

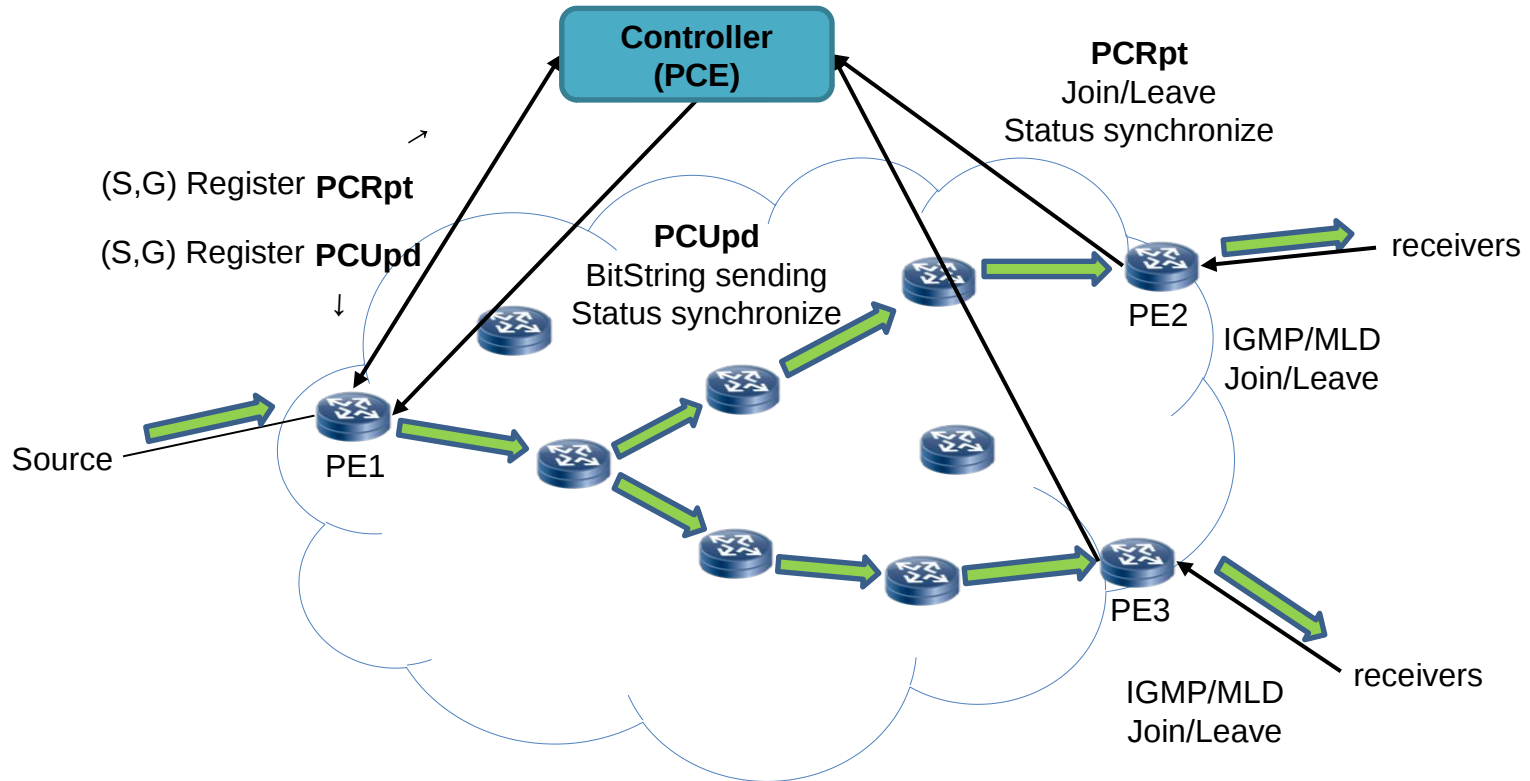
# PCE based BIER Procedures and Protocol Extensions

[[draft-li-pce-based-bier](#)]

*Huanan Li(China Telecom)*  
*Aijun Wang (China Telecom)*  
*Huaimo Chen(Futurewei)*  
*Ran Chen(ZTE Corporation)*  
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- Overview of PCE based BIER solution
- Extensions to PCE
- Further Action

# Overview of PCE based BIER solution



## Main flow for PCE based BIER multicast

1. PCE receives the registration information from ingress and responds.
2. PCE gets reports about egresses in PCRpt.
3. PCE generates BitString and sends it to ingress via PCUpd.
4. Ingress encapsulate BIER header and forward multicast packets.
5. The number of receivers is regularly synchronized between egress and PCE, and between PCE and ingress, using PCRpt and PCUpd respectively.

# Extensions to PCE

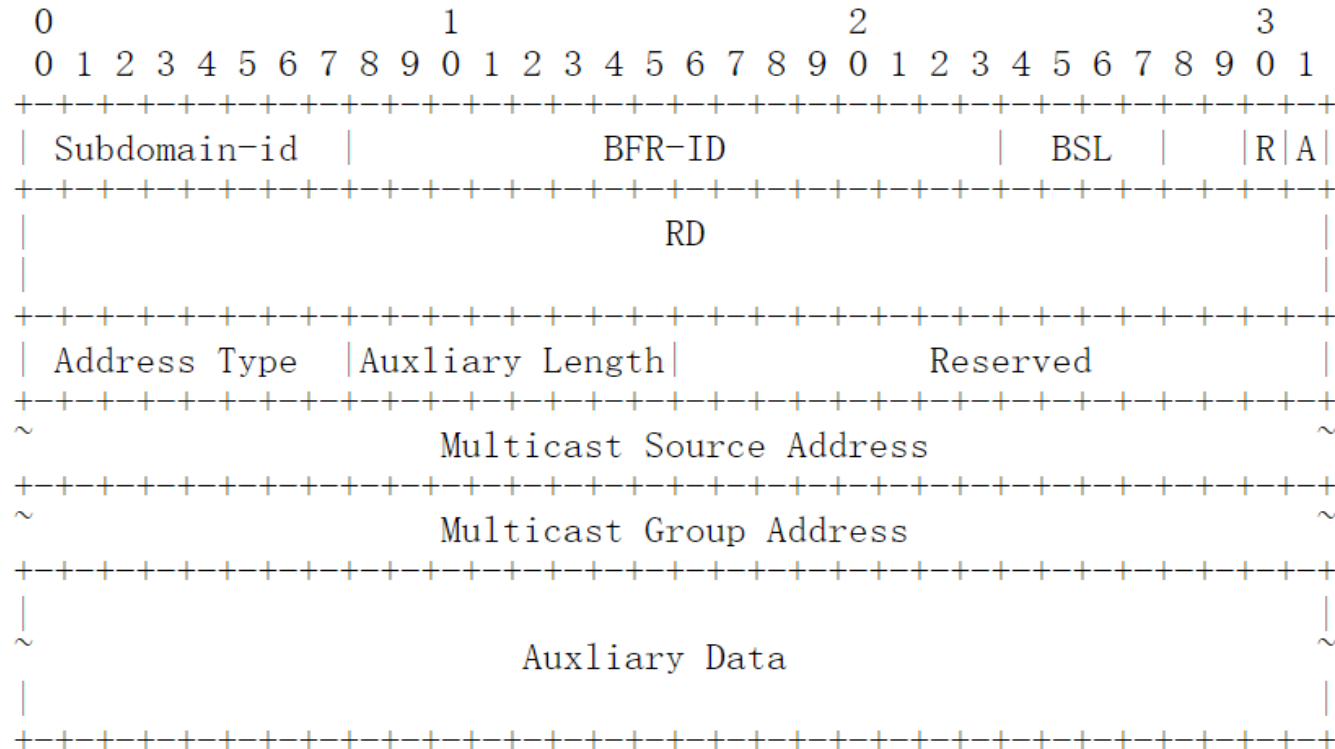
## Newly defined Objects

1. BIER-MULTICAST-CAPABILITY flag in STATEFUL-PCE-CAPABILITY TLV in the OPEN object
2. Multicast Source Registration Object
3. Multicast Receiver Information Object
4. Forwarding Indication Object
5. Multicast Receiver Status Object

## Extensions to PCEP Message

1. Open Message
2. PCRpt Message
3. PCUpd Message

# Multicast Source Registration Object

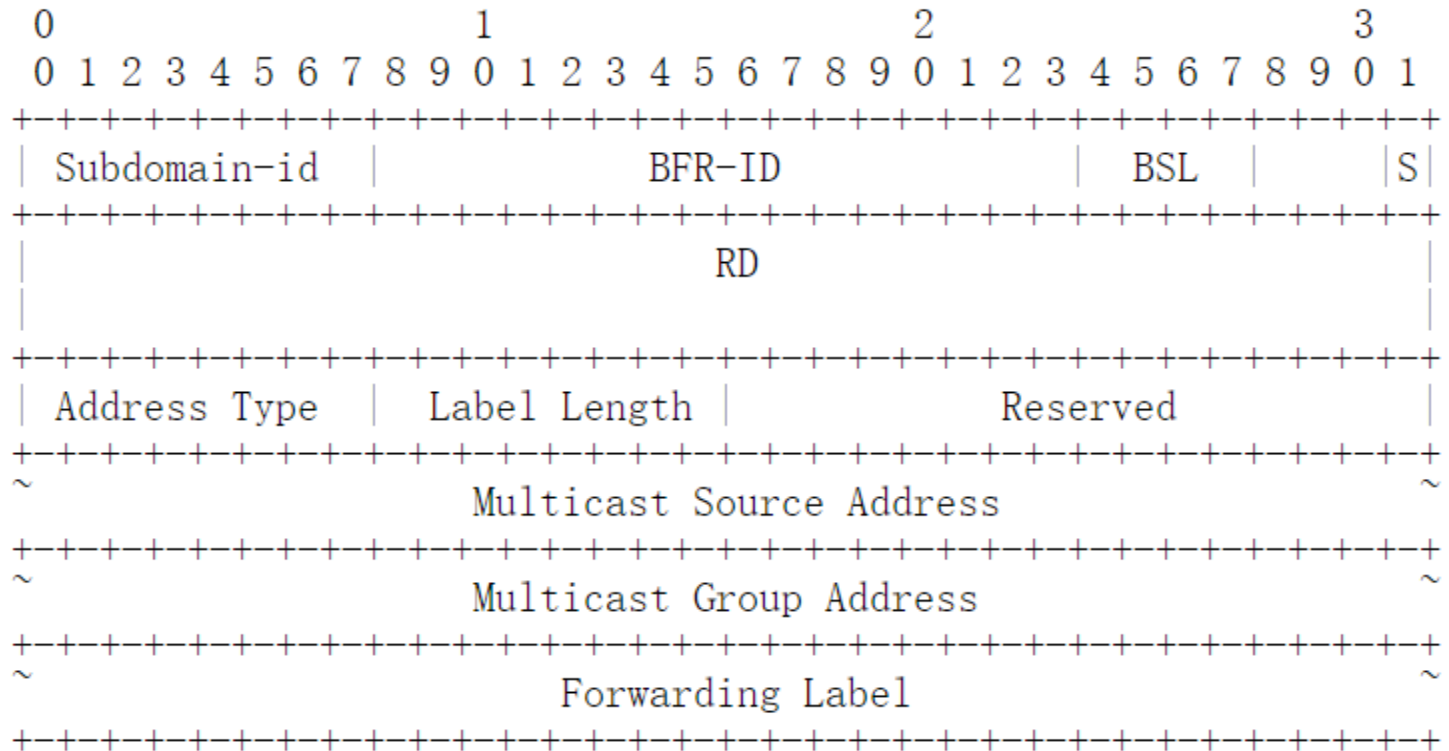


## ◆ Application scenarios:

(S,G) registration/revocation in PCRpt and response in PCUpd

- ✓ Flag “R” bit indicates whether the action of the message is a registration request.
- ✓ Flag “A” bit indicates whether the request is successful.

# Multicast Receiver Information Object

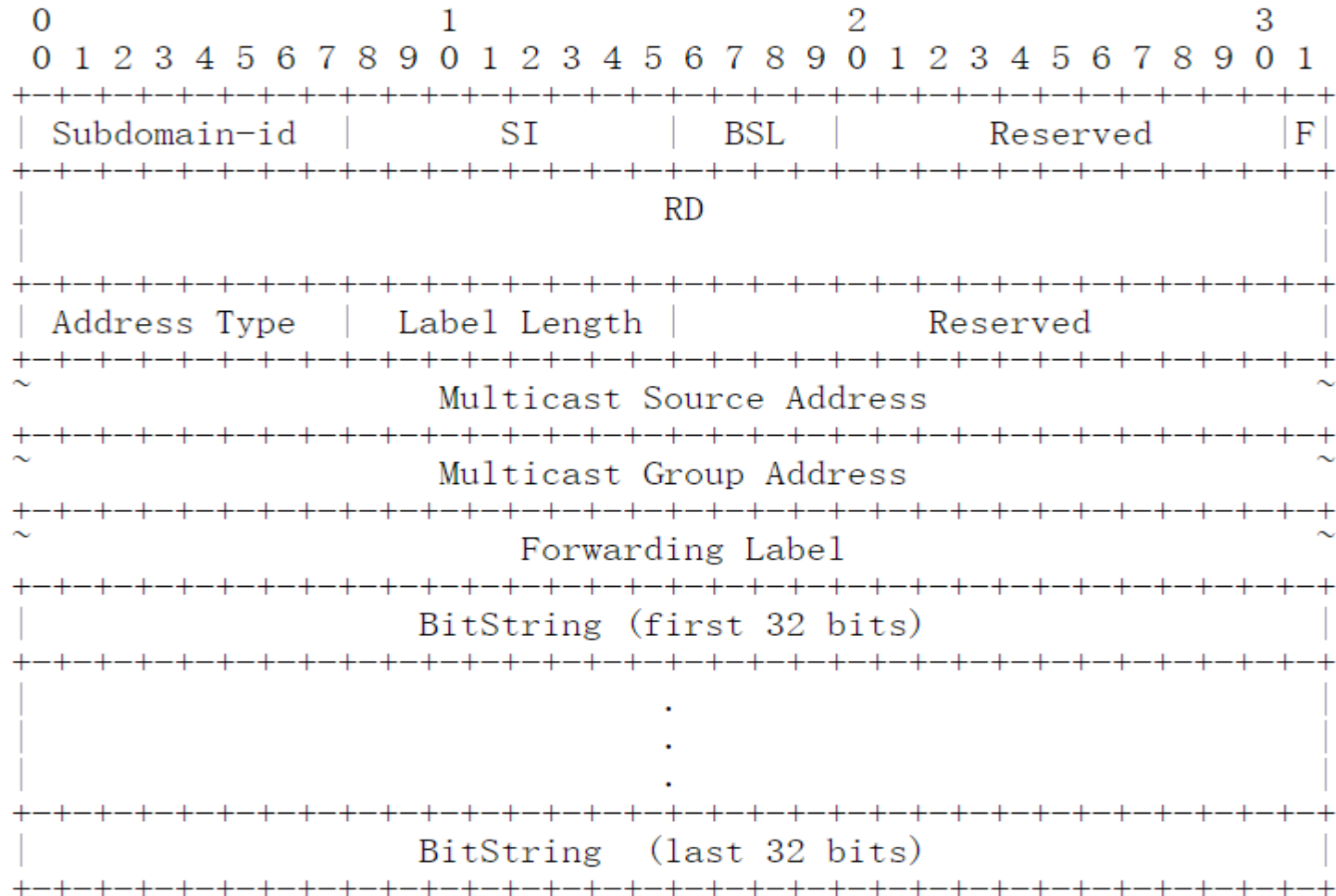


## ◆ Application scenarios:

### Multicast joining or leaving in PCRpt

- ✓ Flag “S” bit indicates whether to join a multicast group.
- ✓ Forwarding Label is used for egress to distinguish receivers at the forwarding layer.

# Forwarding Indication Object

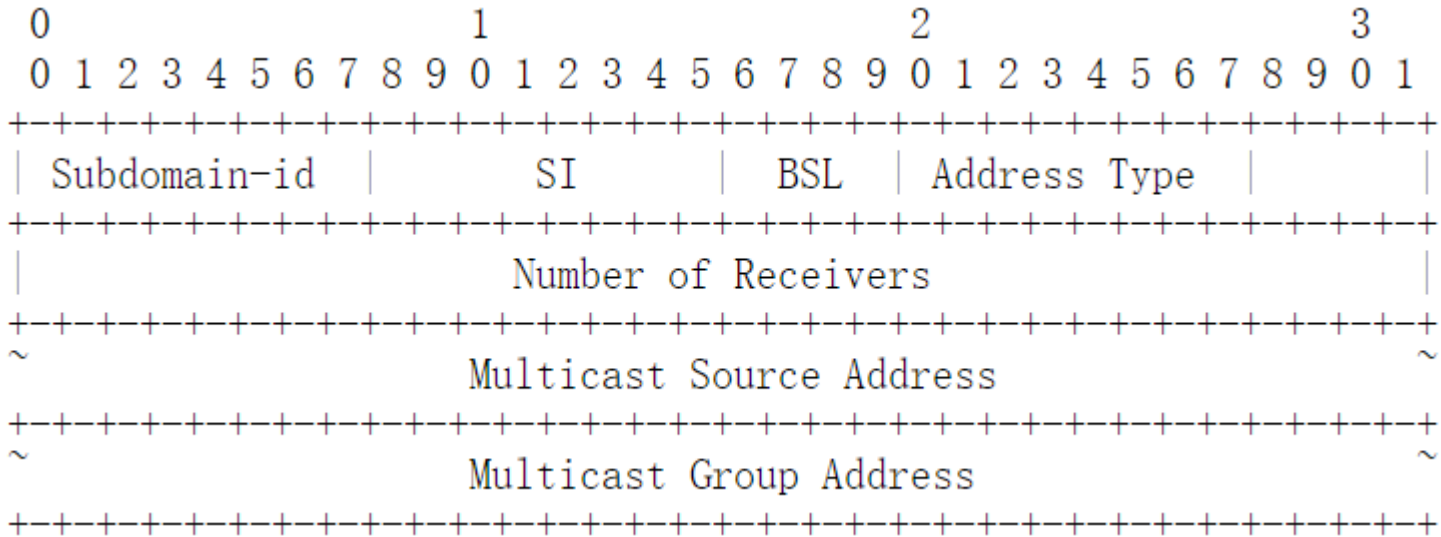


## ◆ Application scenarios:

Informing ingress to forward packets of a specific (S,G) to receivers in PCUpd.

- ✓ Flag “F” bit indicates whether to start forwarding multicast data.

# Multicast Receiver Status Object



## ◆ Application scenarios:

Egress synchronizes receiver information to PCE in PCRpt

PCE synchronizes receiver information to ingress in PCUpd

- ✓ Flag “F” bit indicates whether to start forwarding multicast data.
- ✓ In PCRpt messages, the number of receivers refers to connected to the egress in a specific (S,G) .
- ✓ In PCUpd messages, the number of receivers refers to all receivers in a specific (S,G).



# Extensions to PCEP Message

## Open Message

- BIER-MULTICAST-CAPABILITY flag in STATEFUL-PCE-CAPABILITY TLV in the OPEN object is set to support BIER multicast.

$\langle \text{PCRpt Message} \rangle ::= \langle \text{Common Header} \rangle$   
 $\langle \text{state-report-list} \rangle$

Where:

$\langle \text{state-report-list} \rangle ::= \langle \text{state-report} \rangle [\langle \text{state-report-list} \rangle]$

$\langle \text{state-report} \rangle ::=$  [ $\langle \text{SRP} \rangle$ ]  
 $\langle \text{LSP} \rangle$   
 $\langle \text{path} \rangle$   
[ $\langle \text{MSR} \rangle$ ]  
[ $\langle \text{MRI} \rangle$ ]  
[ $\langle \text{MRS} \rangle$ ]

$\langle \text{PCUpd Message} \rangle ::= \langle \text{Common Header} \rangle$   
 $\langle \text{update-request-list} \rangle$

Where:

$\langle \text{update-request-list} \rangle ::= \langle \text{update-request} \rangle [\langle \text{update-request-list} \rangle]$

$\langle \text{update-request} \rangle ::=$   $\langle \text{SRP} \rangle$   
 $\langle \text{LSP} \rangle$   
 $\langle \text{path} \rangle$   
[ $\langle \text{MSR} \rangle$ ]  
[ $\langle \text{FI} \rangle$ ]  
[ $\langle \text{MRS} \rangle$ ]

## PCRpt Message includes

- MSR object for registration or revocation
- MRI object for receivers' joining or leaving(not the last one)
- MRS object for periodic synchronization of receivers' number
- MRI and MRS objects for receiver's leaving(the last one)

## PCUpd Message includes

- MSR object for response to registration or revocation
- FI object for indicating data forwarding
- MRS object for periodic synchronization of receivers' number

# Next Step

- Comments

[lihn6@chinatelecom.cn](mailto:lihn6@chinatelecom.cn)

[wangaj3@chinatelecom.cn](mailto:wangaj3@chinatelecom.cn)

[Huaimo.chen@futurewei.com](mailto:Huaimo.chen@futurewei.com)

[chen.ran@zte.com.cn](mailto:chen.ran@zte.com.cn)

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