IPv6 Segment Routing for Multicast

@ Comcast

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Why?

• Because of the topology and relative volume of traffic compared to unicast; there is no benefit to running IP Multicast in the Backbone/Regional area networks
  - RAN is a hub and spoke architecture: multicast traffic needs to be on all links to the hubs receiving it
  - BB is a sparse topology with multiple Tb/s links
• Multicast is a significant burden on - vendor silicon/code/testing
  - Comcast multi-vendor interoperability testing and Operations (estimates of 20% of silicon for bus/fabric chips)
• Multicast is an obvious, very beneficial choice to move out of the Underlay Network and into x86, Software and Application control
Simplicity

• The IPv6 header has the capability of adding Option Headers for specific functions
  – The Segment Routing Header (SRH) is one; it is only processed if the Router is the destination of the packet being processed
  – The function of the header is very similar to the Loose Source Route (LSR) function in IPv4; the intermediate IPV6 addresses are SID’s
  – There was an original Option Header defined in IPv6 for this function that was deprecated; SR brings back the function with a new Option Header definition.

IPv6 SR SUPPORT IS NOT REQUIRED BY ANY ROUTER/SWITCH/DEVICE not identified as a SID!!!
IPv6 SR Solution
Source and CMTS support SR

Network Provides Unicast Path Protection

Packet:
Source X::1
Dest Y::1
SRH
SID1 FF:/8

Packet on CMTS recv:
Recognize last SID
Move SID to Dest
Bit set to strip SRH

CMTS recognizes IPv6 multicast dest and forwards as a normal multicast originated locally

CMTS process MLD Joins as normal

Clients send MLD Joins as normal

Packet:
Source X::1
Dest FF:/8
Multicast Address: FF:/8
IPv6 SR Solution
One Source, Multiple CMTS support

Network Provides Unicast Path Protection

Source X::1

DC/BB/CRAN

CMTS Y::1

CMTS Y::2

CMTS Y::3

CMTS Y::4