Dual-Stack lite: a scalable CGN story

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IPv4 reality check: completion of allocation is real

After completion:
Existing IPv4 addresses will **not** stop working. Current networks will still operate.
IPv6 reality check: the IPv4 long tail

• Post IPv4 allocation completion:
  
  ▪ Many hosts in the home (eg Win 95/98/2000/XP, Playstations, consumer electronic devices) are IPv4-only.
    – They will not function in an IPv6-only environment.
    – Few of those hosts can and will upgrade to IPv6.
  
  ▪ Content servers (web, email,…) hosted on the Internet by many different parties will take time to upgrade to support IPv6.
Dealing with both realities: a two prong approach

① Embrace IPv6
   - Move as many devices/services to IPv6 as possible to lower dependency on IPv4 addresses

② Build an IPv6 transition bridge for the IPv4 long tail
   - Goal:
     - Provide IPv4 service without providing a dedicated IPv4 address
   - Technology:
     - Leverage IPv6 access infrastructure
     - Provide only IPv6 addresses to endpoint
     - Share IPv4 addresses in the access networks
     - DS-lite: IPv4/IPv6 tunnel + provider NAT
Migrating Internet traffic to native IPv6 reduces stress on the CGN

IPv4 traffic goes through the CGN

IPv6 traffic goes direct to the Internet
Avoiding the Mega CGNs

Service provider network

CGN

$\text{Access router}$

2X thousand users

X thousand users

X thousand users

X/2 thousand users

X/2 thousand users

5
Horizontal scaling with DS-lite

- Uses DHCPv6 option to configure tunnel end-point
- Sends the traffic to as many CGNs as necessary
- Provides flexibility in network design and enable ‘soft-wiring’ of CGNs