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BGP Specific Route Refresh
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Abstract

In certain scenarios, a BGP router may not require its peer to update all routes within an address family, but rather only the specific routes it needs. For example, in an EVPN network, a router might only require updates for all MAC/IP Advertisement Routes or all IP Prefix Advertisement Routes, or even just a subset of IP Prefix routes.

This document presents a method for requesting the update of specific routes from a peer, thereby minimizing the impact of additional BGP updates.

Status of this Memo

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This Internet-Draft will expire on January 09, 2026.

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1. Introduction

[RFC2918] describes the method for BGP to request route updates via Refresh messages. When the ingress router's policy changes, it can send Refresh messages to its peers to re-update BGP routes and reapply policies, thereby avoiding the need to locally store all routes.

BGP Refresh messages update routes based on the address family + sub-address family. Upon receiving a BGP Refresh message, a peer will send Update messages to update all routes associated with the specified address family.

In certain scenarios, a BGP router may not require its peer to update all routes within an address family, but rather only the specific routes it needs. For example, in an EVPN network, a router might only require updates for all MAC/IP Advertisement Routes or

all IP Prefix Advertisement Routes, or even just a subset of IP Prefix routes.

This document presents a method for requesting the update of specific routes from a peer, thereby minimizing the impact of additional BGP updates.

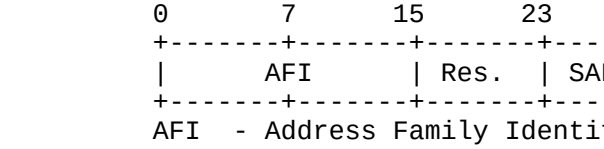
1.1. Requirements Language

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.

2. Specific Route-Refresh Message

RFC 2918 defines the Route-Refresh Message format.

Type: 5 - ROUTE-REFRESH
Message Format: One <AFI, SAFI> encoded as



AFI - Address Family Identifier (16 bit).
Res. - Reserved (8 bit) field.
SAFI - Subsequent Address Family Identifier (8 bit).

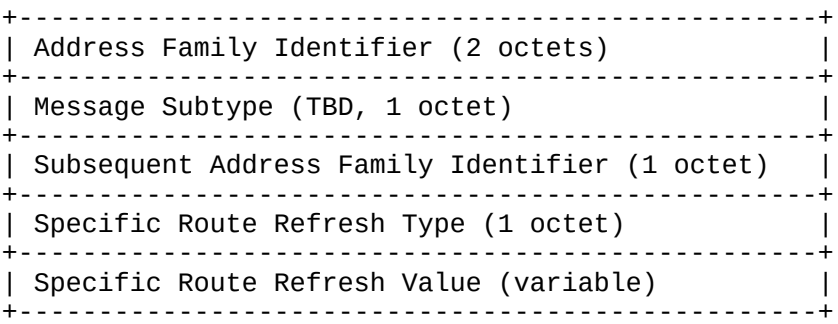
The "Reserved" field of the ROUTE-REFRESH message specified in [RFC2918] is redefined as the "Message Subtype" with the following values in [RFC7313]:

0 - Normal route refresh request [RFC2918] with/without Outbound Route Filtering (ORF) [RFC5291]
1 - Demarcation of the beginning of a route refresh (BoRR) operation
2 - Demarcation of the ending of a route refresh (EoRR) operation
255 - Reserved

This document defines a new message subtype for a Specific Route Refresh request.

TBD - Specific route refresh request.

At the end of the Specific Route Refresh message, the required Route to be refreshed is specified. The format is as follows:



This document defines the following values for the "Specific Route Refresh Type (SRRT)":

1 - Specific Route Type: Specify a particular route type for route refresh when the corresponding AFI/SAFI has multiple route types;

2 - Specific Route Prefix: Specify a particular route prefix for route refresh;

The "Specific Route Refresh Value (SRRV)" field is variable according to the "SRRT", the detailed description is as follows:

* "SRRT" = 1:

  The "SRRV" is a 1-octet route type of the corresponding AFI/SAFI, such as Ethernet VPN (EVPN) [RFC7432] and MCAST-VPN [RFC6514], which has multiple route types.

* "SRRT" = 2:

  The "SRRV" is a variable-octet BGP Network Layer Reachability Information (NLRI) of the corresponding AFI/SAFI, such as unicast NLRI [RFC4760] and EVPN NLRI [RFC7432].

3. Specific Route-Refresh Capability

In order to allow the dynamic exchange of the Specific route refresh request between BGP speakers and subsequent re-advertisement of the respective Adj-RIB-Out, this document defines a new BGP capability [RFC5492] termed ’Specific Route Refresh Capability’. The Specific Route Refresh Capability is defined as follows:

Capability code: TBD

Capability length: 0

By advertising the Specific Route Refresh Capability to a peer, a BGP can convey to the peer that the speaker has capability to receive and properly handle the Specific Route-Refresh message (as defined in Section 2) from the peer.

4. Operation

A BGP speaker that supports the message subtypes for the ROUTE-REFRESH message and the related procedures SHOULD advertise the "Specific Route Refresh Capability".

When the speaker needs to refresh specific route of BGP routes, it sends a Specific Route Refresh message, specifying <AFI, SAFI, SRRT, SRRV>.

In processing a ROUTE-REFRESH message from a peer, the BGP speaker MUST examine the "message subtype" field of the message and take the appropriate actions.

The message processing rules for ROUTE-REFRESH message with subtype of 0 are described in [RFC2918] and [RFC5291].

The message processing rules for ROUTE-REFRESH message with subtype of 1 and 2 are described in [RFC7313].

Upon receiving a subtype of specific route refresh request (TBD), the BGP speaker sends routes of the corresponding route type or prefix from its local routing table to its neighbor via an Update message.

5. Security Considerations

This extension to BGP does not change the underlying security issues.

6. IANA Considerations

This document defines a new subcode for the Specific Route Refresh Message. It should be registered with the IANA in a new registry, as follows:

Value	Code	Reference
0	Route-Refresh	[RFC2918], [RFC5291]

1	BoRR	[RFC7313]
2	EoRR	[RFC7313]
TBD	Specific Route-Refresh	This Document
3-254	Unassigned	
255	Reserved	[RFC7313]

This document also defines a new BGP Capability - the Specific Route Refresh Capability. This new Capability Code also should be assigned in the "Capability Codes" registry by the IANA.

7. References

7.1. 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/rfc/rfc2119>.

[RFC2918] E. Chen, Redback Networks, September 2000, "Route Refresh Capability for BGP-4", rfc2918.txt, DOI 10.17487/rfc2918.txt, September 2000, <https://www.rfc-editor.org/info/rfc2918.txt>.

[RFC4760] Bates, T., Chandra, R., Katz, D., and Y. Rekhter, "Multiprotocol Extensions for BGP-4", RFC 4760, DOI 10.17487/RFC4760, January 2007, <http://www.rfc-editor.org/info/rfc4760>.

[RFC5492] Scudder, J. and R. Chandra, "Capabilities Advertisement with BGP-4", RFC 5492, DOI 10.17487/RFC5492, February 2009, <https://www.rfc-editor.org/info/rfc5492>.

[RFC6514] Aggarwal, R., Rosen, E., Morin, T., and Y. Rekhter, "BGP Encodings and Procedures for Multicast in MPLS/BGP IP VPNs", RFC 6514, DOI 10.17487/RFC6514, February 2012, <https://www.rfc-editor.org/info/rfc6514>.

[RFC7313] K. Patel, E. Chen, Cisco Systems, B. Venkatachalapathy, "Enhanced Route Refresh Capability for BGP-4", rfc7313.txt, DOI 10.17487/rfc7313.txt, July 2014, <https://www.rfc-editor.org/info/rfc7313.txt>.

[RFC7432] Sajassi, A., Ed., Aggarwal, R., Bitar, N., Isaac, A., Uttaro, J., Drake, J., and W. Henderickx, "BGP MPLS-Based Ethernet VPN", RFC 7432, DOI 10.17487/RFC7432, February 2015, <https://www.rfc-editor.org/info/rfc7432>.

[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>.

7.2. Informational References

[RFC5291] Chen, E. and Y. Rekhter, "Outbound Route Filtering Capability for BGP-4", RFC 5291, August 2008.

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