IPv6 in Nokia and NSN Products

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Introduction

- Nokia and NSN IPv6 capabilities
- Nokia Devices
- NSN products
- Conclusion

IPv6 focus in Nokia and Nokia Siemens Networks

- Nokia and NSN have had a good understanding of the importance of IPv6
  - Early investment in IPv6 development
  - IPv6 seen as inevitable and useful for the growth of the industry
  - NSN has made a strategic decision to support IPv6 in all new products
- NSN and Nokia have been key drivers for IPv6
  - Key contributor to the IPv6 protocol standardization in the IETF
  - Contributed towards IPv6 standardization in 3GPP, WiMAX Forum, etc.
- Early support for IPv6 in key products
  - Nokia Siemens Networks and Nokia have implemented IPv6 enablers in multiple products
  - Products have been used in multiple trials

Five years of IPv6 in off-the-shelf Nokia Devices

2009

5140
First Nokia device with IPv6
- exclusively for Push to talk

6630
First Nokia 3G device
with Symbian OS and dual-stack support

9500 Communicator
First Nokia device with IPv6 WLAN
support

N97
State of the art mobile computer for highly personalized Internet experience

6788
First Nokia TD-SCDMA
device, see Data Sheet

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IPv6 in Nokia Devices

- Most S40 and Symbian products contain IPv6 stack
- Application's IPv6 support level varies
  - Applications can choose to use IPv4 or IPv6 (provisioning possible)
- Dual-Stack is the supported transition mechanism
- Best level of IPv6 support is in S60 3.2 and newer
  - Possible to try IPv6 out already!
- IPv6 support in Nokia devices is constantly being enhanced according to technology and market changes
  - Focus is currently on 3GPP Release-8 Dual-Stack bearers
  - Analysis is ongoing for suitability of new IPv6 transition mechanisms for cellular networks (DSMIP6, DS-Lite, PNAT, A+P, 6RD..)
- See also Nokia Views on IPv6 Transition
  - http://www.forum.nokia.com/info/sw.nokia.com/id/64fb6b03-5a1d-4048-a849-b68e5a31fc9e/Nokia_Views_on_IPv6_Transition.html

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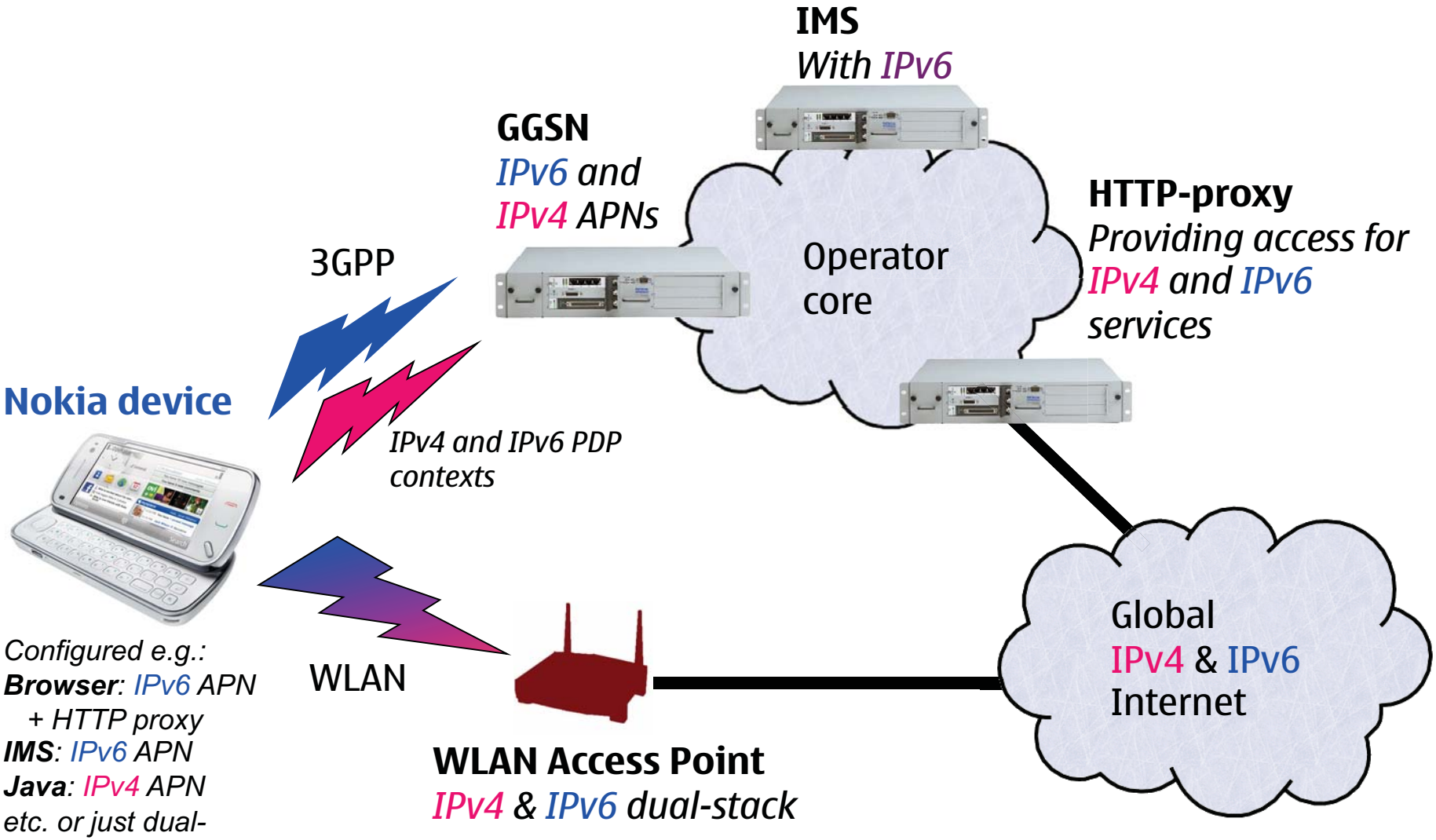
Example of network setup to try out IPv6 *now*



Phased introduction of IPv6

Need for IPv6 will come in phases

- The strongest and the most visible need for IPv6 will be via the operator deployments to begin with
- Other aspects will come later

Nokia Siemens Networks' strategy is to enable and support IPv6 where the need is

- Enable IPv6 as a service for the end-user first
- Support for service where need for addresses is the strongest
- Support for IPv6 in management and other back-end networks later

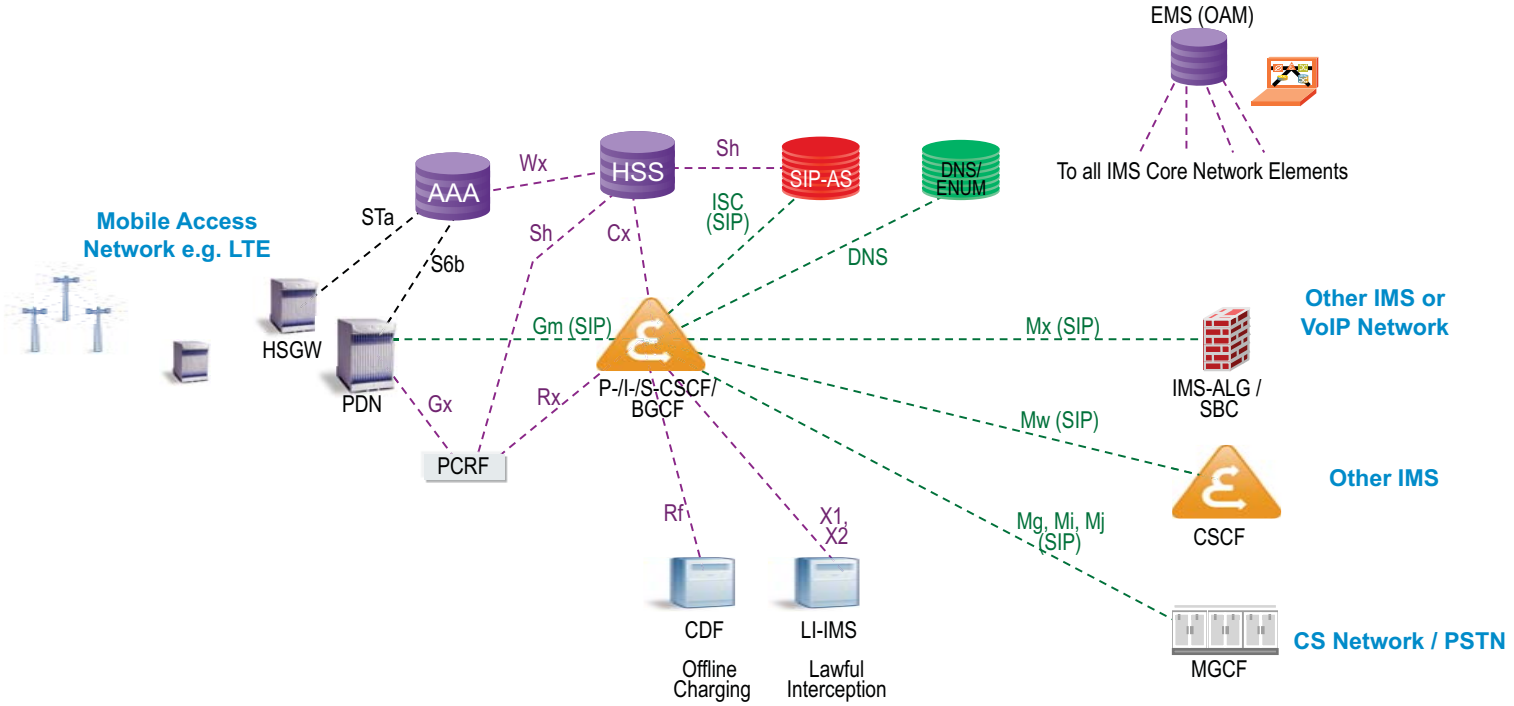
- IPv6 support has, is and will be added in products where they add value to the customer at that time

Nokia Siemens Networks assumptions on IPv6

- IPv6 is needed first at the edge, for the end-user
- IMS one of the driving use cases
- Non user addressed interfaces are secondary
- Existing operator with IPv4 address will have both IPv4 and IPv6
- IPv4 network will not be phased out at this point
- It will take time before all applications, operating systems, networks, and services support IPv6
  - IPv4-only legacy devices and applications need to be supported for a long time
  - IPv6-only devices are not likely to exist in near future

Example: Introducing IPv6 in phases in IMS with Release-8 architecture

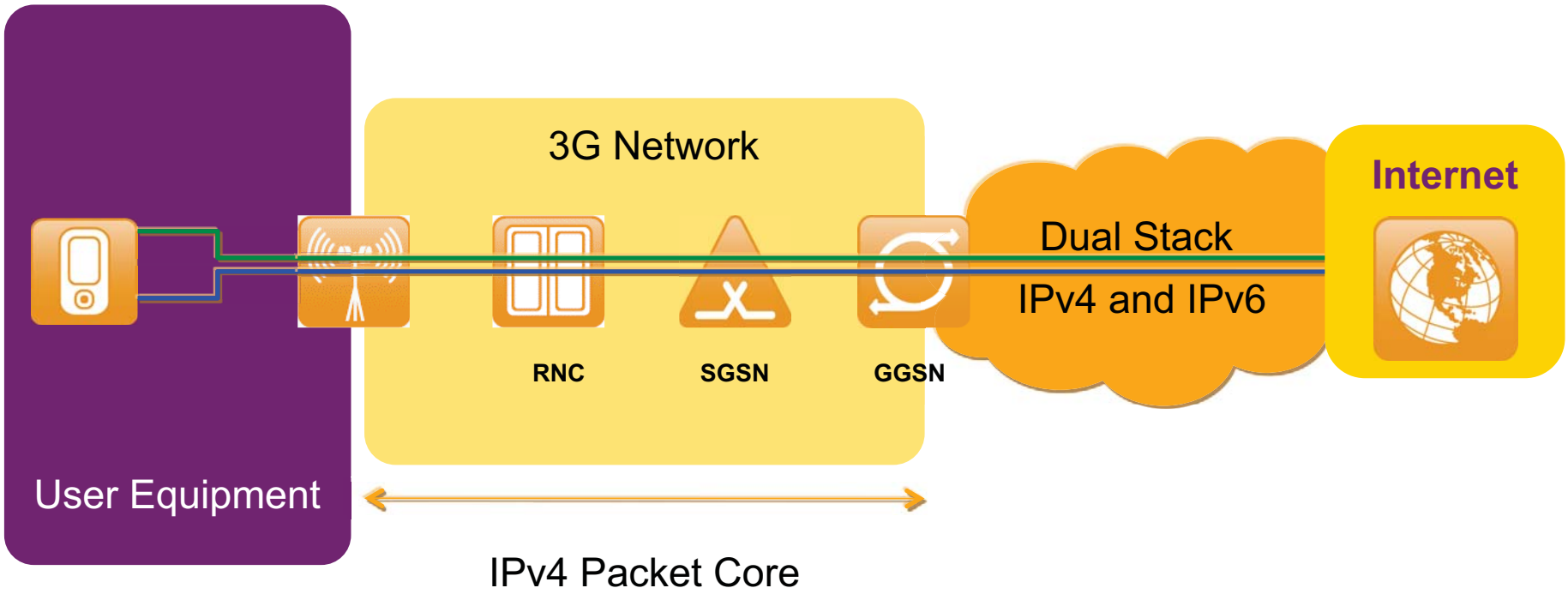
- **IPv6 can be introduced in phases in different parts of the network:**
  - Interfaces that need and benefit from IPv6 support have IPv6
  - Interfaces that do not need IPv6 support can continue to leverage existing IPv4 deployment
    - E.g. O&M interfaces



IPv6 Transport and IPv6 Application Signaling

IPv4 Transport and IPv6 Application Signaling

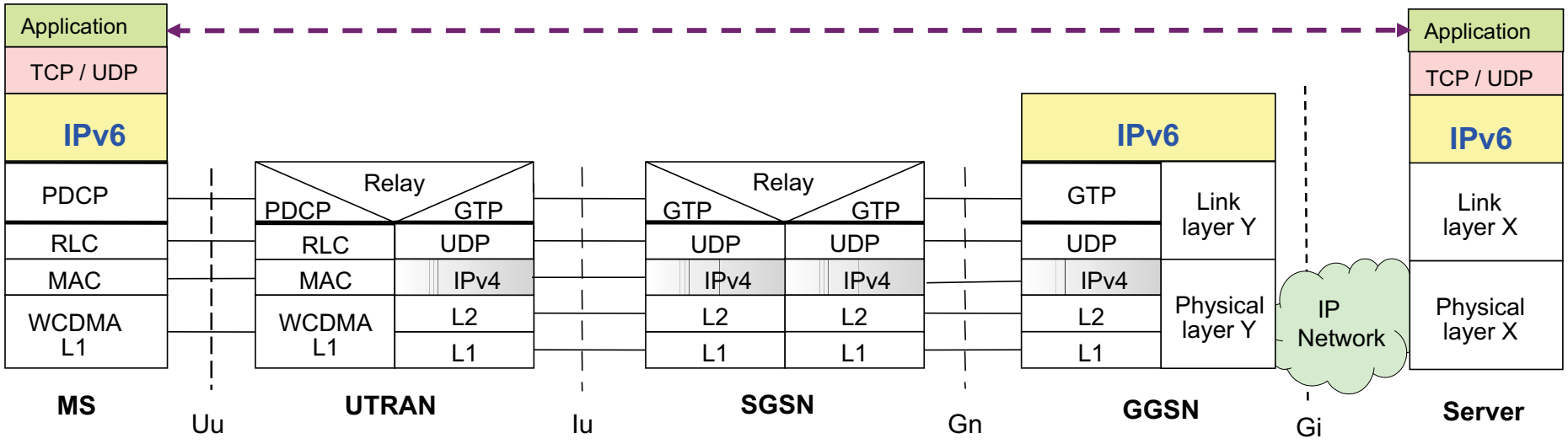
3GPP pre-R8 Dual-Stack
- Parallel IPv4 and IPv6 PDP Contexts



IPv6 PDP Context

IPv4 PDP Context

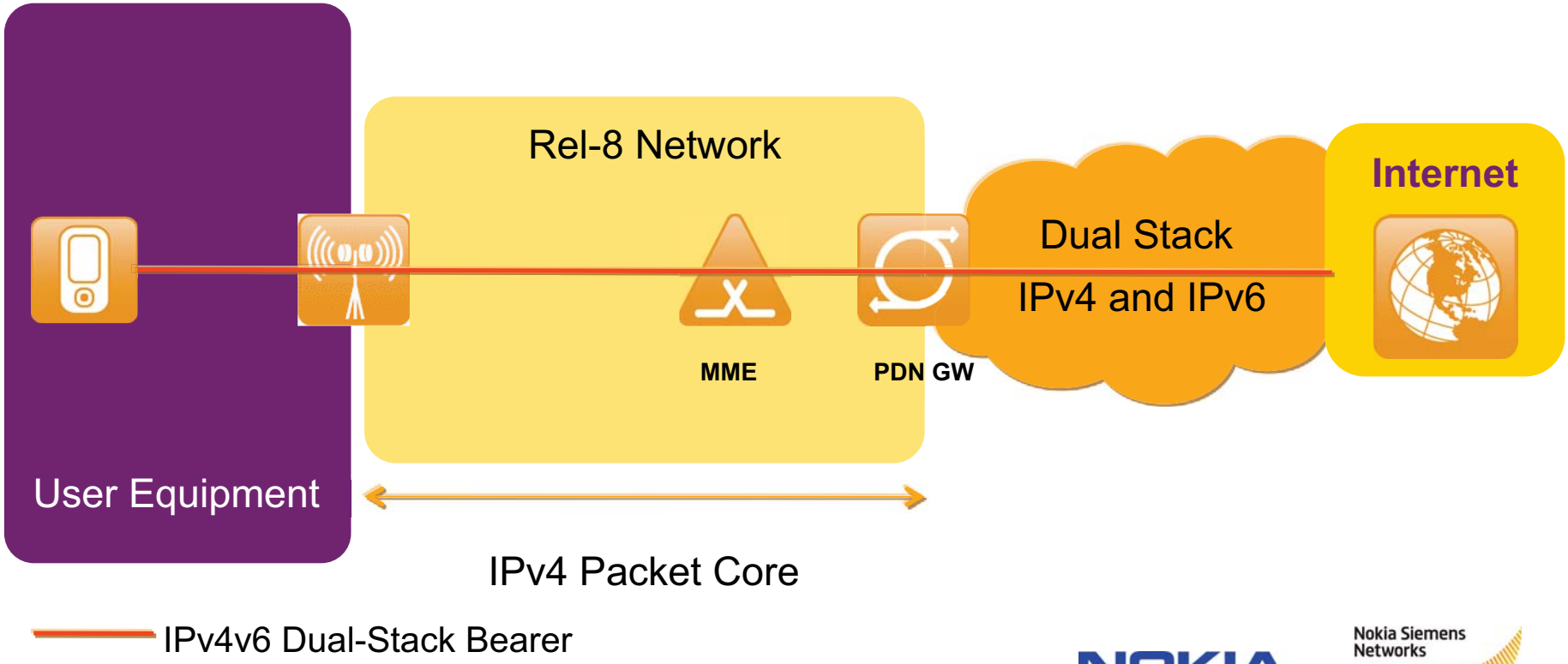
Example: IPv6 support for GPRS



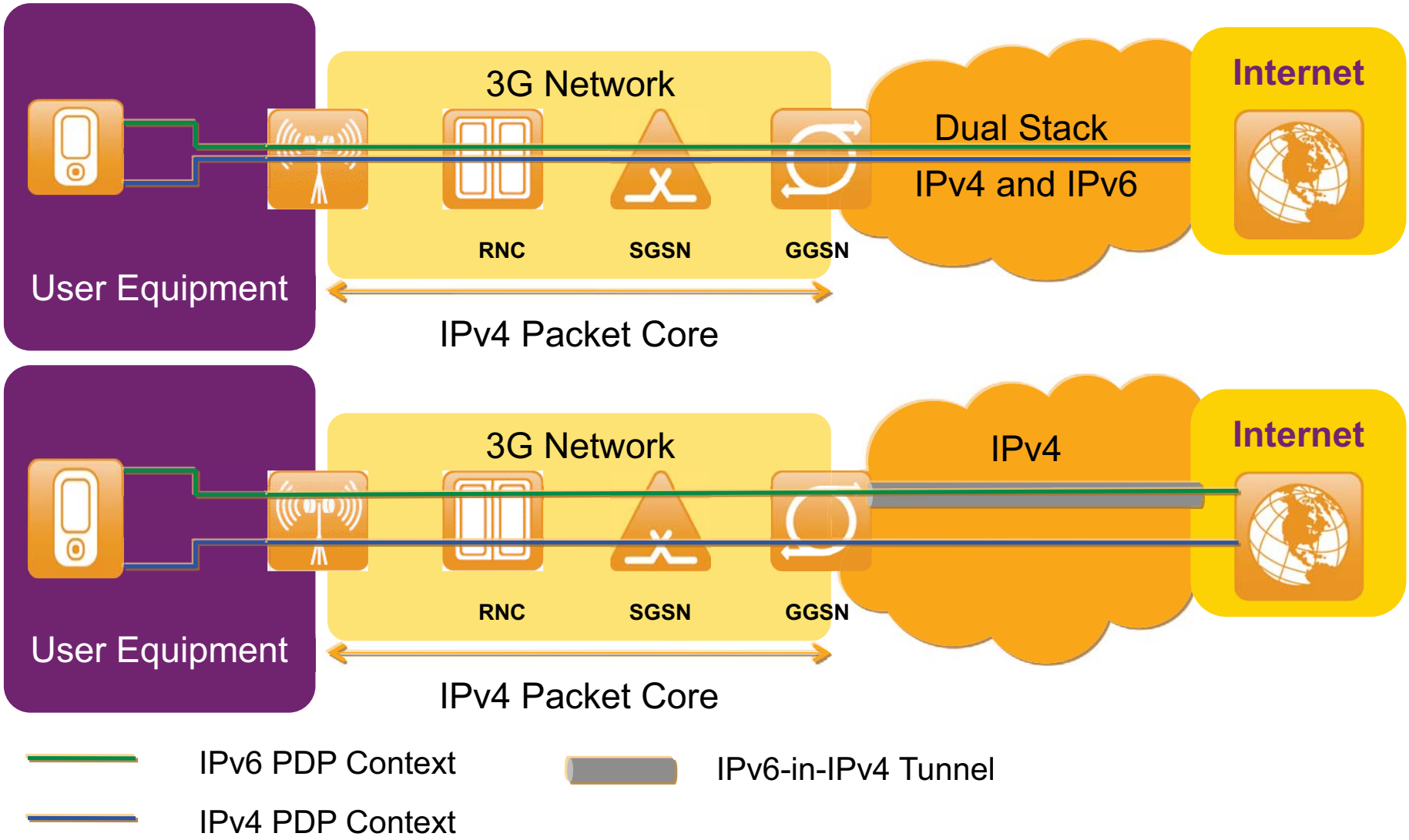
- IPv6 PDP Context support
  - Packet Data Protocol Context is the “link” between the mobile and the access router in GPRS
  - IPv6 can be introduced without changing the existing network connecting the network elements
  - IPv6 user traffic in external networks can be tunneled over IPv4 only segments

3GPP Release-8 introduces Dual-Stack bearers

- 3GPP Release-8 brings significant IPv6/IPv4 interworking improvements due introduction of dual-stack EPS bearer and PDP context
- **Nokia and Nokia Siemens Networks prefer dual-stack as transition mechanism**



Existing operator deployments



Nokia Siemens Networks IPv6 support

- Access and Transport
  - Mobile Access
    - Supporting End-user IPv6 service (IPv6 PDP Context)
  - Broadband access
    - Support for IPv6 over PPPoE, 1:1 VLAN
  - Transport equipment is IP version agnostic
    - Transport of both IPv4 and IPv6 enabled
- IP Multimedia Subsystem
  - Dual-Stack supported in Nokia Siemens Networks IMS solution
  - Nokia Devices' IMS IPv6 enabled as well
- Going forward: Support for IPv6 is enhanced and extended to support all applicable products

Conclusion

- IPv6 has two clear drivers:
  - Readily available IPv4 address space is running out
  - IPv6 simplifies network architecture as IPv4 address exhaustion "mitigation tools" are not needed (e.g. NATs)
- Don't panic!
  - Mobile network architecture is extremely well suited for a gradual deployment of IPv6
  - Nokia and NSN products have supported IPv6 for years. Improvements – *including new transition mechanisms* - are implemented as market situation evolves
- A well planned, phased approach is the key
  - Plan well
  - Try out
  - Do not try to do everything at once
  - Update applications and services to IPv6/Dual-Stack capable