Enabling IPv6 in last miles
(IPv6 deployment of ctc)

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Chubu Telecommunications Co., Inc.
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Corporate profile

Chubu Telecommunications Co., inc. = ctc
A telecommunications carrier in central Japan

Number of Employees:
618 persons

Total amount of sales in FY2011:
USD 657 million \( \times \text{USD1=JPY 94} \)

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 (service name is “commufa HIKARI”)
Number of Subscribers *as of 2013.Mar: Approx. 570,000

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

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

IPv4/IPv6 Dual Stacked Devices
- Routers
- BASes
- 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
1 year and a half later…

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

7 months later…

- World IPv6 Launch measurement as of 22nd Mar. 2013
  IPv6 Traffic : 13.16%
  Rank sorted by IPv6 Traffic : 24th / 111 entries

- APNIC IPv6 measurement per AS number as of 25th Mar. 2013
  v6 capable : 17.68%
  ⇒ about 100,000 subscribers are IPv6 capable
  Rank sorted by v6 capable : 69th

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

Diagram:
- Enabling IPv4/IPv6
- No changes
- Enabling IPv4/IPv6
- ONU
- Switches
- BAS
- Router
- IPv4 Internet
- IPv6 Internet
- Home Networks
- Access Network
- Core Network
HomeGateway development(2)

- Backbone Network
- commufa HIKARI
- BAS
- PPPoE

IPv4 Internet
IPv6 Internet

- IPv4 address: /32 (dynamic assign)
- IPv6 address: /58 (static assign)
- IPv6 address: /64 (dynamic assign)

- PPPoE: Single PPPoE session with IPv4/IPv6 Dual stack
- Global IPv6 address assignment to HGW: DHCPv6-PD
- Global IPv6 address assignment to Devices: RA

ctc is the first ISP used this technique on FTTH in Japan
How to deploy a developed function 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

Providing as standard services
- A home gateway
- IPv4/IPv6 internet access
Monthly fee was max 40% off

Optical Fiber Access Network

Old service
ONU
VoIP-TA
IPv4

the new service
ONU
VoIP-TA
IPv4
IPv6

service change
HGW

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The graph of increasing HomeGateway Users

The average increasing rate of HomeGateway users is 13% since Jun. 2012
IPv6 statistics of “commufa HIKARI”

- IPv6 Traffic of a part of backbone

22nd Aug. 2012
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Conclusion of CTC IPv6 Deployment

- Routers and Servers became Dual-Stacked devices. Management Systems of Home Gateways and Customers were upgraded.

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

- Features of ctc IPv6 deployment
  - By providing HomeGateways
    - Customers can get IPv4/IPv6 connectivity automatically
  - By providing the new service menu
    - The number of HomeGateway users is increasing

Spreading IPv6-capable home network
Thank you