Abstract

This document describes a BGP-based method to communicate source IP reverse-path reachability for sources of multicast IP traffic which is available via AMT (RFC 7450). This document defines a new SAFI (Subsequent Address Family Identifier) Parameter type for MBGP which declares the next hop for RPF (Reverse Path Forwarding) of a source IP to be the AMT tunnel discovered via an explicitly provided anycast IP address for AMT Relay Discovery.

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1. Introduction

AMT [RFC7450] provides a way to forward multicast traffic from an AMT relay in a multicast-capable domain to an AMT gateway in a different multicast-capable domain over a unicast-only network.

AMT also defines a well-known anycast address for relay discovery. However, a relay needs to have multicast connectivity sufficient to receive traffic from a source in order to forward traffic from that source. In some cases, multicast traffic sources may not have multicast connectivity to a relay which can be discovered by a gateway using the well-known address. This issue is described in more detail in [I-D.ietf-mboned-interdomain-peering-bcp], sections 3.3, 3.4, and 3.5.

A service provider may provide multicast traffic and also provide AMT relays that can receive their multicast traffic and forward it to AMT gateways, but the AMT gateways in receiving networks need a way to discover an appropriate AMT relay for the sources of IP multicast channels with subscribers in that network.

This document defines such a mechanism by using BGP with Multiprotocol Extensions [RFC4760], with a new NLRI (Network Layer Reachability Information), described in Section 3.

Although it is also possible to provide multicast connectivity between domains via a GRE tunnel protected with IPSEC, and although a BGP connection between domains is likely to operate over such a tunnel, the service provider has more flexibility in load balancing and automated distribution of multicast traffic-forwarding responsibilities among different forwarders by using AMT instead of using the same GRE tunnel that communicates the routing information.
2. Terminology

AFI  Address Family Information, as defined in BGP

AMT  Automatic Multicast Tunneling [RFC7450]

BGP  Border Gateway Protocol [RFC4271]

MBGP  Border Gateway Protocol with Multiprotocol Extensions [RFC4760]

MRIB  Multicast Routing Information Base, as defined in PIM [RFC7761]

NLRI  Network Layer Reachability Information, as defined in MBGP

SAFI  Subsequent Address Family Information, as defined in MBGP

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].

3. Multicast Source Reachability

This document defines a new NLRI called the "Multicast Source over AMT" NLRI. The Multicast Source over AMT NLRI is carried in BGP [RFC4271] using BGP Multiprotocol Extensions [RFC4760] with an Address Family Identifier (AFI) of 1 or 2 and a Subsequent AFI (SAFI) of TBD1.

The following is the format of the Multicast Source over AMT NLRI:

```
+---------------------------------+
<table>
<thead>
<tr>
<th>Relay-AFI (2 octets)</th>
</tr>
</thead>
<tbody>
<tr>
<td>AMT Relay Discovery Address</td>
</tr>
<tr>
<td>---------------------------------</td>
</tr>
</tbody>
</table>
```

The value of the AFI field in the MP_REACH_NLRI/MP_UNREACH_NLRI attribute that carries the Multicast Source over AMT NLRI determines whether the source route is IPv4 or IPv6. The value of the Relay-AFI field in the Multicast Source over AMT NLRI indicates whether the Relay Discovery Address is IPv4 or IPv6. (AFI 1 indicates IPv4, AFI 2 indicates IPv6.)

The route for the source address MUST NOT be added to any unicast RIB (Routing Information Base) as a result of processing this NLRI. The
route SHOULD be added to MRIBs (Multicast Routing Information Bases) as appropriate according to the BGP peering configuration.

In order for two BGP speakers to exchange labeled Multicast Source over AMT NLRIs, they MUST use a BGP Capabilities Advertisement to ensure that they both are capable of properly processing such an NLRI. This is done as specified in [RFC4760] by using capability code 1 (multiprotocol BGP) with an AFI of 1 or 2 and a SAFI of TBD1.

4. IANA Considerations

IANA has assigned the SAFI Value TBD1 from the SAFI Value registry defined in Section 9 of RFC 4760 [RFC4760], to denote the new NLRI defined in Section 3 of this document.

[TO BE REMOVED: During experimental development, the private value 242 from that registry will be used in our implementation.]

This registration should take place at the following location: https://www.iana.org/assignments/safi-namespace/safi-namespace.xhtml

<table>
<thead>
<tr>
<th>Value</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>TBD1</td>
<td>Multicast Source over AMT</td>
</tr>
</tbody>
</table>

5. Security Considerations

The behavior defined in this document will cause an AMT Gateway to open new tunnels to IP addresses specified by an external AS. As such, this has the same security considerations as section 6.2 and section 6.3 of [RFC7450], in addition to the usual security implications of running the underlying BGP, as described in [RFC4271] and [RFC4272].

It is RECOMMENDED that implementations provide a configurable limit on the number of unique AMT Relay Discovery IPs.

6. References

6.1. Normative References

6.2. Informative References


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