segment-routing-proxy-forwarding

draft-hu-spring-segment-routing-proxy-forwarding-01

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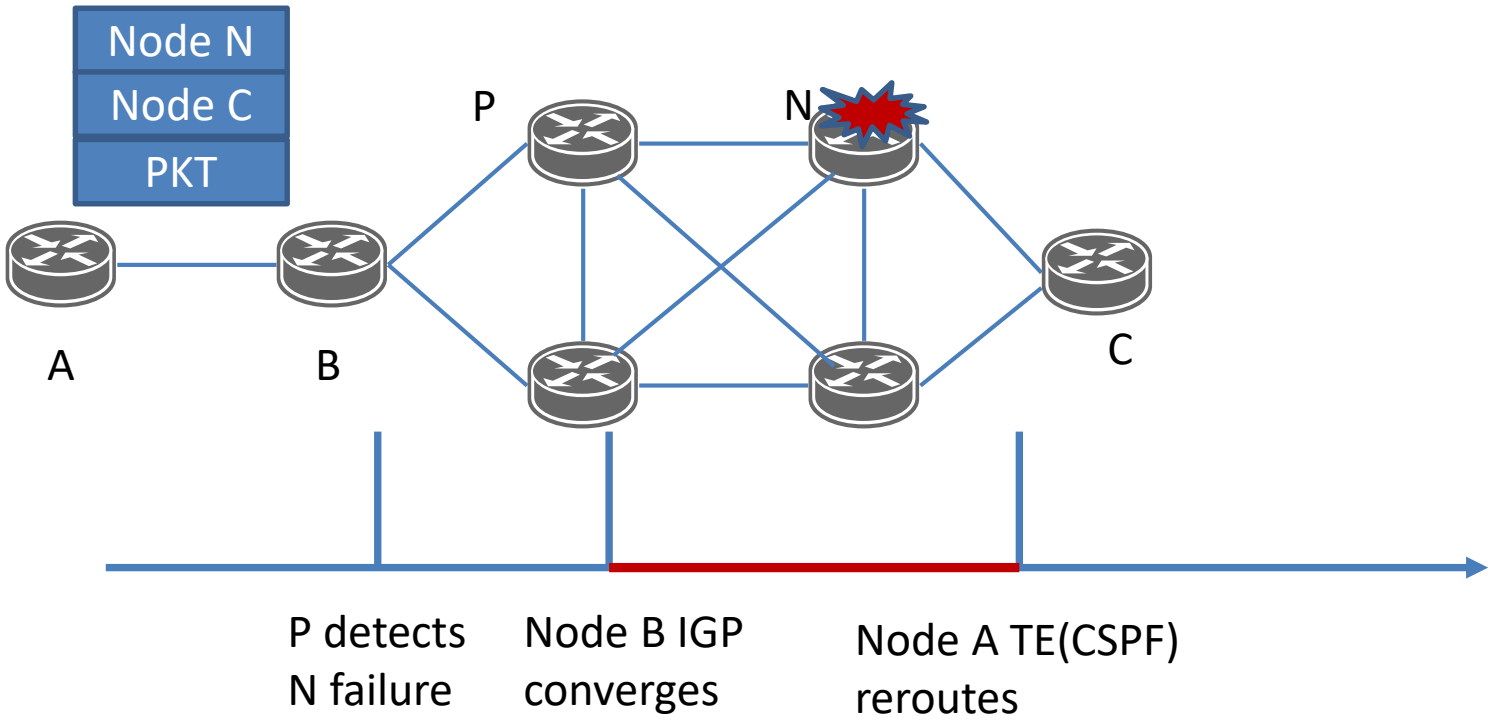
IETF 104,

Introduction

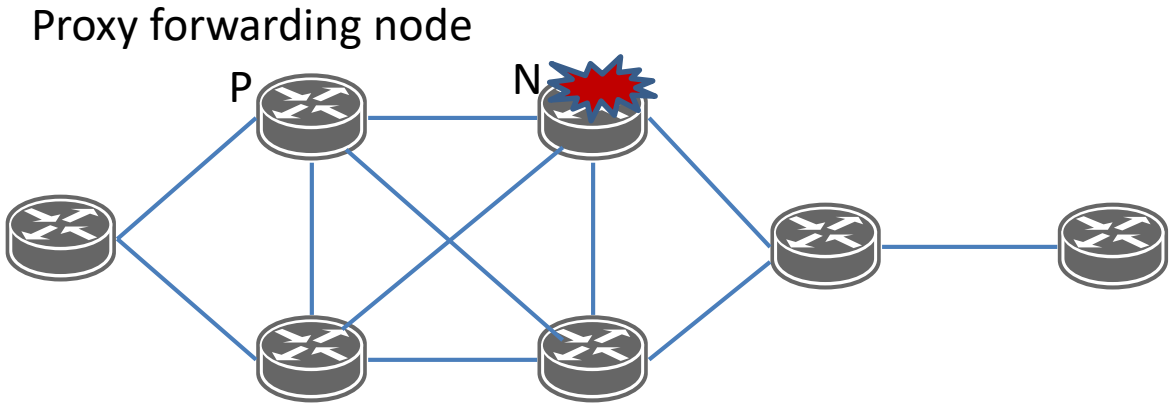
- Existing SR-TE path fast protection
  - local repair on direct neighbors of failed node
  - local repair not working once IGP converges
- This draft resolves this issue
  - It allows traffic to continue on SR-TE path for a extended time after a node on path fails
  - Neighbor (proxy forwarding node) forwards traffic around the failed node

What is problem



- Step1: P detects N failure, P as PLR does FRR to node C.
- Step2: Node B IGP converges. Delete route to node N.(Traffic drops)
- Step3: Node A computes a SR-TE path from A to C and installs it, traffic recovers

Proxy Forwarding Node



- Segment Routing: At ingress, segment list is added into packet, which is forwarded along SR-TE path.
- Proxy forwarding node P for node N is a node, which forwards packet for node N.
- When node N fails, the proxy forwarding node P for N will forward packet for node N.

Protocol Extensions

- Each neighbor P of a possible failed node N
  - Get ready for proxy forwarding for node N
  - Advertise its SR proxy forwarding capability

- A node receiving the capability from P
  - Know that P will do proxy forwarding for SID of N
  - Send traffic to P after N fails

Extensions to OSPF (1/2)

Proxy Forwarding Capability

- Node P advertises it when P can do proxy forwarding for all its neighbors
- Node X learns that each of these neighbor nodes is protected by P through proxy forwarding
- In normal operations, node X prefers to use SID of node N to direct traffic
- When node N fails, node X prefers to use proxy P of node N to direct traffic

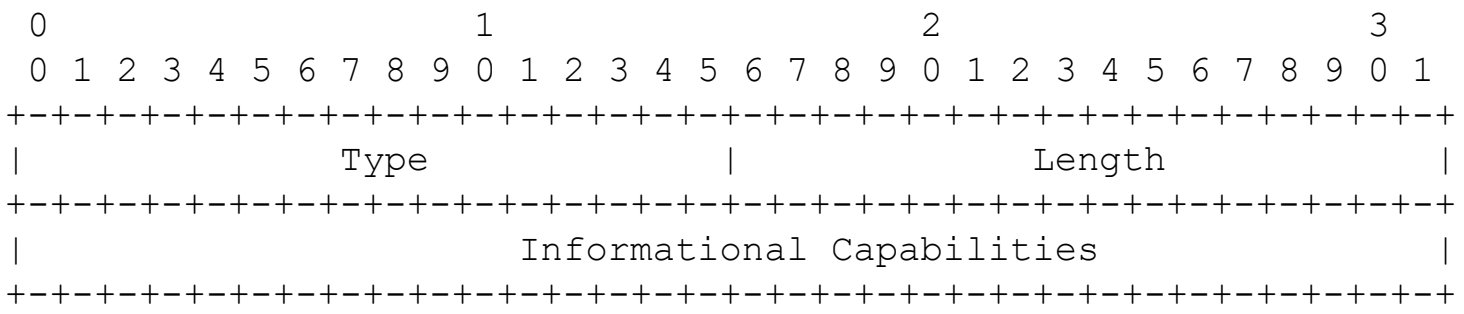


Figure 1: Router Informational Capabilities TLV

Extensions to OSPF (2/2)

Binding Segment on node N (binding SID and a list of segments)

- Node N advertises it only to its neighbor nodes using TLV in link-scope LSA
- When node N fails, node P (neighbor of N) does proxy forwarding for node N using the binding information

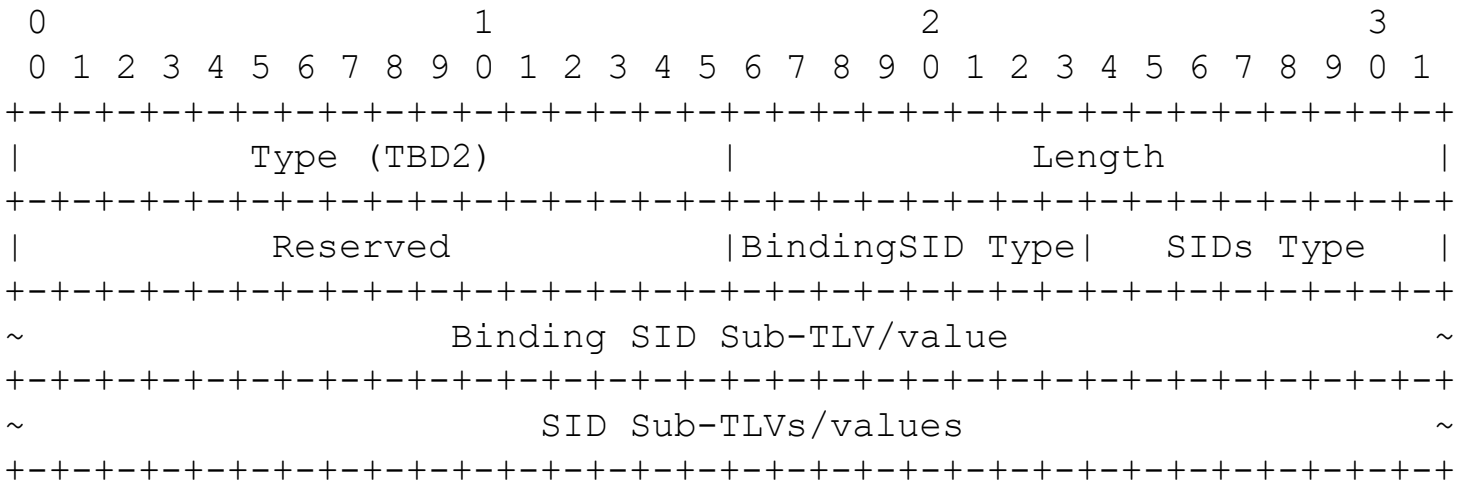


Figure 4: OSPF Binding Segment TLV

Extensions to IS-IS (1/2)

Similar to OSPF for Proxy Forwarding Capability

- Node P advertises it when P can do proxy forwarding for all its neighbors in SR proxy forwarding capability in its LSP
- Node X learns that each of these neighbor nodes is protected by P through proxy forwarding
- In normal operations, X prefers to use SID of node N to direct traffic
- When node N fails, X prefers to use proxy P of node N to direct traffic

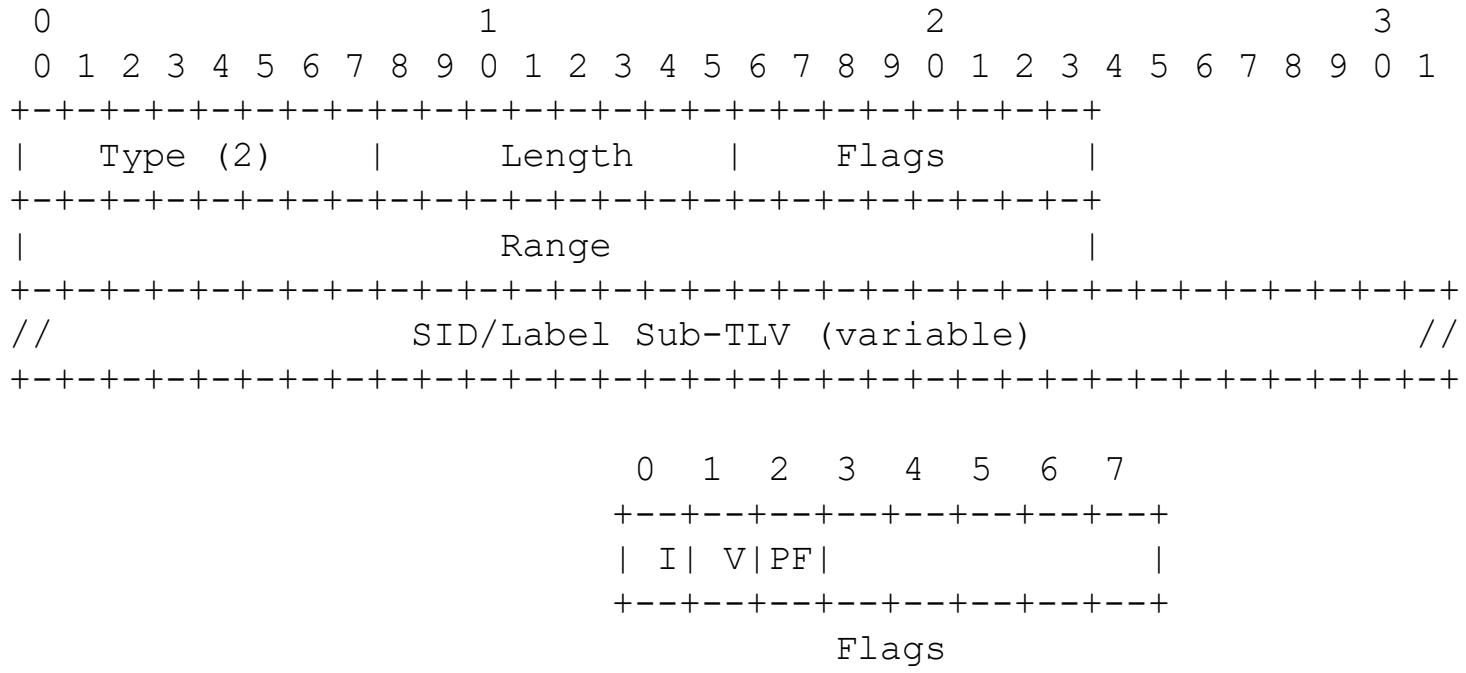


Figure 7: SR Capabilities sub-TLV

Extensions to IS-IS (2/2)

Binding Segment on node N (binding SID and a list of segments)

- Node N advertises it only to its neighbor nodes using TLV in Hello or link-scope LSP
- When node N fails, node P (neighbor of N) does proxy forwarding for node N using the binding information

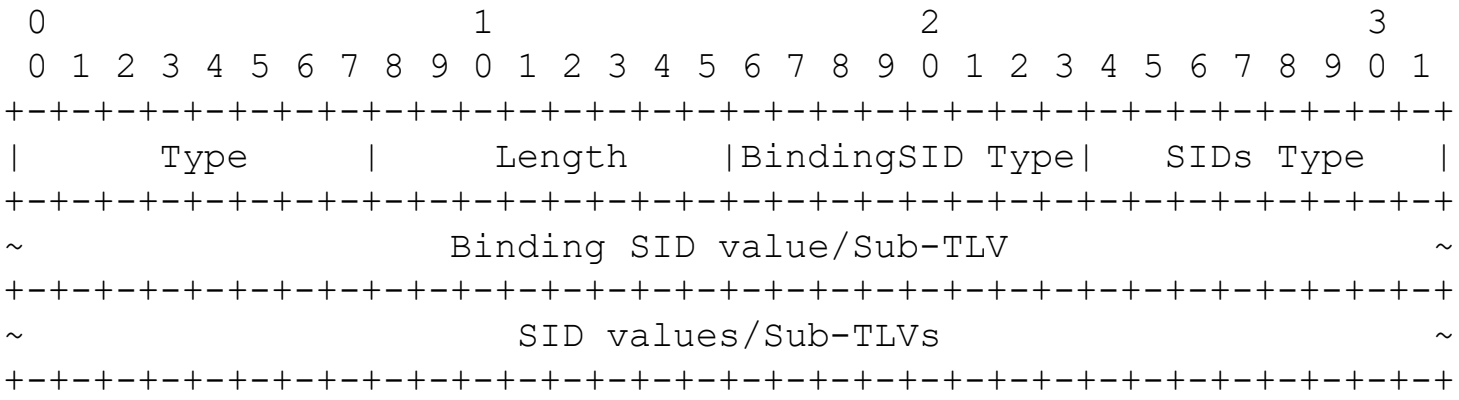


Figure 9: IS-IS Binding Segment TLV

Next Steps

- Welcome comments