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OSPF Extensions to Advertise Seamless Bidirectional Forwarding Detection (S-BFD) Target Discriminators

Abstract

This document defines a new OSPF Router Information (RI) TLV that allows OSPF routers to flood the Seamless Bidirectional Forwarding Detection (S-BFD) Discriminator values associated with a target network identifier. This mechanism is applicable to both OSPFv2 and OSPFv3.

Status of This Memo

This is an Internet Standards Track document.

This document is a product of the Internet Engineering Task Force (IETF). It represents the consensus of the IETF community. It has received public review and has been approved for publication by the Internet Engineering Steering Group (IESG). Further information on Internet Standards is available in Section 2 of RFC 7841.

Information about the current status of this document, any errata, and how to provide feedback on it may be obtained at http://www.rfc-editor.org/info/rfc7884.

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1. Introduction

Seamless Bidirectional Forwarding Detection (S-BFD), specified in [RFC7880], is a simplified mechanism for using BFD with many negotiations eliminated. This is achieved by using 4-octet discriminators, unique within an administrative domain, to identify the network targets. These S-BFD Discriminators can be advertised by the IGPs, and this document concerns itself with OSPF. Specifically, this document defines a new TLV (named the S-BFD Discriminator TLV) to be carried within the OSPF Router Information (RI) Link State Advertisement (LSA) [RFC7770].

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].

1.1. Relationship between OSPF and S-BFD

This document implicitly defines a relationship between OSPF and S-BFD. S-BFD assigns one or more discriminators to each S-BFD reflector node. OSPF, in turn, learns about these from S-BFD and floods them in the newly defined TLV. After this information is flooded, it is stored in all the OSPF nodes such that S-BFD initiators can map out target nodes to target discriminators and can therefore construct the S-BFD probe.

When multiple S-BFD Discriminators are advertised, how a given discriminator is mapped to a specific use case is out of scope for this document.

2. Implementation

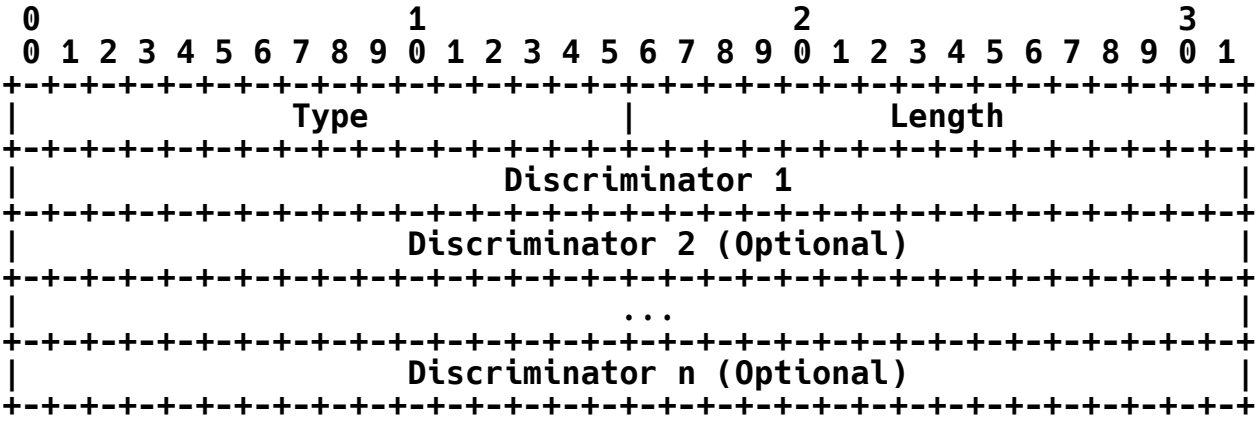
This extension makes use of the Router Information (RI) Opaque LSA, defined in [RFC7770], for both OSPFv2 [RFC2328] and OSPFv3 [RFC5340] by defining a new OSPF Router Information (RI) TLV: the S-BFD Discriminator TLV.

The S-BFD Discriminator TLV is OPTIONAL. Upon receipt of the TLV, a router may decide to install the S-BFD Discriminator in the BFD target identifier table.

In the presence of multiple instances of the OSPFv2/OSPFv3 Router Information LSA, the S-BFD Discriminators for an OSPF router are the union of all discriminators advertised in all instances of the S-BFD Discriminator TLV (see Section 2.1) in all advertised non-MaxAge OSPF Router Information LSAs.

2.1. S-BFD Discriminator TLV

The format of the S-BFD Discriminator TLV is as follows:



Type - S-BFD Discriminator TLV Type (11)

Length - This field represents the total length of the discriminator(s) that appears in the Value field, in octets. Each discriminator is 4 octets, so the Length is four times the number of discriminators included in the TLV. There is no optional padding for this field.

Discriminator(s) - The Value field of the TLV includes the S-BFD network target Discriminator value or values.

Routers that do not recognize the S-BFD Discriminator TLV Type will ignore the TLV [RFC7770] and therefore will not learn S-BFD Discriminators via OSPF.

2.2. Flooding Scope

The S-BFD Discriminator TLV is advertised within OSPFv2 Router Information LSAs (Opaque type of 4 and Opaque ID of 0) or OSPFv3 Router Information LSAs (function code of 12), which are defined in [RFC7770]. As such, elements of this procedure are inherited from those defined in [RFC7770].

The flooding scope is controlled by the Opaque LSA type (as defined in [RFC5250]) in OSPFv2 and by the S1/S2 bits (as defined in [RFC5340]) in OSPFv3. If the flooding scope is area local, then the S-BFD Discriminator TLV MUST be carried within an OSPFv2 type 10 Router Information LSA or an OSPFV3 Router Information LSA with the S1 bit set and the S2 bit clear. If the flooding scope is the entire

IGP domain, then the S-BFD Discriminator TLV MUST be carried within an OSPFv2 type 11 Router Information LSA or OSPFv3 Router Information LSA with the S1 bit clear and the S2 bit set.

When the S-BFD reflector is deactivated, the OSPF speaker advertising a particular S-BFD Discriminator MUST originate a new Router Information LSA that no longer includes the corresponding S-BFD Discriminator TLV, provided there are other TLVs in the LSA. If there are no other TLVs in the LSA, it MUST either send an empty Router Information LSA or purge it by prematurely aging it.

For intra-area reachability, the S-BFD Discriminator TLV information regarding a specific target identifier is only considered current and usable when the router advertising that information is itself reachable via OSPF calculated paths in the same area of the LSA in which the S-BFD Discriminator TLV appears. In the case of domain-wide flooding, i.e., where the originator is sitting in a remote area, the mechanism described in Section 5 of [RFC5250] should be used.

Although the S-BFD Discriminators may change when enabling the S-BFD functionality or via an explicit configuration event, such changes are expected to occur very rarely. Such changes in information will require that the S-BFD Discriminator TLV in OSPF be advertised.

A change in information in the S-BFD Discriminator TLV MUST NOT trigger any SPF computations at a receiving router.

3. Backward Compatibility

The S-BFD Discriminator TLV defined in this document does not introduce any interoperability issues.

A router not supporting the S-BFD Discriminator TLV will just silently ignore the TLV, as specified in [RFC7770].

4. Security Considerations

This document defines OSPF extensions to distribute the S-BFD Discriminator within an administrative domain. Hence, the security of S-BFD Discriminator distribution relies on the security of OSPF.

OSPF provides no encryption mechanism for protecting the privacy of LSAs and, in particular, the privacy of the S-BFD Discriminator advertisement information. However, this is not a concern, as there isn't any need to hide the Discriminator value that can be used to reach the reflectors.

5. IANA Considerations

IANA has defined a registry for TLVs carried in the Router Information LSA defined in [RFC7770]. IANA has assigned a new TLV codepoint (11) for the S-BFD Discriminator TLV in the "OSPF Router Information (RI) TLVs" registry.

Value	TLV Name	Reference
11	S-BFD Discriminator	RFC 7884

6. References

6.1. Normative References

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