

A decorative background consisting of a dark blue square on the left with white lines radiating from its right edge, and a larger blue area on the right with a white wavy shape at the bottom.

**Saudi Arabia IPv6 Task Force
8th Meeting**

Case studies in v6 transition

Riyadh, March 17th 2010

About Italtel

Italian company – leader in EMEA on NGN
Started its experience on “v6” at the end of '90
Long term involvement on standard Organizations

Italtel customers

Italtel includes among its customers more than 40 of the world's top operators. In Italy and in several countries worldwide, Italtel is a reference for the realization of IP-based next generation networks, for the development of convergent multimedia services and for the support of migration activities.



Italtel started its experience on v6 study at the end of '90; following snapshots report a summary of **main case studies** developed in supporting ISPs (especially in Western Europe) towards v6 Migration.

In particular we will analyze pragmatically:

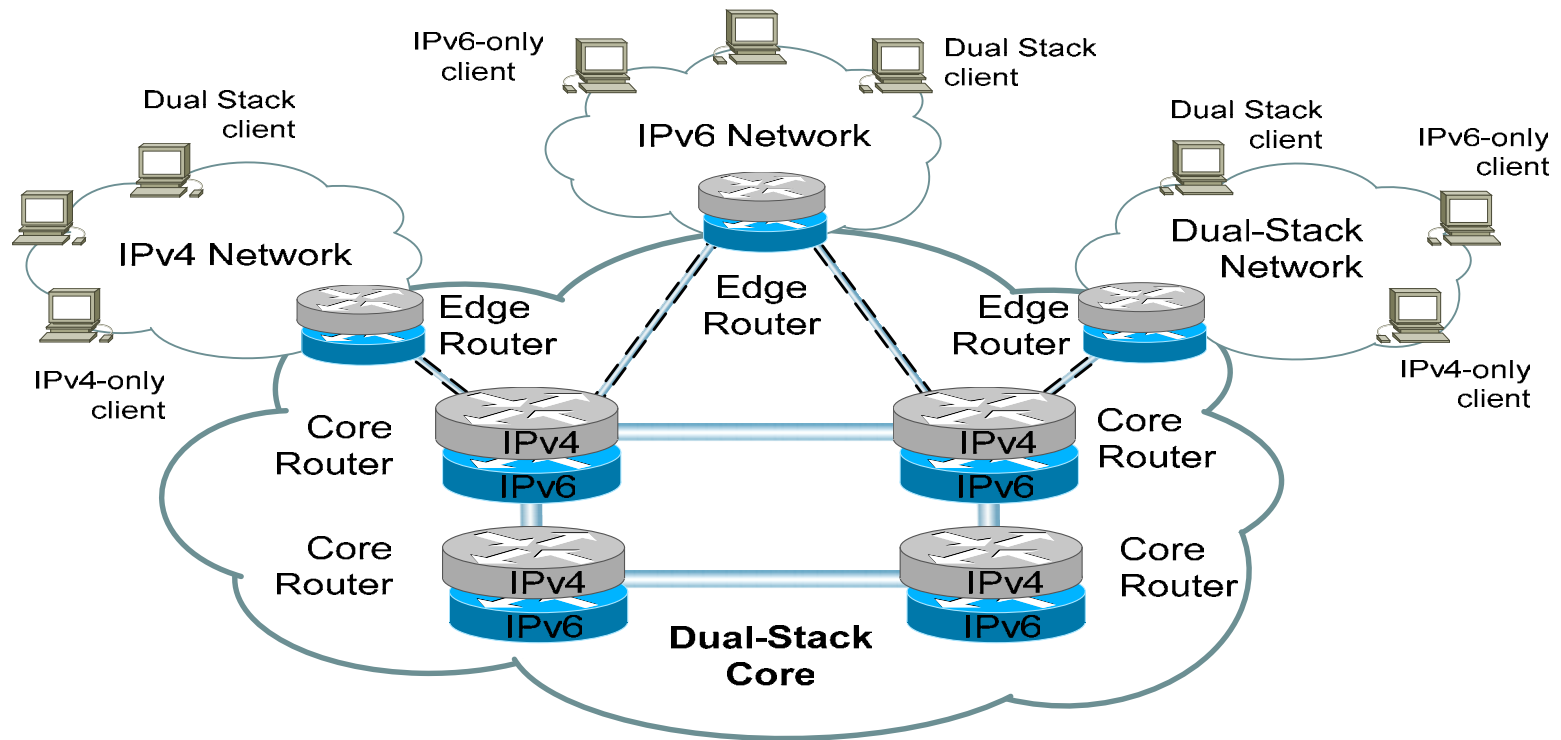
1) scenarios faced for Telco Operators to migrate v6 on **core network**

2) options suggested and implemented in Western Europe to allow v6 on **access**

3) possible ways (currently in evaluation) to allow v6 on GPRS for **Mobile**

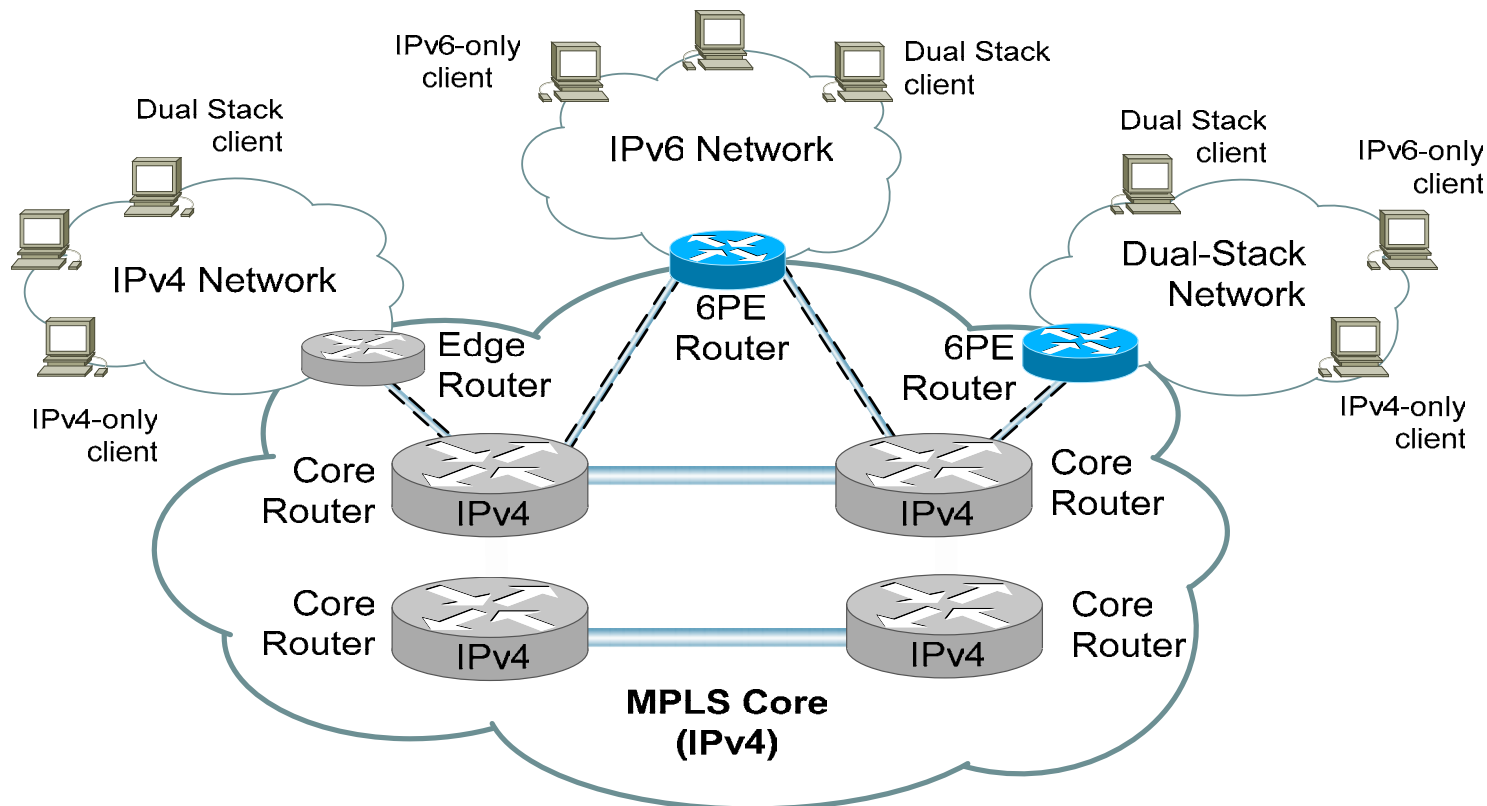
4) main criteria to adopt in order to monitor transition's projects

All the routers supporting both IPv4 and IPv6, according to the specific session need



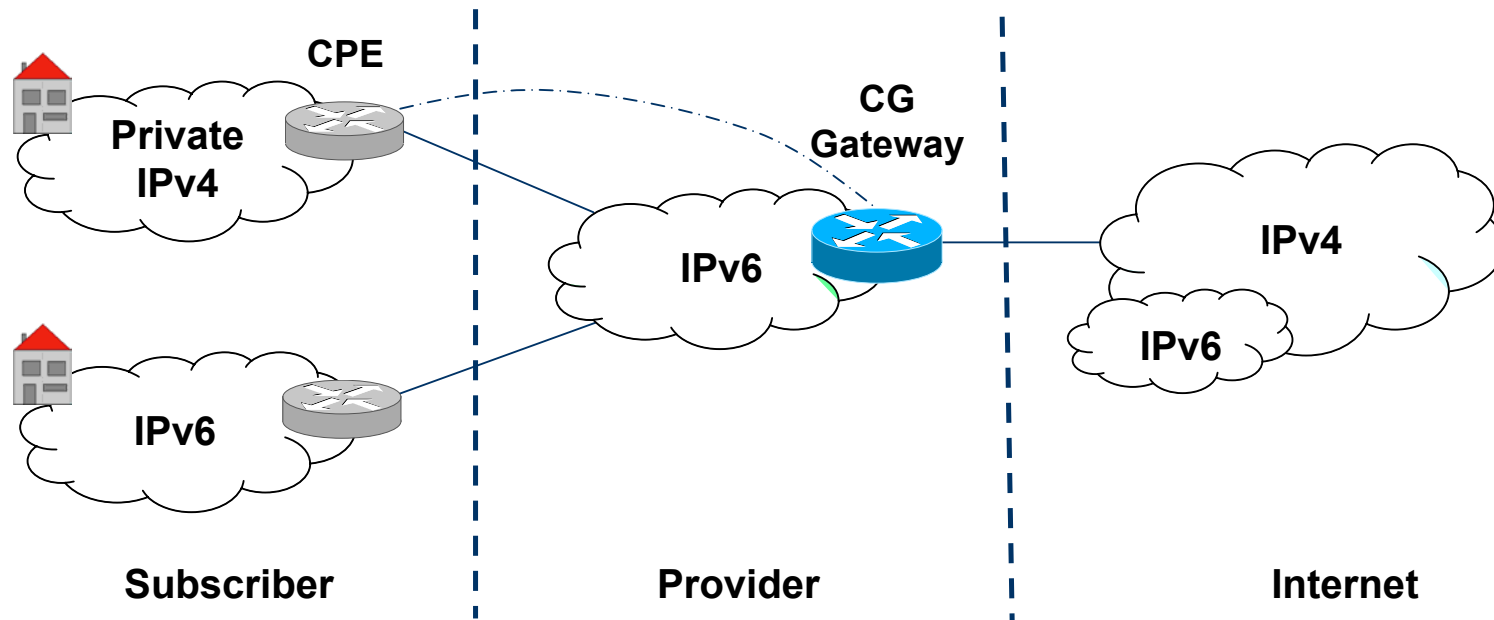
- + No manual tunnel configuration needed
- Edge and Core Routers to be updated to support Dual Stack functionalities
- Intense processing effort required to the routers

IPv6 packets transported from one 6PE router to the other by using the IPv4-based MPLS core infrastructure (IPv6-unaware)



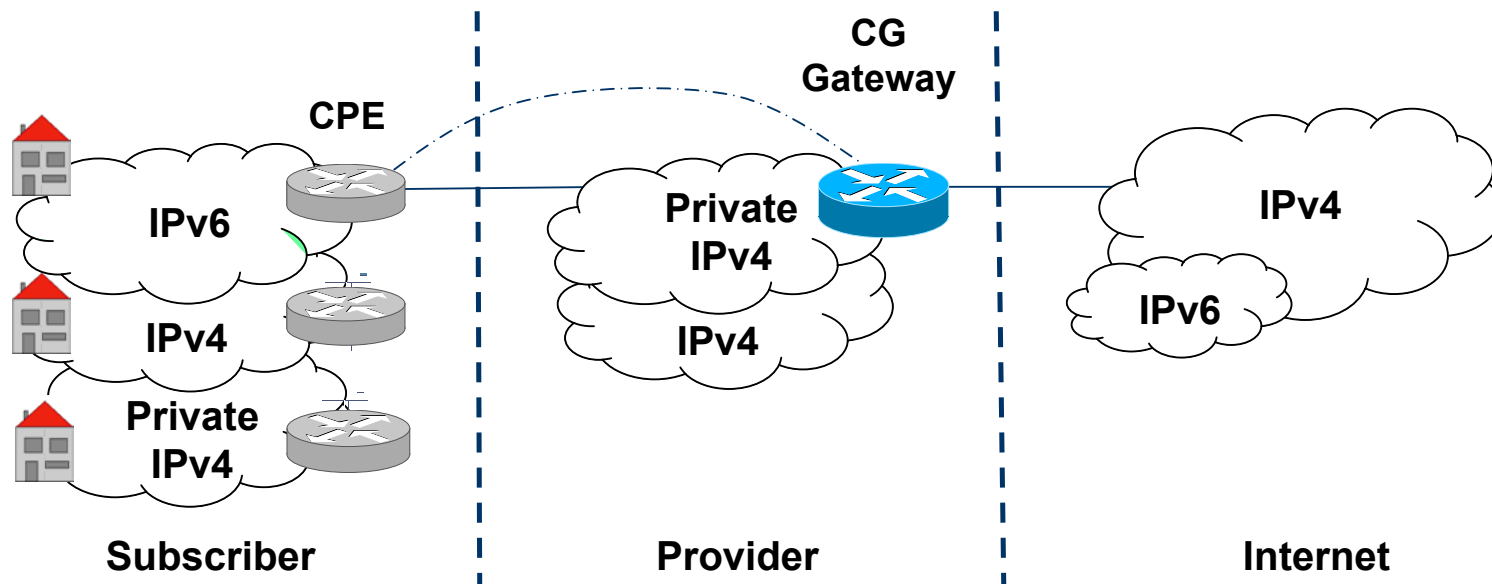
- + No need to upgrade the Core Routers
- PEs to be updated to support Dual Stack

IPv4 traffic from IPv4 private subscriber LAN is tunneled by the CPE to the Carrier Grade Gateway. IPv6 traffic is routed natively through the Provider infrastructure.



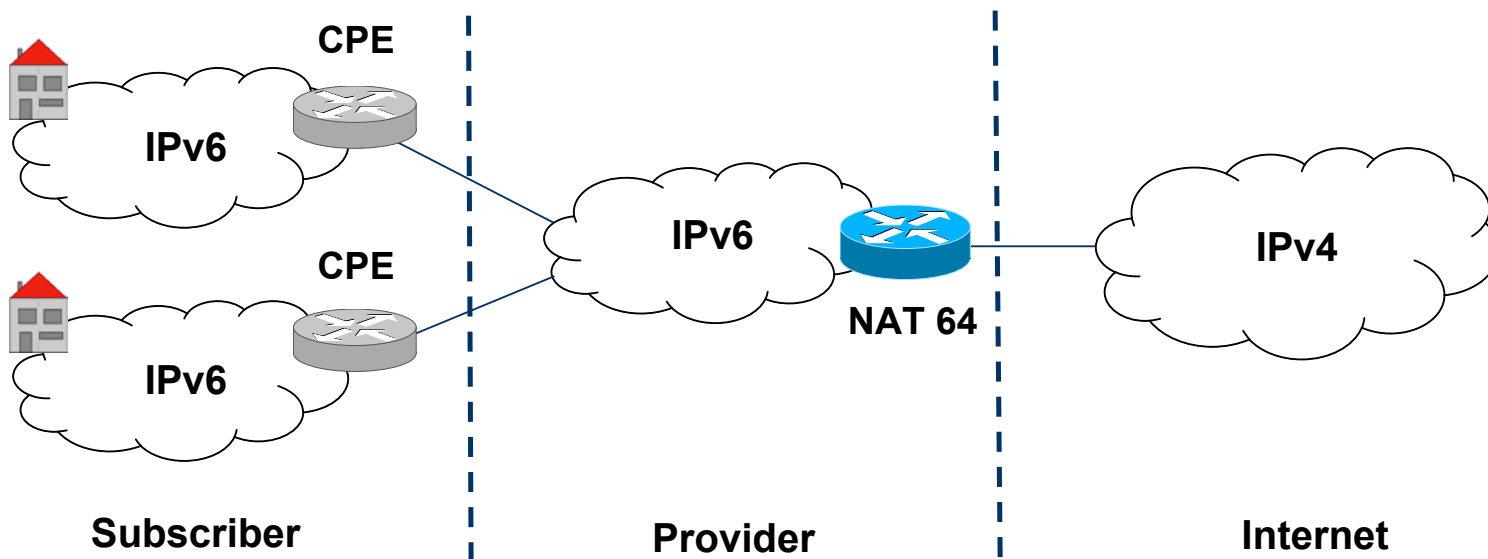
- + Single layer of NAT (NAT44 at the CG Gateway)
- + IPv6-only Provider network
- CPE upgrade required to support IPv6 and tunneling features
- Scalability issue at the CG gateway (massive number of session)

- IPv4 provider access network
- IPv6 encapsulated in IPv4 by the CPE to transit IPv4-only network infrastructure
- Tunnels terminated by a Carrier Grade Gateway



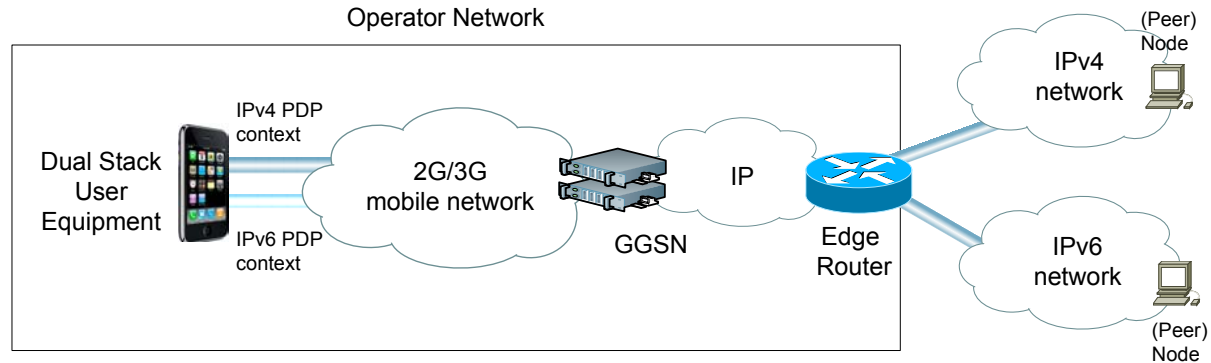
- + Single layer of NAT (NAT44 at the CG Gateway)
- + No need to upgrade the provider network
- CPE upgrade required to support dual stack and tunneling features
- Scalability issue at the CG gateway (massive number of session)

Addresses from the IPv6 family are translated to IPv4 and viceversa (NAT64 and NAT46)

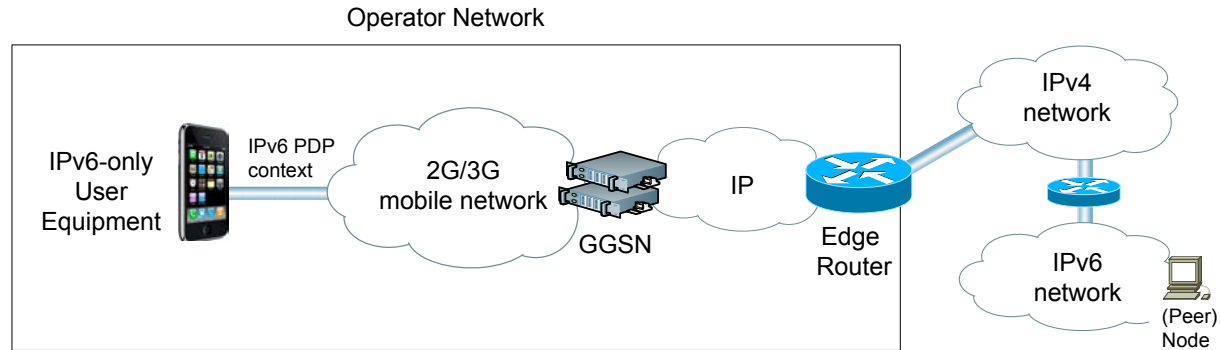


- + Suitable solution for specific scenarios and requirements
- Scalability issue at the translator level
- Design restrictions imposed (traffic symmetry through the translator)
- Single point of failure at the translation router

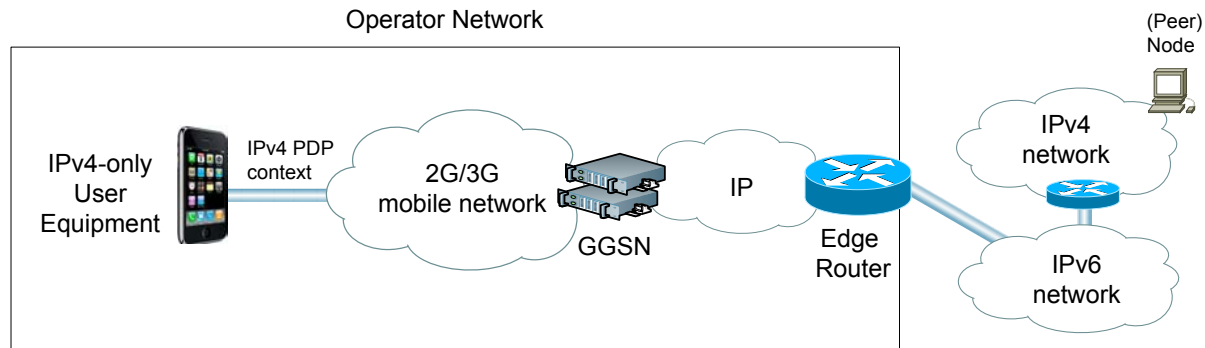
GPRS Scenario #1: Dual Stack UE connecting to IPv4 and IPv6 nodes

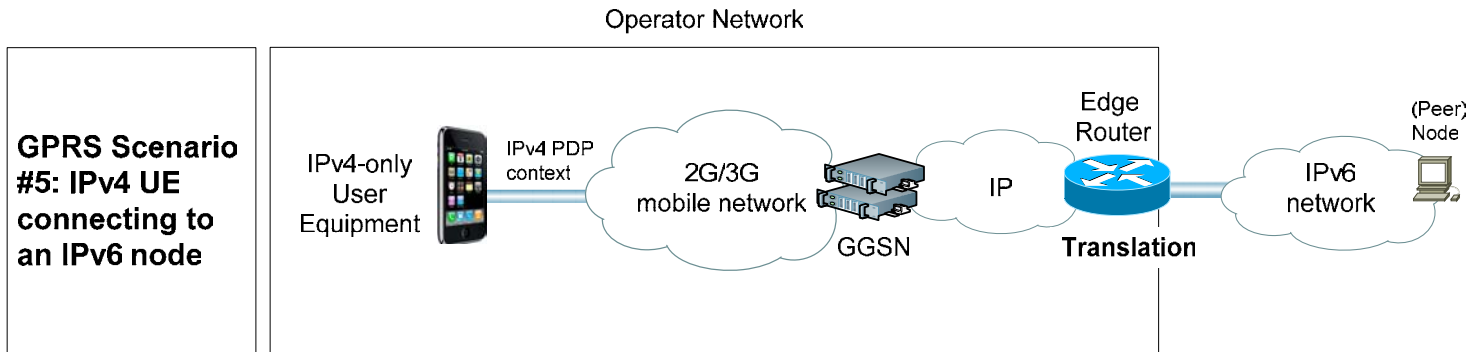
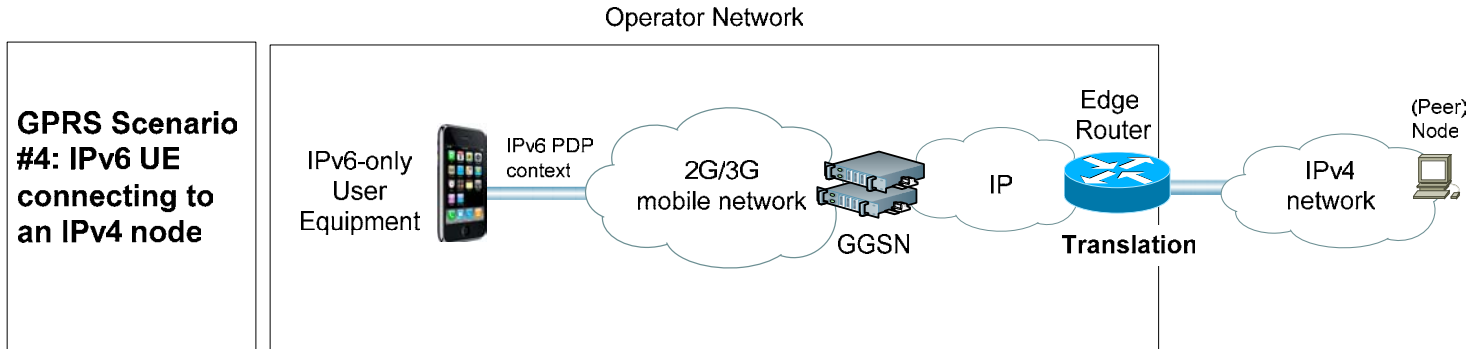


GPRS Scenario #2: IPv6 UE connecting to IPv6 node through an IPv4 network



GPRS Scenario #3: IPv4 UE connecting to IPv4 node through an IPv6 network





Within the transition process, a suitable set of KPIs has to be defined in order to evaluate the activity progress and the IPv6 service quality:

• Transition Progress percentage indicators:

- **Access**

$$P_{access} = \frac{CPE_{IPv6}}{CPE_{tot}} * 100$$

CPE_{IPv6} = number of IPv6 – ready CPEs
CPE_{tot} = total number of CPEs
- **Core/Backbone**

$$P_{core} = \frac{CInt_{IPv6}}{CInt_{tot}} * 100$$

CInt_{IPv6} = number of IPv6 – ready core interfaces
CInt_{tot} = total number of core interfaces
- **Application**
(per application)

$$P_{app} = \frac{AInt_{IPv6}}{AInt_{tot}} * 100$$

AInt_{IPv6} = number of IPv6 – ready appl interfaces
AInt_{tot} = total number of appl interfaces

• Service Quality indicators within the IPv4/IPv6 transition period:

- Data (RTT, specific SLAs...)
- Multimedia (Jitter, Latency, RTT, specific SLAs...)

شكرا لحسن الاستماع
Thank You