

Kick Start Your IPv6 Skills Using Your Home Network Share Session 12149



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Agenda

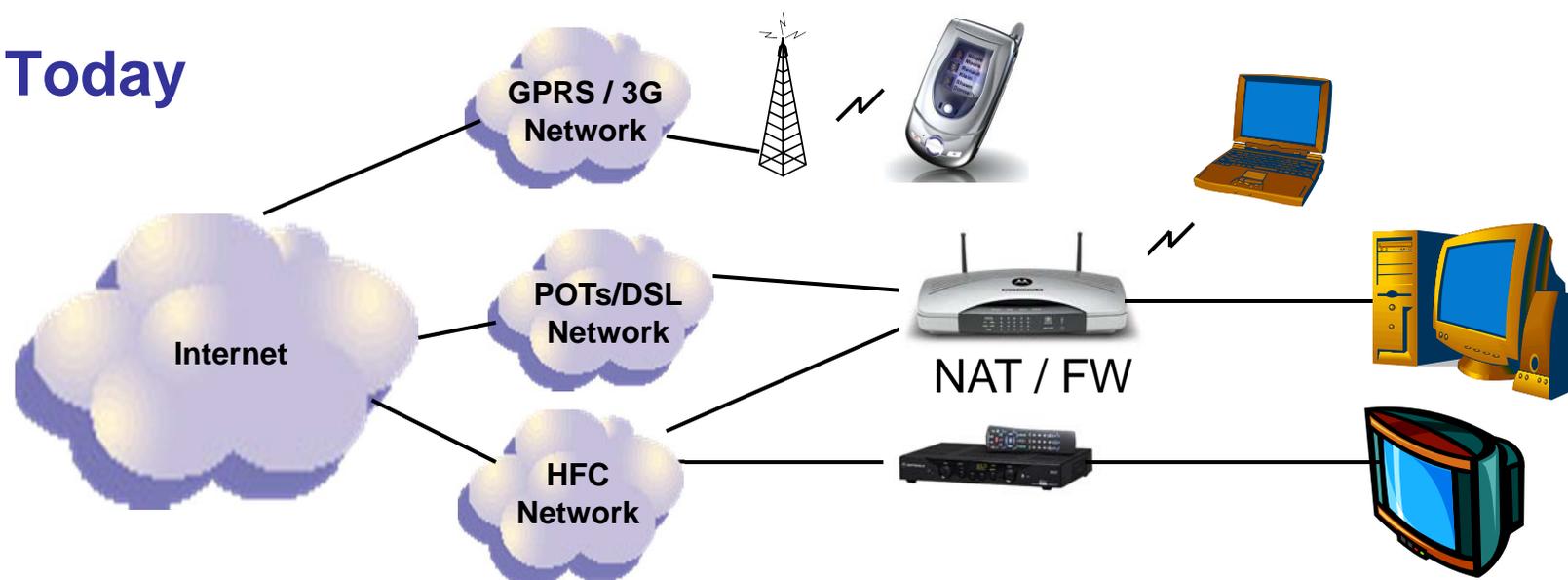
Service Provider Background

IPv6 Broadband

IPv6 Mobile



Today



- Devices
 - Separate Data /Video /Voice Networks
 - Broadband Modem
 - Gateway (maybe part of Modem)
 - Almost certainly has NAT
 - Configuration required on a per protocol basis
 - Some Wireless, mostly wired
- Applications
 - Assumption of asymmetric traffic
 - Works well for email and web surfing
 - Sessions initiate inside the home
 - Assumption that human starts session
 - Doesn't work well for
 - automated devices
 - multiplayer games

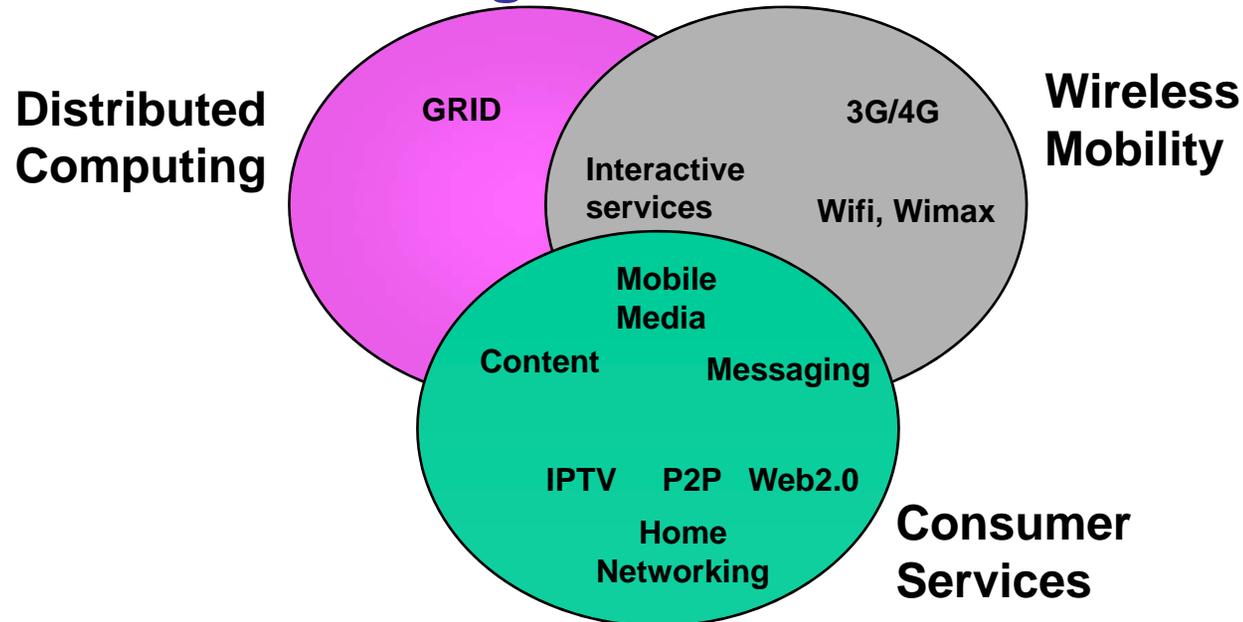
Tomorrow



Consumer has access to what they want, when they want it, where they want it

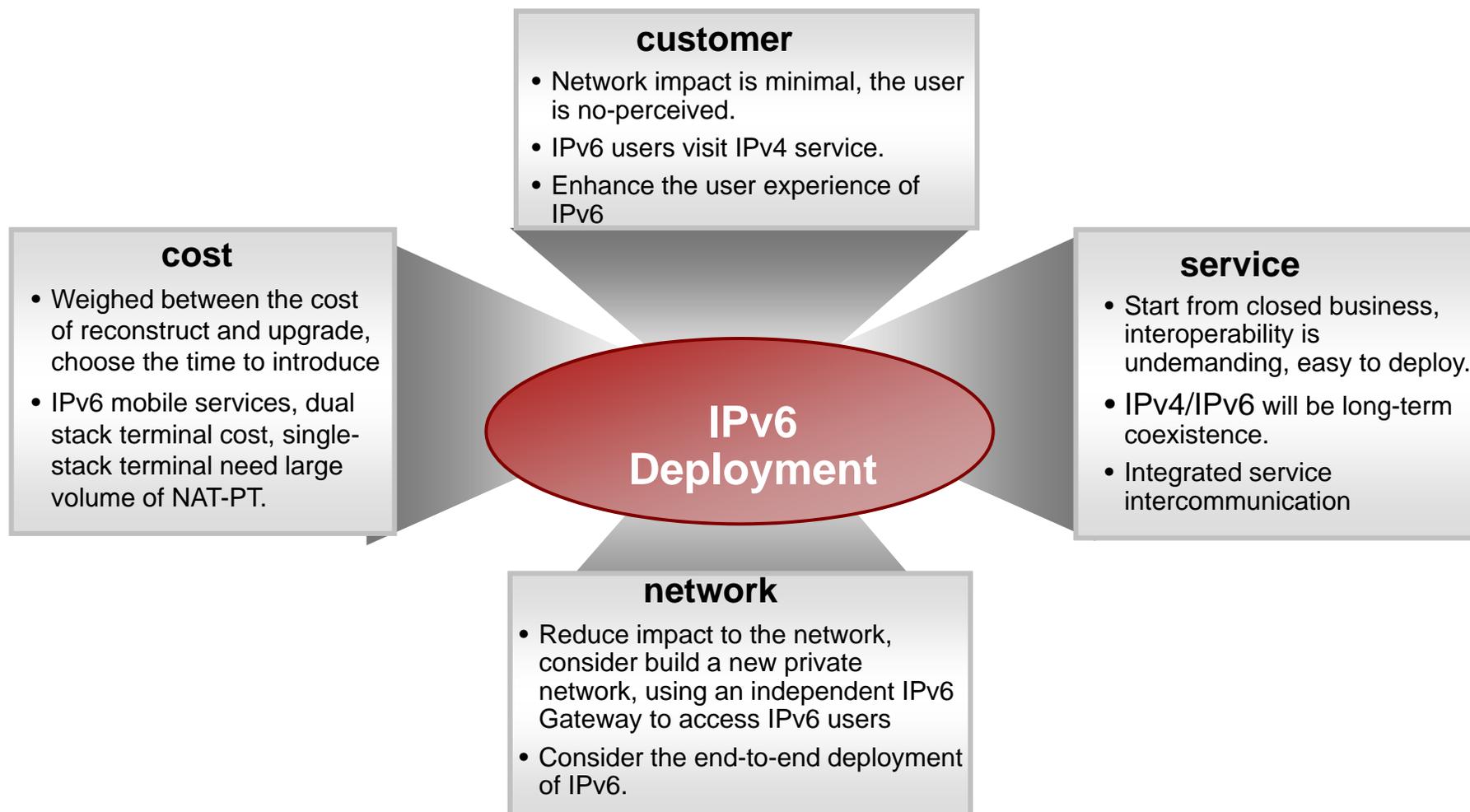
- Devices
 - Converged Networks
 - Broadband Modem(s) + Gateway
 - IP now embedded into all devices
 - Computers, Entertainment
 - Command & Control
 - Pervasive use of Wireless
 - Bluetooth and 802.11 variants
- Applications
 - Traffic is much more symmetric
 - File Sharing (audio and video)
 - Game playing
 - Sessions start outside as well as inside the home
 - Things talking to things
 - Home Automation

Commercial Use Driving IPv6

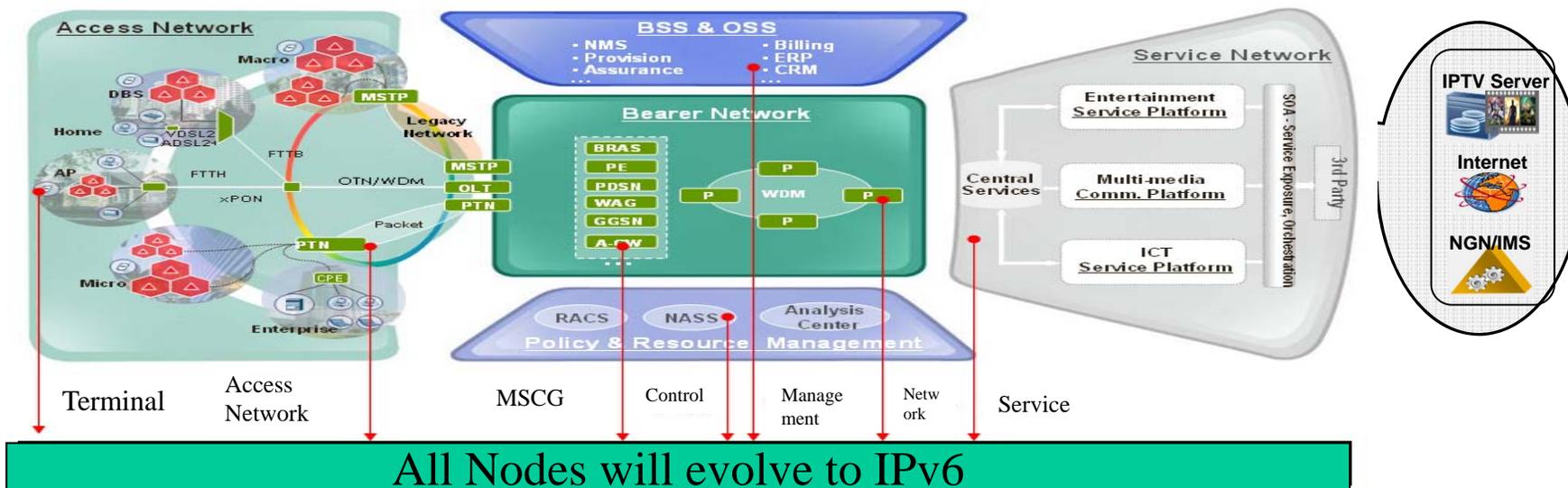


- **This despite increasingly intense conservation efforts**
 - NAT (network address translation)
 - CIDR (classless inter-domain routing)
 - PPP / DHCP address sharing
- **Theoretical limit of 32-bit space: ~4 billion devices**
- **Practical limit of 32-bit space: ~250 million devices (RFC 3194)**

IPv6 Consumer Considerations

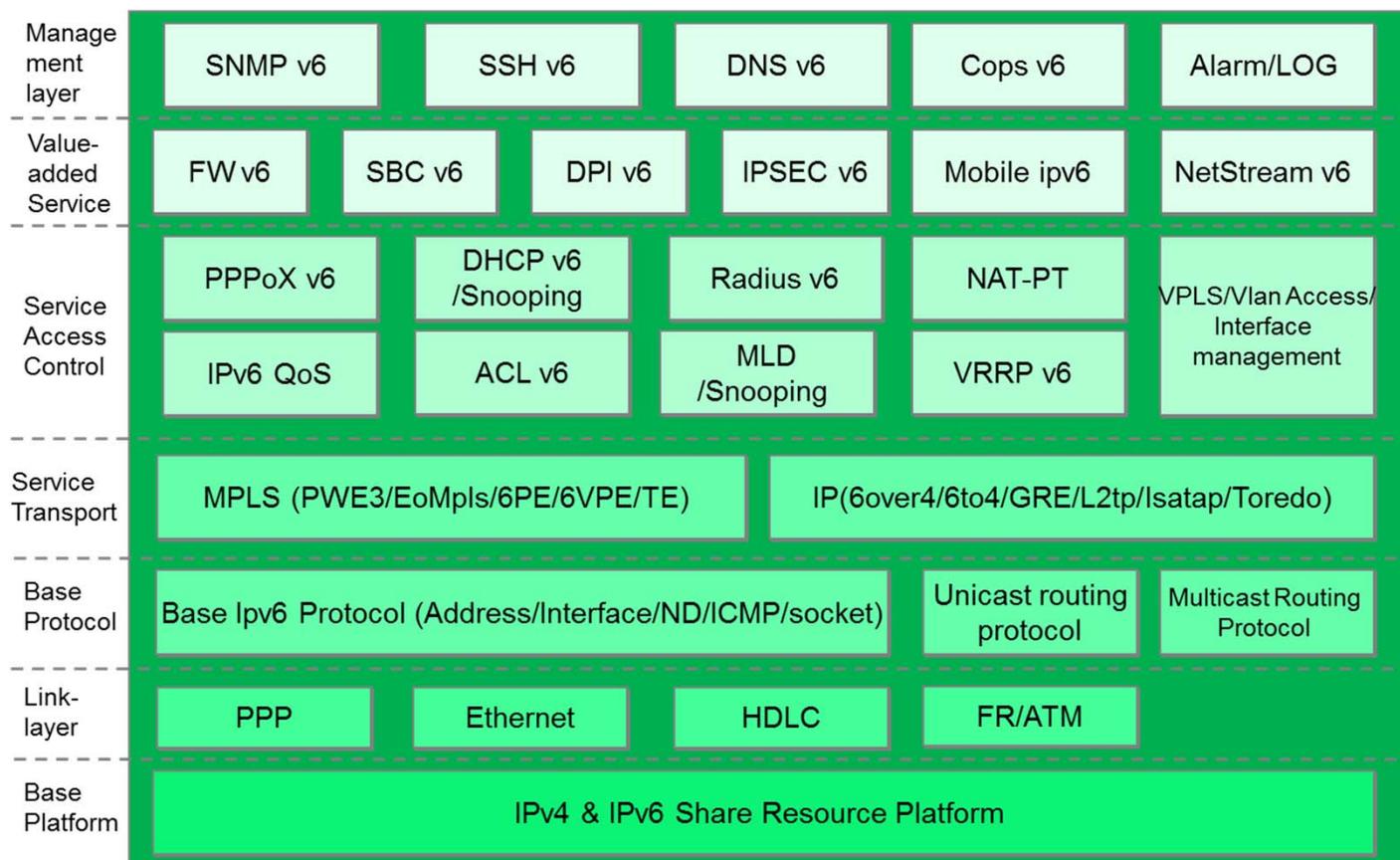


IPv6 is Evolutionary



- The parts of IPv6 E2E evolution:
 - the network nodes, including the access, metro, backbone, management, terminals and services.
- The objectives of IPv6 E2E evolution :
 - upgrade the whole network to IPv6.
- The State of IPv6 network:
 - Chips and external components of the main vendor equipments support IPv6 well, can be upgraded to support IPv6 natively.
 - Main vendors support IPv6 routing, VPN and other basic protocols well; IPv6 access, interoperability waiting for standardization.

Typical IPv6 Architecture



Agenda

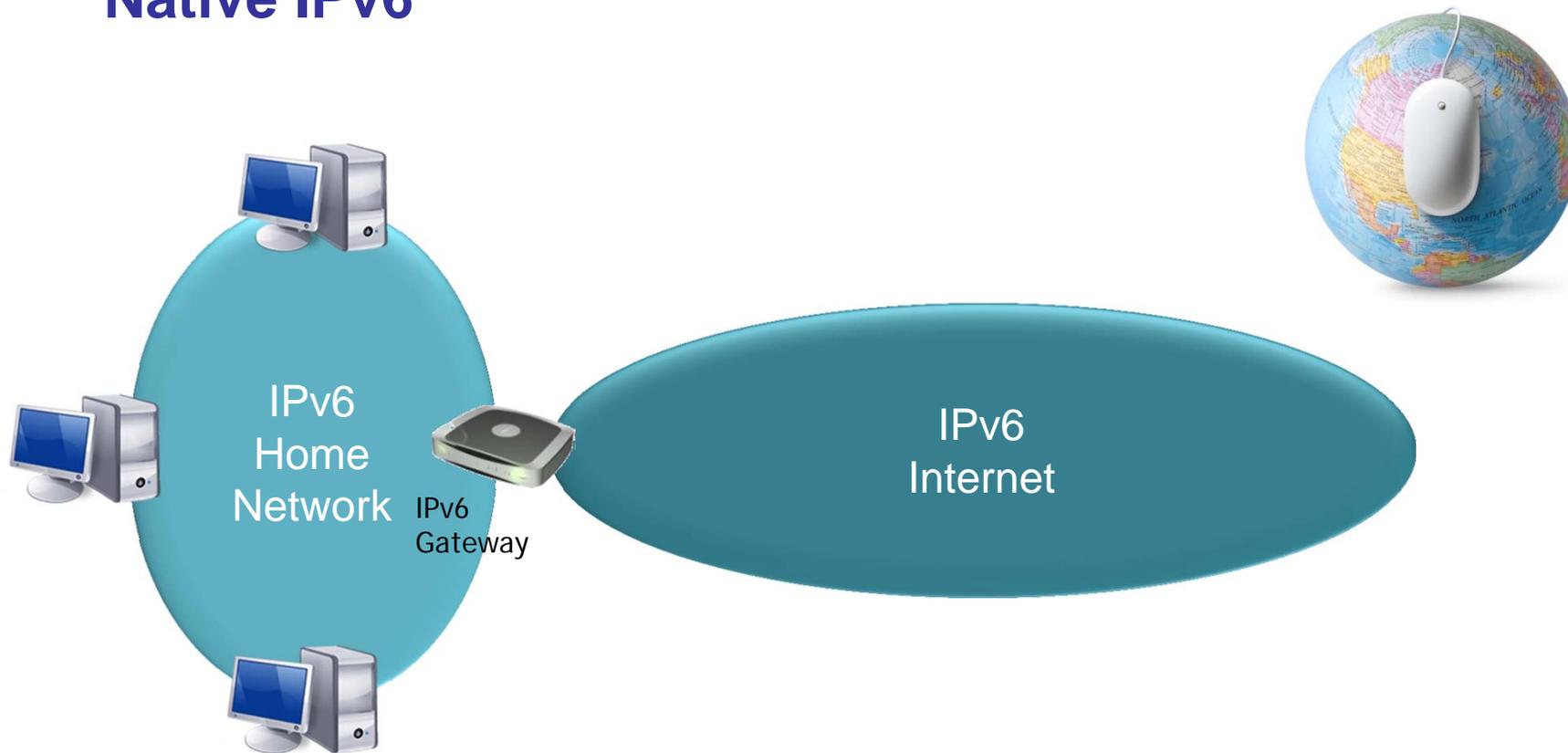
Service Provider Background

IPv6 Broadband

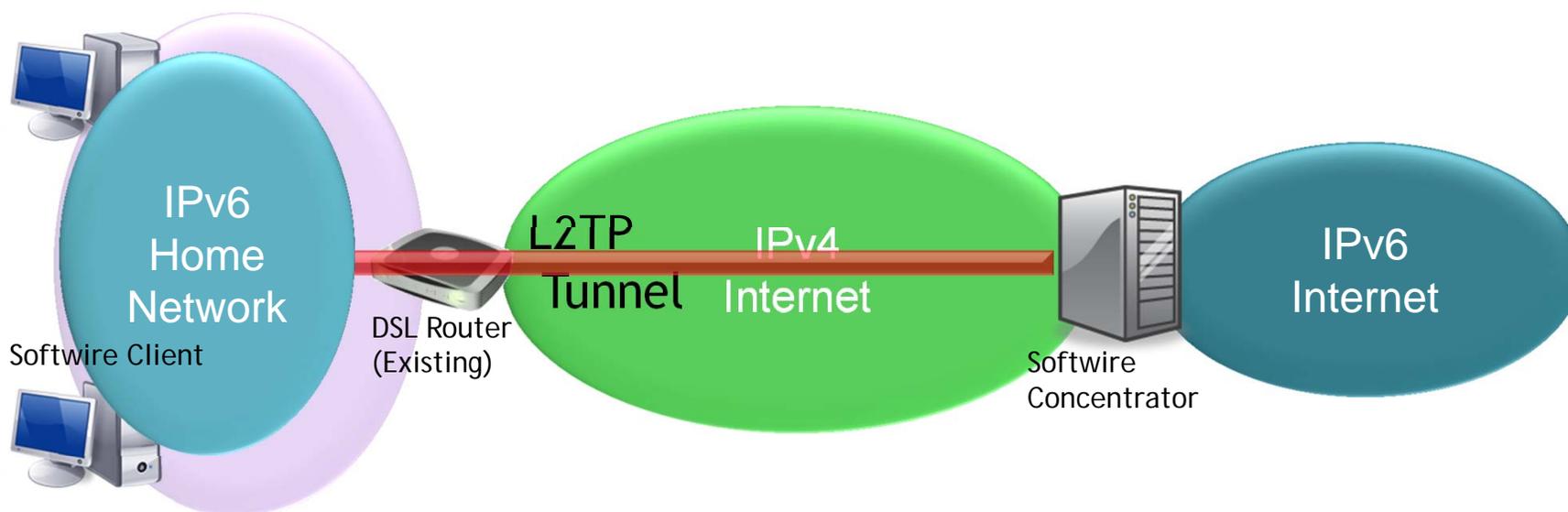
IPv6 Mobile



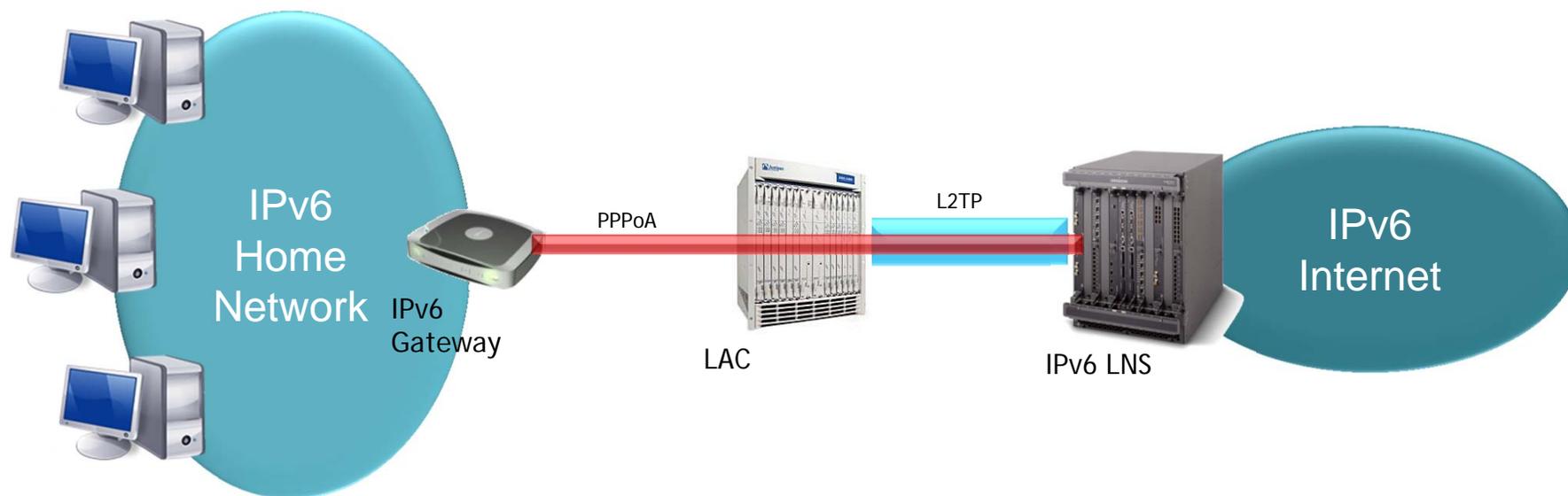
Native IPv6



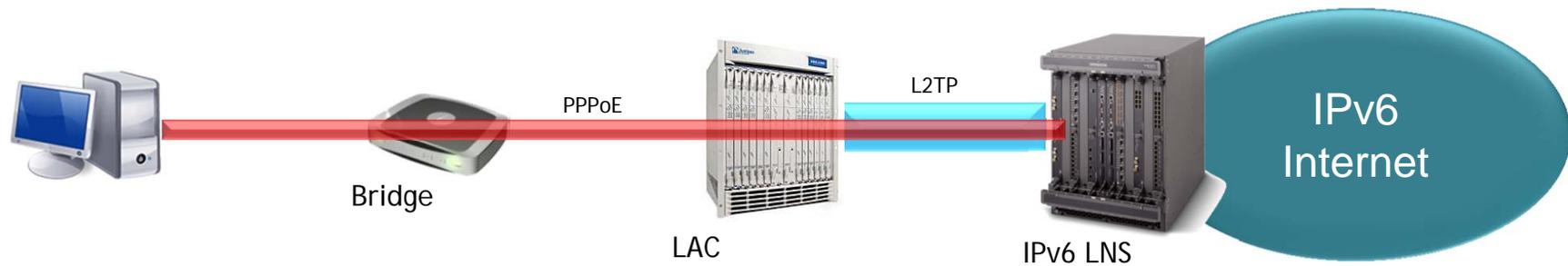
Client in the Home



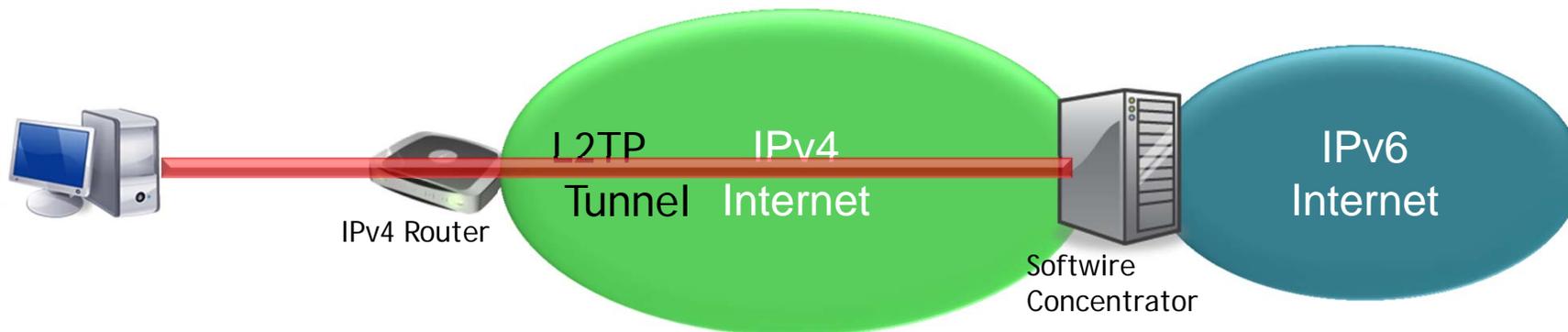
IPv6 Using L2TP



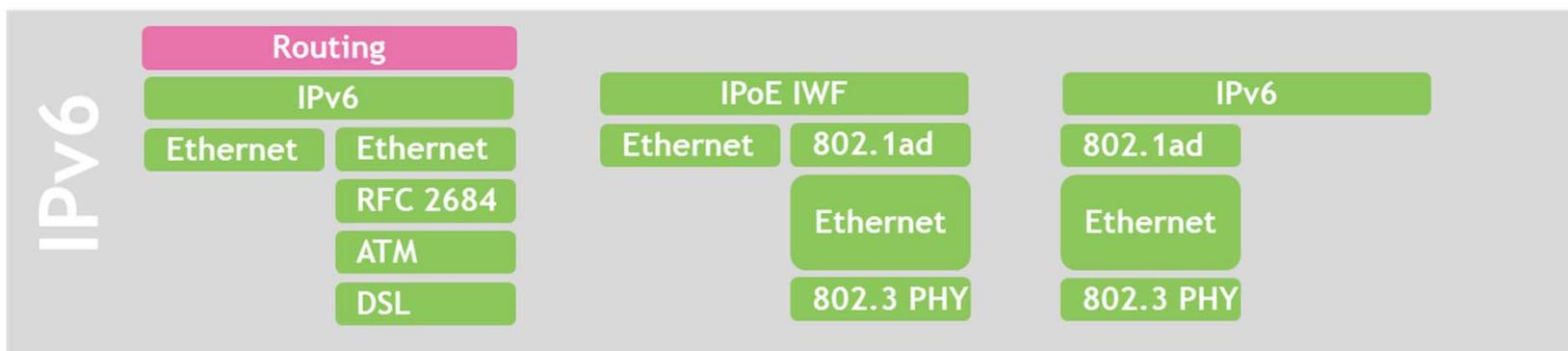
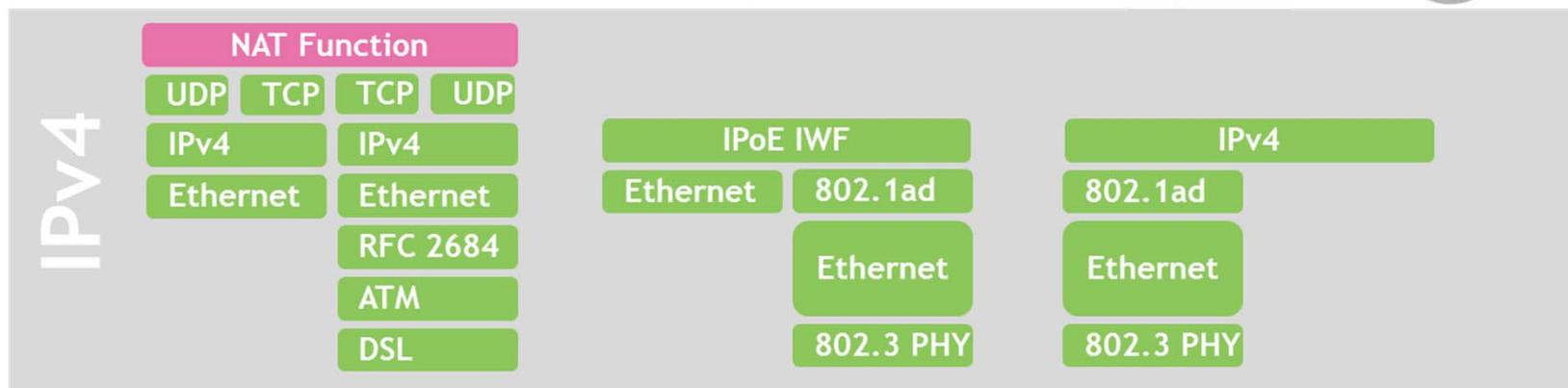
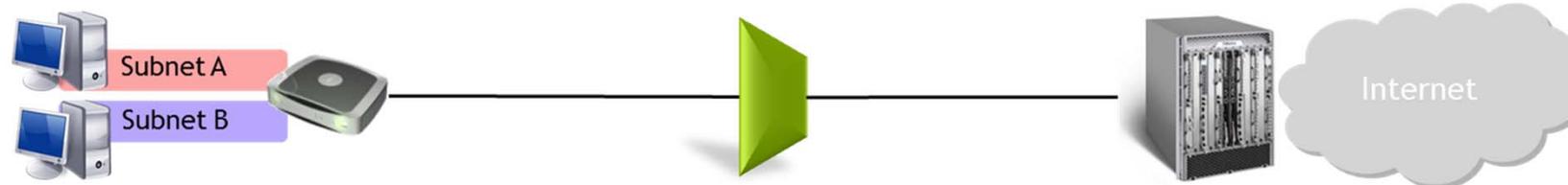
IPv6 Using PPPOE



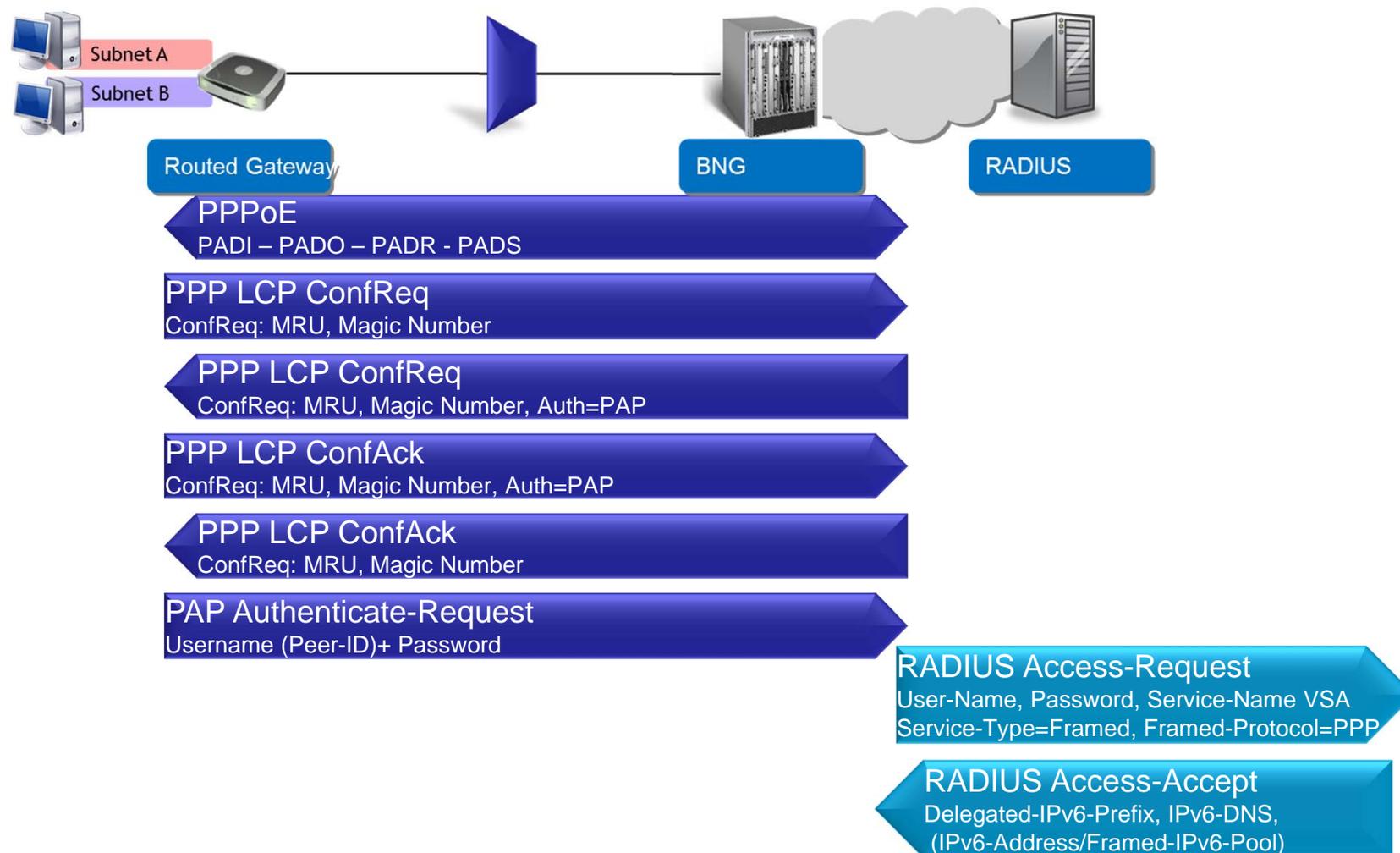
Host Access Using Software



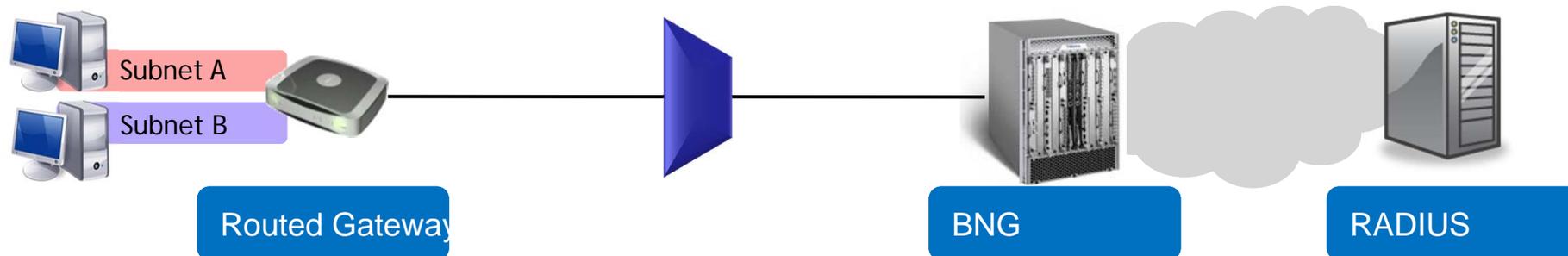
Routing in a Home Network



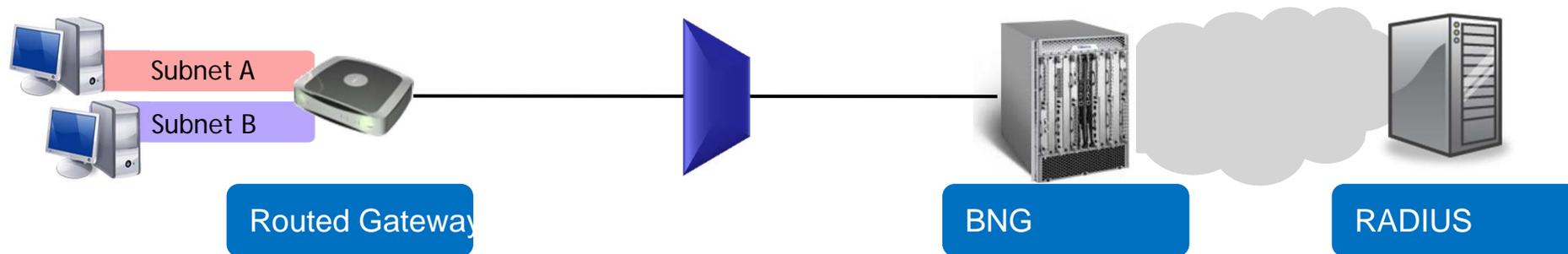
Routed Gateway with PPPoE WAN (1)



Routed Gateway with PPPoE WAN (2)



Routed Gateway with PPPoE WAN (3)

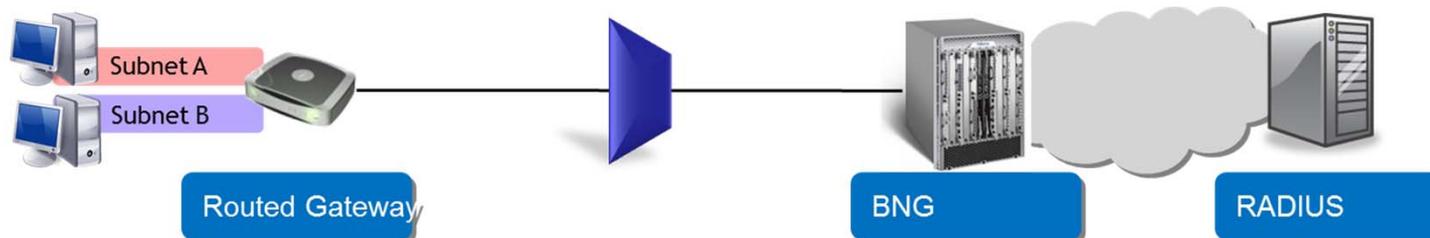


Multicast Router Advertisement
Numbered: M=1,O=0, No PIO
Un-numbered: M=0, O=1, No PIO

DHCPv6 Phase

- DHCPv6 SOLICIT
IA_PD-Option, (IA_NA-Option), DNS-Servers Option
- DHCPv6 ADVERTISE
IA_PD-Option + Prefix, (IA_NA)
- DHCPv6 REQUEST
IA_PD-Option, (IA_NA-Option), DNS-Servers Option
- DHCPv6 REPLY
IA_PD-Option + Prefix, (IA_NA)

Routed Gateway with Ethernet WAN (1)



DHCPv6
Phase

Multicast Router Advertisement
Numbered: M=1, O=0, No PIO
Un-numbered: M=0, O=1, No PIO

DHCPv6 SOLICIT
IA_PD-Option, (IA_NA-Option), DNS-Servers Option

RADIUS Access-Request
User-Name, Password, Service-Name VSA
Service-Type=Framed

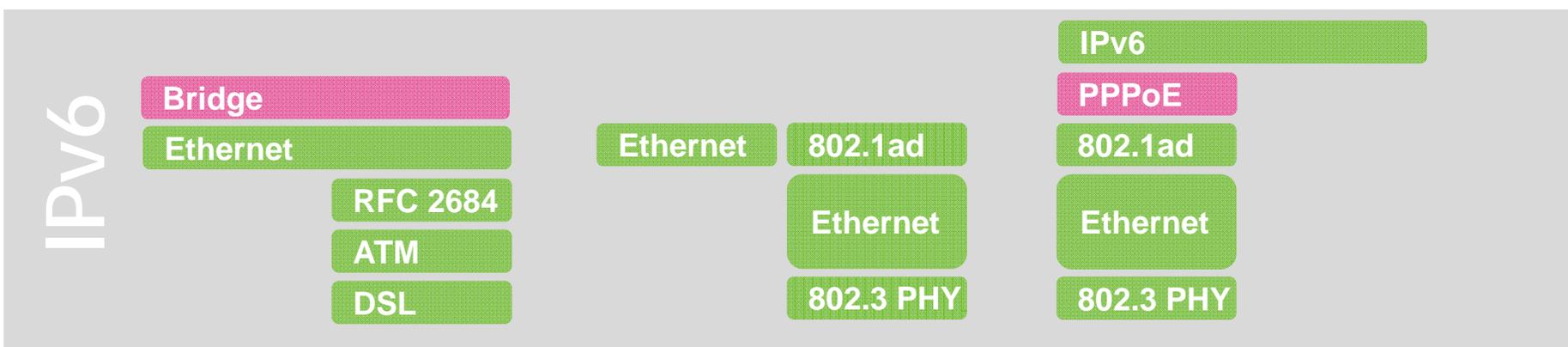
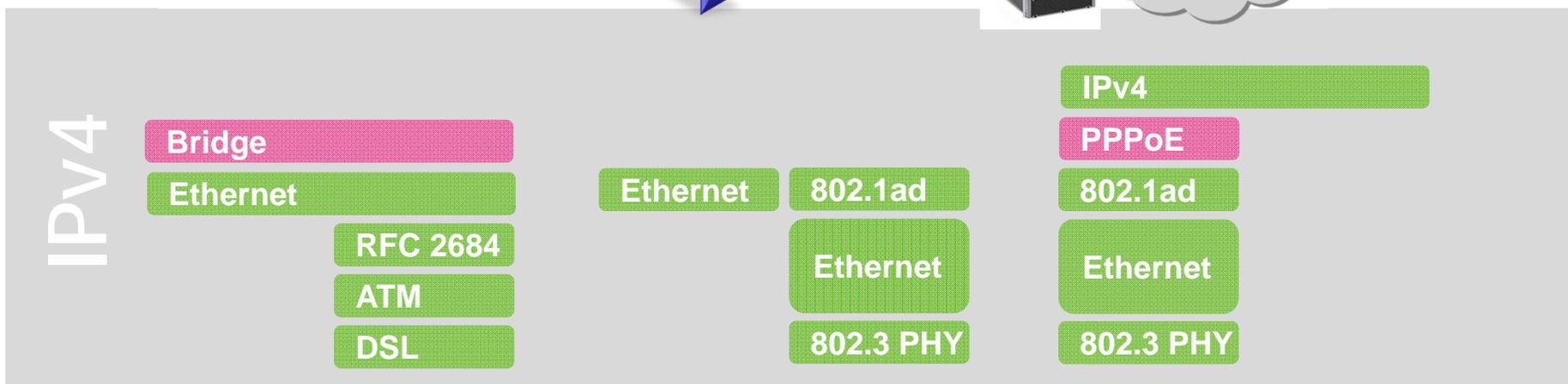
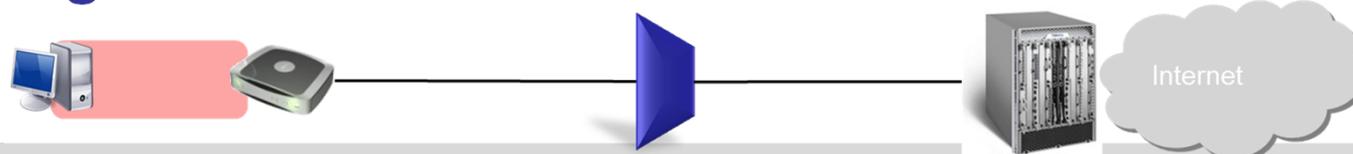
RADIUS Access-Accept
Delegated-IPv6-Prefix, IPv6-DNS,
(IPv6-Address/Framed-IPv6-Pool)

DHCPv6 ADVERTISE
IA_PD-Option + Prefix, (IA_NA)

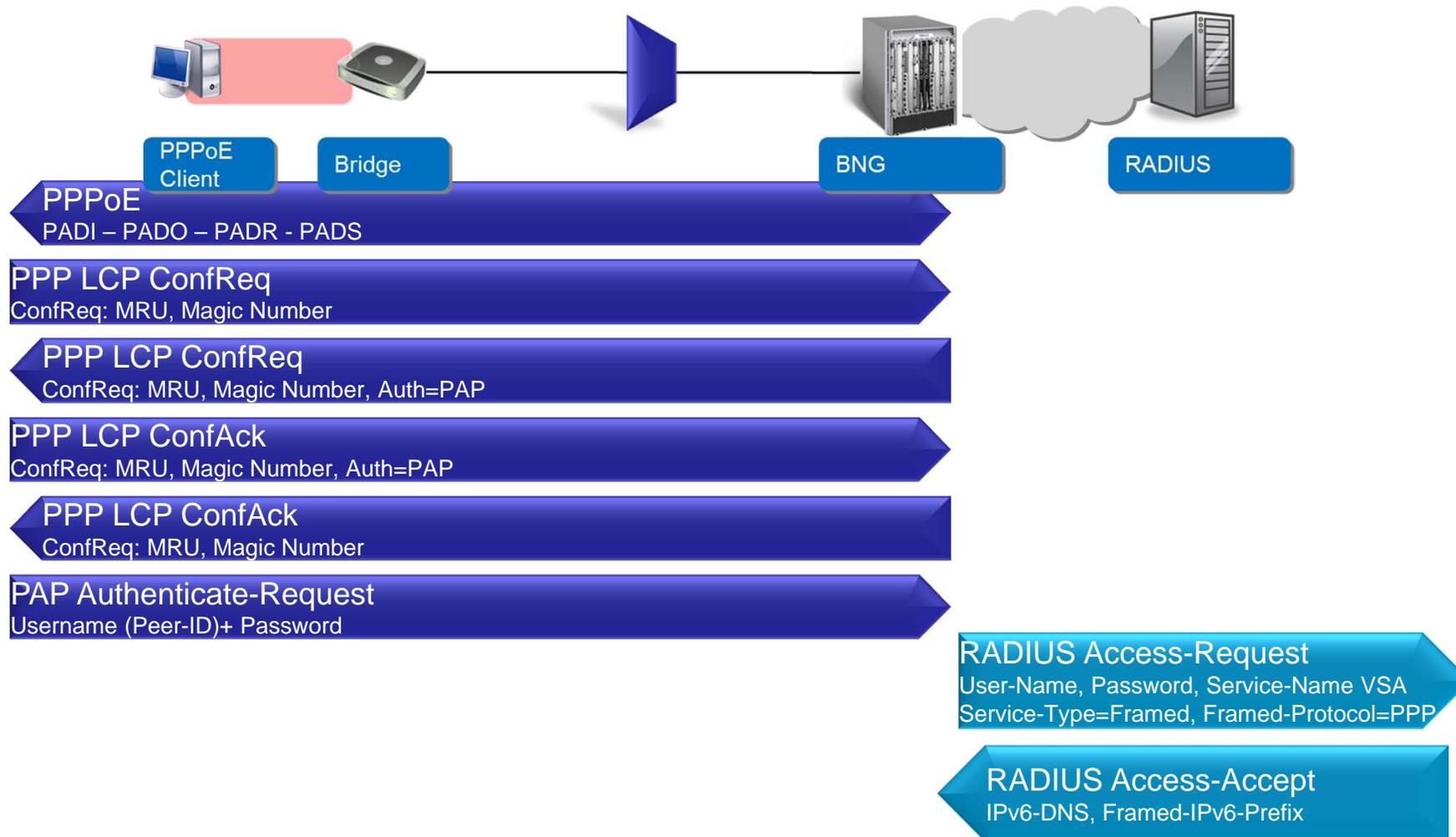
DHCPv6 REQUEST
IA_PD-Option, (IA_NA-Option), DNS-Servers Option

DHCPv6 REPLY
IA_PD-Option + Prefix, (IA_NA)

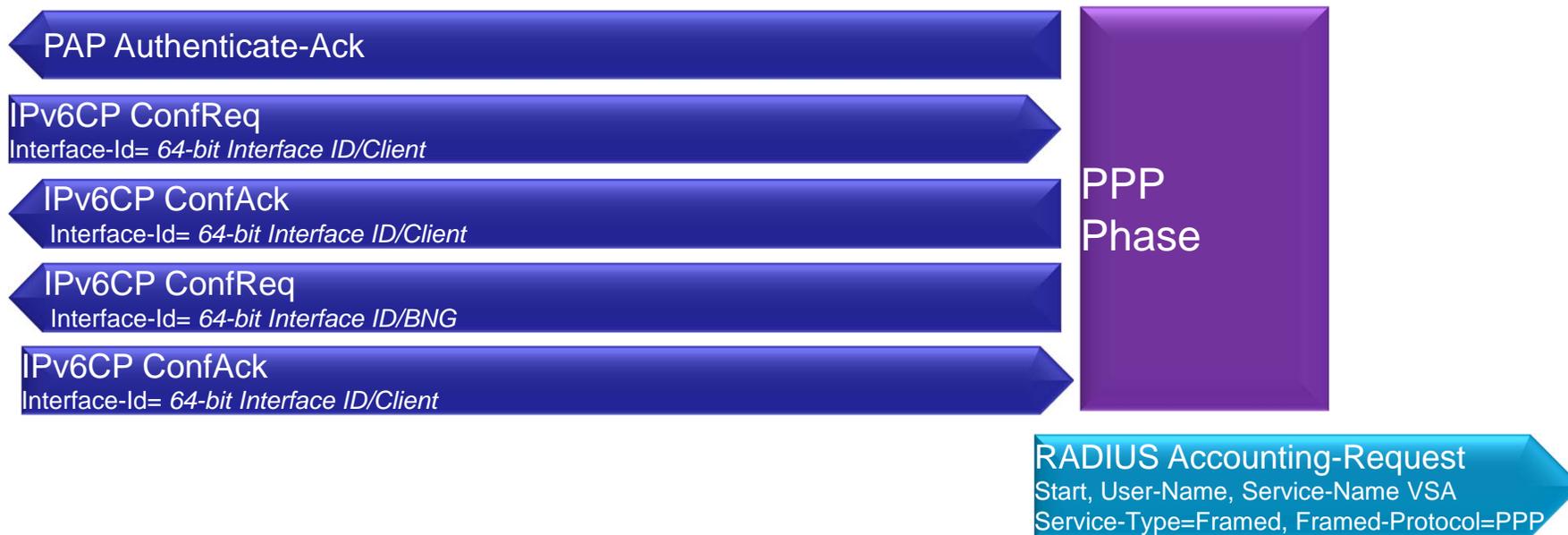
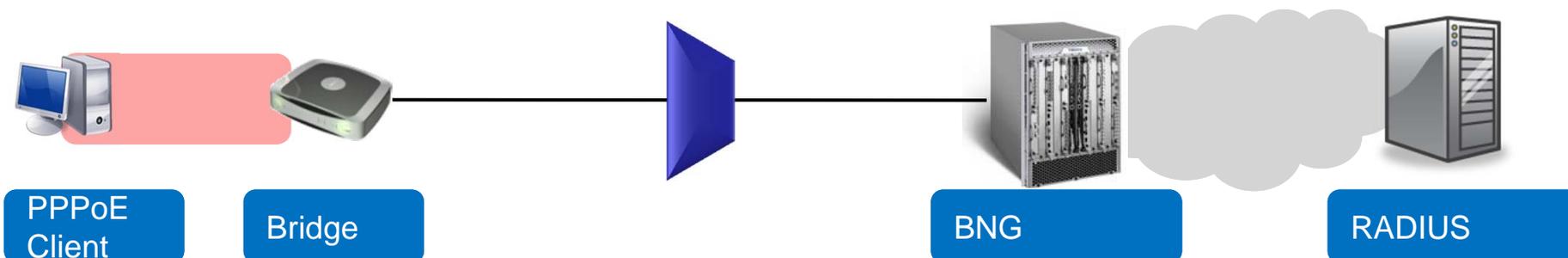
Bridged Home with PPPoE Host



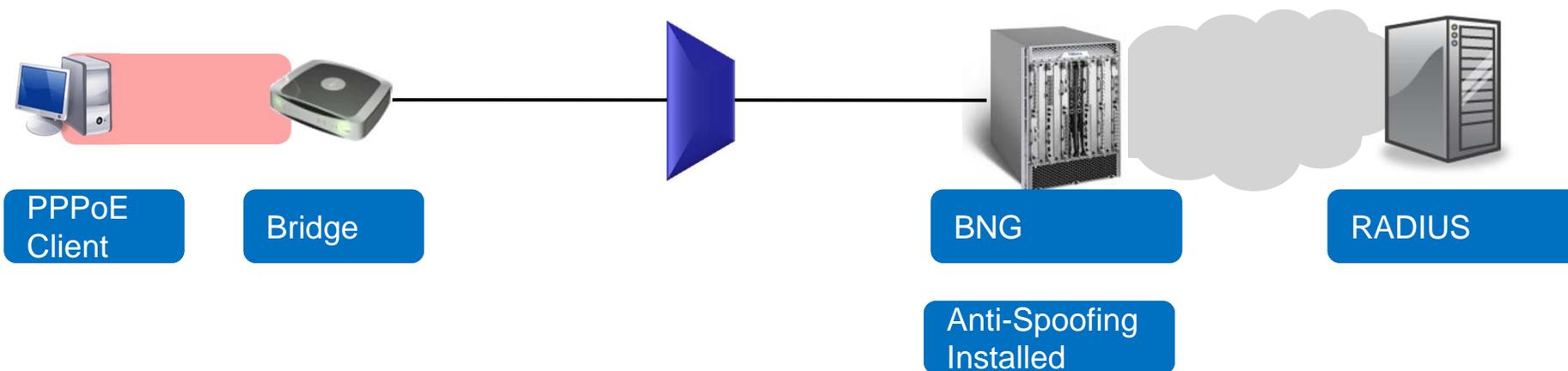
Bridged Home with PPPoE Host (1)



Bridged Home with PPPoE Host (2)



Bridged Home with PPPoE Host (3)



Multicast Router Advertisement
M=0, O=1
Prefix Information Option: *from Framed-IPv6-Prefix*

DHCPv6 INFORMATION-REQUEST
DNS-Servers Option

DHCPv6 REPLY
DNS-Servers Option

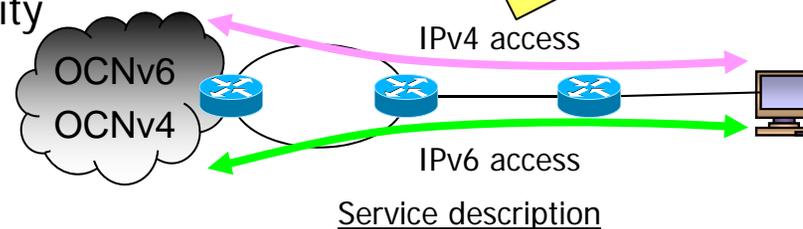
Optional
DHCPv6
Stateless
Phase

OCN IPv6/IPv4 Dual ADSL Service outline

Features:

- Broad band (12M) access service via ADSL line of ACCA networks
- Provide IPv4 and IPv6 dual stack connectivity
- Ease to set up by Plug and Play function

15,980 / month

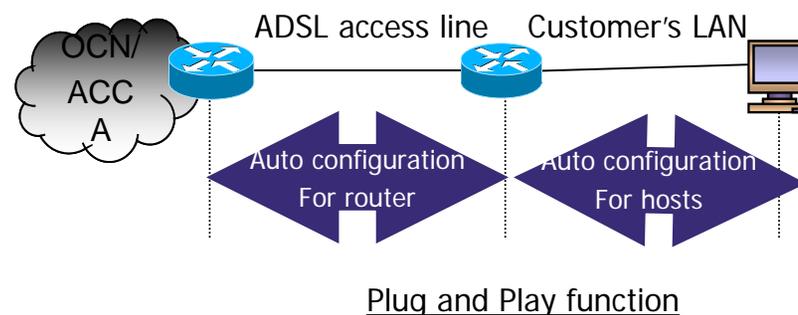


Prospective customer segments:

- Advanced individual / So-Ho users
- IPv6 applications or devices developer

Address assignment:

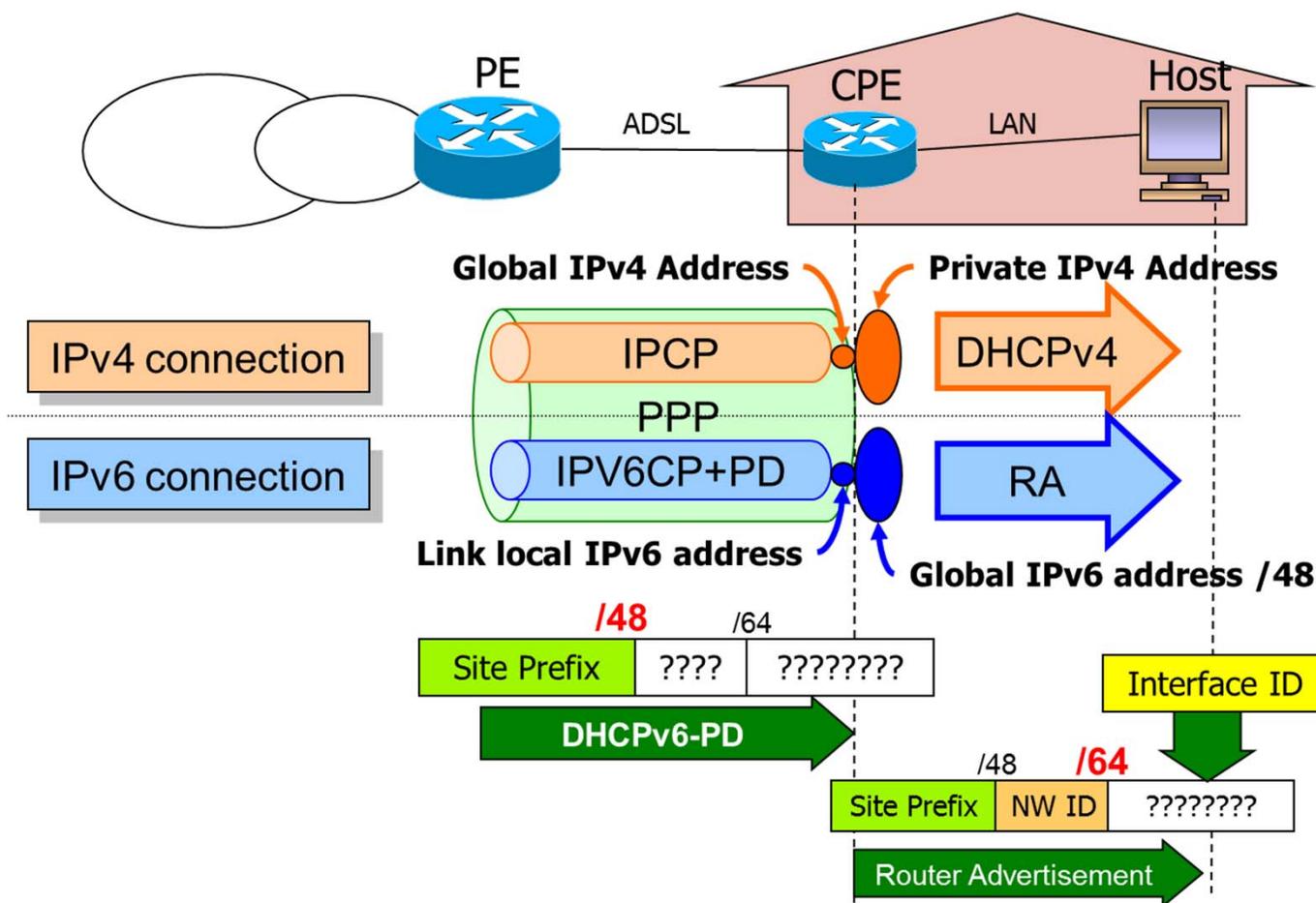
- IPv4 : one global address (dynamic)
- IPv6 : one /48 global address prefix (static)



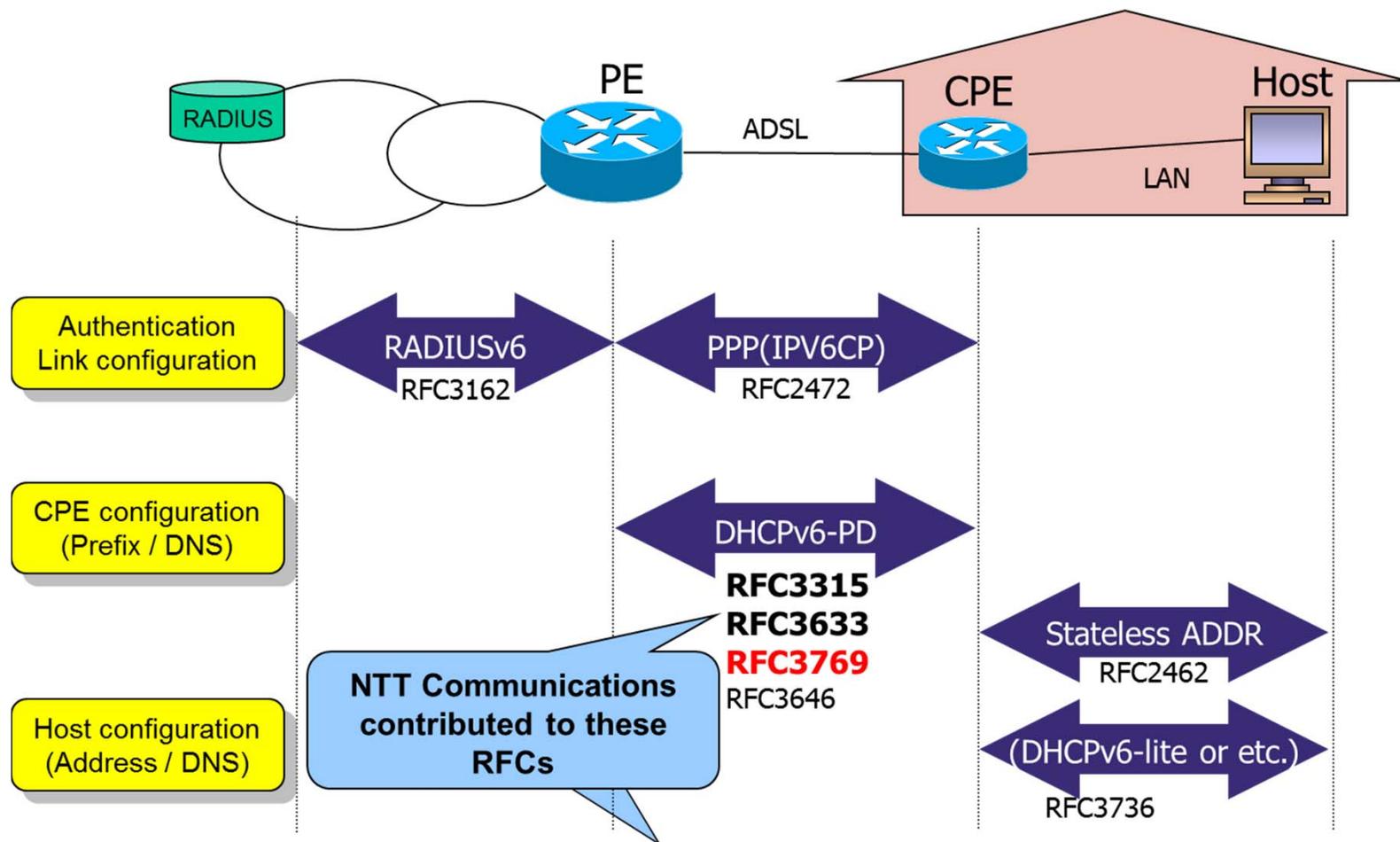
Additional service:

- As same as OCN IPv4 services (e-mail, Web, News, etc...)
- IPv6 DNS service

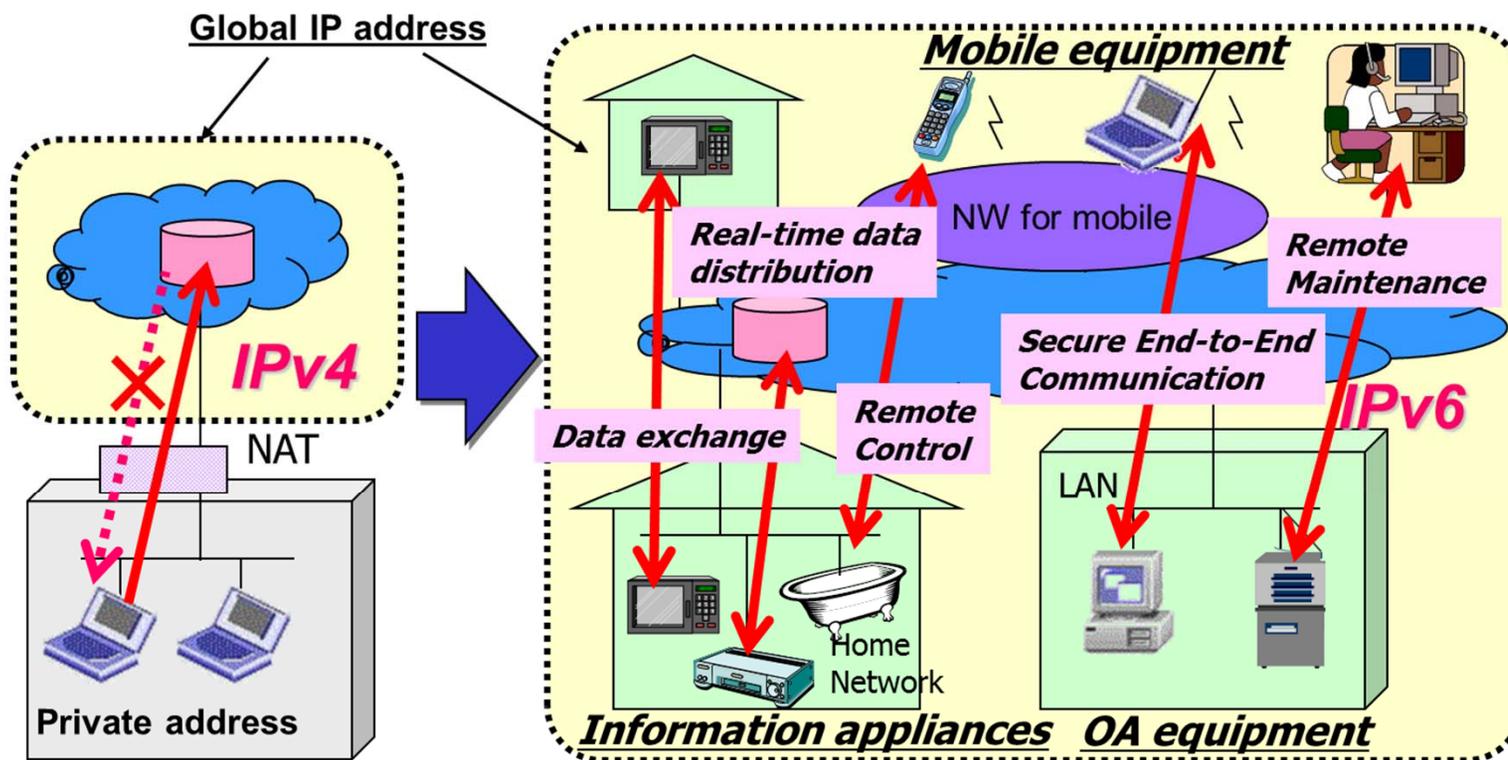
OCN IPv6/IPv4 Dual ADSL Service with PnP function



Standardization



New Internet Business model created by IPv6



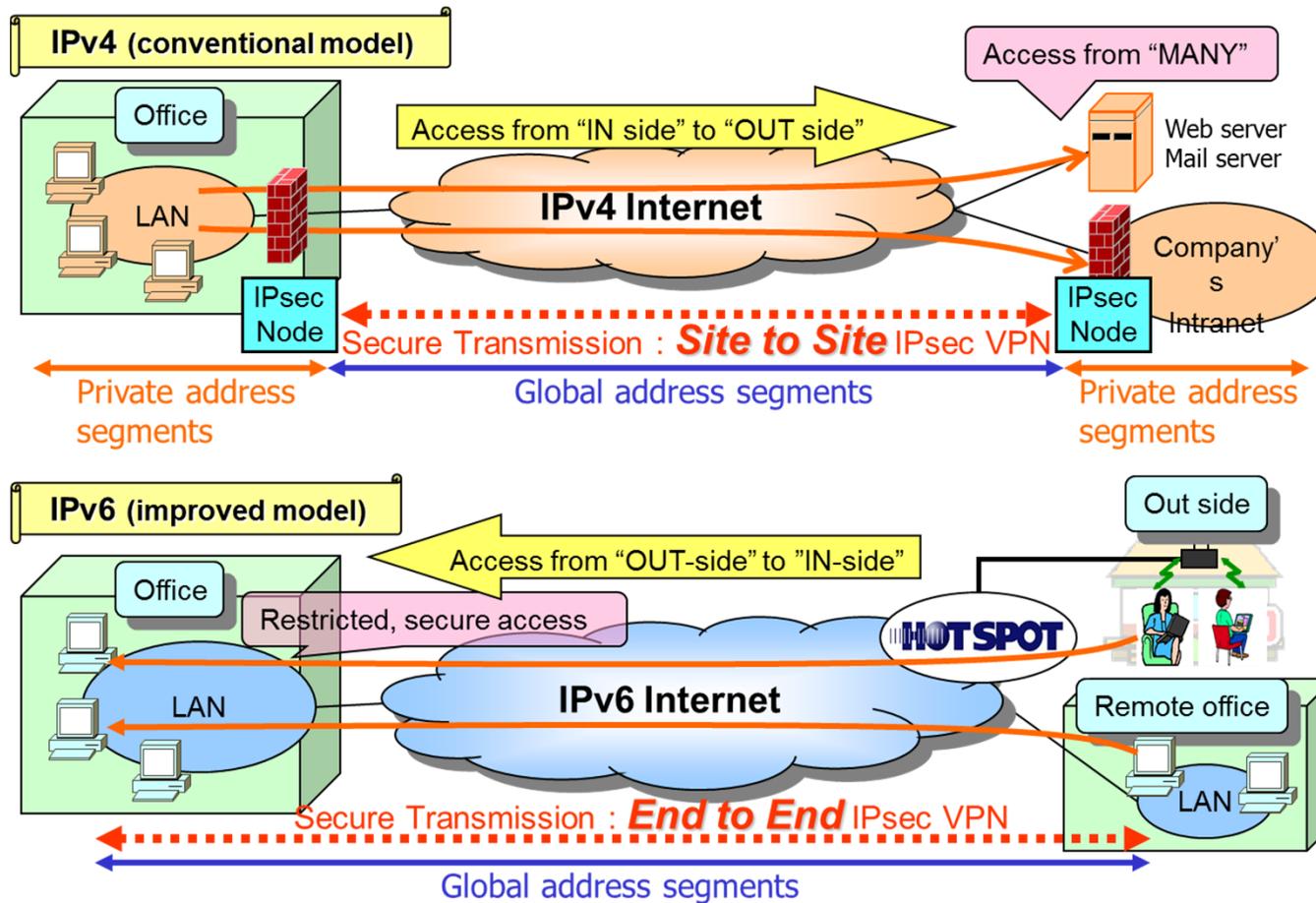
IPv4 : one-way communication

- due to NAT, the business model is only client & server.

IPv6: two-way communication

- two-way communications between information appliance and mobile equipment
- New internet business models will be created

VPN model in IPv4 world and IPv6 world



One of a problem of p2p secure communication...

IPv4

Global IP Address

- Lack of Global IP address
- Apply **NAT** and introduce **private address**

Secure communication

- Only **Site to Site secure** communications available

IPv6

- Enough Global IP address
- Can assign Global IP addresses on every device networked

- Can setup secure communication not only Site to Site connection but also **End to End connectio:**
the key of the IPv6 market



One of a problem is **Management of security configuration**
End users have to manage security policy which can involve many different configurations at end equipment.

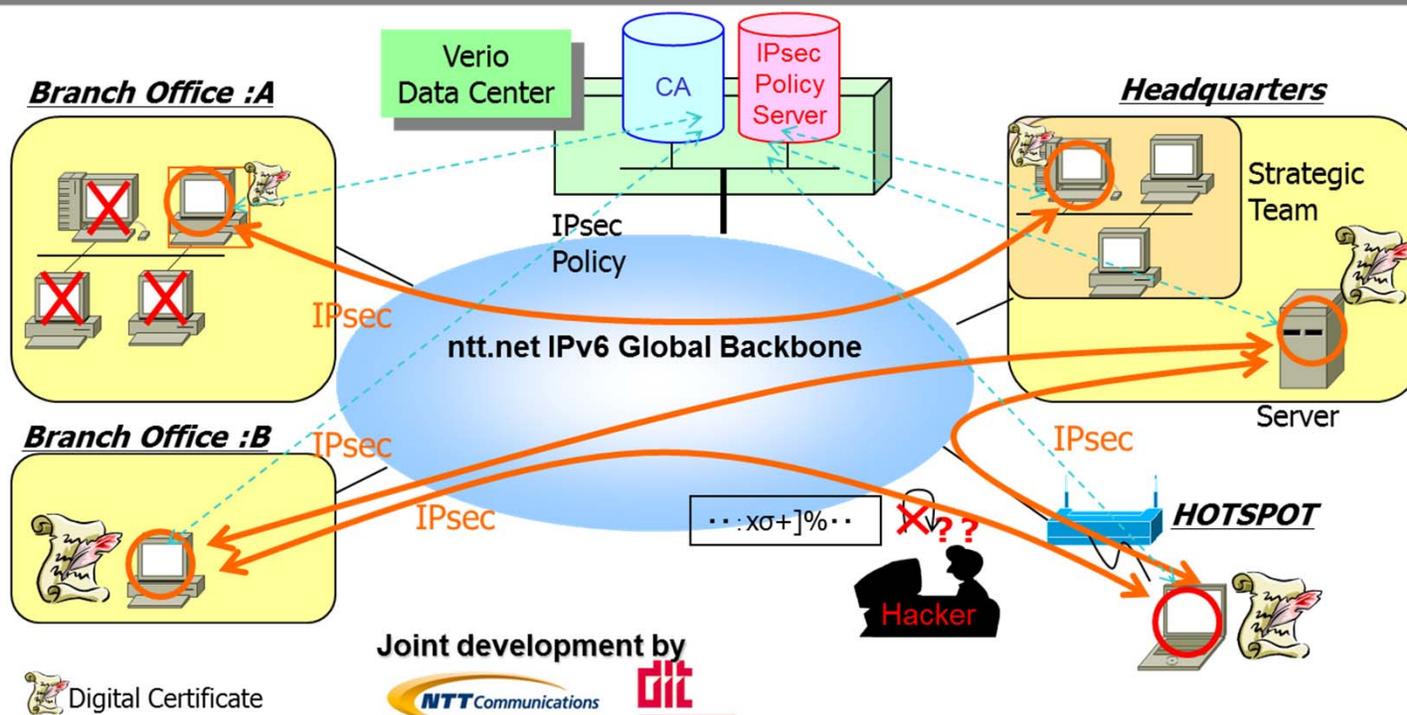


Our solution is : **P2P VPN Platform**

IPv6 P2P VPN Platform Trial Service

IPsec policy server to provide IPsec policy file to each peer on demand

- Effortless setup: Set up end-to-end secure communication easily using web interface
No or low skill requirements
- Adaptable to all communication modes: Client-Server, Peer-to-Peer, Mobile
- Secure instant communication: Connect instantly, while achieving end-to-end security



Agenda

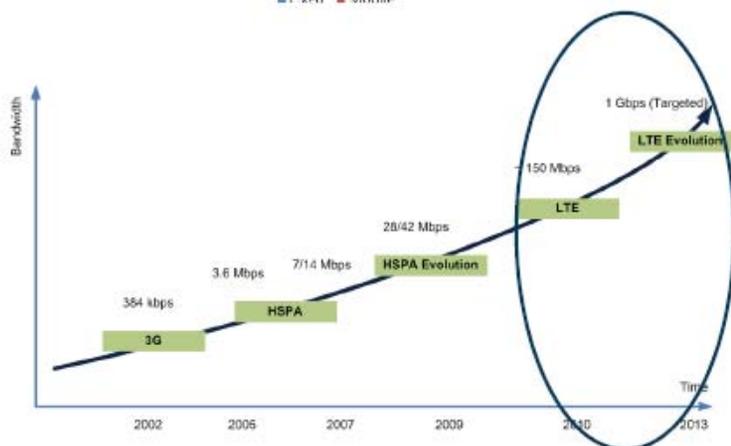
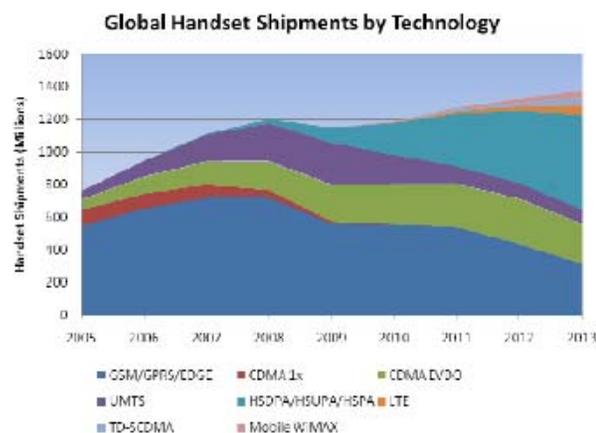
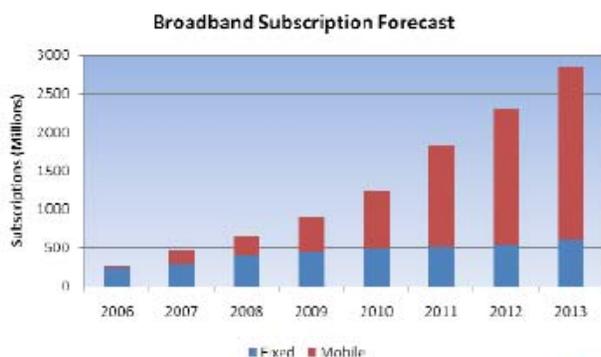
Service Provider Background

IPv6 Broadband

IPv6 Mobile



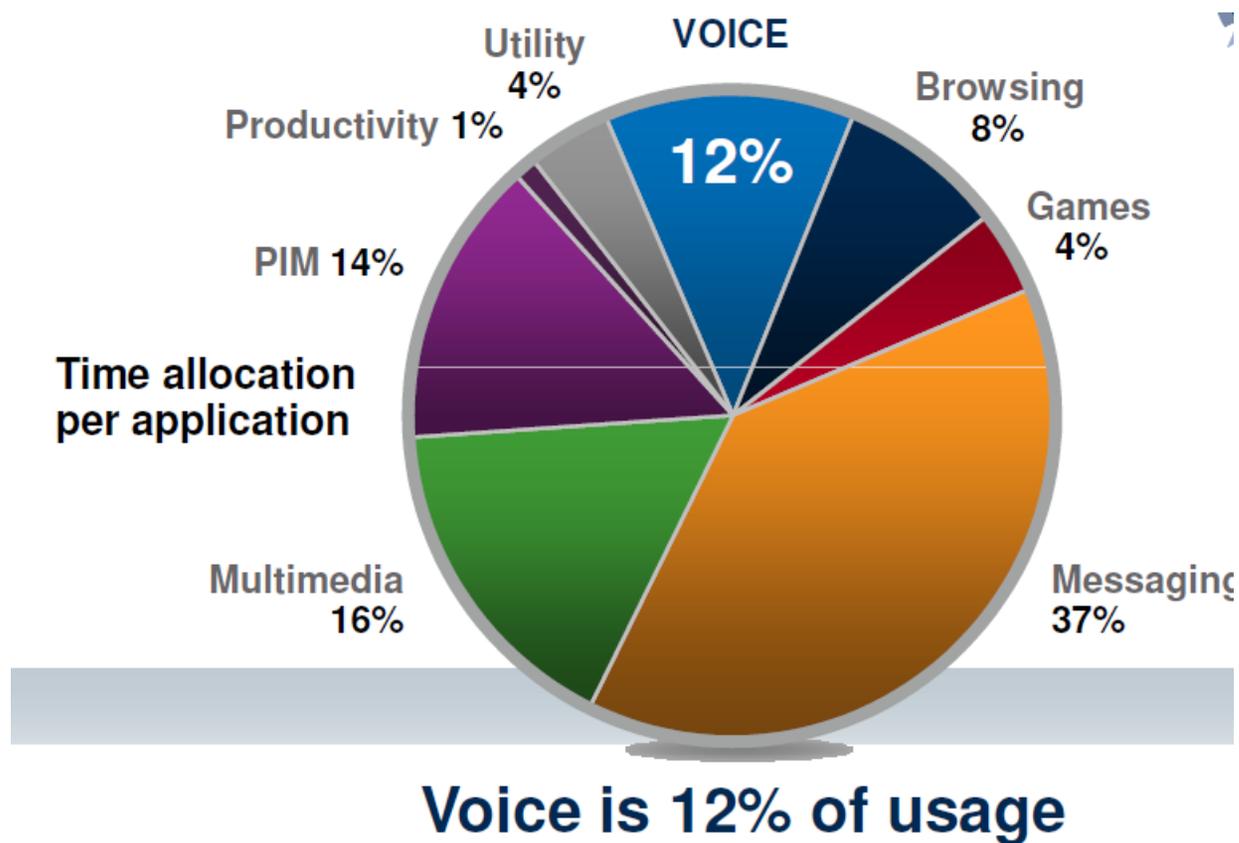
Number 1 Application Driver: Mobile IP



LTE stands for Long Term Evolution – Technology to provide all IP networking; In other words, IP from Mobile terminal to support growing mobile broadband needs

Source: Ericsson, ABI

IPv6 – New Information Types – Critical to LTE



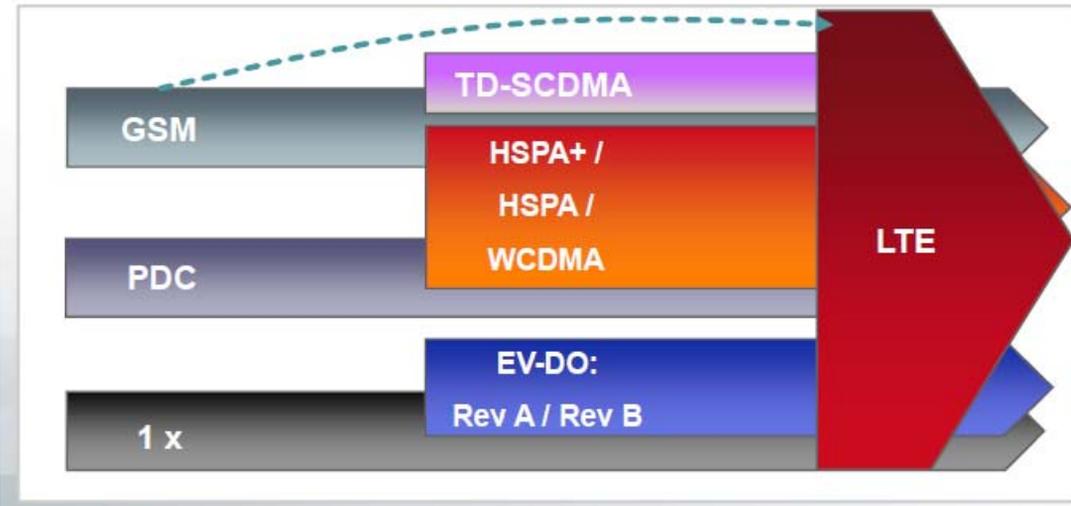
LTE – 4G

Flat IPv6 network

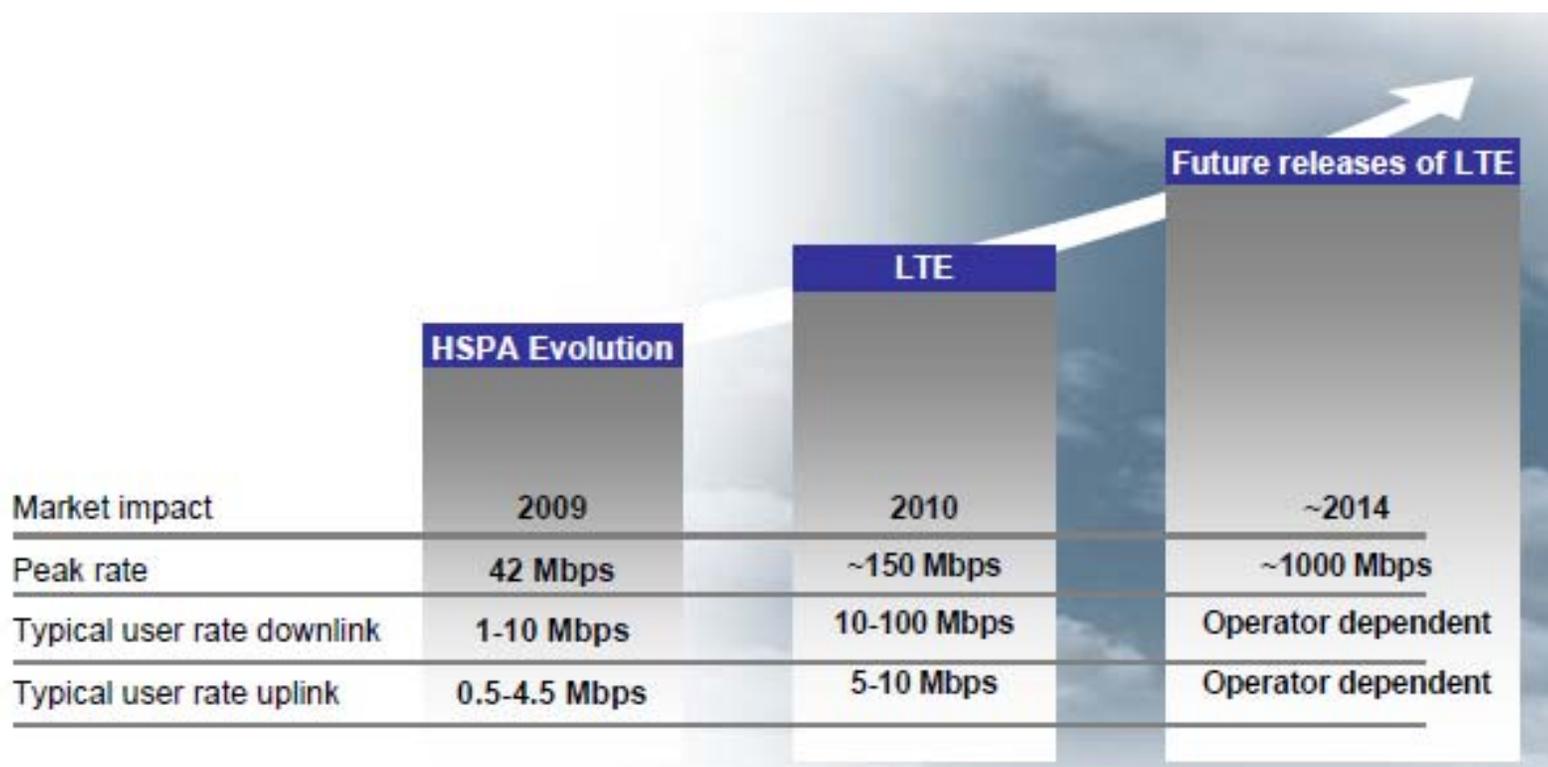
High Throughput

Low Latency

Increased spectrum flexibility



Future of LTE



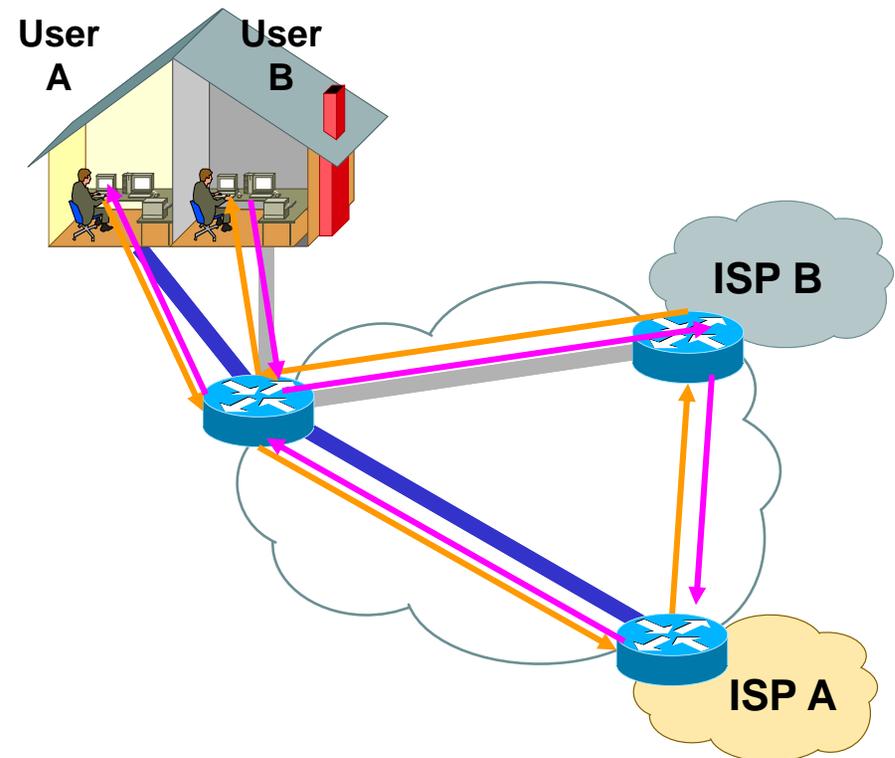
MobileIPv6 Benefits

- MobileIPv6 + Broadband 'Direct' model is a powerful enabler of IP mobility
- End-users running services are continuously on-line and contactable while roaming between broadband network access segments

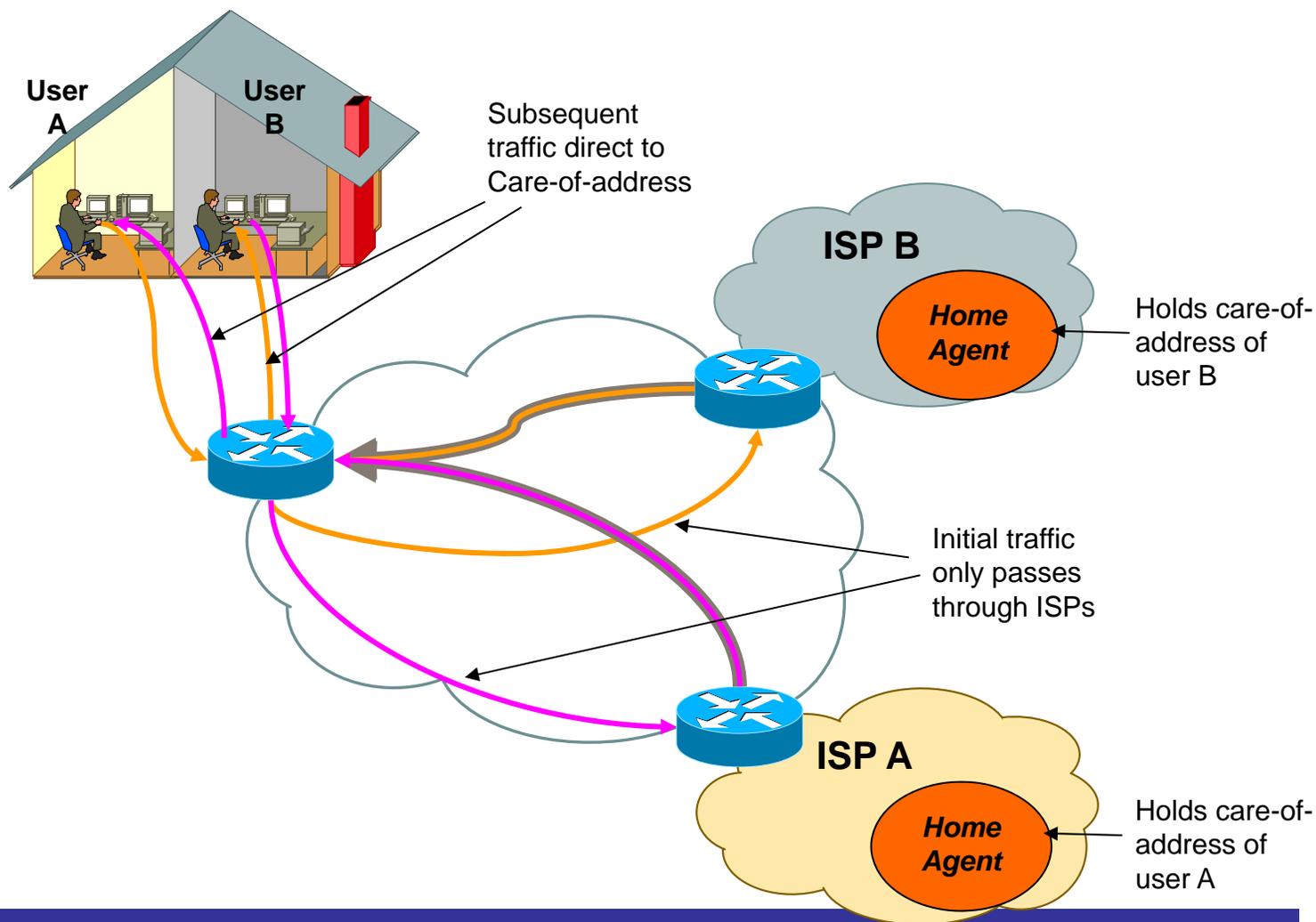


MobileIPv6 and Broadband

- Without MobileIP, connections from UserA to UserB have to go via ISP A and ISP B
- Inefficient routing
- Poor scalability
- Multiple single-points-of-failure



MobileIPv6 and Broadband



MIPv6 Operation

- Mobile Nodes 'Acquire'
 - Home address
 - Home agent
- When away from home
 - Acquire care-of address
 - Register care-of address with home agent and any relevant correspondent nodes...
 - Mobile IPv6 ensures correct routing

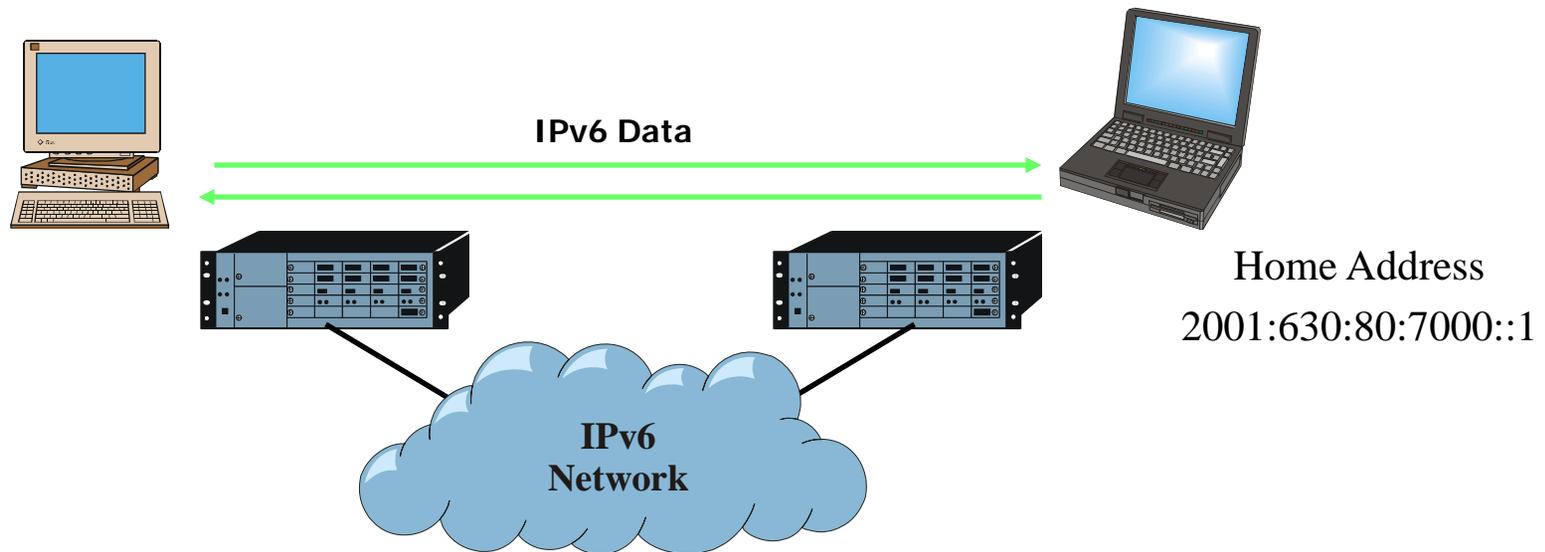


MIPv6 Bindings Cache

- Maintains a mapping between the mobile node's home address and its current care-of address
- Held by home agents and correspondent nodes
- Provides info to allow correct routing of IPv6 packets to mobile node via IPv6 routing header...
- Provides a de-coupling between an IPv6 address and routing information

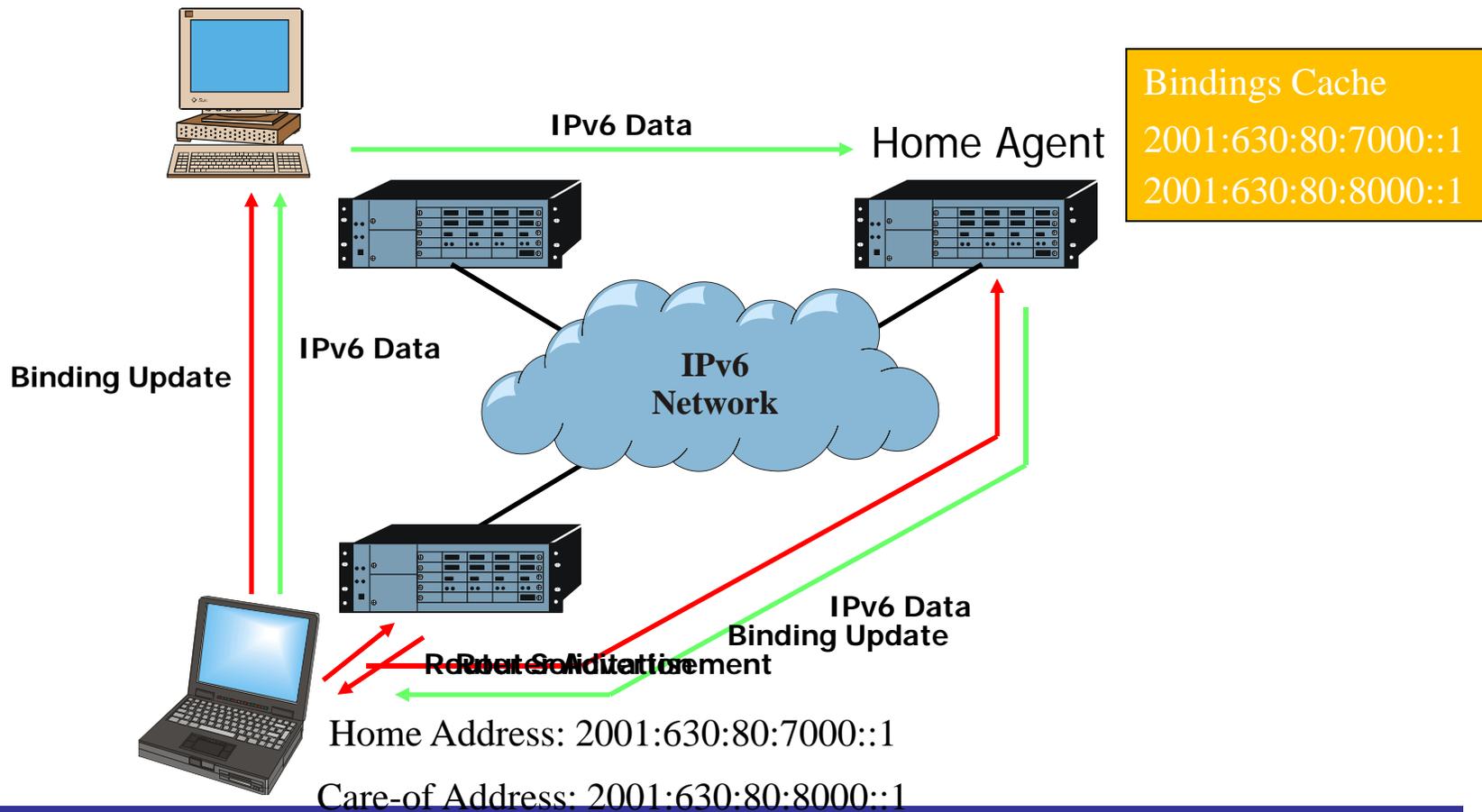


Mobile IPv6 Example Mobile node on home network

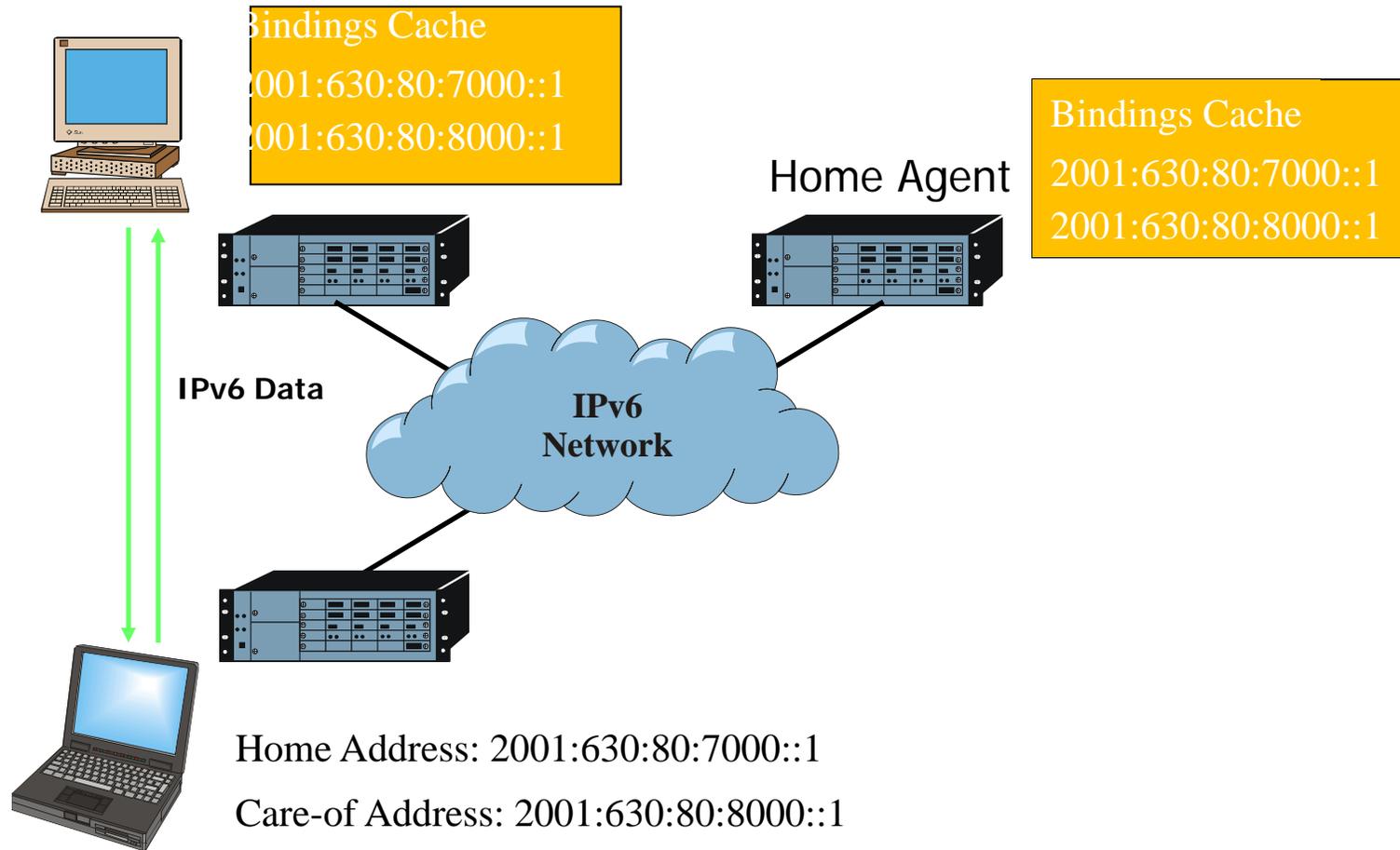


Mobile IPv6 Example

Mobile Node on foreign network



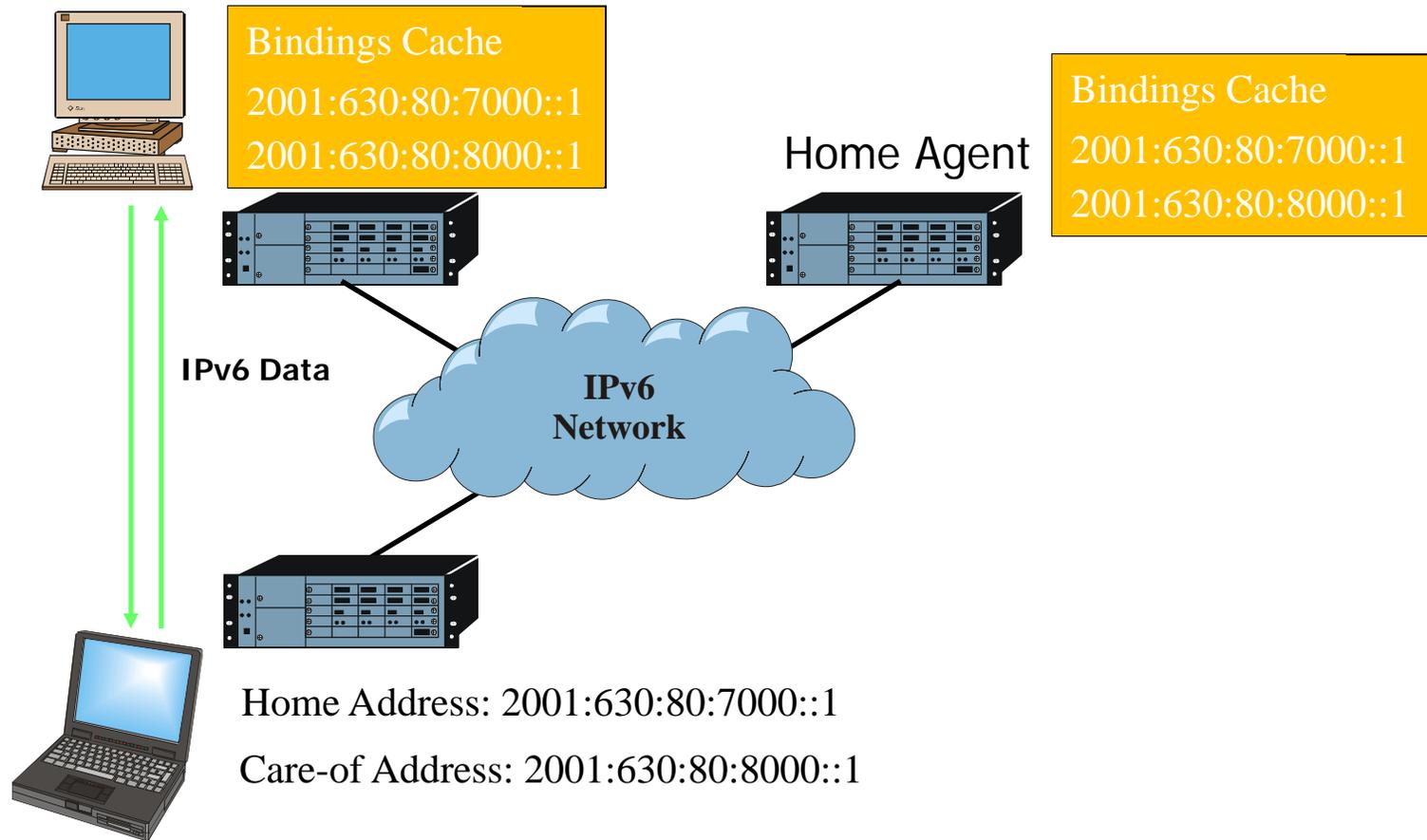
Mobile IPv6 Example Route Optimization



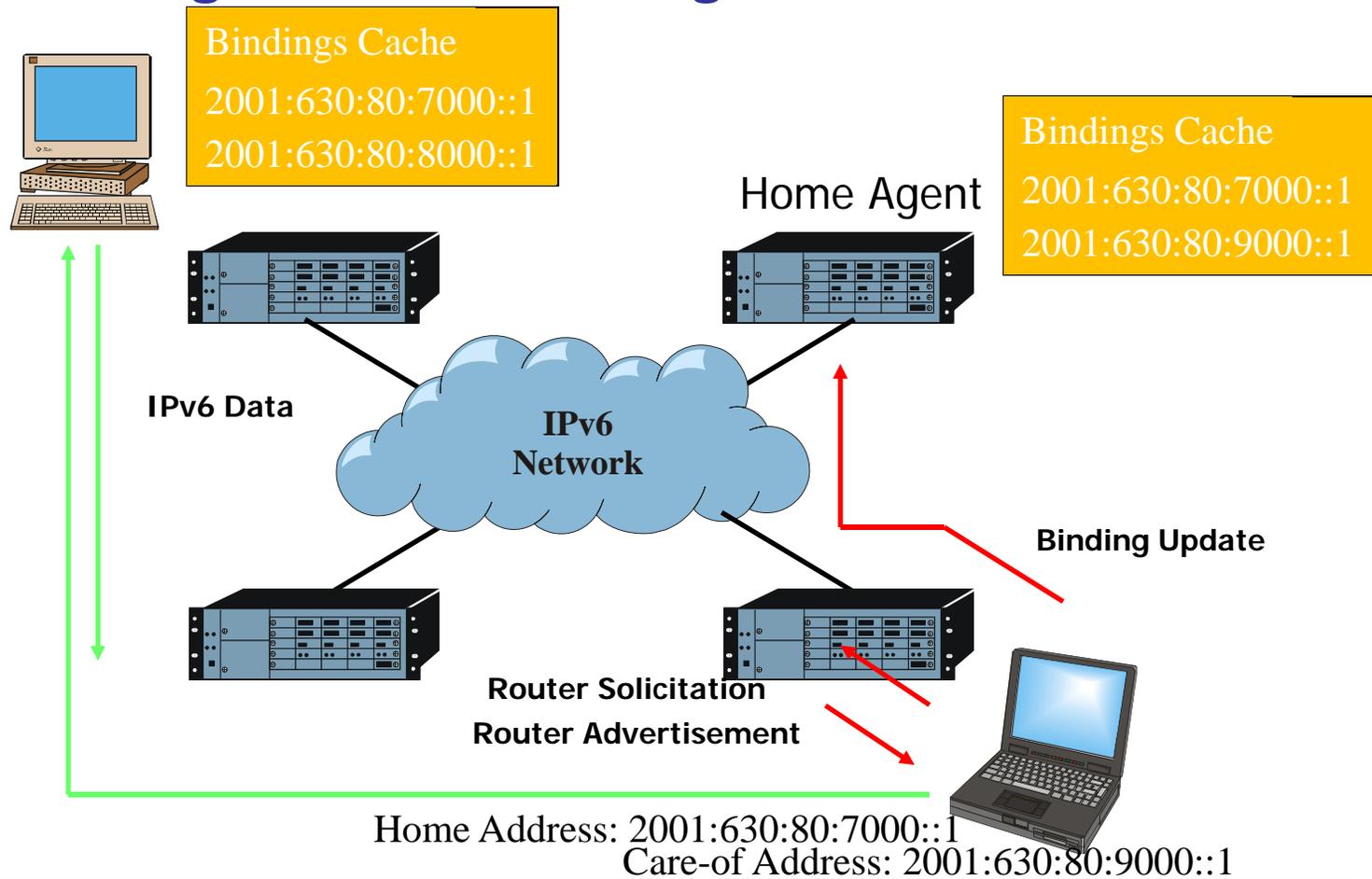
Mobile IPv6 Example

- Okay, but what if we move again?
- Two cases
 - Move from one foreign network to another
 - Return home...
- Need to send more binding updates...

Mobile IPv6 Example Optimised MN-CN session



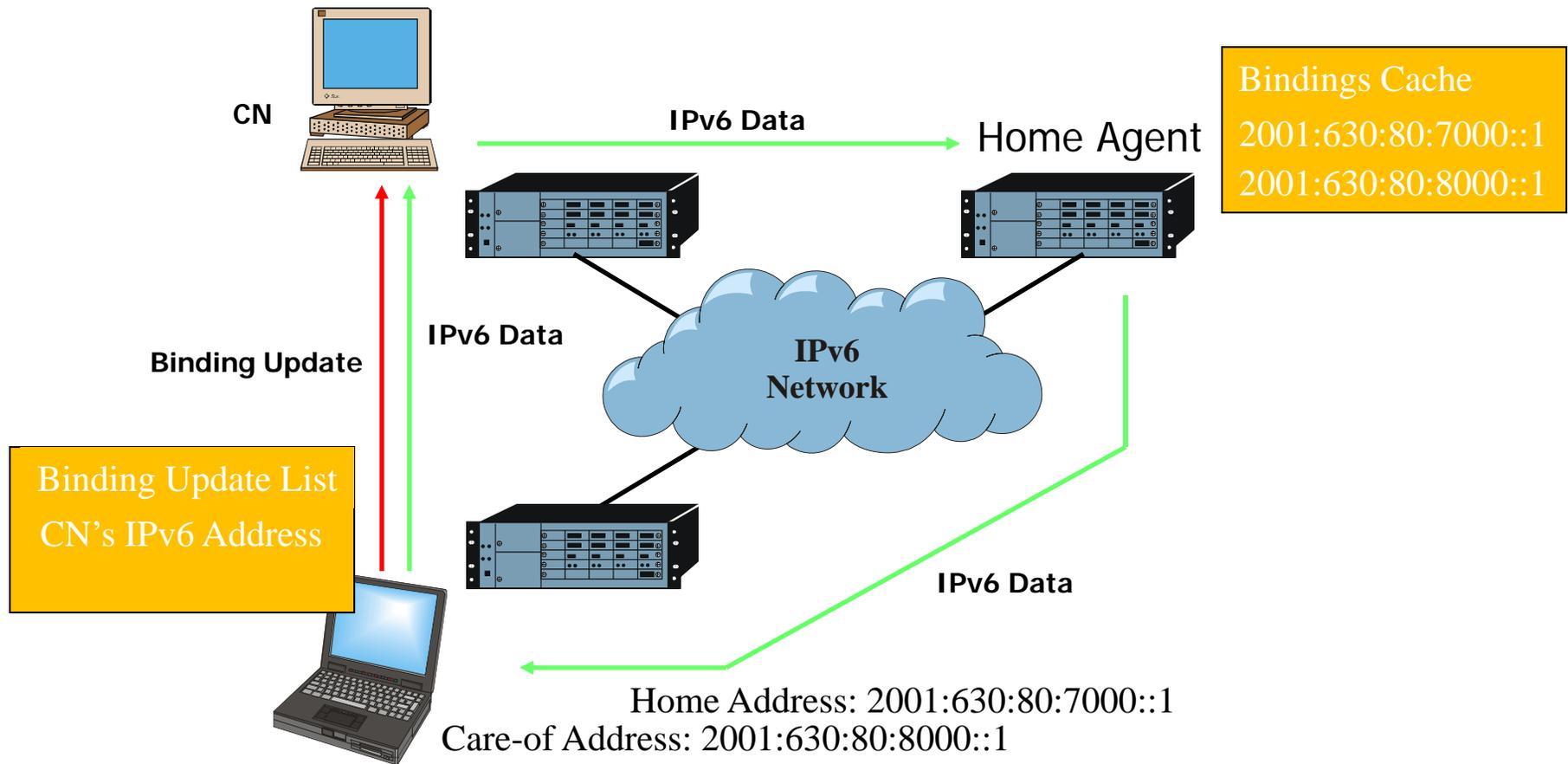
Mobile IPv6 Example MN moves again! Stale Bindings Cache



How to update CN?

- Bindings cache entry out of date...
- Solution
 - Maintain a list of active correspondent nodes in mobile node.
 - Generated when a tunnelled packet received from home agent
 - Known as the ***binding update list***

Mobile IPv6 Example MN maintains BU list



AES Sessions

Session	Title	Day	Time	Room
12152	IPv6 Basics	Tuesday February 5	1:30 PM	Golden Gate 4
12777	Network Problem Diagnosis with Packet Traces	Wednesday February 6	9:30 AM	Golden Gate 3
12778	Performance Factors in Cloud Computing	Wednesday February 6	11:00 AM	Golden Gate 4
12150	I'm Running IPv6 How Do I Access?	Wednesday February 6	3:00 PM	Golden Gate 4
12158	Managing an IPv6 Network	Thursday February 7	11:00 AM	Golden Gate 4
12149	Kick Start your IPv6 Skills using your home network	Friday February 8	8:00 AM	Golden Gate 4
12153	IPv6 Deep Dive	Friday February 8	9:30 AM	Golden Gate 4

Vielen
Dank

ありがとうございました

Köszönettel

Obi Спасибо

ขอบคุณ

شكراً

Bedankt

Gracias

شكراً

Ευχαριστώ

THANK YOU

Merci

Díky

धन्यवाद

Grazie

Danke

Hvala

Merci

ขอบคุณ

תודה

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