Protecting traffic-engineered SR paths against node failure

draft-hegde-spring-node-protection-for-sr-te-paths

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Protecting a traffic engineered SR path (link protection example)

Node 70 sends packet on outgoing intf 70->01 with label stack = [101002, 102080, 180083, 183090] to instantiate path 70->01->02->03->80->83->90

Protection for failure of link 01-02 (without node protection)

Forwarding entry on 01:
Incoming label = [101002]
Primary NHLFE:
outgoing intf = 01->02, Pop (assuming PHP)

Backup NHLFE:
outgoing intf = 01->21, Pop, Push [121022, 722023, 123002]

Right after failure of link, packet leaving 01 on intf 01->21 has label stack = [121022, 722023, 123002, 102080, 180083, 183090]

End-to-end path immediately after failure:
70->01(->21->22->23->)02->03->80->83->90

All metrics are 10 unless otherwise shown
Node XY has node-sid index = XY and SRGB = 1XY000
(for example node 83 has index = 83 and SRGB = 183000)
Link from node AB to node XY has adj-sid = 7AB0XY
Protecting a traffic engineered SR path (node protection example)

Node 70 sends packet on outgoing intf 70->01 with label stack = \([101002, 102080, 180083, 183090]\) to instantiate path 70->01->02->03->80->83->90

Protection for failure of link 01-02 (with node protection)

Forwarding entry on 01:
Incoming label = \([101002]\)
Primary NHLFE:
outgoing intf = 01->02, Pop (assuming PHP)

 Incoming labels = \([101002, 102080]\)
 Backup NHLFE:
 outgoing intf = 01->21, Pop, Pop, Push \([121022, 722023, 123024, 124080]\)

Right after failure of link, packet leaving 01 on intf 01->21 has label stack = \([121022, 722023, 123024, 124080, 180083, 183090]\)

End-to-end path immediately after failure:
70->01(->21->22->23->24->03)->80->83->90

All metrics are 10 unless otherwise shown
Node XY has node-sid index = XY and SRGB = 1XY000
(for example node 83 has index = 83 and SRGB = 183000)
Link from node AB to node XY has adj-sid = 7AB0XY
Why PLR needs to look at the second label for node protection

Path A: Node 70 sends packet on outgoing intf 70->01 with label stack = [101002, 102080, 180083, 183090] to instantiate path 70->01->02->03->80->83->90

Incoming labels = [101002, 102080]
Backup NHLFE:
  outgoing intf = 01->21, Pop, Pop, Push [121022, 722023, 123024, 124080]

Label stack leaving intf 01->21:
[121022, 722023, 123024, 124080, 180083, 183090]

Path B: Node 70 sends packet on outgoing intf 70->01 with label stack = [101002, 102034, 134090] to instantiate path 70->01->02->03->34->83->90

Incoming labels = [101002, 102034]
Backup NHLFE:
  outgoing intf = 01->21, Pop, Pop, Push [121022, 722023, 123024, 124034]

Label stack leaving intf 01->21:
[121022, 722023, 123024, 124034, 134090]
Path A: Node 70 sends packet on outgoing intf 70->01 with label stack = [101002, 102080, 180083, 183090] to instantiate path 70->01->02->03->80->83->90

Incoming labels = [101002, 102080]
Backup NHLFE: outgoing intf = 01->04, Pop, Pop, Push [104080]

Label stack leaving intf 01->04: [104080, 180083, 183090]

Path B: Node 70 sends packet on outgoing intf 70->01 with label stack = [101004, 104080, 180083, 183090] to instantiate path 70->01->04->03->80->83->90

Incoming labels = [101004, 104080]
Backup NHLFE: outgoing intf = 01->04, Pop, Pop, Push [102080]

Label stack leaving intf 01->04: [102080, 180083, 183090]
Example where first label is adj-sid

Node 70 sends packet on outgoing intf 70->01 with label stack = [701002, 102080, 180083, 183090] to instantiate path 70->01->02->03->80->83->90

Protection for failure of link 01-02 (with node protection)

Forwarding entry on 01:
Incoming label = [701002]
Primary NHLFE:
  outgoing intf = 01->02, Pop

Incoming labels = [701002, 102080]
Backup NHLFE:
  outgoing intf = 01->21, Pop, Pop, Push [121022, 722023, 123024, 124080]

Right after failure of link, packet leaving 01 on intf 01->21 has label stack = [121022, 722023, 123024, 124080, 180083, 183090]

End-to-end path immediately after failure:
70->01(->21->22->23->24->03->)80->83->90

All metrics are 10 unless otherwise shown
Node XY has node-sid index = XY and SRGB = 1XY000
(for example node 83 has index = 83 and SRGB = 183000)
Link from node AB to node XY has adj-sid = 7AB0XY
Node 70 sends packet on outgoing intf 70->01 with label stack = [101002, 702003, 103090] to instantiate path 70->01->02->03->80->90.

Protection for failure of link 01-02 (with node protection)

Forwarding entry on 01:
Incoming label = [101002]
Primary NHLFE:
  outgoing intf = 01->02, Pop (assuming PHP)

Incoming labels = [101002, 702003]
Backup NHLFE:
  outgoing intf = 01->21, Pop, Pop, Push [121022, 722023, 123024, 124003]

Right after failure of link, packet leaving 01 on intf 01->21 has label stack = [121022, 722023, 123024, 124003, 103090]

End-to-end path immediately after failure: 70->01->21->22->23->24->03->80->90

Example where second label is adj-sid

All metrics are 10 unless otherwise shown
Node XY has node-sid index = XY and SRGB = 1XY000
(for example node 83 has index = 83 and SRGB = 183000)
Link from node AB to node XY has adj-sid = 7AB0XY
Next steps for

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• Request that chairs consider conducting a poll for WG adoption