S-BFD

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Why Another Flavor of BFD?

• Existing BFD is **excellent** for bi-directional reachability validation scenarios
• S-BFD provides improved **control**, **flexibility** and **simplified operations** to initiator for even wider range of scenarios and use-cases

• Why?
  – Faster reachability verifications
  – Reduction of false failures
  – Built-in fault isolation
  – Better fits those difficult with existing BFD: anycast, centralized controller initiation, etc
How S-BFD Works? [1]

- Pre-create reflector sessions in the network
  - Allocate discrim for local network identifier
  - Create reflector session to **listen** for S-BFD packets coming in with your_discrim = allocated discrim

A allocates 0x01010101 discrim for 1.1.1.1 IPv4 address
B allocates 0x01010102 discrim for 1.1.1.2 IPv4 address
Etc

- Initiator to send S-BFD packet to reflector session
  - Any transport
  - your_discrim=<discrim of intended target>
  - my_discrim=<locally allocated for this initiator instance>

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<table>
<thead>
<tr>
<th>Transport</th>
<th>your_discrim=0x01010103</th>
</tr>
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<tr>
<td></td>
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How S-BFD Works? [3]

- Reflector session to send **response** S-BFD packets
  - Only handles your_discrim for me, otherwise drop
  - Send response S-BFD packets back to initiator
  - Single reflector session can handle multiple initiators

Graph:

- A connects to 1.1.1.1
- B connects to 1.1.1.2
- C connects to 1.1.1.3
- D connects to 1.1.1.4
- E connects to 1.1.1.5
- F connects to 1.1.1.6

Transport:

- your_discrim=xxx_on_A
  - my_discrim=0x01010103
- your_discrim=yyy_on_F
  - my_discrim=0x01010103

Swap discrim on response
Yes ...

• S-BFD is like one-sided echo
  • But ... works for IP multihop, “loop” only on intended target and preserves minimal communication between end points

• S-BFD is like demand mode
  • But ... no per session state on egress, no bootstrapping, and allows one-to-many (many initiators to one reflector session)

• S-BFD is like ping/traceroute
  • But ... comes w/ great performance and scalability of BFD as result of still using fixed BFD header, and supports multiple transports
S-BFD Alert Discriminator

• **Same** discriminator allocated as reflection point in multiple network nodes, called Alert Discrim

• Your_discr=<alert discrim> can solicit response from those network nodes

• S-BFD Path Tracing Example
  – Multihop S-BFD detects failure ...
  – Send S-BFD packets with your_discr=<alert discrim>, with incrementing TTL
  – Record source IP address from received responses.
  – Using anything else may traverse ECMP differently!

• (Alert Discrim + Diag) can indicate various hints
S-BFD Drafts

- draft-akiya-bfd-seamless-base-02
- draft-akiya-bfd-seamless-ip-00
- draft-akiya-bfd-seamless-sr-00
- draft-akiya-bfd-seamless-alert-discrim-00
Major Changes in Base Versions

• -00 -> -01

  In addition, reflector BFD session SHOULD transmit response BFD control packet on the same interface on which it received the packet from initiator.

• -01 -> -02
  – New single UDP destination port for S-BFD
    • Separate discriminator pool MAY be implemented
  – Initiator state machine (Down/Up/AdminDown)
Next Steps

• Add more contents for security aspect in base
  – Spoofed packets can cause loops, D bit to fix?
  – Clarifications on authentications on S-BFD

• Polish up IP/SR/AlertDiscrim documents

• Would like WG review

• Request for WG adoption [near future]
Thank you!

Questions/Comments?
Backup Slide
(in case we need to discuss with topology)