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One-time Address-Prefix Based Outbound Route Filter for BGP-4

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Abstract

   This document defines a new Outbound Router Filter (ORF) type for
   BGP, termed "One-time Address Prefix Outbound Route Filter", which
   would allow a BGP speaker to send to its BGP peer a route refresh
   request with a set of address-prefix-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 replay or recover
   some specific "problematic" routes without requiring its peer to re-
   advertise the whole Adj-RIB-Out of a specific address family, which
   makes the trouble shooting operation (such as packets tracking) 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.

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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].

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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 maintenance, BGP speaker only needs to retrieve
some specific "problematic" routes from its peer if the routes are
possibly lost or contain some problematic attributes for some reason,
but send ROUTE-REFRESH will lead to the peer re-advertising its
whole Adj-RIB-Out. Such large numbers of updates include a lot of
unnecessary routes which would make trouble shooting operation (such
as packets tracking) more difficult, and is a waste of processing
resources and bandwidth. With the increase of IPV6 deployment, this
problem could be more significant. Even configured with ORF
mechanism as defined in [RFC5291], on receipt of a ROUTE-REFRESH
message, the peer will re-advertise all the routes matching 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 problem cannot be
solved by current ORF mechanism.

This document defines a new Outbound Router Filter (ORF) type for
BGP, termed "One-time Address Prefix Outbound Route Filter", which
would allow a BGP speaker to send to its BGP peer a route refresh
request with a set of address-prefix-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 replay or recover
some specific "problematic" routes without requiring its peer to re-
advertise the whole Adj-RIB-Out of specific address family, which
makes the trouble shooting operation (such as packets tracking) 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.

Consider the following scenario: In an Inter-AS environment, if
ASBR-A received a malformed UPDATE from ASBR-B and treated it as
withdraw. For Operator-A, the log on the ASBR-A was not enough to
judge whether the UPDATE was incorrectly sent by ASBR-B or
incorrectly processed by ASBR-A. A good method is to replay and
debug the packets. One-time Prefix ORF is a low impact way to
refresh the UPDATE.

2. One-time Address Prefix ORF-Type

This document defines a new ORF type: One-time Address Prefix ORF.

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 format of One-time Address Prefix ORF-Type entry is the same as
the encoding of Address Prefix ORF in [RFC5292], the specific fields
are defined as follows:

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

The matching rules of the One-time Address Prefix ORF are the same
as defined in Address-Prefix-Based ORF [RFC-5292].

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

3. Operation

The capability negotiation of <AFI/SAFI, One-time Address Prefix
ORF> MUST NOT delay the advertisement of routes with this AFI/SAFI.

The received One-time Address Prefix ORF entries SHOULD only be used
for one-time route filtering and MUST NOT be saved locally. The
received One-time Address Prefix 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 Address Prefix 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 Address
Prefix 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.

Details about how to interoperate when both One-time ORF Capability
and the Enhanced Route Refresh Capability as described in [Enhanced-
Refresh] are enabled will be discussed in the next version.

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 Address-Prefix ORF. The value of the ORF-type needs to be
assigned by the IANA.

6. Acknowledgments

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

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