Transit Trend

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Takeshi (George) Matsuda
NTT Communications Corporation

Takeshi "George" Matsuda

Senior Network and Software Engineer
NTT Communications

- Global IP Network (GIN, AS2914)
  - Asia Product Management
  - OSS planning
- OCN (AS4713)
  - Eye-ball network design
  - IPv6 transition technology
  - System/Software arch/dev

Corporate Information

NTT Communications

<Results for FY2017>

- Operating Revenues : JPY 1,323.0B
- Operating Income : JPY 122.0B

<NTT Com Group Employees>

- Total : Approx. 22,050
  - ✓ Japan : Approx. 11,950
  - ✓ Outside Japan : Approx. 10,100

<Global Deployment>

- Offices in 41 countries/regions, 110 cities
- Global Network Service in over 190 countries/regions
- Global Tier-1 IP backbone provider, one of the largest in Asia
- Over 140 datacenters worldwide

* As of the end of March 2018

Key M&A Achievement

Managed ICT	DTS GROUP Beyond solutions; EMERIO; netmagic An NTT Communications Company; Atlas Information Technology; NTT Communications Managed Services; Secure-24
Managed Security	INTEGRALIS an NTT Communications Group Company; SECODE; NTT Communications NTT Com Security; NTT Security
Cloud-based Applications	arkadin; Applicable
Data Center/ Cloud	DPA DIGITAL PORT ASIA (APAC); e-shelter (EMEA); gyron (EMEA); netmagic An NTT Communications Company (APAC); FRONTLINE HARBOUR; NTT Communications ICT Solutions (APAC); CYBER CSF; NTT Communications NTT Indonesia Nexcenter (APAC); RagingWire DATA CENTERS (Americas)
Network / VoIP	Virtela An NTT Communications Company; NTT GLOBAL Networks; transatel

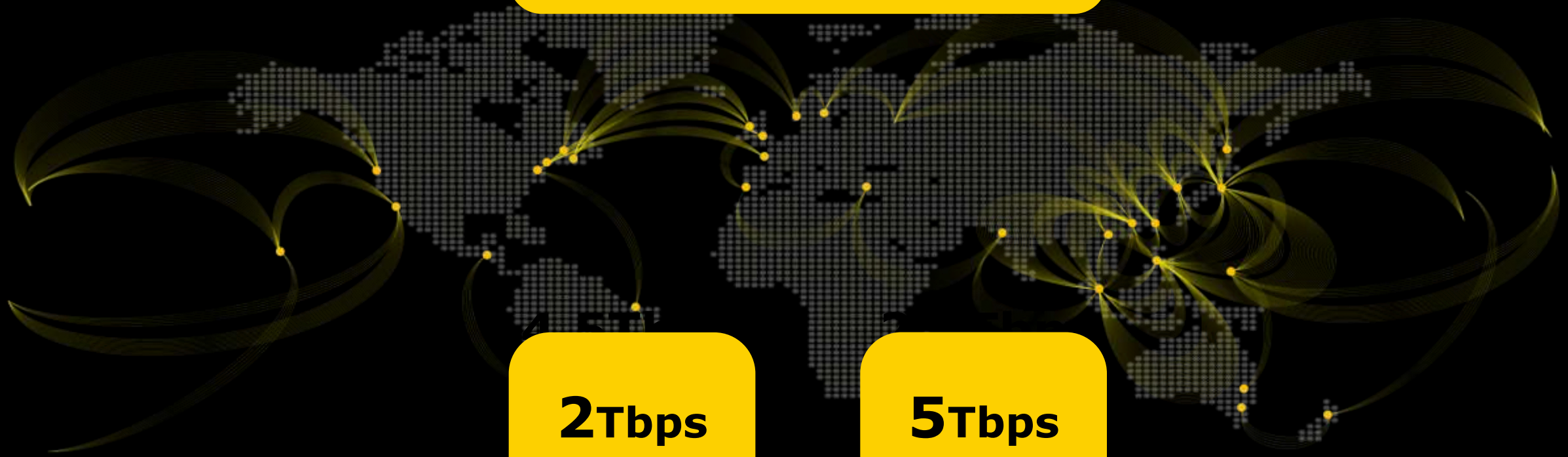
Major Awards

Category		Awards
Overall Service (for enterprises, etc.)		aca 2017 / wca 2016 Winner
Specific Service	Managed Service/ Cloud-based Applications	HfS 2016 Autonomics Premier League Table #2 NTT Com / Frost & Sullivan 2016 Best Practices Award / telecomasia Awards 2017 Best Cloud-Based Service NTT Communications
	Colocation/ Cloud	DatacenterDynamics AWARDS Asia Pacific 2016 - WINNER / SUPERUSER AWARDS
	Network	global carrier Awards 2016 Winner Best North American Wholesale Carrier

*As of June 2017

Our Global Cable Coverage

8.8Tbps
Total Data Capacity



2Tbps
Japan-Asia Cable Capacity

5Tbps
Japan-US Cable Capacity

As of the end of September 2017

Network Service - Arcstar Universal One

Data Center Service

Nexcenter

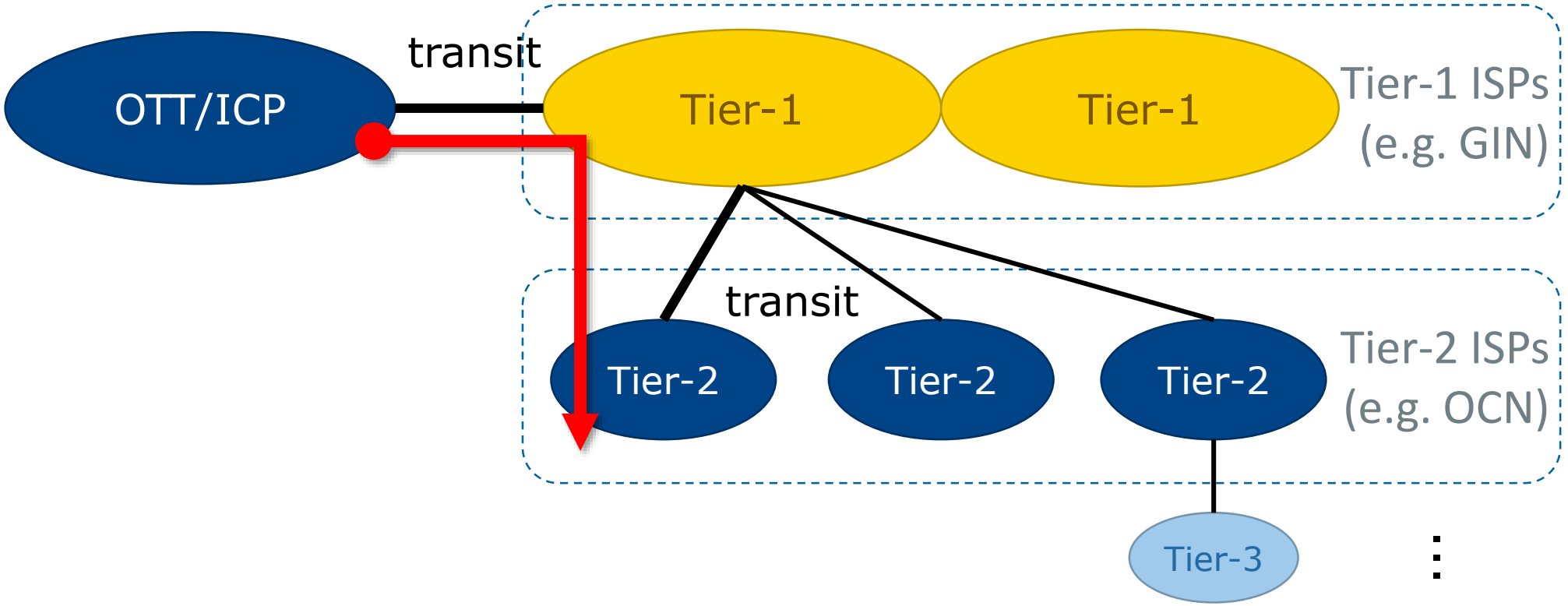
20+ countries/regions

*As of March 2017 (including plan)

Today's theme: Transit Trend

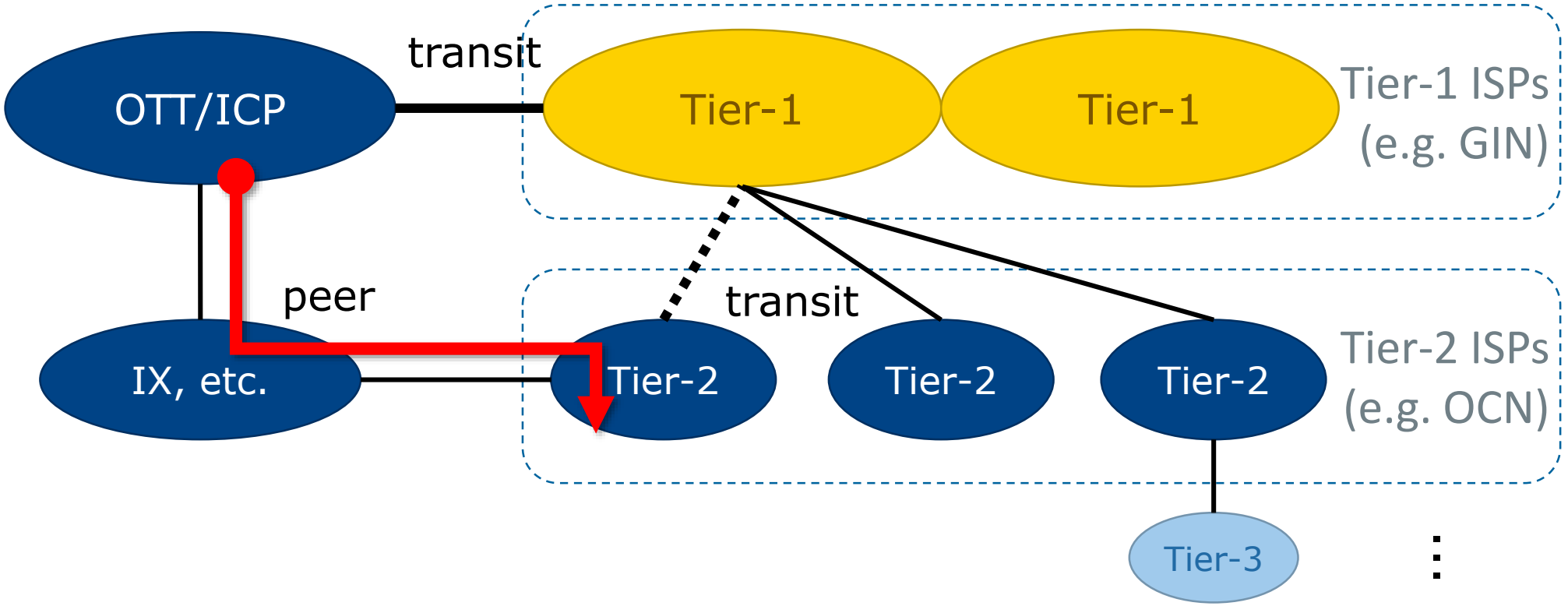
Transit and Peer …

- Originally, people had to rely heavily on transit providers to communicate globally



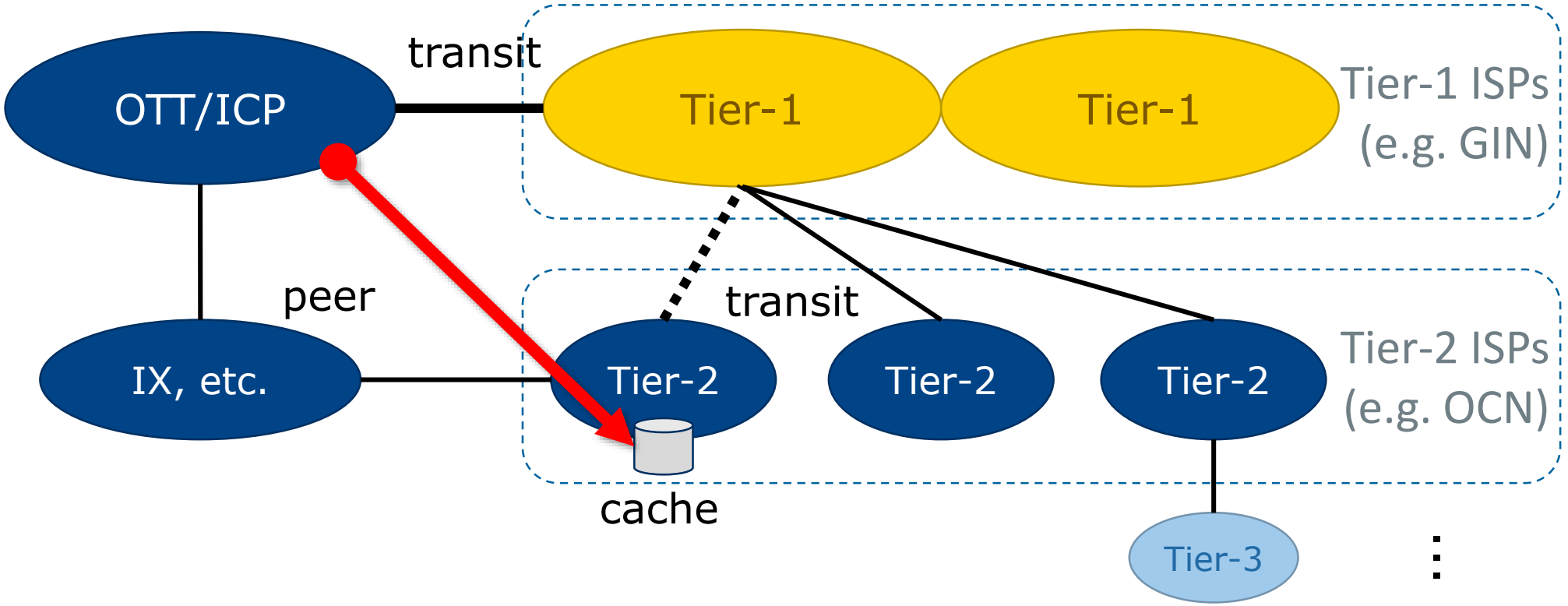
Transit and Peer …

- Direct peers ➔ less dependency on transit providers



Transit and Peer …

- Some OTTs to deploy "content cache servers" to ISP's network
  ➔ bypassing transit + IX providers



Why does this happen?

- Reasons:
  - Latency
  - Cost-saving (transit fee)
  - Quality of Experience (QoE)

Is this happening to me?
How shall we deal with this phenomenon?

Today's topics:

- Our IP traffic trend
  - Global and Japan
- Our Challenges
  - IP transit + Anti-DDoS
  - Utilize as a part in total solution

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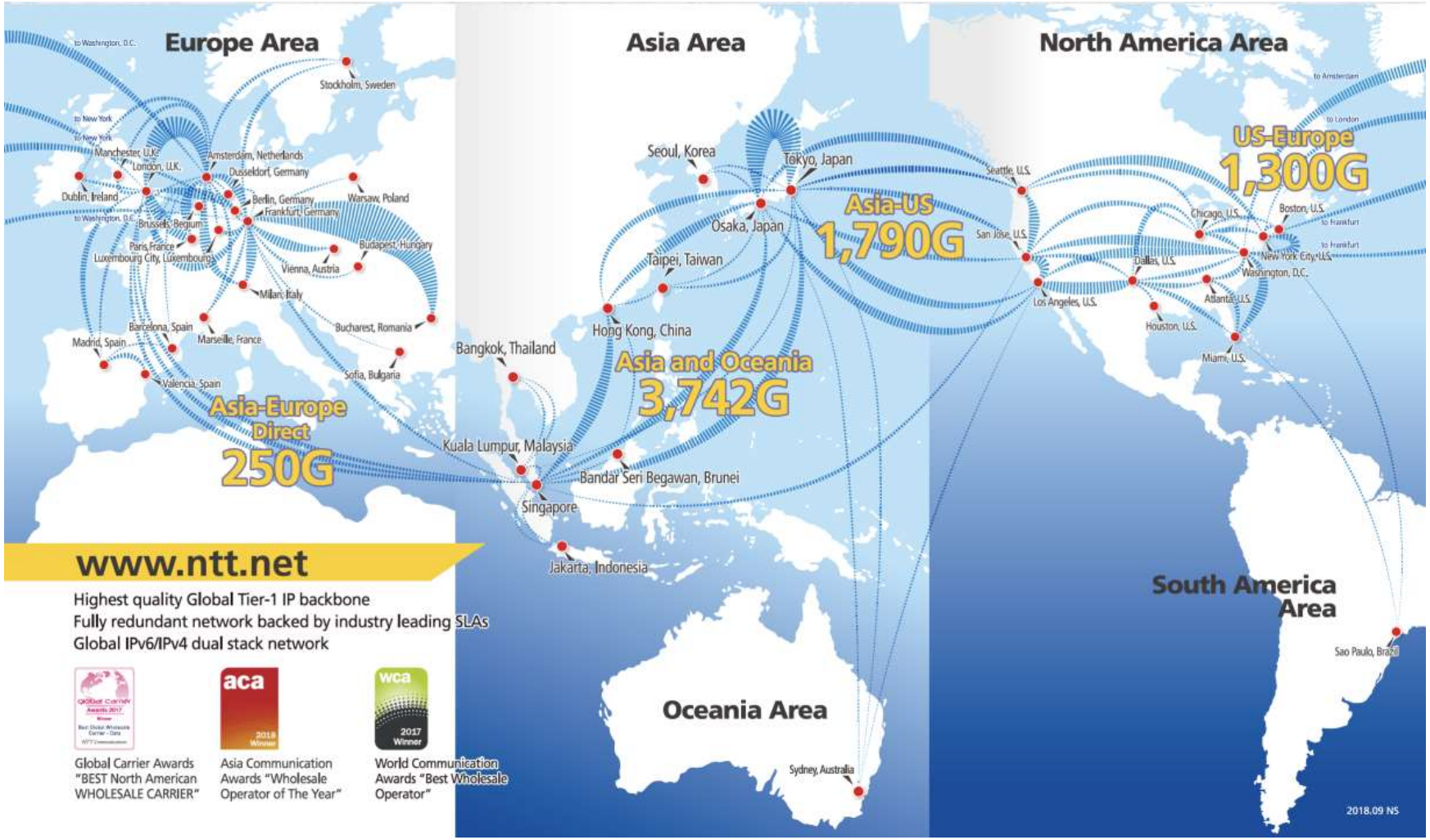
Global IP Network Service

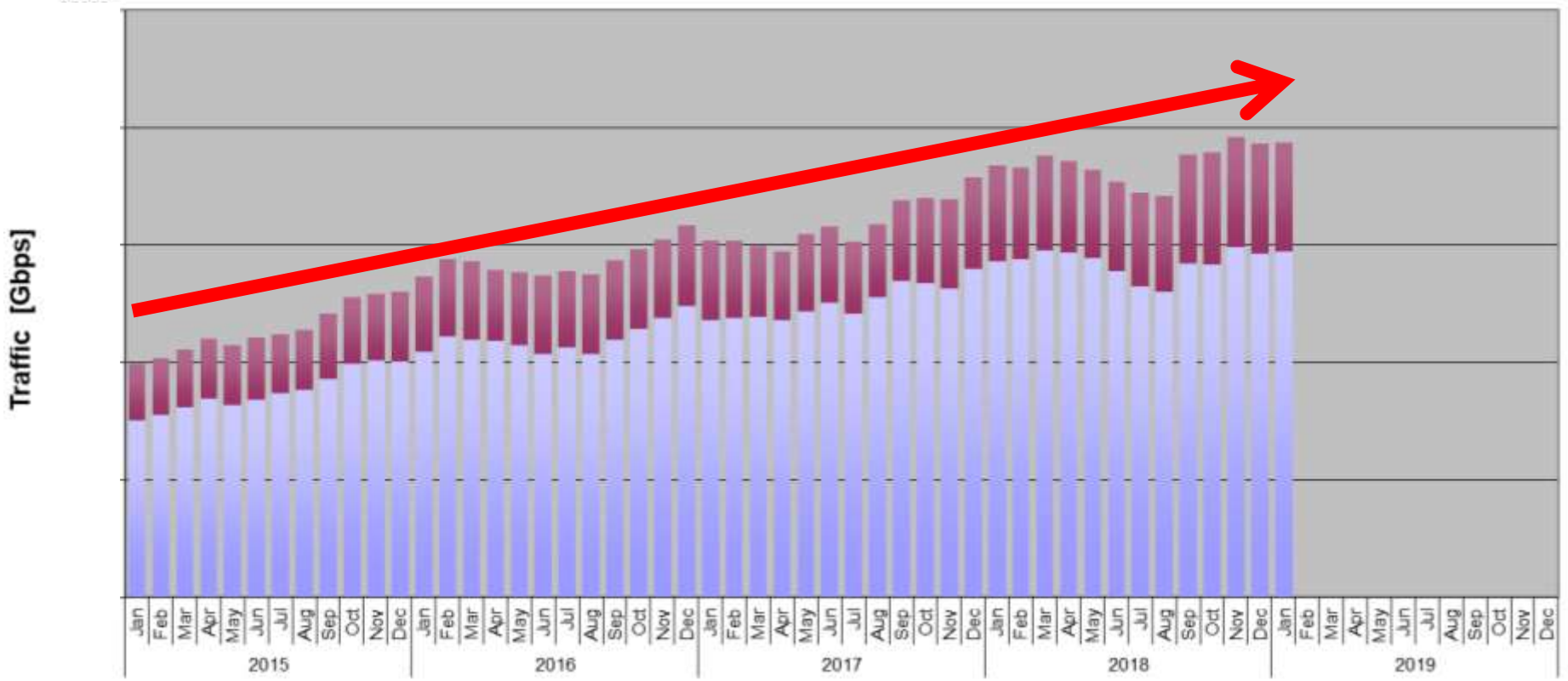
- High-speed and large-capacity IP backbone connecting 26 countries/regions across the globe




Europe Area
Asia Area
North America Area
2018 open: Manchester, Dublin
2019 open: Toronto
Manchester, U.K.
London, U.K.
Dublin, Ireland
Amsterdam, Netherlands
Dusseldorf, Germany
Berlin, Germany
Frankfurt, Germany
Warsaw, Poland
Brussels, Belgium
Paris, France
Luxembourg City, Luxembourg
Budapest, Hungary
Vienna, Austria
Milan, Italy
Barcelona, Spain
Madrid, Spain
Marseille, France
Bucharest, Romania
Sofia, Bulgaria
Valencia, Spain
Asia-Europe
Direct
250G
Seoul, Korea
Osaka, Japan
Asia-US
1,790G
Taipei, Taiwan
Hong Kong, China
Bangkok, Thailand
Asia and Oceania
3,742G
Kuala Lumpur, Malaysia
Bandar Seri Begawan, Brunei
Singapore
Jakarta, Indonesia
US-Europe
1,300G
San Jose, U.S.
Chicago
Boston, U.S.
New York City, U.S.
Washington, D.C.
Dallas, U.S.
Los Angeles, U.S.
Atlanta, U.S.
Houston, U.S.
Miami, U.S.
South America
Area
Sao Paulo, Brazil
Oceania Area
Sydney, Australia
www.ntt.net
Highest quality Global Tier-1 IP backbone
Fully redundant network backed by industry leading SLAs
Global IPv6/IPv4 dual stack network
Global Carrier Awards
"BEST North American
WHOLESALE CARRIER"
aca
2018 Winner
Asia Communication
Awards "Wholesale
Operator of The Year"
wca
2017 Winner
World Communication
Awards "Best Wholesale
Operator"
2018.09 NS

GIN BB traffic trend (global)

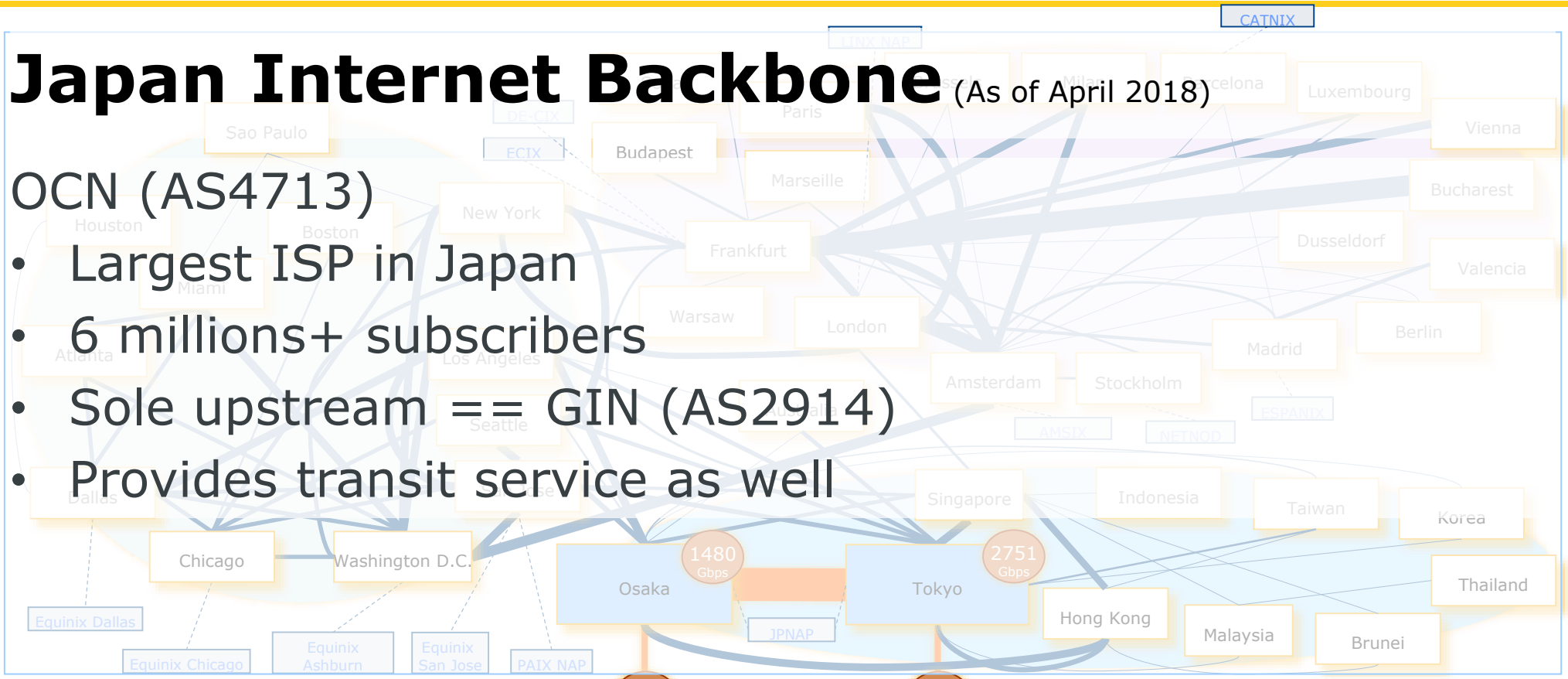
- all ingress traffic
- average growth (CAGR): 18.17%

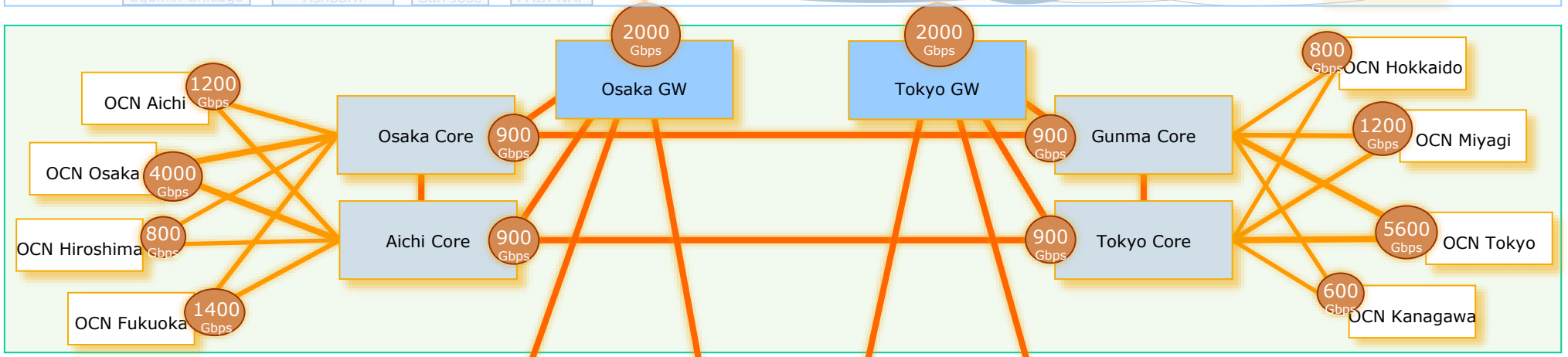


Japan Internet Backbone (As of April 2018)

OCN (AS4713)

- Largest ISP in Japan
- 6 millions+ subscribers
- Sole upstream == GIN (AS2914)
- Provides transit service as well

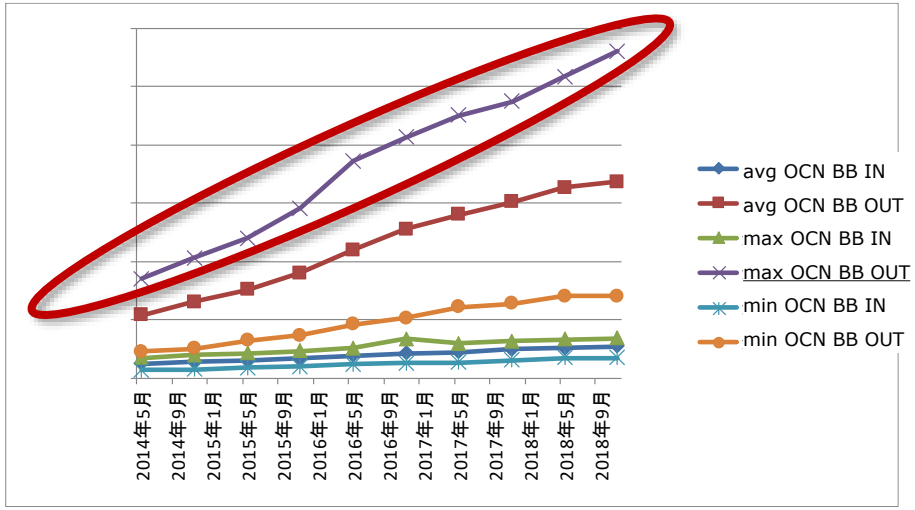




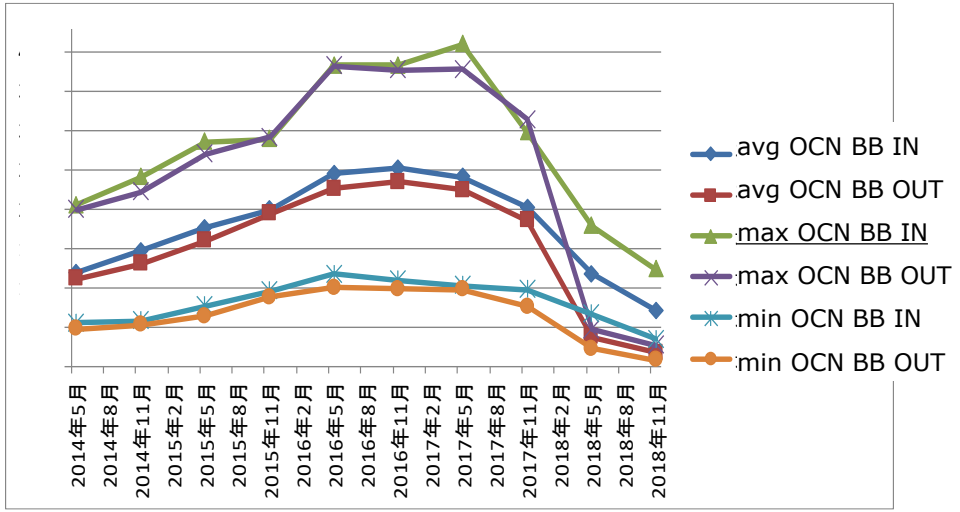
Traffic Trend by Type (2014 May – 2018 Sep)

average growth (CAGR): 34.27%

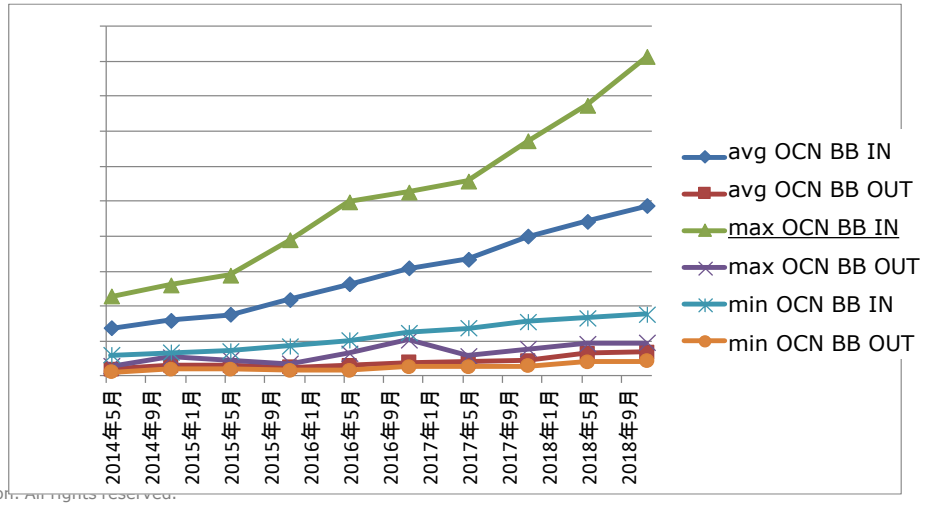
- Broadband



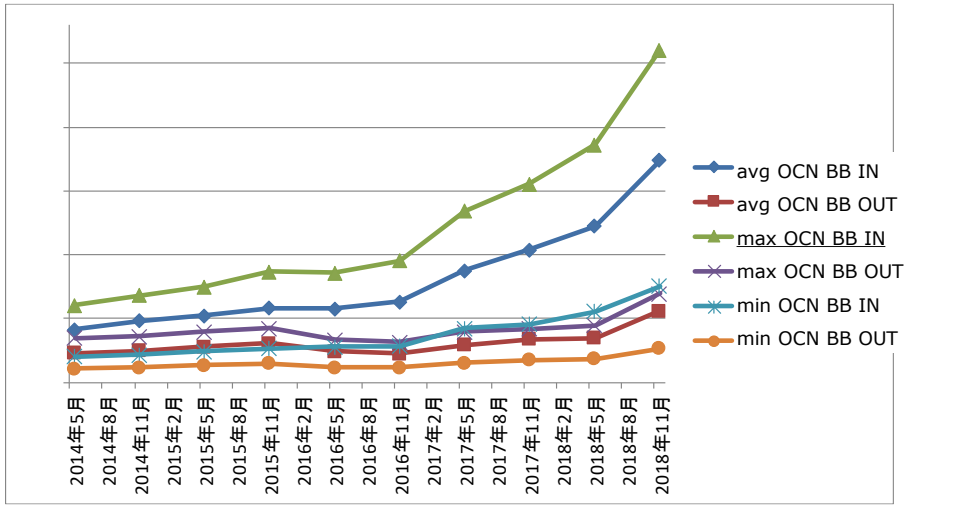
- Private Peer



- International



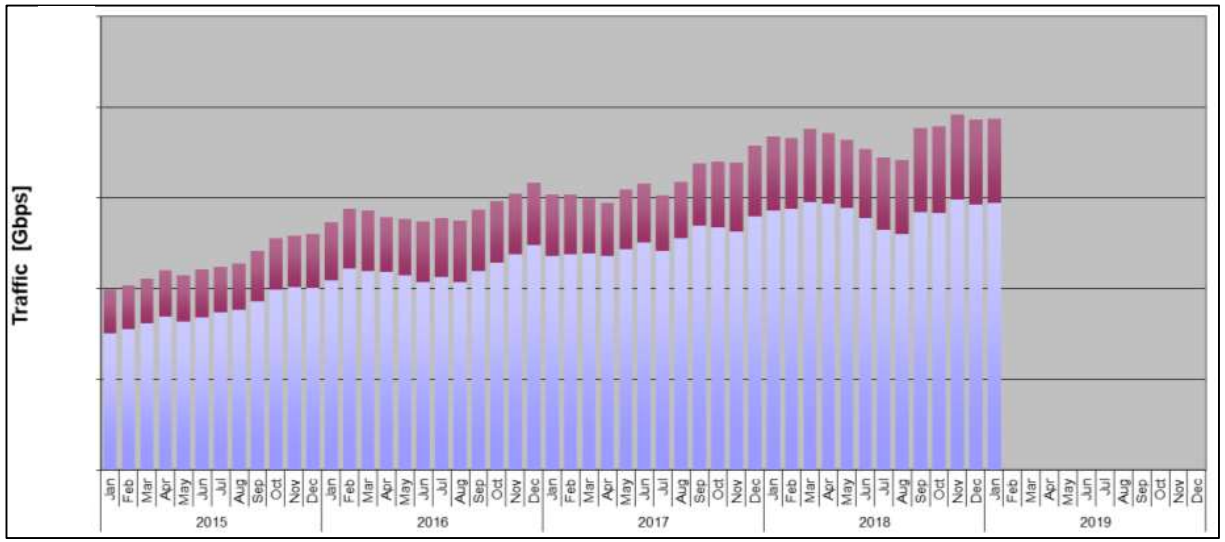
- IX



Traffic Trend in Summary

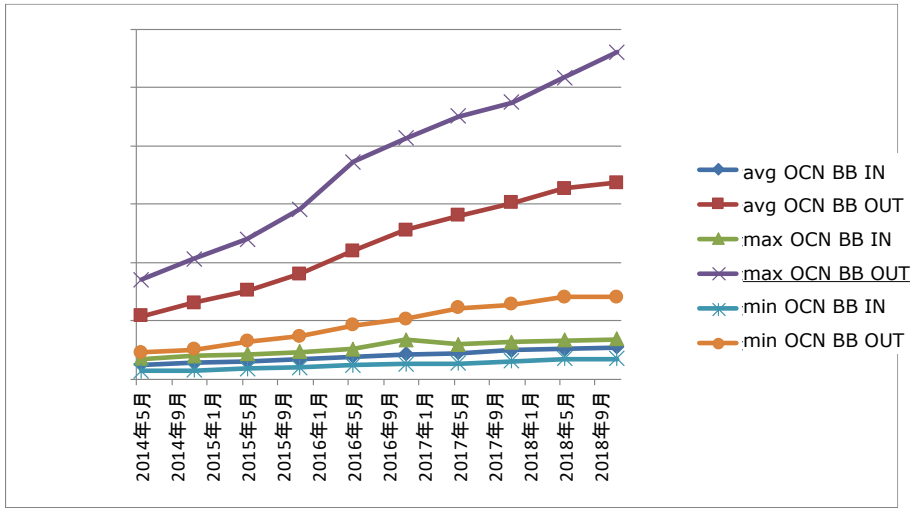
- World's IP traffic trend forecast: CAGR 23% (src: Cisco VNI 2014-2019)
- GIN global IP transit: firm growth but little slower
- OCN subscribers: more than world trend

GIN (global IP transit)



average growth % (CAGR): 18.17%

OCN subscriber (Japan)



average growth % (CAGR): 34.27%

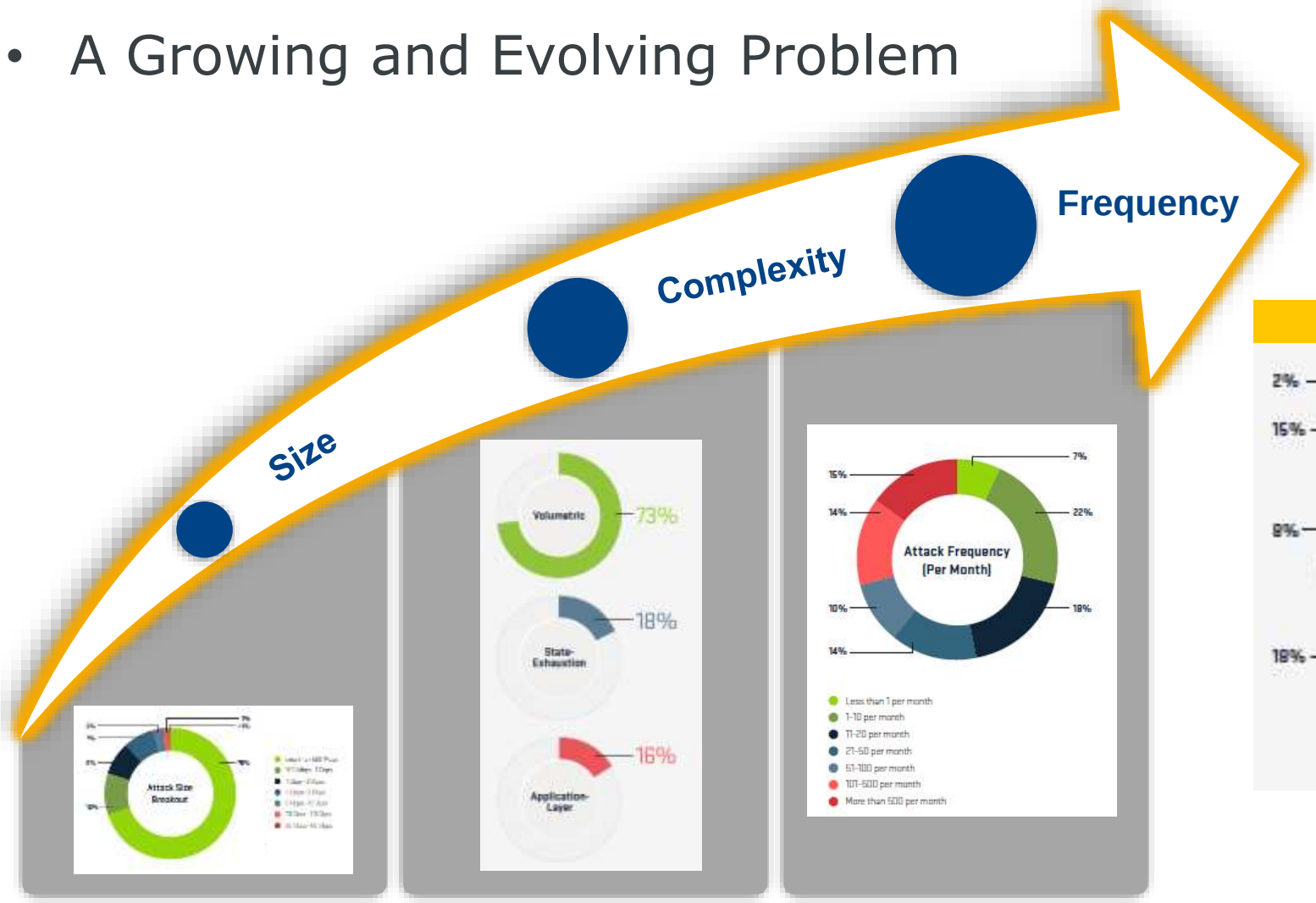
Constantly increasing, but connectivity cannot be the only value

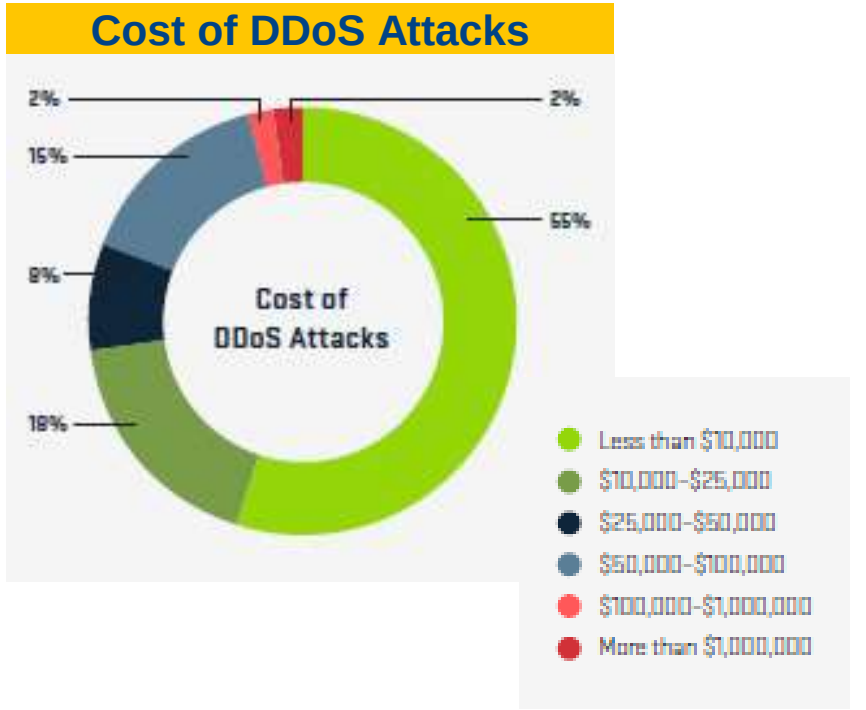
Today's topics:

- Our IP traffic trend
  - Global and Japan
- Our Challenges
  - IP transit + Anti-DDoS
  - Utilize as a part in total solution

DDoS Attacks

- A Growing and Evolving Problem





Source: Arbor Networks XII WISR Report (2017)

Thailand and Mekong region also suffers

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Home » Cybersecurity » SBN News » DDoS attack on Cambodia's top ISPs reached 150Gbps

DDoS attack on Cambodia's top ISPs reached 150Gbps

by Luana Pascu on November 8, 2018

A major DDoS attack hit Cambodia's top ISPs, writes ZDNet. EZECOM, SINET, Telcotech and Digi have all confirmed the attack after users reported issues all last week when trying to use online applications.

The attack's peak was on Nov. 5 and 6, when it almost reached 150Gbps, according to sources, causing at least half a day of downtime and disrupting internet access across the country. Local media reported this security incident as one of the biggest in the country.

"EZECOM has been hard at work with anti-DDoS specialists to deal with this issue, and we expect normalcy to return soon assuming no further large-scale attack," reads the press release.

Announcement on DDoS Attack

Pre-sales support: workshops

What is a DDoS Attack?

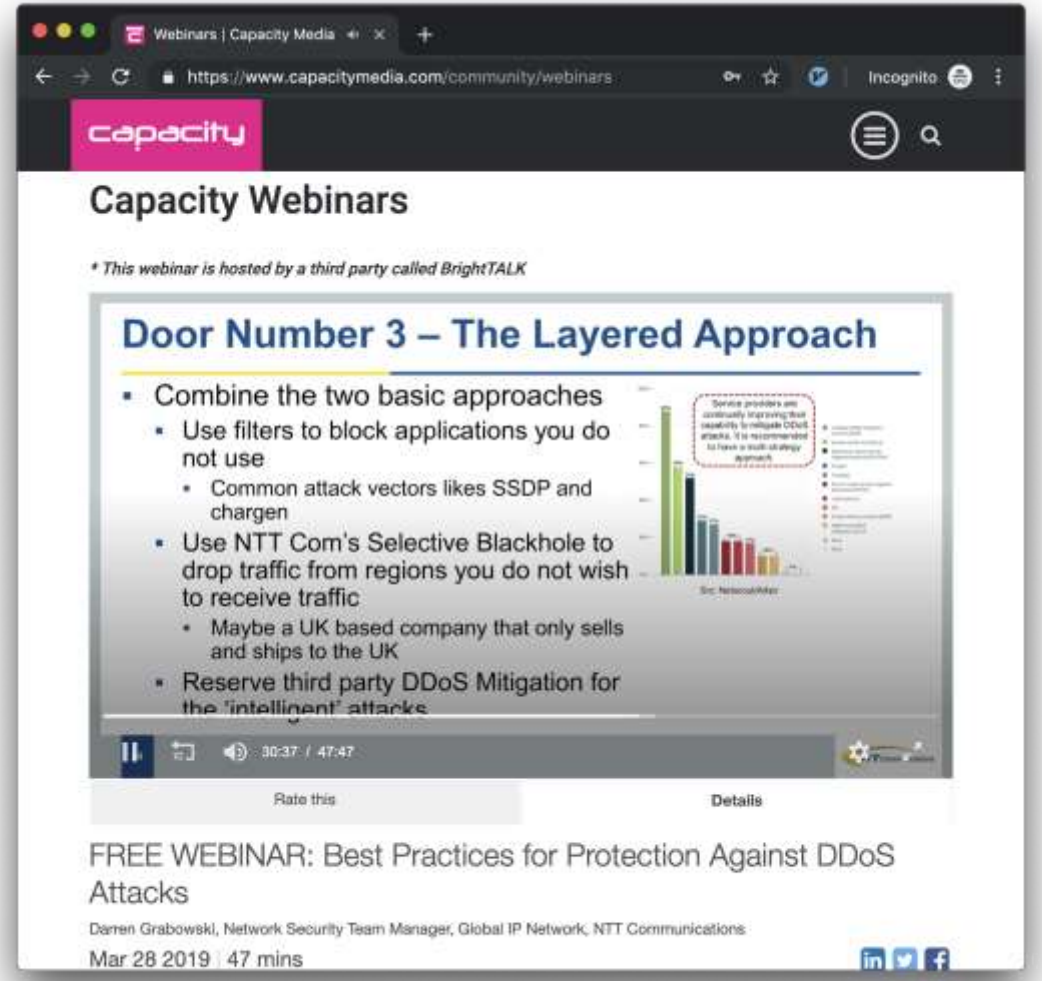
DDoS = Distributed Denial of Service

- Attackers target a specific website or application and flood with a high volume of illegitimate traffic.
- The ensuing slowdown or shutdown blocks legitimate users from access.
- Results are monetary, reputation and brand damage to a company or organization.
- Any Internet-centric organization is a high-potential target for DDoS attacks.

DDoS Attacks

Recent Press Coverage

Open Webinars



Visit Capacity Media: https://www.capacitymedia.com/community/webinars

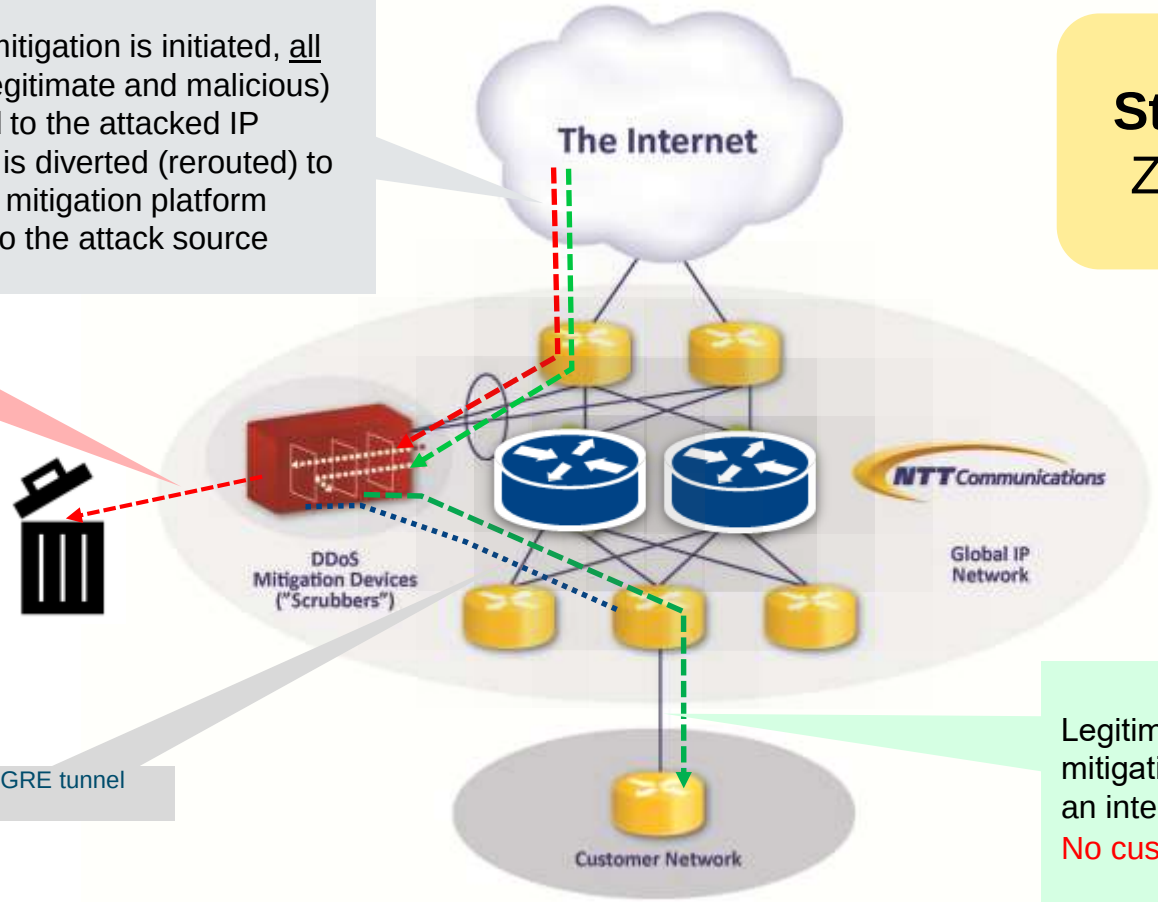
Providing DDoS Protection Service (DPS)

- Mitigation and Clean Traffic Delivery

After a mitigation is initiated, all traffic (legitimate and malicious) destined to the attacked IP address is diverted (rerouted) to the NTT mitigation platform closest to the attack source

Standard Delivery Option
Zero Touch Configuration

Malicious traffic is identified and discarded by the mitigation platform



Legitimate ("clean") traffic is forwarded from the mitigation platform to the customer's IP port over an internal GRE tunnel (using VRF)
No customer configuration required

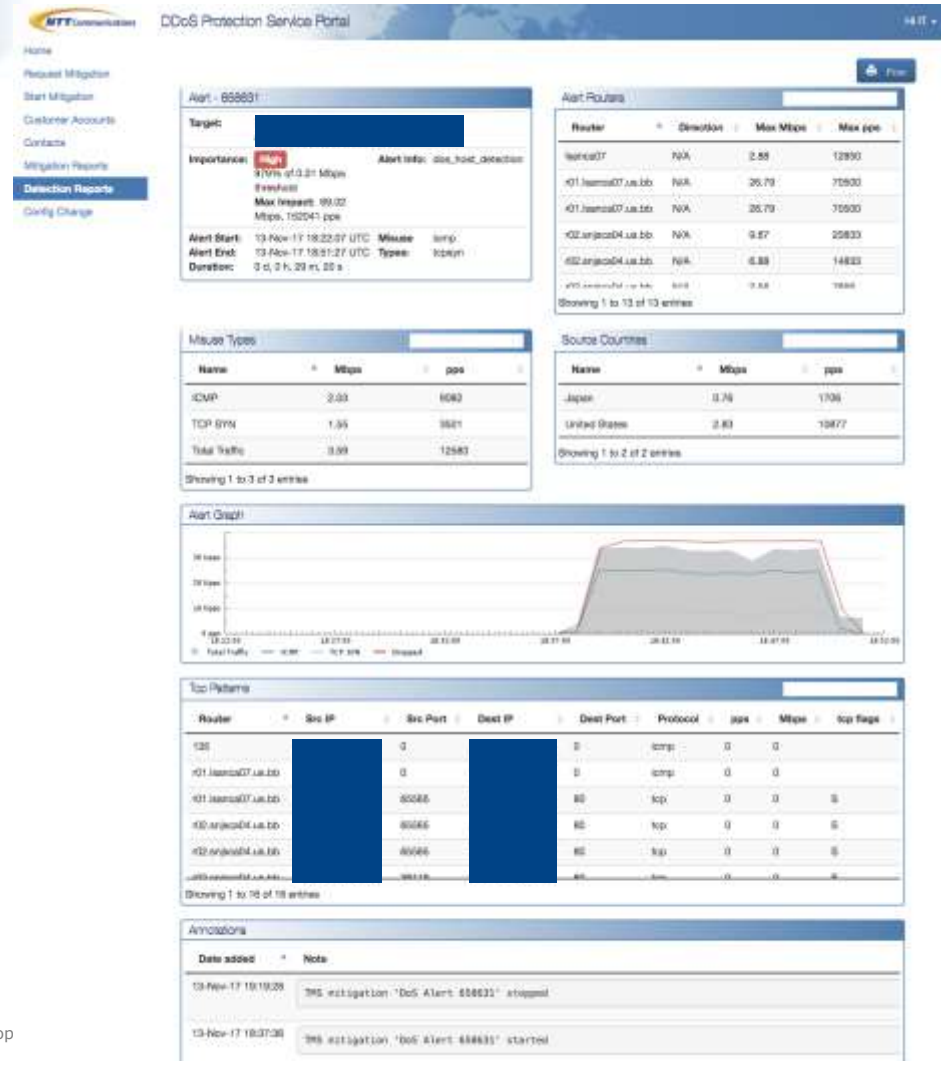
DPS line-up

- A DDoS Protection Solution for Every Customer

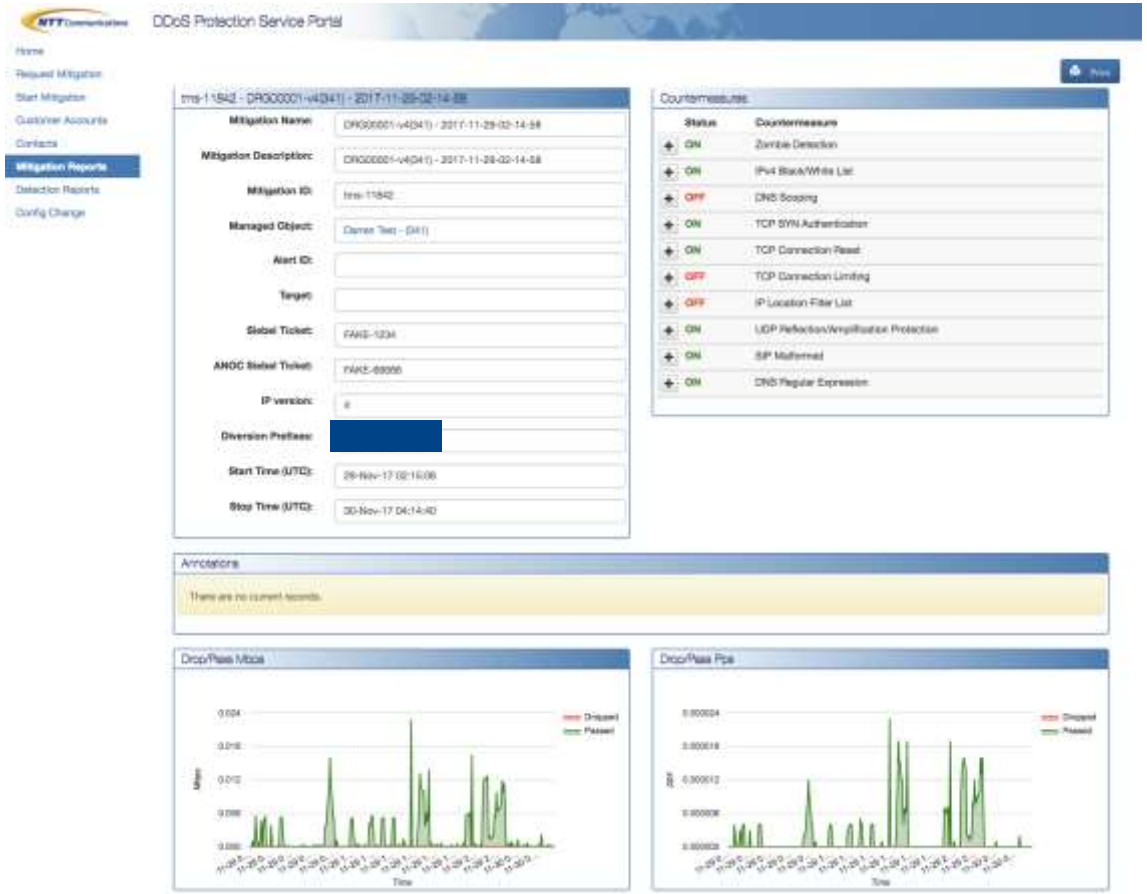
	ACL	Access to NST	On-Request Mitigation	Response Time SLA	Self-Initiated Mitigation	DDoS Detection	DDoS Auto-Mitigation
DPS Control	+	-	-	-	-	-	-
DPS Core	+	+	+	+	-	-	-
DPS Detect	+	+	+	+	+	+	-
DPS Max	+	+	+	+	+	+	+

DPS Portal

Detection Report

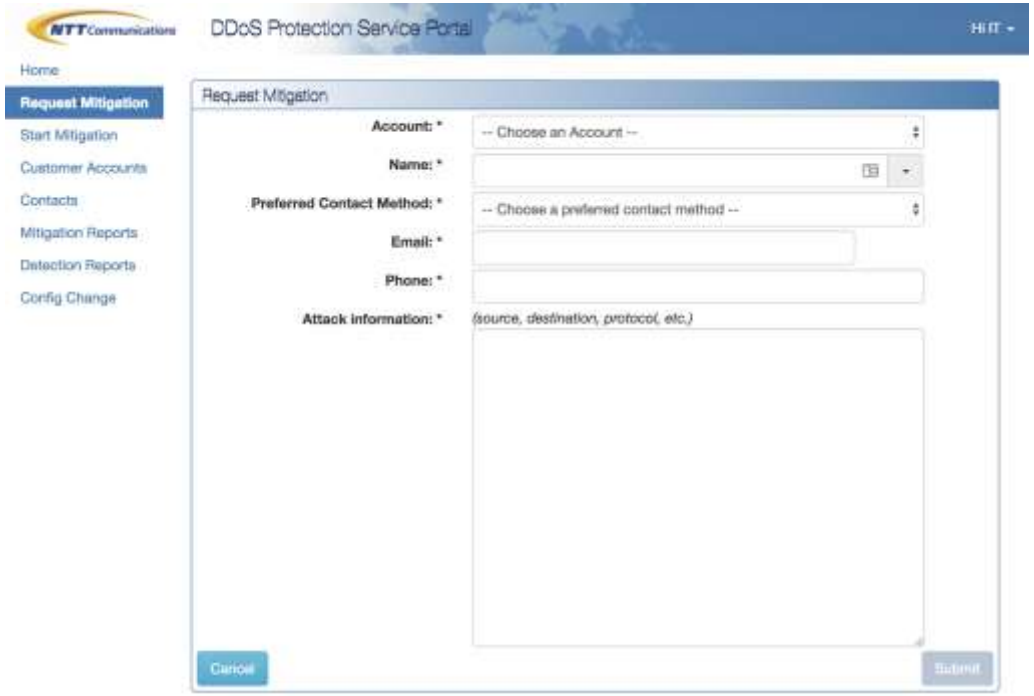


Mitigation Reports



DPS Portal

Request Mitigation



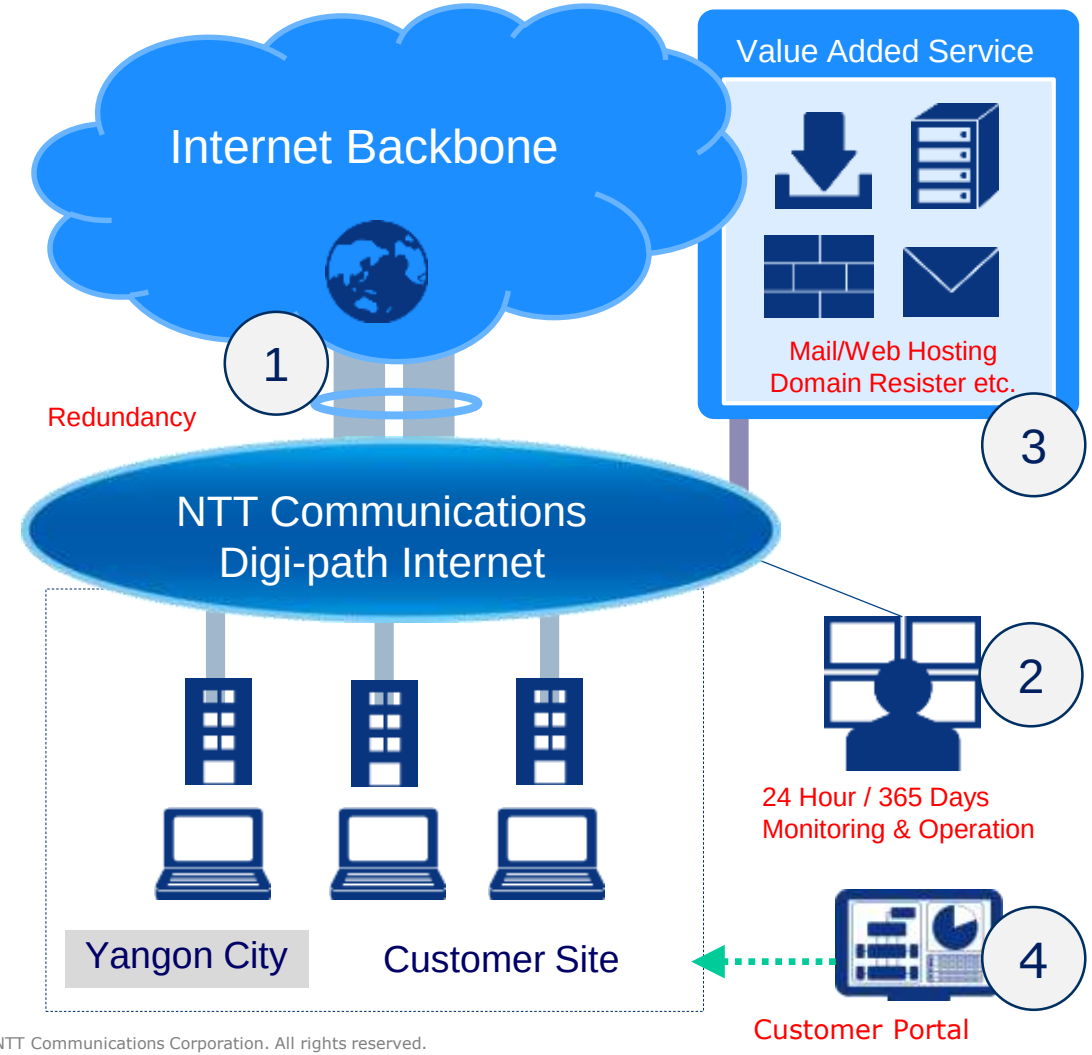
Start Mitigation

Today's topics:

- Our IP traffic trend
  - Global and Japan
- Our Challenges
  - IP transit + Anti-DDoS
  - Utilize as a part in total solution

Thailand case: Digi-path Internet Premier

- A dedicated Internet Access Service with valuable services in Thailand
- Now covers Phnom Penh (Cambodia), Yangon and Mandalay (Myanmar)

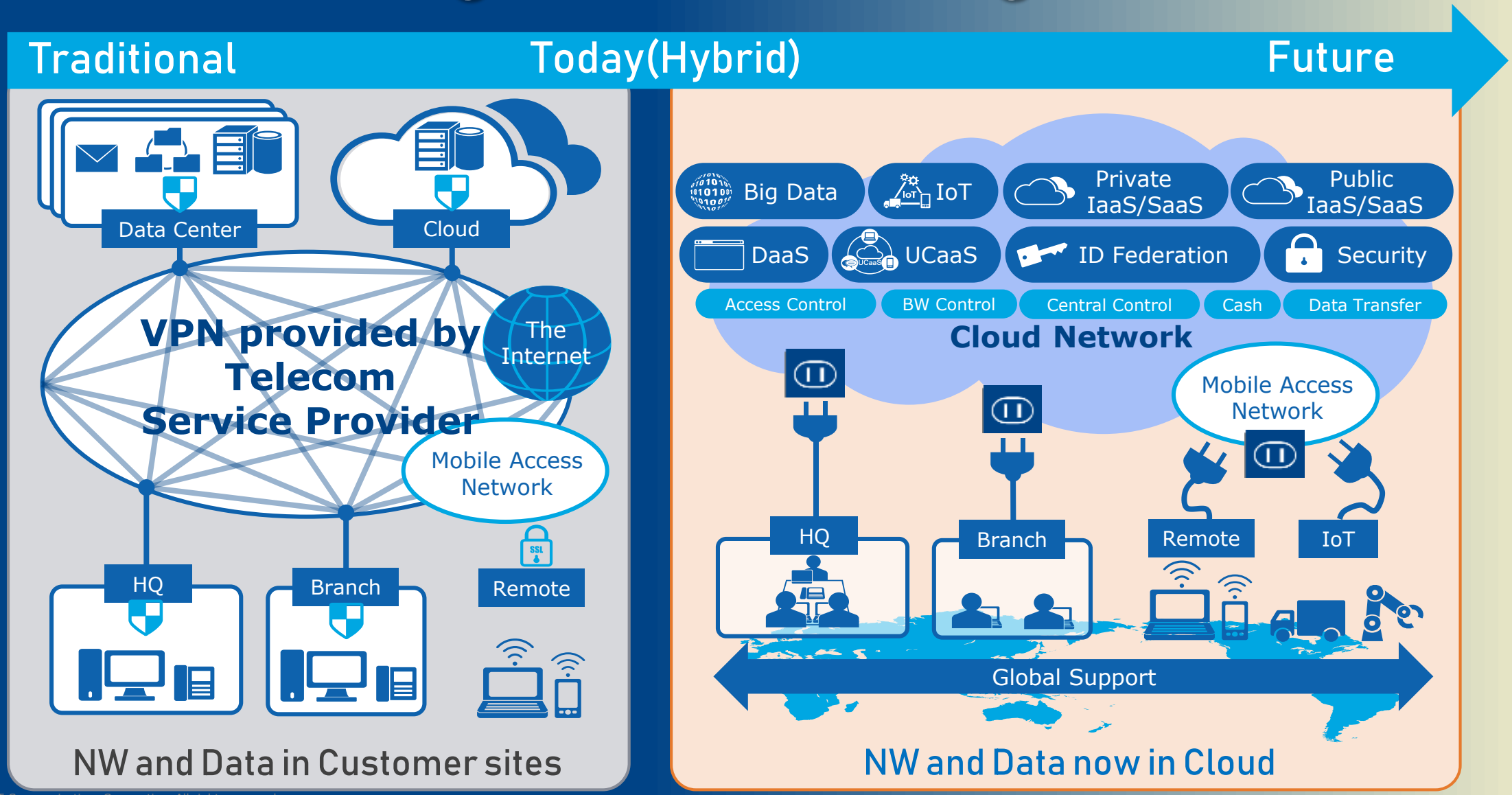


	Feature
1	High Available Infrastructure
2	Reliable Operation
3	Value Added Service
4	Customer Portal

Other challenge

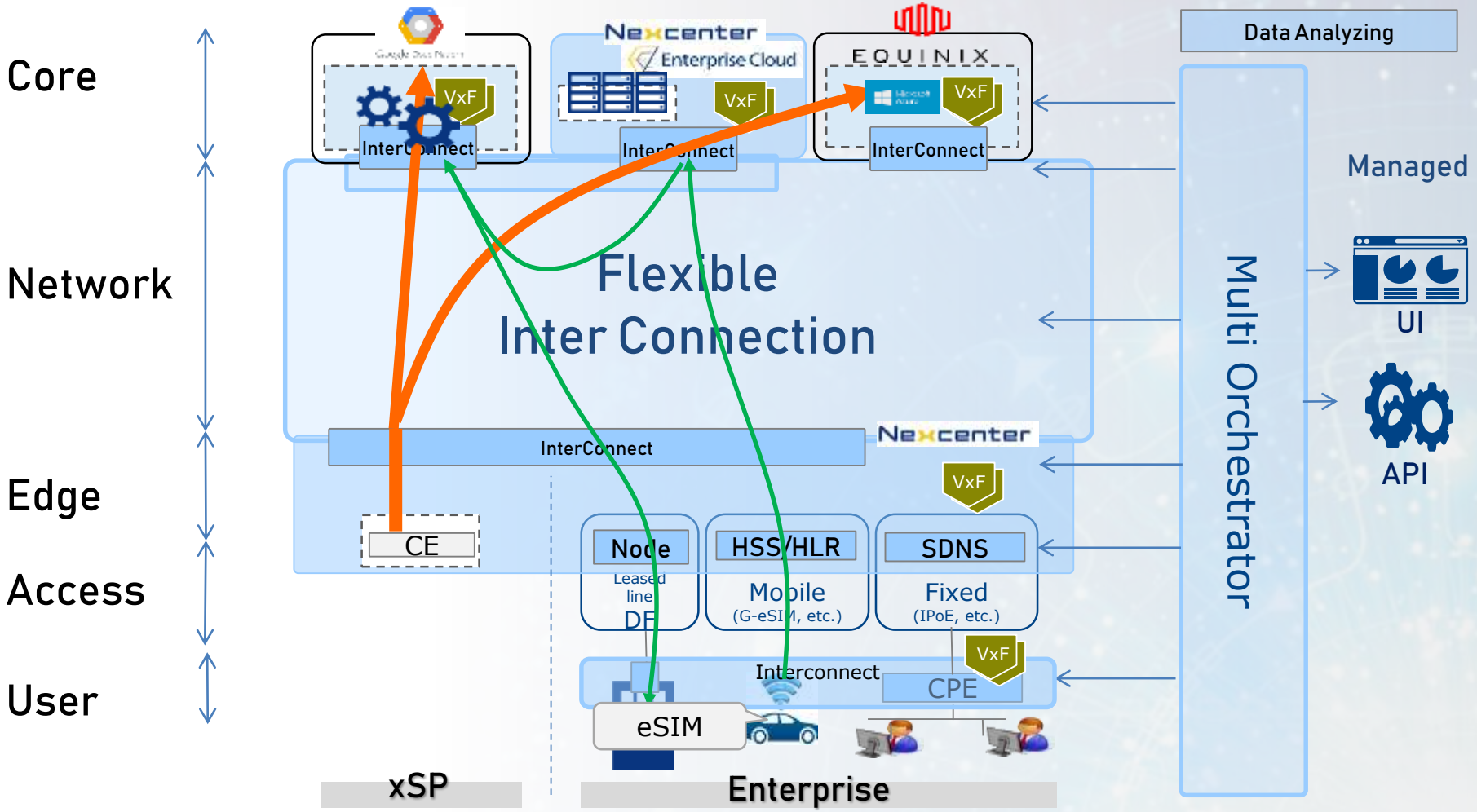
- Still conceptual and early phase of development
  - Customer data asset shift to cloud
  - Towards more flexible end-to-end data management

Market Change surrounding Cloud



Upcoming Service: Flexible Inter Connection

- Enables xSP and Enterprises to connect everything flexibly via our portal/API
- For internet connectivity, IP backbone service to be involved with "evolution"



Summary:

- Our IP traffic trend
  - Constantly increasing, but connectivity cannot be the only value
- Our Challenges
  - IP transit + Anti-DDoS
  - Utilize as a part in total solution (need some evolution)


Transform. Transcend.
Trusted partner of customers
to achieve digital transformation together
ขอขอบคุณ
Thank you
ありがとうございました
NTT Communications
Transform. Transcend.