



How to Choose the Right IPv6 Migration Strategy

CITC Task force 12th Meeting
Nov 2012

Agenda

- Mobily Recognized Achievements
- IPv6 Migration Approaches
- Dual-Stack
- Tunneling
- Translation



Recognized Achievements (1/2)

As part of the strategy of Bayanat/Mobily for IPv6, it has proudly achieved a number of the IPv6 Task Force Strategy Milestones that was developed by CITC in 2008. Showing below the Milestones aligned with Bayanat/Mobily deployment

IPv6 TaskForce Milestones	Contribution and Achievement	Date
IPv6 at ONE FBPs	Announced the connection to a Tier-1 IPv6 International Provider	May 2009
IPv6 Task Force Saudi Arabia	Attendance and Participation of Mobily and Bayanat as one of the first members of Saudi Arabia IPv6 Task Force	Feb 2009
Establish and IPv6 Lab	Deployed a fully service isolated Lab for internal and external awareness and ready for integration with other Labs	Q3 2009
IPv6 National Event	Mobily has hosted one of the IPv6 National meetings for support of awareness and deployment by sharing its own experience with IPv6	May 2009
IPv6 at Multiple FBPs	Partial achievement by support IPv6 service as of Mobily and Bayanat	Since 2009
IPv6 Compliant.SA ccTLD Registry	Partial achievement, by having an IPv6 enabled DNSv6 in the network which can be used for future deployment	Q4 2010
Commercial IPv6 Service Available from 5 ISPs	Partial Achievement, by offering and deploying the first IPv6 transit service with an ISP (Nesma). Also on going pilots are conducted to push the service to end users	Q4 2009

Reference No. (9 pt Arial)



Recognized Achievements (2/2)

IPv6 TaskForce Milestones	Contribution and Achievement	Date
IPv6 Filtering	Successfully demonstrated a working filtering solution for IPv6 and integrated with the commercial IPv6 service offering.	Q1 2012
IPv6 Dual-Stack Network	Successfully build a full dual-stack network for Mobily's International MPLS network.	Q1 2012
IPv6 Native Peering	Native IPv6 peering all major Content providers. (Google, facebook, Yahoo, Akami ...)	Q2 2012



IPv6 Migrations Approaches



Why We need Migration Techniques ?

- Today's Internet has IPv4 backbone to support different services and requirements.
- Instantaneous transition from IPv4 to IPv6 is impossible, they have to coexist for some time.
- Migration techniques are essential to help service provider smoothly transit to IPv6 with no down-time and service interruption.



Where to Start ?

A. Core-to-Edge

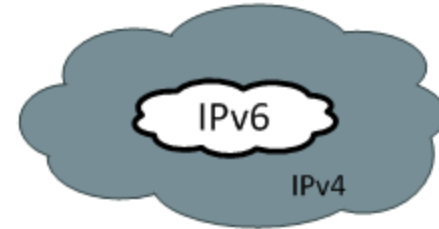
- Core is IP unaware, so easy to migrate.
- Gain Operations.
- No services can be offered.

B. Edge-to-Core

- Good if IPv6 needs to be deployed quickly
- When core dose not support IPv6

C. IPv6 Island

- Good when IPv6 is needed for limited applications or specific datacenters.



Available Techniques

There is wide range of migration strategies that have been developed to different needs and requirements:

A. Dual-Stack

- Dual-Stack in the core
- 6PE
- 6VPE

B. Tunneling

- Can be implemented regardless of core support IPv4/IPv4
- Require special capabilities in the CPE.
- DS-lite
- 6rd

C. Translation

- No need for any special support for any CPE
- NAT64/DNS64

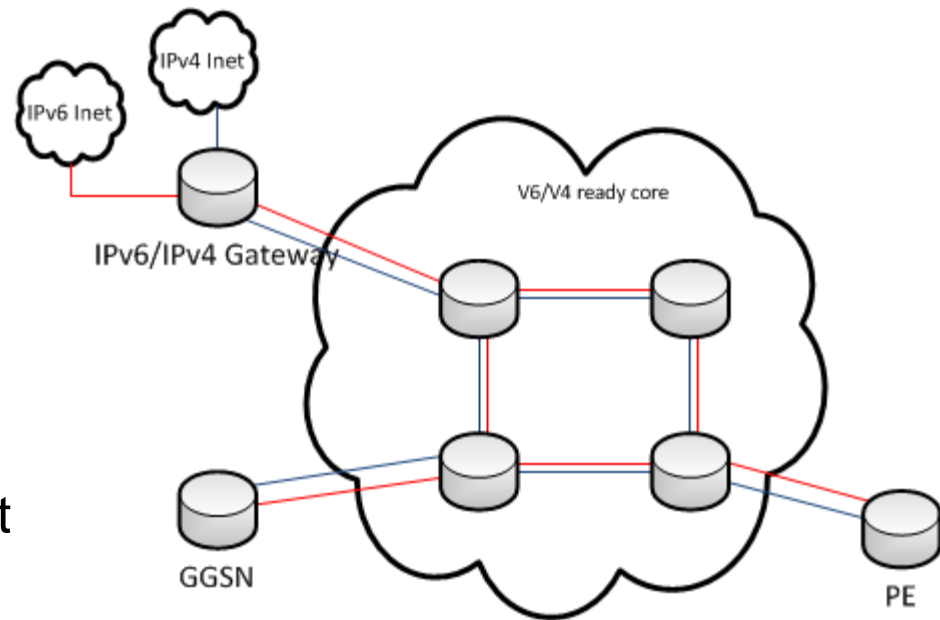


Dual-Stack



Dual-Stack in the Core

- It can be deployed safely in the core
- Run OSPFv3.
 - Running two independent topology.
 - Can start gaining operational experience
- Run Mutli-topolgy ISIS
 - Make sure you change it to mutli-topology.
 - With mutli-topology you protect your IPv4 from issues happening in IPv6
- It will not add much advantage for you since LDP is only IPv4, so we will need to use 6PE and 6VPE techniques to utilize MPLS features



6PE

❑ Why?

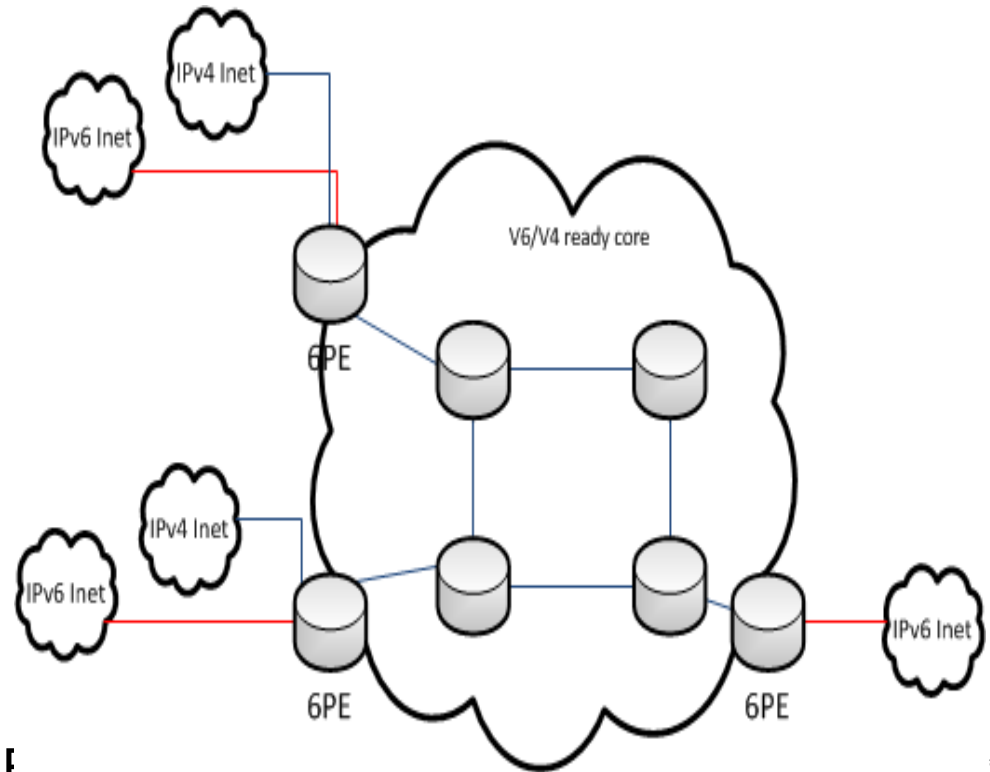
- To gradually migrate your MPLS Edge at your convenience
- Only need to upgrade the router that needs to provide IPv6 service.

❑ For What?

- Best used for internet reachability and routing.

❑ Benefits ?

- Routes will be available in PL, global routing table.
- Inherent MPLS benefits (TE, FRR)
- Core can be IPv6 unaware.
- Gradual introduction of IPv6



6VPE

❑ Why?

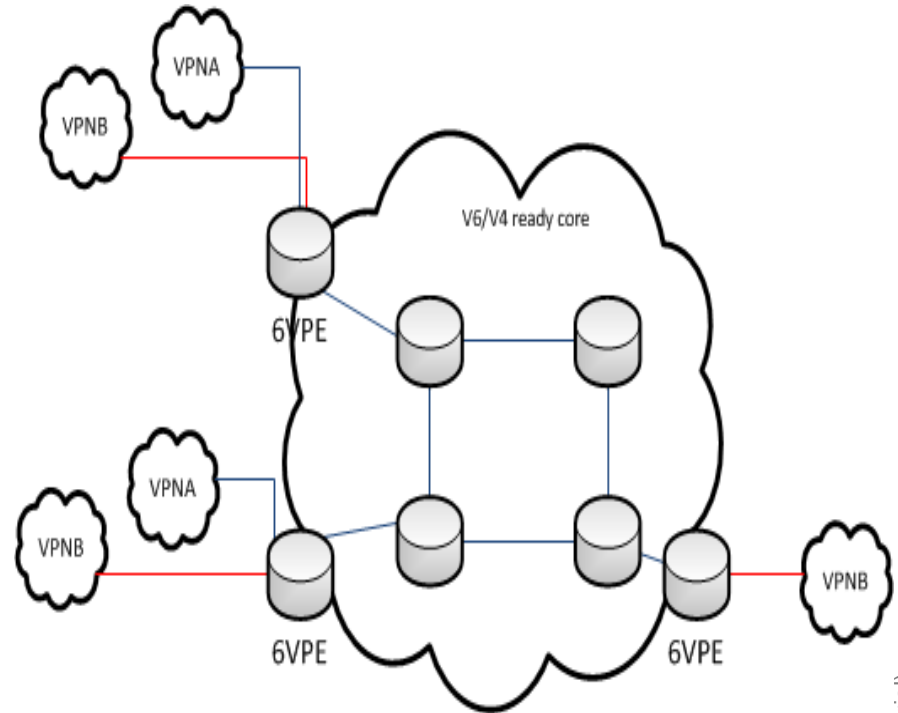
- To gradually migrate your MPLS Edge at your convenience
- Only need to upgrade the router that needs to provide IPv6 service.

❑ For What?

- Best used to provide VPN service to business customers.

❑ Benefits?

- Get the flexibility of MPLS (RD, RT, FRR..etc)
- All VPNs concepts in IPv4 world applies to IPv6
- Core can be IPv6 unaware.
- Gradual introduction of IPv6

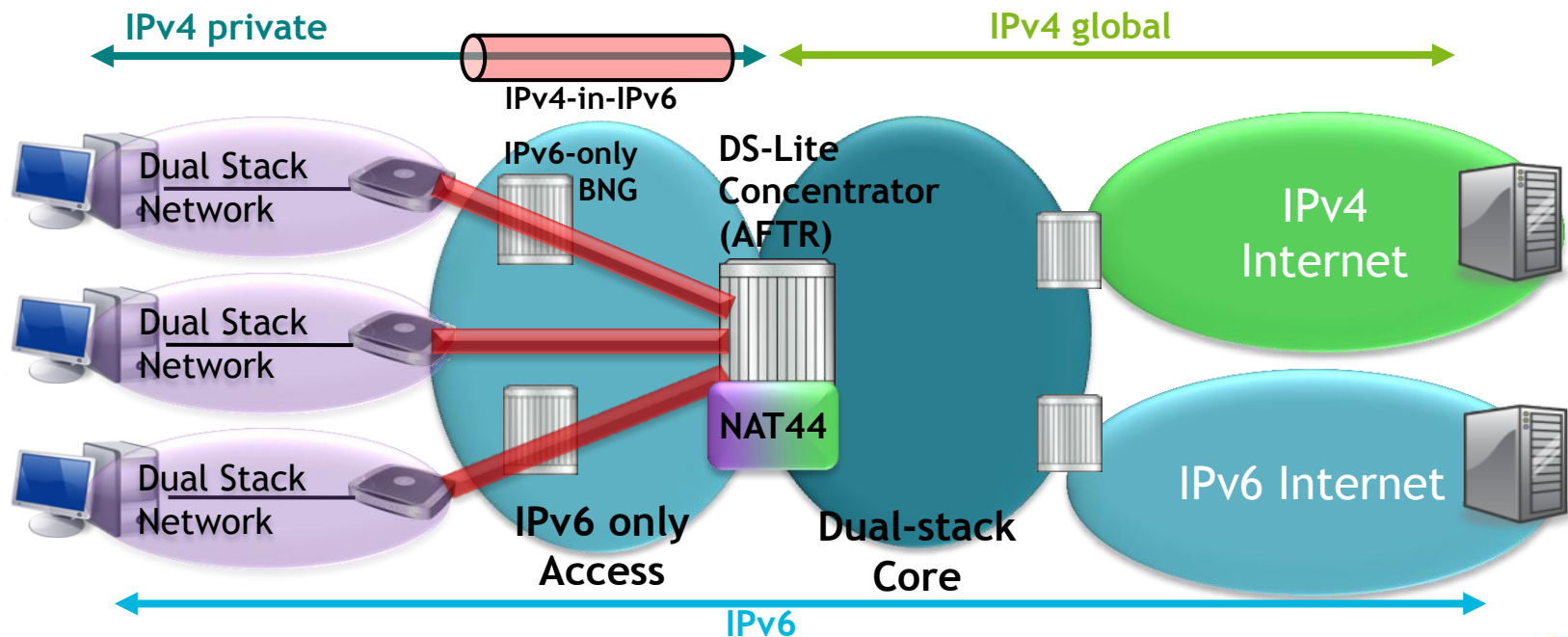


Tunnels



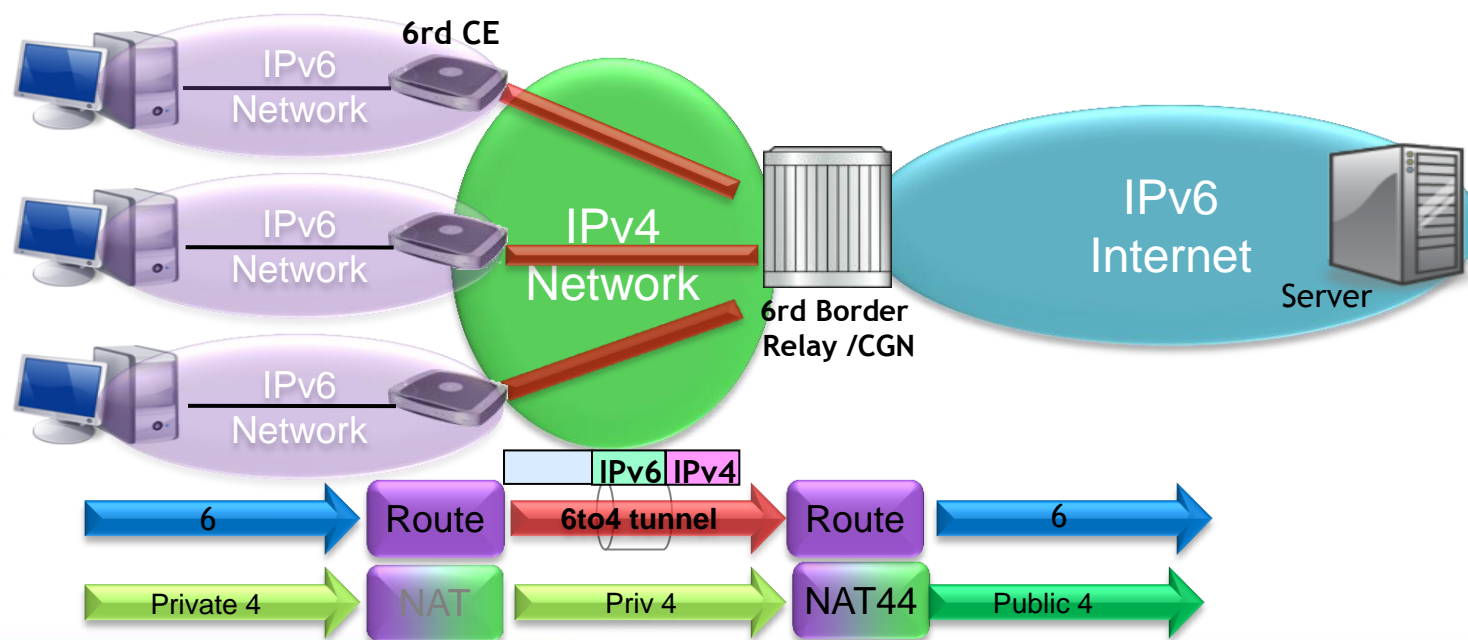
DS-lite Dual Stack Lite

- Needed when only IPv6 access is available.
- IPv4 will be tunneled inside IPv6.
- NAT444 is needed.
- It needs special software/hardware upgrade in the HGW to support DS-Lite.
- Reuse the same IPv4 address for each customer.
- Work well for environments CPE are provided by service provider.



6rd (IPv6 Rapid Deployment)

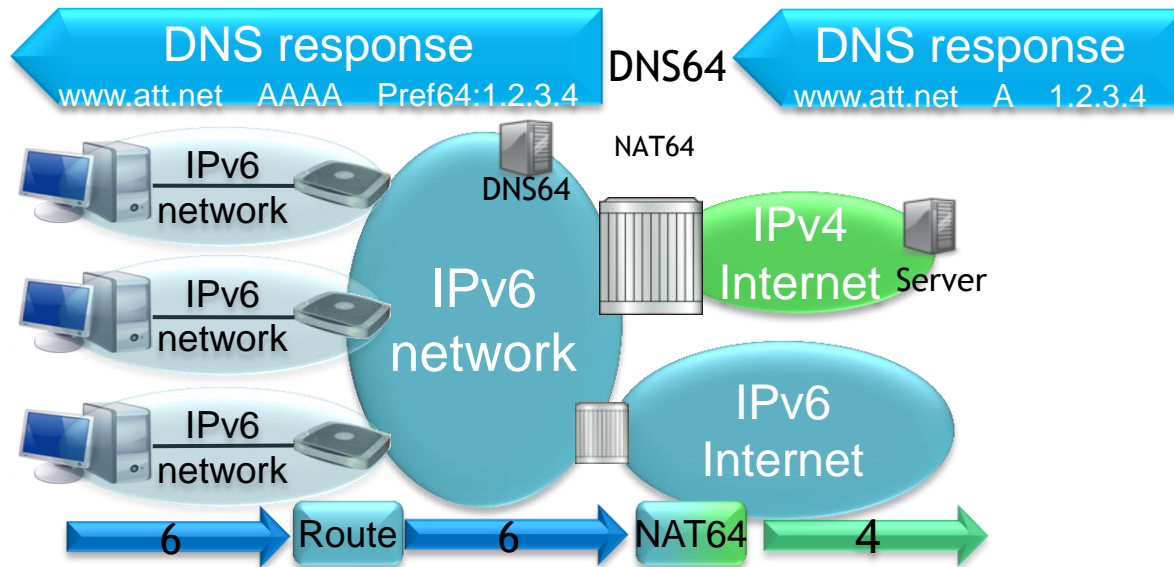
- Needed when only IPv4 access is available.
- Needed when the objective is provide IPv6 access.
- IPv6 will be tunneled inside IPv4.
- NAT444 is needed.
- It needs special software upgrade in the HGW to support 6rd.
- Does not solve IPv4 exhaustion



Translators



NAT64/DNS64



- Handsets will have only IPv6 addresses.
- DNS needs special ALG to convert the A record AAAA
- NAT64 is advertising a special subnet to attract all the traffic with IPv4 destination.
- No need for any CPE support.
- Good for migration if most of your traffic is IPv6 and you don't want to assigned any more IPv4



Comparison of the Different Approaches

Home device	Access network	Destination	Solutions	Comments
IPv4	IPv6	IPv4 Internet	Dual-Stack Lite	<ul style="list-style-type: none"> • Works well for services like DSL, where CPE can be provided to customers. • Need Special CPE software. • It solves the IPv4 depletion issue.
IPv6	IPv6	IPv4 Internet	NAT64	<ul style="list-style-type: none"> • Solve IPv4 depletion • Transparent to customers and needs not CPE configuration • Good for mobile environment
IPv6	IPv4	IPv6 Internet	6RD	<ul style="list-style-type: none"> • Dose not solve IPv4 issue. • Good is your goal is to offer IPv6 service. • Need special CPE software
IPv6/IPv4	IPv6/IPv4	IPv6/IPv4 Internet	Dual-Stack	<ul style="list-style-type: none"> • Needs full network IPv6 support. • Use 6PE and 6VPE • Need NAT44





Thank You