BGP Extensions for IPv6 Compressed Routing Header (CRH)
draft-alston-spring-crh-bgp-signalling-01

Abstract

This document describes a new BGP extension for signalling the mapping between Segment Identifiers (SID’s), as used by a SRv6+ Compressed Routing Header (CRH) and the IPv6 Addresses they represent. The extension defines both a new optional BGP attribute to signal the Maximum SID Value (MSV) and a new Sub-Address Family (SAFI) of the IPv6 Address family.

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1. Overview

The SRv6+ Compressed Routing Header uses an ordered sequence of segment identifiers (SID) to specify the end to end path a packet should follow through the network. This allows for much smaller header sizes than found in the SRH (Segment Routing Header), which utilizes an ordered sequence of 128 bit IPv6 address to achieve the same goal. In addition, this method prevents the overloading of the IPv6 address space.

This results in the need to signal the mapping between the SIDs used in the CRH and the IPv6 addresses they represent. While such signalling can be achieved through IGP extensions [I-D.bonica-lsr-crh-isis-extensions] in a single network domain, circumstances may dictate that the SID to address mapping be signaled both to systems that do not partake in the IGP used within that network domain, and between autonomous systems.

It is envisaged that such signalling will be required to signal, among other things, deep packet inspection systems and flow analysis systems that need the ability to see the full path a packet is traversing, while at the same time not necessarily partaking in the IGP which would normally be used for such signalling. This also allows signalling of SID to Address mapping in environments that do not run an IGP capable of such signalling.
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. SID Signalling

3.1. NLRI Format

The format of the NLRI contained within the MP Reach Attribute is comprised of a 16 bit Length (2 octets) field, followed by a series of 20 octet tuples. The length of the first element of each tuple MUST be 4 octets in length and represents the 32 bit SID. The second element of the tuple is an IPv6 address and MUST be 16 octets in length. The length of the NLRI can be calculated as (20)*N where N is the number of tuples contained within the NLRI.

```
0 1 2 3 4 5 6 7
+-------------+
|  NLRI Length |
|              |  2 octets |
+-------------+

+-------------+
|      SID 1   |
|  (4 octets) |
+-------------+

+-------------+
| IPv6 Address 1|
|  (16 octets) |
+-------------+

+-------------+
|      SID N   |
|  (4 octets) |
+-------------+

+-------------+
| IPv6 Address N|
|  (16 octets) |
+-------------+
```
4. IANA Considerations

This document defines new Sub-TLVs in the following existing registry:

- Subsequent Address Family Identifiers (SAFI) Parameters

4.1. Subsequent Address Family Identifiers (SAFI) Parameters

A new SAFI in the IANA registry for "Subsequent Address Family Identifiers (SAFI) Parameters" will be required:

<table>
<thead>
<tr>
<th>Codepoint</th>
<th>Description</th>
<th>Reference</th>
</tr>
</thead>
<tbody>
<tr>
<td>TBD</td>
<td>SRv6+ CRH Signalling SAFI</td>
<td>This document</td>
</tr>
</tbody>
</table>

5. Security Considerations

SRv6+ CRH BGP Signalling is envisioned to be run within a trusted domain.

Further aspects of security are TBD.

6. Acknowledgements

The authors wish to acknowledge Ben Roberts for his support.

7. References

7.1. Normative References

[I-D.bonica-6man-comp-rtg hdr]

[I-D.bonica-lsr-crh-isis-extensions]

7.2. Informative References


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