IPv6 migration scenarios in China Mobile

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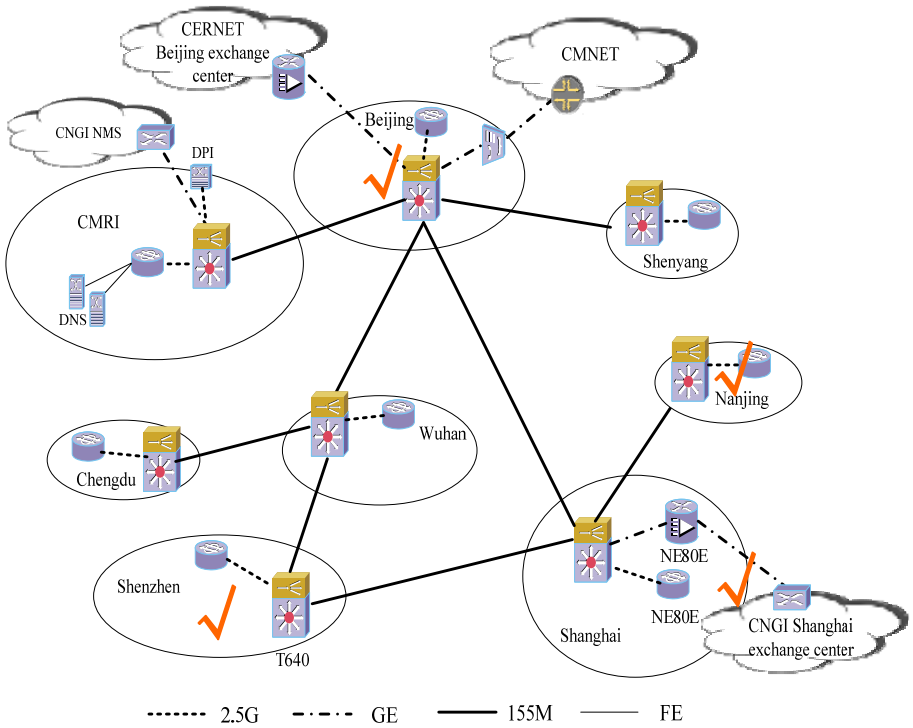
CMCC IPv6 Status

- Dual stack network, covering 8 main cities, one of the largest carrier's CNGI networks (less than 100 routers)
- Finished dual stack upgrade of GPRS network in some cities (4 cities including Shanghai)
- R & D on integration of mobile communication and IPv6
  - Mobile terminal
  - Access network
  - Mobile Core Network
  - Mobile data service
  - The NMS and monitoring system

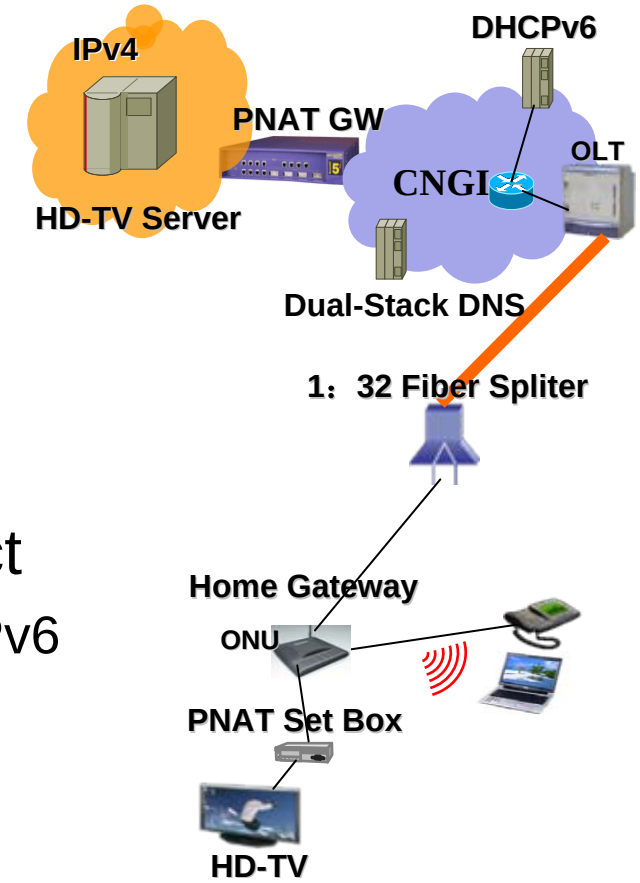


CMCC CNGI 2009

- 3 projects in CNGI 2009

1: Home network project

- PNAT implementation
- High-Definition television using PNAT
- Multi-Media download service
- Instant Message service
- VoIP and video telephone



2: General service platform project

- Bear plane is IPv4, data plane is IPv6
- IMS based service

3: TD—SCDMA IPv6 terminal

Generic Scenarios

1: IPv6 only APN (closed) network

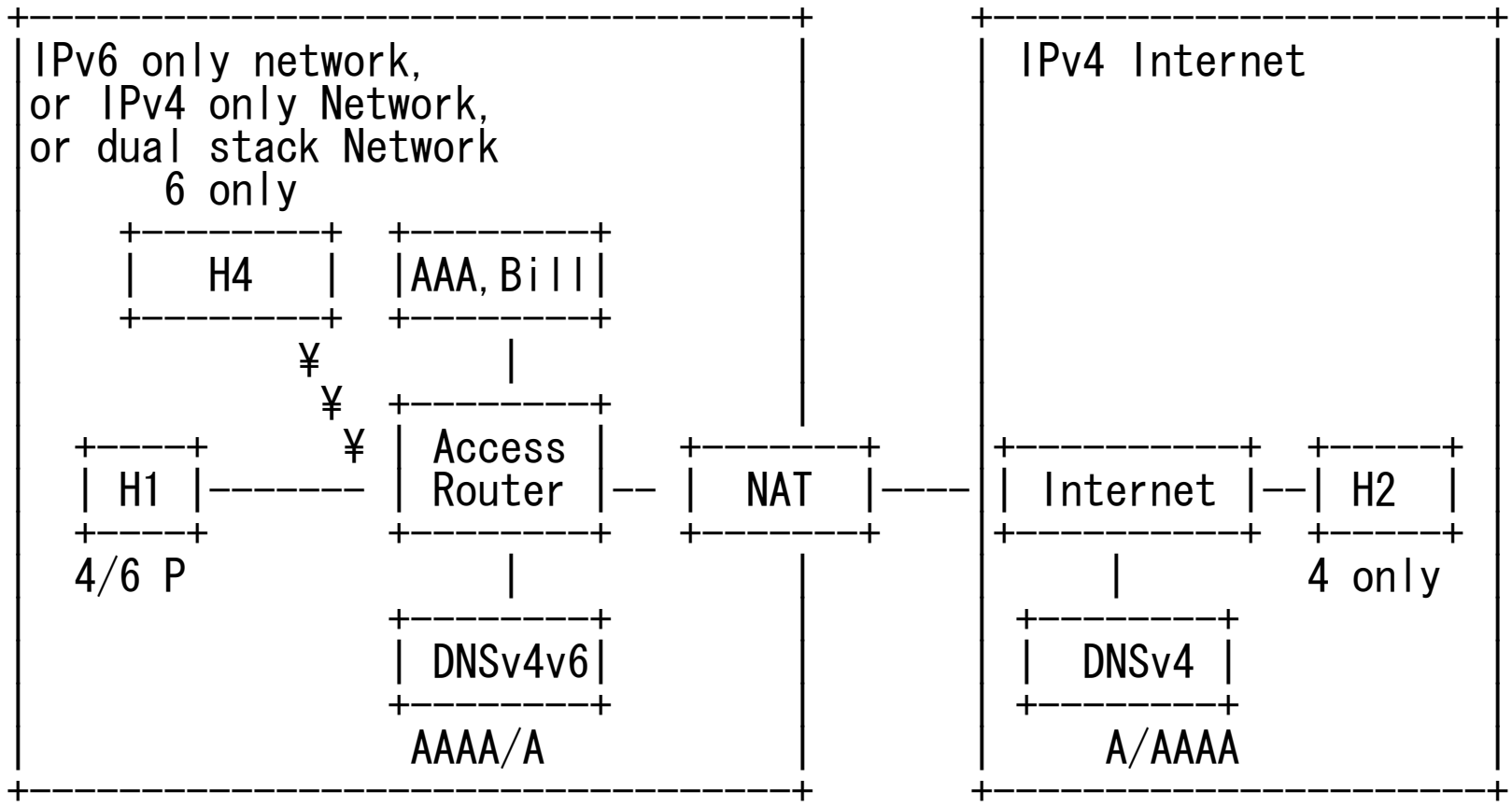
- Avoid NAT traversing (especially double NAT)
- Avoid the public IP port pool number exhaustion and private IP address exhaustion.

Solution today: DS-Lite, DSMIP6, GW-DS-Lite, A+P, Virtual IP Connection.

2: Open network platform

- Provide the DNS identifier to developers
- Peer to Peer 4-6, 6-4 applications.

Problem Statement in this scenario

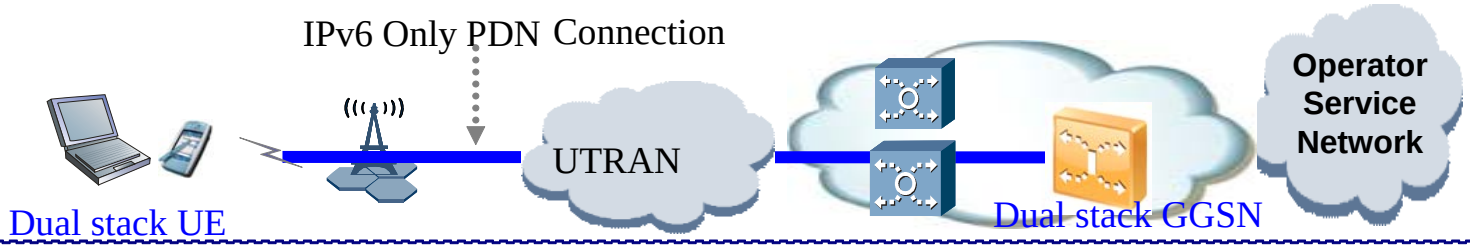


- Problem: H1 need to talk with H4 and H2 simultaneously

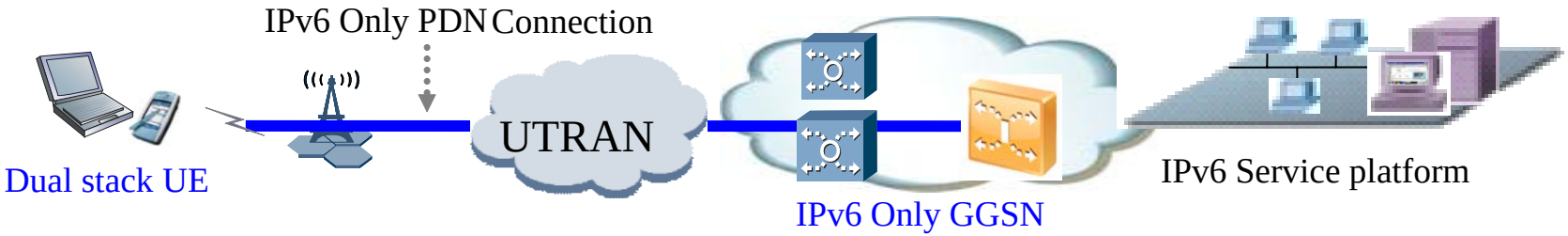
IPv6 only network scenarios have appeared in 3GPP network

Before 3GPP R8, UE cannot activate IPv4 PDP context once IPv6 PDP is activated

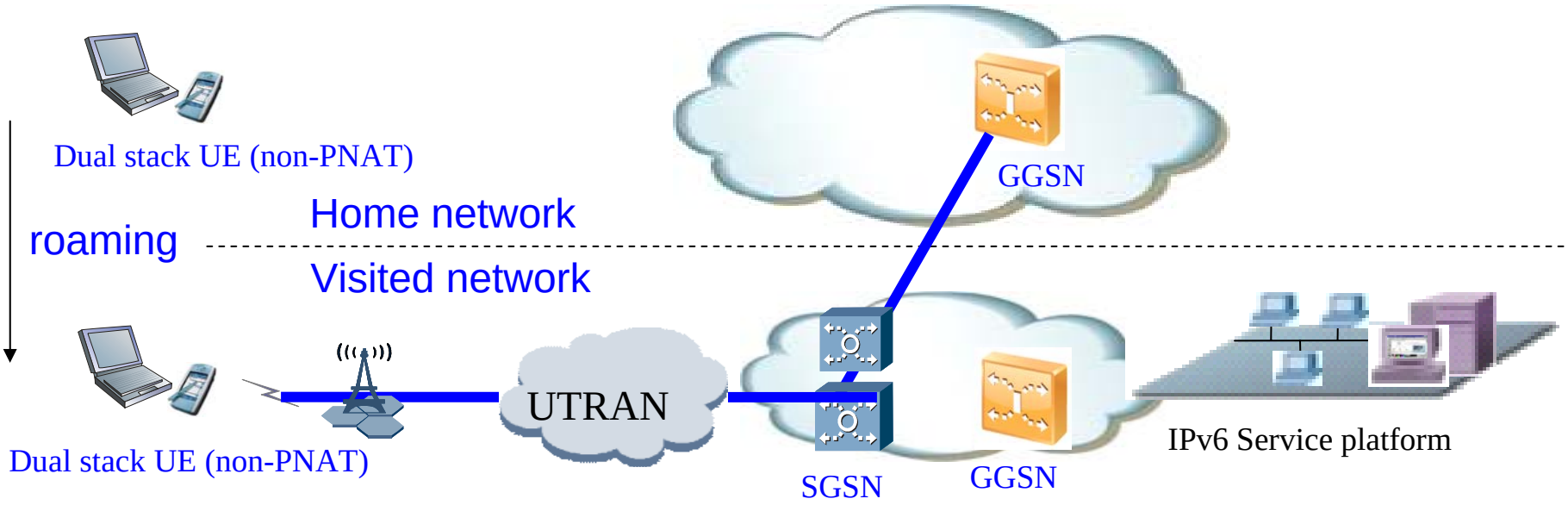
In order to decrease the usage of IPv4 address, GGSN only assign IPv6 address and provide IPv6 PDN to dual-stack UE



Some specific services only are accessible through IPv6 APN



Non-PNAT host roaming support



Host address and APN will be assigned by GGSN in the home network

Host-based Translation Requirements

- R1: Support for legacy IPv4 applications
  - Long tail of IPv4 applications (Apple Store APPs> 80,000)
  - Source code not available
  - Financially not viable
- R2: Support IPv6 only networks
  - Shortage of IPv4 addresses
  - Significant management complexity and costs out of operating dual stack networks
  - Before 3GPP R8, IPv4 PDP context cannot be activated once IPv6 PDP is active
- R3: Minimize overhead on wireless links
  - Wireless spectrum is valuable and scare
  - Ending up adding additional IP header overhead over the air

Host-based Translation Requirements (cont..)

- R4: Allow decentralized peer-to-peer communication
  - Using the most direct route to carry the packets
  - Eliminating bottlenecks and single points of failure in the network
- R5: Simplify DNS Deployment
  - DNS infrastructures are reluctant to evolve, no need of DNS ALG or proxies.
  - Host being able to translate the DNS query and understand the replied DNS Resource Records.

Gap Analysis

Requirements	DS-Lite	NAT64	DS-Lite Variant (Gw)	DIVI (Host)	Virtual IP Connection (Host) (Same as BIS)	PNAT
R1: IPv4 only application	yes	No	Yes		Need more text	Yes
R2: IPv6 only network	Yes	Yes	Yes		Yes	Yes
R3: Minimize Wireless Link	May not	Yes	Yes		Yes	Yes
R4: Host to host Direct	Not	No	No		Need more text	Yes
R5: Simply DNS deploy	yes	No	Yes		Need more text	Yes

Thank you