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Interface Index Capability for BGP
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Abstract

In some scenarios using unnumbered links, it is necessary for the BGP protocol to advertise the link's Interface Index and obtain the peer's Remote Interface Identifier.

This document defines a new BGP capability [RFC 5492] for advertising local interface indexes and obtaining neighbor interface indexes.

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1. Introduction

Here are several issues that arise when using unnumbered links due to BGP's lack of support for interface index.

Scenario 1: BGP-LS-SPF

BGP-LS-SPF (RFC 9815) is a solution that leverages both the BGP protocol [RFC4271] and the BGP-LS extension [RFC9552]. In the BGP SPF routing domain, BGP Routers collect network-wide topology information through the BGP-LS-SPF protocol and perform cross-domain path calculation to compute routes using the SPF algorithm. This approach aims to achieve intelligent traffic engineering and automated routing optimization in large-scale data center or carrier networks.

When an IGP protocol advertises an unnumbered link, it uses the local interface index and the remote interface index to distinguish between different unnumbered links.

BGP-LS-SPF reuses the BGP-LS information from the IGP. However, during the deployment of BGP-LS-SPF, if the remote interface index is unknown, it may lead to path calculation errors.

Scenario 2: BGP Egress Peer Engineering(EPE)

When deploying EPE, the BGP-LS peer link information in EPE is defined as follows (see Section 5.2 of RFC 9086):

Link Descriptors MUST include the following TLV, as defined in [RFC7752]:

- o Link Local/Remote Identifiers (TLV 258) contains the 4-octet Link Local Identifier followed by the 4-octet Link Remote Identifier. The value 0 is used by default when the link remote identifier is unknown

Currently, BGP has no mechanism to obtain the peer's Link Remote Identifier.

Scenario 3: BGP neighbor monitoring

During neighbor monitoring, if displaying bidirectional neighbor connectivity, without the Link Remote Identifier, the corresponding neighbor relationships on both sides cannot be matched.

Therefore, fundamentally, in unnumbered BGP scenarios, BGP peer information should include: local router-id, peer address, peer AS number, local interface index, and remote interface index.

This document defines a new BGP capability [RFC 5492] for advertising support of the interface index capability, thereby advertising local interface indexes and obtaining neighbor interface indexes.

2. Requirements Language

The key words "MUST", "MUST NOT", "REQUIRED", "SHALL", "SHALL NOT", "SHOULD", "SHOULD NOT", "RECOMMENDED", "NOT RECOMMENDED", "MAY", and "OPTIONAL" in this document are to be interpreted as described in BCP 14 RFC 2119 [RFC2119] RFC 8174 [RFC8174] when, and only when, they appear in all capitals, as shown here.

3. Terminology

The following terminology is used in this document.

- o BGP: Border Gateway Protocol
- o EPE: Egress Peer Engineering
- o BGP-LS-SPF: BGP Link State Shortest Path First Routing

4. Interface Index Capability

In the BGP protocol, the OPEN message carries the newly added Interface Index Capability TLV to exchange interface index information with neighbors.

When sending an OPEN message, the Interface Index Capability is included to advertise the Interface Index of the interface used to establish the neighbor relationship.

When receiving an OPEN message, if it contains the Interface Index Capability, the peer's Remote Interface Index is saved. If the Interface Index Capability is not carried, save the Remote Interface Index as 0.

The format of the Interface Index Capability is shown in Figure 1.

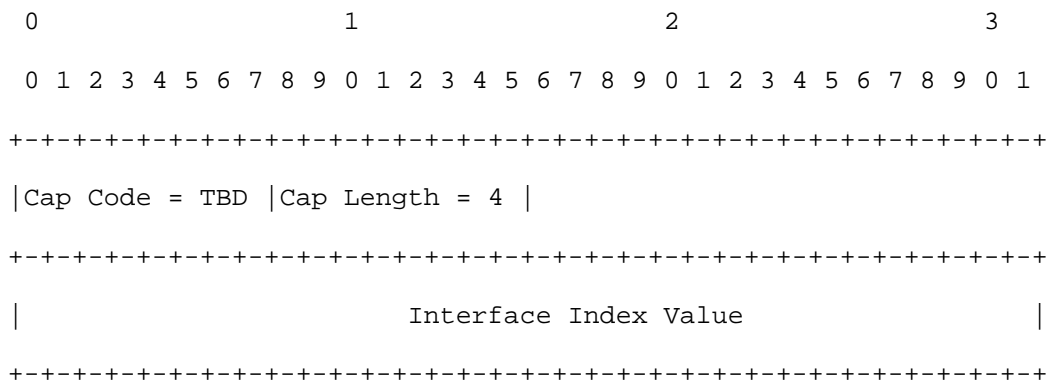


Figure 1: Interface Index Capability

5. IANA Considerations

A new BGP Capability named "Interface Index Capability" will be requested from the "Capability Codes" registry within the "IETF Review" range [RFC5492].

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Code Point	Description	Reference			

+-----+-----+-----+		
TBD	Interface Index Capability	This document
+-----+-----+-----+		

6. Security Considerations

TBD

7. Informative References

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