# IPv6 Deployment of KDDI

February 28th, 2012

KDDI Corporation

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1. Introduction to KDDI

2. Making the decision of IPv6 deployment

3. IPv6 deployment of "au HIKARI(FTTH)"

4. World IPv6 Day and next action

1. Introduction to KDDI

Company Profile

Composition of Shareholders

- Other Companies: 30.28%
- Financial Institutions: 20.56%
- Securities Firms: 2.46%
- Foreign Companies, etc.: 29.56%
- Individuals and Others**: 17.14%

** Of which, own shares 13.3%

■Date of Establishment : June 1, 1984
- KDDI was established upon a three-company merger (DDI, KDD, IDO) in October 2000.

■Capital : 141,851 million

■Number of Employees : 19,290 (consolidated basis)

■Ticker : TSE 9433

■Market Capitalization : 2,404 billion yen(@536k yen)

■Major shareholders :

   Kyocera Corporation : 12.76%

   Toyota Motor Corporation : 11.09%
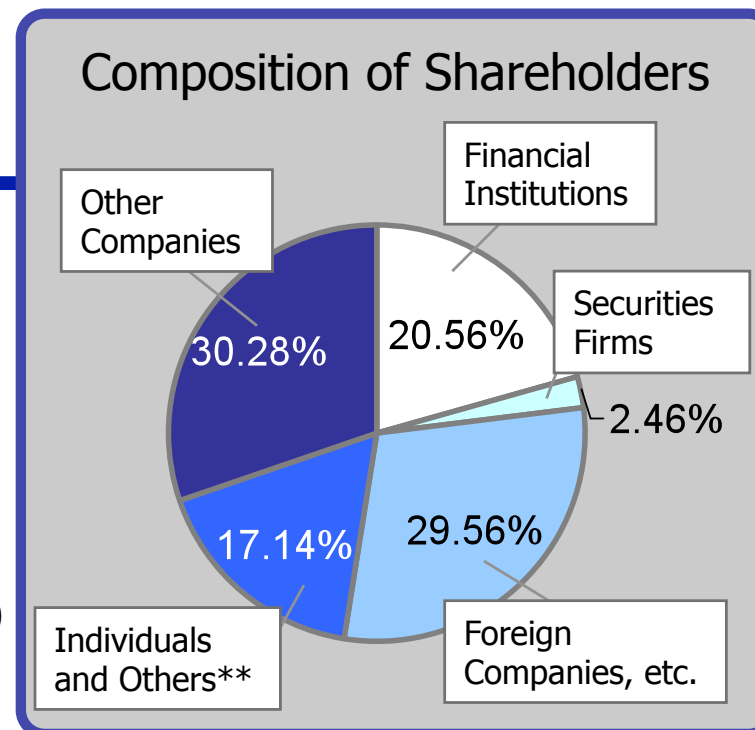
Note 1: As of November 30, 2011.
Note 2: Ratio of controlling share.
Note 3: The controlling stake % reflects only the acquired portion from TEPCO out of the total treasury stock reacquired on November 29 based on the shareholders' list as of September 30 2011.

Major Telecom Operators in Japan

Sales (FY2011.3)	Mobile	Fixed-line			Broadcast
		Local	Long-distance	ISP	CATV

KDDI — Designing The Future

\3.4 trillion — mobile

au by KDDI (33.66M subs) | (au HIKARI) **auひかり** (1.5Msubs) | FTTH | **au one** NET — Merged in January 2007

UQ WiMAX (1.24M subs)

TEPCO / **CTC** — Became a subsidiary in April 2008

JCN — Became a subsidiary in June 2007

J:COM — Purchase of equity in February 2010

NTT

\10.3 trillion

| **NTT DOCOMO** (58.99M subs) | **NTT E / W** | **NTT Communications** |
| | | **NTT E / W** |

SOFTBANK

\3.0 trillion

SOFTBANK MOBILE (26.90M subs)

SOFTBANK BB（ADSL/FTTH）

SOFTBANK TELECOM

Note: ( ) shows mobile subscriber number as of September 30, 2011.　　　are affiliated companies.
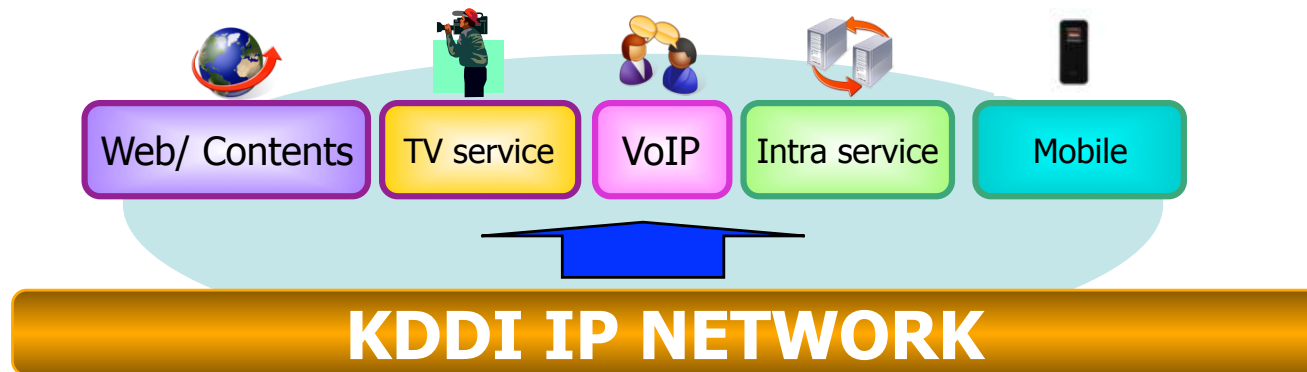
5

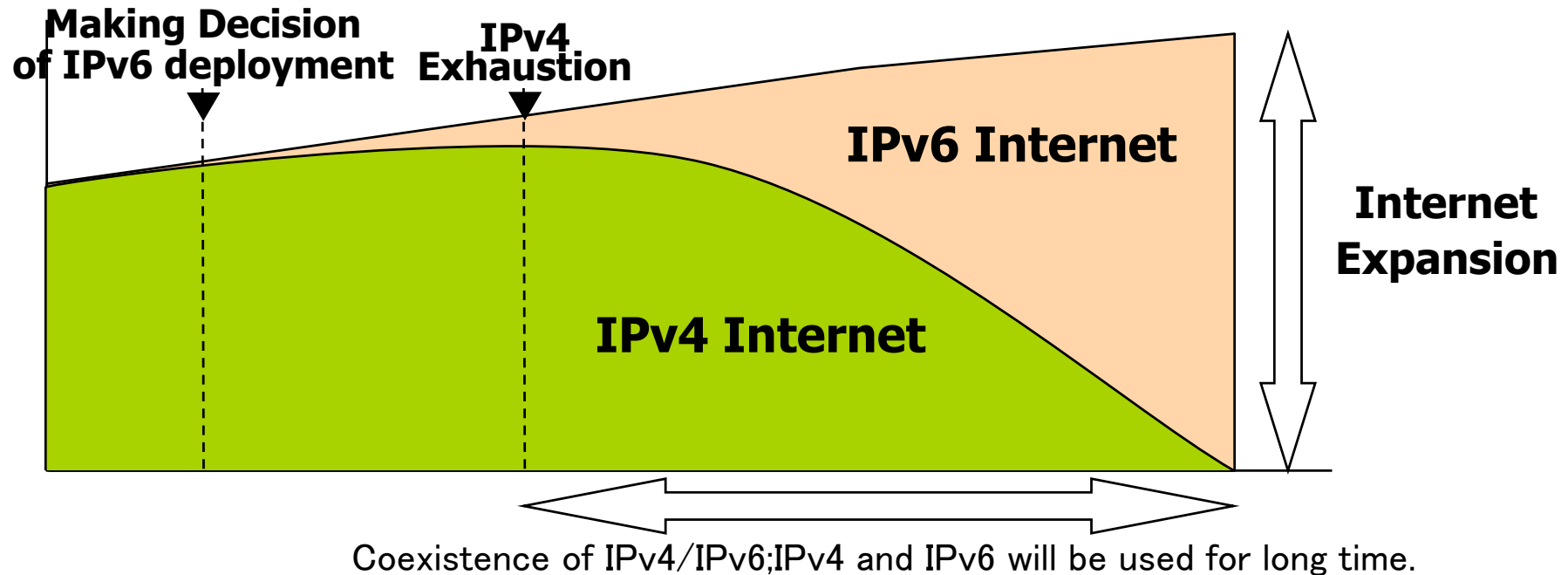# 2. **Making the decision of IPv6 deployment**

KDDI studied IPv4 Exhaustion

2007	2008	2009	2010	2011	2012
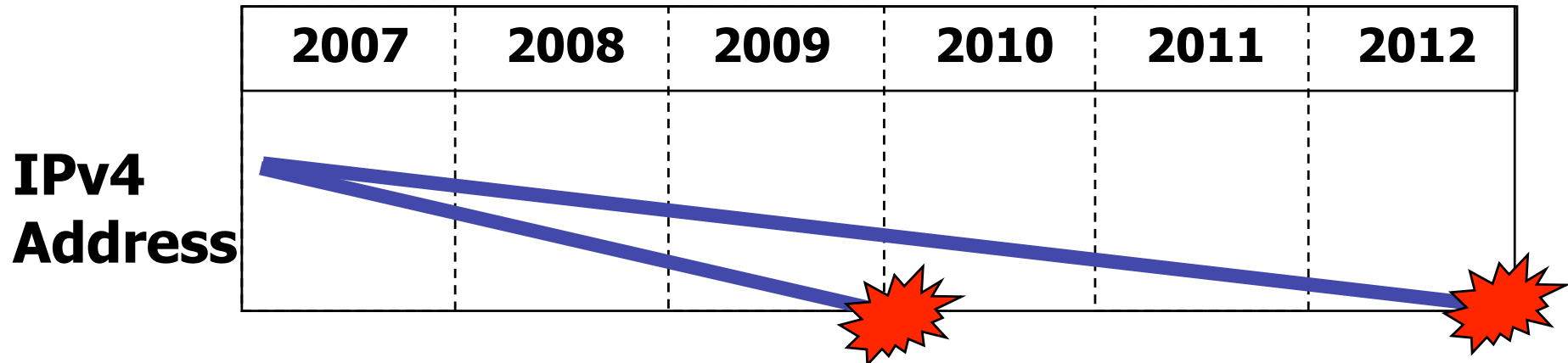
IPv4 Address

KDDI estimated that unallocated address pool would be exhausted in 2010 – 2012.

Internet is society's infrastructure.

| Web/ Contents | TV service | VoIP | Intra service | Mobile |

KDDI IP NETWORK
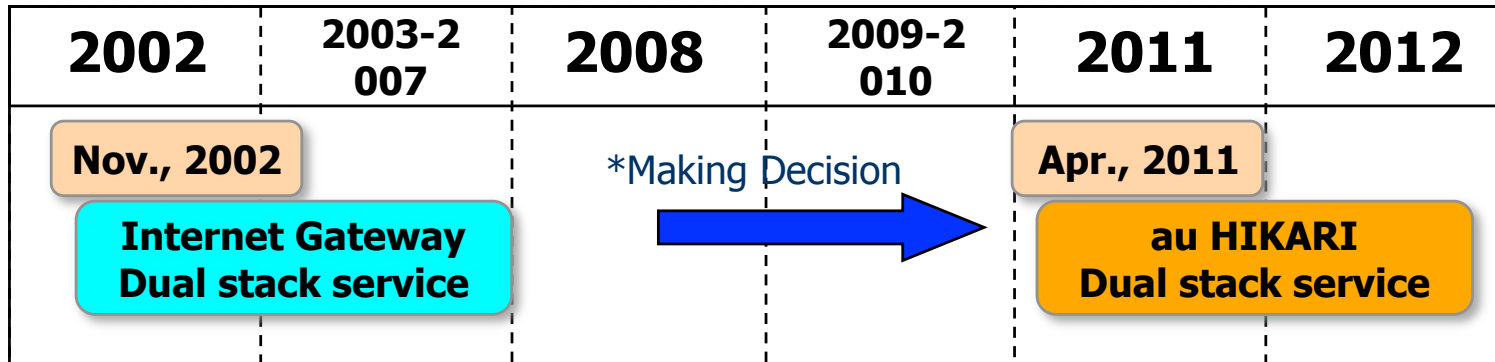
Solution of IPv4 Exhaustion

■ **Internet keeps expanding.**

■ **Solution of IPv4 exhaustion**

　-> **Keep using IPv4 by LSN etc. [Temporary Solution]**

　-> **IPv6 deployment [True Solution]**

Making Decision of IPv6 deployment

IPv4 Exhaustion

IPv6 Internet

Internet Expansion

IPv4 Internet

Coexistence of IPv4/IPv6;IPv4 and IPv6 will be used for long time.

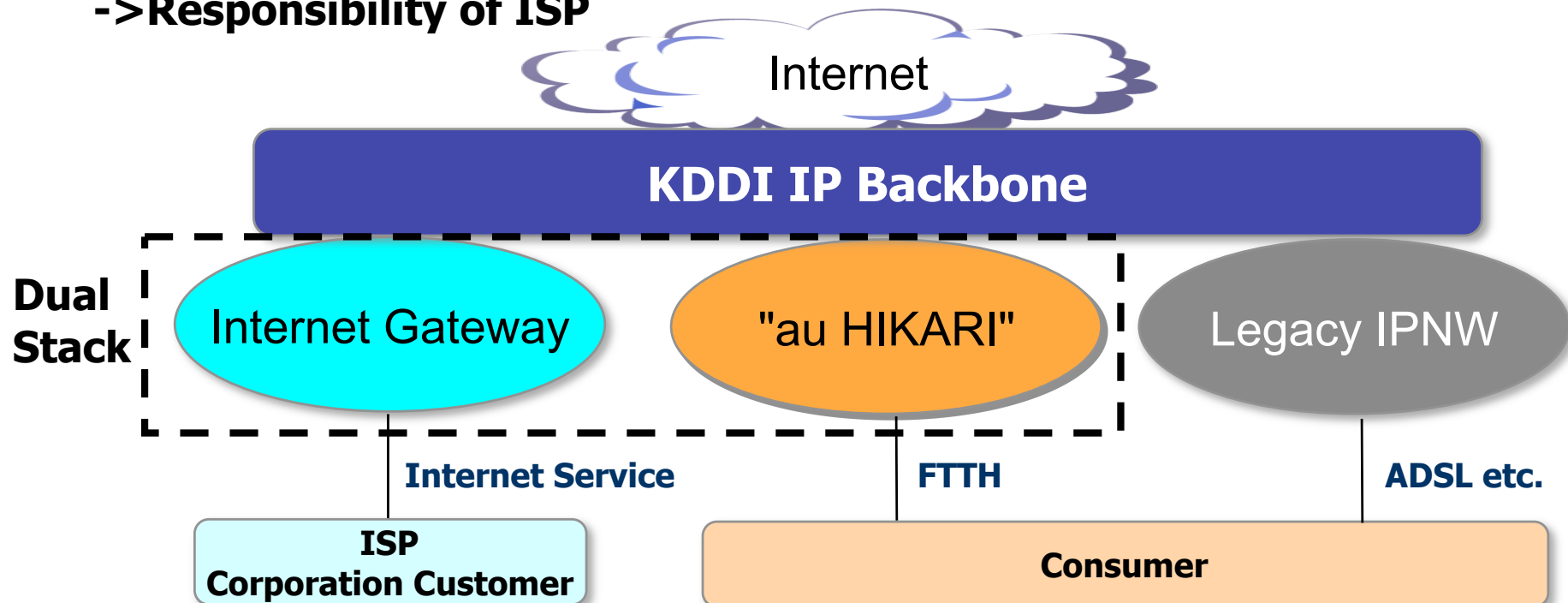**Why doesn't the situation of only IPv6 internet come soon?**

(1) Cost of IPv6 deployment

(2) IPv6 preparation of All ISP, contents providers and customers

(3) No specific service of only IPv6 now

2002	2003-2007	2008	2009-2010	2011	2012

Nov., 2002

Internet Gateway Dual stack service

*Making Decision

Apr., 2011

au HIKARI Dual stack service

[Making decision of IPv6 deployment]
 ->IPv6 is the true solution of IPv4 exhaustion and will continue to be used in the future.
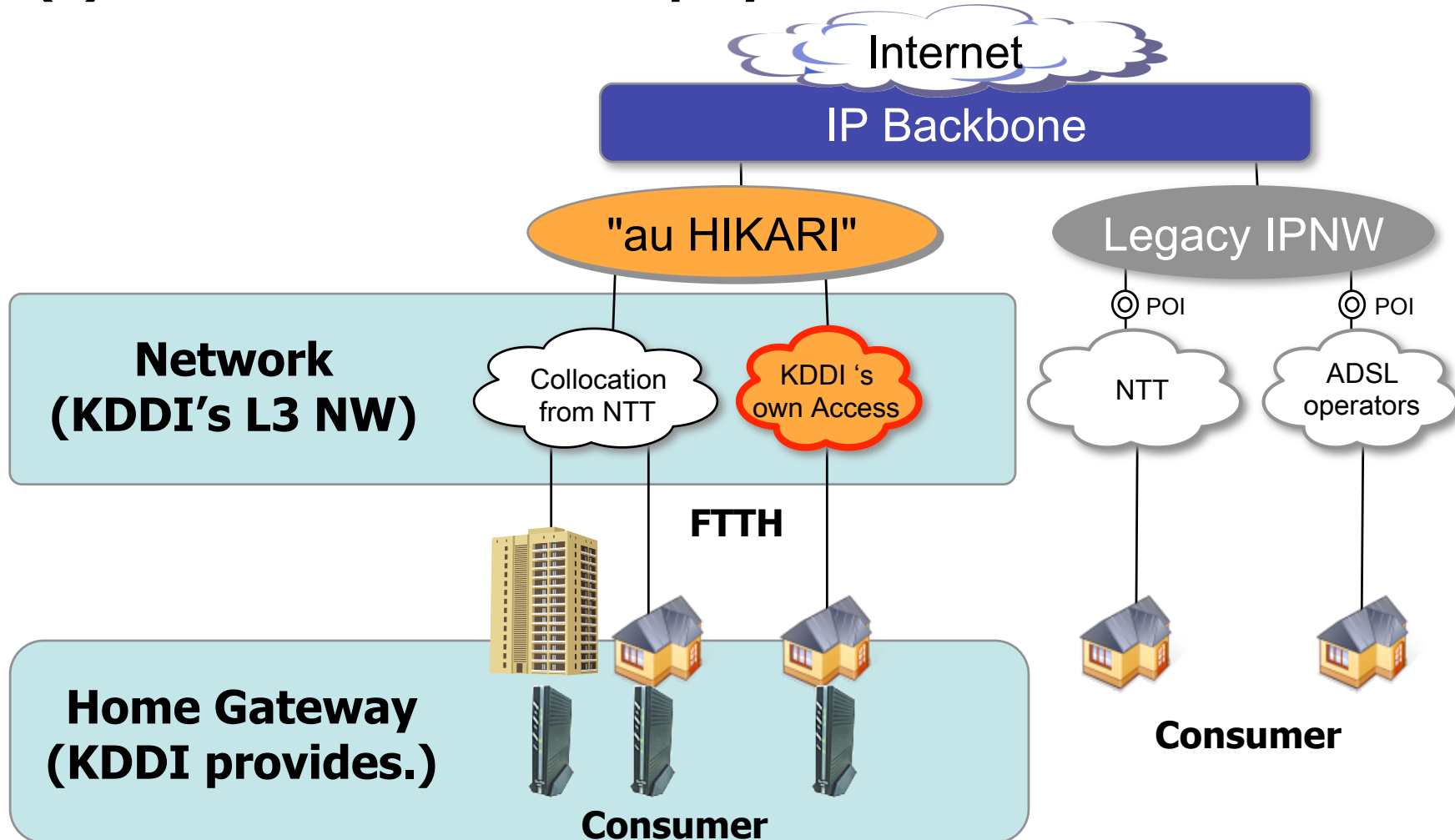 ->Responsibility of ISP

Internet

KDDI IP Backbone

Dual Stack

Internet Gateway

"au HIKARI"

Legacy IPNW

Internet Service

FTTH

ADSL etc.

ISP Corporation Customer

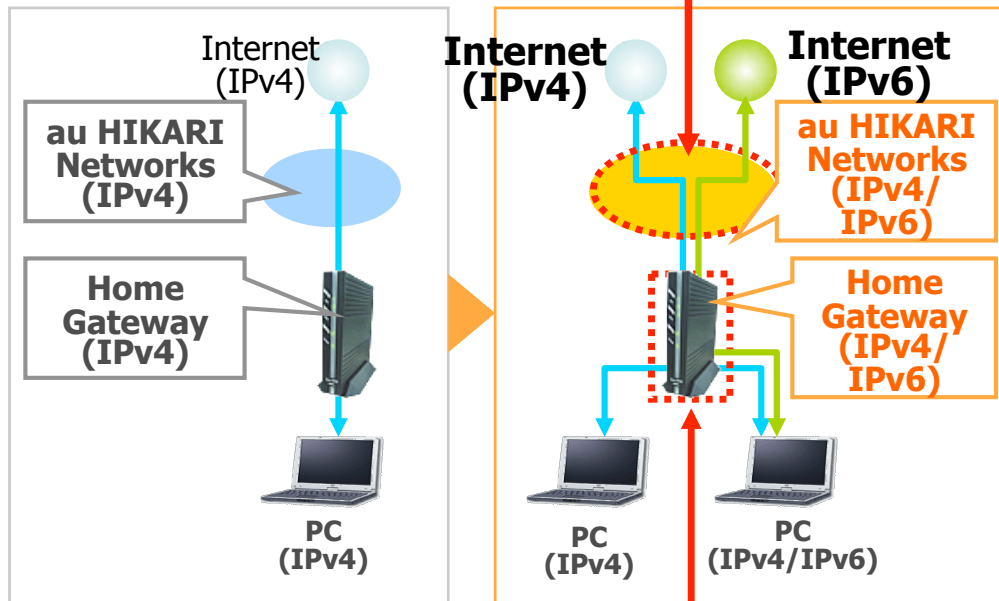**Consumer**

9

3. IPv6 deployment

of "au HIKARI"(FTTH)

Key Issues of "au HIKARI" IPv6 deployment
(1) Customers can get ready for IPv6 automatically.
(2) Minimization of IPv6 deployment cost

Internet

IP Backbone

"au HIKARI"

Legacy IPNW

POI   POI

**Network
(KDDI's L3 NW)**

Collocation from NTT

KDDI 's own Access

NTT

ADSL operators

FTTH

**Home Gateway
(KDDI provides.)**

Consumer

Consumer

■ 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

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

Customers can use IPv6, if they have the IPv6 terminals.

12

KDDI started the migration of "au HIKARI" in Apr., 2011

STEP1 KANTO area(620k subscribers)

2011						
Feb.	**Mar.**	**Apr.**	**May**	**Jun.**	**Jul.**	**Aug.**
Address Exhaustion of IANA		Address Exhaustion of APNIC and JPNIC Migration to dual stack NW of "au HIKARI" in KANTO area		June 8th; World IPv6 Day		

STEP2 except the KANTO area(876k subscribers)

2012			
1Q	**2Q**	**3Q**	**4Q**
Migration to dual stack NW of "au HIKARI" in except the KANTO area			

STEP2

STEP1

KANTO area

13
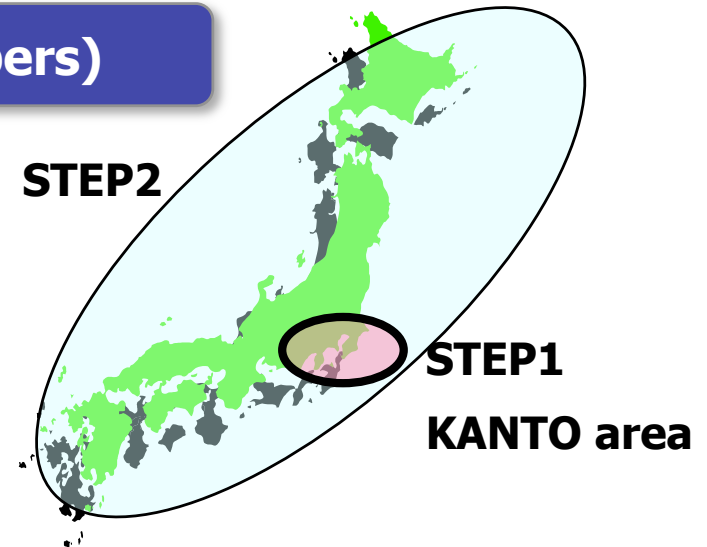
4. World IPv6 day and next action

- # World IPv6 Day
  - ## Overview
    - This was an one day IPv6 experiment done world wide to find out the influence and impact.
    - Major giant CP,Google, Facebook and Yahoo also joined this project .
  - ## Day ：
    - AM9:00 Jun-8 to AM8:59 Jun-9 in 2011 （JST）

- # In fact,,,
  - Google's main services, Youtube, Gmail and Google documents were available by using IPv6
  - There was almost no report of fault.
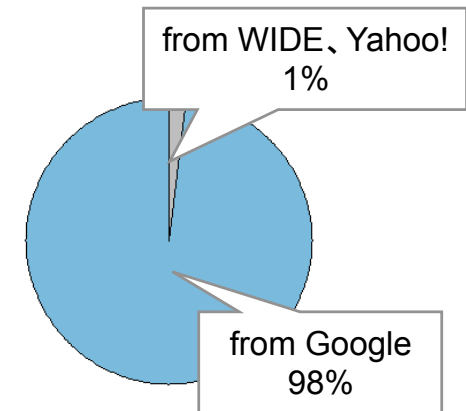 - World IPv6 day ended without confusion.

- **An IPv6 traffic rate changes at 3-5%**
  (It was about 0.11% before World IPv6 Day)
- **The maximum traffic is several Gbps (22:15).**
- **The most traffic came from Google to "au HIKARI"**

maximum of IPv6 traffic

maximum of IPv6 traffic ratio

Internet -> KDDI

from WIDE、Yahoo!
1%

from Google
98%
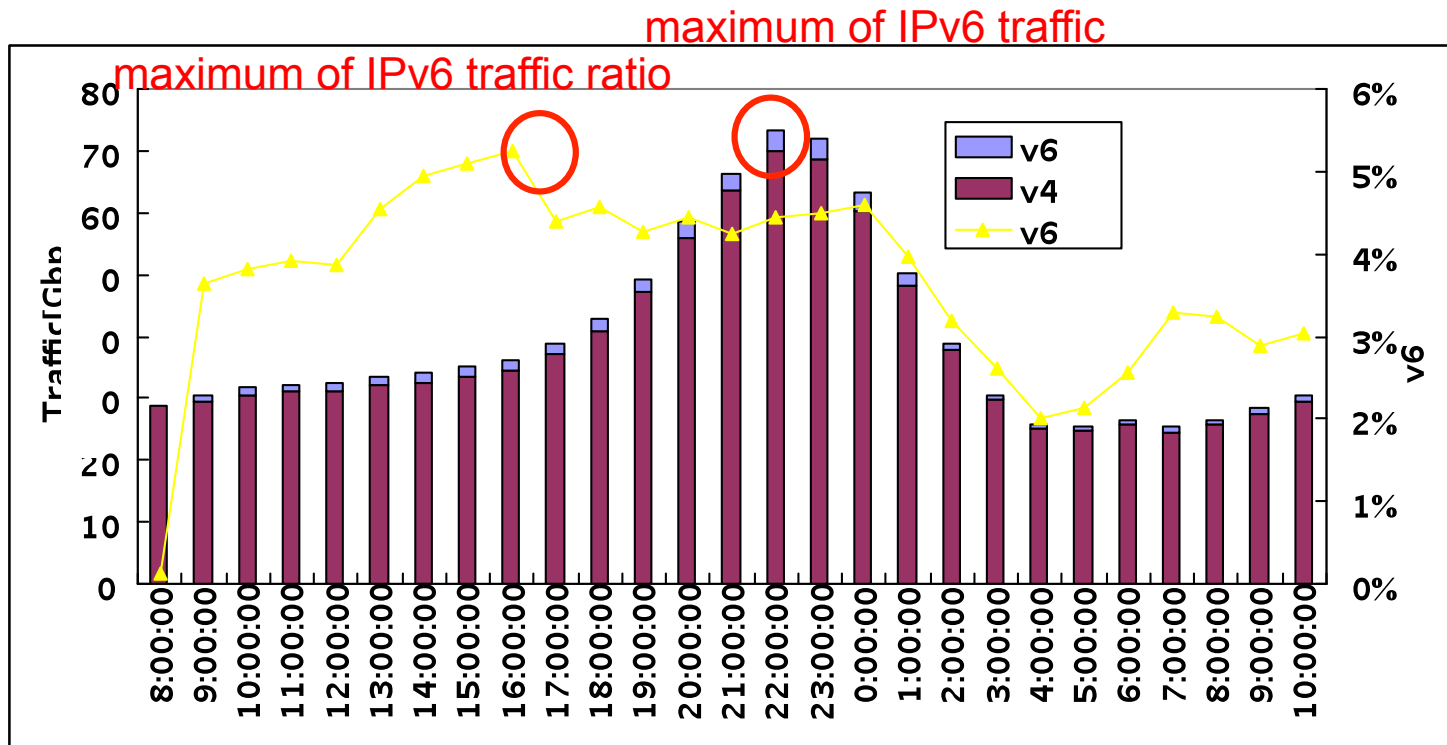
IPv4/IPv6 traffic (left axis)   a ratio of IPv4/IPv6 traffic(right axis)

- **IPv6 traffic continues and increases after World IPv6 Day.**
- **The factor is increasing "au HIKARI" subscribers and subscribers who shift to Windows 7.**

World IPv6 Day

au HIKARI IPv6 Traffic

| 11/6/7 | 11/7/7 | 11/8/7 | 11/9/7 | 11/10/7 | 11/11/7 |
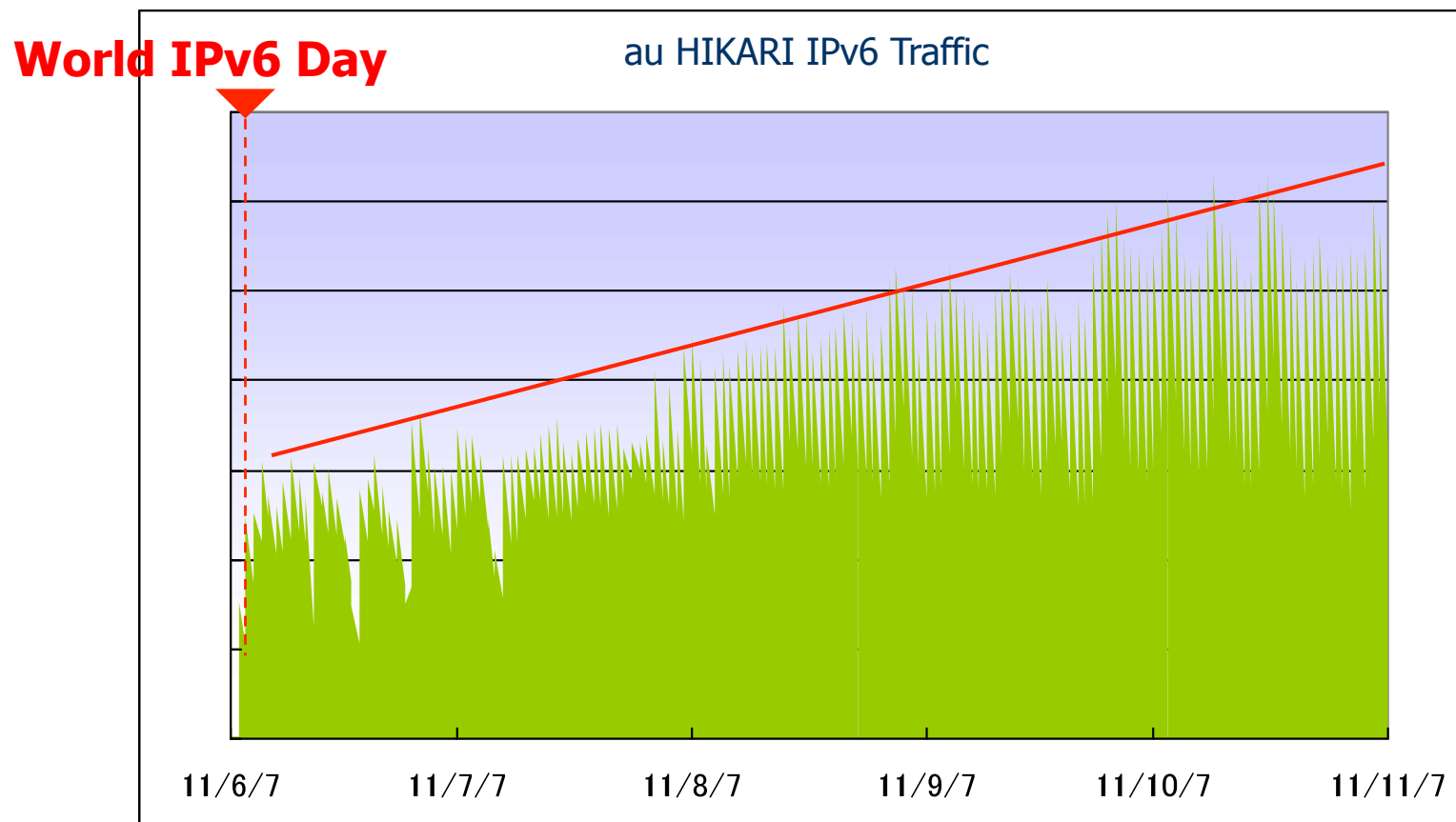
KDDI will participate in the World IPv6 Launch.

"World IPv6 Launch Solidifies Global Support for New Internet Protocol"

 Some ISPs committed that IPv6 will be automatically available.
 At least 1% of their wireline residential subscribers will do so using IPv6 by 6 June 2012.

 Committed ISPs are:
   AT&T
   Comcast
   Free Telecom
   Internode
   KDDI
   Time Warner Cable
   XS4ALL

Reference;
http://www.internetsociety.org/news/world-ipv6-launch-solidifies-global-support-new-internet-protocol

Thank　you