

Routing Header Based BIER Information Encapsulation

[\[draft-wang-bier-rh-bier\]](#)

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- Considerations for BIER info encapsulation in L3 Header
- The format of BIER Routing Header
- Multicast Packet Forwarding Procedures
- Further Action

Considerations for BIER info encapsulation in L3 Header

[\[draft-cheng-spring-ipv6-msr-design-consideration\]](#) proposes requirements for BIER in IPv6, such as:

- Support the basic multicast functionalities(e.g. P2MP forwarding, multicast flow overlay, P2MP OAM, etc.)
- Meet the needs of high quality services with high reliability(e.g. TE, FRR, E2E protection, Advanced network measurement).

Besides, we have additional considerations:

- **Source/destination addresses should be preserved along the forwarding path.**
 - Need to count and monitor multicast traffic, the current technologies are based on the source/destination address.
- **The identification of VPN traffic should be based on the destination address.**

The existing BIER encapsulations cannot meet the above demands.

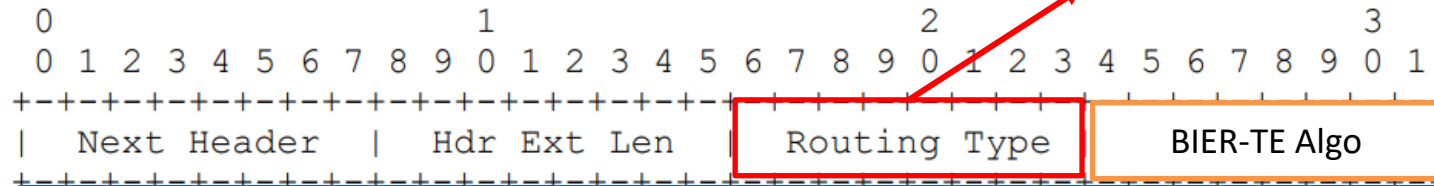
Considerations for using Routing Header to carry BIER info

Why we use Routing Header to carry BIER information?

- Aligned with the usage of the Routing Header.
- TE and BE can be realized in a unified way.
- Meet the previous requirements:
 - source and destination address are not changed along the forwarding path.
 - VPN traffic identification based on destination address can be realized.

The format of BIER Routing Header

Defining a new Routing Type



BIER-TE Algorithm specified part:

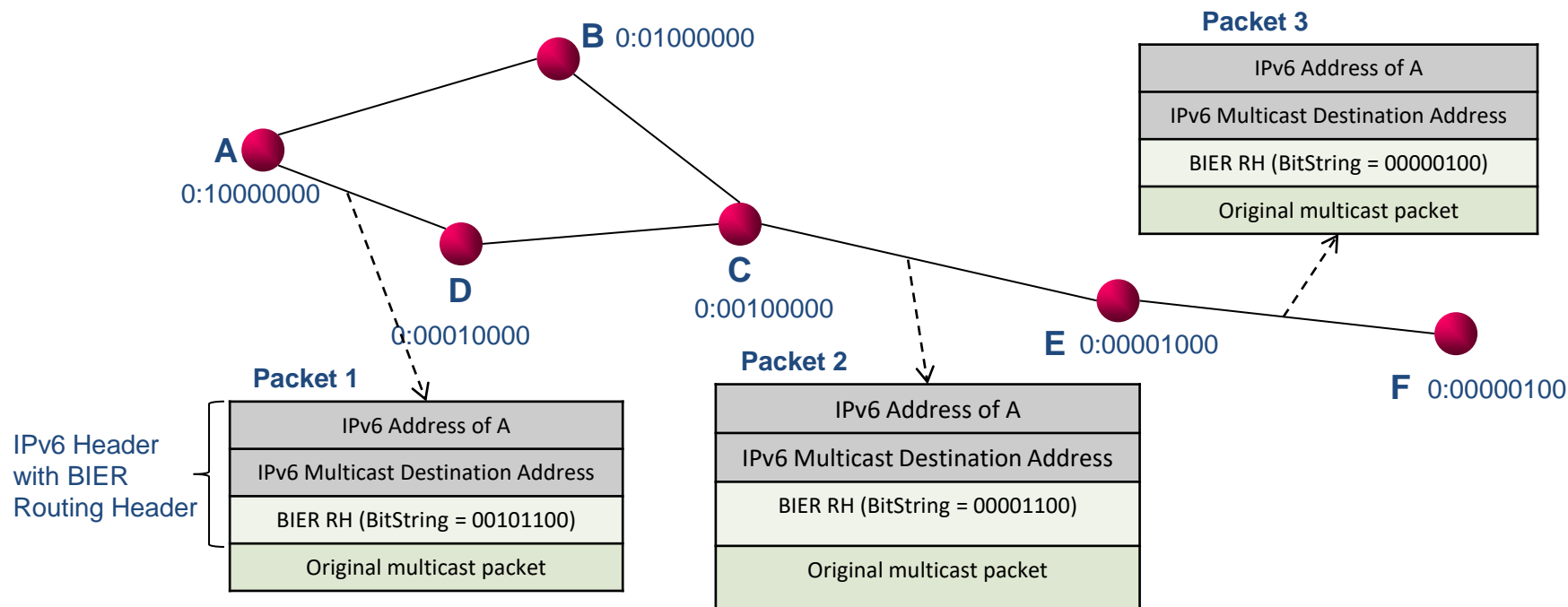
- For IGP, the encoding of this part is described in [\[RFC8296\]](#)
- For CGM2, the encoding of this part is described in [\[draft-eckert-bier-cgm2-rbs\]](#)
- For MRH, the encoding of this part is described in [\[draft-chen-pim-mrh6\]](#)

BIER-TE Algorithm Specified Encoding Format:

Algorithm 0: reserved.
Algorithm 1: IGP
Algorithm 2: CGM2
Algorithm 3: MRH
Algorithm 4-127: Expert Reviews
Algorithm 128-255: Flexible Algorithms

Multicast Packet Forwarding Procedures

All nodes in BIER domain support BIER Routing Header



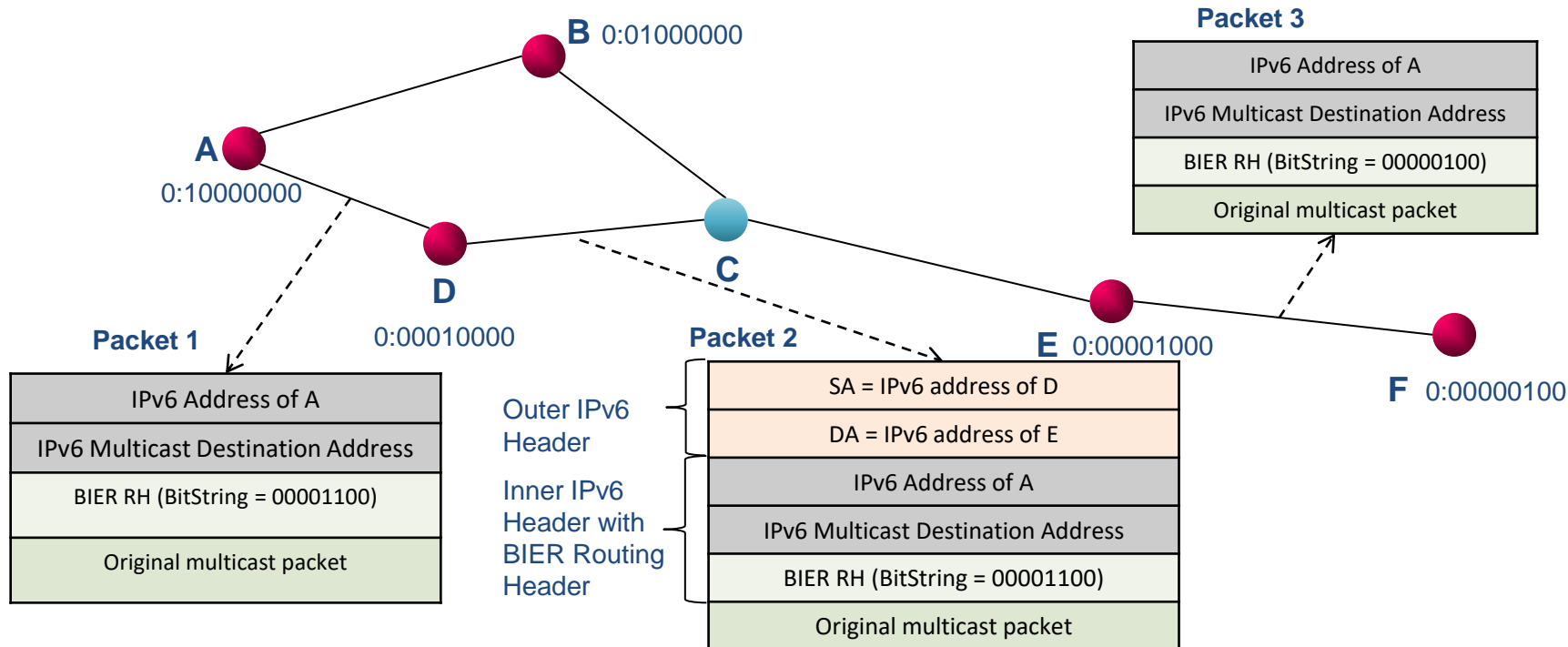
Node A-F support BIER Routing Header.

- Node A checks whether there is BIFT corresponding to the BIFT-id locally. If not, discarding the packet; otherwise, processing the packet as the procedures described in RFC8279.
- Node D-F repeats the above forwarding procedures.

During the forwarding path, the source & destination address in the IPv6 header are **not changed**, only the BitString in BIER Routing Header is updated.

Multicast Packet Forwarding Procedures

Some nodes in BIER domain do not support BIER Routing Header



Node C doesn't support BIER Routing Header.

- Node A forwards the packet to node D according to the BIFT.
- Node D calculates the IPv6 address of node E, and encapsulates an outer IPv6 Header to the packet. The source IPv6 address is the IPv6 address of itself, and the destination IPv6 address is the IPv6 address of node E. Then, sending the packet to node C.
- Node C performs normal IPv6 forwarding according to the outer IPv6 header.
- Node E decapsulates the outer IPv6 header and forwards the packet according to the BIFT.

During the forwarding path, the source & destination address in the inner IPv6 header are **not changed**.

Further Action

- How to carry VPN related information in multicast destination address
- The transmission of the generated multicast destination address
- The behaviors on BFIR/BFR/BFER to the multicast destination address
- More solutions & comments are welcome.

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