Enabling IPv6 on the FTTH network of ctc

28th August 2013

Chubu Telecommunications Co.,Inc.
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Corporate profile

Chubu Telecommunications Co., Inc. = ctc
A telecommunications carrier in central Japan
Number of Employees: 660 persons
Total amount of sales in FY2012: USD 681 million *USD1=JPY98
Shareholders
  KDDI CORPORATION : 80.5%
  Chubu Electric Power Co., Inc. : 19.5%
The total length of optical fiber network built by ourselves is 94,000km.
  (about 2.5 times longer than the circumference of the earth)
Services overview

Many kinds of telecom services are providing based on our optical fiber network

- Services for business
- Service for consumers (the service name is “commufa HIKARI”)
“commufa HIKARI” overview

- Number of subscribers: Approx. 600,000 as of 2013.Aug
- Services: High-speed Internet access, VoIP, TV
  - A line speed is max 1Gbps
  - The price of internet access is fixed charge.
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Our motivation for IPv6 deployment

- IPv4 Address exhaustion
- Spreading IPv6 networks
- The replacement plan of network devices for enhancing the performance of our backbone network

-leading to

ctc decided to start IPv6 deployment

Mar. 2010  Start researching how to deploy IPv6
Mar. 2011  Start IPv6 deployment project
IPv6 deployment project overview

- Backbone network
  - commufa HIKARI
  - RADIUS
  - BAS

- IPv4/IPv6 Dual Stack Devices
  - Routers
  - BASs
  - DNS / Web Servers
  - Network Management System (NMS)
  - HomeGateway (HGW) *a kind of CPEs lent to customers

- Upgrading systems
  - RADIUS
  - HGW Management system
  - Customer Management system

IPv4/IPv6 Dual Stack Devices

- Routers
- BASs
- DNS / Web Servers
- Network Management System (NMS)
- HomeGateway (HGW) *a kind of CPEs lent to customers

Upgrading systems

- RADIUS
- HGW Management system
- Customer Management system

Customers

HGW

HGW · Customer Management systems

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1 year and a half later…

22nd August 2012
IPv6 access service was started on “commufa HIKARI” !!
The results of IPv6 Deployment on “Commufa HIKARI”

1 year later…

- World IPv6 Launch measurement as of 20th August 2013

  IPv6 deployment : 20.53%
  (Our rank sorted by IPv6 deployment : 36th / 216 entries)

- APNIC IPv6 measurement by AS number as of 20th August 2013

  v6 capable : 29.63%
  (Our rank sorted by v6 capable : 28th)

⇒ about 178,000 subscribers are IPv6 capable

Reference) http://www.worldipv6launch.org/measurements/
 http://labs.apnic.net/ipv6-measurement/AS/
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Service policy for IPv6 access service

Our idea for providing IPv6 access service

Providing the automatic IPv4/IPv6 internet connections

Wow! It is easy to access both internet!!
Approaches for automatic internet connections

- HomeGateway Development
- A new service menu
Approaches for automatic internet connections

- HomeGateway Development
- A new service menu
HomeGateway development(1)

Adopting PPPoE as the access technique of subscribers for integrating IPv6 network into IPv4 network

Reasons:
1. PPPoE has been used as the access technique for providing IPv4 connectivity
2. No changes are required in existing access network
HomeGateway development(2)

- Backbone Network
- commufa HIKARI
- BAS
- PPPoE

IPv4 Internet
IPv6 Internet

Global IPv6 address assignment to HGW: DHCPv6-PD
Global IPv6 address assignment to Consumer devices: RA

- ctc is the first ISP used this technique on FTTH in Japan

PPPoE: Single PPPoE session with IPv4/IPv6 Dual stack
 IPv4 address: /32
 IPv6 address: /58 (*1)
 IPv4 address: /64
 IPv6 address: /64

*1: there is a possibility that the prefix length will be changed in the future
How to deploy IPv6 functions to existing HGWs

Our HomeGateways’ special features
- Auto-upgrade
- Auto-configuration

1. Notify a new firmware and a new configuration to HGWs

2. HGWs can get IPv6 connectivity after upgrading and reconfiguring

3. Customers can access IPv6 internet, if they have devices supported IPv6.
Approaches for automatic internet connections

- HomeGateway Development
- A new service menu
A new service menu

Features of a new service menu
- Providing a HomeGateway as a standard equipment
- IPv4/IPv6 internet access
- Monthly fee is max 40% off from old services

Old services
IPv4

New service
IPv4
IPv6

service change
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The graph of increasing HomeGateway users

The average increasing rate of HomeGateway users is 12% since Jun. 2012
IPv6 statistics of “commufa HIKARI”

IPv6 Traffic of a part of backbone (yearly)

22nd Aug. 2012

Comparing IPv4 and IPv6 Traffic (monthly)
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Conclusion(1)

- The replacement of network devices and systems
  - Routers and Servers became IPv4/IPv6 Dual-Stack devices.
  - HGW and Customer Management Systems, RADIUS were upgraded

- HomeGateway technical specification
  - Single PPPoE session with IPv4/IPv6 Dual Stack
  - IPv6 address assignment : DHCPv6-PD(HGW), RA(Consumer devices)
  - Auto-upgrade & Auto-configuration
Conclusion(2)

Features of IPv6 deployment on “commufa HIKARI”
- Providing a HomeGateway as a standard equipment
- IPv4/IPv6 Dual Stack Internet Access
- HGW Management system

- A new service menu
  - Providing a HomeGateway as a standard equipment
- HomeGateways
  - IPv4/IPv6 Dual Stack Internet Access
- HGW Management System
  - Auto-upgrade
  - Auto-configuration

Spreading IPv6-capable home networks
Thank you