Peer Capability Update Notification in BGP Monitoring Protocol (BMP)

draft-lin-grow-bmp-cap-notification-00

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IETF-124, November 2025

Introduction to BGP Dynamic Capability

- **What is it?**
  - Allows BGP peers to **update capabilities** (e.g., new features) **without session reset**.
- **Why does it matter?**
  - Avoids unnecessary session flaps during upgrades.
  - Enhances scalability in large networks (e.g., ISPs, cloud providers).
- **Comparison with Traditional BGP**

Traditional BGP	**BGP Dynamic Capability (ietf-idr-dynamic-cap)**
✓ Capabilities advertised exclusively in OPEN message	✓ Capabilities can be updated via new BGP messages (Dynamic Capability) post-establishment
✓ Session reset required for capability modifications	✓ Capability updates without session reset

- **Related Capabilities**

  Multiprotocol Extensions for BGP-4, Route Refresh Capability for BGP-4, BGP Role, Graceful Restart, Enhanced Route Refresh, Long-Lived Graceful Restart, Routing Policy Distribution, FQDN, Link-Local Next Hop Capability and .....

How BMP Monitors BGP Dynamic Capability

- **BMP Peer UP Notification Can be Used?**
  - ✓ Sent **once** at session establishment for reporting initial capabilities to monitoring stations.
  - ✓ If used for capability dynamic updates, **multiple same Peer UP messages** may confuse monitoring stations.

- **Problem:**
  - ✓ Multiple same "Peer UP" messages → Mistakenly interpreted as **session flapping/re-establishment**.
  - ✓ May clear previously received Route Monitoring Messages.
  - ✓ Requires retransmission of all Route Monitoring messages, unnecessarily increasing network load and consuming additional bandwidth.

- **Need for Dedicated Solutions:**
  - ✓ **Goal:** Report capability changes **without triggering session-reset logic**.
  - ✓ **Proposal:** Define a **new BMP Message** or a **new TLV in other available BMP Message.**

Definition of A New BMP Message

- **Message Type**
  - ✓ Name: Peer Capability Update Notification
  - ✓ Value: TBD, to be assigned by IANA
- **Operation**
  - ✓ If a new BGP capability is added, after all corresponding Peer Capability Updates are sent to monitoring station, the route information and End-of-RIB (EOR) of corresponding peer will be sent via BMP.
  - ✓ If an existing BGP capability is removed, only all corresponding Peer Capability Updates will be sent, but the route withdrawal information of corresponding peer will not be sent via BMP.

- **Message Format**

```
+-----------------------------------------------------+
|            Common Header                            |
+-----------------------------------------------------+
|            Per-Peer Header                          |
+-----------------------------------------------------+
|            Peer CAP Flags (1 byte)                  |
+-----------------------------------------------------+
|            BGP Dynamic Capability PDU               |
+-----------------------------------------------------+
```

Peer CAP Flags Format:

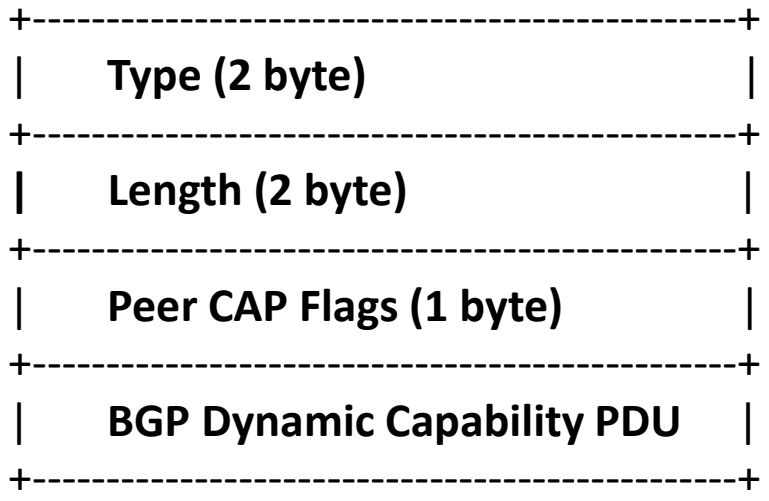
```
 0 1 2 3  4  5 6 7
+-+-+-+-+-+-+-+-+
|T|  Reserved   |
+-+-+-+-+-+-+-+-+
```

T flag (1 bit) : Indicates **the direction** of the BGP Dynamic Capability PDU.

T=1: Received from a peer.
T=0: Sent to a peer.

Definition of A New TLV

- Define **a new TLV** as part of other available BMP messages to report BGP capability updates.
  - ✓ **Type** = TBD, **Peer Capability Update Notification**
  - ✓ **Peer CAP Flags** and **BGP Dynamic Capability PDU** is same with **the definition of above new BMP message.**



Peer Capability Update Notification TLV Format

Notes:

- ✓ The available BMP message **MUST** include corresponding **BGP Peer address**.
- ✓ And **MUST** include **Route Distinguisher** when the BGP peer is associated with a **VPN instance**.
- ✓ The available BMP message can be the **Peer Up Notification message** (as a info TLV) or the **GEN message** (draft-sp-grow-bmp-gen).

Next Steps

- Discuss which solution is more likely to be accepted.
  - ✓ Definition of A New BMP Message (Adding a new message type in the common header)?
  - ✓ Definition of A New TLV(For example, adding a sub-TLV in the Peer Up message)?
- Request more review and feedback to improve the draft.
- Any comments welcomed.

Thank You!