PIM extension for P2MP/tree based BIER

draft-xie-pim-bier-extensions-00

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## Background: P2MP/tree-based BIER

- `<RFC8279/RFC8296>` describe an alternative multicast by using a Multicast-specific BIER-header
- `<draft-xie-bier-mvpn-mpls-p2mp>` describe an multicast by using a P2MP/BIER combining.
- `<RFC4601/7761>`: PIM -- Protocol Independent Multicast

### Put them together:

- **BIER-encapsulation:** *Multicast-specific packet header*, BIER-header
- **BIER-Label:** *Multicast-specific Label*, to indicating the following of this label is the left part of the BIER-header.
- **PIM:** *Multicast-specific protocol*, independent of any underlay routing protocol: IGP/BGP/static/...
CheckBS means, when Replicate to every NHLFE of a Tree, Checking the result by AND’ing the BitString in packet and the F-BM in the NHLFE, Forwarding only when result is not zero.

PopBIERincluding means, to pop the entire BIER header including the BIER Label in packet.
PIM extension for P2MP/tree-based BIER

- **D--C**: PIM Join(S=A, G=232.0.0.1, Nbr=C, Attribute<Label=400, BSL=256, Set=0, FBM=0001>)
- **F--C**: PIM Join(S=A, G=232.0.0.1, Nbr=C, Attribute<Label=600, BSL=256, Set=0, FBM=0010>)
- **C--B**: PIM Join(S=A, G=232.0.0.1, Nbr=B, Attribute<Label=300, BSL=256, Set=0, FBM=0011>)
- **E--B**: PIM Join(S=A, G=232.0.0.1, Nbr=B, Attribute<Label=500, BSL=256, Set=0, FBM=0100>)
- **B--A**: PIM Join(S=A, G=232.0.0.1, Nbr=A, Attribute<Label=200, BSL=256, Set=0, FBM=0111>)
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- **BIER Join Attribute (BS Len, Set ID, BIER-Label, F-BM)**
- **PIM Leaf** should compute the F-BM using (BFR-ID, BS Len, Set Identifier).
- **PIM Build MRIB and MFIB/P2MP-BIFT. MFIB for OAM, P2MP-BIFT for Data forwarding.**

![Figure 3: BIER Join Attribute](image)
PIM extension for P2MP/tree-based BIER

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+-----------------------------------------------+-----------------------------------------------+
| OptionType | OptionLength |
|-----------------------------------------------+-----------------------------------------------+
+-----------------------------------------------+-----------------------------------------------+
| Reserved | Reserved |
+-----------------------------------------------+-----------------------------------------------+

P: The node has BIER P-Capability.
D: The node has BIER D-Capability.
I: The node Ignore the BIER Header except the Label.
R: The node Require a packet without BIER Header except the Label.

Figure 2: BIER-Supported Hello Option

- PIM Hello option
Next Step

• Add Capability and Error handling

• Add BIER Non-MPLS encapsulation support

• Get feedbacks and handle Questions/Comments
Thanks !