

Network Working Group  
Internet-Draft  
Intended status: Standards Track  
Expires: September 11, 2019

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March 10, 2019

**SRv6 Proxy Forwarding**  
**draft-chen-rtgw-srv6-midpoint-protection-00**

Abstract

The endpoints of a SRv6 path are given by a SRv6 Policy. When an endpoint node fails, we need bypass this failed endpoint node and forward the packets to the failed node's next endpoint node.

Requirements Language

The key words "MUST", "MUST NOT", "REQUIRED", "SHALL", "SHALL NOT", "SHOULD", "SHOULD NOT", "RECOMMENDED", "MAY", and "OPTIONAL" in this document are to be interpreted as described in [RFC 2119](#) [[RFC2119](#)].

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## [1.](#) Introduction

"Segment Routing Proxy Forwarding" for IPv4 is defined in [[I-D.hu-spring-segment-routing-proxy-forwarding](#)]. It provides the protections for the middle endpoints of a SR path. This document specifies the proxy forwarding for SRv6, which supports the protections for the middle endpoints of a SRv6 path.

The endpoints of a SRv6 path are given by a SRv6 Policy. When an endpoint node fails, we need bypass this failed endpoint node and forward the packets to the failed node's next endpoint node. On the PLR (i.e., the previous hop node of the failed endpoint node), it performs the bypass protection as follows if NH = SRH and SL != 0.

If the outbound interface fails and the failed endpoint node (FN for short) is directly connected to the PLR, then the PLR forwards the packets through a bypass to the FN's next endpoint node. If it is not directly connected, the normal Ti-LFA is executed.

If it is a FIB miss, the PLR forwards the packets through a bypass to the FN's next endpoint node. There is no need to check if the failed endpoint node is directly connected to the PLR.



## **2. Endpoint Node Protection for Segment List**

### **2.1. Transit Node as PLR**

When the PLR is a transit node, it provides fast protection against the endpoint node failure as follows after looking up the FIB.

```
IF the primary outbound interface used to forward the packet failed
  IF NH = SRH && SL != 0, and
    the failed endpoint is directly connected to the PLR THEN
      SL--; update the IPv6 DA with SRH[SL];
      FIB lookup on the updated DA;
      forward the packet according to the matched entry;
    ELSE
      forward the packet according to the backup nexthop;
  ELSE // there is no FIB entry for forwarding the packet
    IF NH = SRH && SL != 0 THEN
      SL--; update the IPv6 DA with SRH[SL];
      FIB lookup on the updated DA;
      forward the packet according to the matched entry;
    ELSE
      drop the packet;
```

Figure 1: PLR transit

### **2.2. Endpoint Node as PLR**

When a node N receives a packet, if the destination address (DA) of the packet is a local END SID, then node N is an endpoint node.

When the PLR is an endpoint node, it provides fast protections for the failure through executing the following procedure after looking up the FIB for the updated DA.



```
IF the primary outbound interface used to forward the packet failed
  IF NH = SRH && SL != 0, and
    the failed endpoint is directly connected to the PLR THEN
      SL--; update the IPv6 DA with SRH[SL];
      FIB lookup on the updated DA;
      forward the packet according to the matched entry;
    ELSE
      forward the packet according to the backup nexthop;
  ELSE // there is no FIB entry for forwarding the packet
    IF NH = SRH && SL != 0 THEN
      SL--; update the IPv6 DA with SRH[SL];
      FIB lookup on the updated DA;
      forward the packet according to the matched entry;
    ELSE
      drop the packet;
  //ELSE
  // forward accordingly to the matched entry;
```

Figure 2: PLR endpoint

### **2.3. Endpoint x Node as PLR**

An endpoint node with cross-connect (End.X for short) is an endpoint node with an array of layer 3 adjacencies.

When a node N receives a packet, if the destination address (DA) of the packet is a local END.X SID, then node N as PLR provides fast protections for the failure through executing the following procedure after updating DA.



```
IF the layer-3 adjacency interface is down THEN
  FIB lookup on the updated DA;
IF the primary interface used to forward the packet failed THEN
  IF NH = SRH && SL != 0, and
    the failed endpoint is directly connected to the PLR THEN
    SL--; update the IPv6 DA with SRH[SL];
    FIB lookup on the updated DA;
    forward the packet according to the matched entry;
  ELSE
    forward the packet according to the backup nexthop;
ELSE // there is no FIB entry for forwarding the packet
  IF NH = SRH && SL != 0 THEN
    SL--; update the IPv6 DA with SRH[SL];
    FIB lookup on the updated DA;
    forward the packet according to the matched entry;
  ELSE
    drop the packet;
//ELSE
// forward accordingly to the matched entry;
```

Figure 3: PLR endpoint cross-connect

#### **2.4. Endpoint t Node as PLR**

An endpoint node with specific IPv6 table (End.T for short) is an endpoint node with specific IPv6 table lookup function.

When a node N receives a packet, if the destination address (DA) of the packet is a local END.T SID, then node N as PLR provides fast protections for the failure through executing the following procedure after looking up the next segment in IPv6 table T associated with the SID.





```
IF the primary interface used to forward the packet failed THEN
  IF NH = SRH && SL != 0, and
    the failed endpoint is directly connected to the PLR THEN
    SL--; update the IPv6 DA with SRH[SL];
    lookup the next segment in IPv6 table T associated with the SID;
    forward the packet according to the matched entry;
  ELSE
    forward the packet according to the backup nexthop;
ELSE // there is no FIB entry for forwarding the packet
  IF NH = SRH && SL != 0 THEN
    SL--; update the IPv6 DA with SRH[SL];
    lookup the next segment in IPv6 table T associated with the SID;
    forward the packet according to the matched entry;
  ELSE
    drop the packet;
//ELSE
// forward accordingly to the matched entry;
```

Figure 4: PLR endpoint table

### **3. IANA Considerations**

TBD

### **4. Security Considerations**

TBD

### **5. Acknowledgements**

TBD

### **6. References**

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