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The Application Specific Link Attribute (ASLA) Any Application Bit
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Abstract

RFC 8919 and RFC 8920 define Application Specific Link Attributes (ASLA). Each ASLA includes an Application Identifier Bit Mask. The Application Identifier Bit Mask includes a Standard Application Bit Mask (SABM) and a User Defined Application Bit Mask (UDABM). The SABM and UDABM determine which applications can use the ASLA as an input.

This document introduces a new bit to the Standard Application Identifier Bit Mask. This bit is called the Any Application Bit (i.e., the A-bit). If the A-bit is set, the link attribute can be used by any application. This includes currently defined applications as well as applications to be defined in the future.

Status of This Memo

This Internet-Draft is submitted in full conformance with the provisions of BCP 78 and BCP 79.

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This Internet-Draft will expire on January 12, 2023.

Table of Contents

1. Introduction

[RFC8919] and [RFC8920] define Application Specific Link Attributes (ASLA). Each ASLA includes an Application Identifier Bit Mask. The Application Identifier Bit Mask includes a Standard Application Bit Mask (SABM) and a User Defined Application Bit Mask (UDABM).

Each bit in the SABM represents a standard application while each bit in the UDABM represents a user defined application. If a bit in the SABM or UDABM is set, the corresponding application can use the ASLA as an input. If a bit in the SABM or UDABM is not set, the corresponding application cannot use the associated ASLA as an input.

According to [RFC8919]:

"If link attributes are advertised associated with zero-length Application Identifier Bit Masks for both standard applications and user-defined applications, then any standard application and/or any user-defined application is permitted to use that set of link

attributes so long as there is not another set of attributes advertised on that same link that is associated with a non-zero-length Application Identifier Bit Mask with a matching Application Identifier Bit set."

This restriction introduces complexity. For example, assume that a network runs many applications. All applications use Attribute 1 as an input. So, it would be convenient to advertise Attribute 1 with a zero-length SABM / UDABM.

However, Applications X and Y also use Attribute 2 as an input. Because Applications X and Y required unique values for Attribute 2, Attribute 2 cannot be advertised with a zero-length SABM. Therefore, Attribute 1 cannot be advertised with a zero-length SABM / UDABM either, because Applications X and Y require it. This would result in having to set the application X and application Y bits on attribute 1 in the entire network on each link and is operationally complex.

Zero length bitmasks also introduce LSP packing inefficiency. From the example above, The attribute 1 has to be repeated for applications X and Y although application X and Y do not require different values for these applications. When the attributes get advertised from IGP into BGP-LS, attributes from zero length bitmasks of ASLA and ASLA SRLG need to be collated to make it disambiguous. This collation introduces additional complexity.

When a deployment requires link-attributes to be used by all applications instead of using the zero-length bitmasks one could use an ASLA advertisements with all known application bits set. While this may work well for the current deployments for the current set of defined applications, it poses challenge when there are new applications to be deployed. It would require all nodes in the network to support the new bit and require upgrade.

This document reduces operational complexity by introducing a new bit to the Standard Application Identifier Bit Mask. This bit is called the Any Application Bit (i.e., the A-bit). If the A-bit is set, the link attribute can be used by any application. This includes currently defined applications as well as applications to be defined in the future.

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 [RFC2119] [RFC8174] when, and only when, they appear in all capitals, as shown here.

3. The Any Application Bit

A new bit is defined in the Standard Application Identifier Bit Mask. This bit is called the Any Application Bit (i.e., the A-bit). If the A-bit is set, the link attribute can be used by any application. This includes currently defined applications as well as applications to be defined in the future.

If a link advertises an ASLA twice, once with the A-bit set and once with a more specific Application Identifier Bit set, the indicated application MUST use the value from the ASLA with the more specific Application Indicator Bit set.

3.1. IS-IS

IS-IS uses Bit 4 of the SABM to encode the A-bit.

3.2. OSPF

OSPF uses Bit 4 of the SABM to encode the A-bit.

4. Backward Compatibility

The solution described in this document is backward compatible with [RFC8919] and [RFC8920]. An implementation that does not recognize the A-bit will process the SABM as specified in [RFC8919] and [RFC8920].

Implementations MAY advertise attributes under both A bit and with SABM and UDABM length set to zero for backward compatibility reasons. When same attributes are received with A bit set as well as in ASLA with SABM and UDABM set to zero, the attributes MUST be used from the ASLA with SABM and UDABM set to zero and procedures described in RFC 8919 sec 6.2 MUST be followed.

5. Security Considerations

The security considerations discussed in [RFC8919] and [RFC8920] are applicable to this document. This document does not introduce any new security risks.

6. IANA Considerations

This document requests that IANA add the following entry to the registry titled "Link Attribute Application Identifiers" under the "Interior Gateway Protocol (IGP) Parameters" registry:

- Bit: 4
- Name: Any Application (A-bit)
- Reference: This document

7. Acknowledgements

TBD

8. Normative References

[RFC2119] Bradner, S., "Key words for use in RFCs to Indicate Requirement Levels", BCP 14, RFC 2119, DOI 10.17487/RFC2119, March 1997, <https://www.rfc-editor.org/info/rfc2119>.

[RFC8174] Leiba, B., "Ambiguity of Uppercase vs Lowercase in RFC 2119 Key Words", BCP 14, RFC 8174, DOI 10.17487/RFC8174, May 2017, <https://www.rfc-editor.org/info/rfc8174>.

[RFC8919] Ginsberg, L., Psenak, P., Previdi, S., Henderickx, W., and J. Drake, "IS-IS Application-Specific Link Attributes", RFC 8919, DOI 10.17487/RFC8919, October 2020, <https://www.rfc-editor.org/info/rfc8919>.

[RFC8920] Psenak, P., Ed., Ginsberg, L., Henderickx, W., Tantsura, J., and J. Drake, "OSPF Application-Specific Link Attributes", RFC 8920, DOI 10.17487/RFC8920, October 2020, <https://www.rfc-editor.org/info/rfc8920>.

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