

# Post IPv4 “completion”

*Making IPv6 deployable incrementally by making it backward compatible with IPv4.*

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The Internet must support continued, un-interrupted growth regardless of IPv4 address availability













- **DISCLAIMER:**

Comcast has not made any decisions to deploy any of the following technologies.

# Post IPv4 completion

- IPv4 resources alone will not provide a viable supply to the industry for the long term.
- The “Internet” edges will still be mostly IPv4:
  - Many hosts in the home (Win 9.x, XP,...) are IPv4-only.
    - They will not function in an IPv6 only environment.
    - Few of those hosts will upgrade to Windows Vista.
  - Content servers (web, Mail,...) hosted on the Internet by many different parties will take time to upgrade to support IPv6.

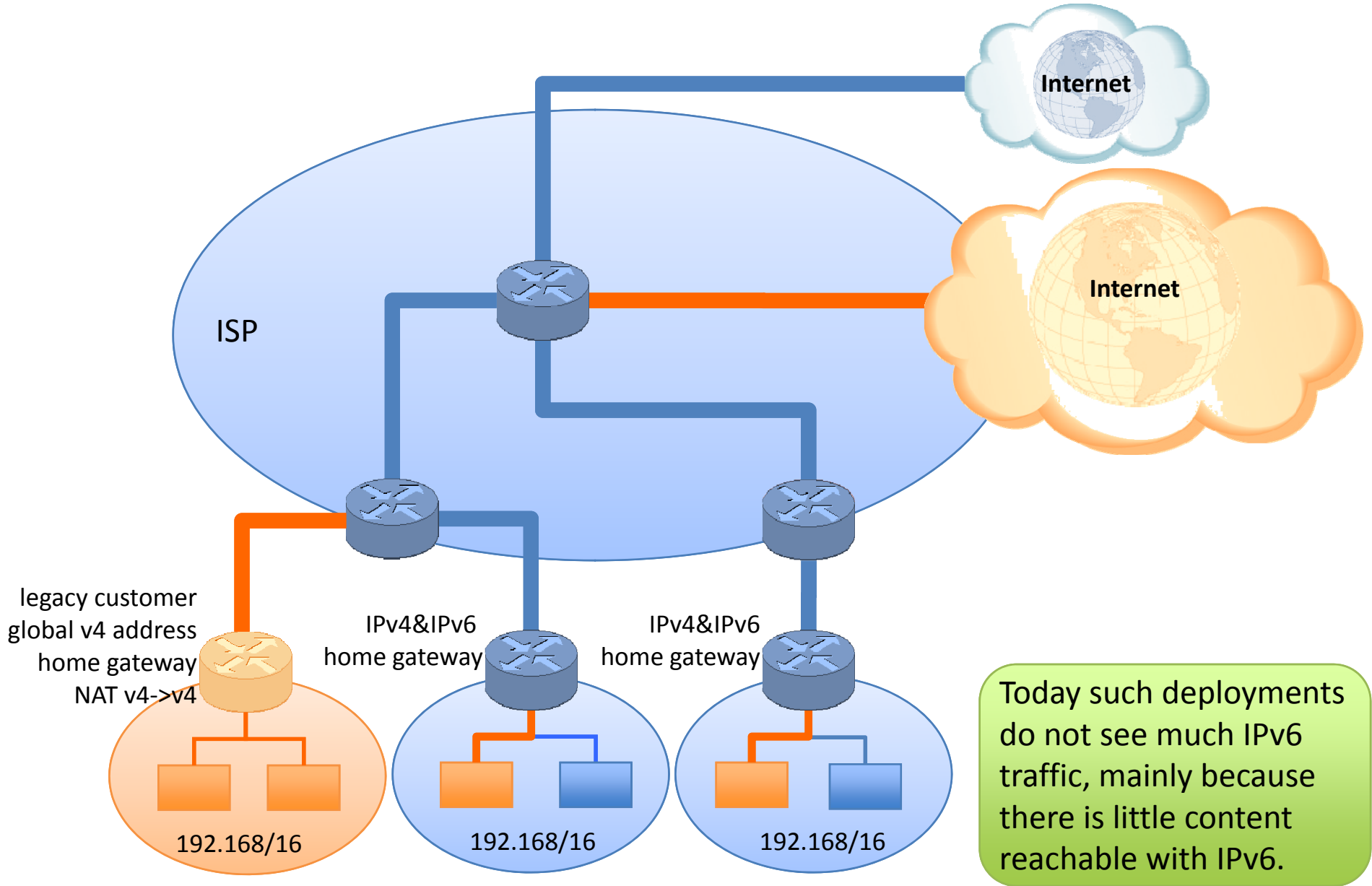
# Provisioning color code

	IPv4-only	dual stack provisioned	dual stack*, IPv6-only provisioned
device			
link			
router			
network			

\* devices with pure IPv6-only code are out of scope

# Plan zero: dual-stack

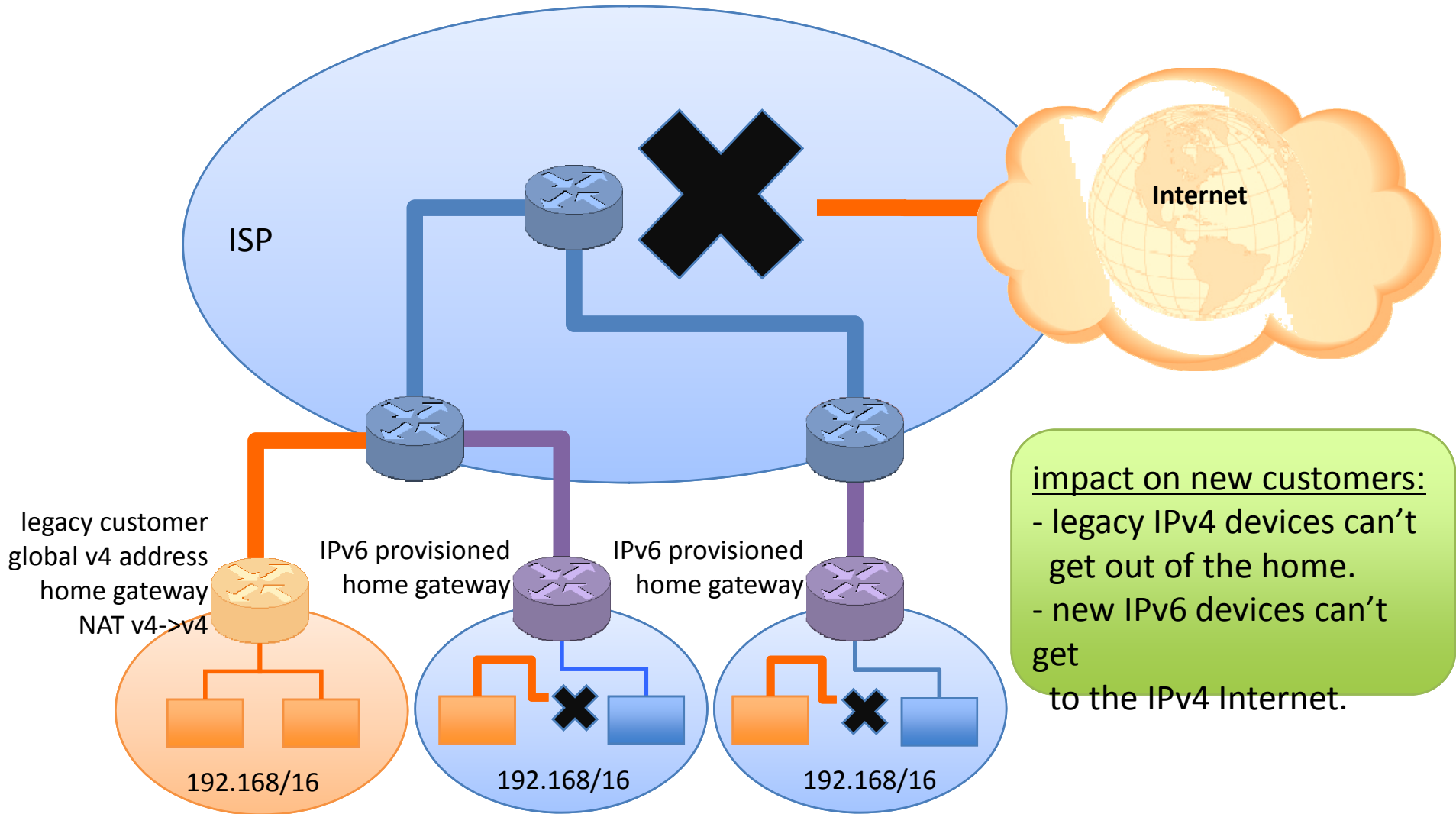
After IPv4 IANA completion, there will not be enough IPv4 addresses to sustain this model.



# Plan A: dual-stack core

new customers are provisioned with IPv6-only but no IPv4 support

lots of broken paths...



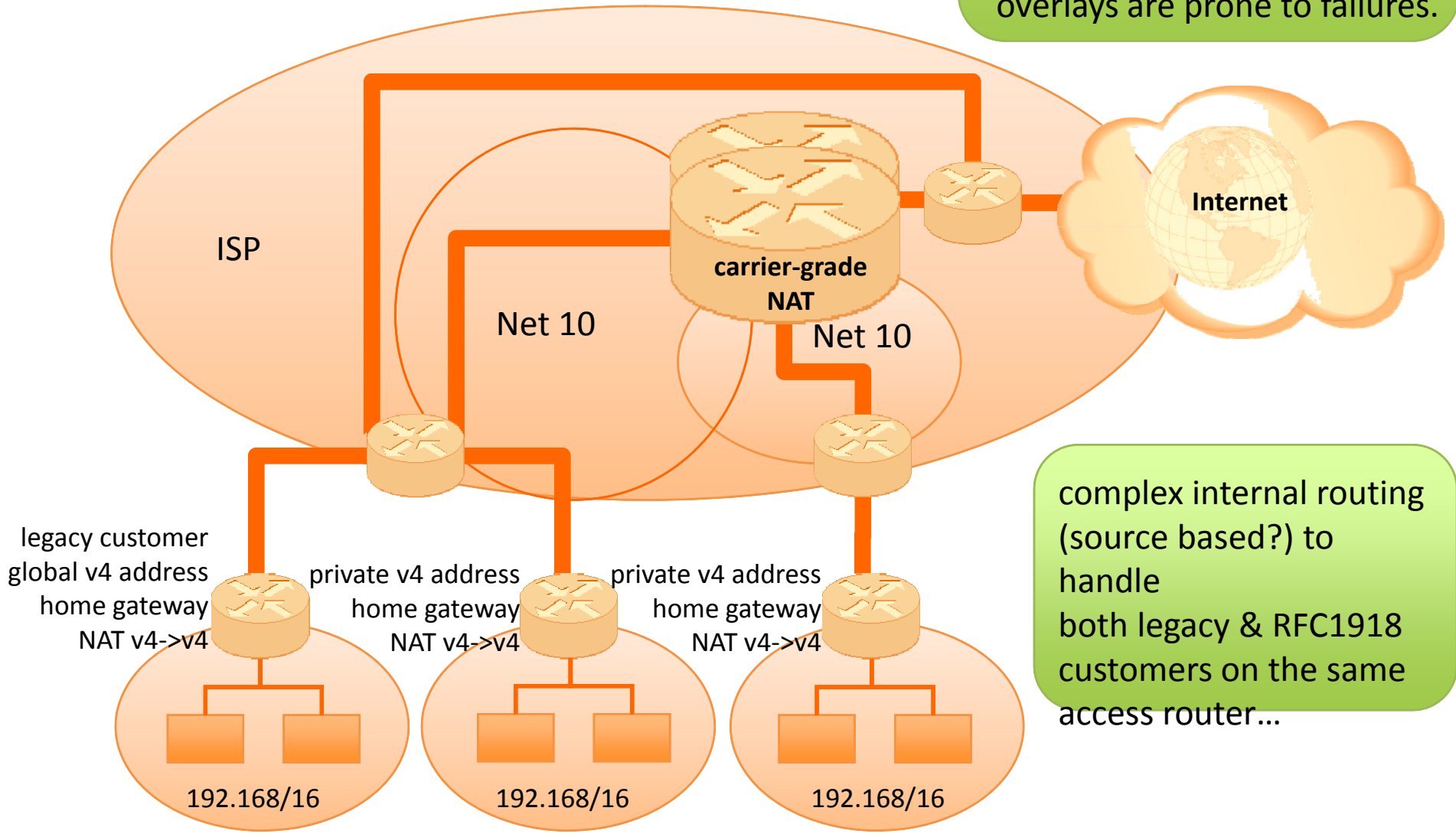
impact on new customers:

- legacy IPv4 devices can't get out of the home.
- new IPv6 devices can't get to the IPv4 Internet.

# Plan B: double NAT

new customers are provisioned with overlays of RFC1918

- two layers of NAT
- no evolution to IPv6
- network gets increasingly complex to operate.
- Intersections of Net 10 overlays are prone to failures.

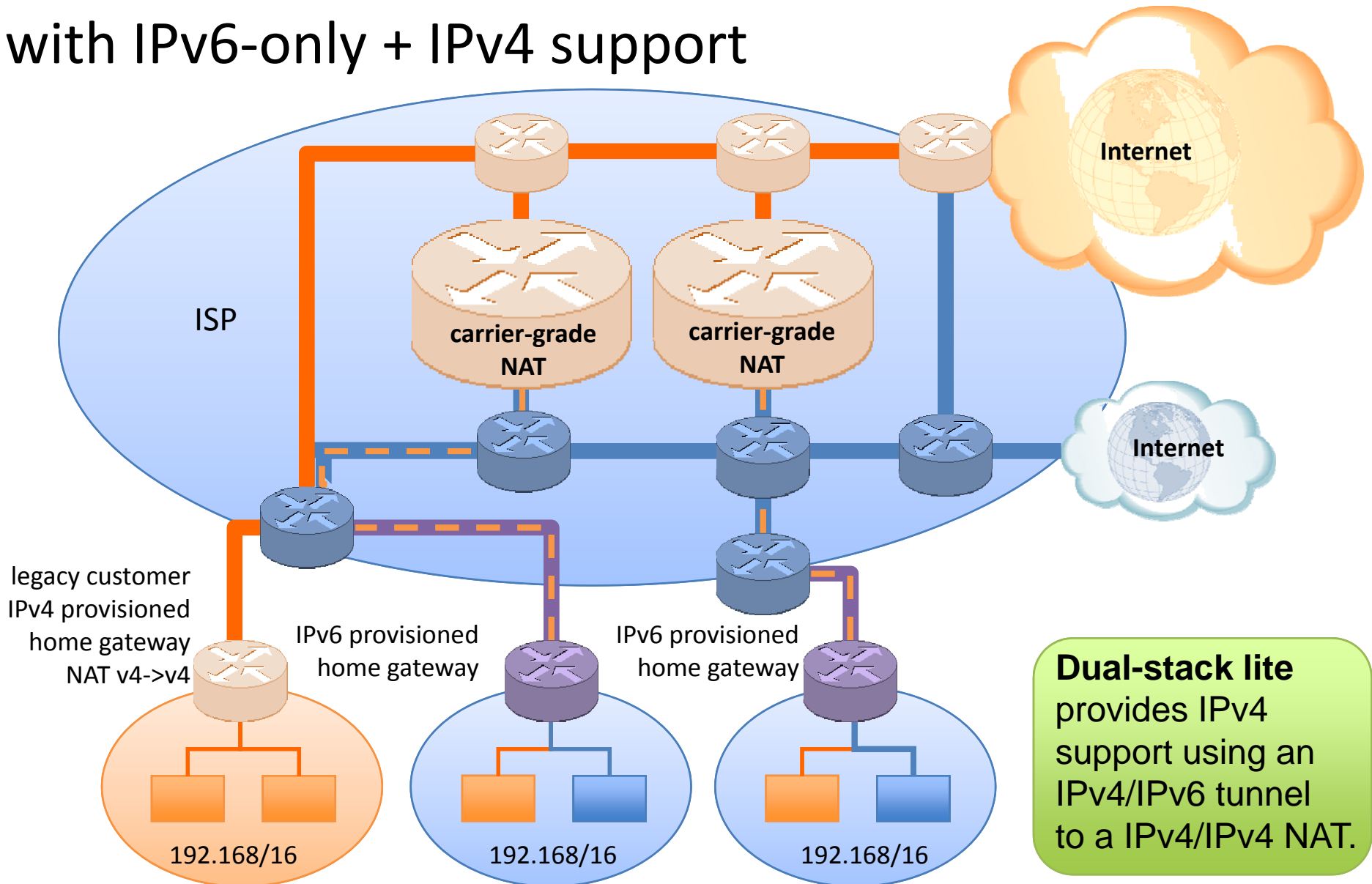


complex internal routing (source based?) to handle both legacy & RFC1918 customers on the same access router...

# Plan C: dual-stack lite

new customers are provisioned with IPv6-only + IPv4 support

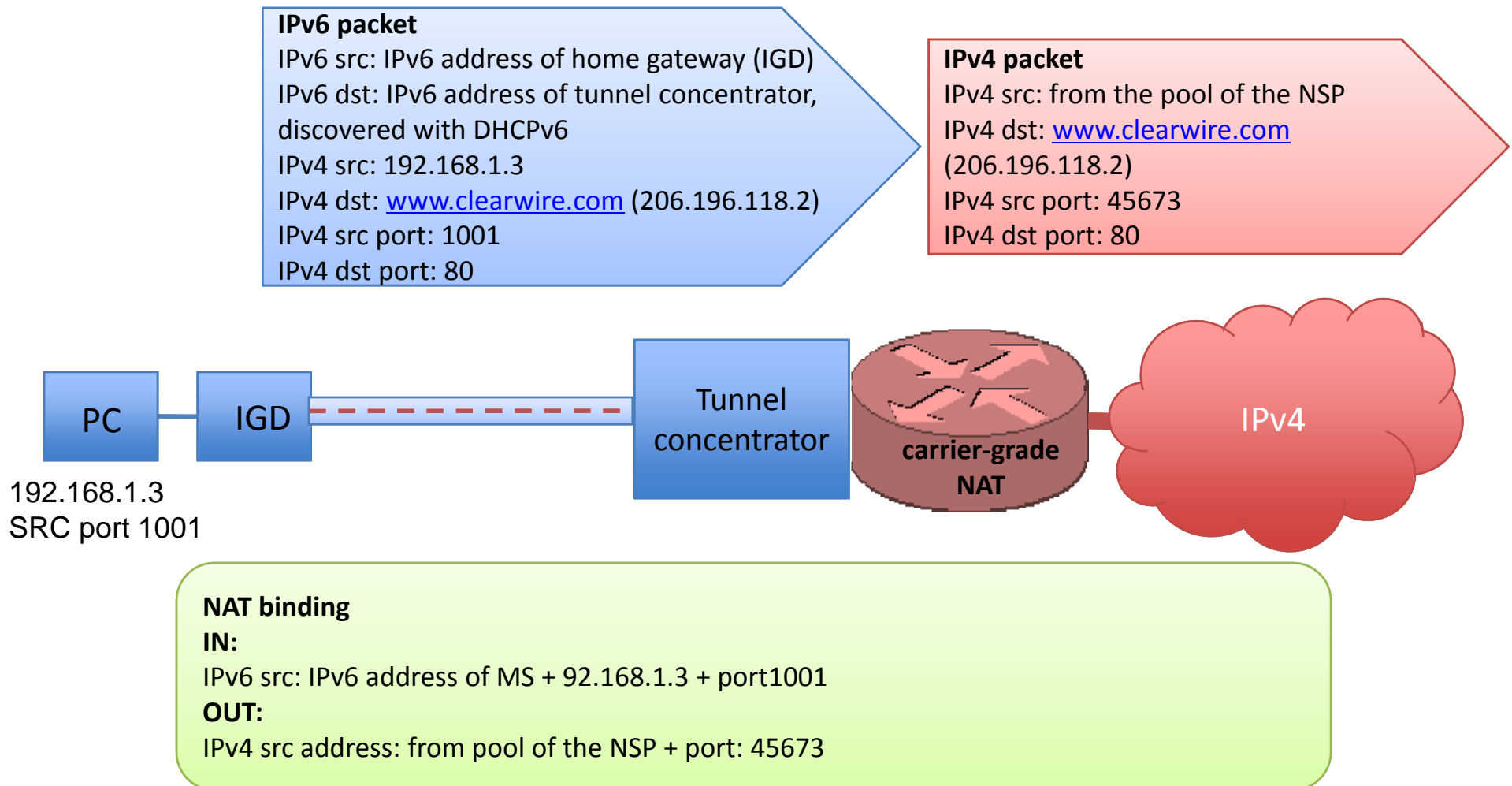
- simplifies network operation
- provides an upgrade path to IPv6



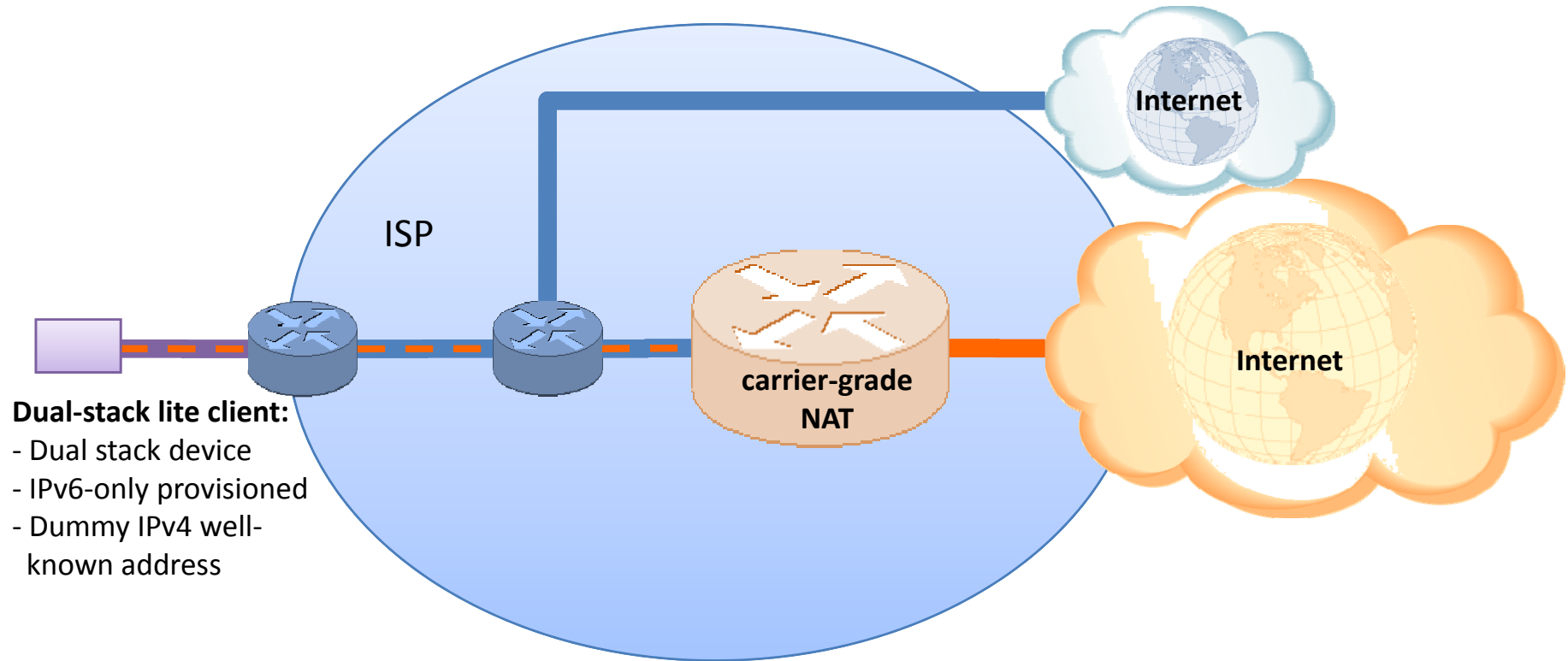


## DS lite:

Dual-stack capable IGD are provisioned with IPv6-only + IPv4 support for the homer PC from a carrier-grade NAT



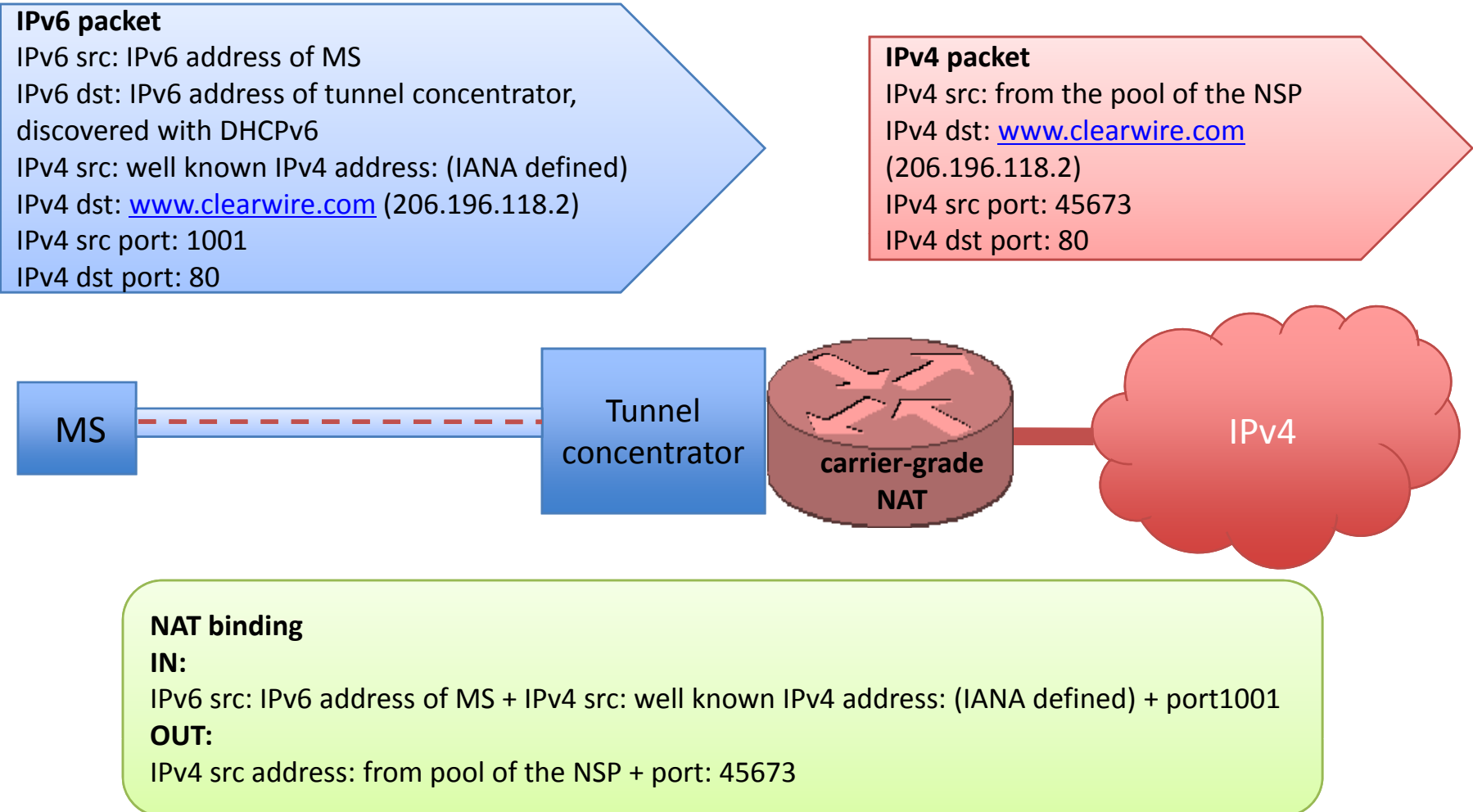
# Plan C': New stand-alone devices are provisioned with IPv6-only + IPv4 support with dual-stack lite



Stand-alone, dual-stack, IPv6-only provisioned devices can use dual-stack lite to reach the IPv4 Internet.

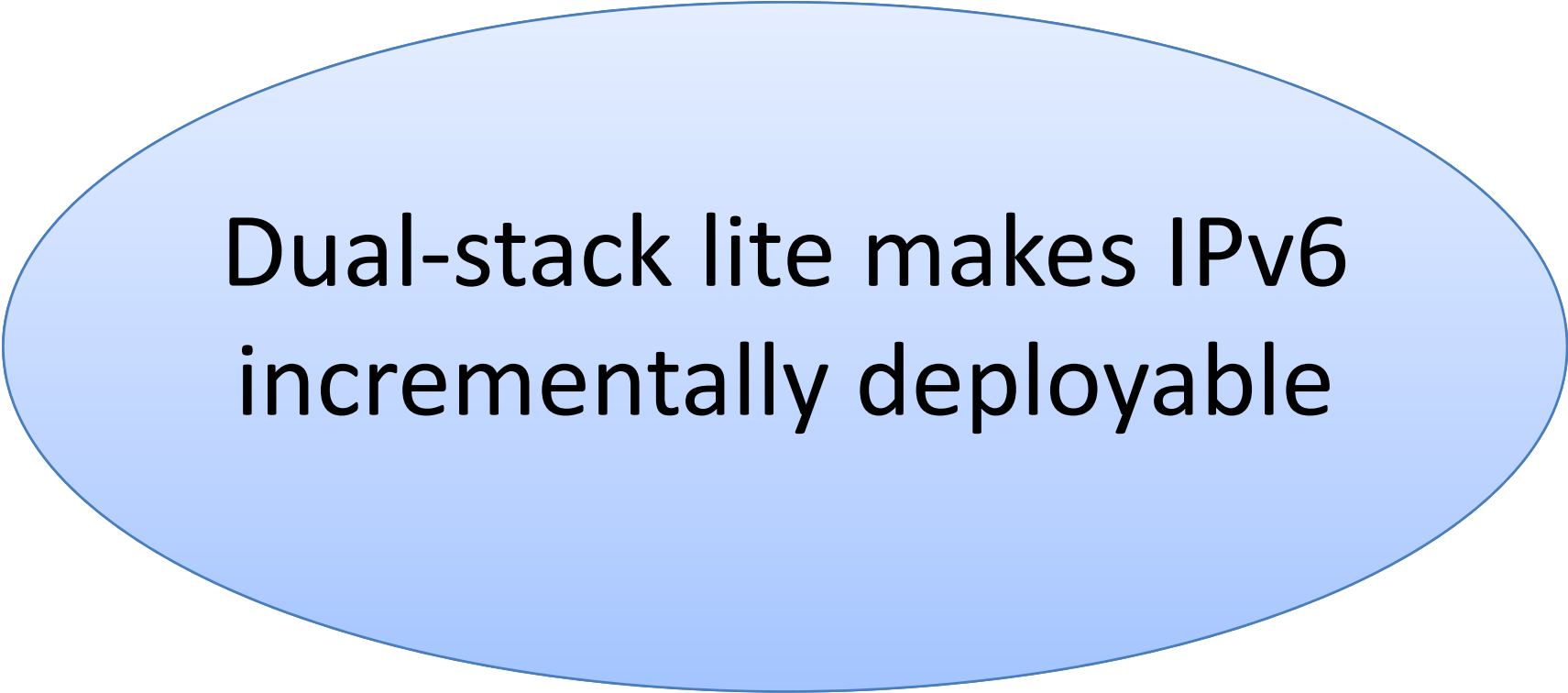
## DS lite:

Dual-stack capable MS devices are provisioned with IPv6-only + IPv4 support from a carrier-grade NAT



# Open issues

- Implementing DS-lite on Windows XP, Vista & after
- DHCPv6 option to configure tunnel end point
- Configuring host to use a 3<sup>rd</sup> party carrier-grade NAT
- UPnP proxy



Dual-stack lite makes IPv6  
incrementally deployable