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Monitoring BGP Capabilities Using BMP
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Abstract

The BGP Monitoring Protocol (BMP) [RFC7854] is designed to monitor BGP [RFC4271] running status, such as BGP peer relationship establishment and termination and route updates.

This document provides a use case that the BMP station can get all BGP capability information of the monitored network device via BMP.

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 September 14, 2017.

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1. Terminology

This memo makes use of the terms defined in [RFC7854].

Virtual Peer: A virtual BGP speaker connecting to the network device

BMP: BGP Monitoring Protocol

BMS: BGP Monitoring Station

2. Introduction

The Border Gateway Protocol (BGP) is a dynamic routing protocol operating on an Autonomous System (AS) and typically configured on a network device. The BGP typically can support a number of capabilities, e.g., IPv4 Unicast, IPv4 Multicast, IPv6 Unicast, and other multiple-protocol extended capabilities, and the different BGP may support a different number of different capabilities. The network device configured with the BGP typically may not enable all capabilities supported in the configured BGP, but enable some currently required BGP capabilities as required for a current task.

The BGP Monitoring Protocol (BMP) introduces the availability of monitoring BGP running status, such as BGP peer relationship establishment and termination and route updates. Without BMP, manual query is required if you want to know about BGP running status. With BMP, a router can be connected to a monitoring station and configured to report BGP running statistics to the station for monitoring, which improves the network monitoring efficiency. BMP facilitates the monitoring of BGP running status and reports security threats in real time so that preventive measures can be taken promptly.

In order to monitor and manage effectively the operating states of the BGP configured on the respective network devices in the network, the existing practice is that a monitoring station obtains BGP information of the respective network devices in the network to monitor and manage centrally the network devices configured with the BGP in the network. By way of an example of a flow in which the monitoring station obtains the BGP information, after a BGP connection is set up between network devices A and B configured with the BGP (or between peers), taking the network device A as an example, the network devices A and B negotiate about their own enabled BGP capabilities in messages under a BGP rule, and the network device A further includes a BGP Monitoring Protocol (BMP) module connected with the monitoring station, where the BMP module can obtain the enabled BGP capabilities of the network device A, and the enabled BGP capabilities of the network device B as a result of negotiation about the enabled BGP capabilities, so that if the BMP module of the network device A sends the configured BGP information of the network device to the monitoring station in a Peer Up Notification message, then the BGP capabilities will include only the BGP capabilities enabled on the network device A.

However it may not suffice if only the deployed or enabled BGP capabilities are sent, but the monitoring station has to obtain all the BGP capabilities supported by the network devices configured with the BGP in the network, including the enabled and disabled BGP capabilities, so that the monitoring station can know comprehensively the real capabilities supported throughout the network, and further provide a valid criterion for deployment and decision throughout the network.

This document provides a use case that the BMP station can get all BGP capability information of the monitored network device via BMP.

3. Virtual Peer

As described in Section 8.2 of [RFC7854], locally originated routes can be modeled as having been sent by the router to itself. This document introduces a virtual BGP speaker for the monitored router

that the speaker is connecting to the router. The virtual BGP speaker existing in the router is a virtual Peer to the router.

4. Operation

Consider the following scenario:

A simple topology:

BMS---Device A----Device B

Configure a BMP session between BMS and Device A,
and a BGP session between Device A and B.

Suppose that the BGP capabilities supported on the network device A and B include three BGP capabilities, which are IPv4 Unicast, IPv4 Multicast, and IPv6 Unicast respectively, and only one of the BGP capabilities is currently enabled on the network device A and B, which is IPv4 Unicast.

When the BGP session between Device A and B reaches the Established state, Device A will send a few BMP messages to BMS, one of the messages is a Peer Up Notification message, which includes only IPv4 Unicast multiple-protocol extended capabilitiy. In this case, the BMS does not know the other support capabilities, such as IPv4 Multicast and IPv6 Unicast.

When the network device A is configured to create a virtual peer, the process follows the steps:

1) A gets all the BGP capabilities from BGP module.

2) A encapsulates a Peer Up Notification message as follows:

- Setting Peer Type field of the Per-Peer header to 2 (Local Instance Peer)
- Placing the router's own address in the Peer Address field of the Per-Peer header
- Setting the Local Port field to 0
- Setting the Remote Port field to 0
- Including IPv4 Unicast, IPv4 Multicast, and IPv6 Unicast in the "Received OPEN Message" part

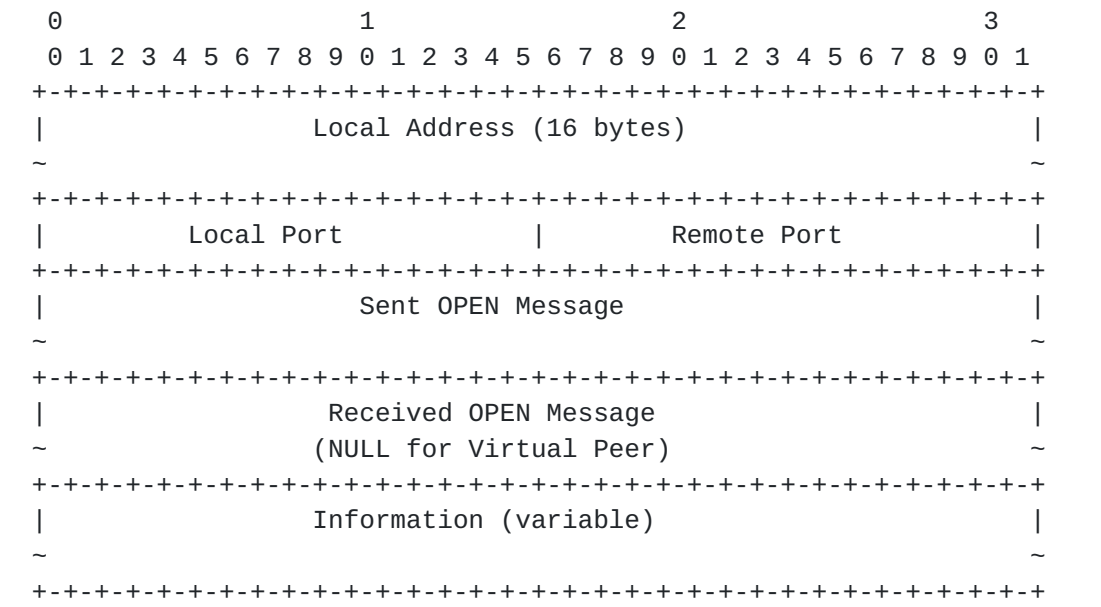

Figure 1: Peer Up Notification for Virtual Peer

3) Upon reception of the Peer Up Notification message, BMS can indentify the virtual peer identifier of the network device A, thereby gets all the BGP multiple-protocol extended capabilities corresponding to the network device A.

Use the method described above, the monitoring station BMS can know comprehensively the real BGP capabilities supported by the monitored device.

5. Acknowledgements

TBD.

6. IANA Considerations

TBD.

7. Security Considerations

TBD.

8. Normative References

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[RFC4271] Rekhter, Y., Ed., Li, T., Ed., and S. Hares, Ed., "A Border Gateway Protocol 4 (BGP-4)", RFC 4271, DOI 10.17487/RFC4271, January 2006, <http://www.rfc-editor.org/info/rfc4271>.

[RFC7854] Scudder, J., Ed., Fernando, R., and S. Stuart, "BGP Monitoring Protocol (BMP)", RFC 7854, DOI 10.17487/RFC7854, June 2016, <http://www.rfc-editor.org/info/rfc7854>.

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