Enhancing Digital Infrastructure to Support Digital Economy in Thailand

## Chalermpol Charnsripinyo, PhD.

Content Outline

- Country Profile and Telecom Indicators
- National Policy and Plan
  - National Digital Economy Plan
- Enhancing Network Infrastructure and Way Forward
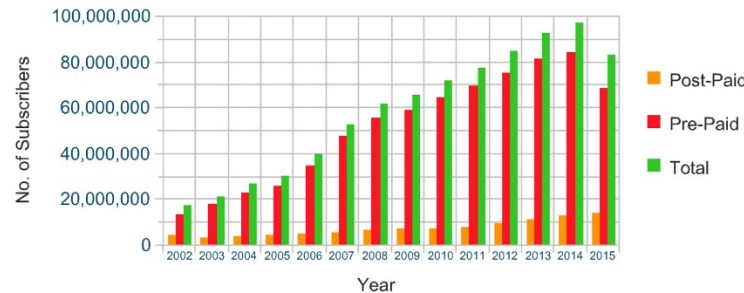
Thailand Profile and Telecom Indicators

- **Area : 513,115 sq km.**
- **Population : 65,729,098**
  Males: 32,280,886, Females: 33,448,212
- **Households : 24,712,420**
- **GDP per Capita :5560 USD**
- **Fixed Broadband Subscribers : 6,229,167**
- **Mobile subscribers: 84,796,545**
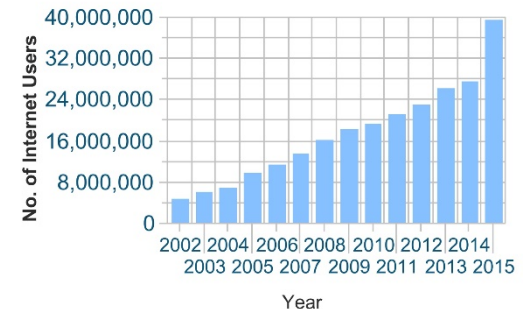- **Estimated Internet users: 38,015,725**

Broadband Internet Subscribers
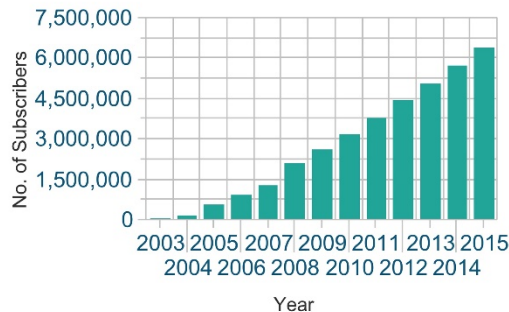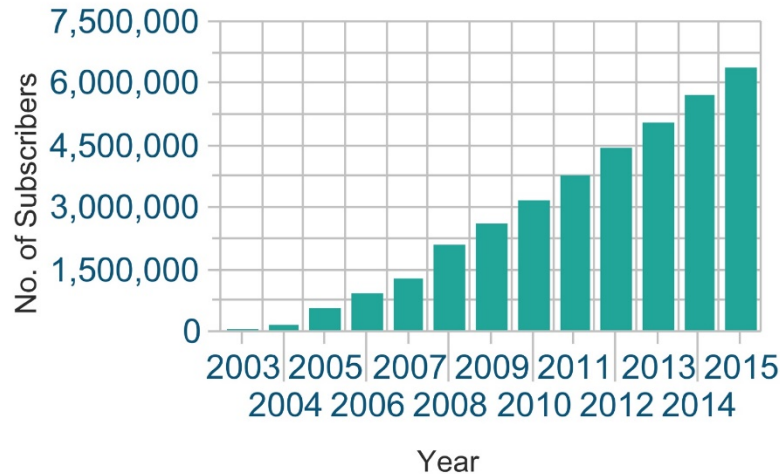
Mobile Subscribers

Thailand Internet Users

Source: DOPA Thailand, Wordbank, NBTC
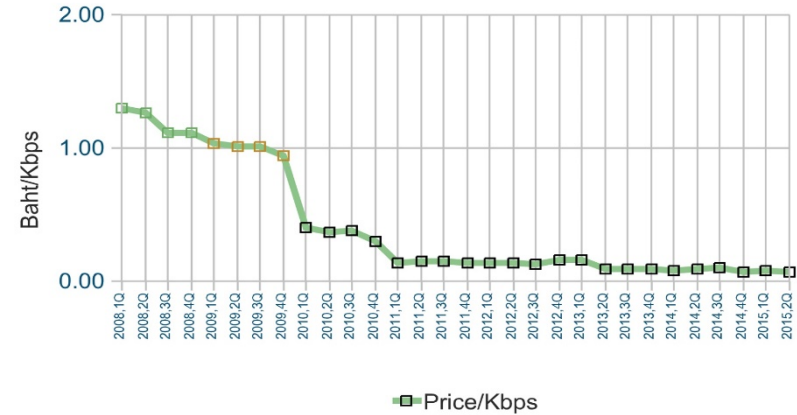
Fixed Broadband Internet Report

Source: NBTC
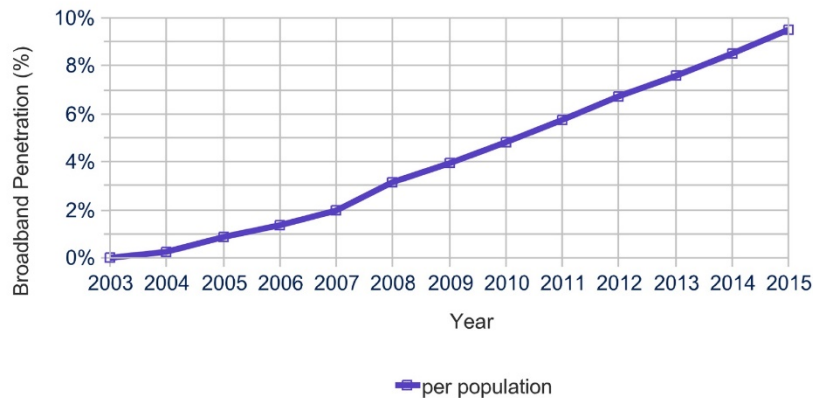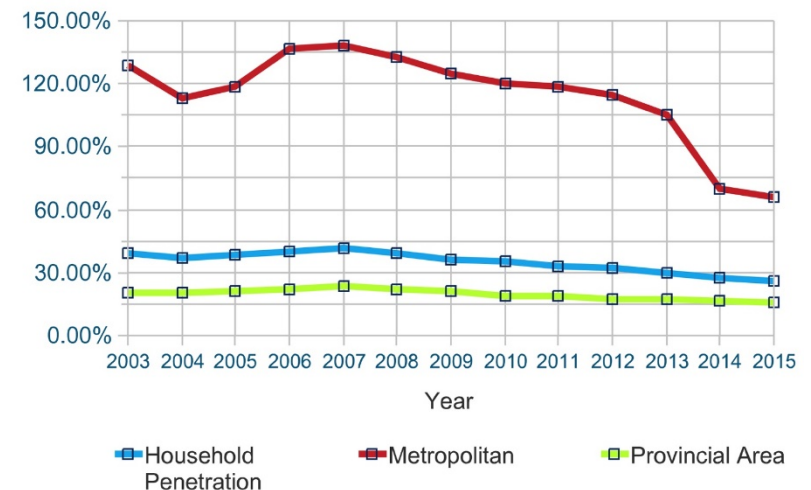
Mobile Market Report
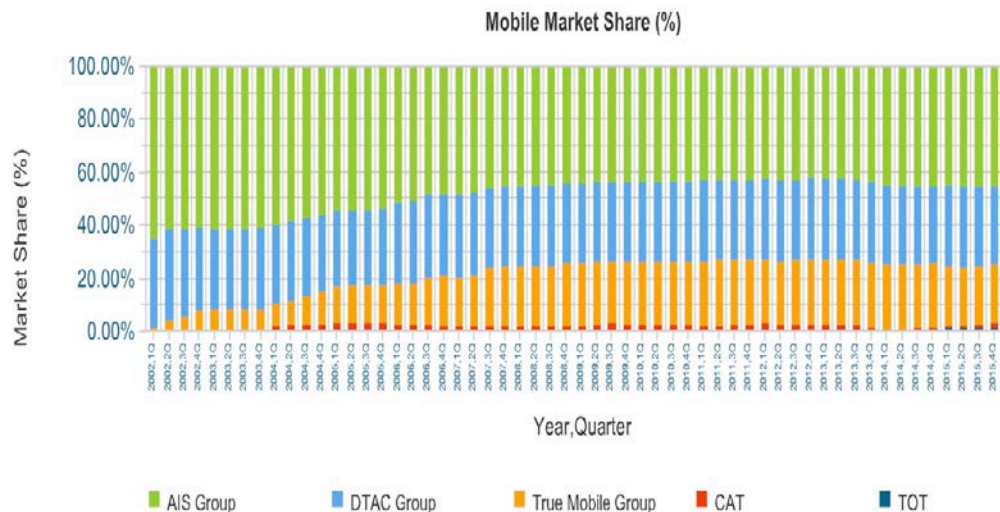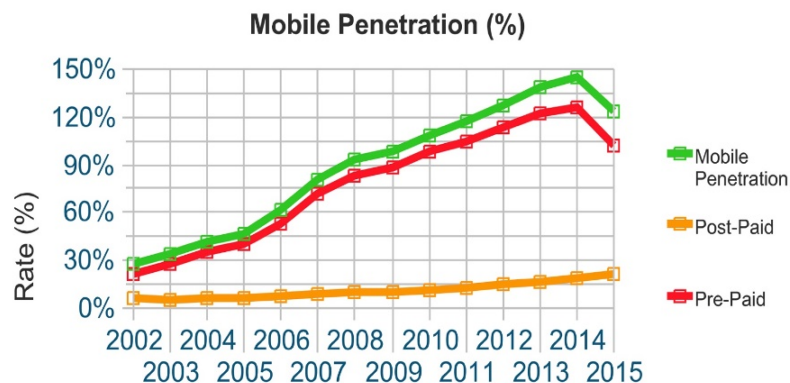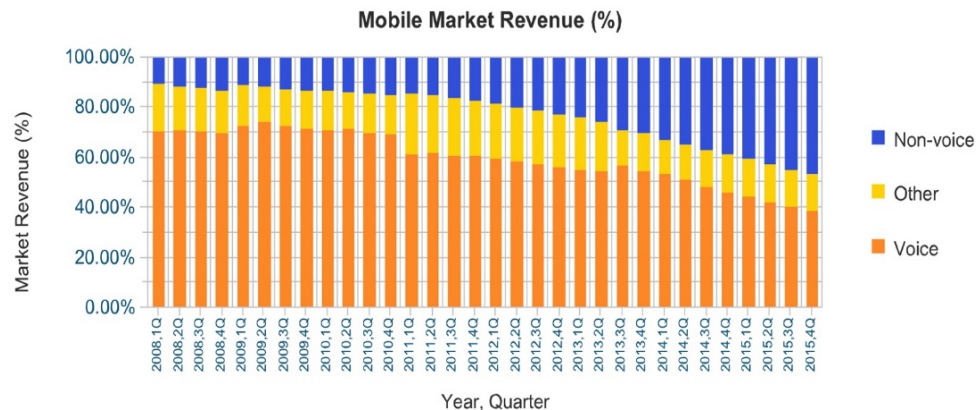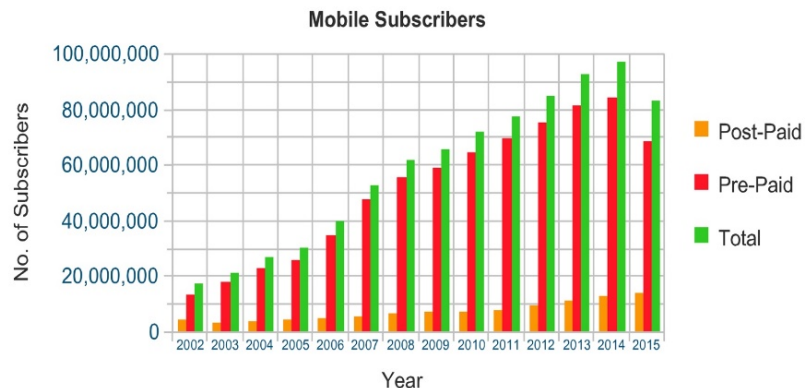
Internet Report

Thailand Internet Users
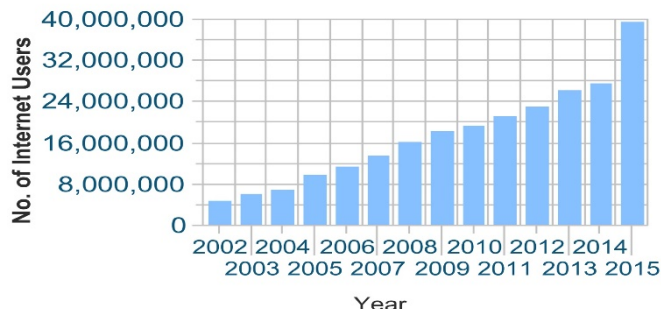
IIG (Mbps) Monitor : July 2006 to March 2016
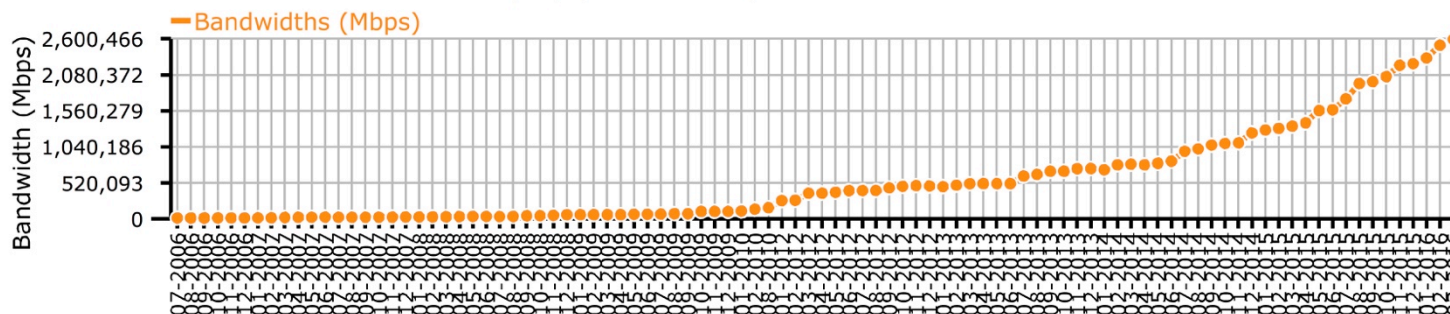
NIX (Mbps) Monitor : May 2007 to March 2016

Source: NBTC
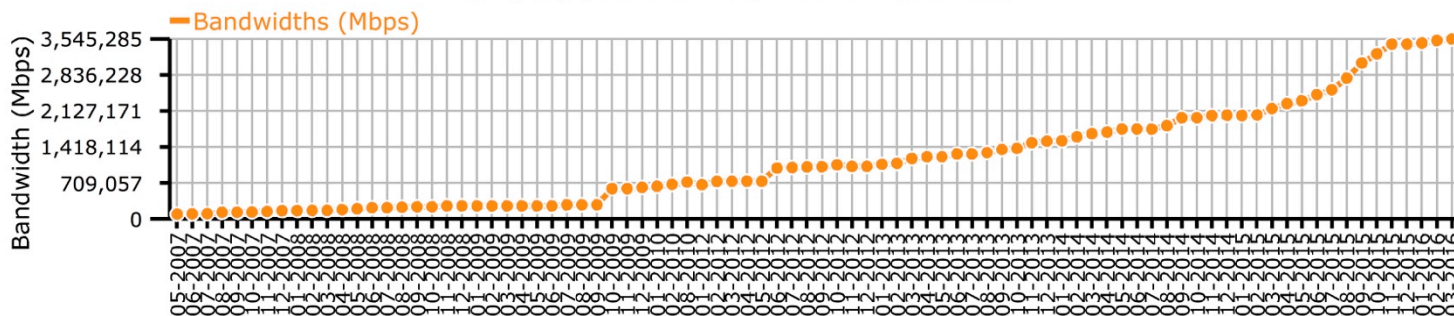
THAILAND INTERNATIONAL INTERNET GATEWAY
แผนภาพการเชื่อมต่อเครือข่ายอินเทอร์เน็ตระหว่างประเทศ

Thailand Internet Map
March 2016

NECTEC
a member of NSTDA

Total International Bandwidth
2,595.466 Gbps.
Last update: 07/04/2016

CAT-IIG AS4651
AWN-IIG (SBN) AS45430
BB Connect-IIG (UIH/ BEENET) AS45796
CSL-IIG (CS Loxinfo) AS7568
DTAC-IIG AS10089
JasTel-IIG AS45629
SYMC-IIG (Symphony) AS132876
TCCT-IIG AS58430
TIG-IIG (TRUE) AS38082
TOT-IIG AS38040
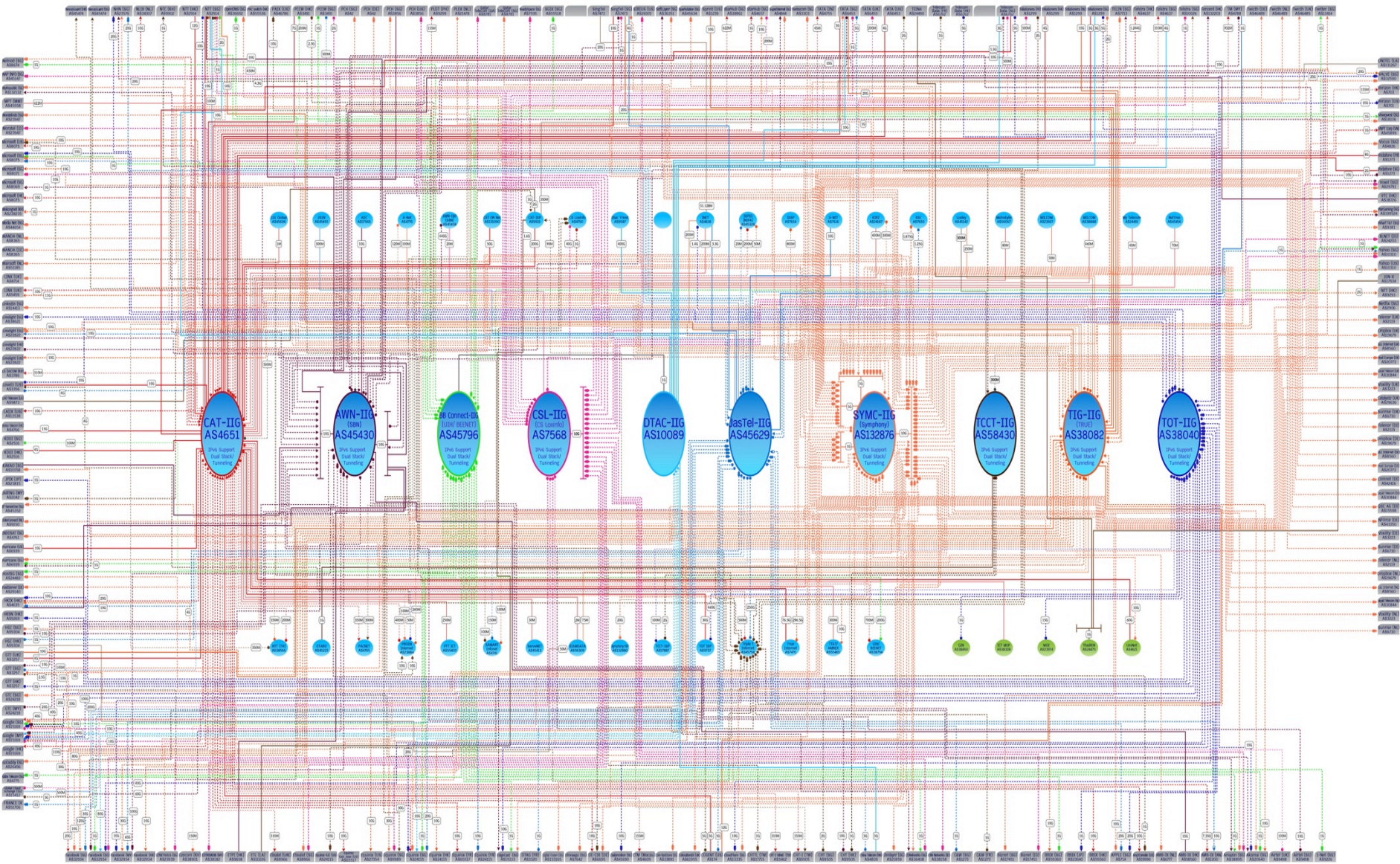
Legend
International Internet Gateway: IIG
International Internet Provider
Commercial Internet Provider
Government/Research/Academic

CAT International Link
BB Connect International Link
CS Loxinfo International Link
DTAC International Link
JasTel International Link
SBN International Link

Symphony International Link
TCCT International Link
TIG International Link
TOT International Link
IIG to IIG

ISP to International Internet Provider
Share Bandwidth
IPv6 Dual Stack
IPv6 Tunneling
IPv6 Native

Peering
Peering/ IPv6 Dual Stack
Peering/ IPv6 Tunneling
Peering/ IPv6 Native

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THAILAND DOMESTIC INTERNET EXCHANGE
แผนภาพการเชื่อมต่อเครือข่ายอินเทอร์เน็ตภายในประเทศ

Thailand Internet Map
March 2016

Total Domestic Bandwidth
3,540.285 Gbps.
Last update: 07/04/2016

Legend

Thailand Internet Exchange : IX	Layer2 Exchange Point
Commercial Internet Provider	
Government/Research/Academic	

- JasTel Internet Exchange — TOT Internet Exchange — Government to ISP or Internet Exchange
- CAT Internet Exchange — SBN Internet Exchange — Internet Protocol Version 6 Native
- BB Connect Internet Exchange — Symphony Internet Exchange — IIR (NECTEC) Internet Exchange — Internet Protocol Version 6 Tunneling
- CS Loxinfo Internet Exchange — TCCT Internet Exchange — ISP to ISP/Internet Exchange to Internet Exchange — Internet ProtocolVersion 6 Dual Stack
- DTAC Internet Exchange — TIG Internet Exchange — Government/Research/Academic — Peering/ IPv6 Native

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International Internet Bandwidth

DECEMBER 2014
Total Internet Bandwidth
1,239,803 Mbps

HK
(ฮ่องกง)
13%

Europe
(ยุโรป)
7%

Others
(อื่นๆ)
1%

SG
(สิงคโปร์)
42%

USA
(สหรัฐอเมริกา)
16%

MY
(มาเลเซีย)
21%
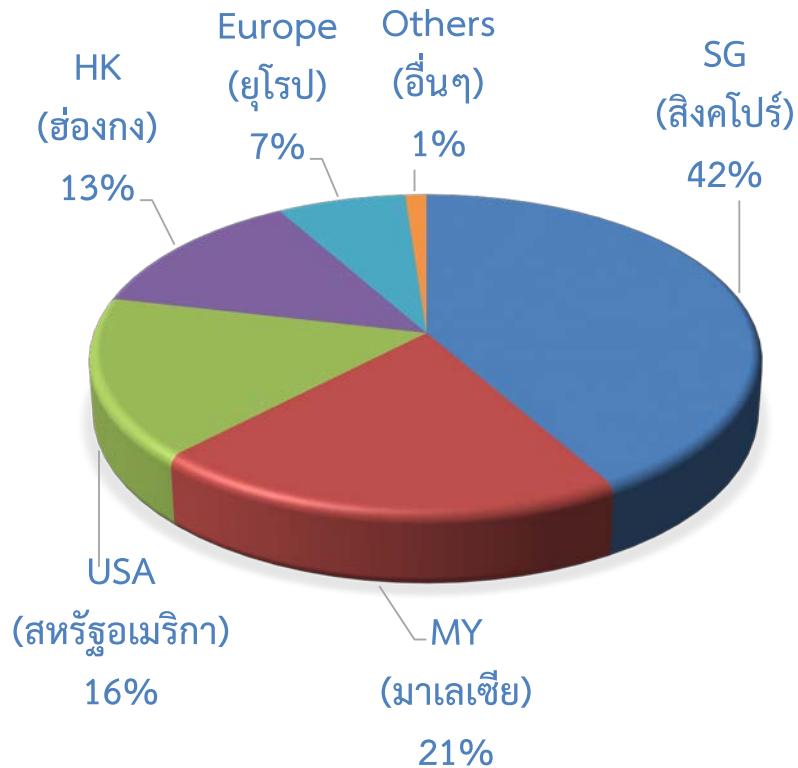
DECEMBER 2015
Total Internet Bandwidth
2,240,783 Mbps

HK
(ฮ่องกง)
10%

Europe
(ยุโรป)
5%

Others
(อื่นๆ)
1%

SG
(สิงคโปร์)
48%

MY
(มาเลเซีย)
28%

USA
(สหรัฐอเมริกา)
8%

Source: NECTEC Internet Map
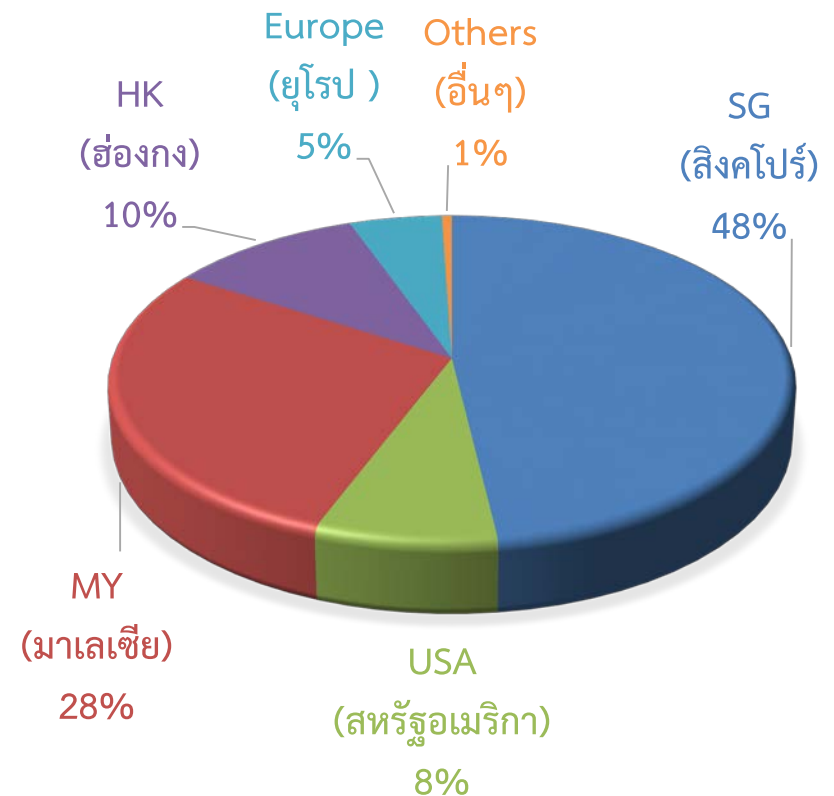
Thailand International Bandwidth Forecast
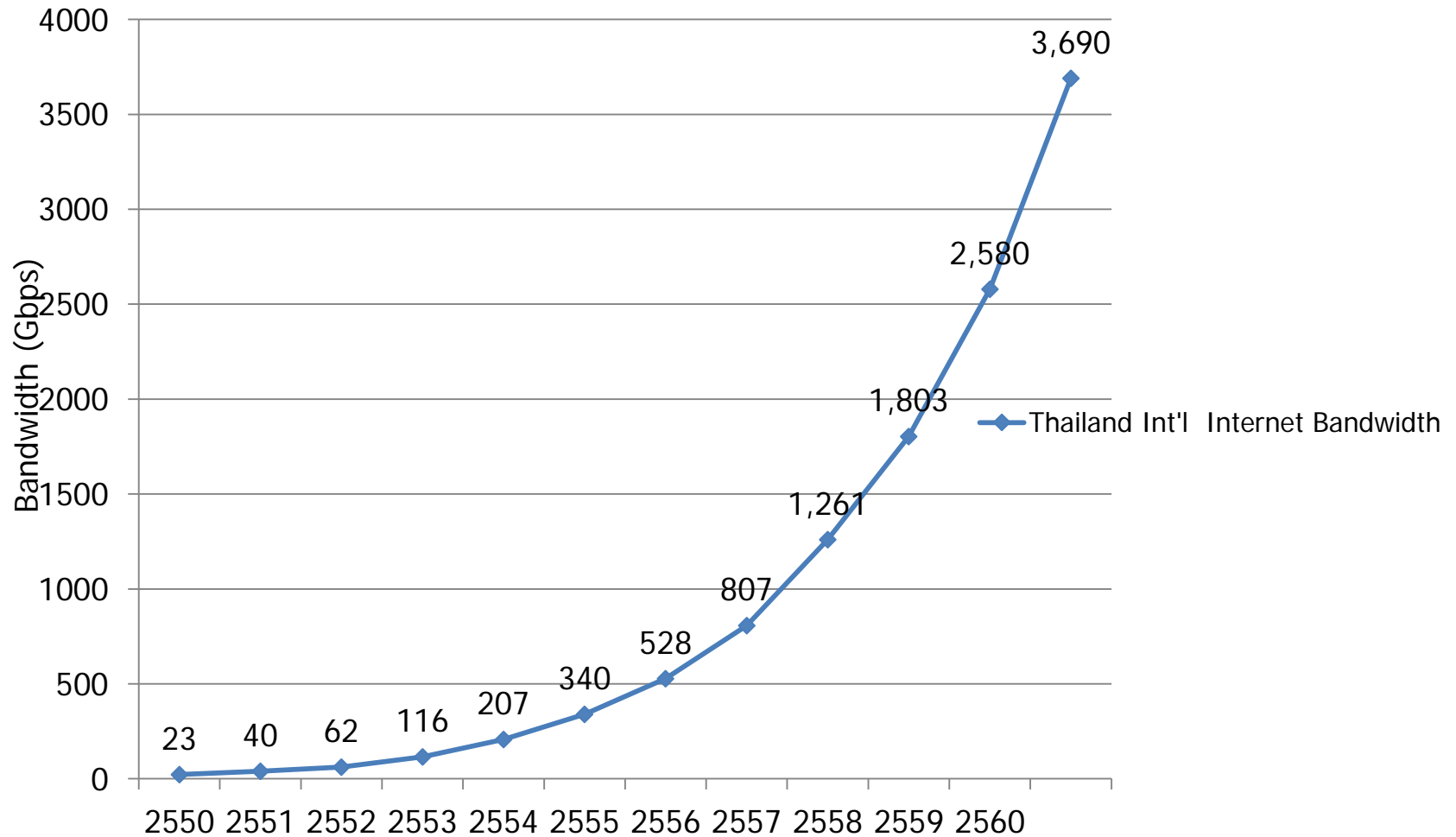
International Internet Traffic

LimeLight
30,000
3.48%

Akamai
21,000
2.43%

Microsoft
71,000
8.23%

Facebook
201,000
23.29%

Content hit

Google
540,000
62.57%

Source: CAT on July 2015

National Policy and Plan

9th National Economic and Social Development Plan (2002-2006)	10th National Economic and Social Development Plan (2007-2011)	11th National Economic and Social Development Plan (2012-2016)	12th National Economic and Social Development Plan (2017-2021)

Year

2000	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21

IT Policy Framework 2000

IT Policy Framework 2010 (2002-2010)

ICT Policy Framework 2020 (2011-2020)

ICT Master Plan (2002-2006)

ICT Master Plan Extended (2007-2008)

2nd ICT Master Plan (2009-2013)

3rd (Draft) ICT Master Plan (2014-2018)

National Digital Economy Plan (5 April, 2016)

National Broadband Policy (9 Nov. 2010)

DE

Digital Government Plan (5 April. 2016)

Government Agenda on Digital Economy

12

National Digital Economy Plan

Vision

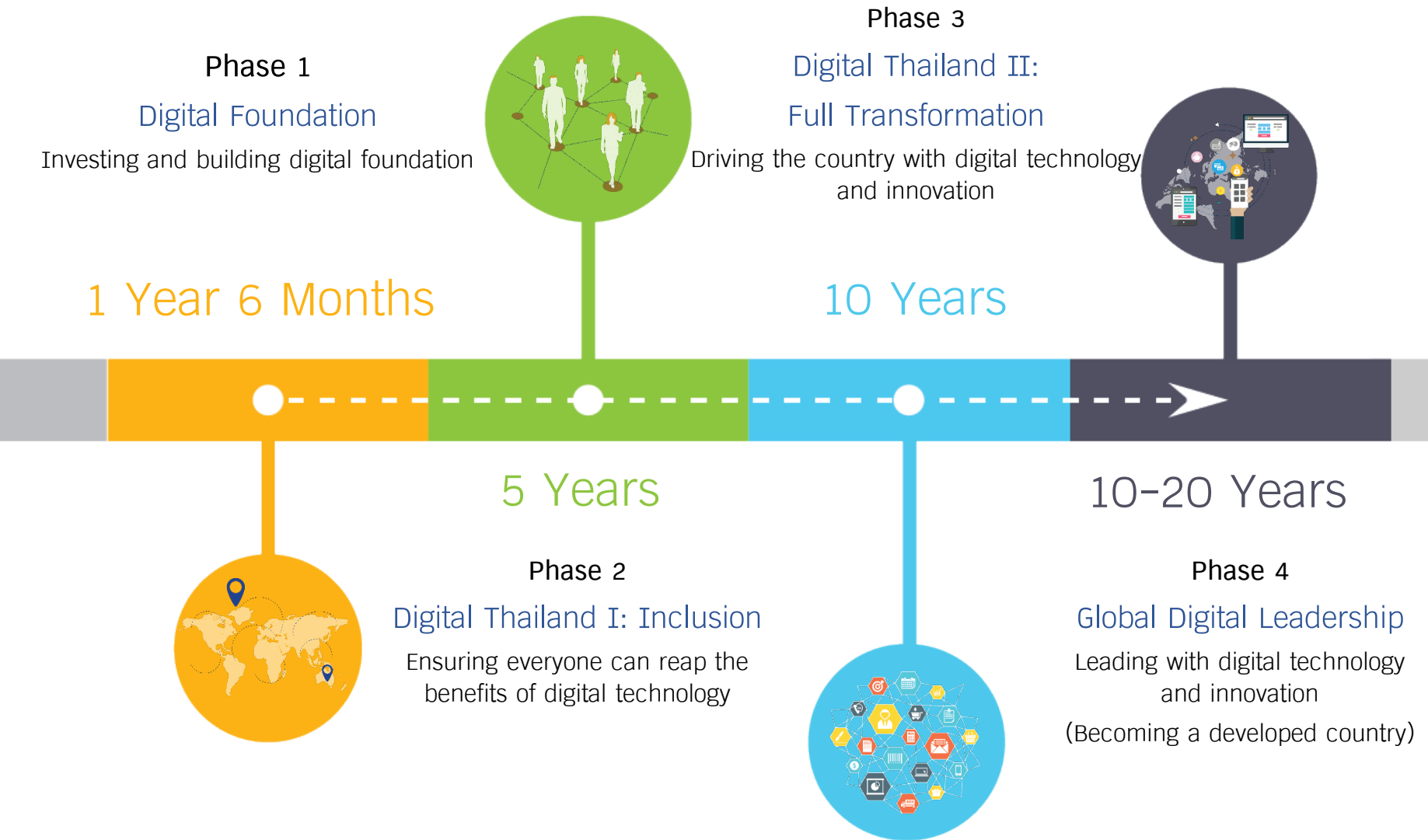Transform towards Digital Thailand

Digital Thailand

is defined as a transformed Thailand that maximizes the use of digital technologies in all socio-economic activities in order to develop infrastructure, innovation, data, human capital, and other digital resources that will ultimately drive the country towards wealth, stability, and sustainability.

The National Digital Economy Plan was approved by the cabinet on 5 April, 2016

20-Year Thailand Digital Landscape

Phase 1
Digital Foundation
Investing and building digital foundation

Phase 3
Digital Thailand II:
Full Transformation
Driving the country with digital technology and innovation

1 Year 6 Months

10 Years

5 Years

10-20 Years

Phase 2
Digital Thailand I: Inclusion
Ensuring everyone can reap the benefits of digital technology

Phase 4
Global Digital Leadership
Leading with digital technology and innovation

(Becoming a developed country)

Strategies

6. Build trust and confidence in the use of digital technology

Updating laws and regulations, Encouraging investments, Ensuring security

1. Build country-wide high-capacity digital infrastructure

Ensuring accessibility, availability, and affordability

5. Develop workforce for the digital era

Developing skilled workforce, Creating jobs
Building strength from within

2. Boost the economy with digital technology

Driving New S-Curve, Raising Competitiveness,
Building new businesses, Creating values

4. Transform into digital government

Creating open government, Facilitating people and businesses, Integrating into One Government

3. Create a knowledge-driven digital society

Building participation, Ensuring inclusive and equal usage

Source: MICT

National Digital Economy Plan

Strategy 1.

Build country-wide high-capacity digital infrastructure

Ensuring accessibility, availability, and affordability

Goals

- High-quality broadband will be rolled out country-wide, covering all villages, all municipalities and economic zones, all schools, all Tambon hospitals, and all digital community centers

- Broadband subscription rate will be priced under 2% of GNP per Capita.

- Mobile services will be provided in all villages, communities, and tourist attractions

- Thailand will become one of the Internet connectivity hubs

- Digital television and radio broadcasting networks will be launched and expanded country-wide.

Actions

1.1 Roll out nation-wide broadband infrastructure

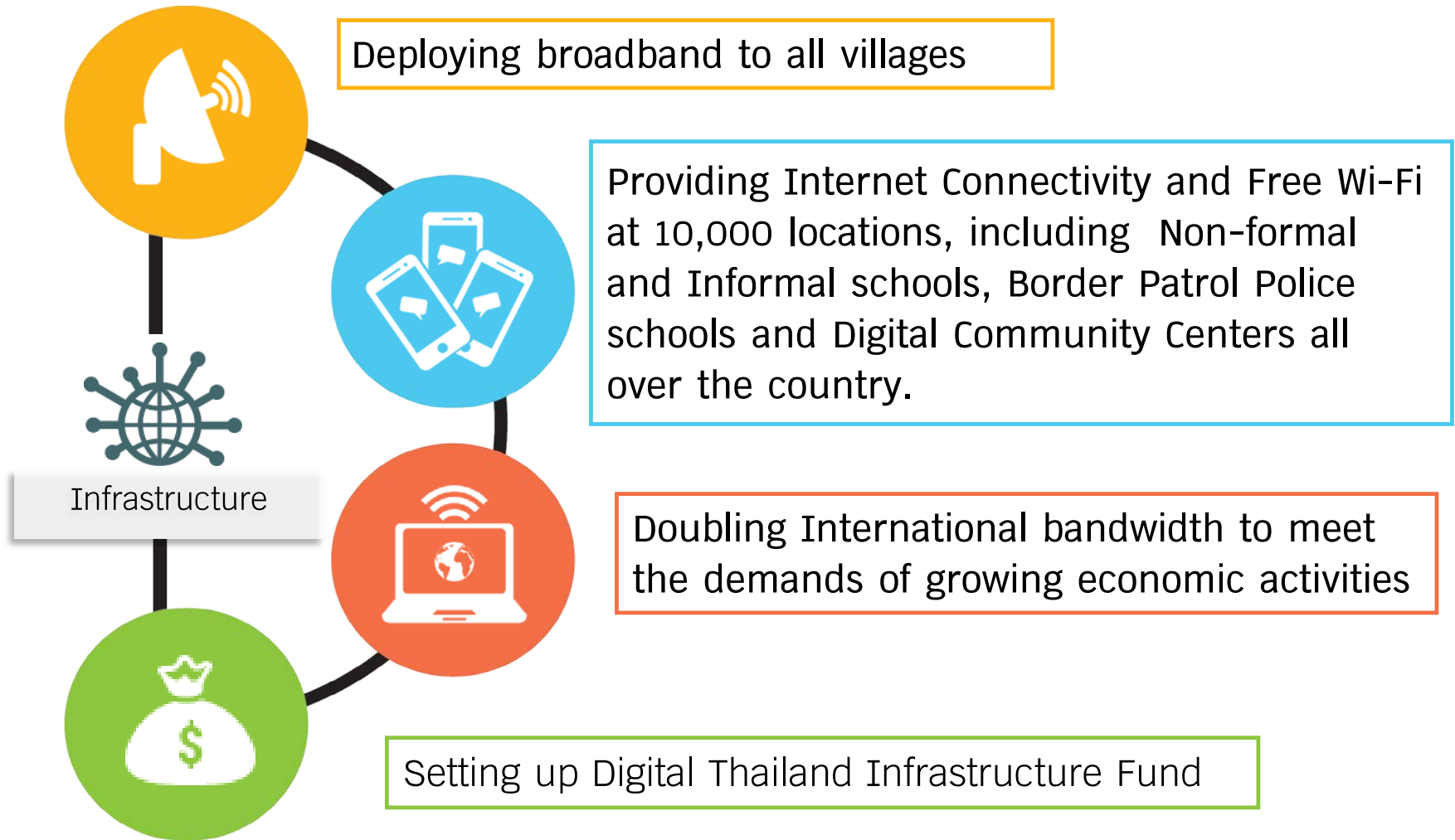1.2 Drive towards an ASEAN connectivity hub

1.3 Develop infrastructure policy

1.4 Reform state-owned enterprises

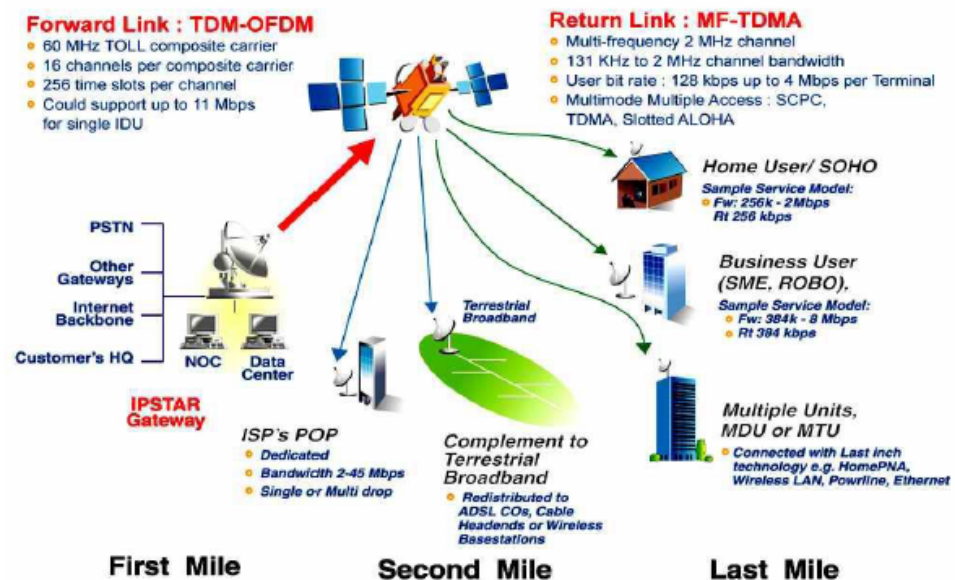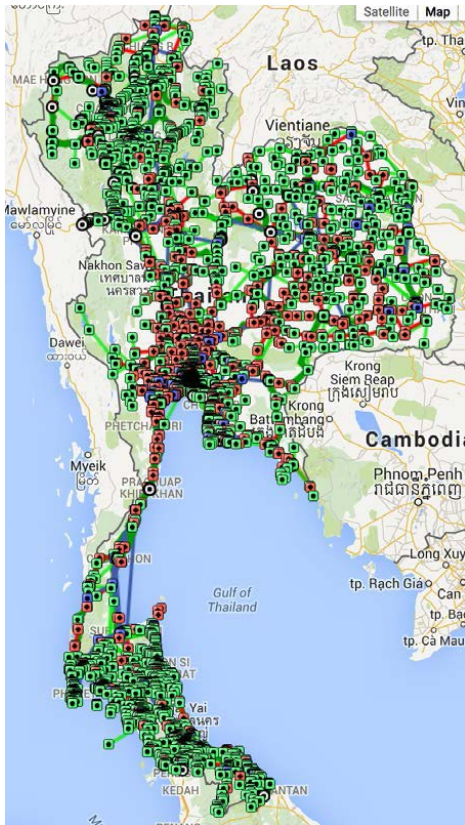# Digital Infrastructure under Thailand' Digital Economy Plan

Source: MICT
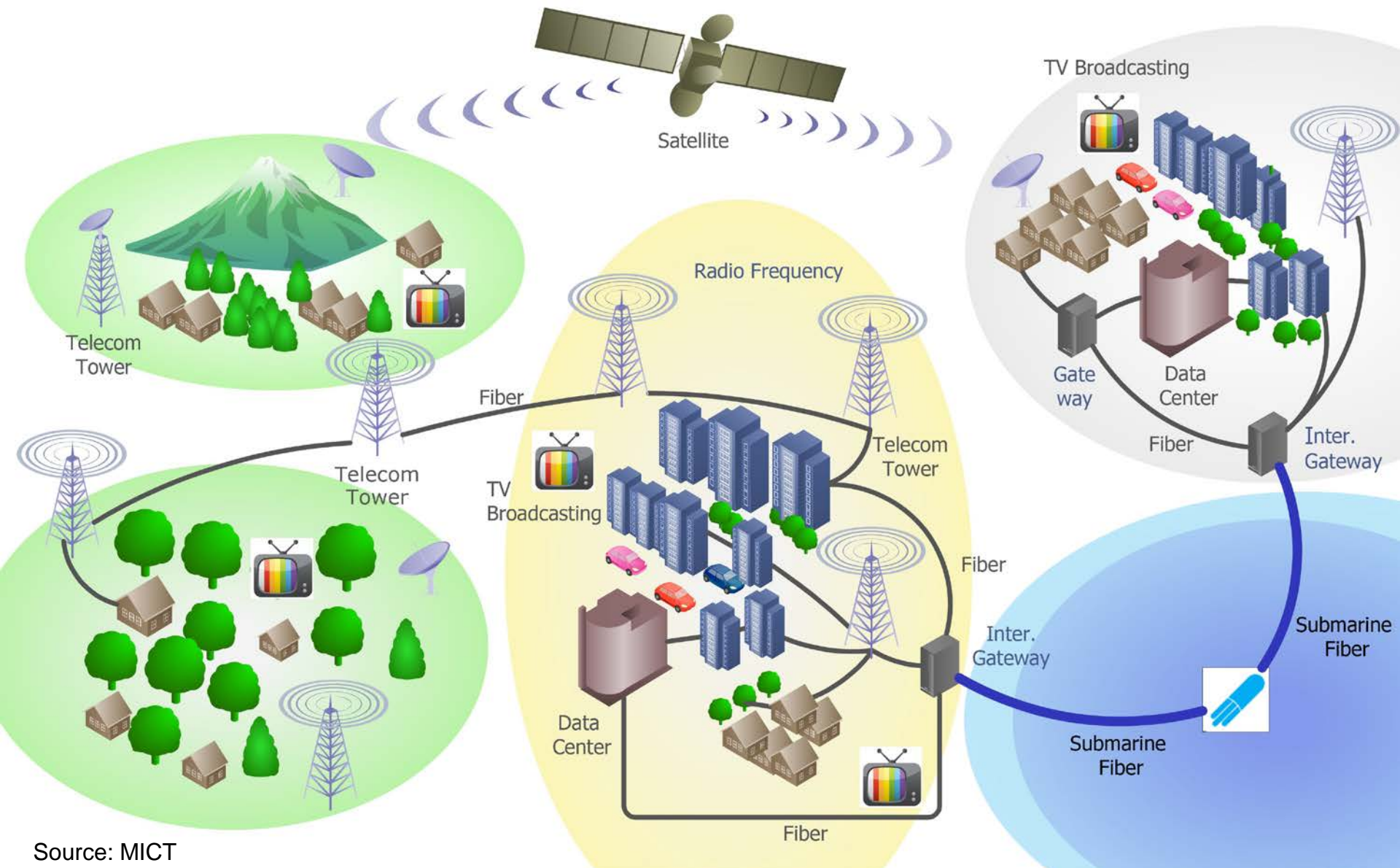
Priority Activities for Strategy 1
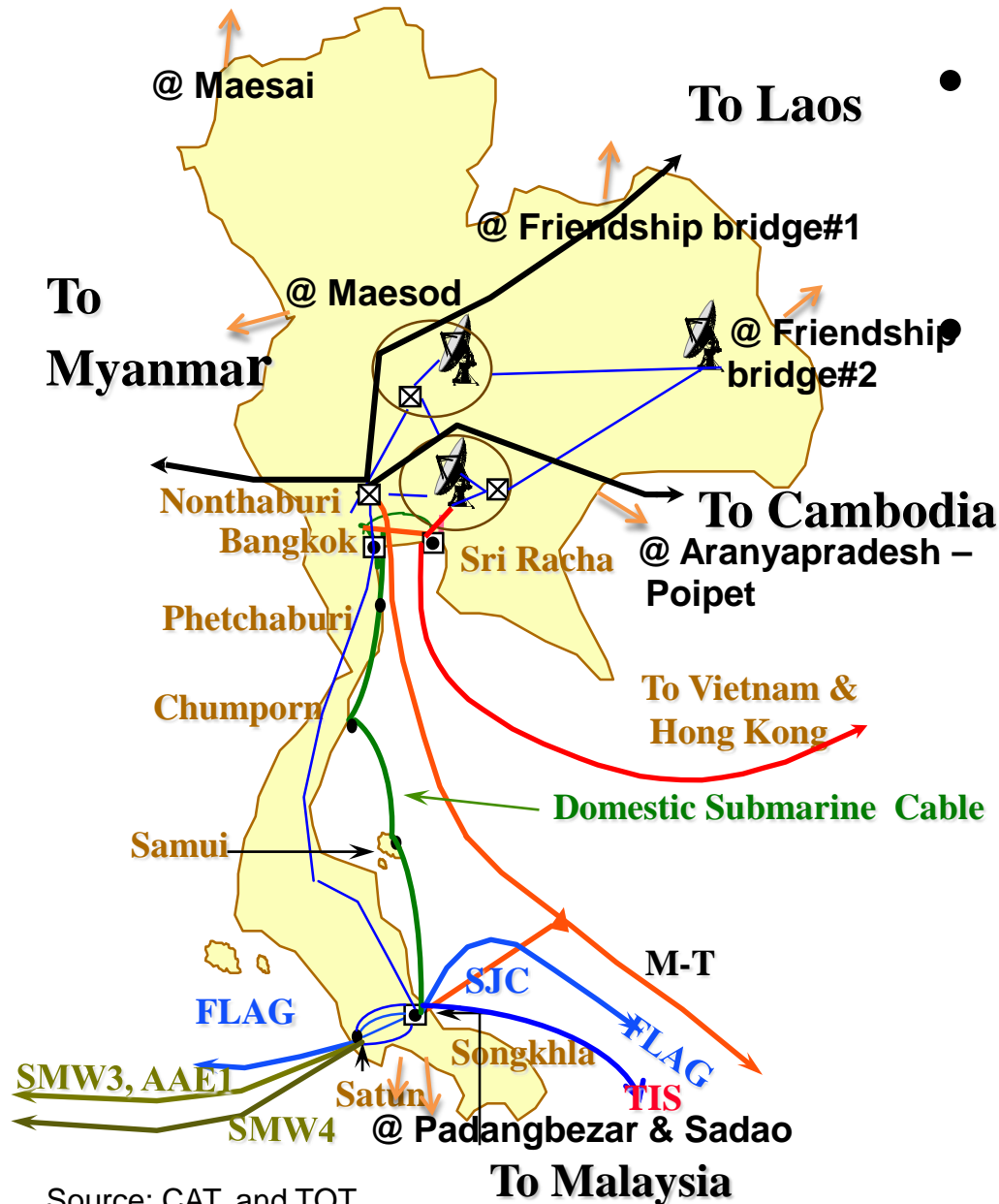
Deploying broadband to all villages

Providing Internet Connectivity and Free Wi-Fi at 10,000 locations, including Non-formal and Informal schools, Border Patrol Police schools and Digital Community Centers all over the country.

Infrastructure

Doubling International bandwidth to meet the demands of growing economic activities

Setting up Digital Thailand Infrastructure Fund

Source: MICT

Existing Network Infrastructure

- Optical fiber cables > 310,000 km national-wide
- ~76% of sub-districts have fiber cable access
- Mobile Broadband Network covers 97% of populated areas
 - The rest will be covered by satellite service

Forward Link : TDM-OFDM
- 60 MHz TOLL composite carrier
- 16 channels per composite carrier
- 256 time slots per channel
- Could support up to 11 Mbps for single IDU

Return Link : MF-TDMA
- Multi-frequency 2 MHz channel
- 131 KHz to 2 MHz channel bandwidth
- User bit rate : 128 kbps up to 4 Mbps per Terminal
- Multimode Multiple Access : SCPC, TDMA, Slotted ALOHA

PSTN
Other Gateways
Internet Backbone
Customer's HQ

NOC   Data Center

IPSTAR Gateway
ISP's POP
- Dedicated
- Bandwidth 2-45 Mbps
- Single or Multi drop

Terrestrial Broadband

Complement to Terrestrial Broadband
- Redistributed to ADSL COs, Cable Headends or Wireless Basestations

Home User/ SOHO
Sample Service Model:
- Fw: 256k - 2Mbps
- Rt 256 kbps

Business User (SME, ROBO),
Sample Service Model:
- Fw: 384k - 8 Mbps
- Rt 384 kbps

Multiple Units, MDU or MTU
- Connected with Last inch technology e.g. HomePNA, Wireless LAN, Powrline, Ethernet

First Mile   **Second Mile**   **Last Mile**

IPSTAR Network Service

Current International Gateway Networks

@ Maesai

To Laos

@ Friendship bridge#1

To Myanmar

@ Maesod

@ Friendship bridge#2

To Cambodia

Nonthaburi
Bangkok

Sri Racha

@ Aranyapradesh – Poipet

Phetchaburi

To Vietnam & Hong Kong

Chumporn

Domestic Submarine Cable

Samui

SJC

M-T

FLAG

FLAG

SMW3, AAE1

Songkhla

Satun

TIS

SMW4

@ Padangbezar & Sadao

To Malaysia

Source: CAT, and TOT

- Thailand has international gateways through terrestrial links, submarine cables, and satellites

- Submarine cable systems are mainly used for global network connections. Three telecom operators (i.e., CAT Telecom, TOT, and Symphony Communication PCL) which have submarine cable systems (SMW3, SMW4, FLAG, AAG, TIS,APG, AAE1, SJC, MCT)
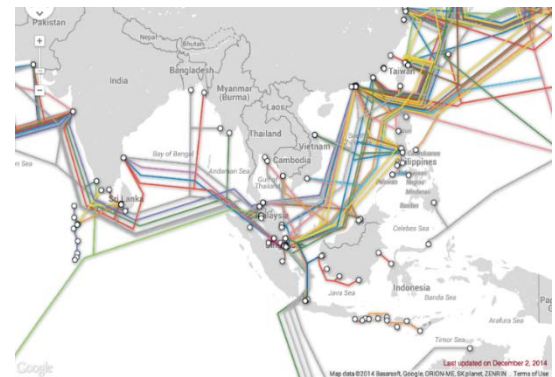
International Submarine Cables From Thailand
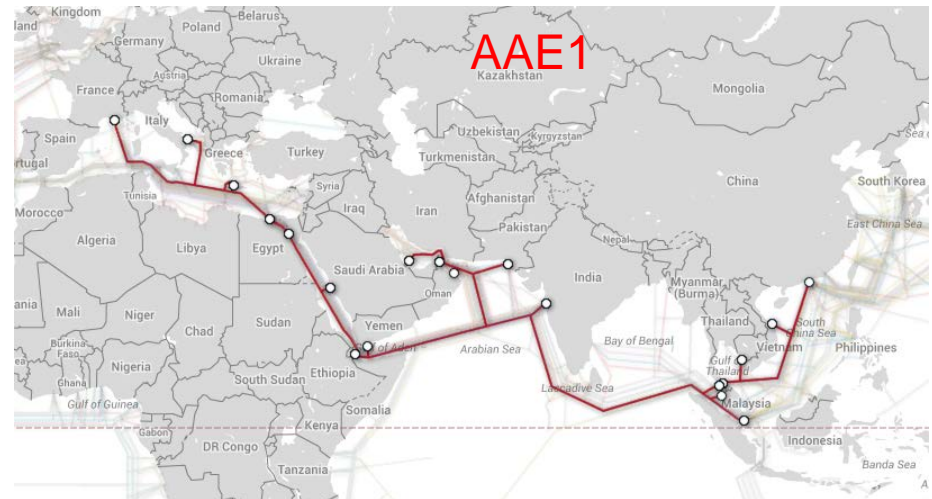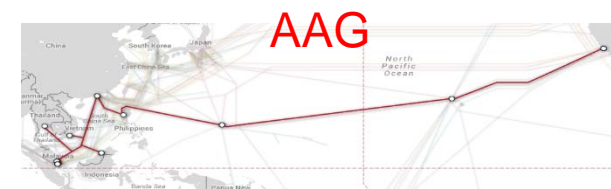
SMW3

SMW4

FLAG

AAG

AAE1

APG

SJC

MCT

International PoP and Connectivity

Source: CAT
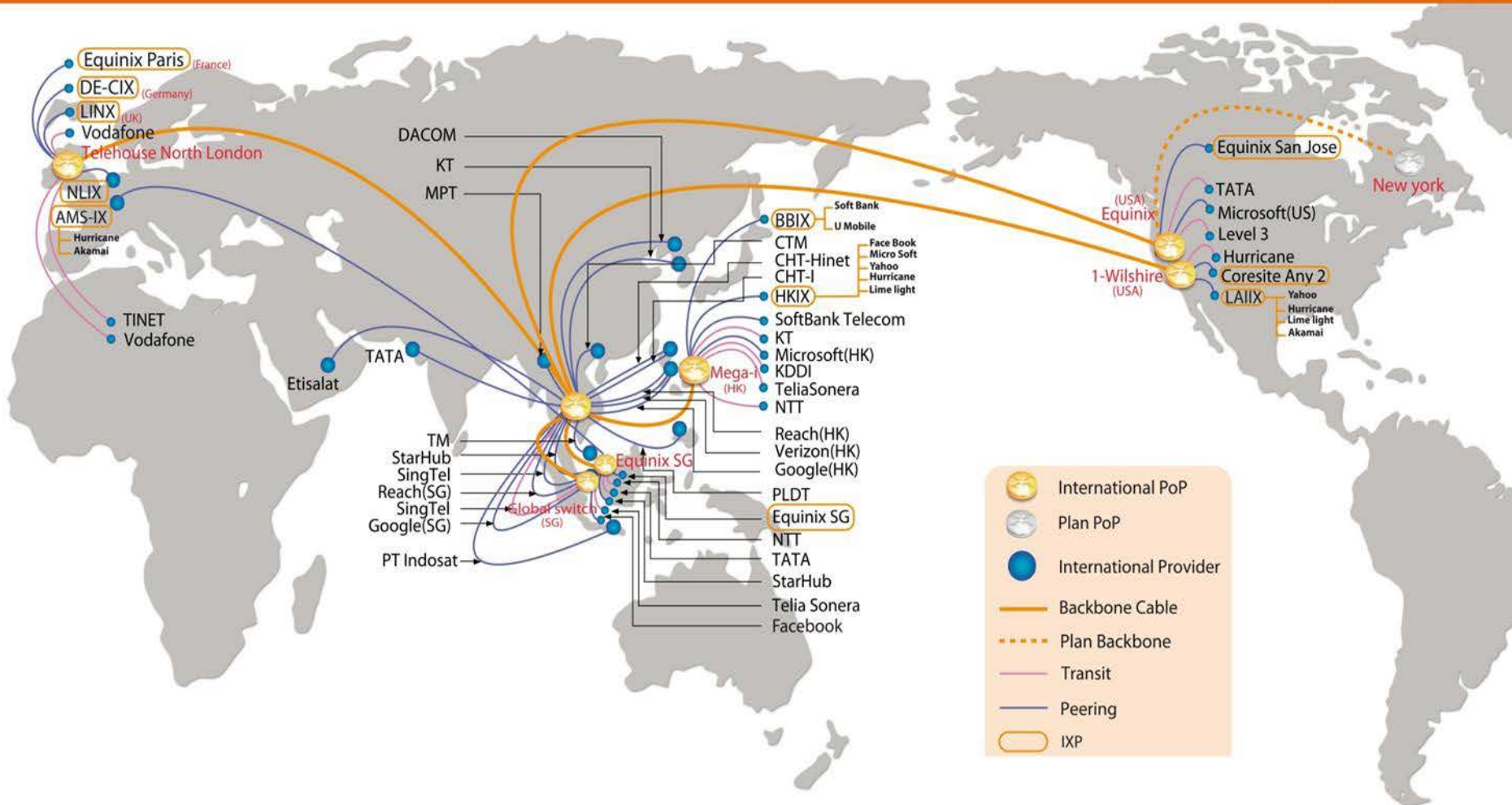
International PoP and Connectivity

- Major International PoPs and Internet routes
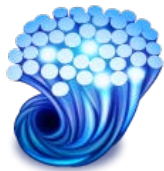

Source: CAT, and TOT
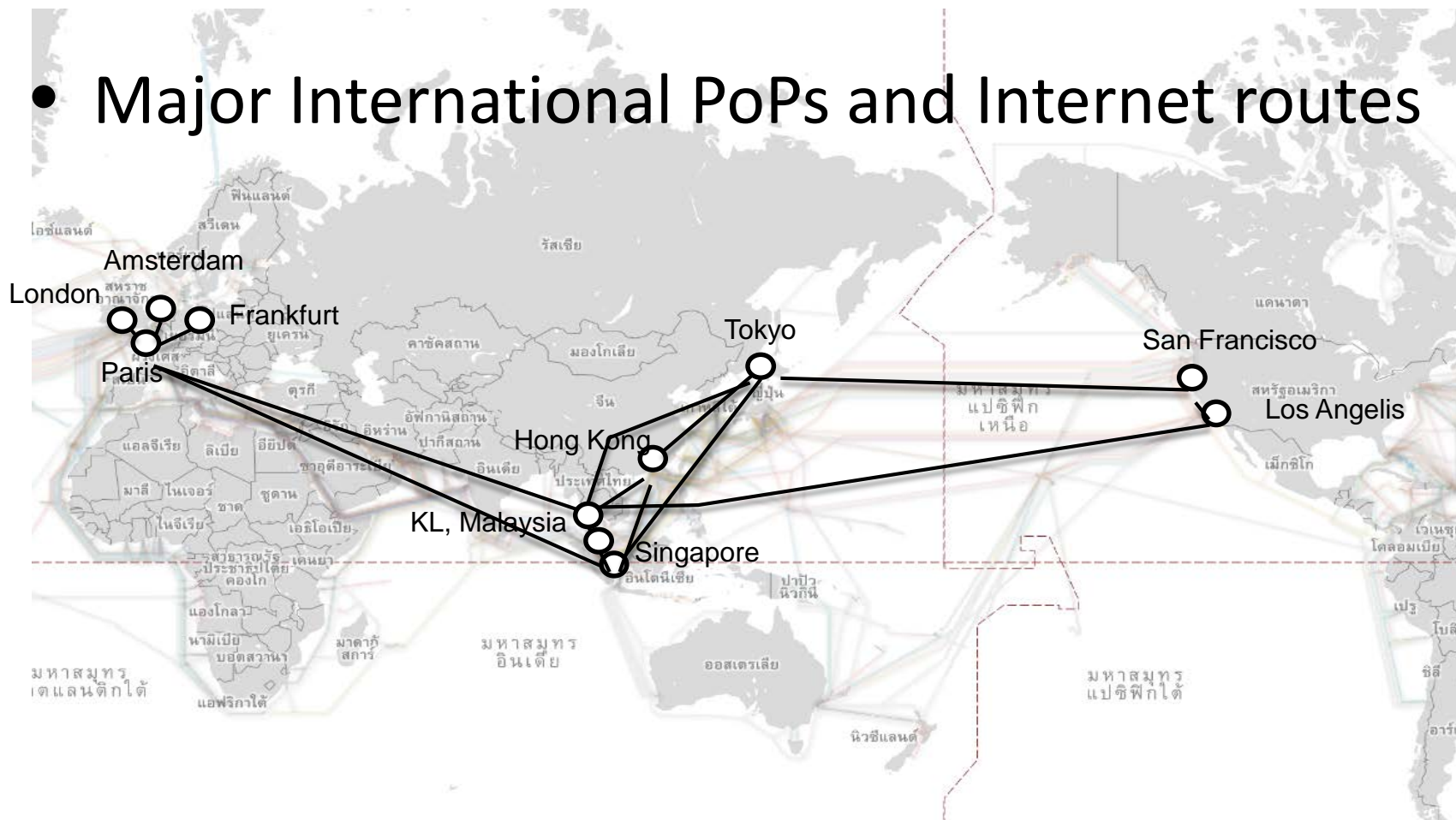
Priority Activities: Providing Public Internet and Free Wi-Fi

Goal Provide public Internet access with suitable media at 10,000 locations and have Free Wi-Fi services for the communities

Fiber 30 Mbps

Wireless 10-30 Mbps

Satellite 4/2 Mbps

10,000 locations Wi-Fi

Target Groups

7,xxx locations

2,xxx Locations

1xx Locations

Non-formal Education Schools

Digital Community Centers

Border Patrol Police Schools

Non-formal Education Schools **7,xxx**

Digital Community Centers **2,xxx**

Border Patrol Police Schools **1xx**

Source: MICT
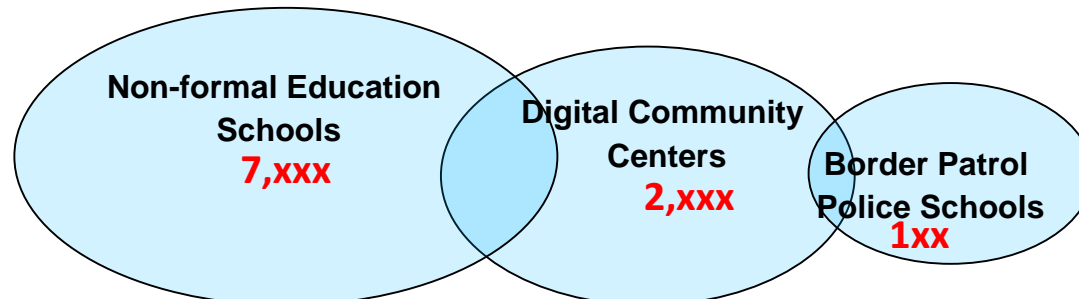
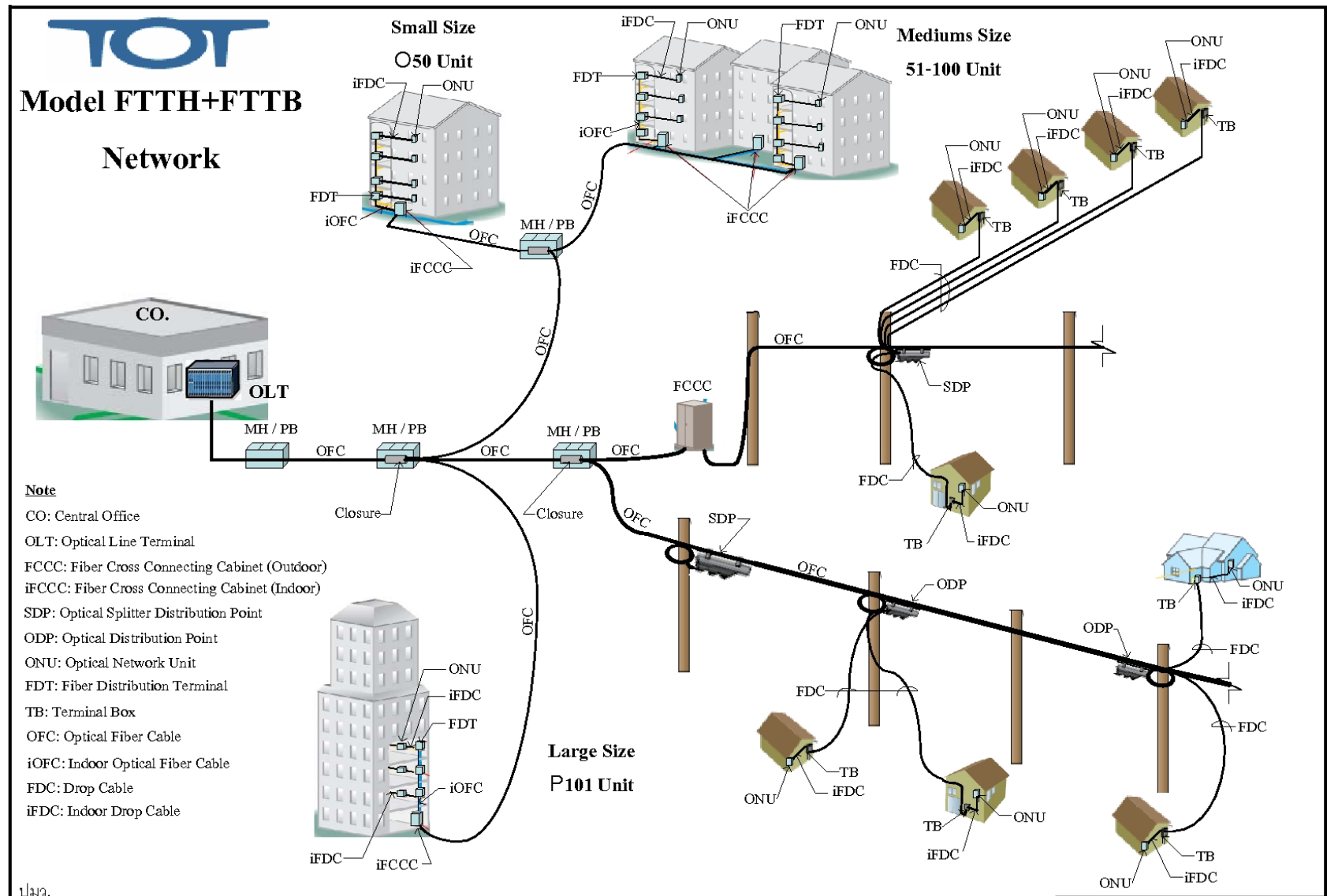# Priority Activities: Enhancing Broadband Internet Access to All Villages
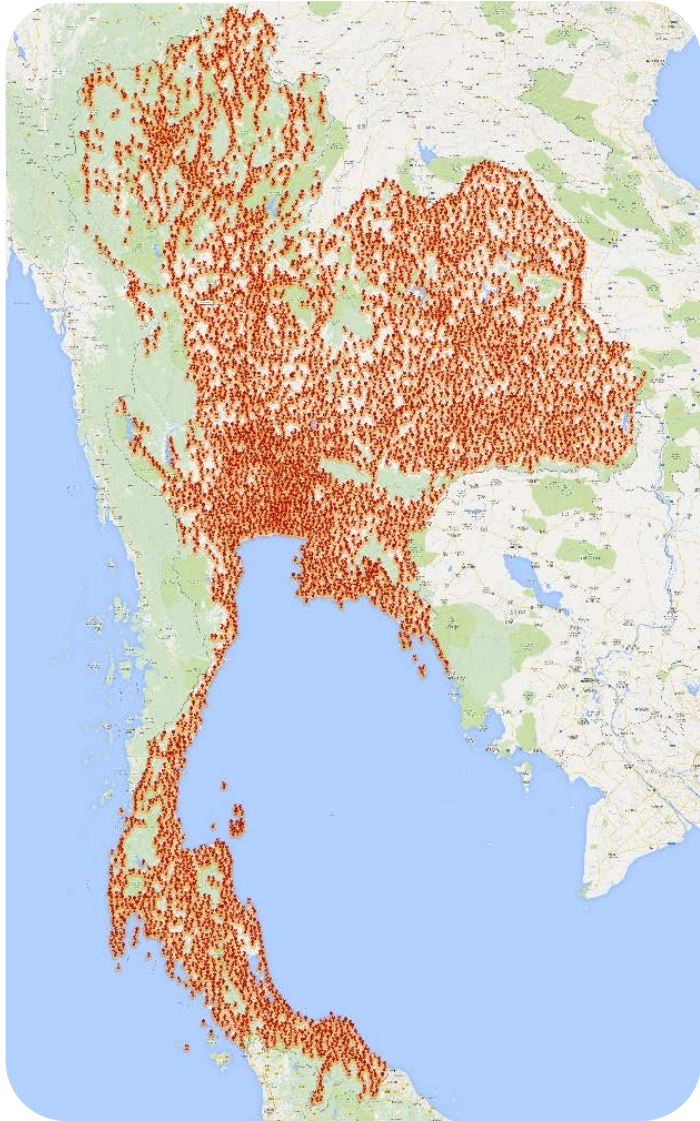
Source: TOT, MICT

- There are 74,965 villages in Thailand.
  - 53% are able to access high-speed Internet
  - 40% are lack of fixed network infrastructure for broadband access
  - 7% are in very remote areas where providing fixed broadband access networks are very difficult
- At least 93% of total villages will have high-speed Internet access
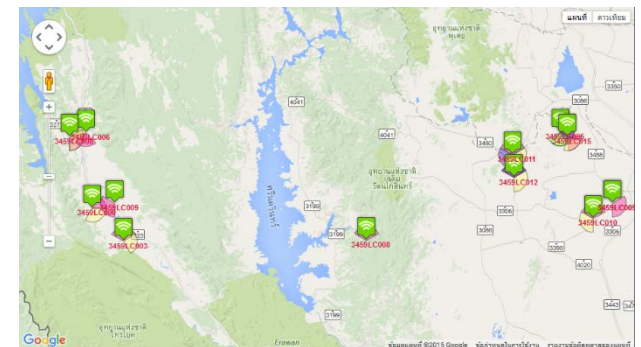
Broadband Internet Access Network

Source: TOT, MICT

Priority Activities : Enhancing International Submarine Networks

➢ Thailand will increase network capacity and have at least 2 submarine cable systems to each significant Internet Hub

Legend:
- Terrestrial Backhaul
- SEA-ME-WE-4
- TIS
- APG
- AAG
- SJC
- AAE-1
- Unity
- Faster
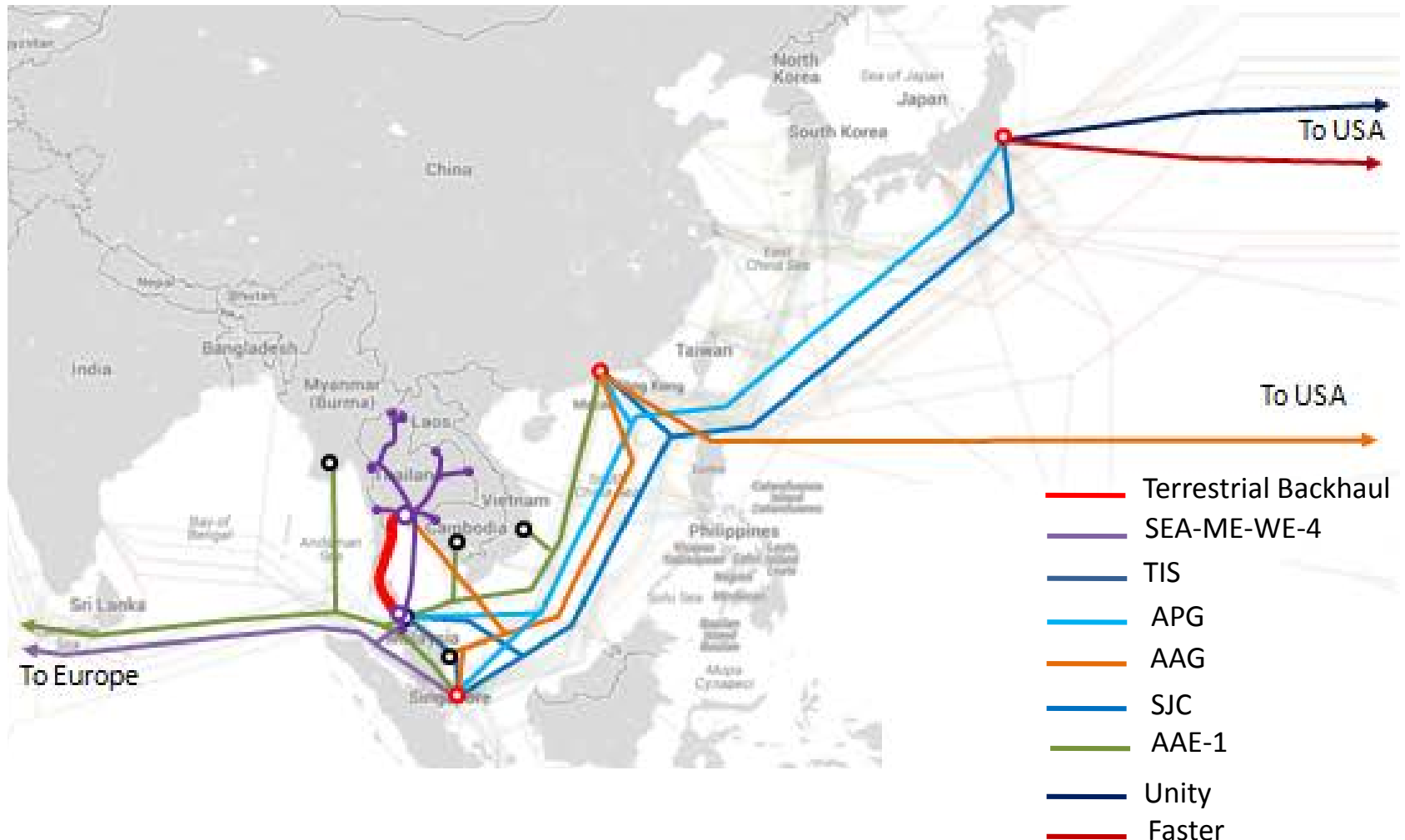
Thank You for Your Attention

Q & A

You are invited to attend