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OSPFv2 Extensions for Link Capabilities to support U-turn Alternates for IP/LDP Fast-Reroute

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Abstract

This document proposes an extension to OSPF Version 2 for advertising

link capabilities using the extensions defined for traffic engineering. The link capabilities are defined there for future extensibility. To support the signaling requirements of U-turn alternates for IP Fast-Reroute, this document defines three bits in the proposed link capabilities extension.

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1. Introduction

The motivations for an extension to OSPF version 2 to allow advertising link capabilities is to both allow the signaling required by [U-TURN] and to provide for future extensibility.

[RFC3630] specifies OSPFv2 Traffic Engineering extensions for carrying link attributes, via a new Link TLV which is carried in the TE LSA. The Link TLV comprises of several sub-TLVs characterizing the links. Among those sub-TLVs are the Link ID and Link Type sub-TLVs, which are the only mandatory sub-TLVs. This is the set of information that is necessary to associated advertised link capabilities to the specific link. To avoid potentially unnecessary redundant advertisement of the Link ID and Link Type, in the event that a router needs to support signaling for both TE and link capabilities, this document proposes adding a Link Capabilities sub-TLV to the Link TLV.

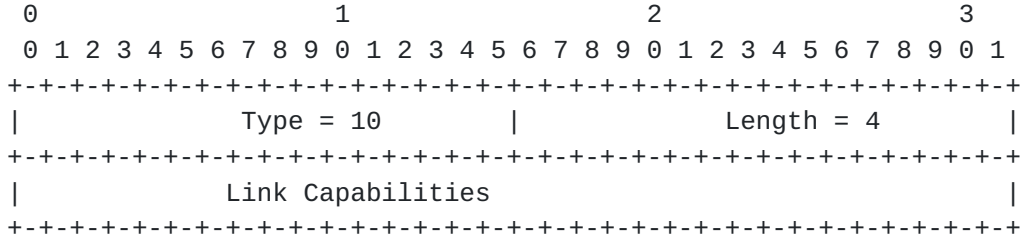
The Link Capabilities sub-TLV is defined and three bits are identified to support the signaling required by [U-TURN].

2. Link Capabilities sub-TLV

A new "Link Capabilities" sub-TLV is defined here to be carried in the "Link" TLV which uses the TE LSA [RFC3630]. The Link Capabilities field contains 32 flags, each indicating a different link capability. The following flags are defined:

Bit	Capability
0-1	Reserved
2	Link excluded from local protection path
3-4	Reserved
5	Explicit Marked U-Turn Recipient Capable
6	Implicit U-Turn Recipient Capable
7-31	Future assignments

Following is the format for Link-ID sub TLV:



3. Interpretation for U-turn Alternates for IP Fast-Reroute

The OSPFv2 extensions described in this document define three bits which are relevant for determining the capabilities of a link in reference to U-turn Alternates for IP/LDP Fast-Reroute.

If a link is advertised as "link excluded from local protection path", then the router's neighbors are informed that the router considers whether that link cannot be used as an alternate next-hop. For other applications, such as RSVP-TE FRR [RFC4090], this means the link SHOULD not be included in any computation of a repair path by any other router in the routing area.

If a router's link is advertised as Implicit U-turn Recipient capable, then the advertising router can apply the implicit U-turn packet identification method[U-TURN] to identify packets as U-turn packets and redirect those U-turn packets towards an appropriate alternate next-hop, if such is available. A neighbor, which wishes to use this link as a U-turn alternate next-hop, should not mark traffic sent on the link into a U-turn alternate.

If a router's link is advertised as Explicit Marked U-turn Recipient capable, then the advertising router can apply the explicitly marked U-turn packet identification method[U-TURN] to identify packets as U-turn packets and redirect those U-turn packets towards an appropriate alternate next-hop, if such is available. A neighbor, which wishes to use this link as a U-turn alternate next-hop, should mark traffic sent on the link into a U-turn alternate.

4. IANA Considerations

A new sub-TLV in the Link TLV will need to be assigned by IANA; this is requested to be type 10, which is to be assigned via Standards Action [RFC3630]. The remaining bits in the Link Capabilities sub-TLV will need to be assigned by IANA.

5. Security Considerations

This document does not introduce any new security issues.

6. References

[RFC3630] Katz, D., Kompella, K., and D. Yeung, "Traffic Engineering (TE) Extensions to OSPF Version 2", RFC 3630, September 2003.

[RFC4090] Pan, P., Swallow, G., and A. Atlas, "Fast Reroute Extensions to RSVP-TE for LSP Tunnels", RFC 4090, May 2005.

[U-TURN] Atlas, A., Ed., "U-turn Alternates for IP/LDP Fast-Reroute", draft-atlas-ip-local-protect-uturn-03.txt (work in progress), February 2006.

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