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%

Shareholders

KDDI

80.5%

19.5%

Chubu Electric Power

Service Areas

Aichi
Gifu
Mie
Nagano
Shizuoka

Tokyo

Osaka
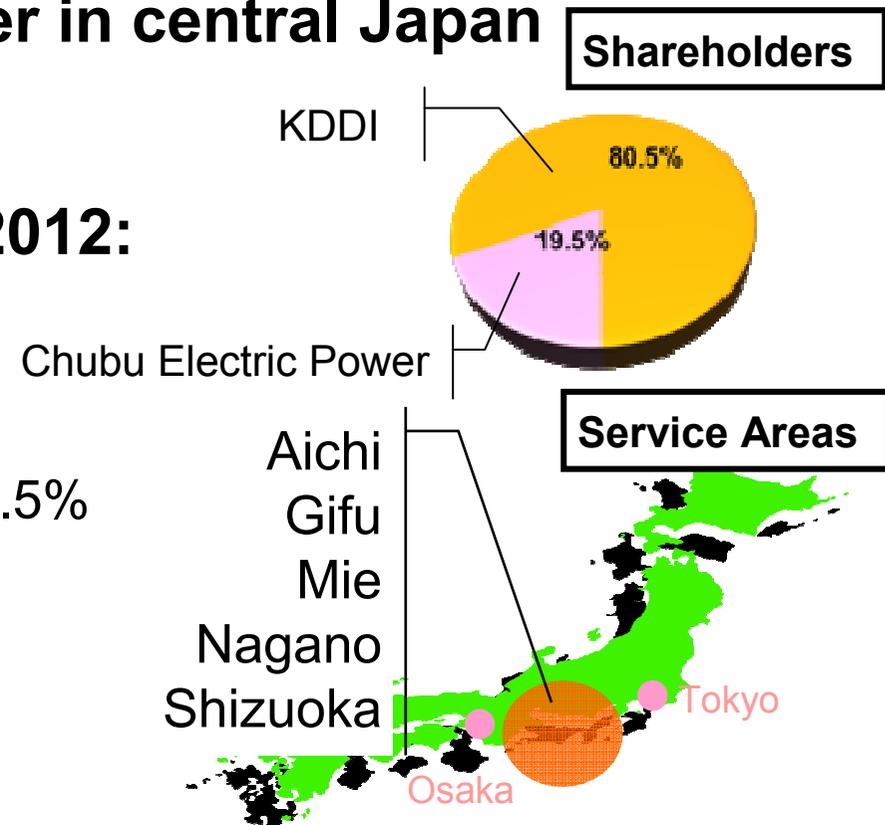
- **The total length of optical fiber network built by ourselves is 94,000km.**
  (about 2.5 times longer than the circumference of the earth)

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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")
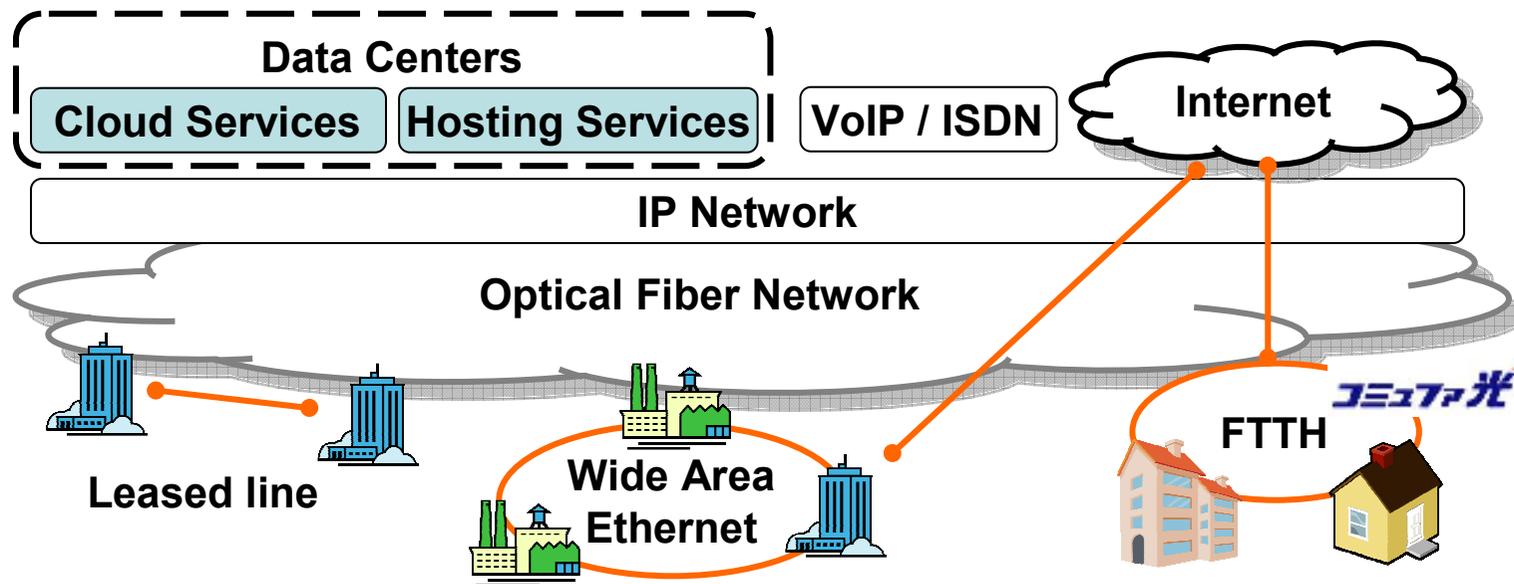
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"commufa HIKARI" コミュファ光 overview

Number of subscribers *as of 2013.Aug* **: Approx. 600,000**

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

Worldwide

IPv4 Address exhaustion

Spreading IPv6 networks

+

ctc

The replacement plan of network devices for enhancing the performance of our backbone network

ctc decided to start IPv6 deployment
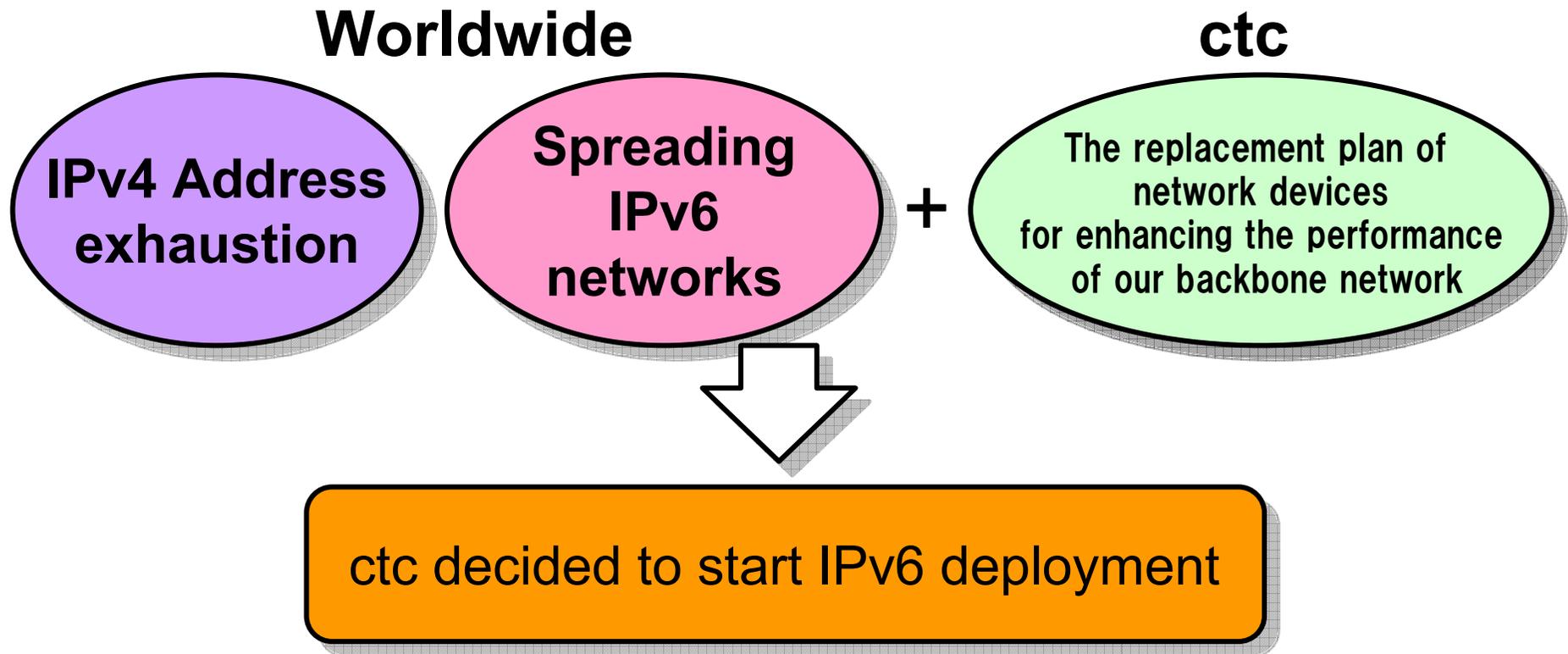
Mar. 2010 Start researching how to deploy IPv6

Mar. 2011 Start IPv6 deployment project

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IPv6 deployment project overview

NMS

DNS/Web

Backbone network

RADIUS

commufa HIKARI

BAS

HGW · Customer Management systems

HGW

Customers

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

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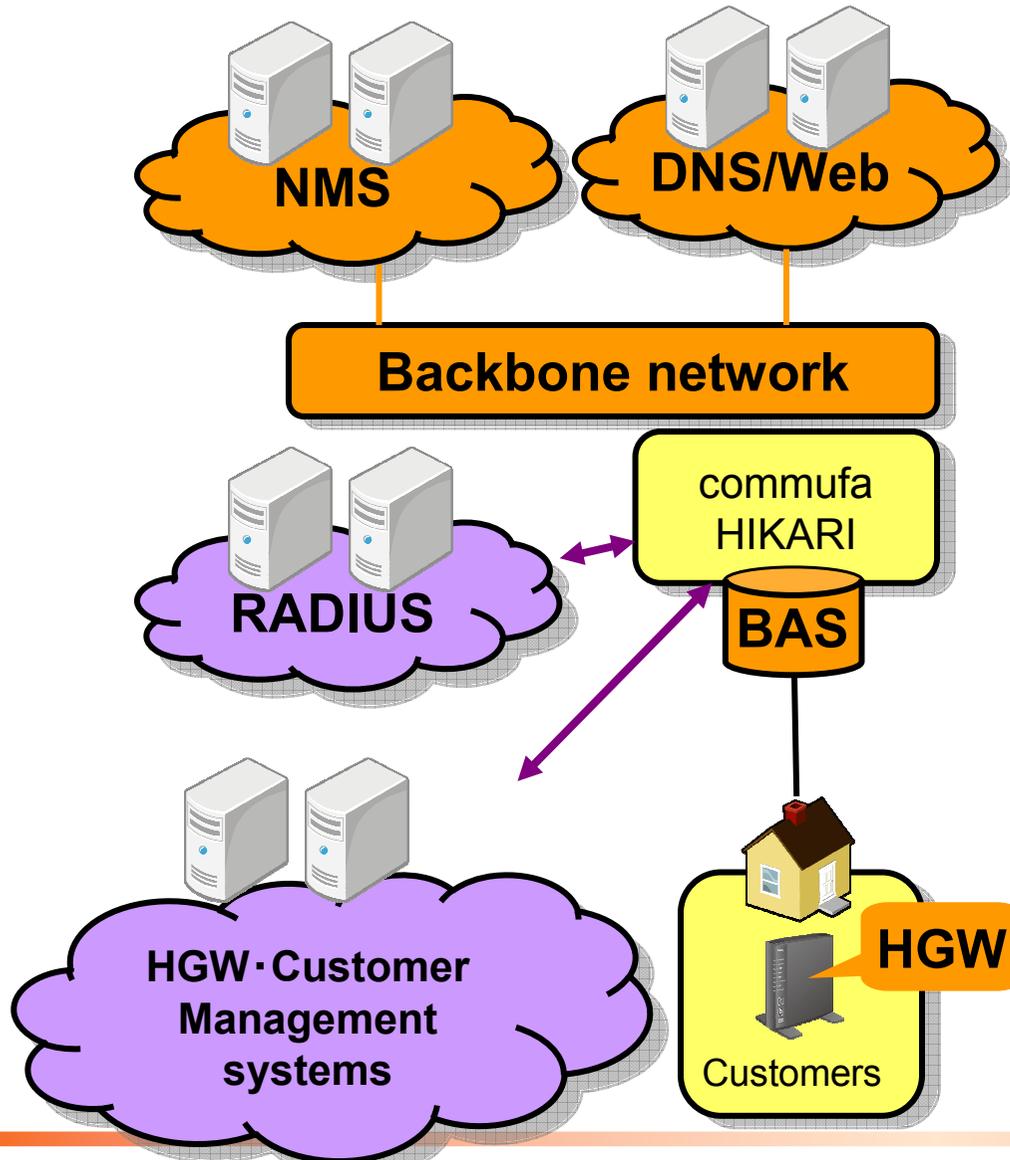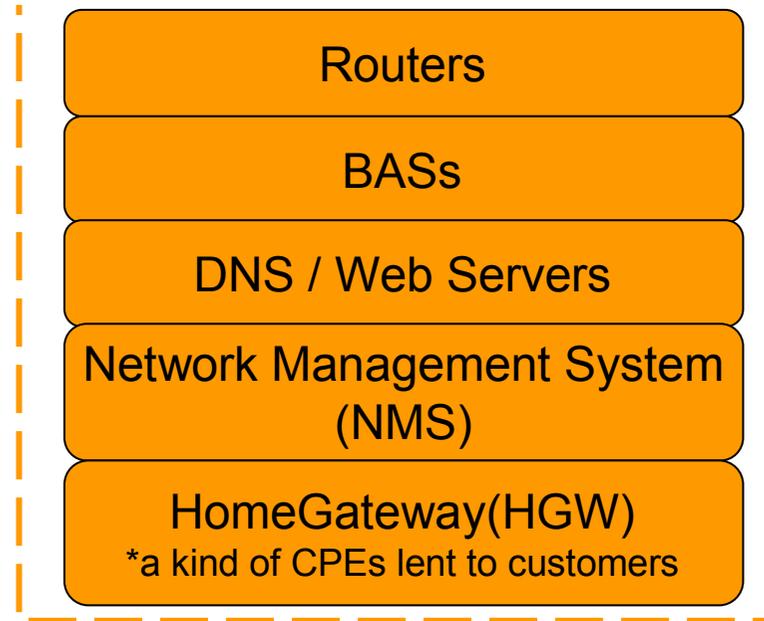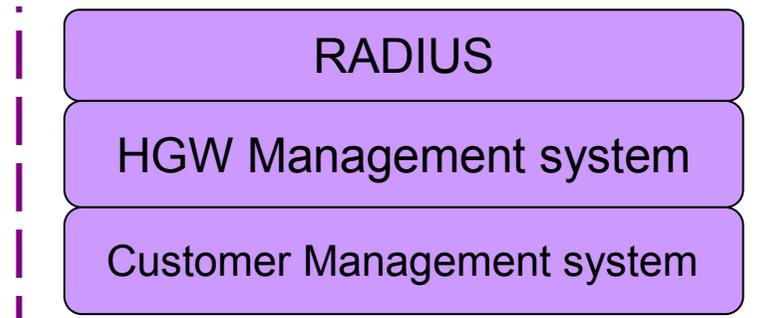
1 year and a half later…

22nd August 2012
IPv6 access service was started
on "commufa HIKARI" !!

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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

Customers easily access IPv4/IPv6 internet without care of IPv4 and IPv6 connectivity.
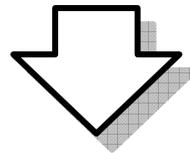
Providing the automatic IPv4/IPv6 internet connections
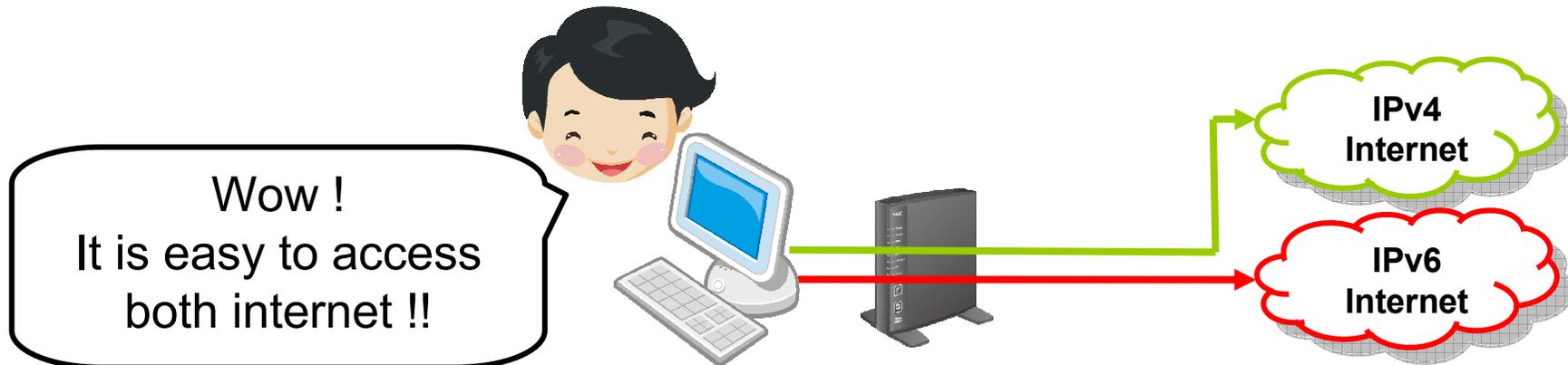
Wow !
It is easy to access
both internet !!

IPv4
Internet

IPv6
Internet

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Approaches for automatic internet connections

- HomeGateway Development
- A new service menu

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Approaches for automatic internet connections

■ HomeGateway Development

■ A new service menu

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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

Enabling IPv4/IPv6

No changes

Enabling IPv4/IPv6

IPv4 Internet

IPv6 Internet

ONU

Switches

BAS

Router

Home Networks

Access Network

Core Network

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HomeGateway development(2)

IPv4 Internet

IPv6 Internet

Backbone Network

commufa HIKARI

BAS

PPPoE

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

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

IPv4 address: /32

IPv6 address : /58 (*1)

IPv6 address : /64

IPv4 IPv6   IPv4 IPv6

*1 : there is a possibility that the prefix length will be changed in the future

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How to deploy IPv6 functions to existing HGWs

Our HomeGateways' special features
- Auto-upgrade
- Auto-configuration
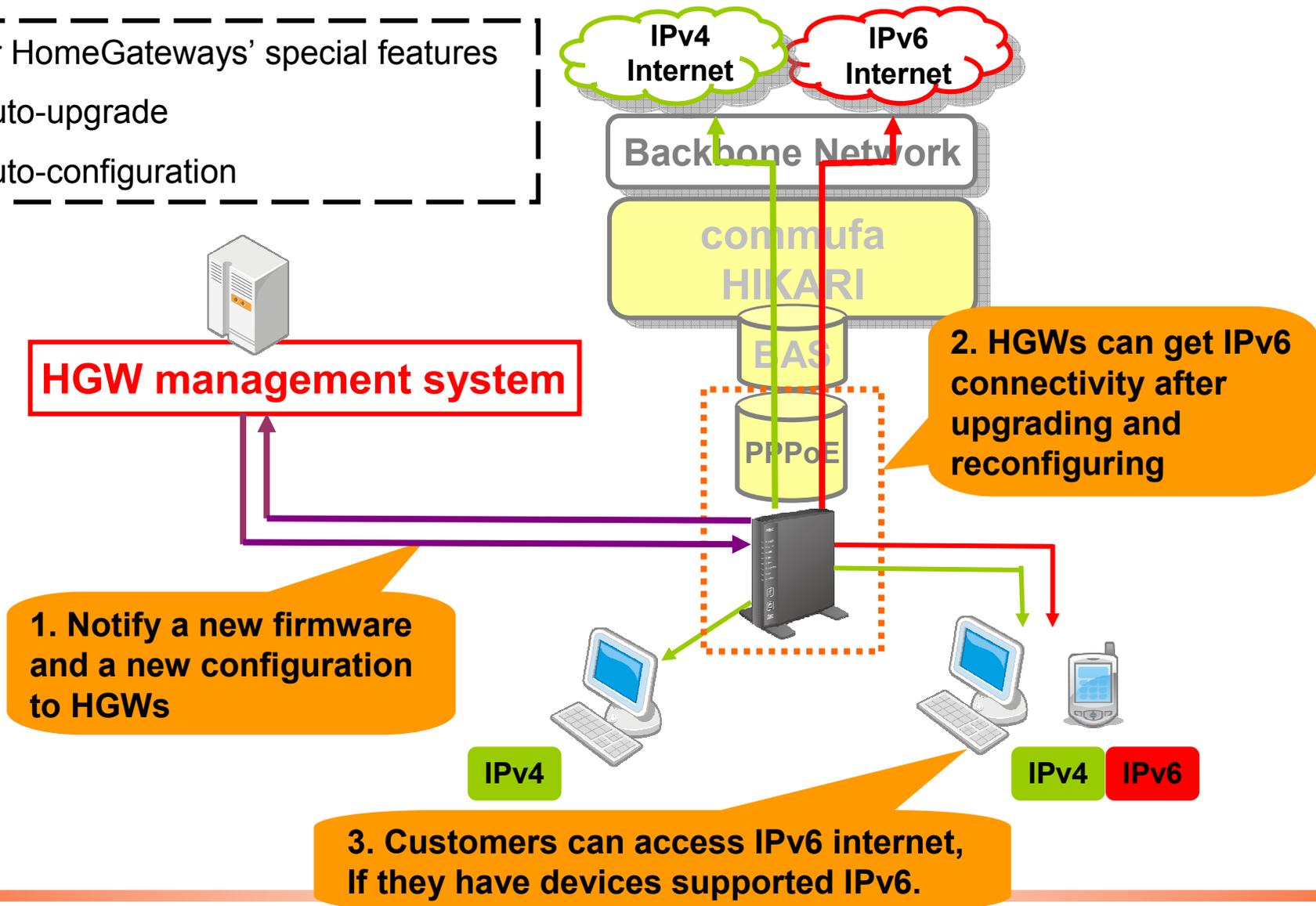
IPv4 Internet

IPv6 Internet

Backbone Network

commufa HIKARI

BAS

PPPoE

HGW management system

2. HGWs can get IPv6 connectivity after upgrading and reconfiguring

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

IPv4

IPv4 **IPv6**

3. Customers can access IPv6 internet, If they have devices supported IPv6.

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Approaches for automatic internet connections

■ HomeGateway Development

■ A new service menu

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A new service menu

Internet

Backbone network

commufa HIKARI

BAS

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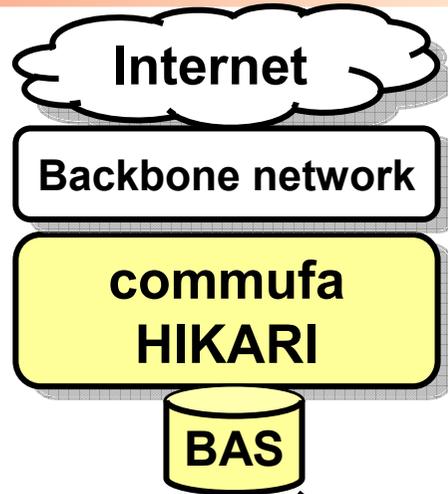
Features of a new service menu
- Providing a HomeGateway
  as a standard equipment
- IPv4/IPv6 internet access
- Monthly fee is max 40% off
  from old services
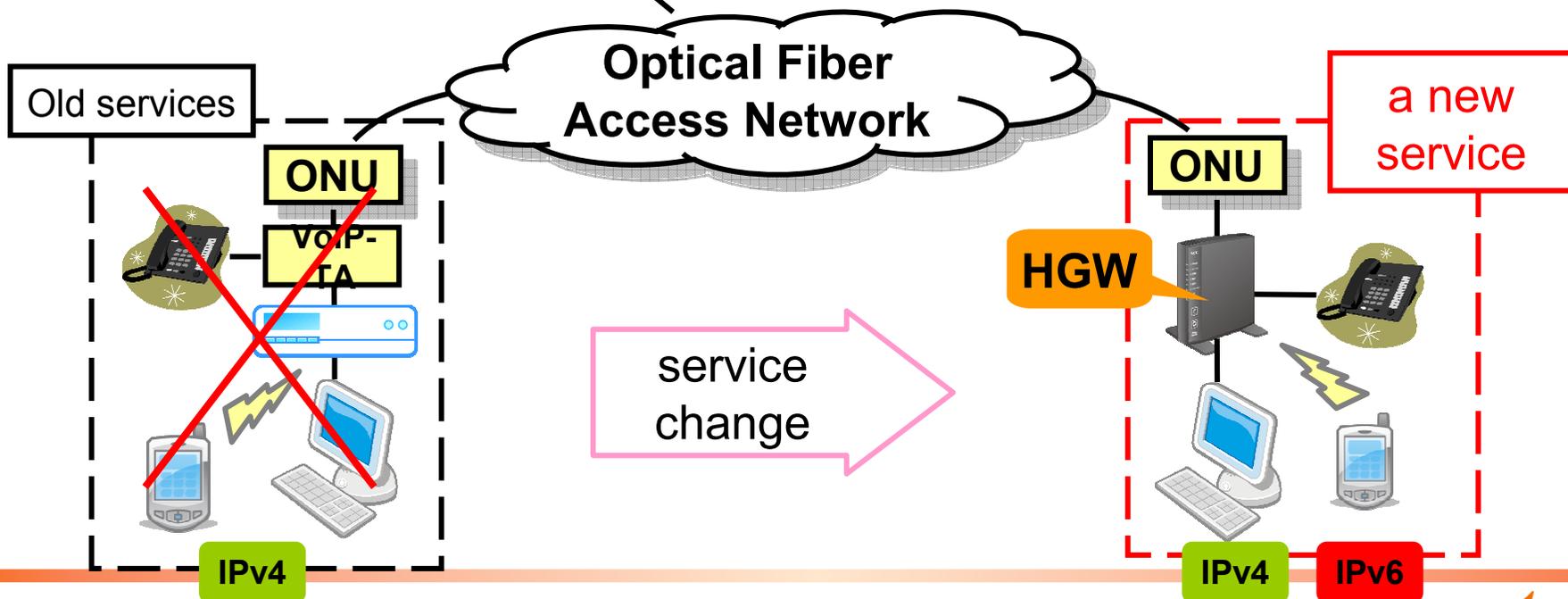
Old services

ONU

VoIP-TA

IPv4

service change

a new service

ONU

HGW

IPv4   IPv6

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The graph of increasing HomeGateway users

The percentage of HomeGateway users (%)

The number of other users

The number of HomeGateway users

2012/6

2013/7

1st Jun. 2012
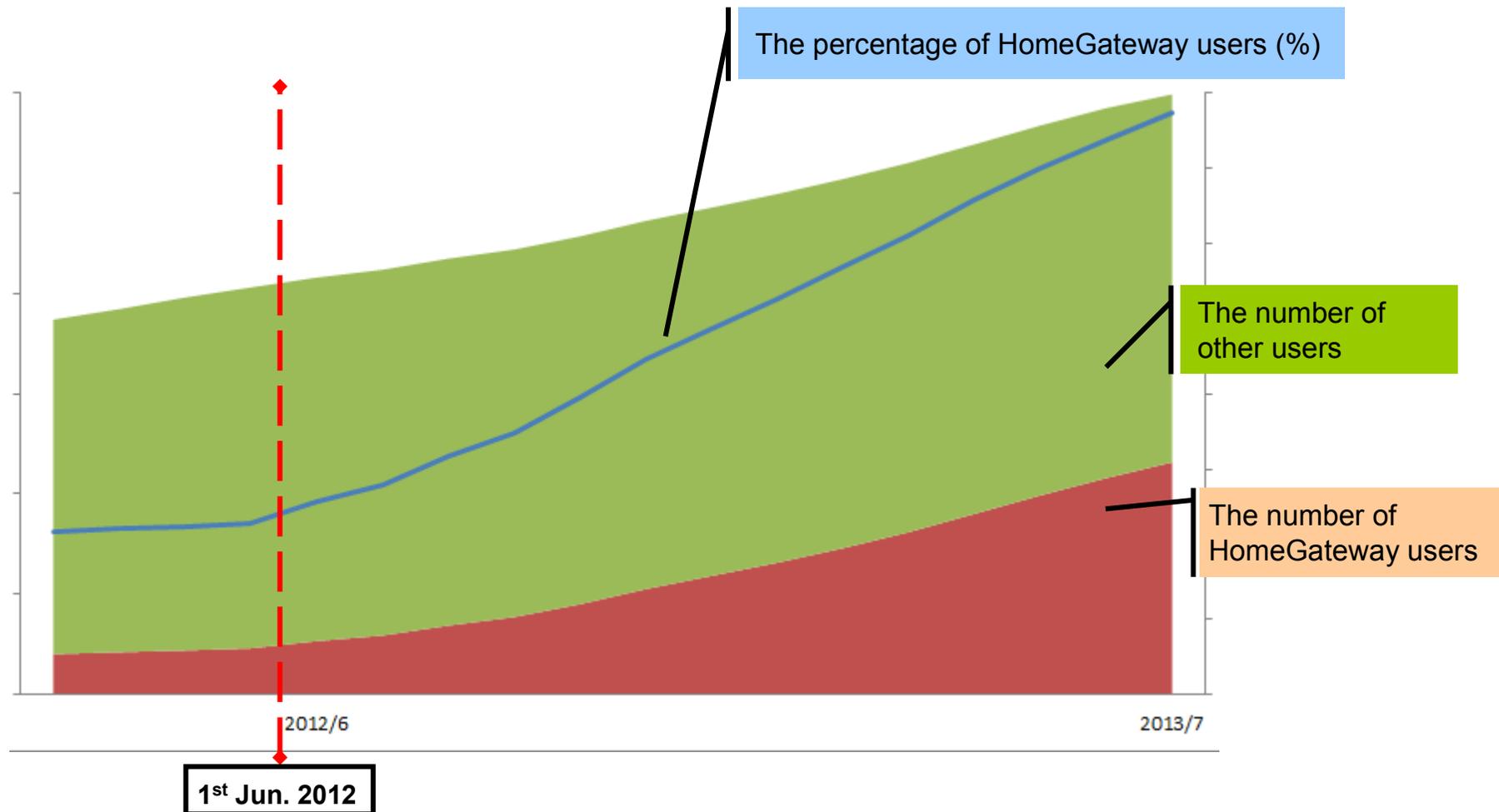
The average increasing rate of HomeGateway users is 12% since Jun. 2012

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IPv6 statistics of "commufa HIKARI"

IPv6 Traffic of a part of backbone (yearly)

downstream

Upstream

22nd Aug. 2012
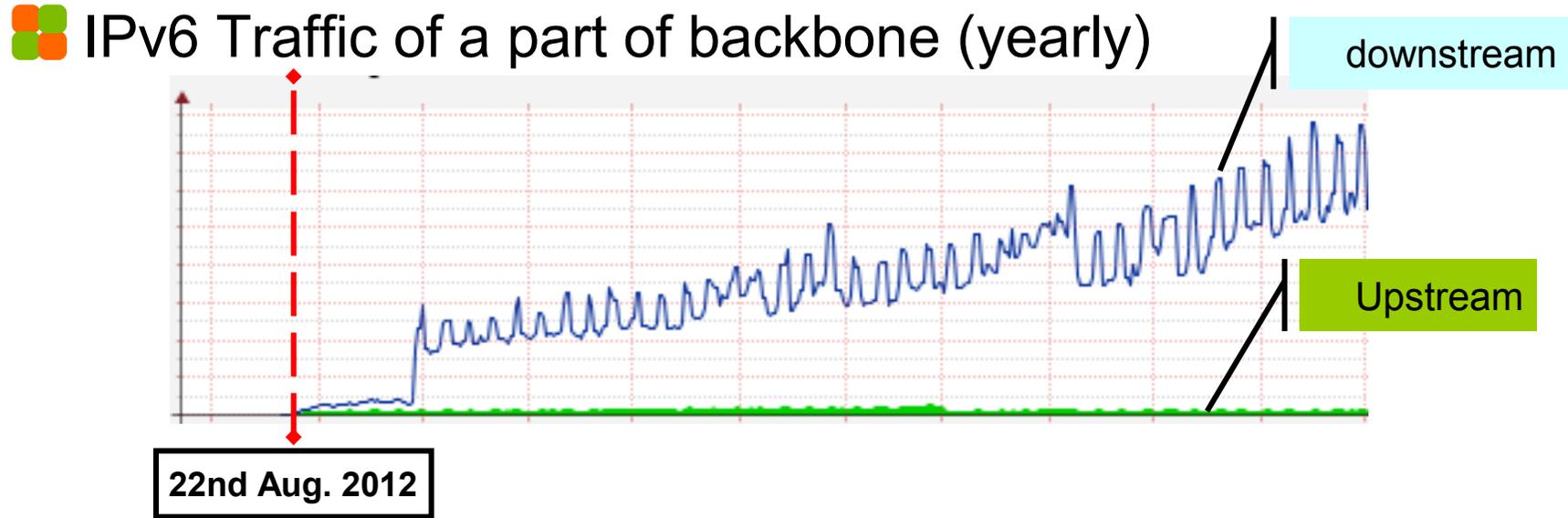
Comparing IPv4 and IPv6 Traffic (monthly)
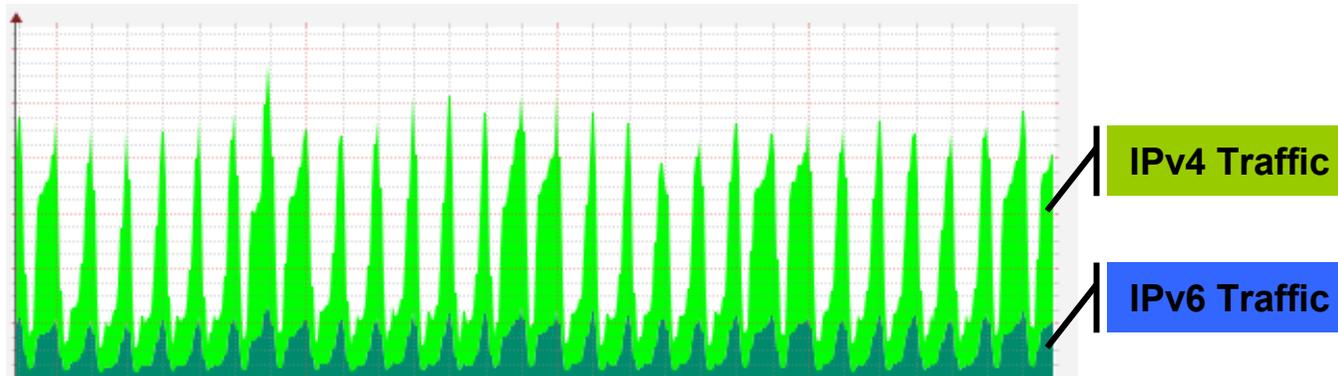
IPv4 Traffic

IPv6 Traffic

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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

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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

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Thank you

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