Current status and the future direction of IPv6 in Japan

http://www.kokatsu.jp/

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IPv4 Address Exhaustion Task Force, Japan

Table of Contents

1. IPv6 Day for Japanese networks and contribution by Japanese cases to global IPv6 deployment.
2. Market Overview
3. Backbone operation
   – Commercial ISP
4. Last one mile operation
   1. Broadband access(ADSL, FTTH, CATV)
   2. Wireless access(LTE)
5. Others

Overview of Japanese IPv6 Networks

- KDDI's au ONENET works well at the 1st IPv6 Day
- NTT DoCoMo provides IPv6 service over LTE (i.e., Xi)

- Large scale IPv6 and IPv4 multi-home environment over NTT's NGN will be deployed in 2012.
    1. PPPoE (called as "tunneling")
    2. IPoE (called as "native")
- IPv6 Day of June 08, 2011 was "before" the development and deployment of PPPoE and IPoE.
- We believe we need to establish good operational practice and experiences.
    - Multi-homing architecture and implementation discussed in RFC3484 and RFC 5220

Experience and practice at the 1st IPv6 Day

- Solutions without PPPoE and IPoE over NGN
    1. TCP session resetting ; we do not want to do this, but, without the well-deployment of RFC3484 multi-home policy management algorithm, this was one of feasible solutions.
    2. Development and delivery of policy management and control software (RFC3484), by WIDE Project and by the TF on IPv4 address exhaustion
- Japanese contribution to the rest of world
    1. Establish appropriate "fall-back" behavior, e.g., reaction against the reception of the ICMP unreachable message
    2. Feed-back of best practices by the advanced and large scale multi-homing environment with NTT's NGN.
- Accelerate the IPv6 service introduction to all ISPs

Market Overview
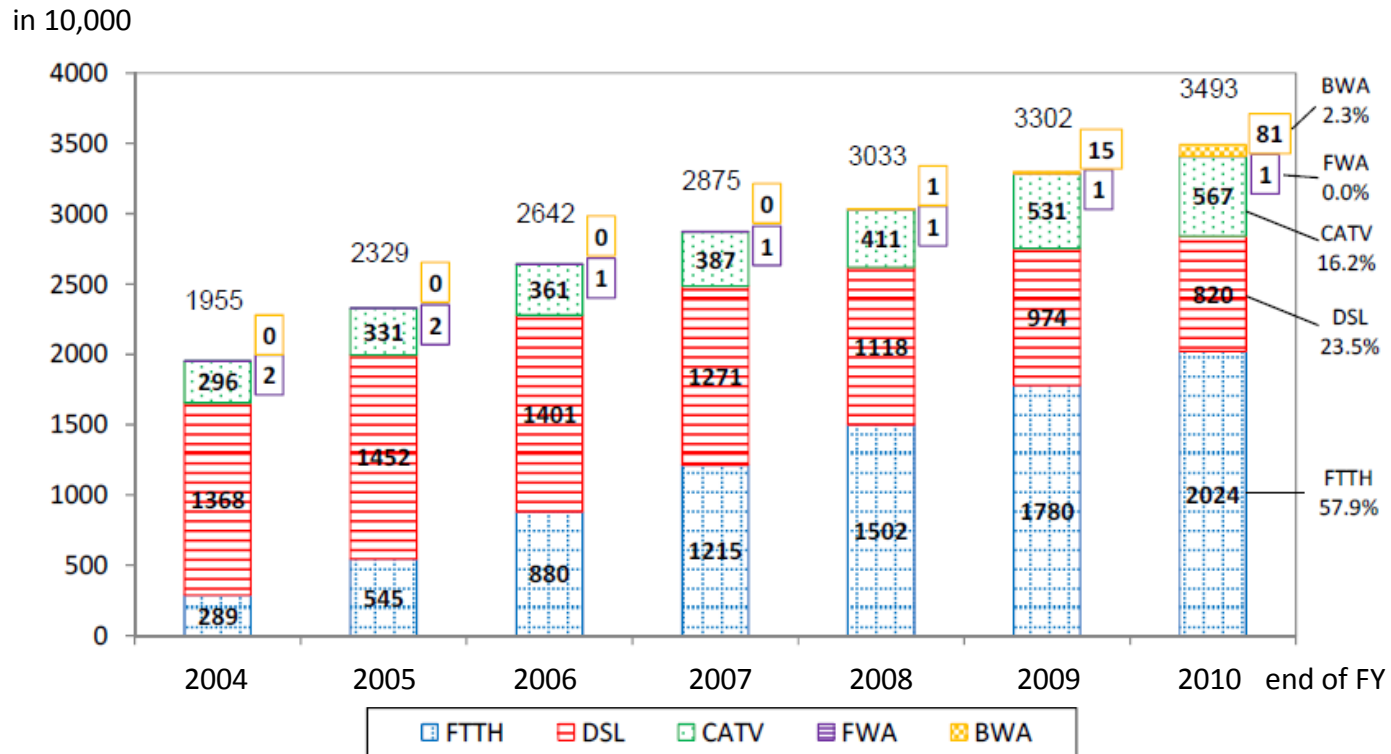
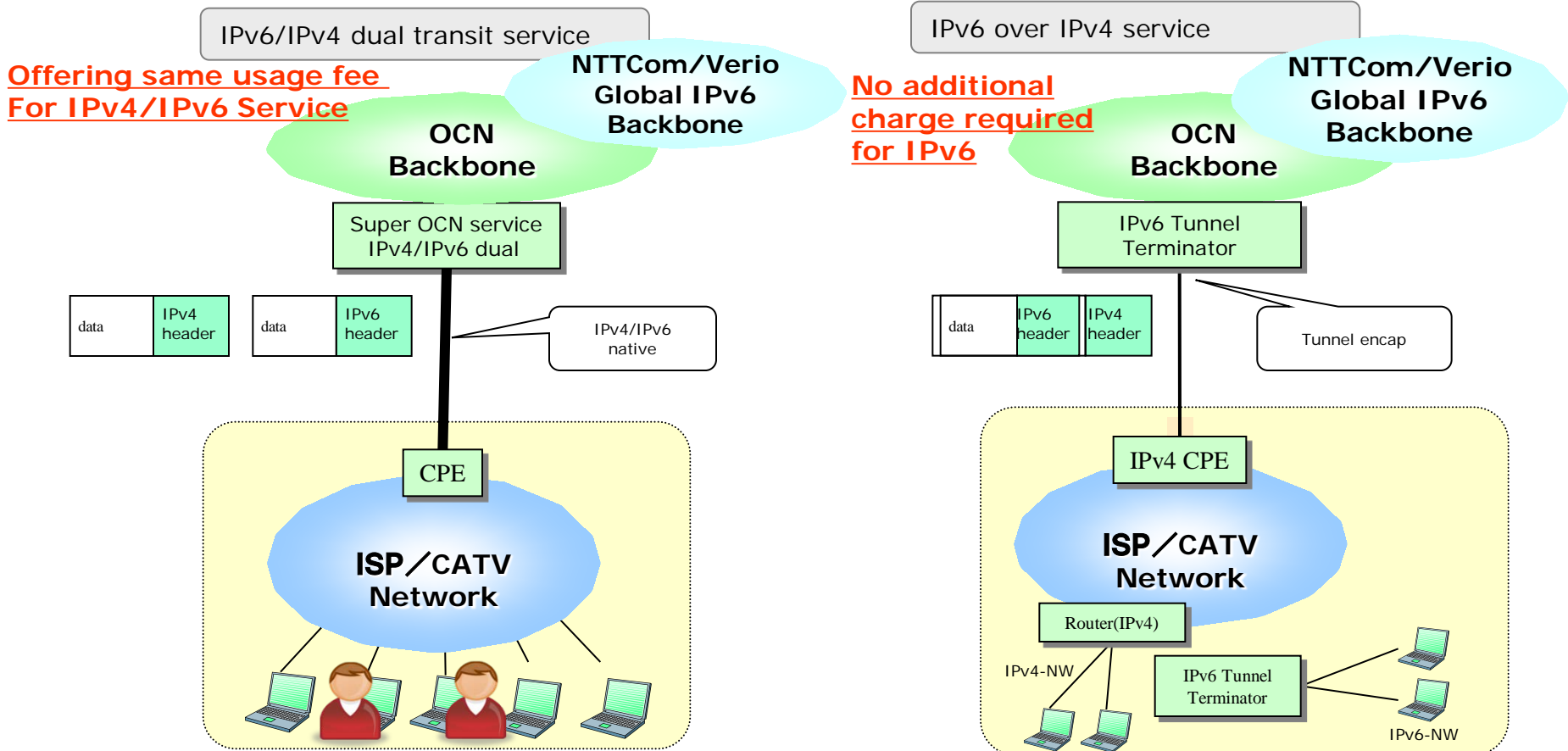Transition of Broadband subscribers (MIC)

IPv6 available Major Services

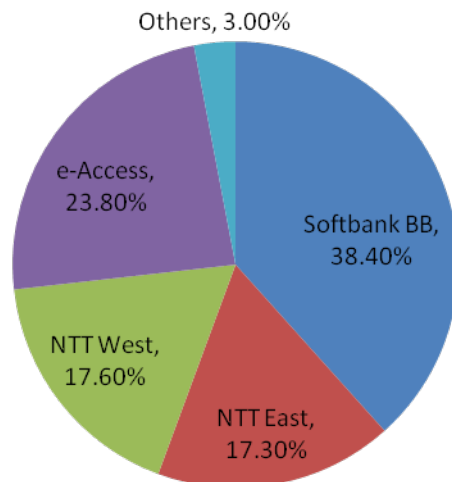|			
FTTH	KDDI	Announced IPv6 adoption for all current au hikari subscribers in April, 2011 and expand to all Kanto area by the end of July, 2011 and expand to nationwide after 2012	7.2million
	NTT East/West	Started provision of IPv6 Internet access function to ISPs by tunneling protocol in June, 2011 and by native protocol in July, 2011 on Flets hikari Next (NGN)	
	K-Opticom	Launched IPv6 Internet access service in July, 2011	
ADSL	Softbank BB	Planning to provide IPv6 Internet access service by 6rd	-
CATV	Jupiter Telecom	Planning to launch IPv6 access service in 2012	-
mobile	NTT Docomo	Launched IPv6 Internet Access for LTE in June 2011	0.2million

Backbone operation
Idea of offering OCN IPv6 Transit fee for OCN Services

■Current IPv6 Service fee for OCN Service provided to ISP and Corporative Company has revised. IPv6 Service will propel as a standard menu and the fee will offer the same price as IPv4 Service
■All functions of IPv4 Service will be applied to IPv6 Service

IPv6/IPv4 dual transit service

Offering same usage fee For IPv4/IPv6 Service

NTTCom/Verio Global IPv6 Backbone

OCN Backbone

Super OCN service IPv4/IPv6 dual

| data | IPv4 header |
| data | IPv6 header |

IPv4/IPv6 native

CPE

ISP／CATV Network

IPv6 over IPv4 service

No additional charge required for IPv6

NTTCom/Verio Global IPv6 Backbone

OCN Backbone

IPv6 Tunnel Terminator

| data | IPv6 header | IPv4 header |

Tunnel encap

IPv4 CPE

ISP／CATV Network

Router(IPv4)

IPv4-NW

IPv6 Tunnel Terminator

IPv6-NW

source: MIC Study Group on Advanced Use of Internet with IPv6 the 3rd interim Report, http://www.soumu.go.jp/main_content/000127670.pdf

Broadband access -ADSL

- Softbank BB
- e-Access
- FLET'S ADSL
- Local ADSL

source: MIC Competition Review in the Telecommunications Business Field in FY2010
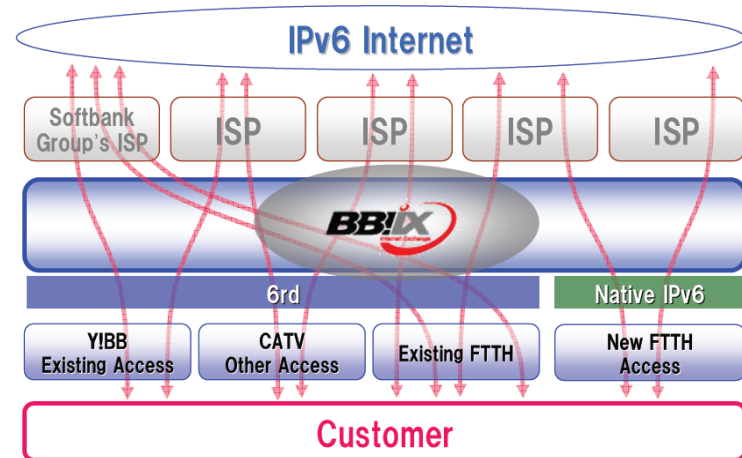
source: MIC Study Group on Advanced Use of Internet with IPv6   the 3rd interim Report,
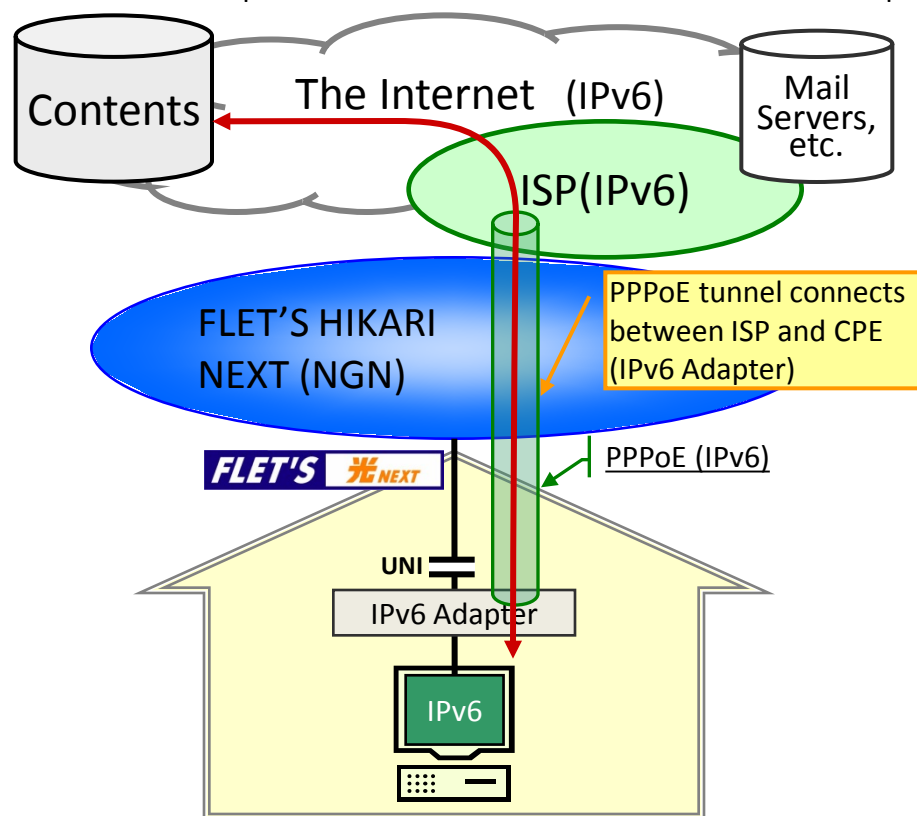http://www.soumu.go.jp/main_content/000127670.pdf

Broadband access -FTTH

- NTT-East and West
  - NGN(FLET'S HIKARI Next)
  - B-Flet's
- KDDI
- eo (K-Opticom)
- Others

NTT East and West, NGN's IPv6 PPPoE

Outline of IPv6 PPPoE

• IPv6 Prefix will be assigned to User via PPPoE by ISP

• new CPE for handling PPPoE(v6CP) and NAT66 is required to access both NGN and the Internet.

• Dedicated ID and password for IPv6 tunnel must be set on IPv6 Adapter

Contents

The Internet   (IPv6)

Mail Servers, etc.

ISP(IPv6)

FLET'S HIKARI NEXT (NGN)

PPPoE tunnel connects between ISP and CPE (IPv6 Adapter)

FLET'S 光 NEXT

PPPoE (IPv6)

UNI

IPv6 Adapter

IPv6

Service specifications

Connection method	PPPoE(IPv6)
Fee	Included in monthly charge of FLET'S
IPv6 Prefix assign method	DHCPv6-PD via PPPoE
ISPs	OCN plala So-net DTI dream.jp and 128 ISPs in total
Remark	IPv6 adapter or similar function to terminate PPPoE(v6CP) and NAT66 is required

source: MIC Study Group on Advanced Use of Internet with IPv6   the 3rd interim Report, http://www.soumu.go.jp/main_content/000127670.pdf

NTT East and West, NGN's IPv6 IPoE

Outline of IPv6 IPoE

- VNE's prefix will be assigned to UNI when user subscribe to ISP
- Users are required to subscribe to NGN with "FLET'S v6 Option" to make UNI-UNI communications go through shortest path in NGN

The Internet (IPv6)

Contents

ISP(IPv6)

VNE(IPv6)

Mail Servers, etc.

Communications between NGN's Users are completed through shortest path

FLET'S HIKARI NEXT (NGN)

FLET'S 光 NEXT

UNI

IPv6

FLET'S 光 NEXT

UNI
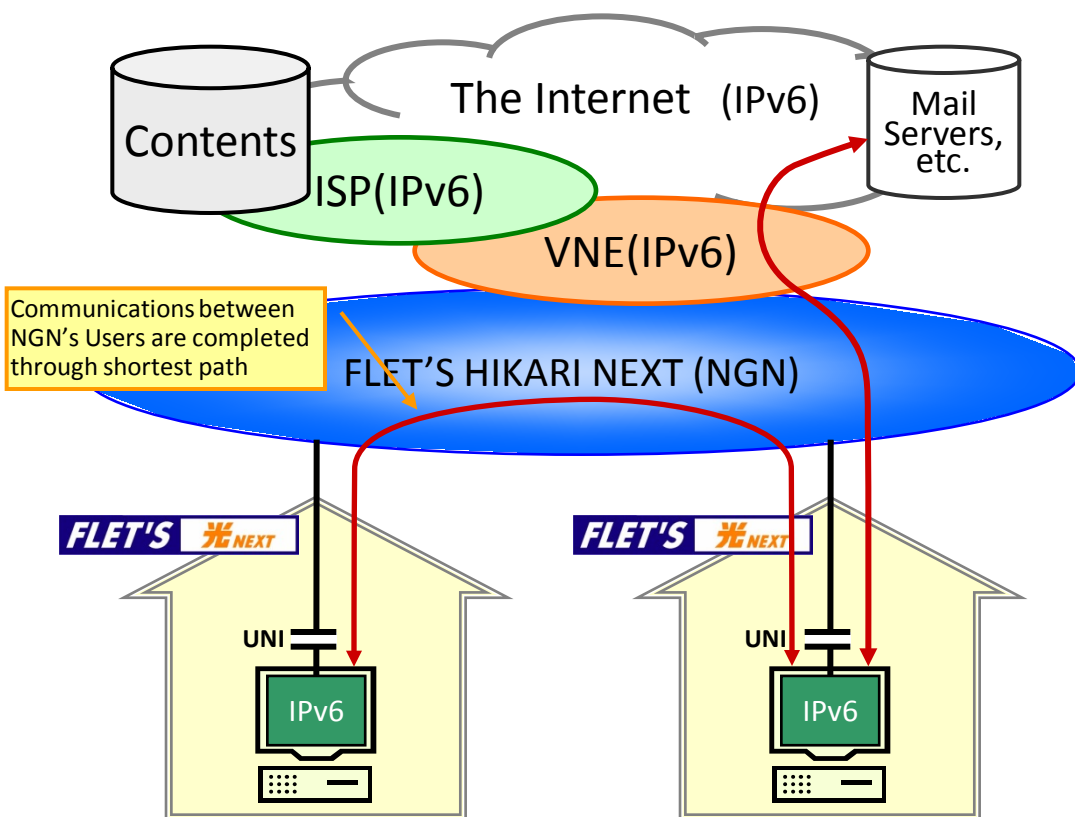
IPv6

Service specifications

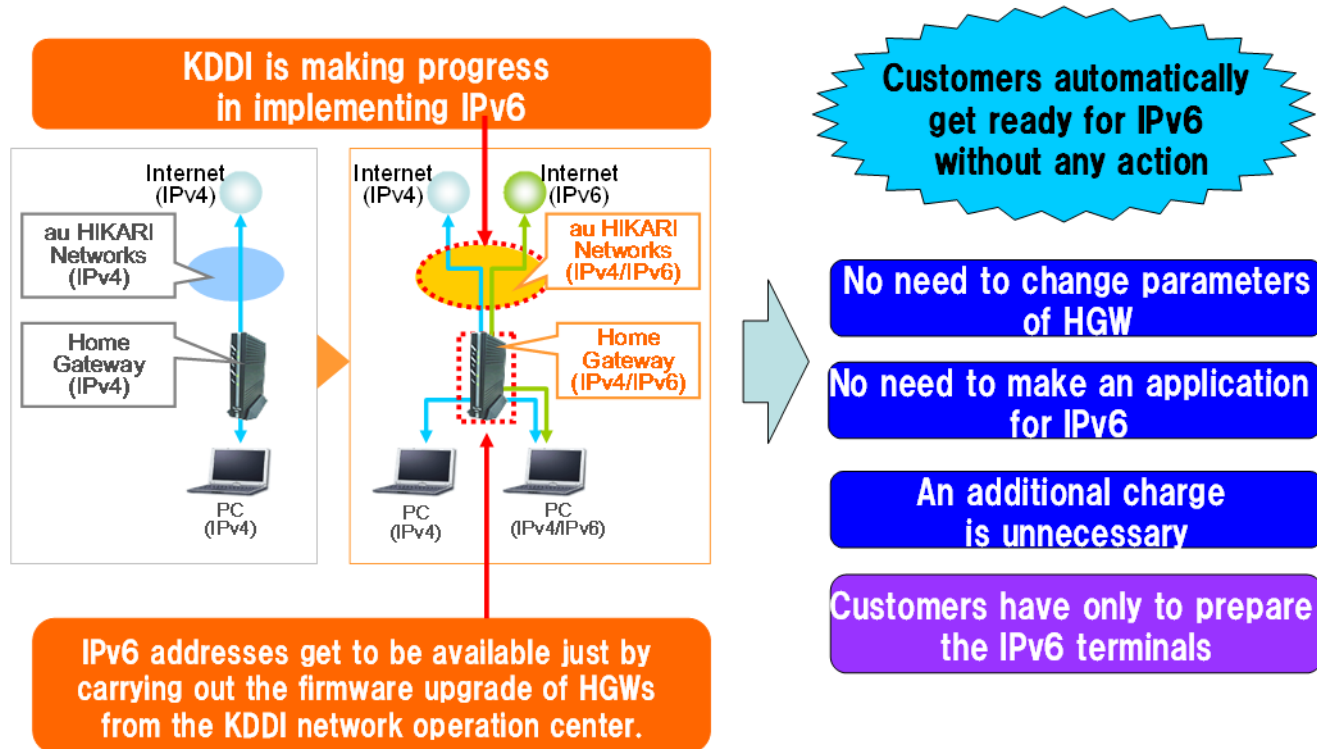| Connection method	IPoE(IPv6)
Fee	Included in monthly charge of FLET'S
IPv6 Prefix assign method	RA or DHCPv6-PD (VNE's Prefix)
ISP	BIGLOBE @nifty IIJmio au one NET VECTANT And some more ISPs *1
Remark	VNE (Virtual NW Enabler*2) – BBIX, Inc. – Japan Network Enabler, Co. – Internet Multifeed, Co.

*1: http://www.fletes.com/next/ipv6_ipoe/isp.html
*2: A kind of roaming service provider

source: MIC Study Group on Advanced Use of Internet with IPv6   the 3rd interim Report,
http://www.soumu.go.jp/main_content/000127670.pdf

KDDI (dual stack)

IPv6 implementation to the "au HIKARI" Networks

■ **Migration to IPv6**

KDDI is making progress in implementing IPv6

Customers automatically get ready for IPv6 without any action

Internet (IPv4)
au HIKARI Networks (IPv4)
Home Gateway (IPv4)
PC (IPv4)

Internet (IPv4)   Internet (IPv6)
au HIKARI Networks (IPv4/IPv6)
Home Gateway (IPv4/IPv6)
PC (IPv4)   PC (IPv4/IPv6)

No need to change parameters of HGW

No need to make an application for IPv6

An additional charge is unnecessary

Customers have only to prepare the IPv6 terminals

IPv6 addresses get to be available just by carrying out the firmware upgrade of HGWs from the KDDI network operation center.

2011/5/19

source: MIC Study Group on Advanced Use of Internet with IPv6   the 3rd interim Report,
http://www.soumu.go.jp/main_content/000127670.pdf

Wireless Access LTE

mopera-U's IPv6 internet access service

döcomo

Internet (IPv4)

Internet (IPv6)

mopera U

moperaU configuration site

FOMA (3G PS domian)

LTE

Data dedicated terminal (XI) and PC

Data dedicated terminal (XI) and PC
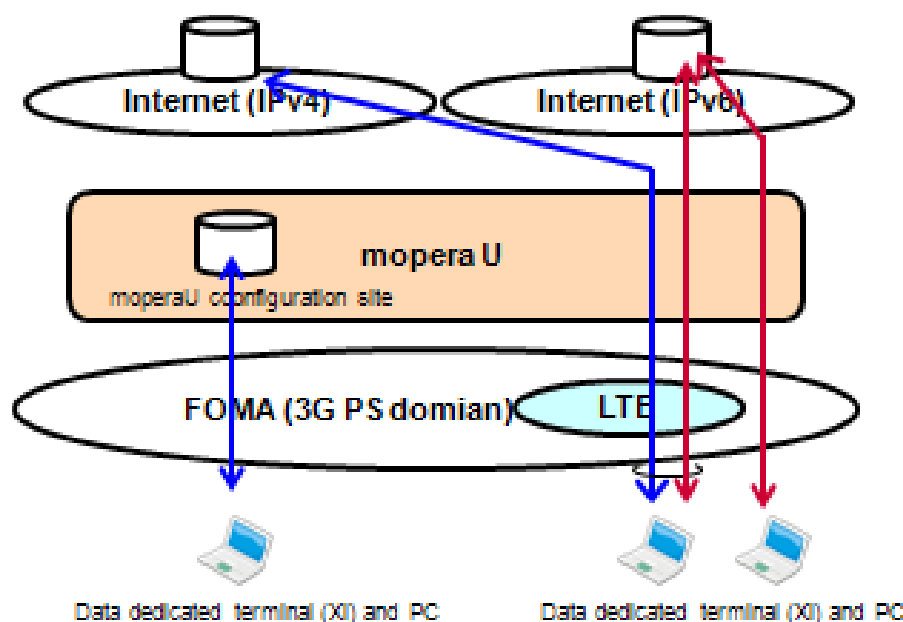
Change the setting yourself
v4 only -> v4/v6 dual

v4/v6 dual add(s). to be assigned.

※ You can also use v6 connectivity via 3G network.

How to use IPv6 service?

- Xi service contract
- mopera-U's ISP contract
- Xi handset
  (L-02C or F-06C by now)
- Change the setting to activate IPv6 using mopera-U's self configuration site.

Note ## In the following cases, you cannot use IPv6 service.

- Access via public wireless LAN nor fixed broadband including FTTH/ADSL, etc. provided by NTT)
- Access in a roaming environment.

- 7 -

source: MIC Study Group on Advanced Use of Internet with IPv6   the 3rd interim Report,
http://www.soumu.go.jp/main_content/000127670.pdf

CATV: Preparing for IPv4 address exhaustion

Action. Preparing for the new internet protocol

• Application services, such as email, web-space, and the access services will be supported.

J:COM will preparing for the IPv6 in two steps

Step 1：IPv6-enabled mail, web-space.
　　　A service can be accessed from the net, such as webmail, and
　　　web-space, is made available in advance to IPv6.
Step 2：Deploying IPv6 address.
　　　Provides IPv6 to our subscribers.

IPv4/IPv6 access-services

- • Will not provides only IPv6 service, will provides native "dual-stack" service. (IPv4 and IPv6 coexisting)　Will begin trials of dual-stack service, starts in 2012.
  - • will provides IPv6 address before IPv4 address exhaustion.
- • Will provide production-grade "dual-stack service", once trials have successfully completed.

Under consideration

- • IPv6 Access-service detail.
- • Customer notification.
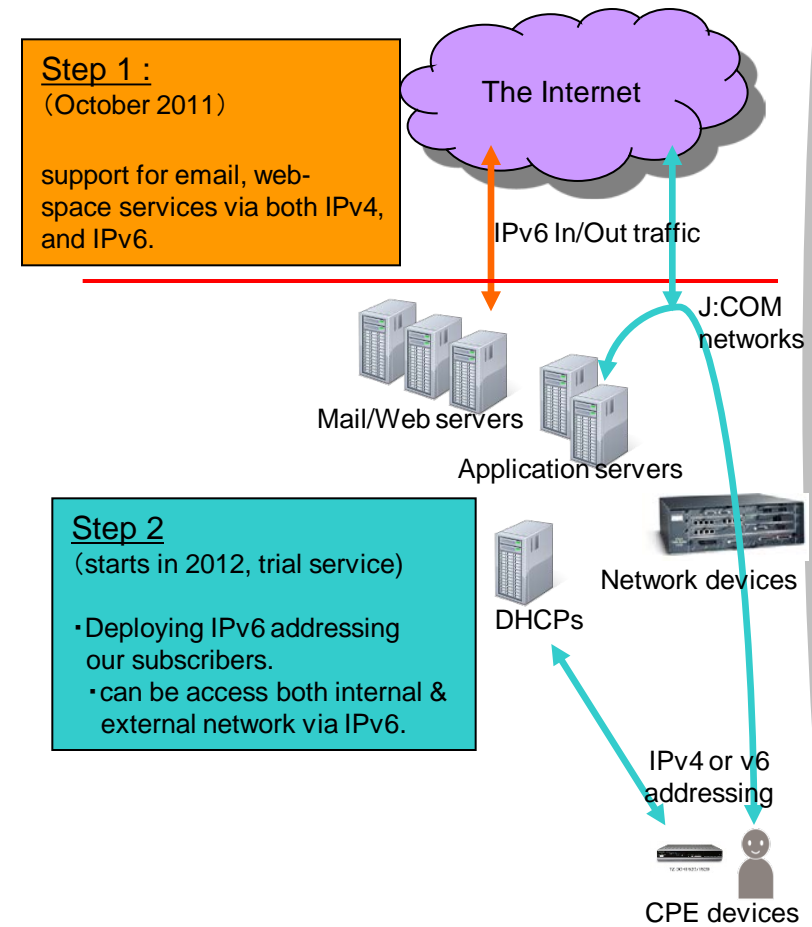- • Internal IPv6 training, especially call centers, and service engineers.

Step 1 :
（October 2011）

support for email, web-space services via both IPv4, and IPv6.

The Internet

IPv6 In/Out traffic

J:COM networks

Mail/Web servers

Application servers

Step 2
（starts in 2012, trial service）

・Deploying IPv6 addressing our subscribers.
・can be access both internal & external network via IPv6.

Network devices

DHCPs

IPv4 or v6 addressing

CPE devices

Figure：IPv4/IPv6 access-services

List of ISPs providing IPv6 service

Company	ISP	IPv6 Service support site (English page with link, Japanese without)
ASAHI Net,Inc.	ASAHI Net	http://asahi-net.jp/en/support/news/101210_3.html
eAccess Ltd.	AOL	http://support.aolservice.jp/info/2010/11/ipv6_101130.html
Internet Initiative Japan Inc.	IIJ	http://www.iij.ad.jp/en/service/IPv6/index.html
NEC BIGLOBE, LTd.	BIGLOBE	http://support.biglobe.ne.jp/ipv6/
NTT Communications Corporation	OCN	http://www.ntt.com/ipv6/
NTT Plala Inc.	Plala	http://www.plala.or.jp/ipv6/
KDDI Corporaiton	au one net	http://www.auone-net.jp/ipv6/
CNCI Group (8 CATV companies)	CATV	http://www.cnci.co.jp/ipv6.html
Sony Business Solutions Corporation	bit-drive	http://www.bit-drive.ne.jp/ipv6/
So-net Entertainment Corporation	So-net	http://www.v6.so-net.ne.jp/common/IPv6/index.html
Softbank Telecom Corp.	ODN/ SpinNet	http://www.odn.ne.jp/odn_info/ipv6/ http://www.spinnet.jp/csc/ipv6/
Softbank BB Corp.	Yahoo! BB	https://ybb.softbank.jp/ipv6/
Densan Co, Ltd	avis	http://www.avis.ne.jp/ipv6/
Dream Train Internet	DTI	http://dream.jp/ipv6/
nifty corporation	@nifty	http://support.nifty.com/support/ipv6/
NSK Internet	@nsk	http://www.nsk.ad.jp/n_information/ipv6.html
UCOM	BROAD-GATE 02	http://www.fttx.co.jp/Home/information/tabid/85/Default.aspx?itemid=27

What should/must we do, toward next IPv6 Day ?

1. End-host --- "feasibility" is the key…..
   a. Fall-back behavior
   b. Multi-home, e.g., RFC3484 (Policy Table)

2. CPE(e.g., SOHO router)
   a. RFC5220/5221 (routing information)

3. Access Network
   a. TCP resetting ➔ should not do, but we need…
   b. DNS
      i. AAAA filtering ➔ do not want to do ?, but we need…
      ii. Other ? , e.g., two DNSs for IPv4 only and for dual-stack
   c. Without NGN, e.g., KDDI auONENET
   d. Improve the subscription procedure of IPoE's