中国移动通信
CHINA MOBILE

Mobile Changes Life

IPv6 Progress in China Mobile

2012-08-29

Agenda

- Overview of IPv6 Progress
- Challenged of deploying IPv6
- IPv6 Working Plan

IPv6 Progress in 2011

Network Trail and Test

- 8 provinces are involved in network trail and test, including IP bearer, metropolitan network, IMS etc.
- End-to-end test are being done in lab before trial, inluding LTE, service network (WAP GW), BRAS etc.

TD Chip and Terminal

- ZTE U900, first IPv6 TD test terminal, successfully access the commercial 3G network in Beijing
- A new IPv6 TD chip and terminal are being tested

IPv6 Address

- Obtain /20 IPv6 prefix

APNIC

CNGI Project

- Complete two service development project
  - Universal Service Platform
  - Homenetwork servive

Innovative IPv6 Migration Tech.

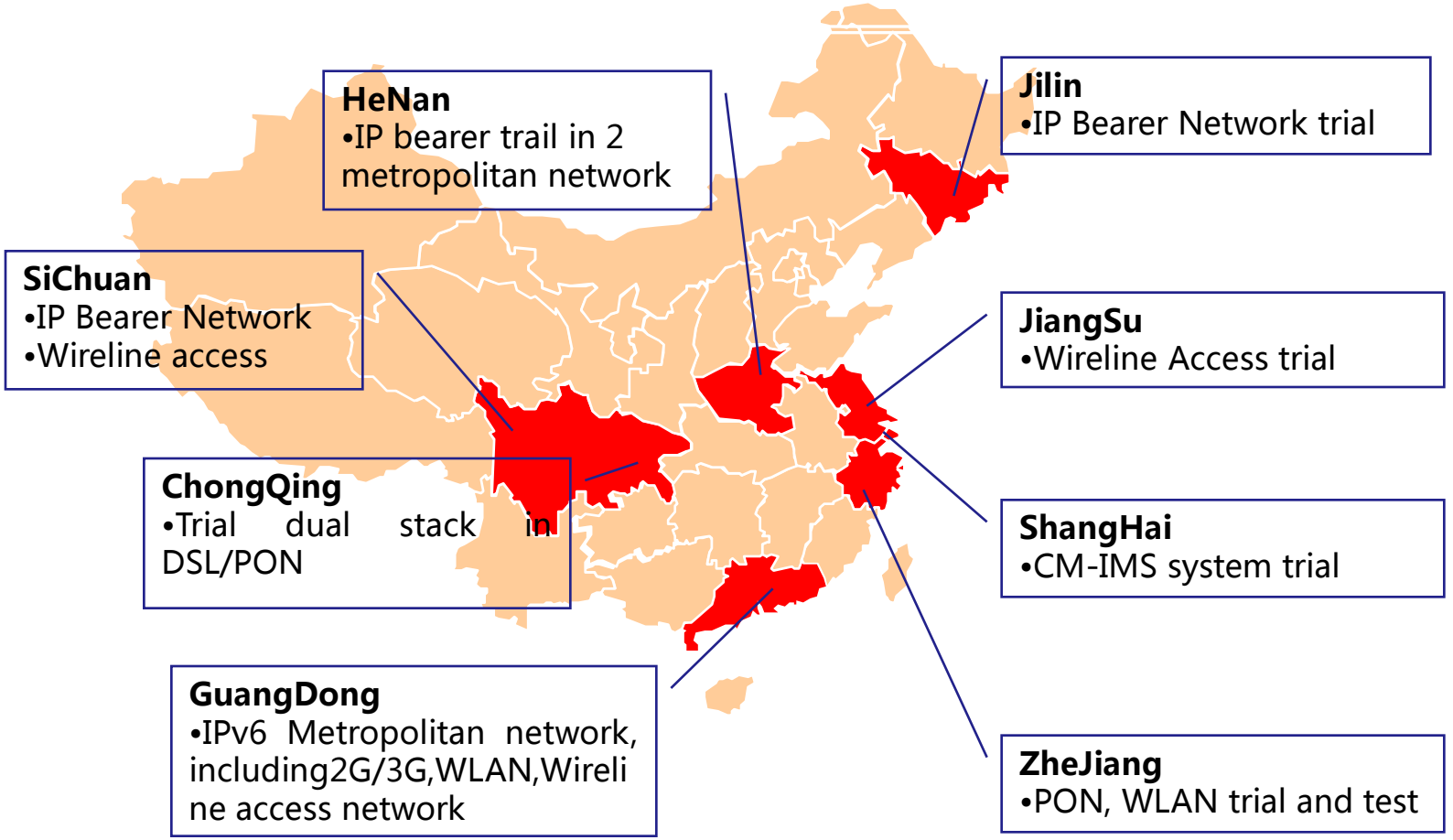
- BIH/PNAT is adopted as **RFC6535**
- LWIG is becoming a new WG for IoT
- TR23.975 is approved in 3GPP

IETF

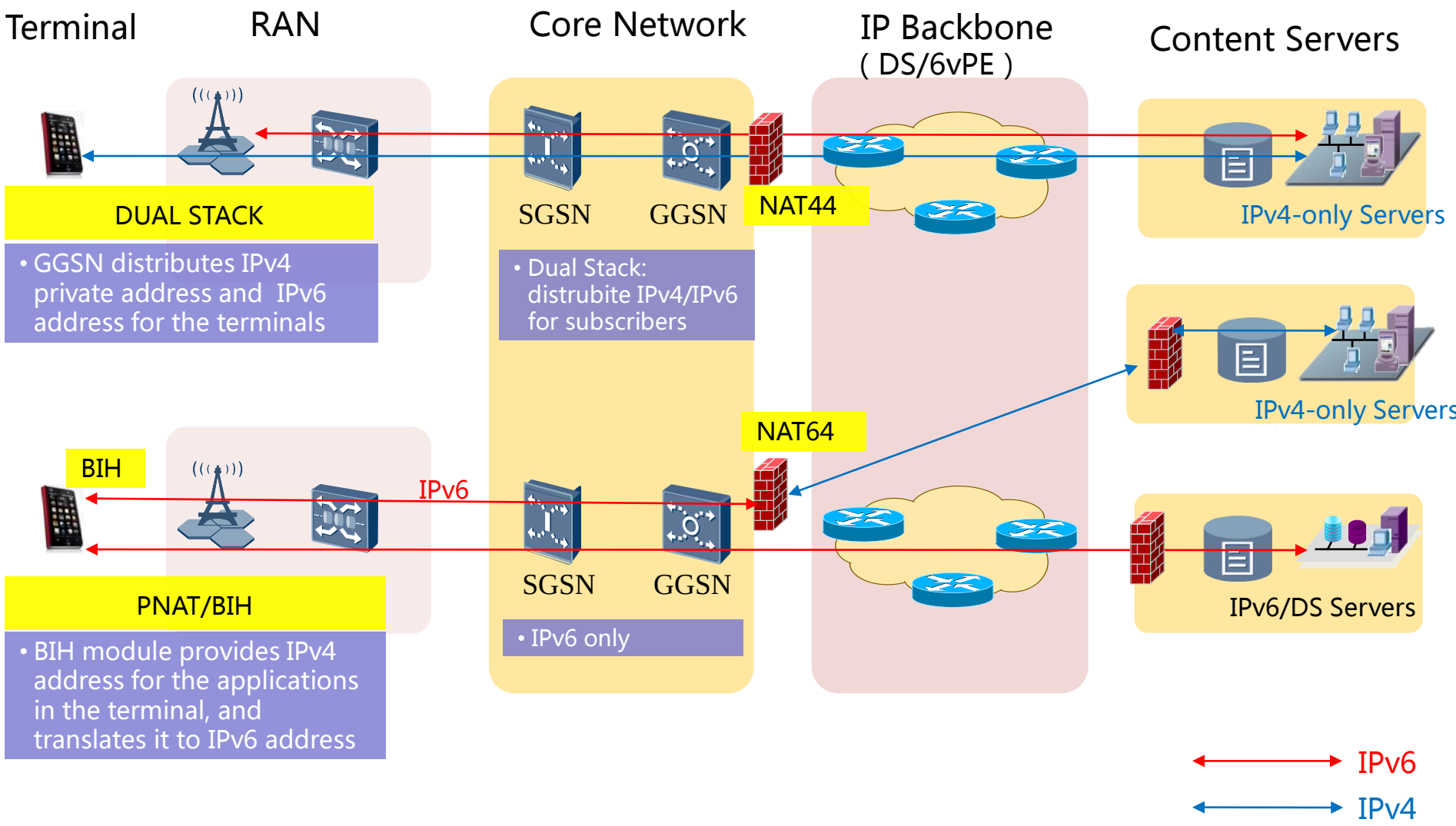
3GPP A GLOBAL INITIATIVE

Large-scale IPv6 Network Trial

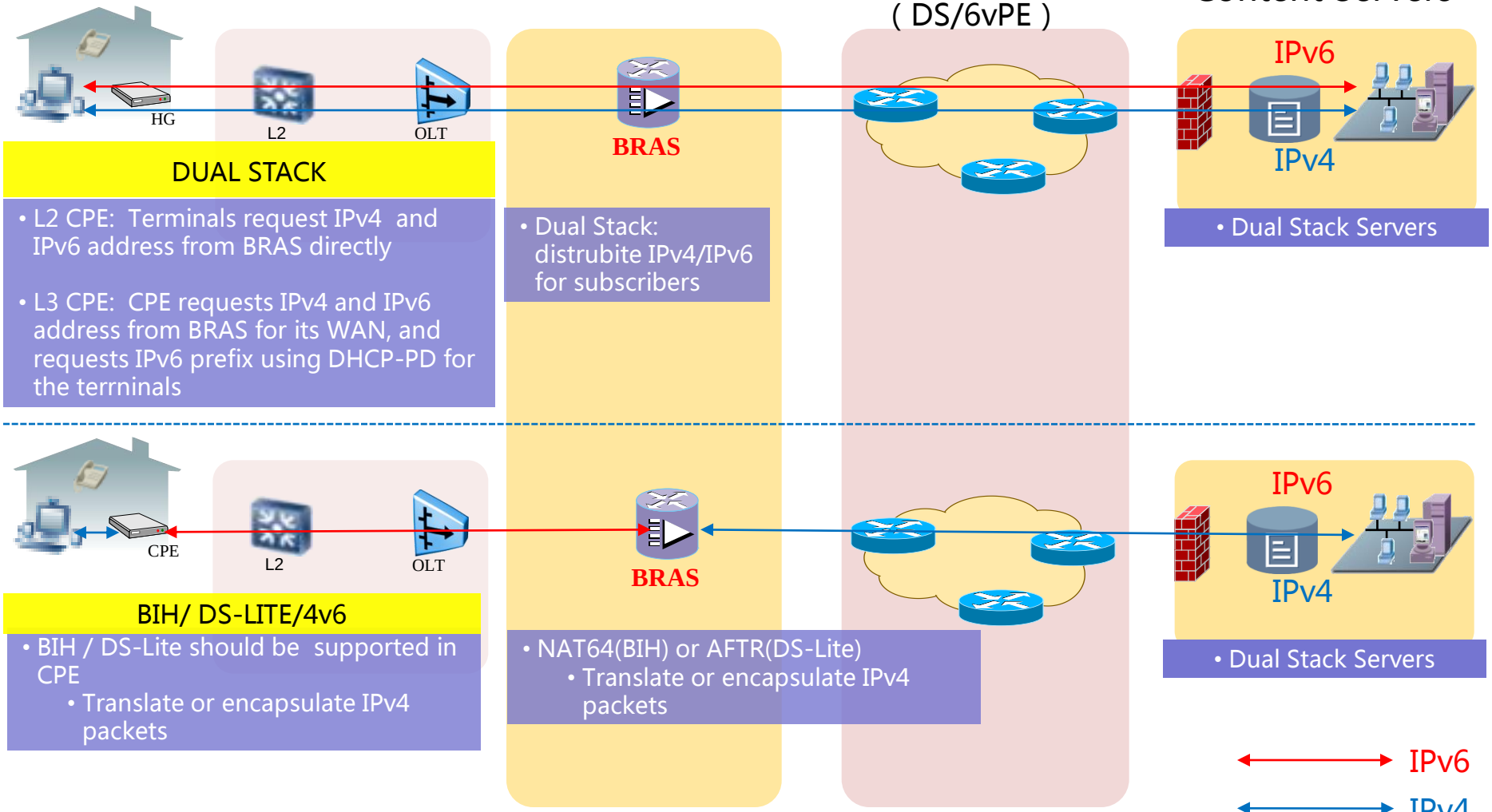
- Network trail and test are in 8 provinces



IPv6 Trial Solution - GPRS

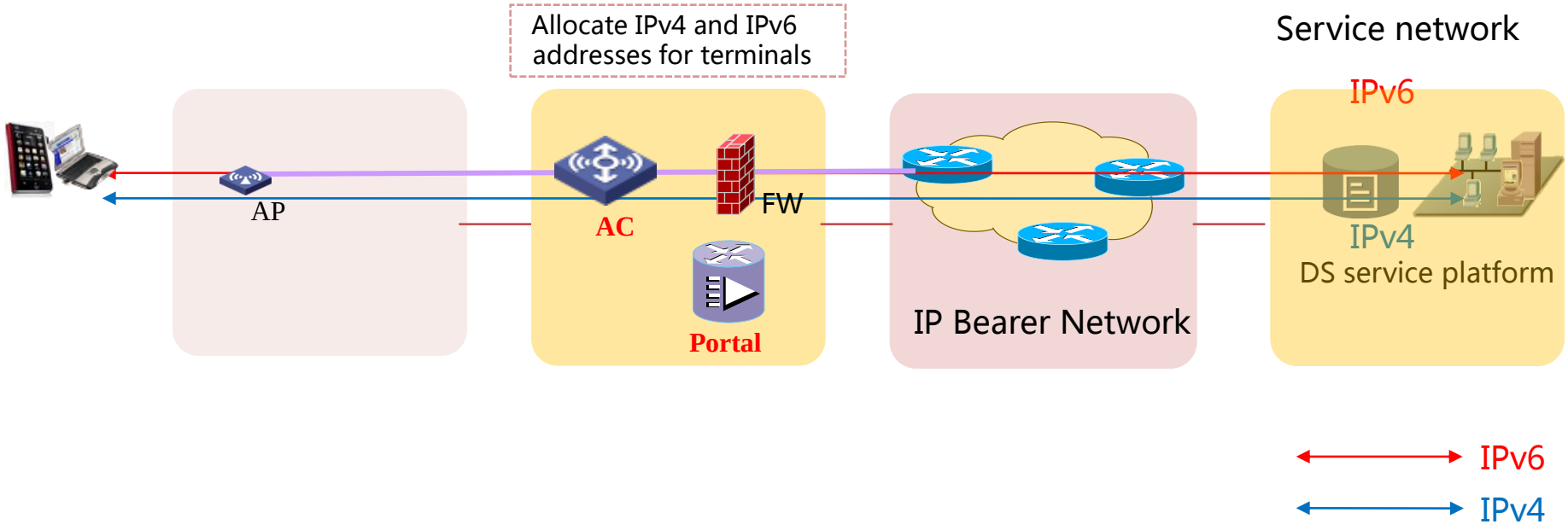


IPv6 Trial Solution – Wireline Access



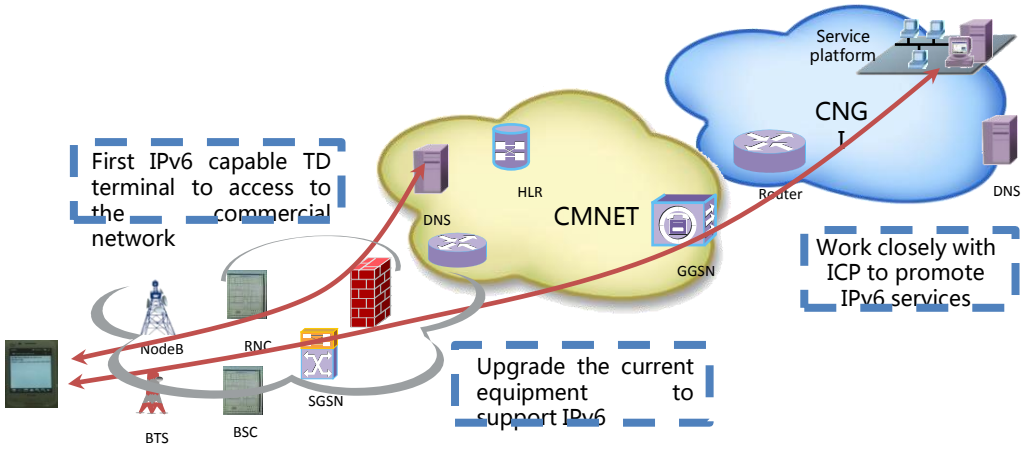
IPv6 Trial Solution - WLAN

- based on dual stack
  - dual-stacked ACs to support IPv4/IPv6 access.
  - Portal system is also to be rebuilt or upgraded to realize IPv6 authentication.



Develop TD chip and device, provide TD access in commercial network

First Time IPv6 TD terminal accessing to the commercial network



- 2G/3G commercial network in Beijing is upgraded to support IPv6
- TD device, ZTE U900, successfully access to the network

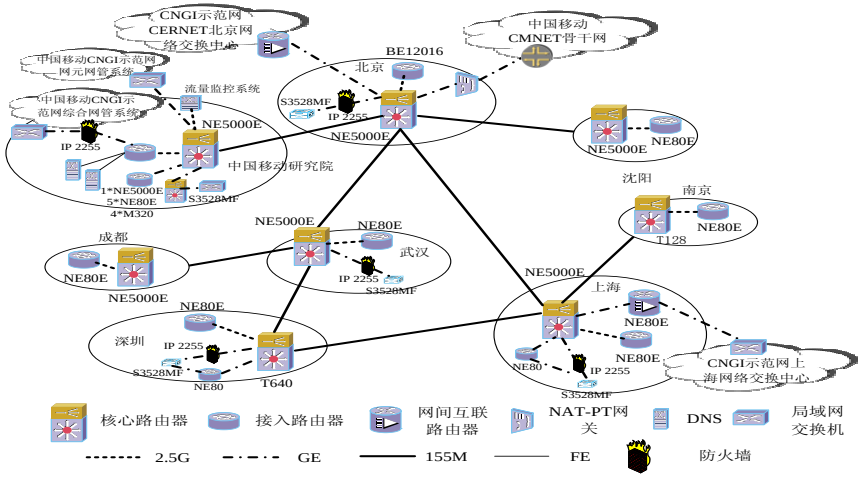
Promote TD device chips to support IPv6

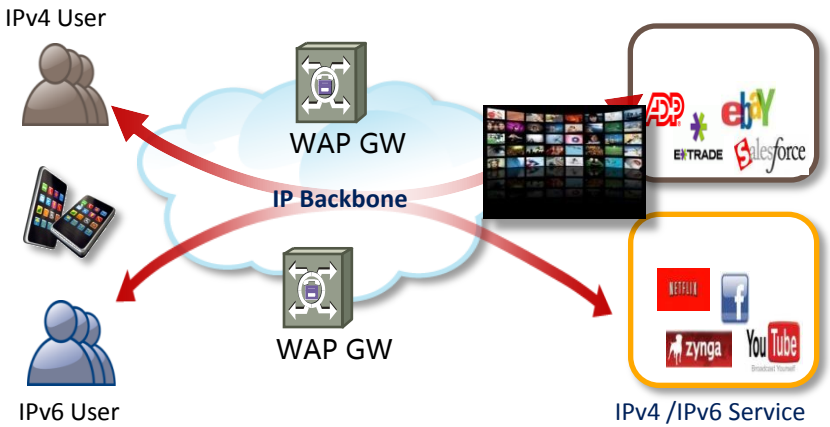
- Cooperated with Marvell, the second TD chip prototype is tested
- With the chip, more IPv6 TD devices prototype will be tested later

IPv6 Progress in China Next Generation Internet (CNGI) project

CNGI IPv6 Backbone

- Since 2005， an IPv6 backbone network with more than 30 routers has been built up in 8 cities,
- IPv6 network Management system is also build up

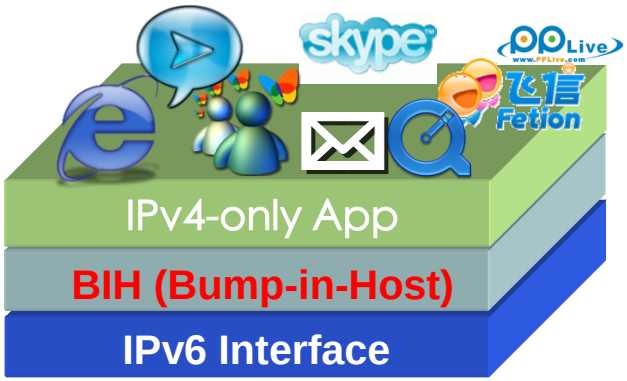




IPv6 Service Development

- IMS based Universal Service Platform (phase I and phase II)
- Home Network Service, providing downloading, HD TV service
- Olympic Game on-demand and Live programs, based on IPv6 WAP platform,
- ultra-HD VoD Demo carries more than 50Mbps
- IPv6 MMS, a new information platform for News, Instant messages and entertainments

IPv6 STEERING by PNAT/BIH



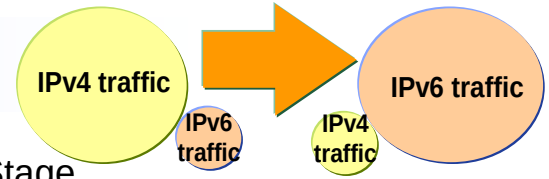
Application Independent

BIH modules are transparent to conventional IPv4 applications, whereby it avoids modification of various applications and facilitates IPv6 deployment

IPv4 & IPv6 Coexistence

BIH is one solution trying to migrate and deploy IPv6&IPv4 coexistence networks without any technical gaps

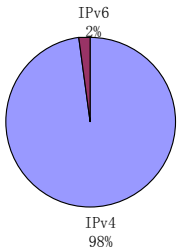
BIH-IPv6 Steering



The network traffic will be increased by 50 times

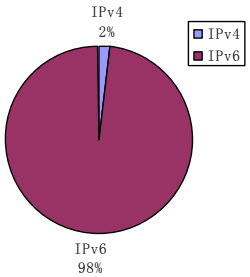
Initial Stage → Advanced Stage

BIH Migration



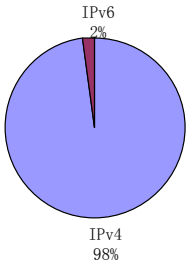
The increased traffic will be migrated to IPv6

	IPv4	IPv6	
Initial Stage	100	2	(Units)
Proportion	98%	2%	
Advanced Stage	100	4902	(Units)
Proportion	2%	98%	



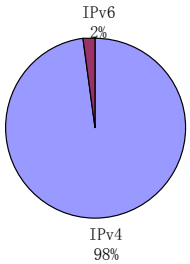
The traffic would be steered to IPv6; IPv6 will gradually dominate the network

Other Means



The increased traffic will stay in IPv4

	IPv4	IPv6	
Initial Stage	100	2	(Units)
Proportion	98%	2%	
Advanced Stage	5000	100	(Units)
Proportion	98%	2%	



The majority traffic would stay in IPv4; IPv6 will gradually disappear

PNAT/BIH Open Source

- BIH v1.0.0 has been contributed to OPEN SOURCE COMMUNITY.
  - the source can be downloaded from the below link

http://code.google.com/p/bump-in-the-host/source/

  - The Open source adopts GPLv2.0 license and grant users the right to redistribute their modified software
- The open source project of PNAT/BIH has been advanced in Linux Foundation. The maturity of running code could be validated and further enhanced

TR23.975 (3GPP) and LWIP WG (IETF)

3GPP TR23.975 “IPv6 Migration”

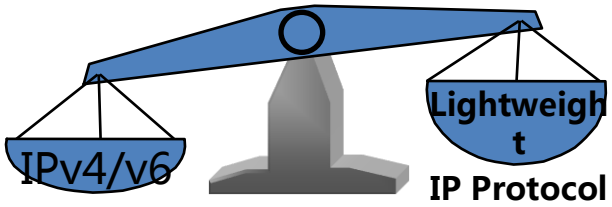
- TR23.975 is approved by 3GPP as the IPv6 migration guideline

Main Content

- IPv6 Migration architecture based line is clarified
- IPv6 Migration scenarios are identified
- Candidate solutions are documented (dual stack, NAT64, GI-ds-lite, BIH, etc)

Lightweight Implementation Guidance (LWIG WG)

- Problems for IoT: if not specified clearly, smart sensors with reduced IP protocol suites could not inter-operate with each other;
- LWIG WG was formed in March 2011, to document the current implementation practice in the area;



Agenda

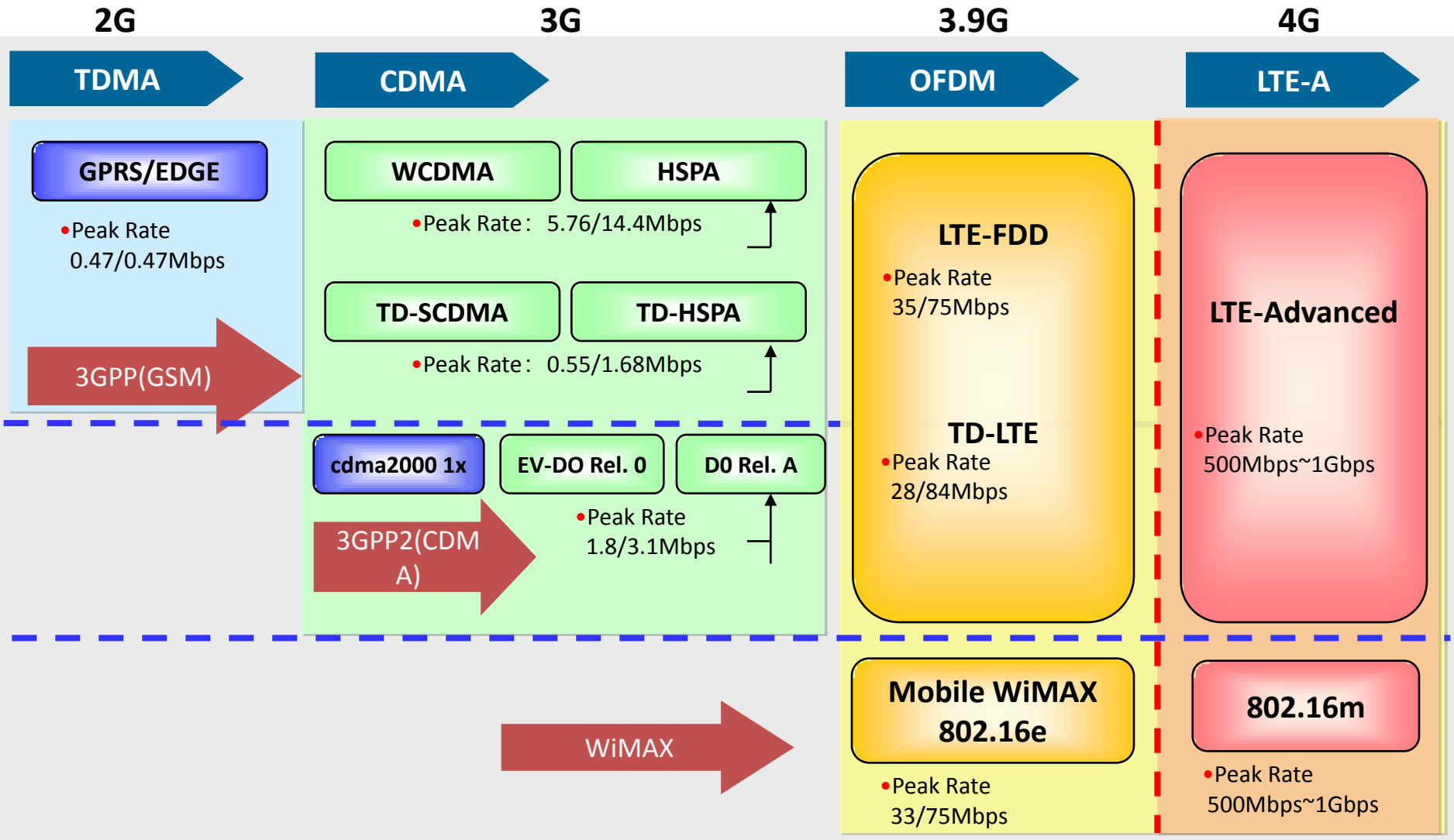
Overview of IPv6 Progress in China Mobile

Challenged of deploying IPv6

IPv6 Working Plan

What's LTE/TD-LTE

- LTE=Long Term Evolution TD-LTE=TDD mode of LTE



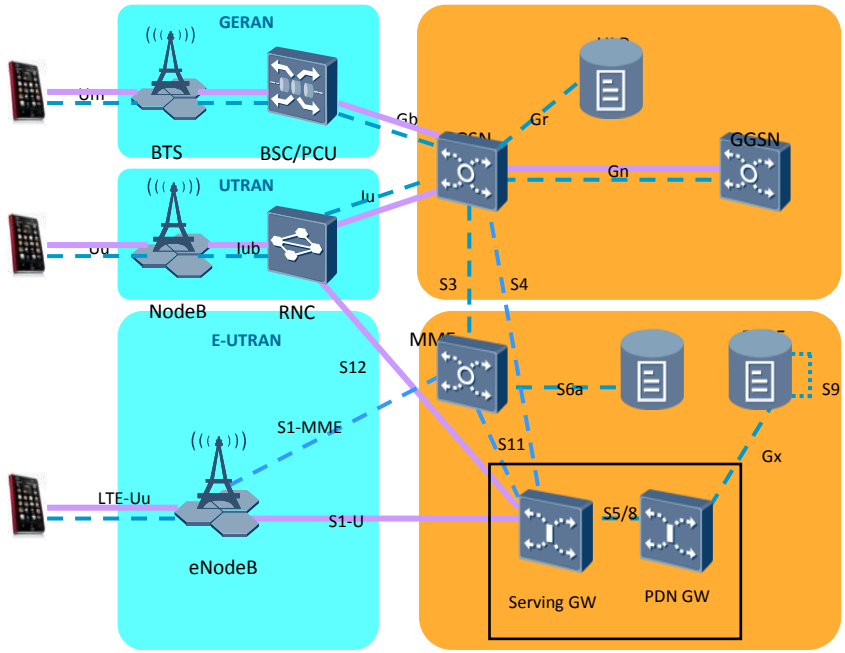
IPv6 in TDD-LTE should be promoted

Large amount of IP address is needed, IPv6 is essential for LTE

- IP address amount in LTE is about 20-40 times of that in 2G/3G
- LTE is always-on, which means whenever the terminal turns on no matter whether a service will be used or not, IP addresses should be assigned to the terminal.
- Multiple APNs is needed for LTE. Multiple IP addressed should be assigned to one LTE device

IPv6 is important for TD

- When a terminal is switching between LTE and 2G/3G network, service continuity should be supported
- Some IPv6 service should be supported by 3G network



How to improve terminal’s IPv6 capability

- Application
  - should be able to work both on IPv4 and IPv6 stack
- OS
  - support IPv6 stack
- Chip
  - In TD and TDD-LTE terminal
    - Software should be upgraded to support IPv6
    - chip is also needed to be changed to support IPv6
  - In WLAN terminal
    - Chip Is not needed to change

Applications and Equipments are not Ready

Application and software

- All self service platforms in China Mobile's network are IPv4-only now
- Most Client are IPv4
- 12 in 50 client software are IPv6 ready
- Browsers work well on IPv6 OS
- IM, on line VIDEO in the test do not support IPv6: MSN, QQ, Fetion,PPLive, UUsee, PPstream, QQ Live
- Most WebSites are IPv4. According to the statistics by Alex

1.3% of top 25K websites are IPv6 ready

1% percent of top 1M websites support IPv6

Some Equipments

- Some important date equipment in IDC, for example Fire Walls and Load balancers, are not support IPv6
- Test Result shows that IPv6 capability is not supported well in some equipments. For example,
- 5 types of BRASF from 4 vendors are tested
- Basic IPv6 protocol functions, such as PPPoEv6 and routing, are supported well
- DHCPv6 Server function is not supported in 4 types of BRAS from 3 vendors.
- IPv6 FIB capacity is only 10% of IPv4 FIB Capacity

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- Overview of IPv6 Progress in China Mobile
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- **IPv6 Working Plan**

IPv6 target and plan in China Mobile

- China Mobile will promote IPv6 in the E2E industrial chain and carry out large scale experiments and trials in the next few years

Start-up Period (2011-2013)

To 2013:

- Do IPv6 experiments and trials in related provinces, develop about 3M subscribers
- Produce more and more LTE/3G UE support IPv6 with the association of manufacturers

Promotion Period (2014 - 2015)

To 2015:

- complete network IPv6 transition
- Start IPv6 commercial deployment
- Develop more IPv6 subscribers

Application Period (2016 - 2020)

To 2020:

- All the increased subscribers and service use IPv6 address
- All the backbone and MAN use IPv6

LTE Terminal Development

- By the end of 2013, 5K TDD-LTE terminal prototypes, with at lest 4 TDD-LTE new terminal chips will be used in IPv6 trial
  - TDD-LTE single-mode mobile phone and data card
  - 2G/TD/TDD-LTE multimode mobile phone, Multimode Data Card
  - TDD-LTE CPE

Network Trial (2012-2013) Plan

According to our government IPv6 plan:

- TDD-LTE Test and Trial in 4-10 cities
- WLAN Test and Trial in 6-10 Cities
- Wireline Access Test and Trial in 4-10 Cities
- Commercial Service
  - Around 10 China Mobile's self service platforms, including mobile reading/mobile mailbox etc.
- About 3M commercial trial users by the end of 2013

Conclusions

- The demand of IPv6 has become increasingly urgent
- the ecosystem of IPv6 is still incomplete and needs more work to accelerate the process, especially in TD and TDD-LTE
- China Mobile is willing to work with industry and standard bodies to promote IPv6 deployment
  - IPv6 will be trial and tested in a large scale in the next 2 years

Thank You