Network Working Group   Enke Chen
Internet Draft   Redback Networks
Expiration Date: February 2005   Srihari R. Sangli
                                                     Cisco Systems

Address Prefix Based Outbound Route Filter for BGP-4

draft-ietf-idr-bgp-prefix-orf-00.txt

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2. Abstract

This document defines a new Outbound Router Filter type for BGP,
termed "Address Prefix Outbound Route Filter", that can be used to
perform address prefix based route filtering. This ORF-type supports
prefix length or range based matching, wild-card based address prefix
matching, as well as the exact address prefix matching for address
families.

3. Introduction

The Cooperative Outbound Route Filtering Capability defined in [BGP-ORF] 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.

This documents defines a new ORF-type for BGP, termed "Address Prefix Outbound Route Filter (Address Prefix ORF)", that can be used to perform address prefix based route filtering. The Address Prefix ORF supports prefix length or range based matching, wild-card based address prefix matching, as well as the exact address prefix matching for address families [BGP-MP].

4. Address Prefix ORF-Type

The Address Prefix ORF-Type allows one to express ORFs in terms of address prefixes. That is, it provides address prefix based route filtering, including prefix length or range based matching, as well as wild-card address prefix matching.

Conceptually an Address Prefix ORF entry consists of the fields <Sequence, Match, Length, Prefix, Minlen, Maxlen>.

The "Sequence" field is a number that specifies the relative ordering of the entry.

The "Match" field specifies whether this entry is "PERMIT" (value 0), or "DENY" (value 1).

The "Length" field indicates the length in bits of the address prefix. A length of zero indicates a prefix that matches all (as specified by the address family) addresses (with prefix itself of zero octets).

The "Prefix" field contains an address prefix of an address family.

The "Minlen" field indicates the minimum prefix length in bits that is required for "matching". The field is considered as un-specified with value 0.

The "Maxlen" field indicates the maximum prefix length in bits that is required for "matching". The field is considered as un-specified with value 0.

The fields "Sequence", "Length", "Minlen", and "Maxlen" are all unsigned integers.

This document imposes the following requirement on the values of
these fields:

           0 <= Length < Minlen <= Maxlen

In addition, the "Maxlen" must be no more than the maximum length (in
bits) of a host address for a given address family [BGP-MP].

5. Address Prefix ORF Encoding

The value of the ORF-Type for the Address Prefix ORF-Type is 64.

An Address Prefix ORF entry is encoded as follows. The "Match" field
of the entry is encoded in the "Match" field of the common part [BGP-
ORF], and the remaining fields of the entry is encoded in the "Type
specific part" as follows.

```
        +-------------------------------+
        |    Sequence (4 octets)        |
        +-------------------------------+
        |   Minlen   (1 octet)          |
        +-------------------------------+
        |   Maxlen   (1 octet)          |
        +-------------------------------+
        |   Length   (1 octet)          |
        +-------------------------------+
        |   Prefix   (variable length)  |
        +-------------------------------+
```

Note that the Prefix field contains the address prefix followed by
enough trailing bits to make the end of the field fall on an octet
boundary. The value of the trailing bits is irrelevant.

[6](6). **Address Prefix ORF Matching**

   In addition to the general matching rules defined in [[BGP-ORF](BGP-ORF)],
   several Address Prefix ORF specific matching rules are defined as
   follows.

   Consider an Address Prefix ORF entry, and a route maintained by a BGP
   speaker with NLRI in the form of <length, prefix>.

   The route is considered as "no match" to the ORF entry if the NLRI is
   neither more specific than, nor equal to, the <Length, Prefix> fields
   of the ORF entry.

   When the NLRI is either more specific than, or equal to, the <Length,
   Prefix> fields of the ORF entry, the route is considered as a match
   to the ORF entry only if the NLRI match condition as listed in the
   following table is satisfied.

```
         ORF Entry                     NLRI
    Minlen      Maxlen           Match Condition
   +-----------------------------------------------------+
   | un-spec.    un-spec.      NLRI.legnth == ORF.length |
   +-----------------------------------------------------+
   | specified   un-spec.      NLRI.length >= ORF.Minlen |
   +-----------------------------------------------------+
   | un-spec.    specified     NLRI.length <= ORF.Maxlen |
   +-----------------------------------------------------+
   | specified   specified     NLRI.length >= ORF.Minlen |
   |                       AND NLRI.length <= ORF.Maxlen |
   +-----------------------------------------------------+
```

   It is possible that the speaker would have more than one Prefix
   Address ORF entry that matches the NLRI of the route. In that case
   the "first-match" rule applies. That is, the ORF entry with the
   smallest sequence number (among all the matching ORF entries) is
   considered as the sole match, and it would determine whether the
   route should be advertised.

7. Security Considerations

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

8. References

[BGP-4] Rekhter, Y., T. Li, and S. Hares, "A Border Gateway Protocol 4 (BGP-4)", draft-ietf-idr-bgp4-24.txt, November 2003.

[BGP-MP] Bates, T., Chandra, R., Katz, D. and Y. Rekhter, "Multiprotocol Extensions for BGP-4", RFC 2858, June 2000.

[BGP-ORF] Chen, E., and Rekhter, Y., "Cooperative Route Filtering Capability for BGP-4", draft-ietf-idr-route-filter-10.txt, March 2004.

9. Author Information

Enke Chen
Redback Networks, Inc.
300 Holger Way
San Jose, CA 95134
Email: enke@redback.com

Srihari R. Sangli
Cisco Systems, Inc.
170 W. Tasman Dr.
San Jose, CA 95134
Email: rsrihari@cisco.com

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