

Multicast Extensions to DS-Lite

draft-qin-softwire-dslite-multicast-01

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Basic Requirements

- DS-Lite serviced customers accessing the same advanced services as (IPv4) legacy customers **MUST** have the same QoE
 - This includes IPTV
- Means to guarantee IPv4 service continuity during the transition period **SHOULD** be investigated
 - Including the delivery of Multicast-Based services such as live TV broadcasting

Context

- In the current IPv4 network delivering multicast, to make it realistically feasible and efficient,
 - That is to reduce the burden of Access Gateway and the consumption of downstream bandwidth
- The network is optimized by involving Layer 2 infrastructure in the Access Network
 - Traffic is replicated within multicast VLAN
 - IGMP Snooping with Proxying is introduced into L2 Nodes between the Access Gateway and the receivers

Problem Statement

- The current design of DS-Lite covers [Unicast](#) exclusively
- If it is used for multicast delivery, similar issue shows up since,
 - AFTR must process a huge number of IGMP Reports received through tunnels and perform as the Replication Point, downstream bandwidth is vastly consumed as well
 - Even worse if the AFTR capability is centralized ...
 - Severe overloading of both device and bandwidth
 - Impossible to deploy Rapid Channel Zapping mechanisms
- While the network optimization can NOT be implemented due to the tunnel encapsulation,
 - This I-D contributes to define an efficient solution for the delivery of multicast service offerings to DS-Lite serviced customers

Solution Overview

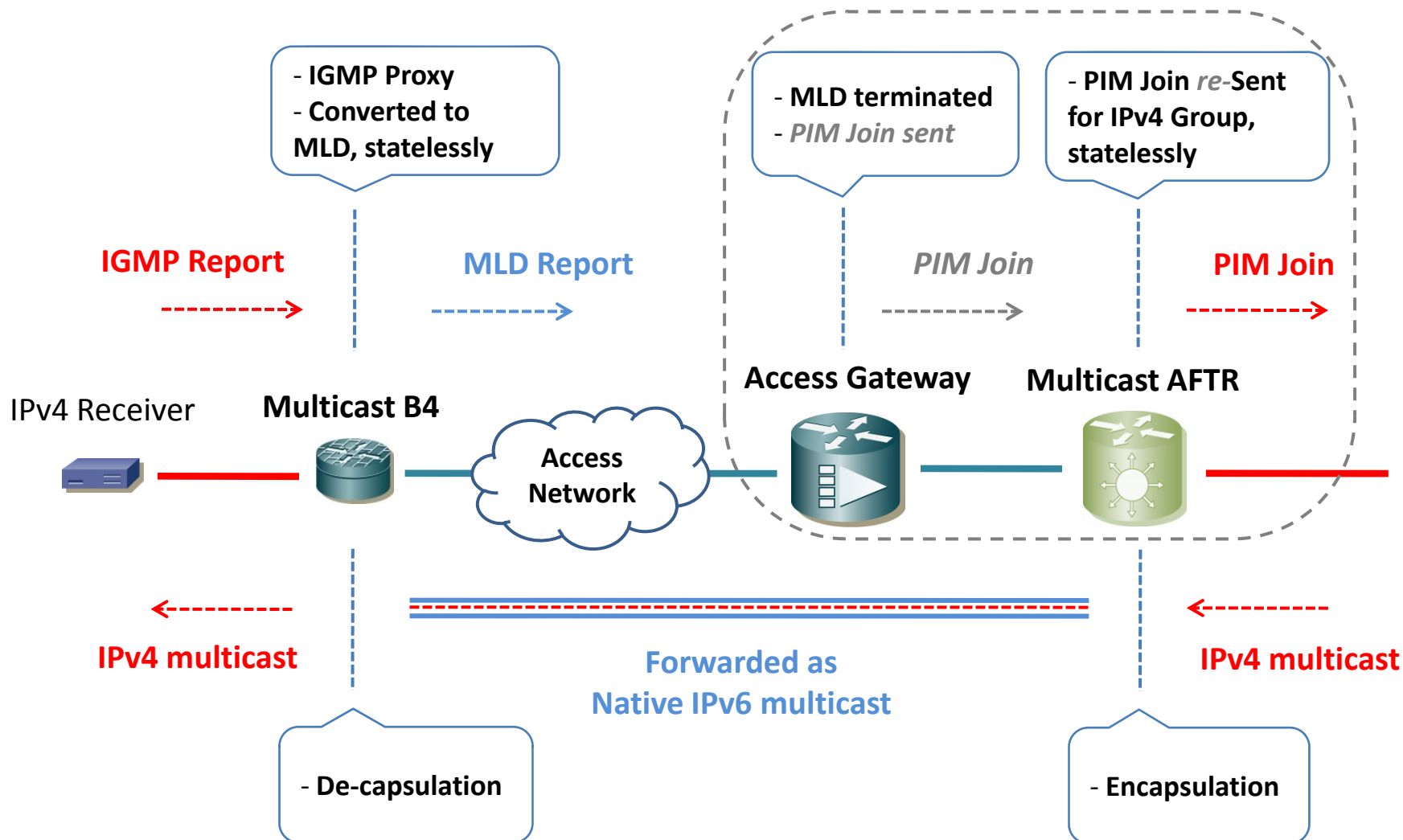
- New Entities:
 - [Multicast AFTR](#), may be located in the first hop router or upstream in the network, as part of both the IPv4 and IPv6 multicast distribution trees
 - [Multicast B4](#), is a functional entity embedded in a CPE
- Multicast Distribution Tree establishment
 - Multicast B4 performs IGMP/MLD Proxying per RFC4605, assuming IGMP-MLD Inter-working function
 - [Only](#) MLD Report messages are relayed up to the first hop router
 - Multicast AFTR re-Sends PIM Join for the corresponding IPv4 group when receiving MLD or PIM Join for the IPv4-embedded IPv6 group

Solution Overview (Cont.)

- Data Forwarding
 - Multicast AFTR encapsulates IPv4 multicast flows into IPv6 statelessly using the IPv4 (group address)-Embedded IPv6 address as the destination
 - Address format is defined in RFC6052
 - Multicast B4 de-capsulates received IPv6 datagrams that convey original IPv4 multicast packets and forwards them to the IPv4/Dual Stack receivers

Example:

Multicast AFTR can be also embedded into the Access Gateway



Changes to the “Unicast DS-Lite”

- The Multicast AFTR does NOT undertake any stateful NAT operation
- Multicast B4 does NOT need to discover a Multicast AFTR
- Two IPv6 prefixes are needed as well as an unified Address Mapping Algorithm
 - [mPrefix64](#), for constructing IPv6 address with the original IPv4 group address embedded
 - [uPrefix64](#), for constructing IPv6 address with the IPv4 multicast source embedded

Text Representation Examples

- As an illustration, if a packet is received from 192.1.2.3 and destined to 230.1.2.3, the Multicast AFTR will encapsulate it in an IPv6 packet using ffx:abc::230.1.2.3 as the destination address and 2001:db8::192.1.2.3 as the multicast source address

Destination:

mPrefix64	IPv4 address	IPv4-Embedded IPv6 address
ffx:abc::/96	230.1.2.3	ffx:abc::230.1.2.3

Source:

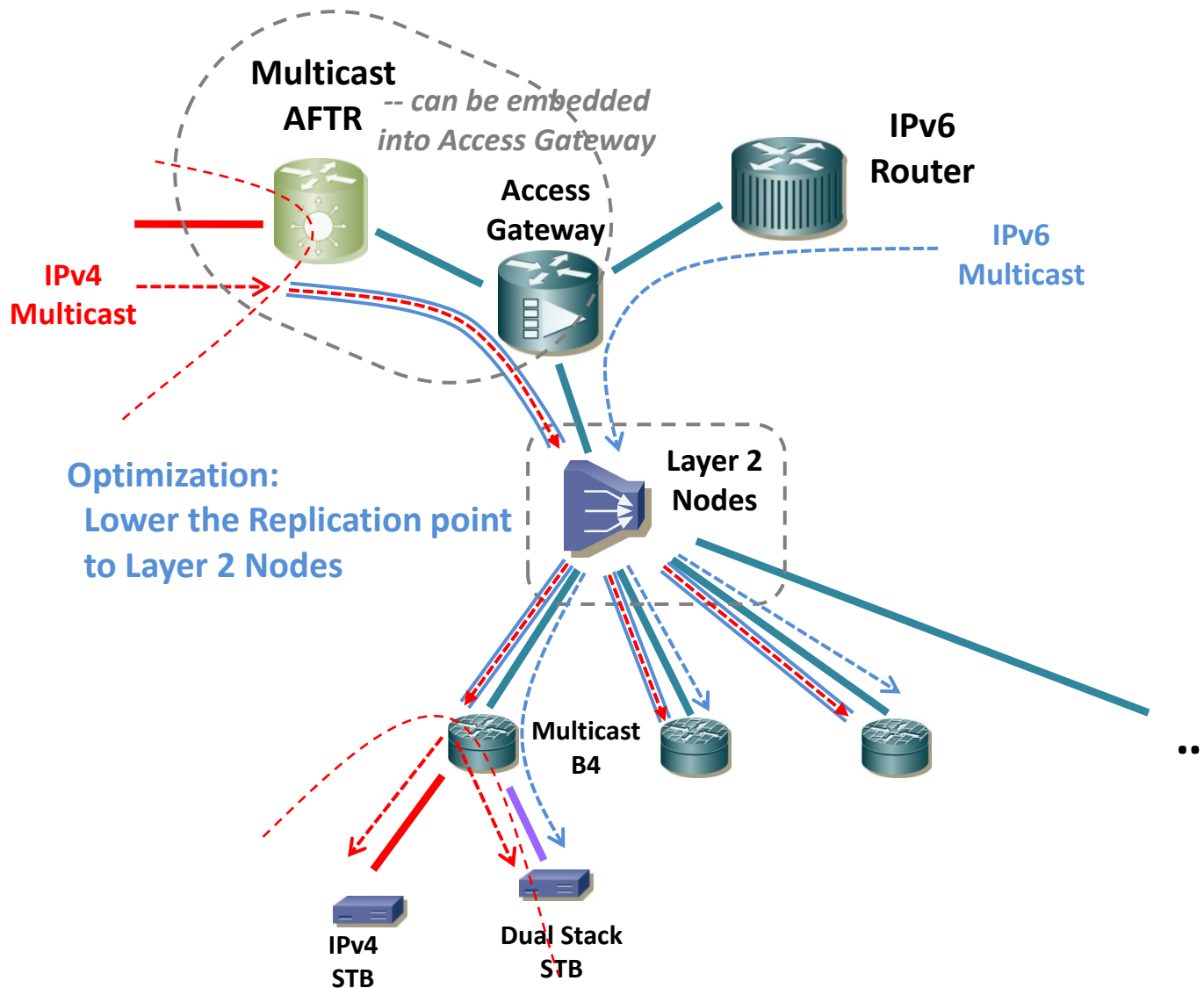
uPrefix64	IPv4 address	IPv4-Embedded IPv6 address
2001:db8::/96	192.1.2.3	2001:db8::192.1.2.3

Next Step

- Please read the draft and comment on it ...
 - <http://tools.ietf.org/html/draft-qin-softwire-dslite-multicast-01>

Appendix

Example: Network Optimization together with native IPv6 multicast



Thank You!