apply:

- i) Do not include any of the abstract nodes in a given set. This is referred to as XRO (exclude route object)
- ii) Do not include certain abstract nodes or resources between a specific pair of abstract nodes within an ERO. This is referred to as NOT(ERO subobject).

A new RSVP-TE object shall be specified for the first type of exclude route.

The second type of exclude route require modification of the existing ERO or a new C_Type for the existing ERO to be specified. This type of exclude route will be added to this draft in a future version.

2. Exclude Route

The exclude route identifies a list of abstract nodes that must NOT be traversed along the path.

2.1 Exclude Route Object

Abstract nodes to be excluded are specified via the EXCLUDE_ROUTE object (XRO). The Exclude Route Class value is TBD. Currently one C_Type is defined, Type 1 Exclude Route. The EXCLUDE_ROUTE object has the following format:

Class = TBD, C_Type = 1

```

      0                1                2                3
      0 1 2 3 4 5 6 7 8 9 0 1 2 3 4 5 6 7 8 9 0 1 2 3 4 5 6 7 8 9 0 1
+--+--+--+--+--+--+--+--+--+--+--+--+--+--+--+--+--+--+--+--+--+--+
|                                                                    |
//                               (Subobjects)                               //
|                                                                    |
+--+--+--+--+--+--+--+--+--+--+--+--+--+--+--+--+--+--+--+--+--+--+

```

Subobjects

The contents of an EXCLUDE_ROUTE object are a series of variable-

length data items called subobjects. The subobjects are identical to those defined in [[RSVP-TE](#)] and [[GMPLS-RSVP-TE](#)] for use in EROs.

The following subobject types are supported.

- 1 IPv4 prefix
- 2 IPv6 prefix
- 32 Autonomous system number

The defined values for Type above are specified in [[RSVP-TE](#)]

The L bit that denotes a loose hop when the subobject is used in the ERO has no meaning in the XRO and should be ignored.

2.2. Semantics of the Exclude Route Object

The exclude route is encoded as a series of subobjects contained in an EXCLUDE_ROUTE object. Each subobject identifies a group of nodes in the exclude route. An exclude route is thus a specification of groups of nodes NOT to be traversed.

In [[RSVP-TE](#)], a node may be an abstract node, which is made up of a group of nodes (as in an Autonomous System). Hence an exclude route that consists solely of Autonomous System number subobjects specifies the Autonomous Systems not to be traversed.

3. Security

The new exclude route object poses no security exposures over and above [[RSVP-TE](#)].

4. Acknowledgment

This draft reuse text from [[RSVP-TE](#)] for the description of EXCLUDE_ROUTE.

5. Authors' Information

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References

[RSVP-TE] <ftp://ftp.isi.edu/in-notes/rfc3209.txt>

[GMPLS-RSVP-TE] Generalized MPLS Signaling - RSVP-TE Extensions, Internet Draft <[draft-ietf-mpls-generalized-rsvp-te-06.txt](#)>, November, 2001