



IS-IS V6/MT Deployment Considerations

draft-chunduri-lsr-isis-mt-deployment-cons-02

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- This work was presented in LSR WG (@IETF 103)
- Based on the feedback/suggestions, we are presenting here (V6OPS)

Background

- There are lot of IPv4 IS-IS deployments
- Few more folks are seeking “IPv6 only” IS-IS deployments
- This is based on talks with multiple operators in
 - Mobile backhaul (5G, SRv6??)
 - L3 DC undelays

What's the goal & What can be done

- Goal of this document is to lay out the nuances around IS-IS IPv6
- IS-IS MT != IS-IS Ipv6
- Provide various options and limitations with IS-IS
 - For transitioning from IPv4 to IPv6
 - For IPv6 only deployments
- Doesn't provide any protocol extensions
 - Seek inputs from the community if anything more to be done to simplify things
- Non-Goal: Covering ISIS-MT use cases or applications

IPv6 in IS-IS

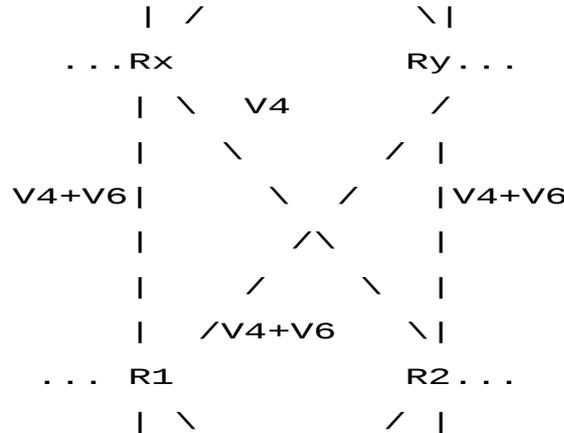
- IPv6 first introduced in IS-IS through RFC 5308
 - New Reachability TLV xx TLV236
 - It works in Single Topology Mode

- Later Multi-Topology IS-IS xx RFC 5120 (IS-IS MT)
 - Introduces Topology Specific Adjacencies (222), MT aware reachability TLVs (235, 237)
 - Topology specific Decision process
 - ...and defined Multi-Topology ID #2 for "**Reserved for IPv6 routing topology**"
 - Safe alternative to deploy IPv6 on legacy network



Network Congruency

- IPv6 with RFC 5308 is yes, simple and straight forward
- But network congruency **MUST** be maintained, I.e.,
 - Network Can be only IPv6 (all links and nodes **MUST** support) or
 - “All” Links and Nodes **MUST** support both IPv4 and IPv6
- Else one will have routing black holes like below



- Assume all links metrics are 1; Direct link from Rx to R2 is Shortest Path from Rx to R2
- V6 Traffic block hole from R2 to Rx is even though alternate path available (Rx, R1, R2)
- This gets fixed
 - Either by enabling V6 on that link (making network congruent)
 - Use RFC 5120, MT-ID #2



Single Topology Mode – with multiple AFs

- Restrictions: network MUST be congruent (as seen above)
 - I.e., all routers in the topology MUST support only IPv4, only IPv6 or both IPv4 and IPv6 address families on all links and node.

- Some examples where congruency is not possible as follows:
 - a. When IPv6 is getting introduced in the network legacy nodes that are IPv6 incapable.
 - b. Implementation issues causing IPv6 to be disabled on some nodes.
 - c. Hardware scale limitations causing IPv6 to be disabled on some low-end nodes.



A Note on IS-IS MT

- **Single ADJ with supported MT-IDs**
- **MT-ID specific decision process and route computation (common RIB/FIB)**
- **MT Deployments?**
 - One of the main use case for IS-IS MT is MT-ID #2 (IPv6)
 - while MT can be generically be used for other topologies (IPv6 or otherwise), not much deployed
 - Not all vendors support extensible sub-topologies with different MT-IDs



Topology & Address Family Confusion?

- Terminology is fully intertwined in IS-IS
- MT ID #2 is called "Reserved for IPv6 routing topology"
- Yes, one can define other MT's for IPv6 other than above.
- Tiring conversation !!
 - Want IPv6 only \Leftrightarrow Use MT ID #2
 - I don't want Multi-Topology, just want IPv6 IS-IS \Leftrightarrow yes, use MT-ID #2
- One of the goals of this document is to ease this conversation.
- MT Deployments: A note
 - One of the main use case for IS-IS MT is MT-ID #2 (IPv6)
 - while MT can be generically be used for other topologies (IPv6 or otherwise), not much deployed
 - Not all vendors support extensible sub-topologies with different MT-IDs

Summary & Next Steps

- In summary, this document only provides various options available for
 - Deploying IPv6 only topology
 - Transitioning to IPv6 from IPv4 (pitfalls to avoid)
 - Demystifies what's been deployed with IS-IS MT

- Comments/Feedback from operators?

- Planning to ask for adoption of this draft at LSR WG