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

** Of which, own shares 13.3%

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

SOFTBANK

Sales: ¥3.0 trillion

SOFTBANK MOBILE

(26.90M subs)

SOFTBANK BB (ADSL/FTTH)

SOFTBANK TELECOM

NTT

Sales: ¥10.3 trillion

NTT DOCOMO

(58.99M subs)

JCN

Became a subsidiary in June 2007

Became a subsidiary in April 2008

Purchase of equity in February 2010

J:COM

Became a subsidiary in January 2007

au by KDDI

Sales: ¥3.4 trillion

(au HIKARI)

(33.66M subs)

FTTH

TEPCO

CTC

NTT E / W

Broadcast

JCN

Became a subsidiary in June 2007

NTT Communications

Merged in January 2007

CATV

Note: ( ) shows mobile subscriber number as of September 30, 2011. are affiliated companies.
2. Making the decision of IPv6 deployment
KDDI studied IPv4 Exhaustion

<table>
<thead>
<tr>
<th>Year</th>
<th>2007</th>
<th>2008</th>
<th>2009</th>
<th>2010</th>
<th>2011</th>
<th>2012</th>
</tr>
</thead>
<tbody>
<tr>
<td>IPv4 Address</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

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

Internet is society’s infrastructure.
Solution of IPv4 Exhaustion

- Internet keeps expanding.
- Solution of IPv4 exhaustion
  - Keep using IPv4 by LSN etc. [Temporary Solution]
  - IPv6 deployment [True Solution]

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
[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
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
IPv6 deployment of “au HIKARI”

**Migration to IPv6**

KDDI is making progress in implementing IPv6

- Customers automatically get ready for IPv6 without any action
  - No need to change parameters of HGW
  - No need to make an application for IPv6
  - An additional charge is unnecessary
  - Customers can use IPv6, if they have the IPv6 terminals.

IPv6 addresses get to be available just by carrying out the firmware upgrade of HGWs from the KDDI network operation center.
KDDI started the migration of “au HIKARI” in Apr., 2011.

**STEP1 KANTO area (620k subscribers)**

<table>
<thead>
<tr>
<th>Year</th>
<th>Month</th>
<th>Action</th>
</tr>
</thead>
<tbody>
<tr>
<td>2011</td>
<td>Feb.</td>
<td>Address Exhaustion of IANA</td>
</tr>
<tr>
<td></td>
<td>Mar.</td>
<td>Address Exhaustion of APNIC and JPNIC</td>
</tr>
<tr>
<td></td>
<td>Apr.</td>
<td>Migration to dual stack NW of “au HIKARI” in KANTO area</td>
</tr>
<tr>
<td></td>
<td>May</td>
<td>June 8th; World IPv6 Day</td>
</tr>
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</table>

**STEP2 except the KANTO area (876k subscribers)**

<table>
<thead>
<tr>
<th>Year</th>
<th>Quarter</th>
<th>Action</th>
</tr>
</thead>
<tbody>
<tr>
<td>2012</td>
<td>1Q</td>
<td>Migration to dual stack NW of “au HIKARI” in except the KANTO area</td>
</tr>
<tr>
<td></td>
<td>2Q</td>
<td></td>
</tr>
<tr>
<td></td>
<td>3Q</td>
<td></td>
</tr>
<tr>
<td></td>
<td>4Q</td>
<td></td>
</tr>
</tbody>
</table>
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.
The IPv6 Traffic of KDDI in World IPv6 day

- 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"

IPv4/IPv6 traffic (left axis)  a ratio of IPv4/IPv6 traffic (right axis)
The IPv6 traffic after World IPv6 Day

- IPv6 traffic continues and increases after World IPv6 Day.
- The factor is increasing “au HIKARI” subscribers and subscribers who shift to Windows 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
- KDDI
- Time Warner Cable
- XS4ALL

Reference:
Thank you