

Prefix Unreachable Announcement(PUA)

[\[draft-wang-lsr-prefix-unreachable-announcement\]](#)

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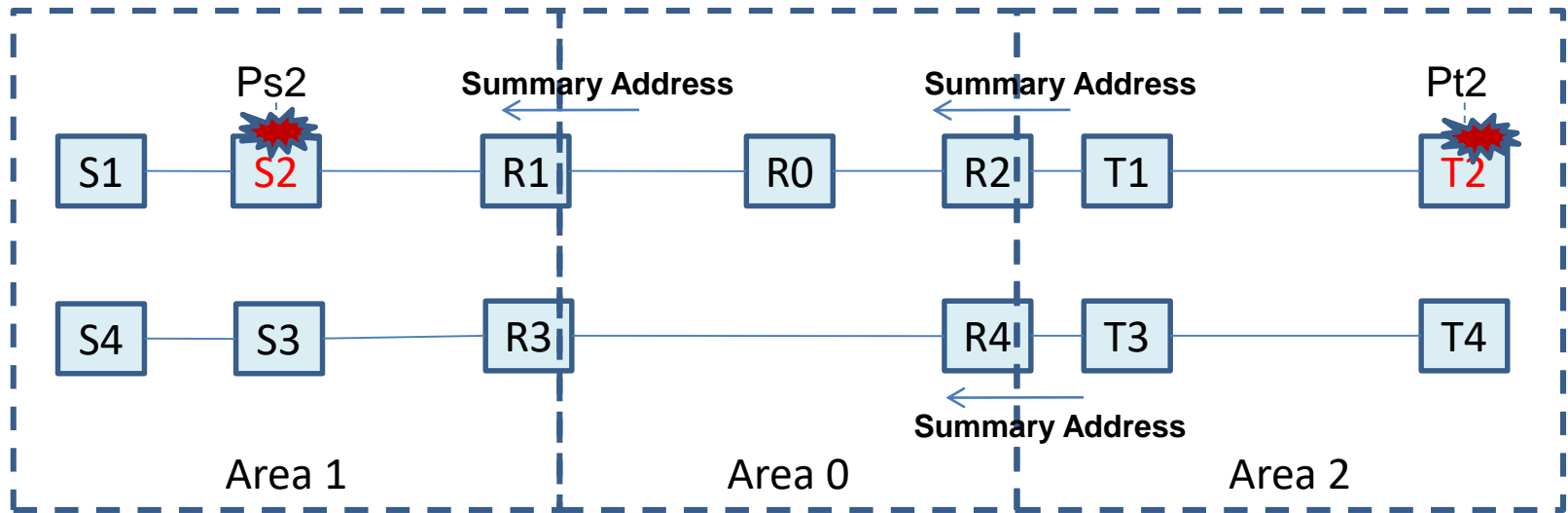
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Motivation

- PUA use case:
 - Notifies BGP next hop is unreachable to trigger BGP route convergence.
 - Inter-Area scenario, notify other area nodes that the prefix is unreachable via one ABR. And trigger IGP select another ABR.
- With the introduction of SRv6, more and more services are migrated from the MPLS data plane to the IPv6 data plane. On a large-scale network, route summarization is a common deployment mode.
- We think it is necessary to reopen the discussion on how to perceive the unreachability of nodes in summary scenarios.

- PUA Mechanism Review
- Updates
 - Usages of Tunnel among ABRs
 - Fast Rerouting to Avoid Routing Black Hole
 - PUA Capabilities Announcement
- Further Action

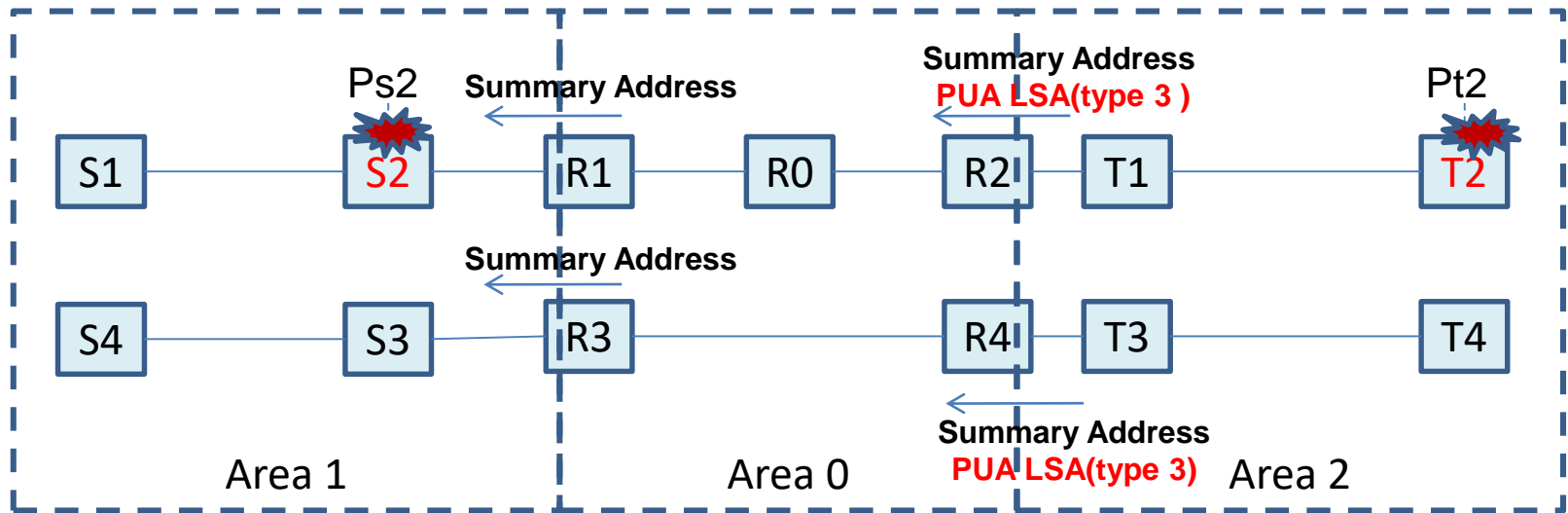
Prefix Unreachable Scenario (Inter-Area/Intra-Area)



OSPF Prefix Unreachable Scenario (**Node** Failure)

- When ABR(R2/R4 or R1/R3) do summary work:
 - Only the summary address will be announced to another Area
- When **Node/Link** failure, routers in other area will not be notified.
 - Traffic to these Node/Link will be in black hole.
 - Control plane(BGP) based on the logical interface of the Node(Ps2/Pt2) will keep alive until it detects.
 - Detail procedures can refer to [here](#)
- **Such situation will be exacerbated for SRv6 based VPN solution**

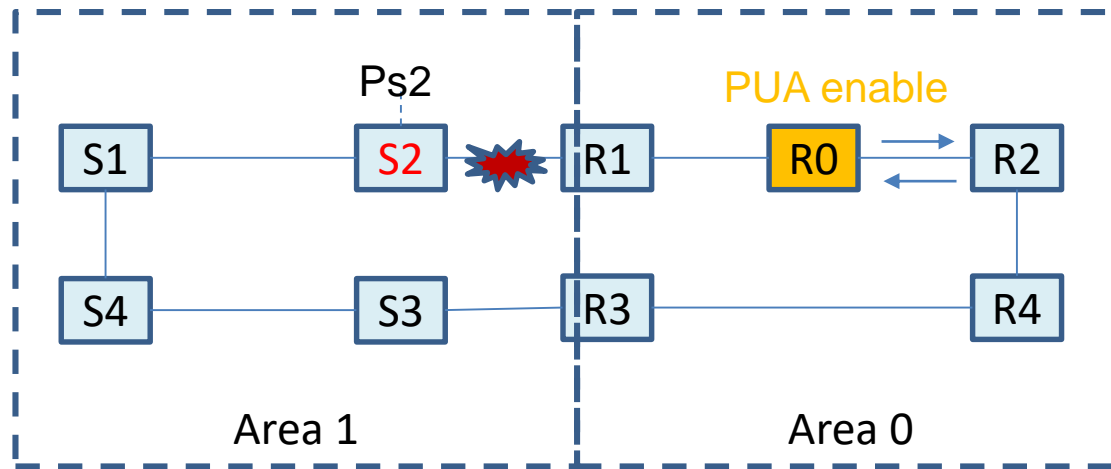
PUA Mechanism(Inter-Area/Intra-Area)



OSPF Prefix Unreachable Announcement Solution

- For Inter-Area scenario,
 - PUA LSA(Prefix Originator be set to NULL) will be generated by the ABR
 - If Nodes receives the PUA LSA from all of the ABR, it will generate one black hole route to the specified prefix, or else, prune the ABR that advertised PUA from the possible next hop to the specified prefix.
- For Intra-Area scenario,
 - Nodes within the same area will generate one black hole route to the specified prefix for defined period.

When PUA mechanism is not effective.....



1. Both ABR R1/R3 reach the PUA limit, but there exist ABR reach the prefix.
 - ✓ Using Tunnel among ABR to redirect the traffic to another viable ABR
 - ✓ Using SR technologies to detour the traffic to another viable ABR
2. Not all routers in one area support PUA mechanism-----Possible Loop
 - ✓ Defines the PUA capabilities for router.
 - ✓ ABR announcement only the PUA information when all routers within one area support PUA

Comparison of Candidate Solutions

Key Points	PUA	Tunnel	Fast Rerouting
BGP Route Convergence Scenario	✓	✗	✗
IGP Inter-Area Scenario	✓	✓	✓
Need Support from All Nodes of the Network?	✓	✗	✗

PUA, together with Tunnel or Fast Rerouting

- ✓ Extend PUA solution to cover more complex scenarios
- ✓ Minimize the influence of the traffic black hole

PUA Capabilities Definition

- OSPF v2
 - Define P-Bit(suggest 0x20) within “OSPF Router Properties Registry”
- OSPF v3
 - Define PUA Capability Support Bit(suggest bit 8) within “OSPF Router Informational Capabilities Bits Registry”
- IS-IS
 - Define “PUA Support Capabilities sub-TLV(suggest type 29)” within IS-IS Router Capability TLV(TLV242)

Further Action

- Comments?
- Adopt as WG document?

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