Immediate options for Multrans avoiding NAT?

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Multrans challenge

• Multrans proposals all include in-network multicast NAT
  Or else just tunneling == mostly config options of existing tunneling methods.

• Multicast NAT == new router platform work
  The further into the core, the more work == more expensive/slow to adopt.
  If customers can find a solution to make use cases work without this (or further towards the edge) we should strongly consider to concentrate on those first.
    Faster to adopt
    Nothing new to configure in network  == easier to operate ?!
    “good enough” / equally good ?!.
    Might invalidate investment made into the more complex solution.
Concept

• Architecturally…
  IP multicast receivers do not need global routed IP address.
  IGMPv3 memberships can be sent with source-IP address 0.0.0.0
  MLD membership reports are sent with link-local-scope IPv6 address (or ::)

• Tentative summary::
  Use-case 1:
  We likely can leverage this to avoid NAT for v4 multicast->v6 in routers
    Reason: no (global) v4 addresses in clients, but possible v4 stacks.
  Use-case 2:
  Less likely we can avoid NAT for v6 multicast -> v4
    Reason: no v6 support because client devices are legacy. MUST use IPv4 on them.
Use-case 1: IPv4 only multicast in network, IPv6 only host

• Most important short-term use-case ?!
  Existing IPv4 deployments running out of IPv4 addresses.

• Assumptions:
  No NAT done for unicast. Application uses IPv6 unicast for eg; IPTV EPG retrieval etc.
    Aka: Introducing NAT just for IP multicast is undesirable complexity.
  Hosts will have an IPv4 host stack – but no global IPv4 address.
    Target approach: use IPv4 host stack to receive multicast. No NAT needed.
  Details on later slide.
Use-case 2: IPv6 only multicast in network, IPv4 only host

- Somewhat longer term use-case?
  New v6 centric network designs.

- Assumptions
  IPv4 services expected to be tunneled across IPv6 core.
  Tunneling of IPv4 multicast over IPv6 multicast complex ("MVPN like").
  Many widely options for unicast, no simple / widely used one for multicast ?!
  IPv4 only host will not be able to use IPv6. Neither unicast nor multicast.
  Host/Apps are legacy. Even if OS supports IPv6, App/OS can not be upgraded..

- Solution
  Likely best/necessary to do NAT for multicast (tunneled IPv4 for unicast).
  But NAT can be simple static v6->v4 multicast group adress mapping.
  And this NAT can/should be implemented as far on the edge as possible: Home-gateway. – Otherwise there is duplicate traffic on eg: DOCSIS DS.
Use-case 1 details/questions:

- If SP only offers IPv6, how will home support non-IPv6 equipment?
  
  Case 1:
  
  RFC1918/RFC3330 in home.
  
  Easy: No need to have hosts use source-IP 0.0.0.0

  Home Gateway has no outside IPv4 address.
  
  Give Home Gateway outside “local” IPv4 address
  
  Or: persuade Home Gateway to send IGMPv3 with 0.0.0.0 source IP address.

  DHCP option to indicate v4 multicast only to Home Gateway ?!

  Case 2:
  
  No IPv4 whatsoever in home (homenet target network ?).
  
  How short term is this as a real business case?

  Need to make host send IGMPv3 with source-IP address 0.0.0.0
  
  Experiment with existing OS required to know if this is easy…impossible.
Summary?

• Now:
  Experiment with Host/Home-Gateway behavior for Use-Case 1.
  Identify if fixups in Home Gateway / hosts are needed or just identify working configs.

• Step 1 Multran candidate:
  v6only client getting IPv4 multicast without NAT via 0.0.0.0/local-IPv4

• Step 2 Multran candidate:
  Requirements for Home Gateways v6->v4 multicast NAT (static mapping)
  Takes a while to proliferate to commercial products ?
  DD-WRT/OpenWRT work to demonstrate … ?
  … Could then also include other direction v4-v6 if Step 1 ws not sufficient.