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                    Dynamic Capability for BGP-4

                    draft-ietf-idr-dynamic-cap-02.txt

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2. **Abstract**

   This document defines a new BGP capability termed "Dynamic
   Capability", which would allow the dynamic update of capabilities
   over an established BGP session. This capability would facilitate
   non-disruptive capability changes by BGP speakers.

3. Introduction

   Currently BGP capabilities [BGP-CAP] are only advertised in the OPEN
   message during the session initialization. In order to enable a new
   capability or remove an existing capability (such as an Address
   Family support [BGP-MP]), an established session needs to be reset,
   which may disrupt other services running over the session.

   This document defines a new BGP capability termed "Dynamic
   Capability", which would allow the dynamic update of capabilities
   over an established BGP session. This capability would facilitate
   non-disruptive capability changes by BGP speakers.

4. Dynamic Capability

   The Dynamic Capability is a new BGP capability [BGP-CAP]. The
   Capability code for this Capability is specified in the "IANA
   Considerations" section of this document. The Capability Length
   field of this Capability is set to 0.

   By advertising the Dynamic Capability to a peer in the OPEN, a BGP
   speaker conveys to the peer that the speaker is capable of receiving
   and properly handling the CAPABILITY message (as defined in the next
   Section) from the peer after the BGP session has been established.

5. Capability Message

   The CAPABILITY Message is a new BGP message type with type code 6.
   In addition to the fixed-size BGP header [BGP-4], the CAPABILITY
   message contains one or more of the following tuples:

```
               +------------------------------+
               | Action (1 octet)             |
               +------------------------------+
               | Capability Code (1 octet)    |
               +------------------------------+
               | Capability Length (1 octet)  |
               +------------------------------+
               | Capability Value (variable)  |
               +------------------------------+
```

   The value of the Action field is 0 for advertising a capability, and
   1 for removing a capability.

The triple <Capability Code, Capability Length, Capability Value> is the same as defined in [BGP-CAP], and it specifies a capability for which the "Action" shall be applied.

6. **Error Handling**

A new NOTIFICATION error code is defined:

     7 CAPABILITY Message Error

which has the following error subcodes:

     1 Invalid Action Value
     2 Invalid Capability Length
     3 Malformed Capability Value

If the Action field of a received CAPABILITY message is other than 0 or 1, then a NOTIFICATION message with the error subcode "Invalid Action Value" MUST be sent and the data field of the NOTIFICATION message MUST contain the erroneous Action field.

If the Capability Length field of a received CAPABILITY message is incorrect for a Capability Code, then a NOTIFICATION message with the error subcode "Invalid Capability Length" MUST be sent and the data field of the NOTIFICATION message MUST contain the Capability Code and the Capability Length fields.

If the Capability Value field of a received CAPABILITY message is malformed (the definition of "malformed" depends on the Capability Code), then a NOTIFICATION message with the error subcode "Malformed Capability Value" MUST be sent and the data field of the NOTIFICATION message MUST contain the Capability Code, Capability Length, and the Capability Value fields.

7. **Operation**

A BGP speaker that is willing to receive the CAPABILITY message from its peer should advertise the Dynamic Capability to the peer using BGP Capabilities advertisement [BGP-CAP].

A BGP speaker may send a CAPABILITY message to its peer only if it has received the Dynamic Capability from its peer.

The Dynamic Capability itself can not be revised dynamically via a CAPABILITY message. The lifetime of the Dynamic Capability is the duration of the BGP session in which the capability is advertised.

Upon receiving a CAPABILITY message from its peer, the BGP speaker
shall update the capabilities previously received from that peer
based on the "Action" in the message, and then function in accordance
with the revised capabilities for the peer. Any unrecognized
capabilities in the message should be ignored.

It is noted that the dynamic capability update may not be feasible
and should be disallowed for some capabilities. One example is the
four-byte AS number capability [BGP-4BYTE-AS] as its dynamic update
could introduce ambiguity in parsing the UPDATE messages.

8. IANA Considerations

This document uses a BGP Capability code to indicate that a BGP
speaker supports the Dynamic Capability. The Capability code has
been assigned by IANA per RFC 2842.

9. Intellectual Property Considerations

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protected by one or more patents assigned to Cisco Systems, Cisco
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non-discriminatory terms.

10. Security Considerations

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

11. Acknowledgments

The authors would like to thank Yakov Rekhter, Ravi Chandra, Dino
Farinacci, Pedro Marques and Chandrashekhar Appanna for their review
and comments. We also would like to thank Bruno Rijsman for
suggesting the initial text for the Error Handling section.

12. References

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