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Capabilities Negotiation with BGP-4

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**1. Status of this Memo**

**2. Abstract**

   Currently BGP-4 [BGP-4] requires that when a BGP speaker receives an
   OPEN message with one or more unrecognized Optional Parameters, the
   speaker must terminate BGP peering. This complicates introduction of
   new capabilities in BGP.

   This document defines new Optional Parameter, called Capabilities,
   that is expected to facilitate introduction of new capabilities in
   BGP by providing graceful capability negotiation without requiring
   that BGP peering be terminated.

   The proposed parameter is backward compatible - a router that
   supports the parameter can maintain BGP peering with a router that
   doesn't support the parameter.

[3](3). Overview of Operations

   When a BGP speaker that supports capabilities negotiation sends an
   OPEN message to its BGP peer, the message may include an Optional
   Parameter, called Capabilities. The parameter lists the capabilities
   supported by the speaker.

   A BGP speaker may use a particular capability when peering with
   another speaker only if both speakers support that capability.  A BGP
   speaker determines the capabilities supported by its peer by
   examining the list of capabilities present in the Capabilities
   Optional Parameter carried by the OPEN message that the speaker
   receives from the peer.

   A BGP speaker determines that its peer doesn't support capabilities
   negotiation, if in response to an OPEN message that carries the
   Capabilities Optional Parameter, the speaker receives a NOTIFICATION
   message with the Error Subcode set to Unsupported Optional Parameter.

   If a BGP speaker that supports a certain capability determines that
   its peer doesn't support this capability, the speaker may send a
   NOTIFICATION message to the peer, and terminate peering. The Error
   Subcode in the message is set to Unsupported Capability. The message
   should contain the capability (capabilities) that causes the speaker
   to send the message.  The decision to send the message is local to
   the speaker.


[4](4). Capabilities Optional Parameter (Parameter Type 2):

   This is an Optional Parameter that is used by a BGP speaker to convey
   to its BGP peer the list of capabilities supported by the speaker.

   The parameter contains one or more triples <Capability Code,
   Capability Length, Capability Value>, where each triple is encoded as
   shown below:

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

The use and meaning of these fields are as follows:

   Capability Code:

      Capability Code is a one octet field that unambiguously
      identifies individual capabilities.

   Capability Length:

      Capability Length is a one octet field that contains the length
      of the Capability Value field in octets.

   Capability Value:

      Capability Value is a variable length field that is interpreted
      according to the value of the Capability Code field.


A particular capability, as identified by its Capability Code, may
occur more than once within the Optional Parameter.

This document reserves Capability Codes 128-255 for vendor-specific
applications.

This document reserves value 0.

Capability Codes (other than those reserved for vendor specific use)
are assigned only by the IETF consensus process and IESG approval.


**5. Extensions to Error Handling**

This document defines new Error Subcode - Unsupported Capability.
The value of this Subcode is 7. The Data field in the NOTIFICATION
message lists the set of capabilities that cause the speaker to send
the message.  Each such capability is encoded the same way as it was
encoded in the received OPEN message.

6. Security Considerations

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

7. Acknowledgements

   To be supplied.

8. References

   [BGP-4]   Rekhter, Y., and T. Li, "A Border Gateway Protocol 4 (BGP-
   4)", RFC 1771, March 1995.

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