Running MPLS on an IPv6-only Network

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IPv6-only Network Realization: Use case

Service Providers, Cable Companies, Mobile Operators, WiFi providers

- Thousands (or millions) of devices that need to be IP-addressable
  - Set Top boxes, macro/micro/femto/picocell devices, WiFi APs, M2M/IoT
  - Today: Massive overlap/reuse of RFC1918, squat, little public IPv4 space available
  - ASAP: <u>Endpoints</u> **only** get IPv6 addresses, *preserve IPv4 for customers*
- What happens when I need to extend my MPLS infrastructure/features/services to/through these IPv6-only nodes?
  - Does everything still work?
  - And don't assume we can put IPv4 addresses on upstream PE or P routers either

MPLS IPv6 network: Use case time-line

- But isn't IPv6-only networking a long way off?
  - Deploying IPv6-only devices **TODAY**
- MPLS/LDP on IPv6-only networks isn't needed yet, but let's assume it will be within ~5 years:
  - IETF protocol dev process = 2+ years
  - Vendor Implementation and test = 1-2 years
  - Carrier test and roll-out = 1-2 years
- Get IPv6-only support on MPLS ahead of when we need it
- MUST NOT require IPv4 for proper and complete function (RFC6540)

Proposal: A Gap Analysis

- Assuming a network of IPv6-only PE/P routers
- Assuming all services defined for MPLS Today

Gap Analysis: Possible impact on IPv6 only MPLS networks

Assuming a network of IPv6-only PE/P routers

- L2VPN/VPLS/MPLS-TP
- L3VPN (4PE/4VPE??)
- NG-MVPN (v4 and v6 multicast)
- Control plane, LDP, TE
- OAM
- Both classical LDP and GRE/L2TPv3 over IPv6 transport (non-MPLS core)
- Ensure that user data address family is agnostic of transport network address family
- Some ongoing efforts in IETF to address known gaps
  - Updates to LDP for IPv6: draft-ietf-mpls-ldp-ipv6-08
  - Router-Alert : draft-manral-mpls-rsvpte-ipv6
  - Definitions of Textual Conventions (TCs) for Multiprotocol Label Switching (MPLS) Management : draft-manral-mpls-rfc3811bis-01