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Briefing on IIJ's New Network Service

The latest network trends by the further adoption of Cloud in Japan



June 15, 2022

Internet Initiative Japan Inc.

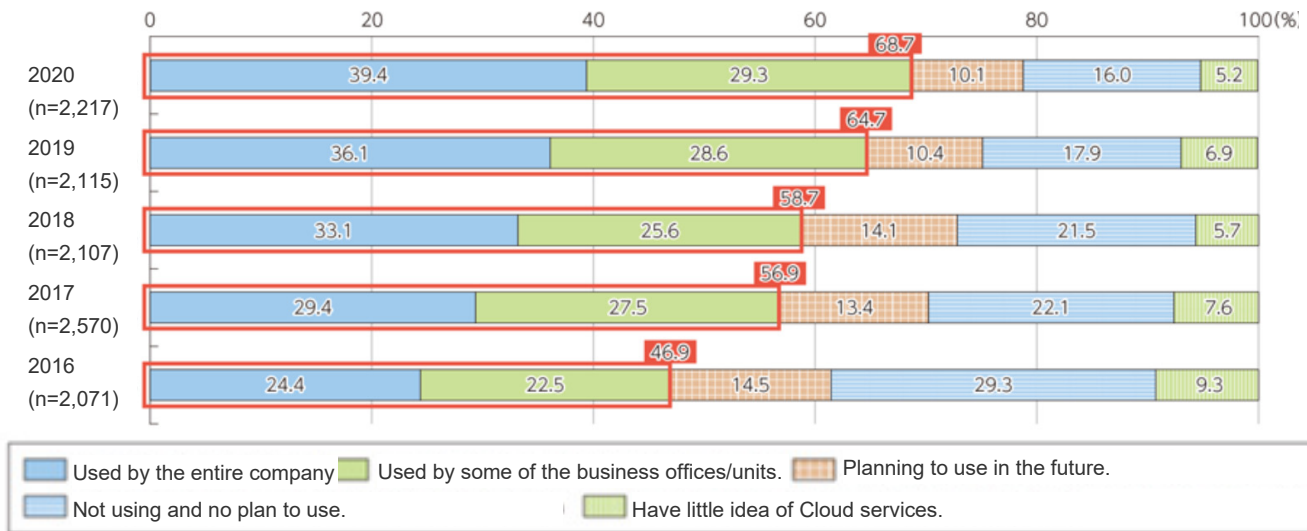
Hajime Shironouchi, Executive Officer, Division Director of Network Division

- 1. Use of Cloud Services in Japan**
- 2. Changes in Closed Network Traffic for Cloud Services**
- 3. Changes in Required Roles of Networks**
- 4. Technology for Cloud connectivity**
- 5. Summary**

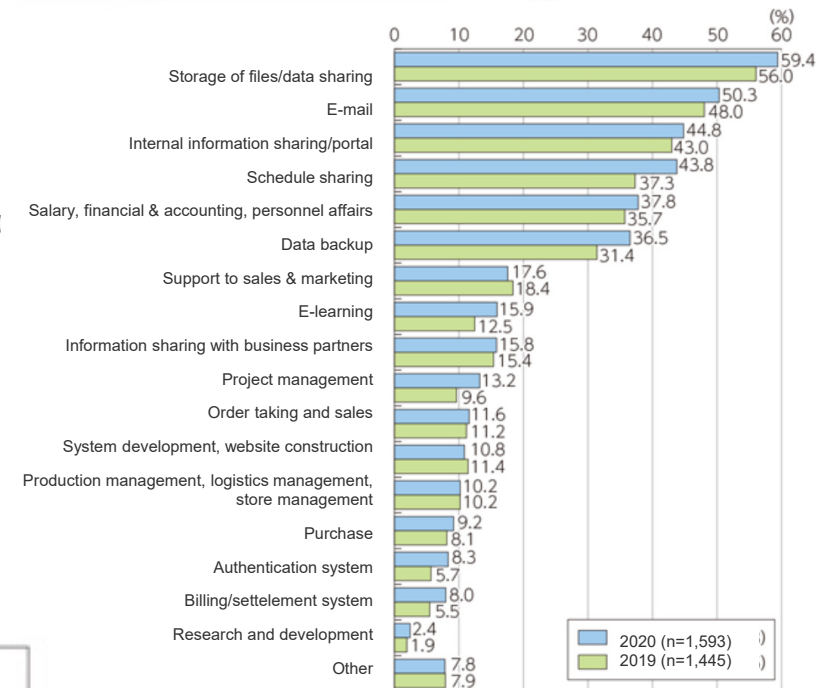
1. Use of Cloud Services in Japan

The use of Cloud services is increasing year after year. As workstyles are changing, use of Cloud services is expanding while they are used for business at a full scale.

Uses of Cloud services



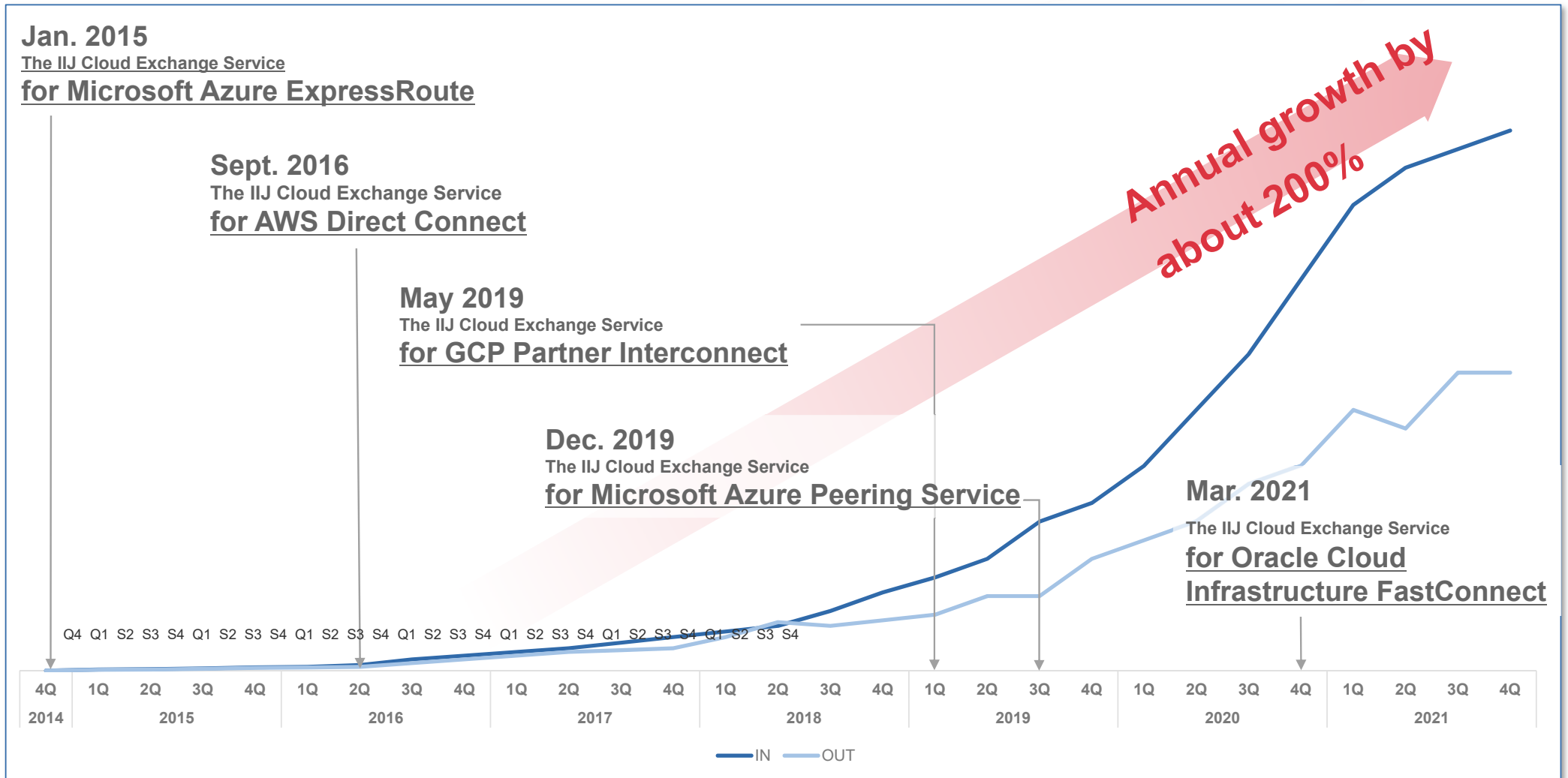
Breakdown of uses of Cloud services



Source: 2021 White Paper on Telecommunications

As a result, Cloud networks are subject to more and more requirements every year. Customers want **safety and security** most commonly.

2. Changes in Closed Network Traffic for Cloud Services



3. Changes in Required Roles of Networks

While the Cloud traffic in varied services started to increase around 2016, the COVID-19 pandemic of 2020, which changed workstyles, **accelerated the transition to Cloud networks for information systems**, leading to the significant increase of traffic.

The use of **business-related systems** has been growing while the increase in Cloud traffic has been stabilized. What clients want now is **safety, security, broader bandwidth**, and for busy seasons, **flexibility**.



4. Technology for Cloud connectivity

IJ provides Cloud connections using technology cultivated on the Internet.

- High redundancy secured for connections with Cloud service providers, such as East-West redundant configuration and different routes for cable.
- For path exchange, dynamic routing protocol (BGP) tuned on an individual basis.
- Flexible response to respective connection specifications of Cloud service providers.
- Technological communications and cooperation carried out with a direct path to persons in charge from Cloud service providers.

However,

Possible issues in the case of Cloud:

- Specifications changed suddenly.
- Release accompanied by trial and error.
- Problems of unknown cause persist. and more.

Possible issues in the case of multi-Cloud:

- The number of routes may be limited. and more.

For instance,

Network specifications suddenly changed

Portal specifications suddenly changed, presence of bugs

Routes suddenly disappear

Announcement on maintenance to be conducted during business hours of Japan

IJ continues to handle such issues that happen every day.

Today, networks need **broader bandwidth** and **flexibility** in addition to stability and security as the full-scale adoption of Cloud services is taking place.

IIJ offers services that allow high-quality connections to Cloud, using technology cultivated through Internet. We have developed **new network infrastructures** to realize **broader bandwidth** and **flexibility**.

Now, let me present IIJ's new service using the new network infrastructure

IIJ Private Backbone Service/Smart HUB.

Details of New Network Services

Internet Initiative Japan Inc.
Yuhei Onohara, General Manager of Network Service 2 Division

- 1. Issues surrounding Network and Cloud connectivity going forward**
- 2. Introducing “IIJ Private Backbone Service/Smart HUB”**
- 3. Major functions offered**
- 4. Technology to realizes**
- 5. Assumed use cases**
- 6. Summary**

1. New Issues with Networking Accompanied by the Promoted Use of Cloud Computing Systems

Status quo: Networks are not ready for increased use of Cloud services.

 Along with Cloud adoption, unexpected issues rose to the surface one after another.



Increasing use of Cloud computing systems and rapidly growing traffic

Concerns about stability and security

Complication of bandwidth, operation, and management



Future: Broader bandwidth for and seamless access to various Cloud services required!

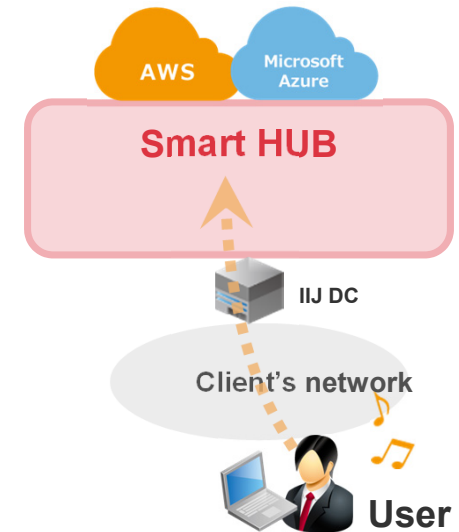
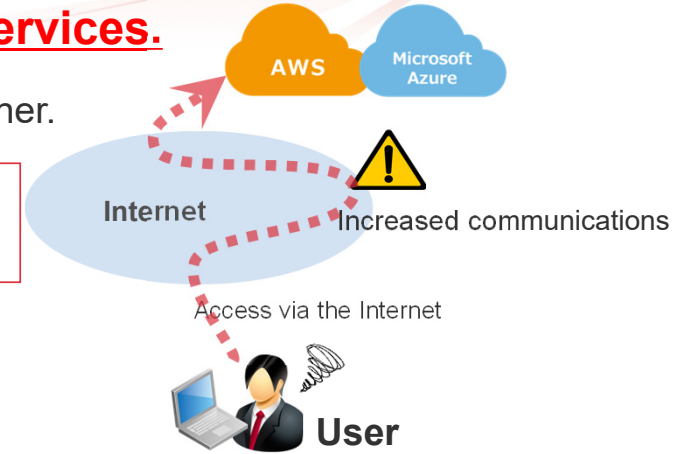
 Use the existing environment to realize broadband connections to varied Clouds



Broadband readiness and flexible resource control

Stable connections and higher security

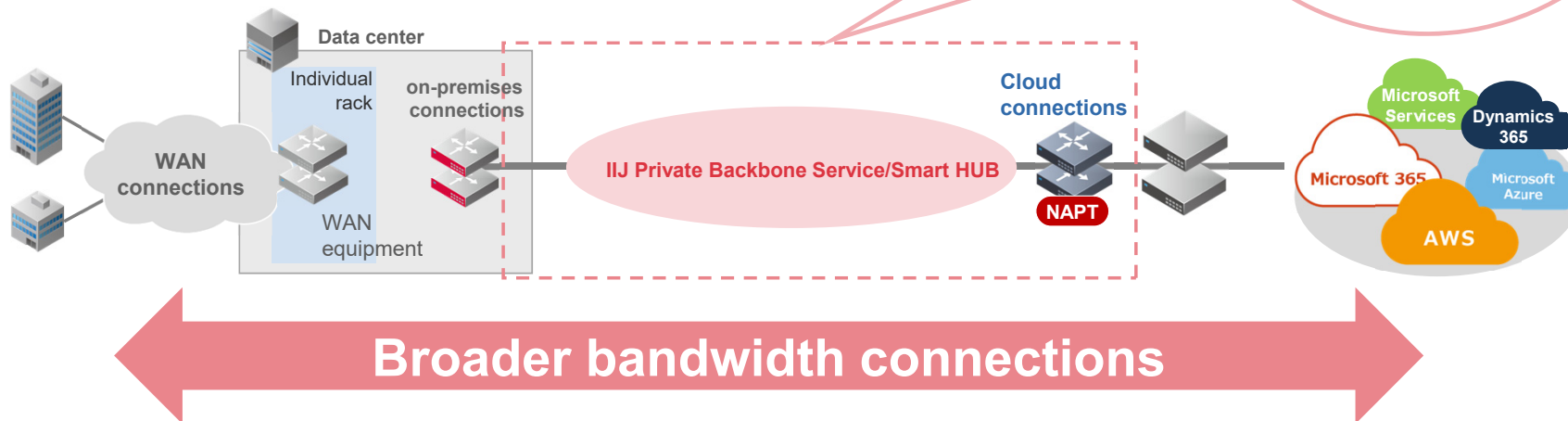
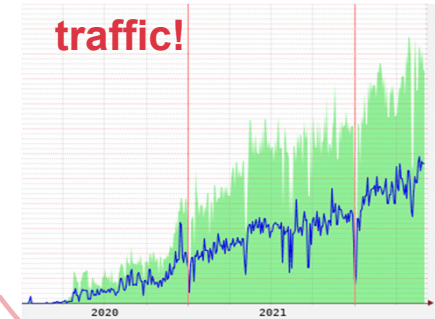
Less burden of operation and management



1. What Is Required for Cloud Connections?

- ✓ **Ability to flexibly respond to broader bandwidth connections**
- ✓ **Ability to offer options of configurations with high stability and expandability**
- ✓ **Less burden of operation and management**

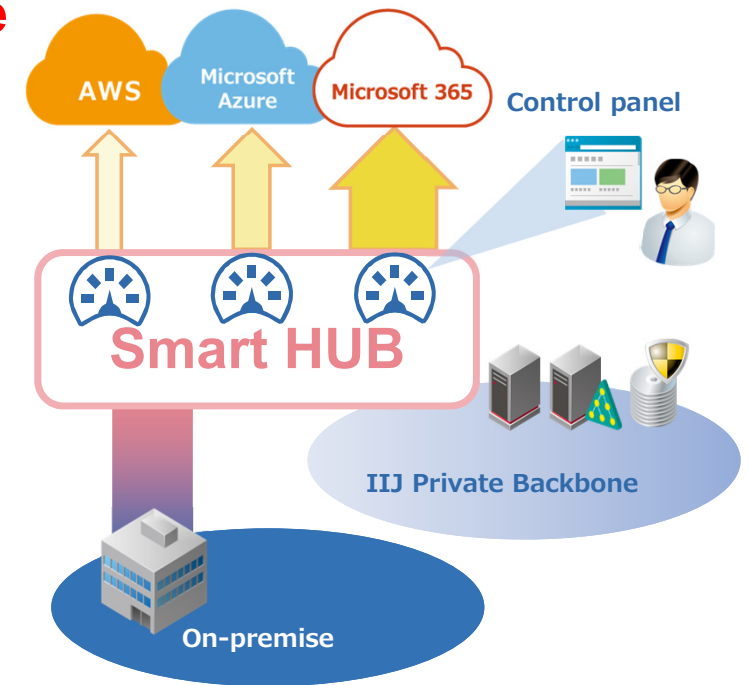
Rapid increase of traffic!



2. Outline and Features of the Service

IIJ Private Backbone Service/Smart HUB

Offers Cloud connections with higher performance



Feature

1

Broadband connections to varied Clouds

Feature

2

Online free bandwidth assignment

Feature

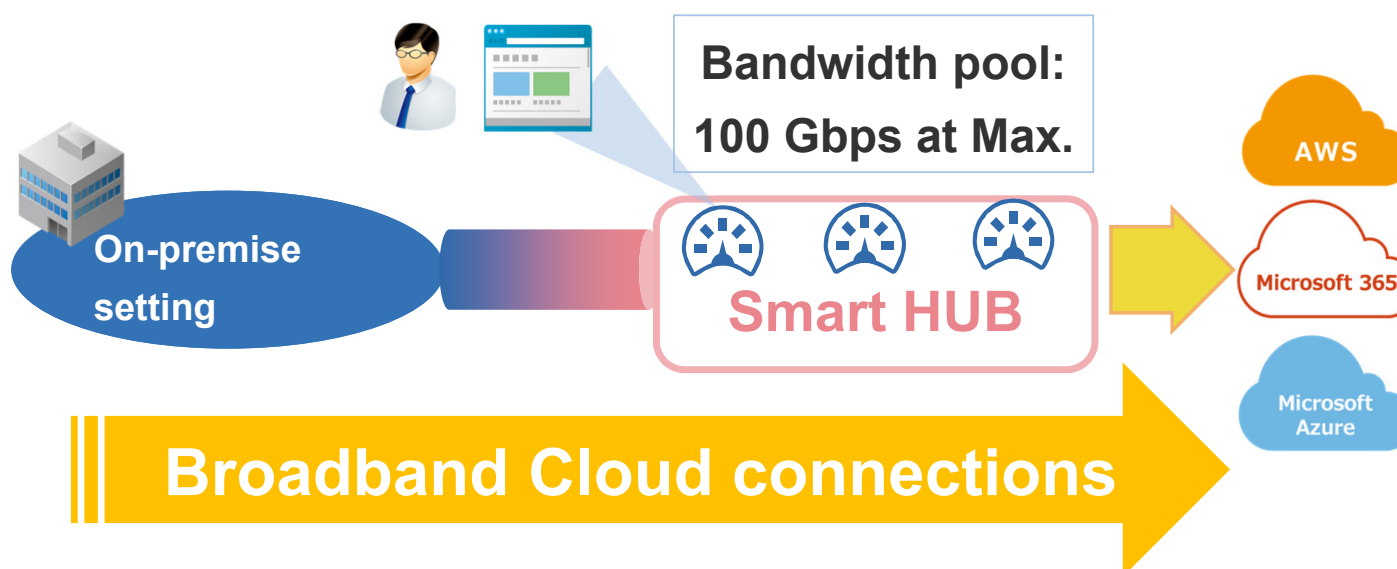
3

Combined proposals through coordinated use of many different services of IIJ

2. Outline and Features of the Service

1: Ability to Flexibly Offer Broadband Connections

**Ready for broadband Cloud connections.
Able to assign bandwidths online freely.**



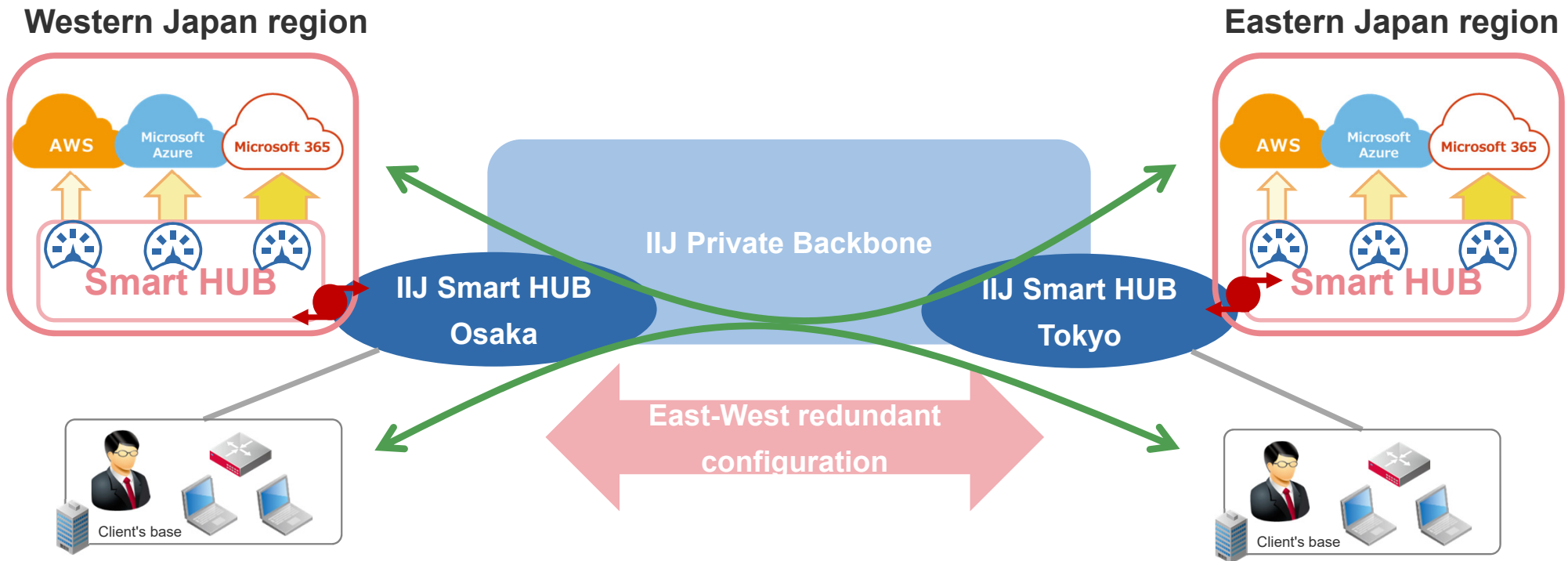
- ✓ Permits seamless broader bandwidth connections to Cloud connectivity that are rapidly increasing.
- ✓ Permits bandwidth assignment to varied Clouds in increments of 10 Mbps.

2. Outline and Features of the Service

2: Ability to Flexibly Offer a Redundant Configuration (DR Configuration) in West and East Japan

Service facilities in Tokyo and Osaka

Private Backbone realizes secure and stable communications in inter-region communications.

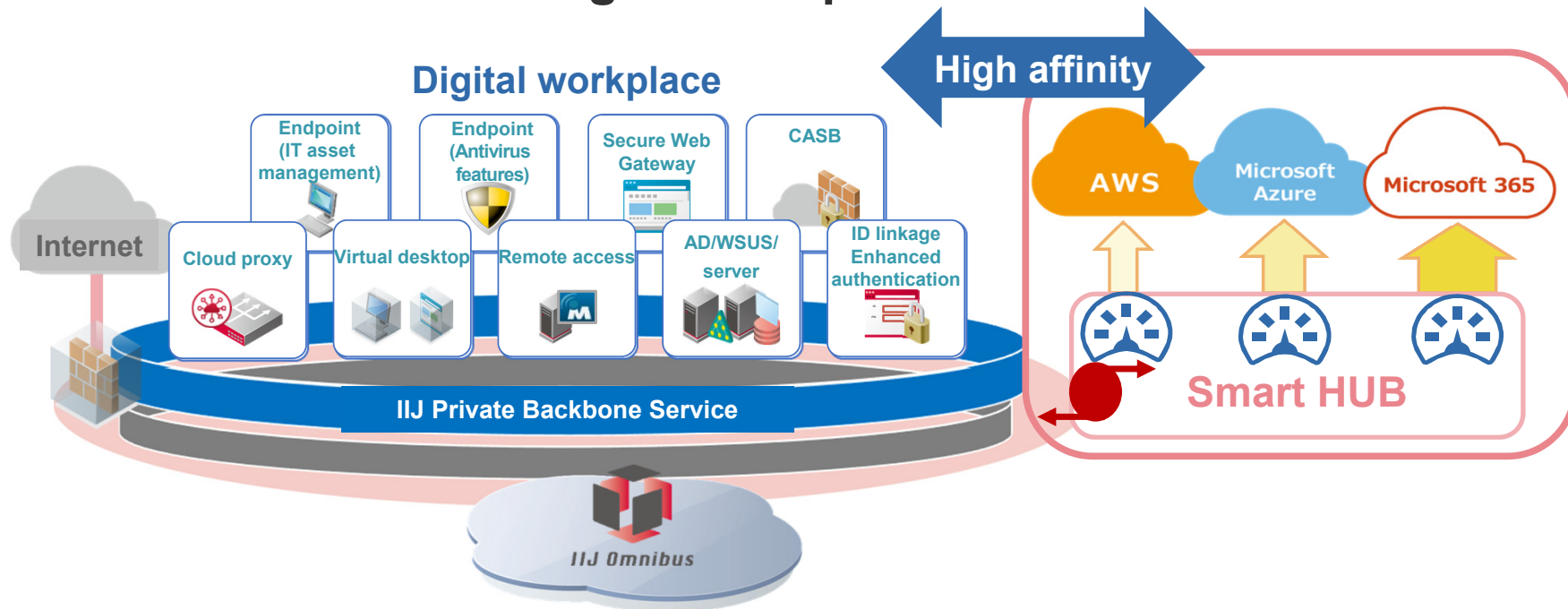


- ✓ IIJ Private Backbone will take full care of communications between Smart HUBs for stable service provision.
- ✓ Flexibly meets a need for East-West zone redundant configuration with no cost of inter-region communications.

2. Outline and Features of the Service
3: High Affinity with IIJ's Services

Ensures high affinity with the existing services of IIJ and permits flexible combinations of services.

Offers the digital workplace environment service.



✓ Realizes the optimal digital workplace environment via links with varied IIJ's services.

3. Major Functions Offered

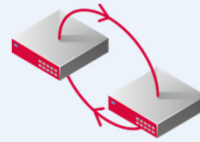
■ Basic functions

Control panel



Users can change settings of resources.

Bandwidth pool (pay-per-use)



Users can set the upper limit to 100 Gbps at maximum.
Users can assign bandwidths to each port in increments of 10 Mbps.

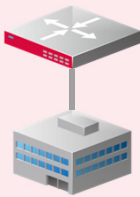
Connections to IJ Private Backbone



Connections are provided as standard.

■ Optional functions

on-premises connector ports



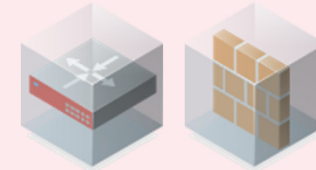
Connections to client's base

Cloud connector port



Connections to varied Clouds

NAPT / Static NAT / FW



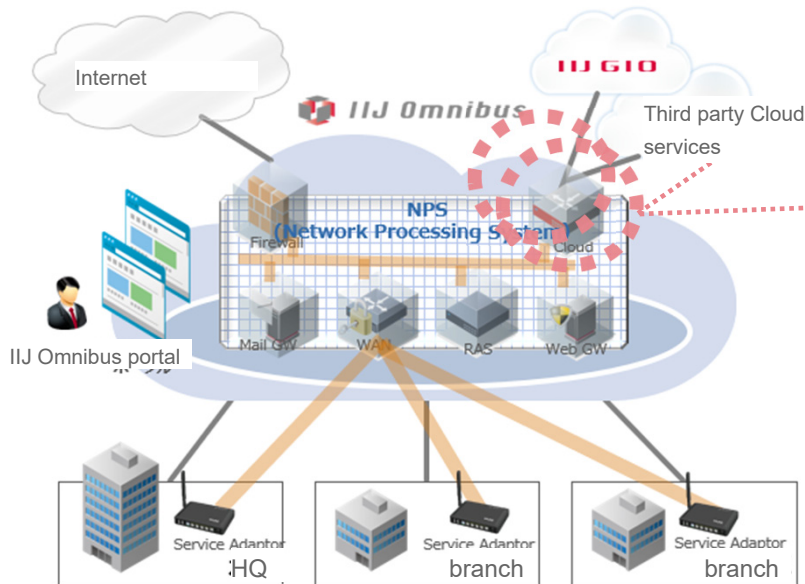
Can be additionally installed for each of optional ports.

Plan to expand functions (e.g., readiness for Clouds and security function)

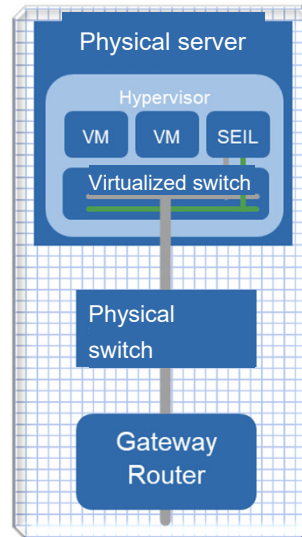
4. Technology to Realize: The Past Efforts

Various functions have been provided on IIJ's Cloud since around 2015.

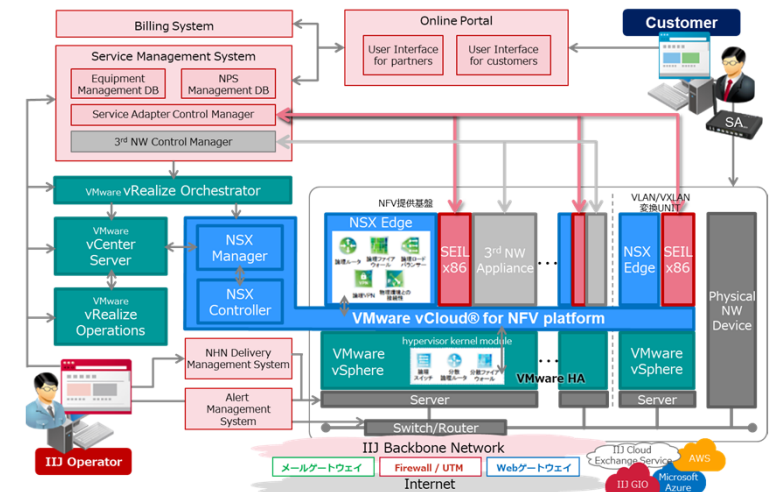
IIJ Omnibus service



Virtualization of a router



Conceptual scheme of Omnibus service architecture



✓ **Abundant track record of NFV environment construction and operation realized still higher performance!**

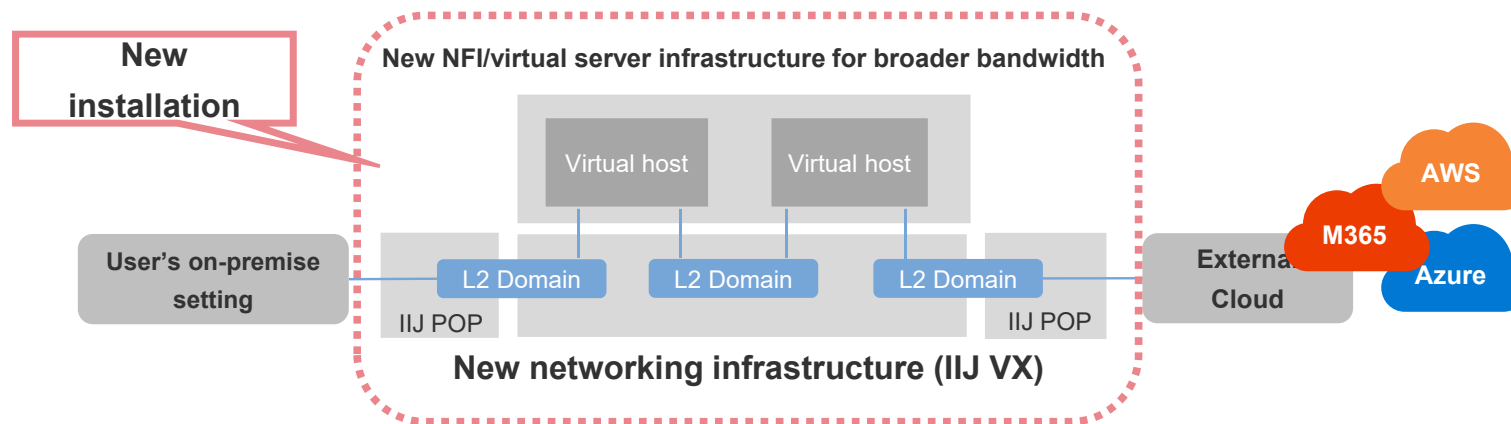
*NFV (Network Function Virtualization):

The technology virtualizes the networking function that used to be installed on special equipment and installs the function on a general-purpose server as software.

4. Technology to Realize: The Current Efforts

A new infrastructure dedicated for broadband connections has been constructed.

IIJ Virtualization eXchange (IIJ VX)



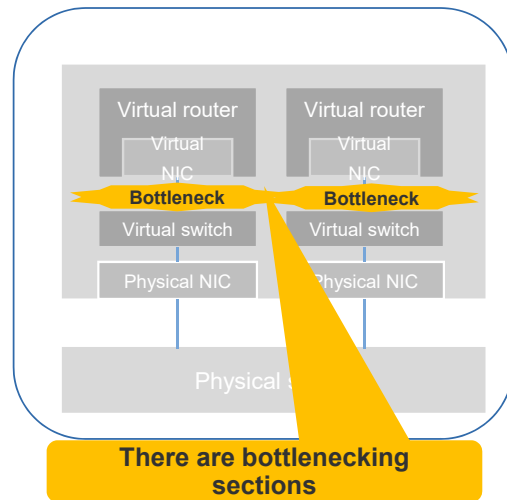
The full utilization of the new networking infrastructure (IIJ VX)

- ✓ **Cisco ACI (Application Centric Infrastructure), SDN solution for data center from Cisco Systems G.K., employed.**
- ✓ **Interconnects the POP and virtual server infrastructures that terminate user environment with external Clouds to realize broadband/large-capacity connections from user environment to Cloud services.**

4. Technology to Realize: The Current Efforts

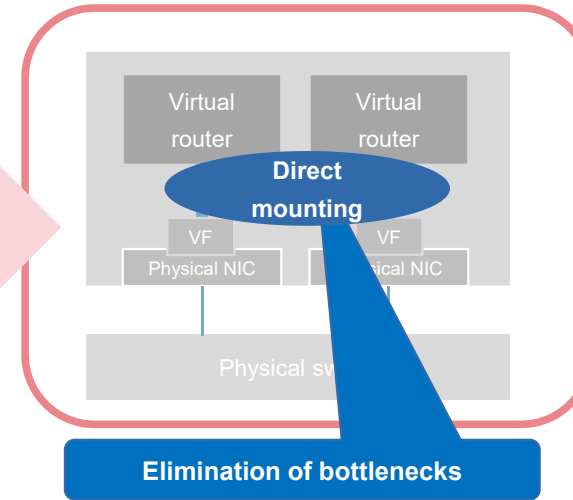
Realization of broadband connections with virtual router

General virtual infrastructure



Realization of broadband virtual infrastructure

Significant improvement of performance

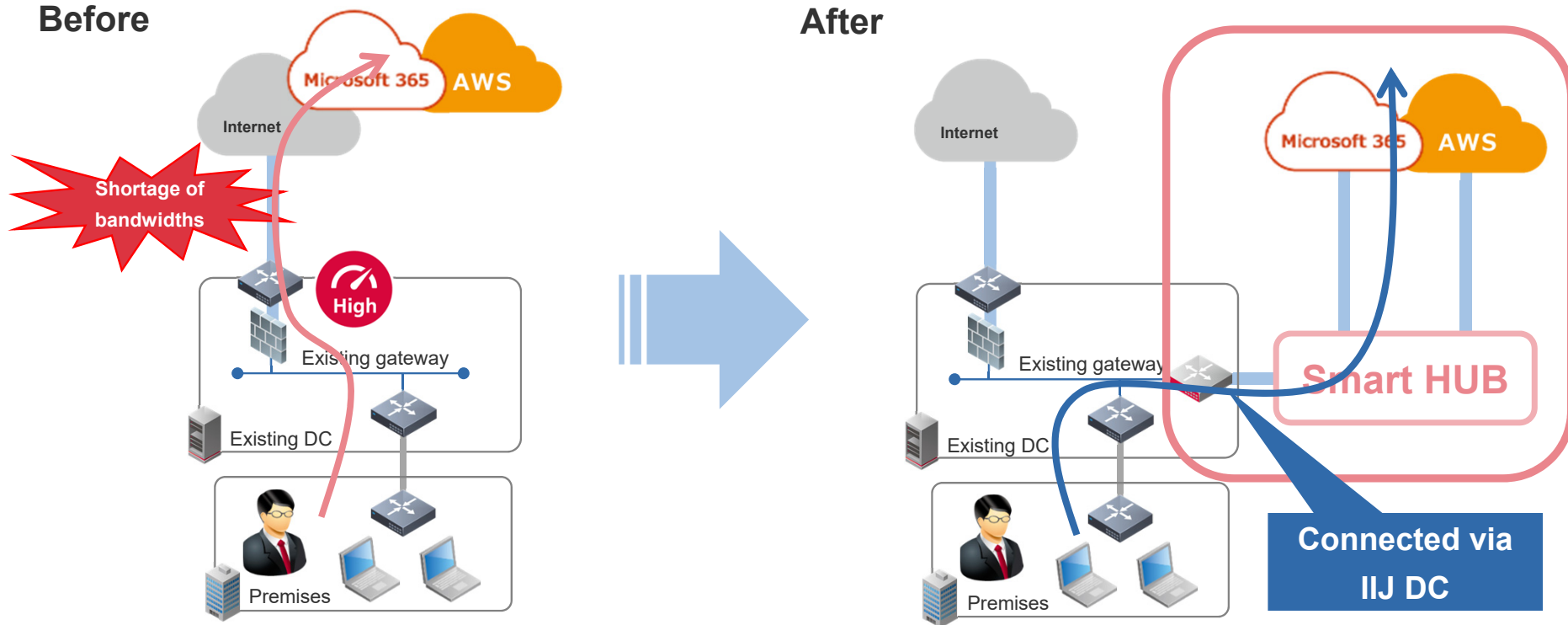


Broadband routers constructed for each user on a virtual server infrastructure

- ✓ vSRX Virtual Firewall from Juniper Networks, Inc. employed.
- ✓ Limitations to operation and restrictions on function enhancement reduced through accommodation of a virtual router for each user. Such limitations and restrictions used to arise from accommodation of plural users in a physical router (collective equipment).
- ✓ Physical NIC directly mounted from a virtual router to avoid bottlenecks for a virtual switch.

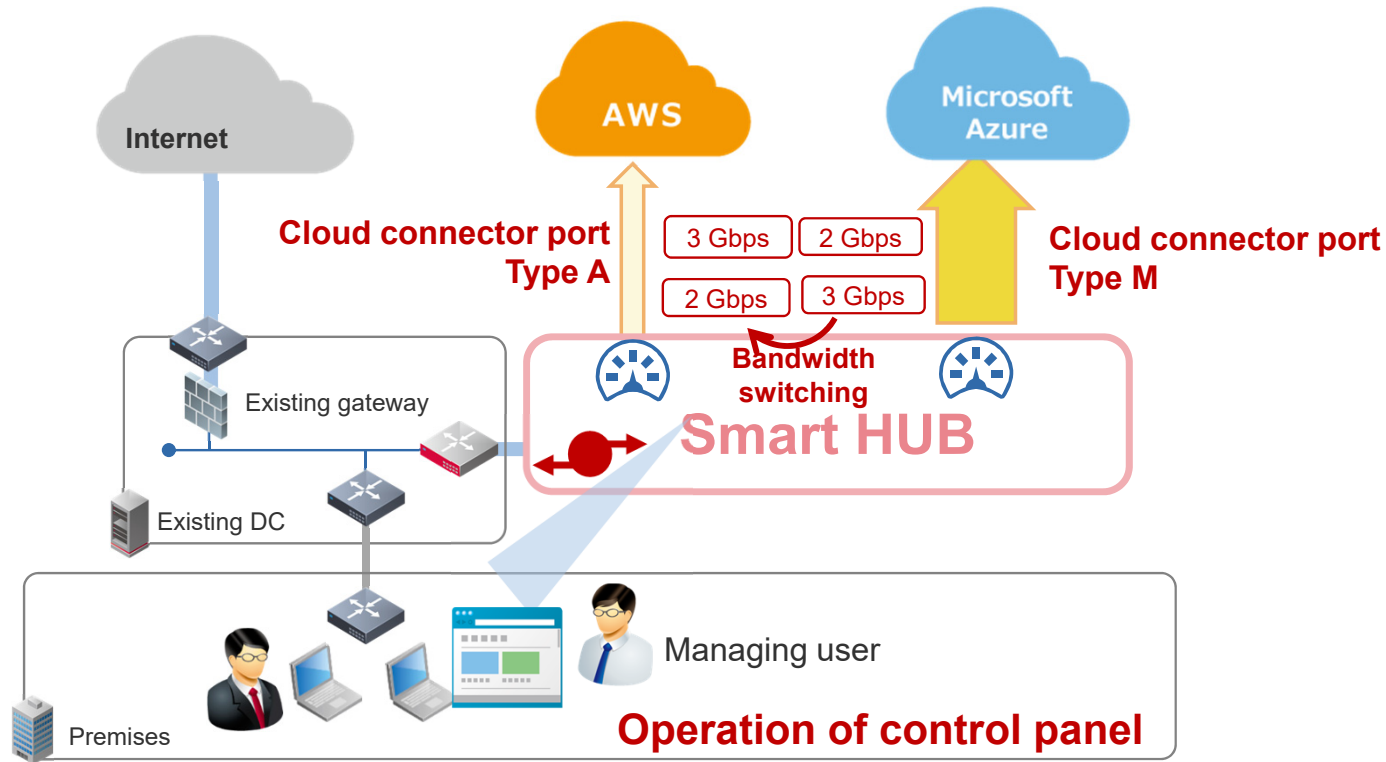
5. Assumed Use Cases (1)

To transfer increasing communications addressed to Clouds without changing the existing environment



- ✓ Connections with the existing networking environment by Smart HUB. Only Cloud connections to be broken out.
- ✓ No need for troublesome routing management and equipment enhancement for a large quantity of sessions.

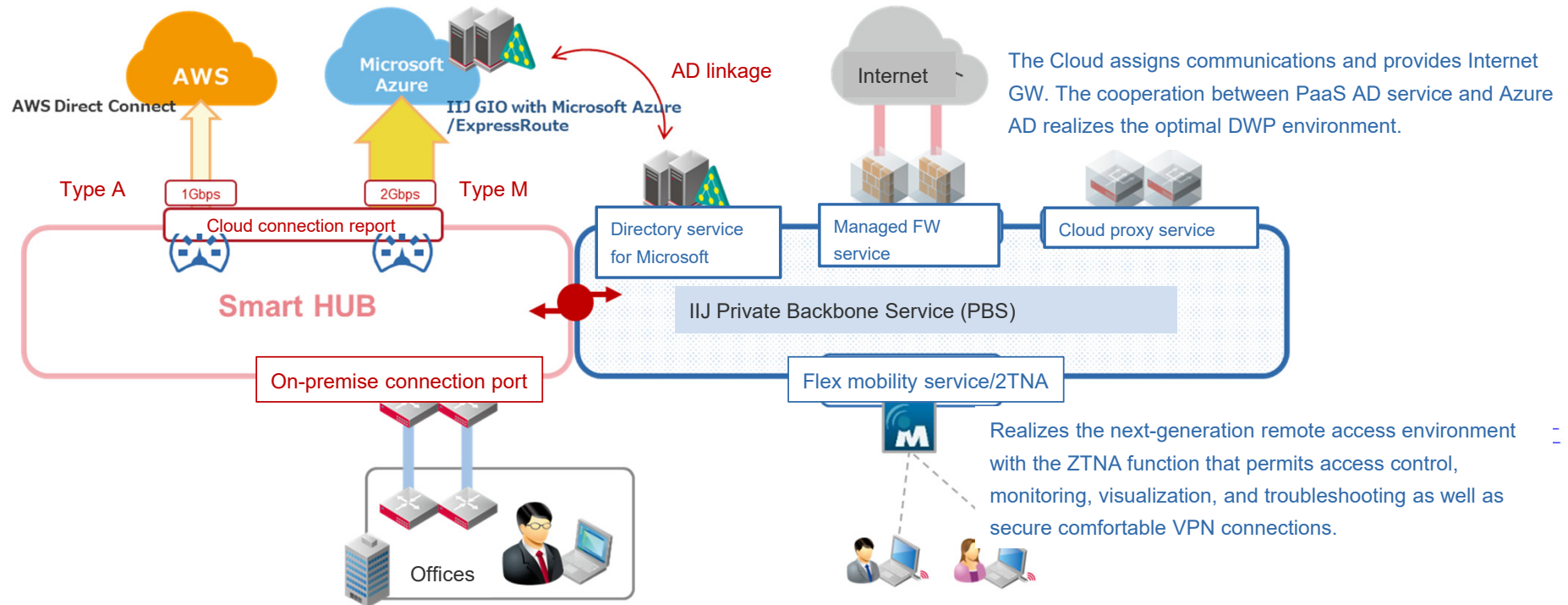
To control bandwidth addressed to Cloud flexibly as needed



- ✓ Control panel permits on-demand assignment of bandwidth on an as-needed basis.
- ✓ Flexible response even to the uses accompanied by the sudden occurrence of large-capacity communications.

5. Assumed Use Cases (3)

Realization of a seamless digital workplace

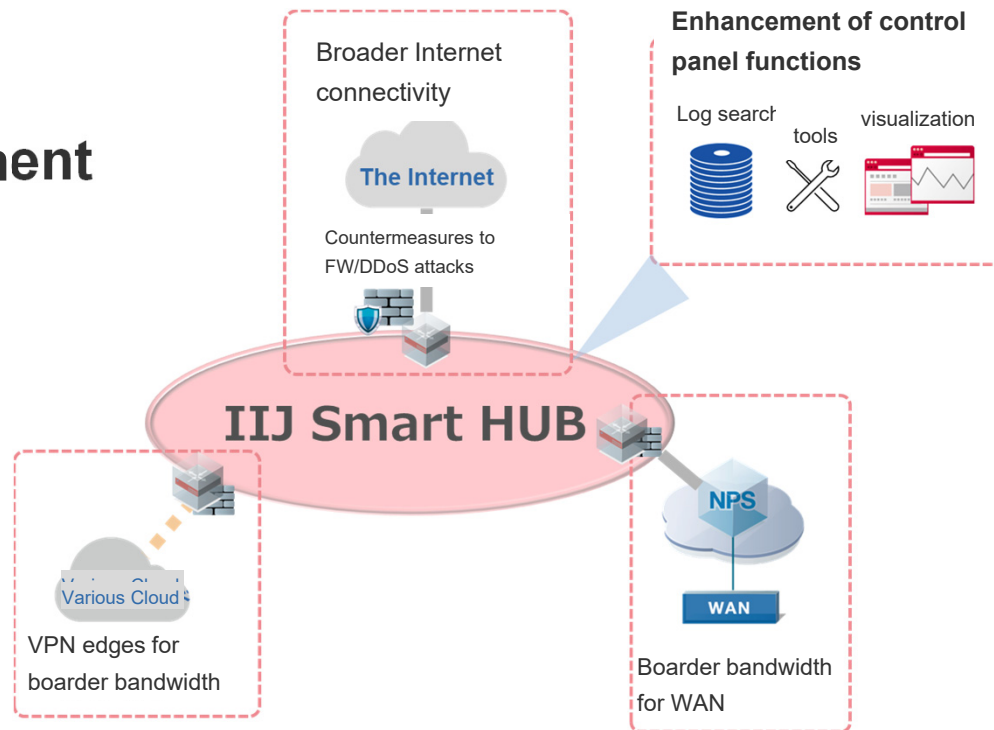


- ✓ **Construction of the optimal digital workplace environment enabled by cooperation with Private Backbone and combination with many different services of IJ.**

6. Summary

- ✓ The infrastructure to be totally renewed in anticipation of future possibilities and expandability!
- ✓ Flexible provision of stable broadband connections through connection between on-premises and varied Clouds!
- ✓ Provision of DWP service along with many different IIJ services!

Predicated future function enhancement





The internet started in Japan in 1992, along with IIJ. Since that time, the IIJ Group has been building the infrastructure for a networked society, and with our technical expertise, we have continued to support its development. We have also continued to evolve our vision for the future and innovate to make it a reality. As an internet pioneer, IIJ has blazed the trail so that others could realize the full potential of a networked society, and that will never change. The middle "I" in "IIJ" stands for "initiative," and IIJ always starts with the future.

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