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:

<table>
<thead>
<tr>
<th>Bit</th>
<th>Capability</th>
</tr>
</thead>
<tbody>
<tr>
<td>0-3</td>
<td>Reserved</td>
</tr>
<tr>
<td>4</td>
<td>Eligible Alternate</td>
</tr>
<tr>
<td>5</td>
<td>Explicit Marked U-Turn Recipient Capability</td>
</tr>
<tr>
<td>6</td>
<td>Implicit U-Turn Recipient Capability</td>
</tr>
<tr>
<td>7-31</td>
<td>Future assignments</td>
</tr>
</tbody>
</table>

Following is the format for Link-ID sub TLV:

```
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
+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+
|              Type = 10                  |             Length = 4                  |
+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+
|                           Link Capabilities                                    |
+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+
```
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 with a capability of "Eligible Alternate", then the router’s neighbors are informed that the router considers whether that link can be used as an alternate next-hop.

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

[FRAMEWORK]
Shand, M., "IP Fast Reroute Framework",

[IPFRR]
Internet-Draft  draft-atlas-ip-local-protect-uturn-01  October 2004


Editor's Address

Alia K. Atlas (editor)
Avici Systems, Inc.
101 Billerica Avenue
N. Billerica, MA 01862
USA

Phone: +1 978 964 2070
EMail: aatlas@avici.com

Contributing Authors' Addresses

Raveendra Torvi
Avici Systems
101 Billerica Avenue
N. Billerica, MA 01862
USA

Phone: +1 978 964 2026
EMail: rtorvi@avici.com

Gagan Choudhury
AT&T
Room D5-3C21
200 Laurel Avenue
Middletown, NJ 07748
USA

EMail: gchoudhury@att.com
Phone: +1 732 420-3721

Christian Martin
Verizon
1880 Campus Commons Drive
Reston, VA 20191

Atlas                    Expires April 24, 2005                 [Page 5]
EMail: cmartin@verizon.com

Brent Imhoff
LightCore
14567 North Outer Forty Rd.
Chesterfield, MO 63017
USA

EMail: brent@lightcore.net
Phone: +1 314 880 1851

Don Fedyk
Nortel Networks
600 Technology Park
Billerica, MA 01821

EMail: dwfedyk@nortelnetworks.com
Phone: +1 978 288 3041
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