

Internet Draft
Expires: August 2004

Alia Atlas (Avici Systems)
Raveendra Torvi (Avici Systems)
Gagan Choudhury (AT&T)
Christian Martin (Verizon)
Brent Imhoff (Wiltel)
Don Fedyk (Nortel)

OSPFv2 Extensions for Link Capabilities and IP/LDP Local Protection

[draft-atlas-ospf-local-protect-cap-00.txt](#)

Status of this Memo

This document is an Internet-Draft and is in full conformance with all provisions of [Section 10 of RFC2026](#).

Internet-Drafts are working documents of the Internet Engineering Task Force (IETF), its areas, and its working groups. Note that other groups may also distribute working documents as Internet-Drafts.

Internet-Drafts are draft documents valid for a maximum of six months and may be updated, replaced, or obsoleted by other documents at any time. It is inappropriate to use Internet-Drafts as reference material or to cite them other than as ``work in progress.''

The list of current Internet-Drafts can be accessed at <http://www.ietf.org/ietf/lid-abstracts.txt>

The list of Internet-Draft Shadow Directories can be accessed at <http://www.ietf.org/shadow.html>.

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 IP Local Protection [IP-LOCAL-PROTECT], this document defines two bits in the proposed link capabilities extension. Additionally, this document reserves a bit in the Router Capabilities TLV defined in [[OSPF-RTR-CAP](#)].

This document specifies additional information that can be inserted in

Internet Draft

August 2004

OSPF LSAs to convey link capabilities that may be useful in certain applications. In particular, a router may indicate that zero or more of its links may be used by an upstream router as an alternate, SPT-disjoint path to an arbitrary destination D. Additionally, a router may convey that zero or more of its links are capable of breaking a U-turn, which may be described as a single-hop forwarding loop between two router's. This means that a router can detect the presence of a forwarding loop by recognizing that traffic to a destination is being received from a neighbor to which it has forwarding state pointing back to the same neighbor for that destination. In such a situation, it will switch to a loop-free node-protecting alternate until new primary forwarding state has been installed, thus breaking the U-turn. Therefore, the immediate applicability for these two link capabilities is in support of local protection in the event of a link and/or node failure while the OSPF area is reconverging onto a new topology.

Contents

1	Introduction	2
2	Link Capabilities sub-TLV	2
3	IP/LDP Local Protect Router Capability	3
4	Interpretation for IP/LDP Local Protection	3
5	IANA Considerations	4
6	Security Considerations	4
7	Full Copyright Statement	4
8	References	5
9	Authors Information	5

[1](#). Introduction

The motivations for an extension to OSPF version 2 to allow advertising link capabilities is to both allow the signaling required by [[IP-LOCAL-PROTECT](#)] and to provide for future extensibility.

[RFC 3630] 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

This document reserves bit 10, which is currently unassigned [OSPF-RTR-CAP], to indicate the capability for IP/LDP Local Protection [[IP-LOCAL-PROTECT](#)], with an interpretation as described in [Section 4](#).

4. Interpretation for IP/LDP Local Protection

The OSPFv2 extensions described in this document define three bits which are relevant for determining the capabilities of a link in reference to IP/LDP Local Protection. The Link Capabilities advertised in the TE LSA and the Router Capabilities in "Router Information" LSA are independent, i.e. a router may send Link

Atlas et al.

[Page 3]

Internet Draft

August 2004

Capabilities without including Router Capabilities and vice versa.

They are to be interpreted as follows:

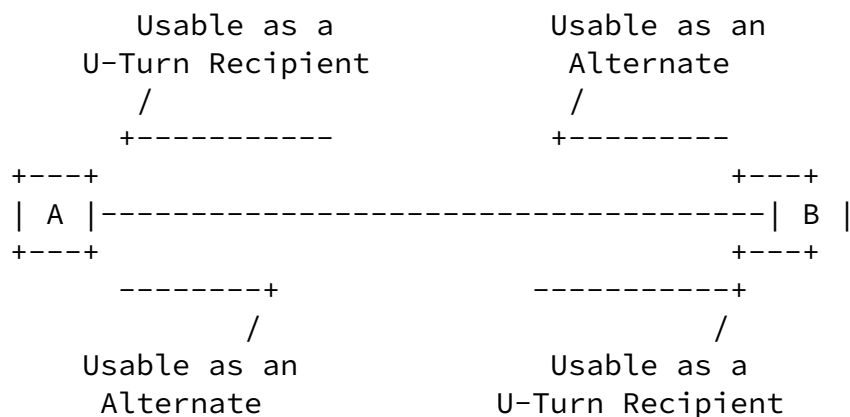
IP/LDP Local Protect Router Capability	Eligible Alternate Link Capability	Usable as Alternate?
0 or Not Present	0 or Not Present	NO
0 or Not Present	1	YES
1	0 or Not Present	NO
1	1	YES

If a link is usable as an alternate, then the router's neighbors can assume that the router will have considered that link as an alternate next-hop.

IP/LDP Local Protect Router Capability	Eligible U-Turn Recipient Link Capability	Usable as U-Turn Recipient?
0 or Not Present	0 or Not Present	NO

0 or Not Present	1	YES
+-----+		+-----+
1	0 or Not Present	NO
+-----+		+-----+
1	1	YES
+-----+		+-----+

If a router's link is usable as a U-Turn recipient, then the router can determine if traffic received on that link is from the router's primary neighbor for that traffic and, if so, redirect it to the router's alternate next-hop. If a router's link is usable as a U-Turn recipient, then the router's neighbor can use select for an alternate a U-Turn alternate which goes across that link to that router. The following picture may clarify this. If B indicates that it can be a U-Turn Recipient on the link from A to B, then if A can use the link from A to B as an alternate, A can use the link as a U-Turn alternate, if appropriate.



5. 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 [[RFC 3630](#)].

A new bit in the Capabilities field specified in the OSPF Router Capabilities TLV will need to be assigned; this is requested to be bit 10.

The remaining bits in the Link Capabilities sub-TLV will need to be assigned by IANA.

6. Security Considerations

This document does not introduce any new security issues.

7. Full Copyright Statement

Copyright (C) The Internet Society (2004). All Rights Reserved.

This document and translations of it may be copied and furnished to others, and derivative works that comment on or otherwise explain it or assist in its implementation may be prepared, copied, published and distributed, in whole or in part, without restriction of any kind, provided that the above copyright notice and this paragraph are included on all such copies and derivative works. However, this document itself may not be modified in any way, such as by removing the copyright notice or references to the Internet Society or other Internet organizations, except as needed for the purpose of developing Internet standards in which case the procedures for copyrights defined in the Internet Standards process must be followed, or as required to translate it into languages other than English.

Atlas et al.

[Page 5]

Internet Draft

August 2004

The limited permissions granted above are perpetual and will not be revoked by the Internet Society or its successors or assigns.

This document and the information contained herein is provided on an "AS IS" basis and THE INTERNET SOCIETY AND THE INTERNET ENGINEERING TASK FORCE DISCLAIMS ALL WARRANTIES, EXPRESS OR IMPLIED, INCLUDING BUT NOT LIMITED TO ANY WARRANTY THAT THE USE OF THE INFORMATION HEREIN WILL NOT INFRINGE ANY RIGHTS OR ANY IMPLIED WARRANTIES OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE.

8. References

[IP-LOCAL-PROTECT] A. Atlas, R. Torvi, G. Choudhury, C. Martin, B. Imhoff, and D. Fedyk, "IP/LDP Local Protection", [draft-atlas-ip-local-protection-00.txt](#), February 2004, work-in-progress

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

[OSPF-RTR-CAP] A. Lindem, N. Shen, R. Aggarwal, S. Shaffer, JP Vasseur, "Extensions to OSPF for Advertising Optional Router Capabilities", [draft-ietf-ospf-cap-01.txt](#), April 2004, work-in-progress

[RFC3137] Retana, A., Nguyen, L., White, R., Zinin, A., and McPherson, D., "OSPF Stub Router Advertisement", [RFC 3137](#), June 2001

9. Authors Information

Alia Atlas
Avici Systems
101 Billerica Avenue
N. Billerica, MA 01862
USA
email: aatlas@avici.com
phone: +1 978 964 2070

Raveendra Torvi
Avici Systems
101 Billerica Avenue
N. Billerica, MA 01862
USA
email: rtorvi@avici.com
phone: +1 978 964 2026

Gagan Choudhury
AT&T
Room D5-3C21

Atlas et al.

[Page 6]

Internet Draft

August 2004

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
email: cmartin@verizon.com

Brent Imhoff
WilTel Communications
3180 Rider Trail South
Bridgeton, MO 63045
USA
email: brent.imhoff@wcg.com
phone: +1 314 595 6853

Don Fedyk
Nortel Networks
600 Technology Park
Billerica, MA 01450
email: dwfedyk@nortelnetworks.com
phone: +1 978 288 3041