

Solution 1: Structural Segment List for Multicast Tree

■ Basic Idea :

Define a new Function type, End.RL(Replication through segment list), for explicitly specifying the nodes which the multicast tree passes through; and define two parameters in the SID: Replication Number and Pointer, which are used to indicate the replication-forwarding relationship between upstream and downstream nodes.

■ Solution :

1. MSR6 Segment List.

Contains the SIDs corresponding to the indicated nodes in the multicast tree

2. MSR6 End.RL Segment format.

Locator: used to route to the replication node, e.g., IPv6 address prefix

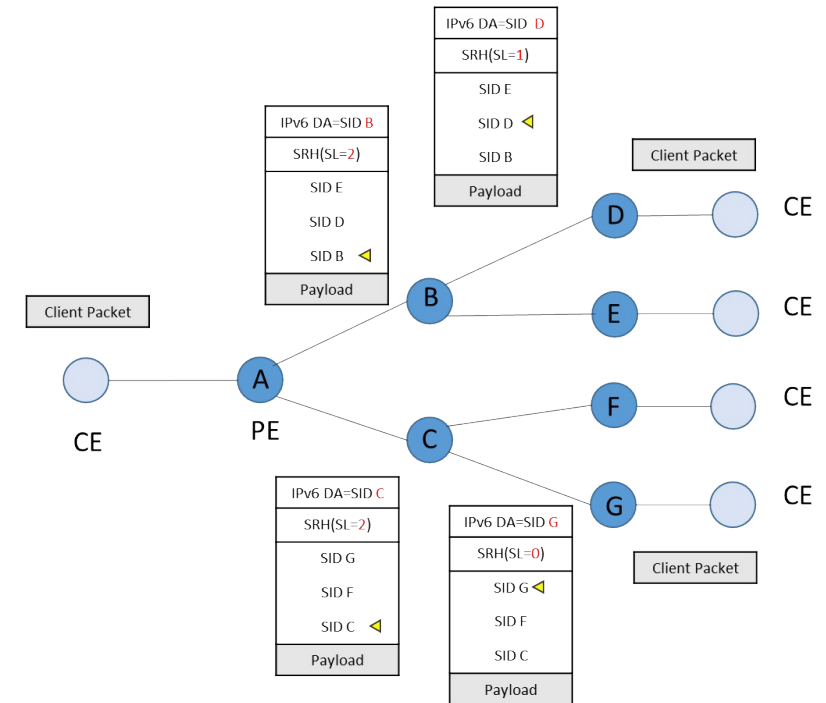
Function: Indicates that the segment performs the End.RL function.

Replication Number: Indicates how many packets to replicate in this nodes

Pointer: Indicates the Segment left value of the first child node;

3. End.RL Behavior:

- Replicate packets based on “replication number”
- update Segment Left and IPv6 DA based on “pointer”
- forward the replicated packets to the downstream nodes



- **Ingress node:** Encapsulate the packet with IPv6 header and MRH. The segment list in MRH shows the indicated multicast tree
- **Endpoint:** Replicate the packet based on the “replication number” and update the IPv6 DA with the SID which is indicated by “pointer”
- **Egress Node:** Pointer==0 and de capsulate the packet

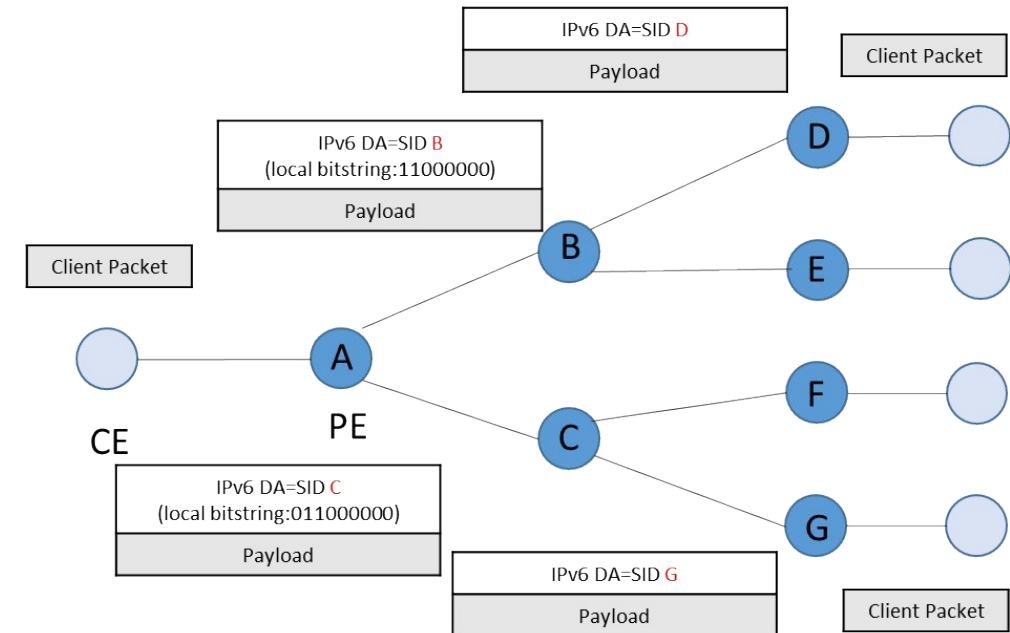
Solution 2: Structural Segment List with Local Bitstring

■ Basic Idea :

1. Define a new Function type, End.RLB.X(Replication through Local Bitstring), for adding a Local Bitstring to the SID to specify the output port sending; The meaning of the bitstring is local to the node which advertises the SID

■ Solution :

1. MSR6 Segment List
 - Contains the SIDs corresponding to the indicated nodes in the multicast tree except for the leaf nodes
2. MSR6 End.RLB.X Segment format
 - Locator:** used to route to the replication node, e.g., IPv6 address prefix
 - Function:** Indicates that the segment performs the End.RL function.
 - Pointer:** Indicates the Segment left value of the first child node;
 - Local Bitstring:** Each bit represents a local outgoing port, and a bit position represents the outgoing port from which the packet is to be forwarded
3. End.RLB.X Behavior:
 - Replicate packets based on “bitstring”
 - update Segment Left and IPv6 DA based on “pointer”
 - forward the replicated packets to the downstream nodes



Ingress node: Encapsulate the packet with IPv6 header and MRH. The segment list in MRH shows the indicated multicast tree

Endpoint: Replicate the packet based on the “local bitstring” and update the IPv6 DA with the SID which is indicated by “pointer”

Egress Node: Pointer==0 and de capsulate the packet