Network Business Presentation

ACCESS CO., LTD.

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Notes on Forward-Looking Statements

- Forward-looking figures mentioned in this document, including performance targets, are based on information available to the ACCESS Group as of the time of the publication of this document.

- Forward-looking statements are subject to uncertainties that could cause actual results or outcomes to differ materially from these statements. Accordingly, you are advised not to make investments and other decisions based solely on these statements.

Contents

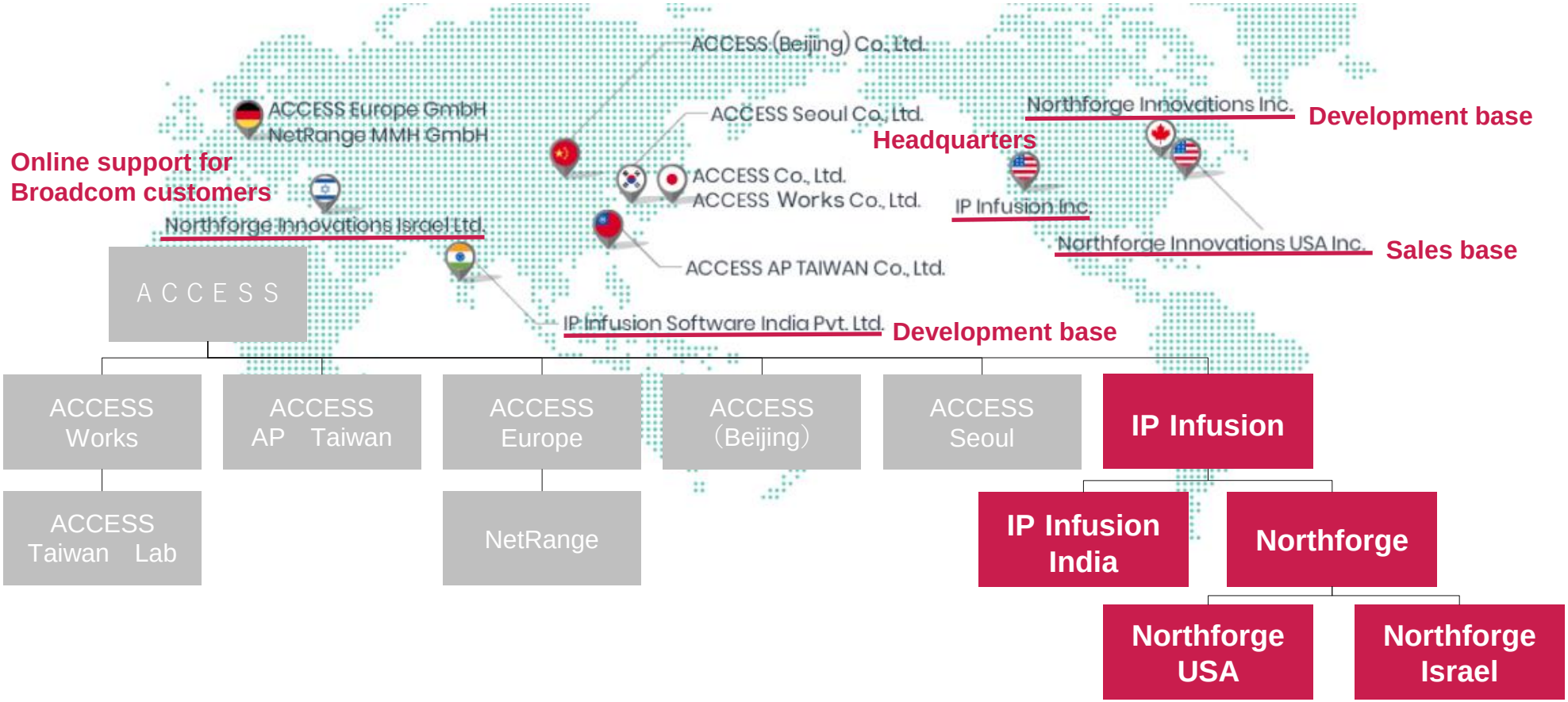
1. Overview of the Network Business

2. Market Environment

3. Initiatives in Target Domains

The Network Business Overview

- IP Infusion, a member of ACCESS group, develops and provides software for telecommunications equipment.



Domestic Business Segment

Overseas Business Segment

Network Business Segment

Business Overview

- The ZebOS suite of protocol software for network devices serves as the technological infrastructure of the business.
- In view of market changes where network devices are transitioning to white box solutions, we provide the OcNOS network operating system, which packages ZebOS as a white box solution.
- Through collaboration with AT&T, which actively promotes white box platforms in the industry, we exclusively distributes DANOS-Vyatta edition that has a proven track record with AT&T.

Major Products

1. ZebOS™

ZebOS™

Layer 2, Layer 3, and MPLS network platform adopted by over 300 device vendors worldwide

2. OcNOS™

OcNOS™

Industry's first network operating system for white box platforms, featuring quality standards tailored to telecommunications carriers

3. DANOS-Vyatta edition

Network operating system that offers flexibility needed for white box platforms, based on DANOS (OSS*)

Protocol Software → **White box solutions**

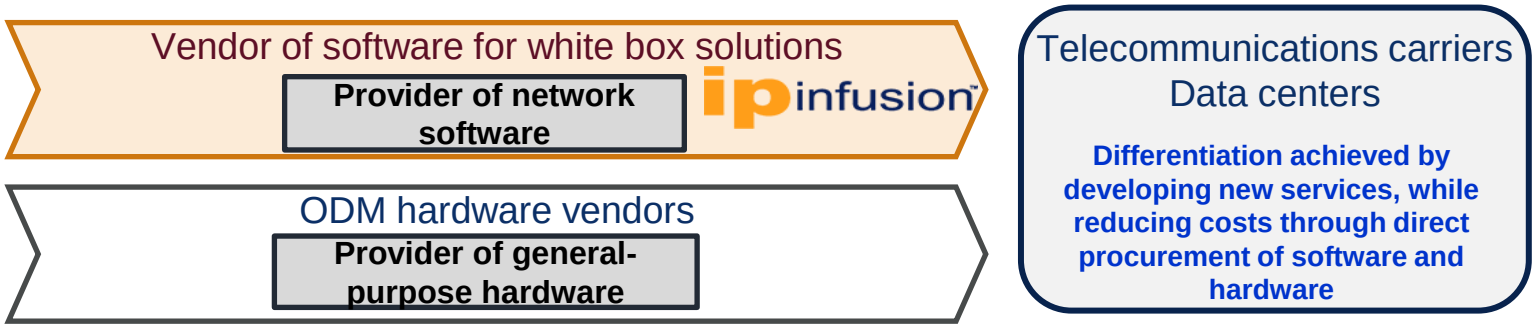
* OSS stands for "open source software," which refers to software whose source code is open to the public and as such may be freely improved and redistributed.

Transitioning of Network Devices to White Box Solutions

- Along with the enhancement of network equipment, steady migration to white box solutions is expected as a means of addressing needs in terms of: 1. reducing investment costs, 2. swiftly responding to a shift toward high performance, and 3. flexibility that allows for differentiation.

Conventional solutions: Purchasing hardware to develop computer networks

White box solutions: Direct purchase of standard hardware and software

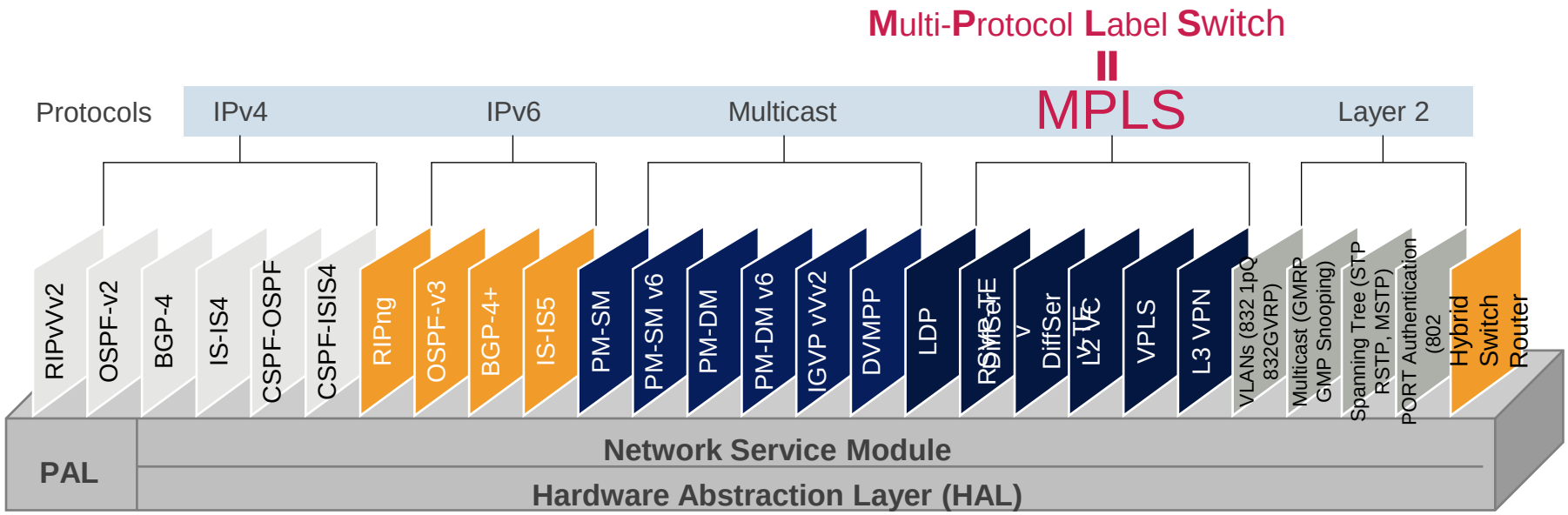


- Compatible with “virtual” and “cloud” networks because software is a separate component

Product 1: ZebOS

With extensive control-plane protocols, ZebOS underpins IP Infusion's technological competitiveness.

- IP Infusion has an extensive line-up of offerings amid a landscape where very few companies are capable of providing a wide range of technologies for control-plane functions*.
- In particular, the highly versatile technologies and wide range of applications made possible by its MPLS functionality affords a competitive edge.

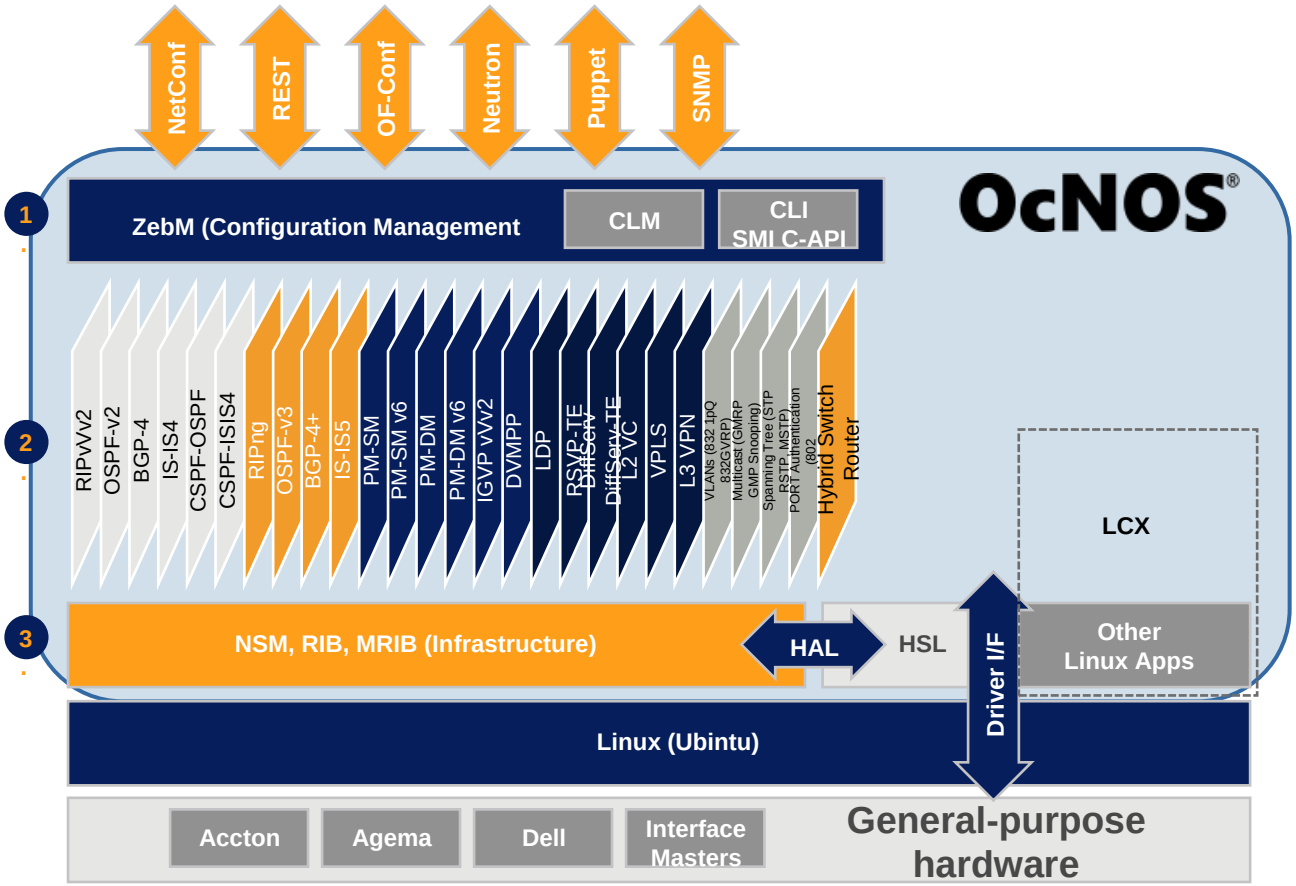


* Functions responsible for controlling network.

Product 2: OcNOS

OcNOS is a network operating system packaging ZebOS for white box solutions for each use case.

The strengths of OcNOS relative to competitors lie in its abundant track record with respect to control plane and its compatibility with numerous use cases.



1 OcNOS® Management Plane

- Transactional
- Model Driven, Cumulative
- GUI

2 OcNOS Control Plane

- Modular, Scalable, Fault & Tolerant
- Open Standards-Based Support (ITU, IEEE, MCF, OCP, CNF, MCF, IETP)
- In-Service Software Upgradable
- SON and NFW Compatible
- Support for Developed Apps
- Comprehensive Protocol Support (1.2, 1.3, Routing, Switching, MPLS, Data Center and Carrier Ethernet Networking)

3 OcNOS Data Plane

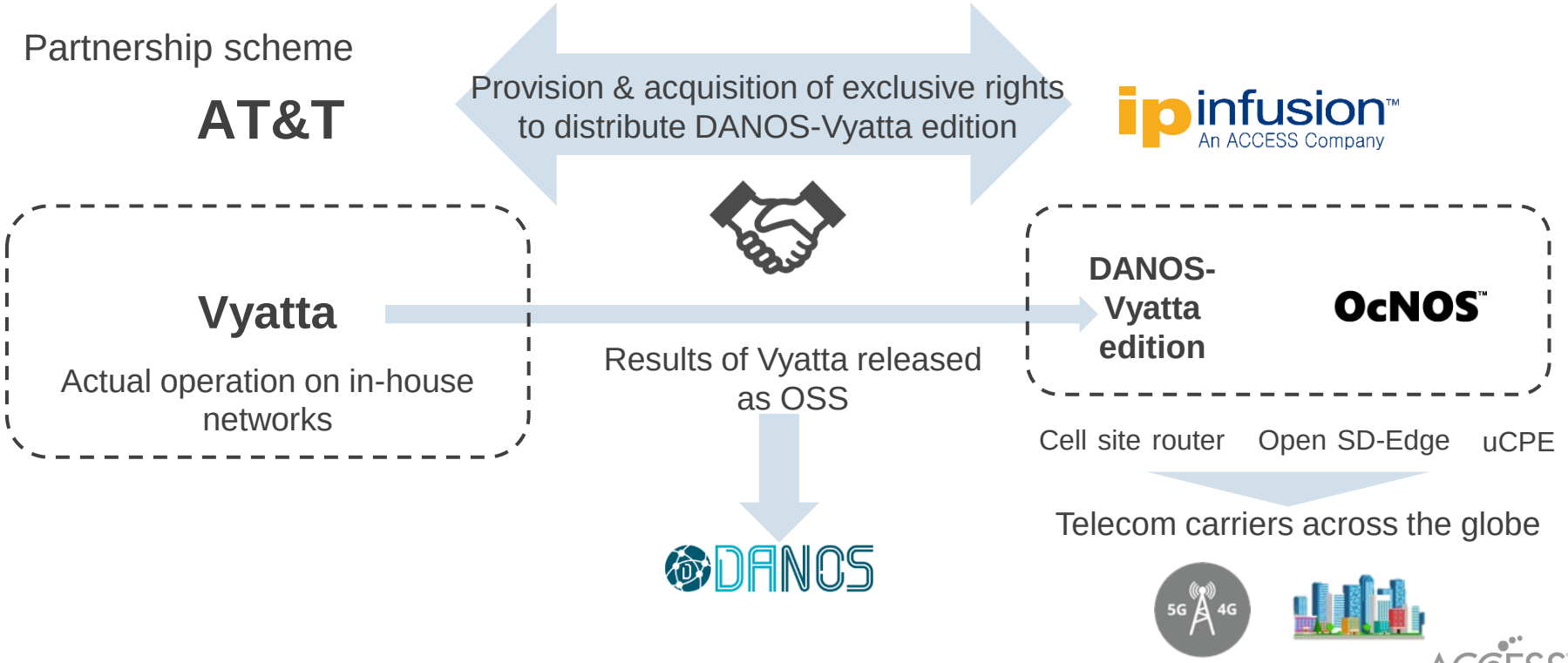
- Modular, Scalable, Exchangeable
- SoC, Network ASIC
- Future Hardware Services
- Pizza Box and Multi-Slot Chassis Capable

Product 3: DANOS-Vyatta edition

Accelerating the shift to white box platforms among telecom carriers, through joint efforts with AT&T.

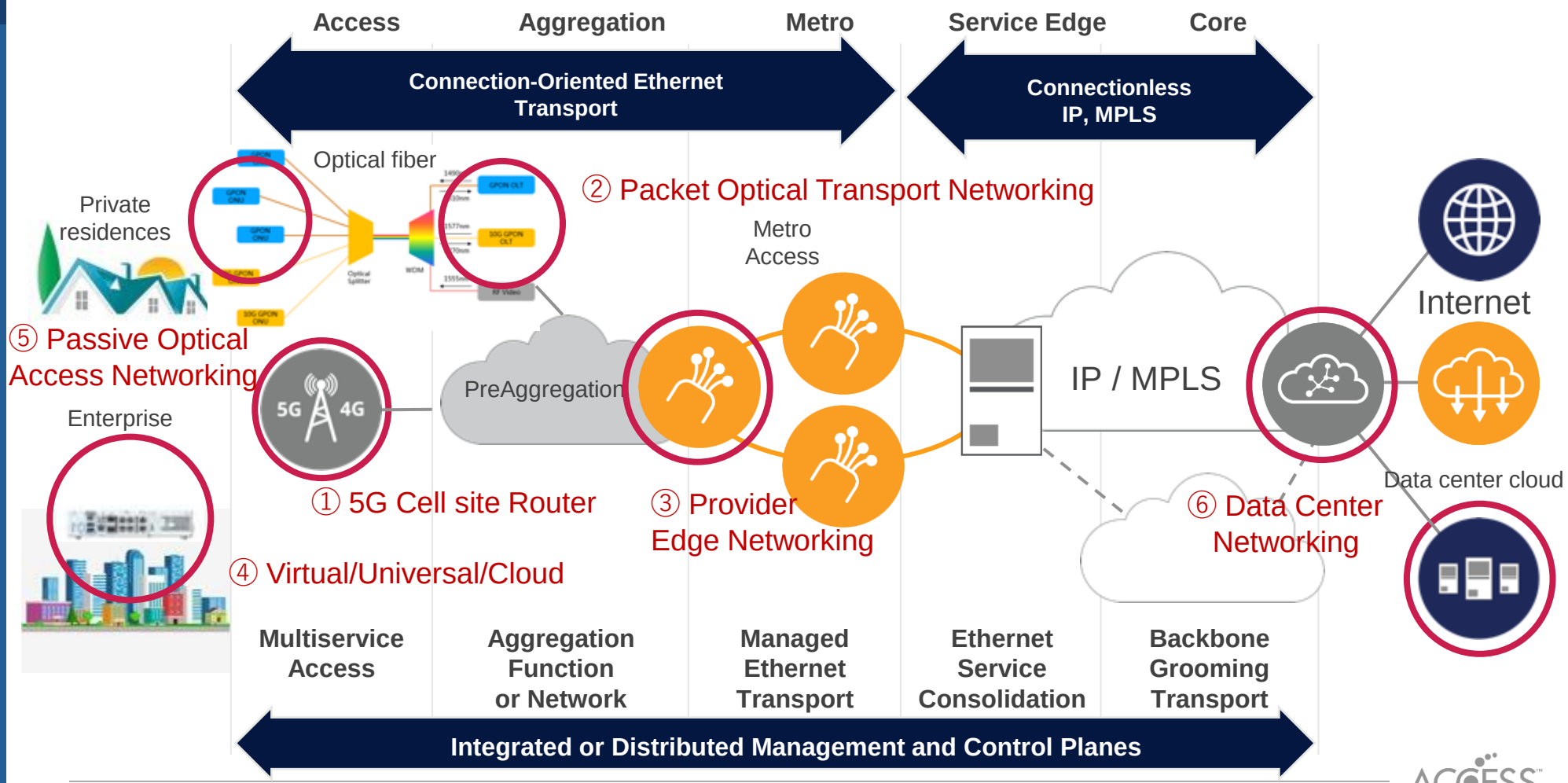
- We are working with AT&T, which is at the forefront of efforts to aggressively promote the adoption of white box platforms by telecom carriers.
- Results are released as OSS (DANOS).
- IP Infusion exclusively distributes and supports DANOS-Vyatta edition, a carrier-grade and proven white box solution

Partnership scheme



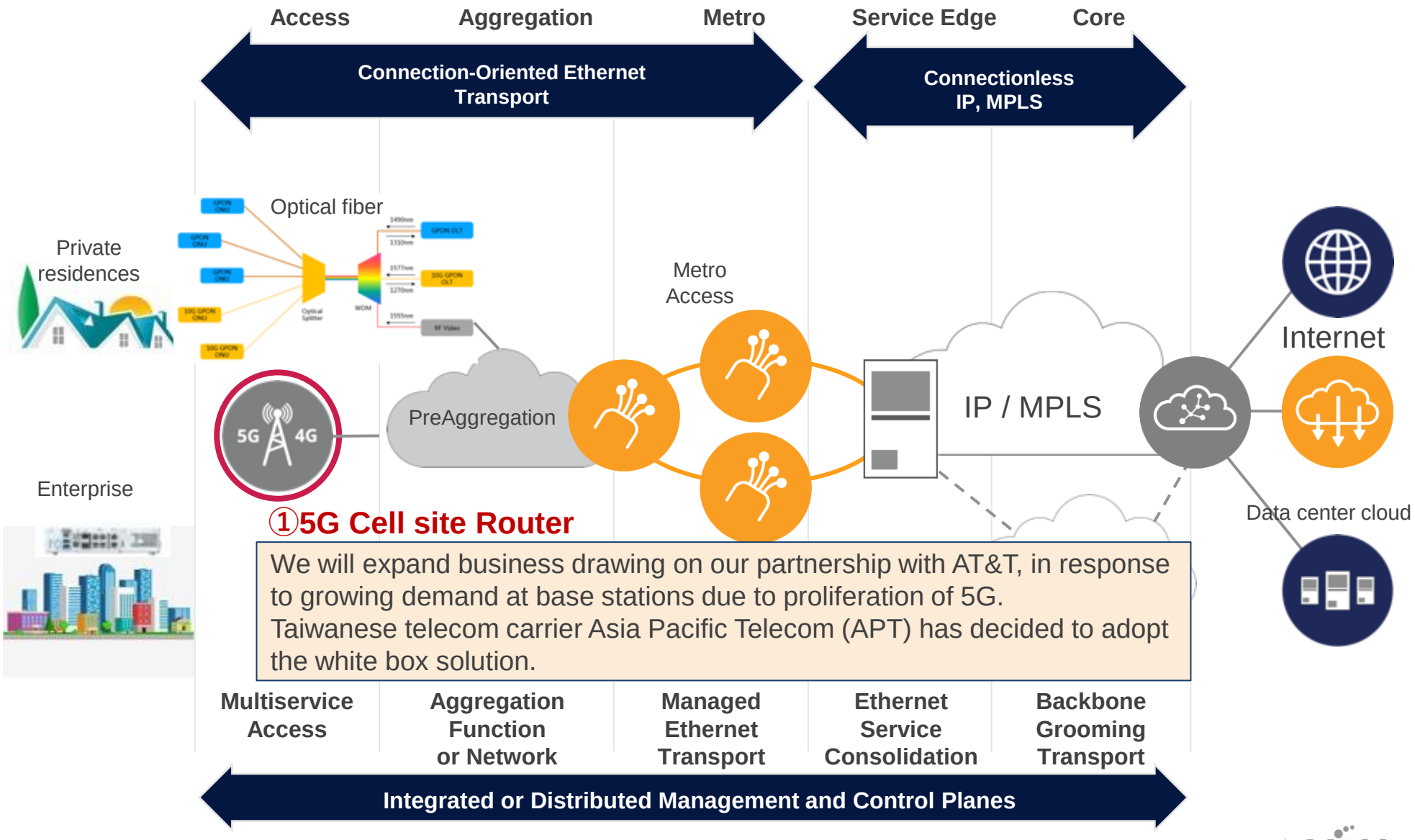
Six Domains Where White Box Adoption is Expected (Overview)

- White box products will be launched in the following six domains, based on the customer needs and market trends that have been identified through previous business activities.



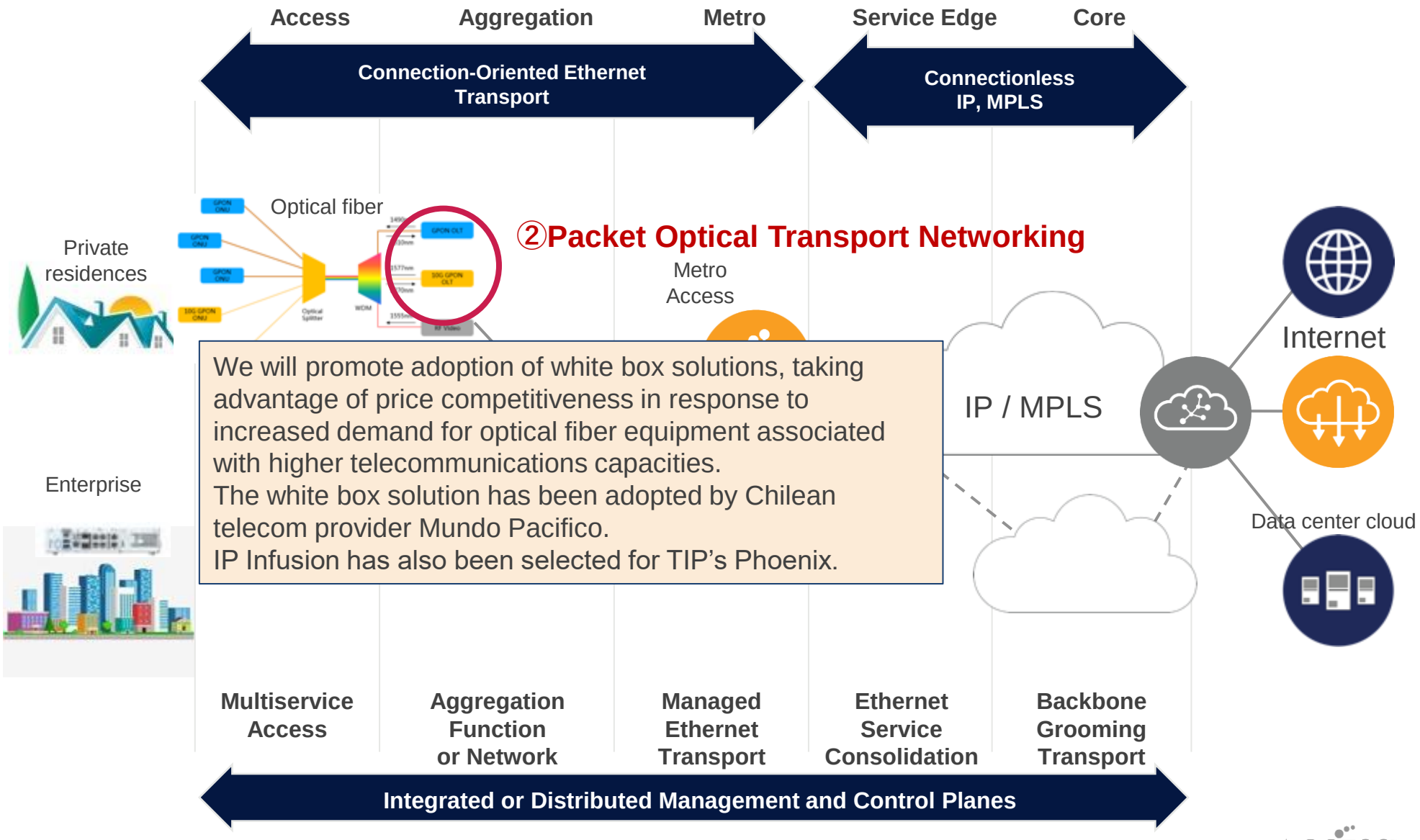
Six Domains Where White Box Adoption is Expected (1/6)

①:5G Cell site Router



Six Domains Where White Box Adoption is Expected (2/6)

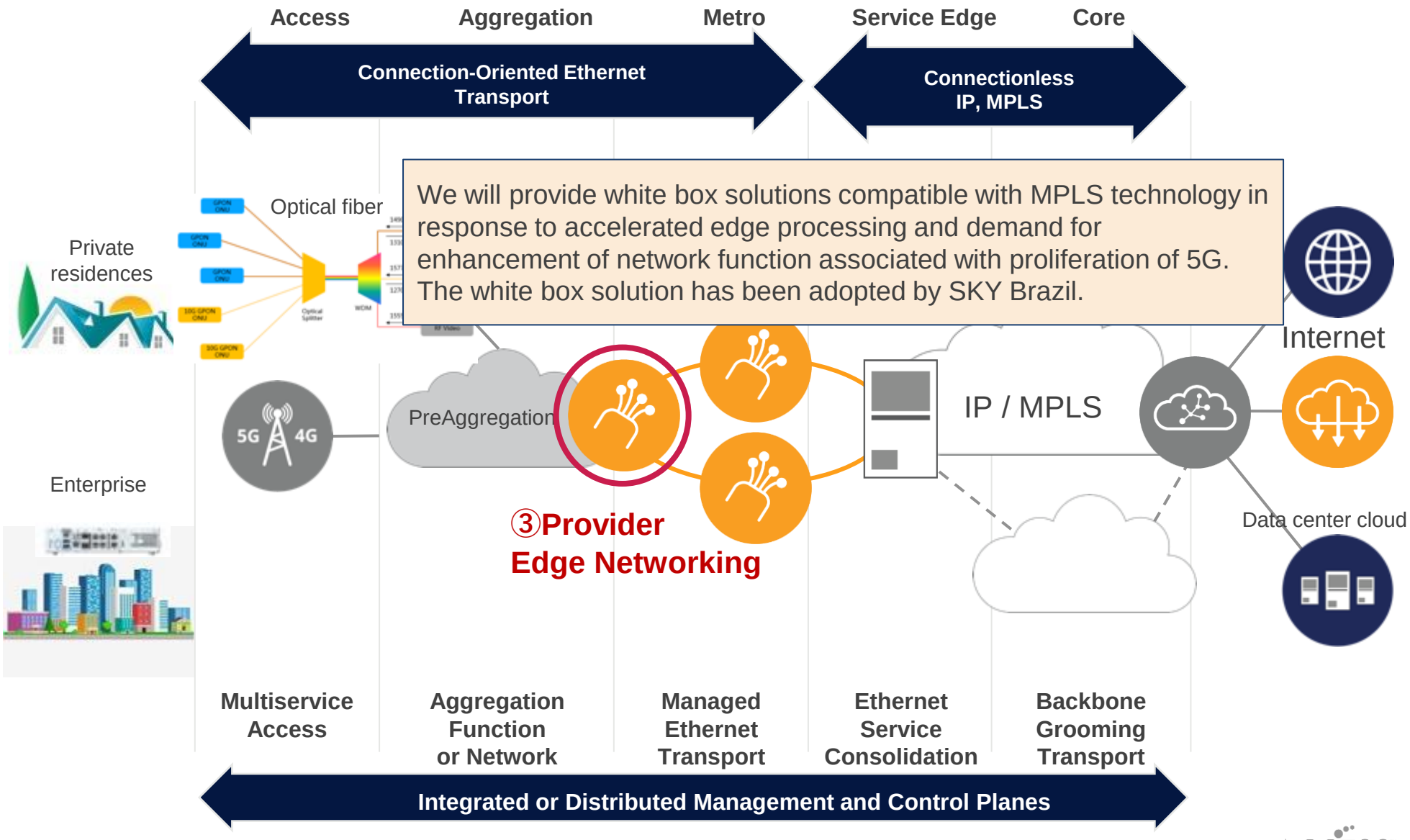
②:Packet Optical Transport Networking



We will promote adoption of white box solutions, taking advantage of price competitiveness in response to increased demand for optical fiber equipment associated with higher telecommunications capacities.
The white box solution has been adopted by Chilean telecom provider Mundo Pacifico.
IP Infusion has also been selected for TIP's Phoenix.

Six Domains Where White Box Adoption is Expected (3/6)

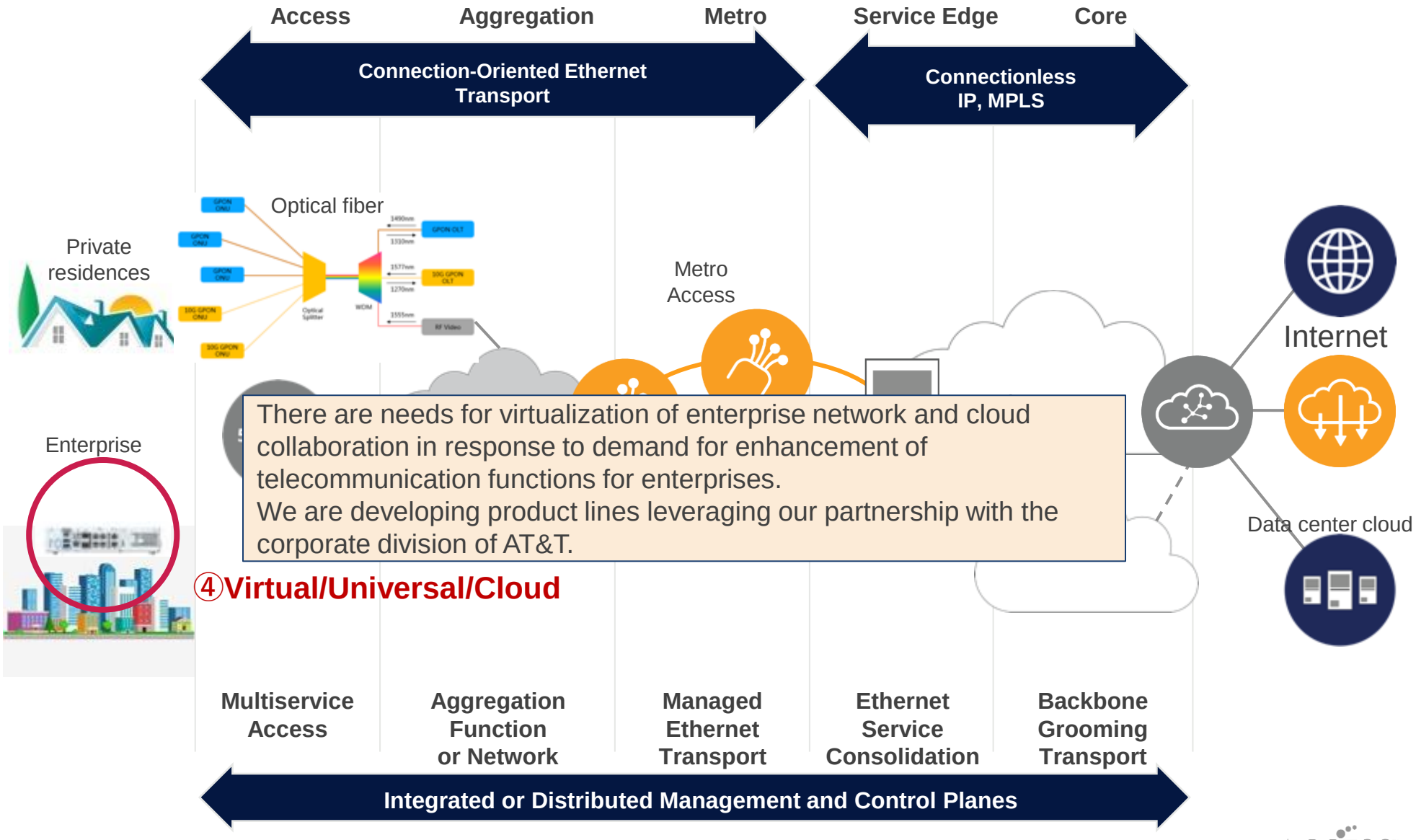
③:Provider Edge Networking



We will provide white box solutions compatible with MPLS technology in response to accelerated edge processing and demand for enhancement of network function associated with proliferation of 5G. The white box solution has been adopted by SKY Brazil.

Six Domains Where White Box Adoption is Expected (4/6)

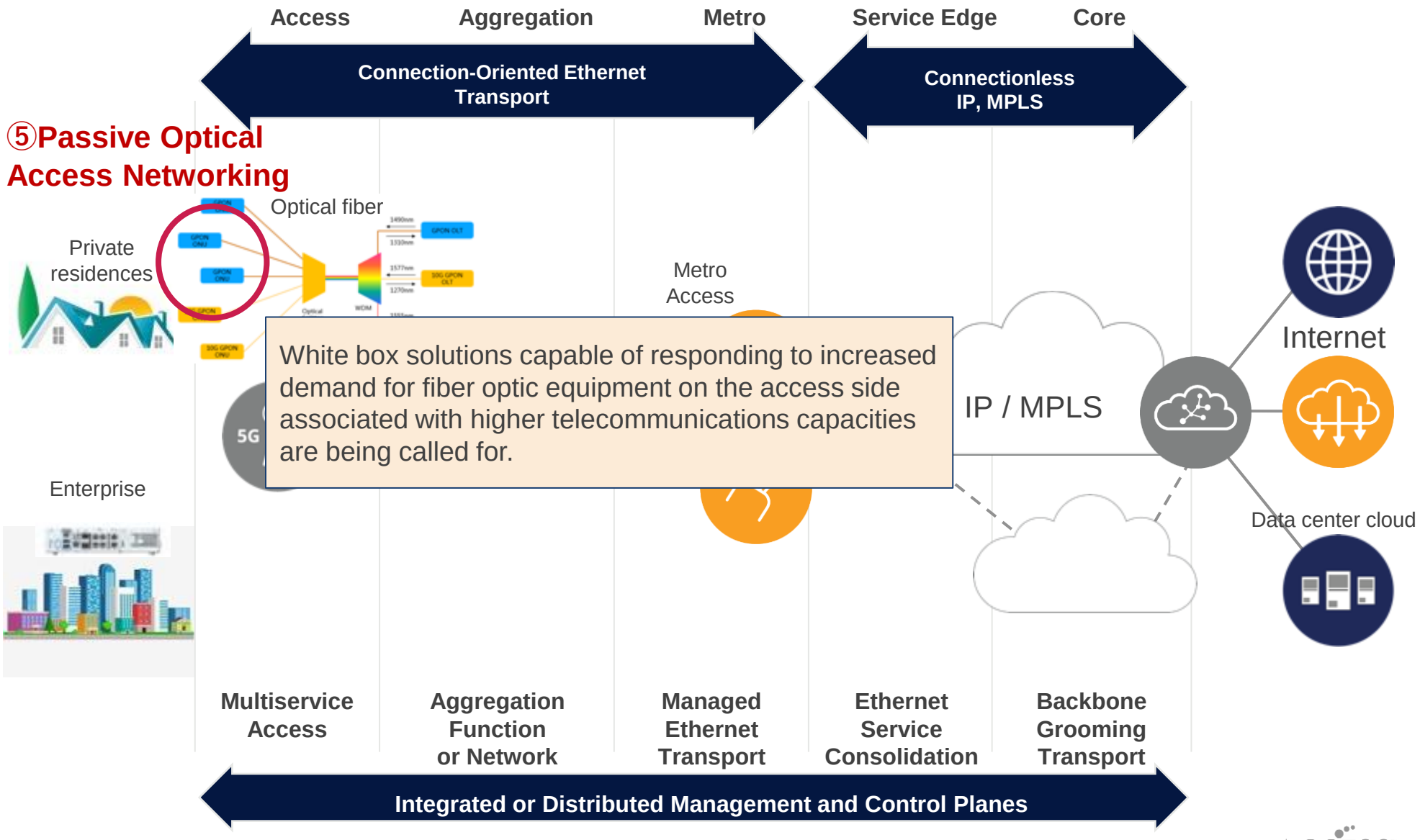
④:Virtual/Universal/Cloud



There are needs for virtualization of enterprise network and cloud collaboration in response to demand for enhancement of telecommunication functions for enterprises.
We are developing product lines leveraging our partnership with the corporate division of AT&T.

Six Domains Where White Box Adoption is Expected (5/6)

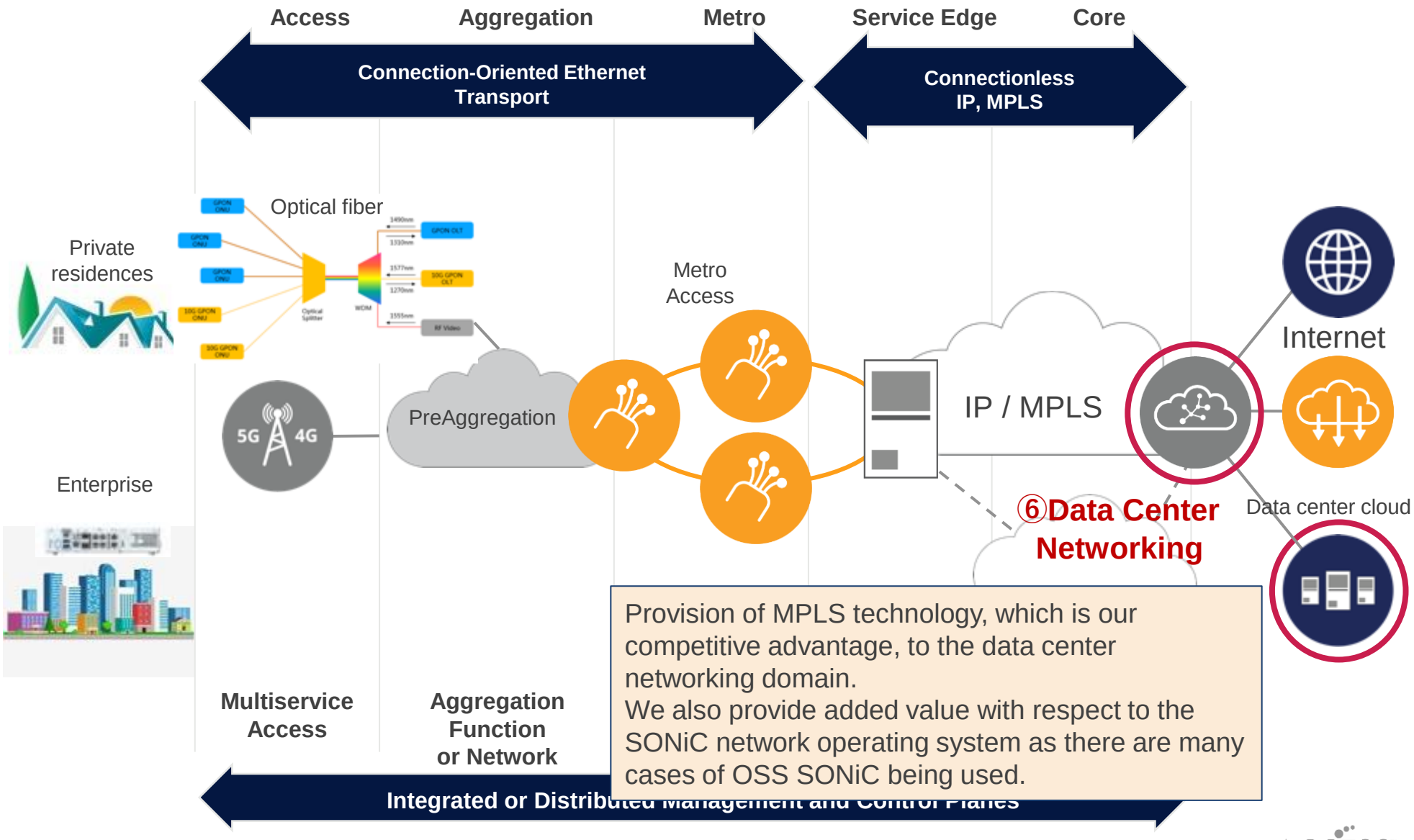
⑤:Passive Optical Access Networking



White box solutions capable of responding to increased demand for fiber optic equipment on the access side associated with higher telecommunications capacities are being called for.

Six Domains Where White Box Adoption is Expected (6/6)

⑥:Data Center Networking



Provision of MPLS technology, which is our competitive advantage, to the data center networking domain.
We also provide added value with respect to the SONiC network operating system as there are many cases of OSS SONiC being used.

Business Strategies Per Target Domain

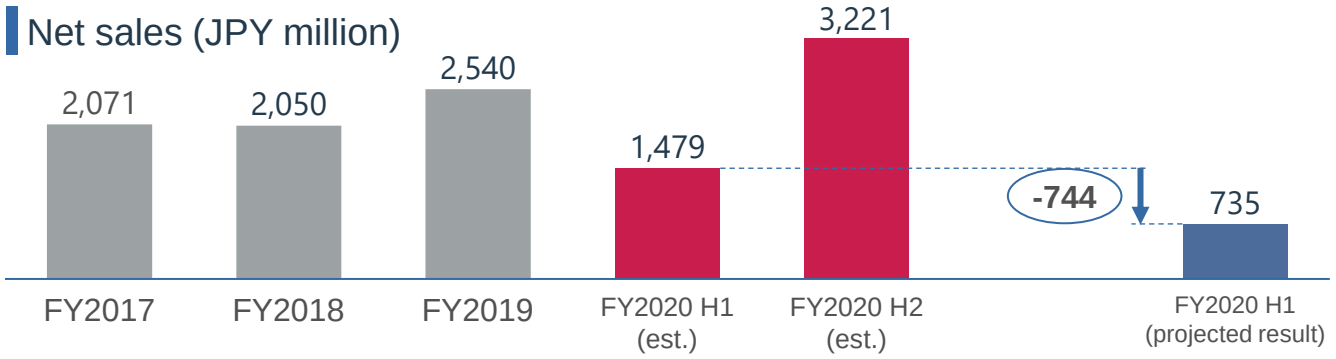
» We aim to maximize profit from the target market by making the most of control plane technologies while leveraging partnerships with other companies.

Target domains	Business expansion strategies
5G Cell site Router（①）	Expand business drawing on our partnership with AT&T, in response to growing demand at base stations due to proliferation of 5G.
Packet Optical Transport Networking（②）	Promote adoption of white box solutions, taking advantage of price competitiveness in response to increased demand for optical fiber equipment associated with higher telecommunications capacities.
Provider Edge Networking（③）	Provide white box solutions compatible with MPLS technology in response to accelerated edge processing and demand for enhancement of network function associated with proliferation of 5G.
Virtual/Universal/Cloud（④）	Promote adoption by developing product lines leveraging our partnership with AT&T in response to demand for enhancement of telecommunication functions for enterprises.
Domains slated for new product development going forward	
Passive Optical Access Networking（⑤）	Respond to increased demand for fiber optic equipment on the access side associated with higher telecommunications capacities
Data Center Networking（⑥）	Provide MPLS technology, which is our competitive advantage, to the data center networking domain.

Trends in Financial Results of the Network Business

» Both sales and profit were below target. This was attributable to a situation where the time taken for evaluations and adoption with respect to individual telecom carriers was longer than anticipated, and due to upfront increases in depreciation expense associated with having bolstered investment in product development.

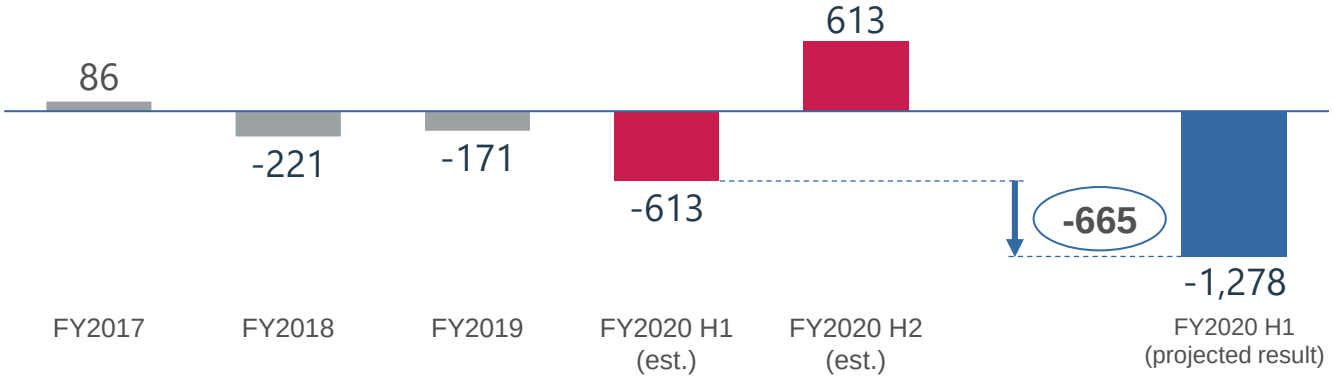
Net sales (JPY million)



Main factors causing unmet first-half targets

- Lower priority for new solutions (white box) in the short term as a result of COVID-19.
- Delays were encountered relative to plans amid a situation where the time taken for evaluations and adoption with respect to individual telecom carriers was longer than anticipated.

Segment profit (JPY million)



Main factors causing unmet first-half targets

- We incurred upfront increases in depreciation expense associated with having bolstered investment in product development, whereas it will take time to generate sales.

Initiatives to Bolster Sales Amid the COVID-19 Pandemic

» In view of current circumstances, we are implementing measures to bolster sales in order to generate sales growth.

	Initiative	Details
Products	Add new products with a proven track record	• We will expand sales opportunities by increasing use cases drawing on our partnership with AT&T. * New products (examples): 1. uCPE (for enterprises) 2. Virtual SD-Edge
Sales channels	Strengthen distributors	• We will expand sales channels by strengthening alliance with each distributor.
	Propose solutions jointly with alliance partners	• We will expand sales channels by proposing solutions jointly with AT&T and other partners.
Sales promotion	Reinforce marketing	• We will strengthen efforts involving webinars & online sessions, and press releases. • We will prepare packaging that can be evaluated, even on a remote basis.

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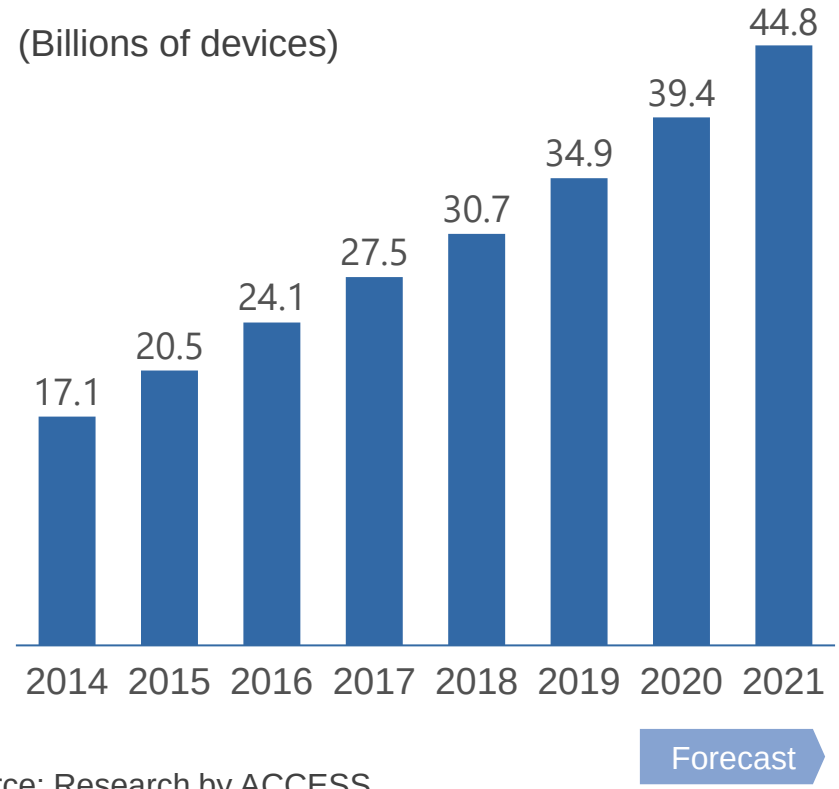
Mounting Needs for Enhancing Network Equipment

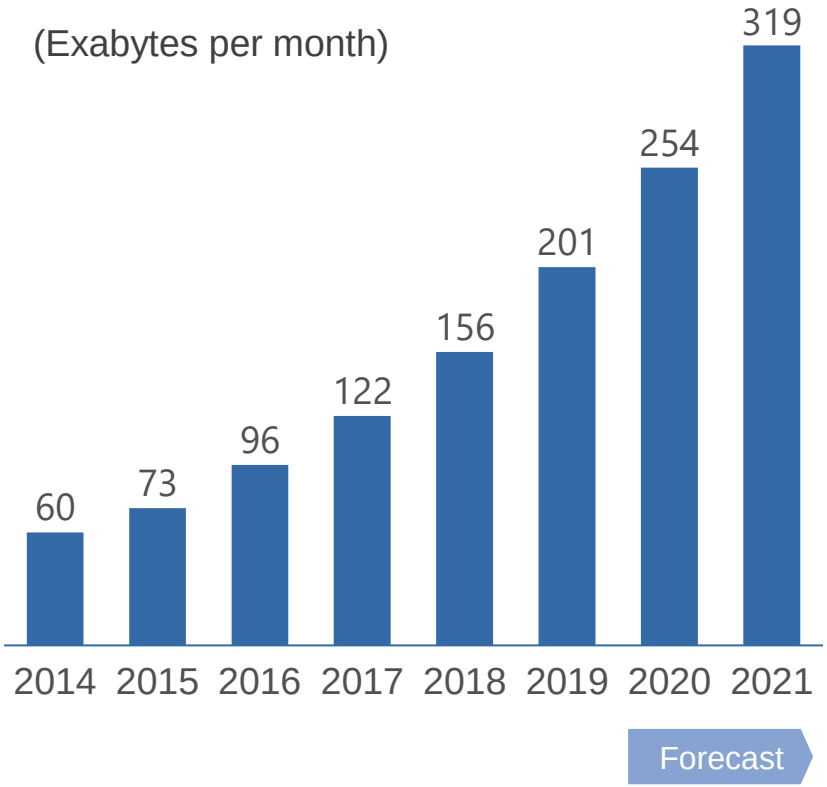
Data traffic has been increasing

- Data traffic is projected to grow at an average annual rate of more than 20% over the period 2017 to 2021, in conjunction with increasing numbers of devices connected to IP networks.

Numbers of IoT devices worldwide (actual and forecast)



Data traffic worldwide (actual and forecast)

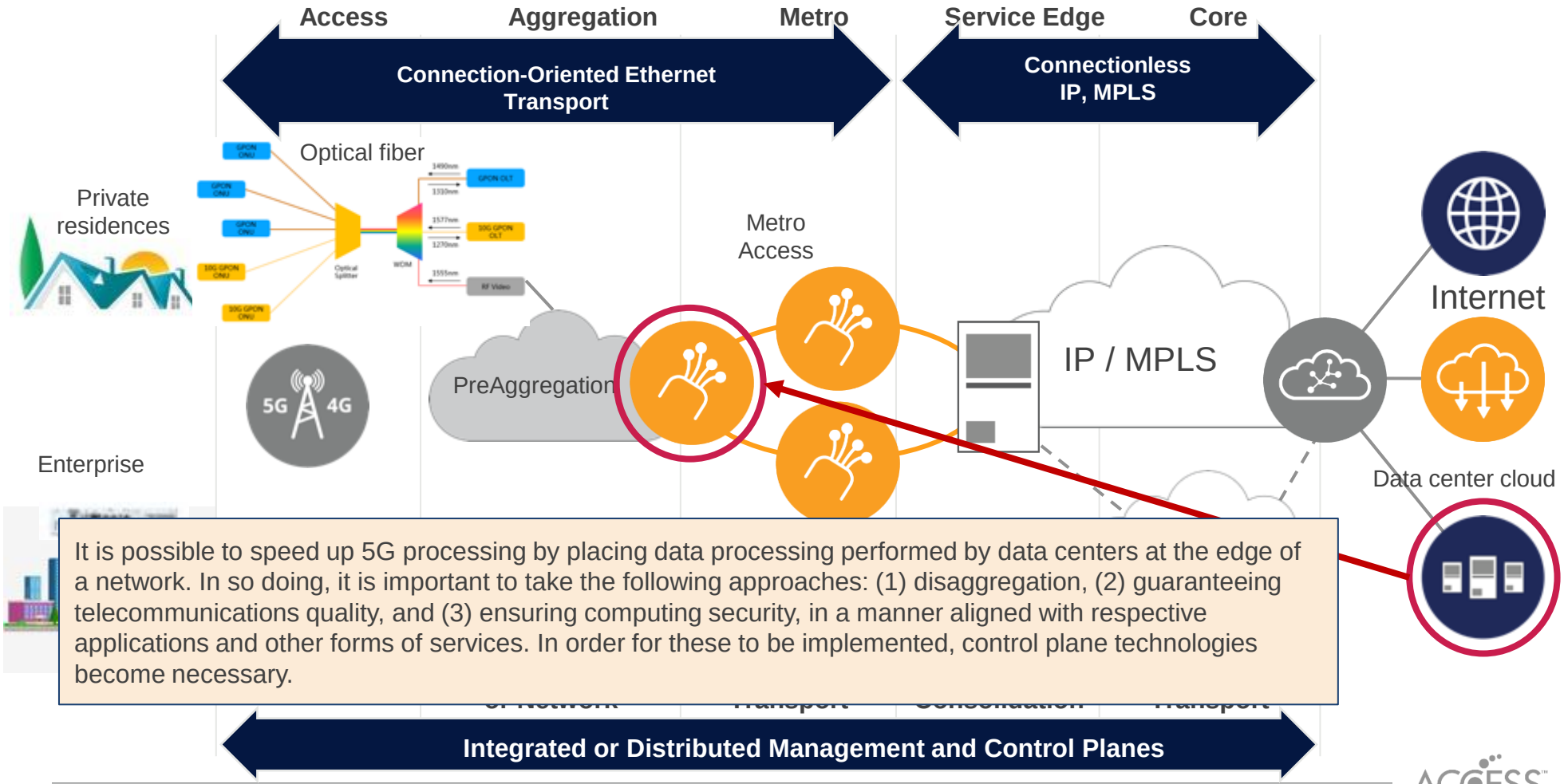


Source: Research by ACCESS

Mounting Needs for Flexible Network Construction

Edge computing demand

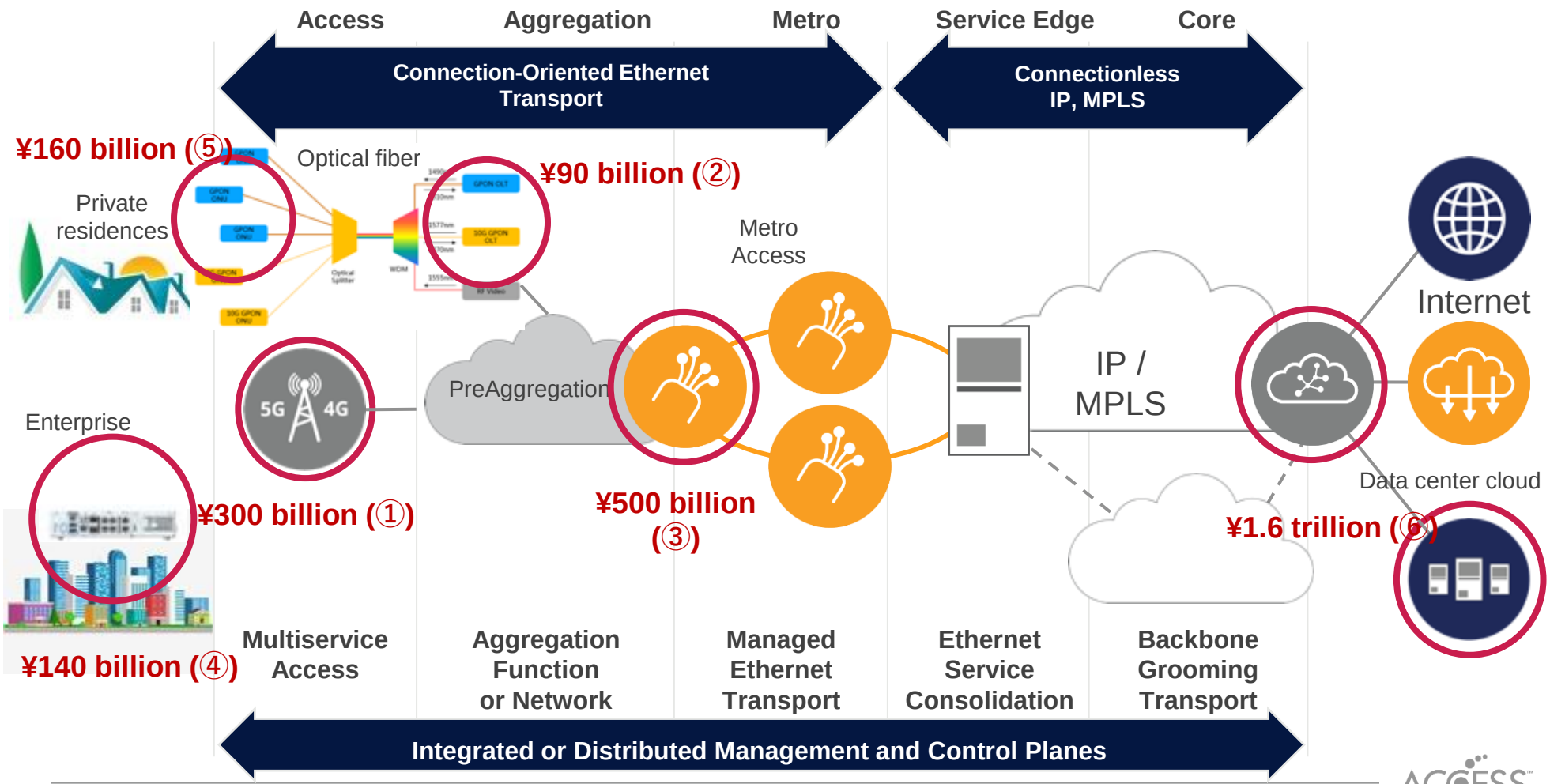
- There have been mounting needs involving network functionality enhancements and control plane technologies as edge computing makes gains against a backdrop of the shift to 5G.



It is possible to speed up 5G processing by placing data processing performed by data centers at the edge of a network. In so doing, it is important to take the following approaches: (1) disaggregation, (2) guaranteeing telecommunications quality, and (3) ensuring computing security, in a manner aligned with respective applications and other forms of services. In order for these to be implemented, control plane technologies become necessary.

Estimated Market Size of Respective Target Domains

- Total estimated market size in 2023 amounts to approximately 2.8 trillion yen.
- We aim to achieve net sales of 12.0 billion yen in the year 2023, as we closely monitor the extent to which white box solutions have penetrated the market in each domain.



Source: Research by ACCESS

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Initiatives in the 5G Cell Site Router Domain (①)

- With the launch of 5G services in Taiwan, Asia-Pacific Telecom selected IP Infusion's white-box network operating system for cell site routers. Going forward, 5,000 units are expected to be rolled out.
  - This arrangement involves partnership with UfiSpace and Foxconn Global Network

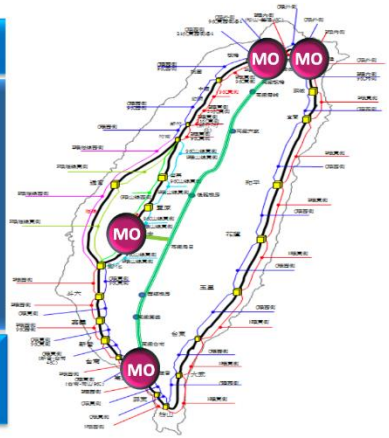
Asia Pacific Telecom

- We aim to extend our support to other telecom carriers going forward.

High Availability and Stability Network

- Along the eastern and western rails of Taiwan Railway
- Along the rails of Taiwan High Speed Rail
- Duct construction methods
- Closed environment
- 5 optical fiber cables are mutual protection for each other

Optical fiber system links four main offices – Nankang、Neihu、Taichung、Kaohsiung

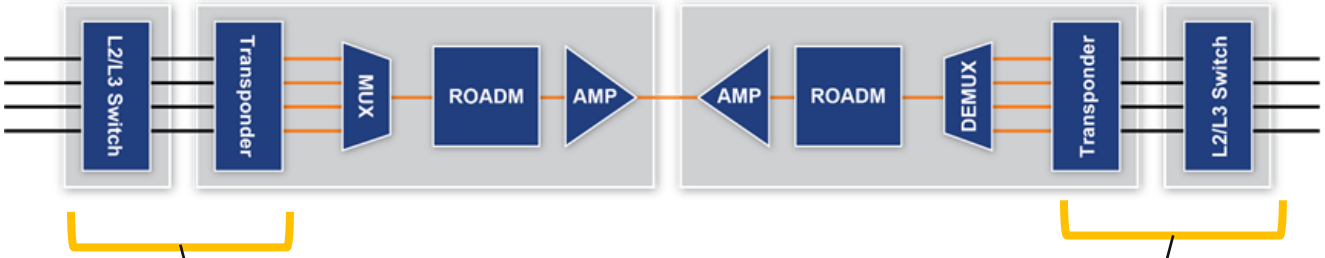


Related news release
July 16, 2020
[Asia Pacific Telecom awards contract for 5G Cell Site Router deployment to IP Infusion]

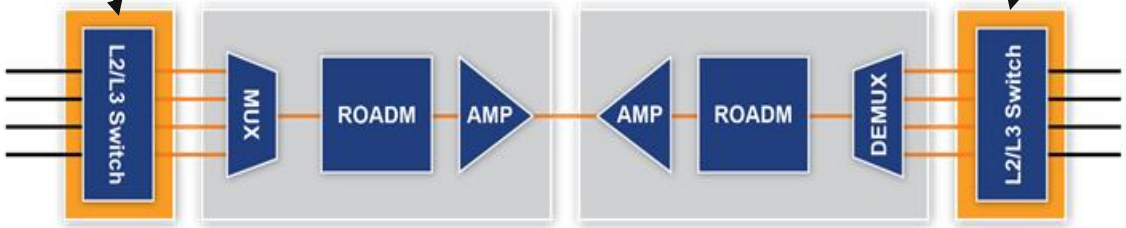
Initiatives in the Packet Optical Transport Networking Domain (②)

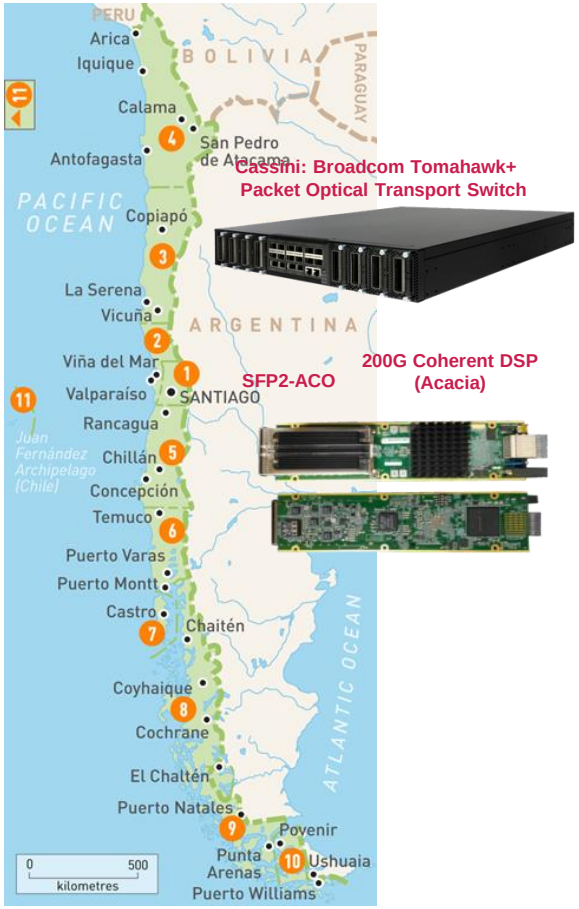
- Introduction of the OcNOS network operating system and Cassini by Chile's telecom carrier Mundo Pacifico as it deploys Latin America's first optical whitebox-based network.

Conventional optical connection
(switches and optical transmission device are separate devices)



Cassini devices integrate switching and optical transmission.
(Fewer devices & optical transceivers are readily upgradeable)

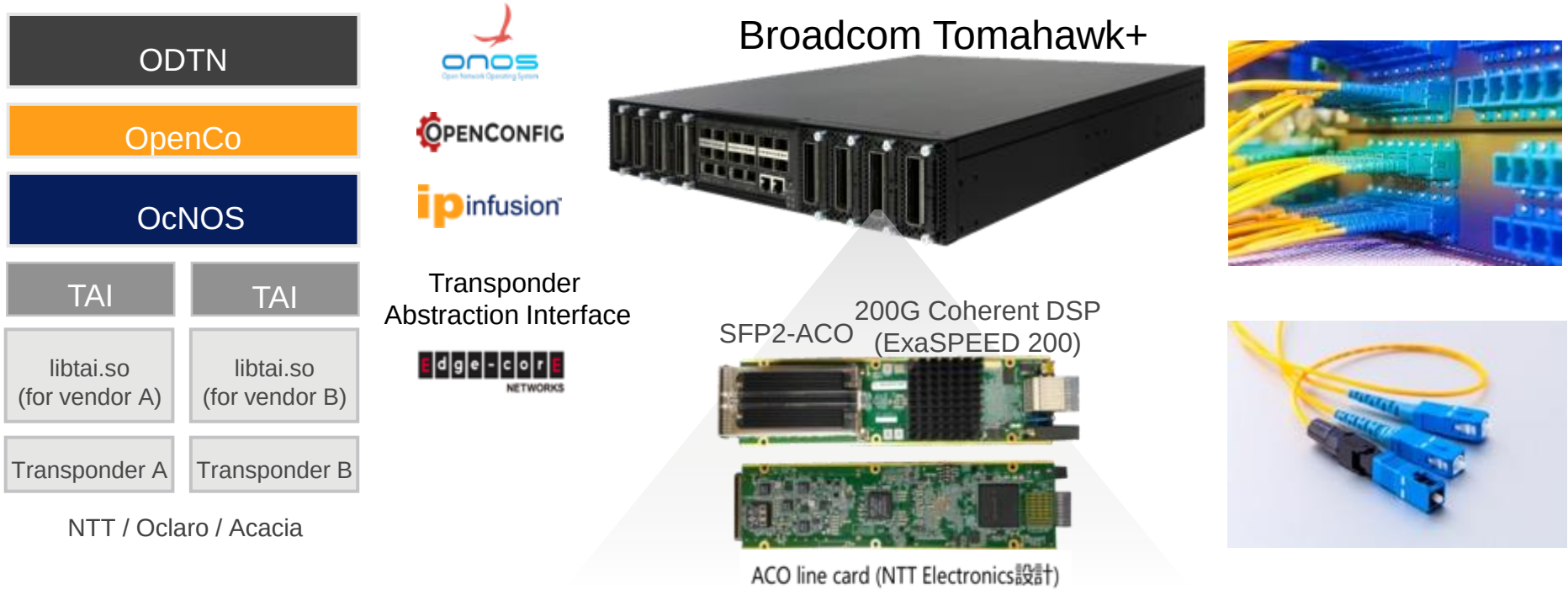




Related news release
July 20, 2020
[Mundo Pacífico selects IP Infusion and Whitestack for deploying HyperNET, the first disaggregated optical network in Latin America]

Reference: Open Optical Packet Transport Cassini

- We are currently engaging in the Open Optical Packet Transport (OOPT) project under the Telecom Infra Project (TIP) amid a situation where the industry seeks a shift to white-box solutions with respect to hardware for optical fiber networks that are used to enable direct connections between backbone networks and data centers of telecom carriers.



Related news releases

May 23, 2019: IP Infusion Qualifies Inphi COLORZ ® in its Latest Release of the OcNOS Network Operating System

October 16, 2018: IP Infusion Joins Software, Device and Component Vendors in the Telecom Infra Project to Create Industry-First Software Interface for Optical Modules and Systems

Reference: Telecom Infra Project (TIP)

TELECOM INFRA PROJECT

- TIP was launched in February 2016, based on initiatives mainly led by Facebook.
- More than 500 companies have taken part in the TIP, carried out with the aim of achieving technological innovation in areas including open and disaggregated solutions in the telecommunication network field.

- IP Infusion has been actively taking part in the TIP since October 2018.
- We have attracted attention as a company that has white box technologies with respect to initiatives involving Disaggregated Cell Site Gateway (DCSG) and the optical fiber telecommunications category of the Open Optical Packet Transport (OOTP) project.
  - https://telecominfraproject.com/the-new-transport-network-from-open-transponders-to-disaggregated-cell-site-gateways/

Related news releases

December 17, 2018: IP Infusion's OcNOS-CSR to Enable Service Providers to Deploy 5G Wireless Services with Disaggregated Open Network Benefits

February 18, 2019: IP Infusion to Showcase Multi-vendor Disaggregated Networking Solutions for BGP Peering, DCSG and OOPT at Industry Events

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Reference: Telecom Infra Project (TIP) Initiatives - TIP Phoenix

- IP Infusion's white-box network operating system has been certified as a candidate system for TIP Phoenix*.

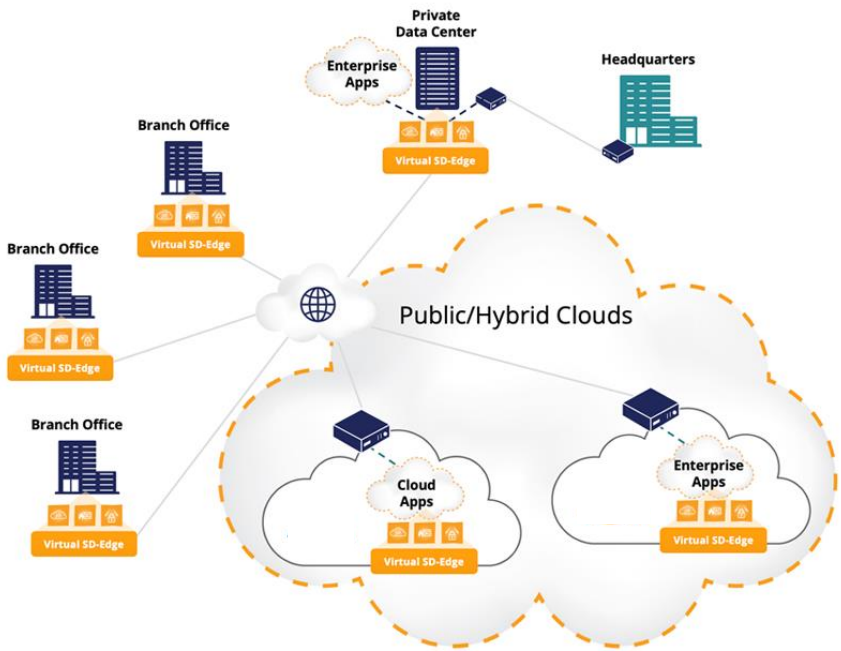
  * TIP Phoenix features high-performance specifications as a successor to Cassini, an optical whitebox platform.
- The selection is expected to boost the adoption in the TIP community, as it proves that IP Infusion's operational track record and technological capabilities involving the Cassini platform have been recognized.
- We anticipate demand for strengthening optical backbones in order to address the surge in data traffic in recent times.

Related news release

July 17, 2020: IP Infusion selected as a software provider for Telecom Infra Project Phoenix solution

Initiatives in the Virtual/Universal/Cloud Domain (④)

- The Open SD-Edge platform has been added as a new solution for enterprise customers.
- The solution allows for operational simplicity, agile implementation of virtualization services and lower CAPEX, leading to reduced total cost of ownership.
- The solution can be installed in cloud computing environments.



- The Open SD-Edge platform enables smooth operation by virtualizing network through the use of network function virtualization (NVF) technologies.
  1. Connects a cloud service with a company's own data centers
  2. Connects a cloud service with multiple business locations
  3. Connects multiple cloud services with multiple business locations

- Applications of business enterprises are deployed on:
  - virtual routers at a company's own data center,
  - virtual routers at business locations,
  - cloud-based virtual routers.

  Enterprise users are free to deploy, re-deploy, and upgrade the applications, without making any changes to actual connection configurations.

Related news release

May 19, 2020: IP Infusion introduces Open SD-Edge platform powered by DANOS-Vyatta edition, promoted by AT&T

Conclusions

- We have been making progress in expanding the white box business by rolling out products and forming business alliances.
- We are beginning to see results with respect to solutions being adopted that we are able to disclose publicly.
- We are offering white box products in all six target domains.
- We are taking action in terms of time requirements for the evaluation and selection by telecom carriers and with respect to the impact of COVID-19, as follows:
  - We are adding more solutions with proven track records.
  - We are acquiring business via our distributors and business partners.
  - We are reinforcing marketing initiatives online and arranging solutions packaged to enable remote evaluation.
- We aim to achieve a scale of business on the order of 12.0 billion yen in 2023.
  - Our plans are feasible enough given the proportion of white box solutions in the overall market amounting to 2.8 trillion yen.