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One-time Extended Community Based Outbound Route Filter for BGP-4
draft-dong-idr-one-time-ext-community-orf-01

Abstract

   This document defines a new Outbound Router Filter (ORF) type for
   BGP, termed "One-time Extended Community Outbound Route Filter",
   which would allow a BGP speaker to send to its BGP peer a route
   refresh request with a set of extended-community-based filters to
   make the peer re-advertise only the specific routes matching the
   filters to the speaker. This ORF-type enables a BGP speaker to
   refresh some specific routes without requiring its peer to re-
   advertise the whole Adj-RIB-Out, which makes the route refresh
   operation more efficient and reduces the impact on network stability.
   This filter does not change the outbound route filters on BGP peers
   and should only be used for one-time filtering.

Requirements Language

   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].

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, 2012.

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1. Introduction

   The Outbound Route Filtering Capability defined in [RFC5291] provides
   a mechanism for a BGP speaker to send to its BGP peer a set of
   Outbound Route Filters (ORFs) that can be used by its peer to filter
   its outbound routing updates to the speaker.

   During some network operations, a BGP speaker only needs to retrieve
   some routes with specific extended communities from its peer, but
   sending plain ROUTE-REFRESH will lead to the peer re-advertising its
   whole Adj-RIB-Out. Such a large amount of updates includes a lot of
   unnecessary routes which would result in waste of processing
   resources and bandwidth. With the increase of IPv6 deployment, this
   problem could be more significant. Even configured with the ORF
   mechanism as defined in [RFC5291], on receipt of a ROUTE-REFRESH
   message, the peer will re-advertise all the routes matching the
   current outbound route filters, i.e., the whole Adj-Rib-Out for this
   BGP speaker. Since in this case the BGP speaker does not want to
   change the outbound route filters on its peer, this requirement
   cannot be met by the current ORF mechanism.

   This document defines a new Outbound Router Filter (ORF) type for
   BGP, termed "One-time Extended Community Outbound Route Filter",
   which would allow a BGP speaker to send to its BGP peer a route
   refresh request with a set of Extended Community based filters to
   make the peer re-advertise only the specific routes matching the
   filters to the speaker. This ORF-type enables a BGP speaker to
   retrieve routes with specific Extended Communities without requiring
   its peer to re-advertise the whole Adj-RIB-Out, which makes such
   route refresh operation more efficient and also reduces the impact on
   network stability. This filter does not change the outbound route
   filters on BGP peers and should only be used for one-time filtering.

   One use case of one-time Extended Community ORF would be to refresh
   routes with specific Route Target (RT) Extended Community. For
   example, on receipt of routes with specific RTs, according to local
   policies some attributes of the routes may be changed, or some routes
   may be discarded. When later such local policies are changed or
   removed, the routes impacted by such policies need to be refreshed
   and processed according to the new local policies. With the whole
   Adj-RIB-Out route refresh it would result in a lot of unnecessary
   routes being re-advertised, and this would be a waste of the
   processing resource and bandwidth. In this case, one-time Extended
   Community ORF would be quite useful to request only routes matching
   specific RTs to be re-advertised.

   Another use case is network maintenance or verification. During
   maintenance, it may be revealed that some routes may be incorrect. A

refresh of a small segment of the routing table can help to correct
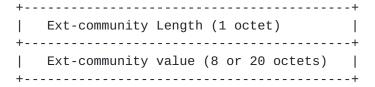those routes without requiring a refresh of the total routing table.

2. One-time Extended Community ORF-Type

This document defines a new ORF type: One-time Extended Community
ORF. Value of this ORF-Type is to be assigned by IANA.

In the following description, the sending speaker sends a one-time-
ORF request and the receiving speaker receives it and sends back the
routes to satisfy the request.

As specified in the [RFC5291], an ORF entry is a tuple of the form
<AFI/SAFI, ORF-Type, Action, Match, ORF-value>. An ORF consists of
one or more ORF entries that have a common AFI/SAFI and ORF-Type. An
ORF is identified by <AFI/SAFI, ORF-Type>.

The ORF entry consists of a single Extended Community, encoded as
either 8 octets [RFC4360], or 20 octets [RFC5701]. The encoding of
the type-specific part is as below:

```
            +------------------------------------------+
            |    Ext-community Length (1 octet)         |
            +------------------------------------------+
            |    Ext-community value (8 or 20 octets)   |
            +------------------------------------------+
```

The "Ext-community Length" field contains length in octets of the
extended community in the "Ext-community value" field.

Since the semantics of this new ORF-Type is "one-time filtering" and
has no impact on existing ORFs, the Action field is irrelevant and
MUST be ignored on receipt.

The MATCH field of the One-time Extended Community ORF SHOULD be set
to PERMIT on the sender and SHOULD be ignored on the receiver. This
is the same as defined in Extended-Community ORF
[I-D.chen-bgp-ext-community-orf].

The ORF entries of this type would only be used as one-time filters
that MUST not change any previously installed ORF entry on the
receiving speaker.

3. Operations

The capability negotiation of <AFI/SAFI, One-time Extended Community

ORF> MUST NOT delay the advertisement of routes with this AFI/SAFI.

The received One-time Extended Community ORF entries SHOULD only be used for one-time route filtering and MUST NOT be saved locally. The received One-time Extended Community ORF entries MUST NOT modify the outbound route filters on the receiving speaker (either locally configured or received from the sending speaker through ORF).

On receipt of ROUTE-REFRESH message with One-time Extended Community ORF entries, the receiving speaker SHOULD re-advertise to the sending speaker the routes from the Adj-RIB-Out associated with the sending speaker which pass the entries carried in the One-time Extended Community ORF as well as the locally saved ORFs (if any) received from the sending speaker.

Since different processing orders may lead to different results, the One-time-ORFs and the regular ORFs SHOULD not be encoded in one ROUTE-REFRESH message.

During the period when the receiving speaker is sending updates to satisfy the One-time-ORF request, it may experience other routing activity that will require it to send updates unrelated to the One-time-ORF request. It is permitted to send these updates before it has completed sending the One-time-ORF related updates.

Similarly, if a route that passes the One-time-ORF has already been sent and the receiving speaker experiences routing activity that changes this route and the receiving speaker has not yet sent all routes to satisfy the One-time-ORF request, it is permitted to send the changed route immediately. A withdrawal of the route counts as a valid change.

If the receiving speaker has received the Enhanced Route Refresh Capability as described in [I-D.ietf-idr-bgp-enhanced-route-refresh], then it SHALL perform the following additional procedures.

It SHALL send a ROUTE-REFRESH message with the subtype to indicate demarcation of the beginning of route refresh (start-of-refresh) before sending routes to satisfy the ORF request and send a ROUTE-REFRESH message with the subtype to indicate demarcation of the ending of route refresh (end-of-refresh) after sending all routes to satisfy the request.

As part of the start-of-refresh and end-of-refresh messages, it SHALL include the one-time-ORF rules that it is satisfying with this refresh. The presence of the ORF is indicated in the same way as it is with the normal route refresh as in [RFC5291]: A BGP speaker can distinguish an incoming ROUTE-REFRESH message that carries one or

more ORF entries from an incoming plain ROUTE-REFRESH message by
using the Message Length field in the BGP message header.

As with the procedures without the Enhanced Route Refresh Capability,
the receiving speaker is permitted to send updates for routes
unrelated to the ORF request before it has sent all updates to
satisfy the current ORF request.

If a receiving speaker receives a new one-time-ORF request before it
has finished completing a previous one, it MAY stop sending routes
for the previous ORF request. It MUST NOT send an end-of-refresh for
the previous request. If the speaker has received the Enhanced Route
Refresh Capability, it SHALL send a start-of-refresh for the new
request and start sending updates for it.

4. Security Considerations

This extension to BGP does not change the underlying security issues
in [RFC4271].

5. IANA Considerations

This document specifies a new Outbound Route Filtering (ORF) type,
One-time Extended Community ORF. The value of the ORF-type needs to
be assigned by IANA.

6. Acknowledgements

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Hares, Haibo Wang, Jiawei Dong, Yaqun Xiao, Mach Chen for their
valuable suggestions and comments to this document.

7. Normative References

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