

Internet Landscape in APAC

from IXP perspective

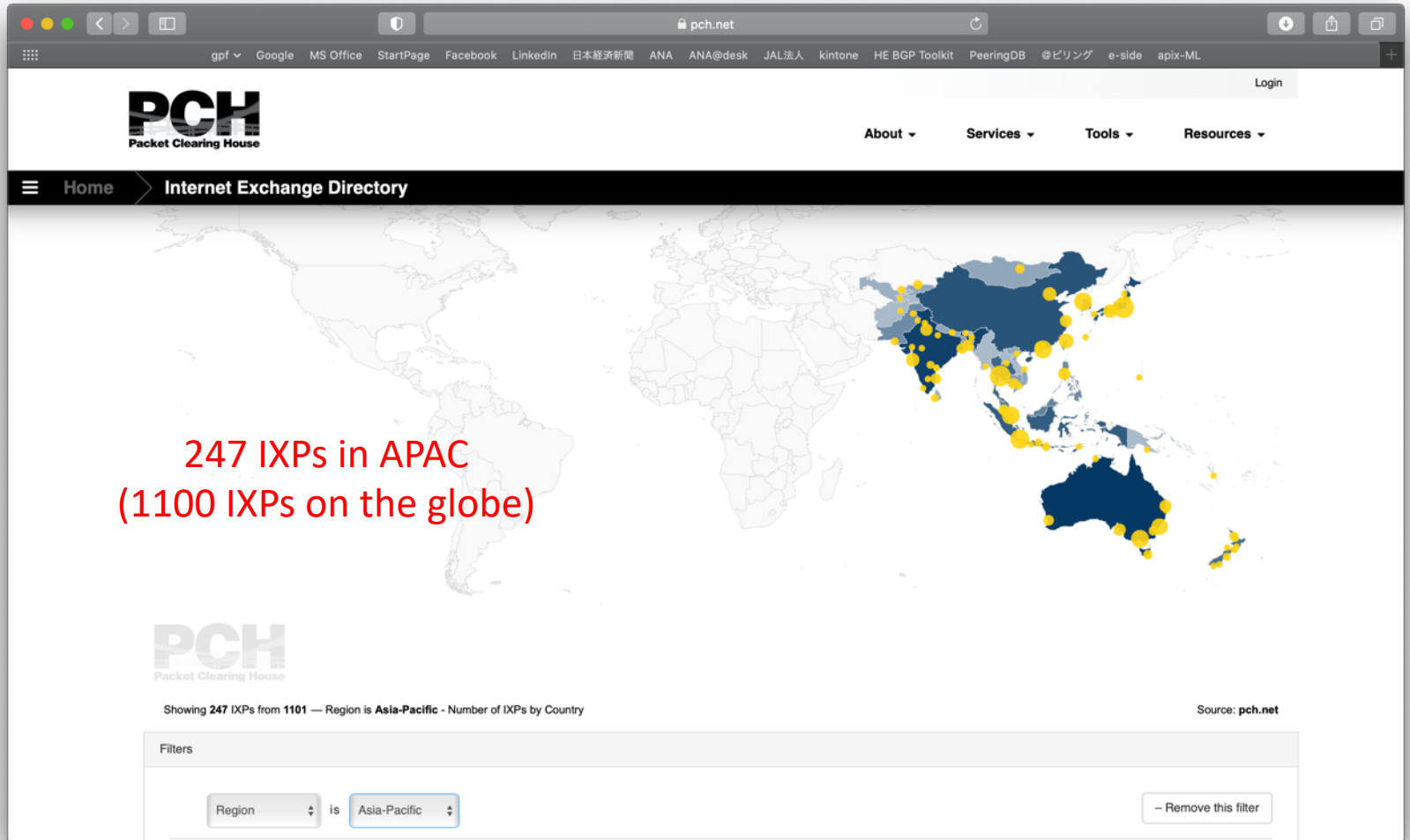
Phillipine Peering Forum, 24 Jun 2021

Katsuyasu Toyama
Chair of APIX association
COO of JP NAP

Self-introduction: Katsuyasu Toyama

- JPNAP (2001, 2007-2012, 2015-)
 - Representative Director, EVP
- Asia Pacific Internet Exchange (APIX) association
 - Chairperson (2010-2017, 2019-)
- Peering Asia
 - Peering Asia WG member (2017-)
- NTT
 - SVP of Internet and Mobile Services (2012-2015)
 - AS2914(GIN), AS4713(OCN)





IXP associations in the world

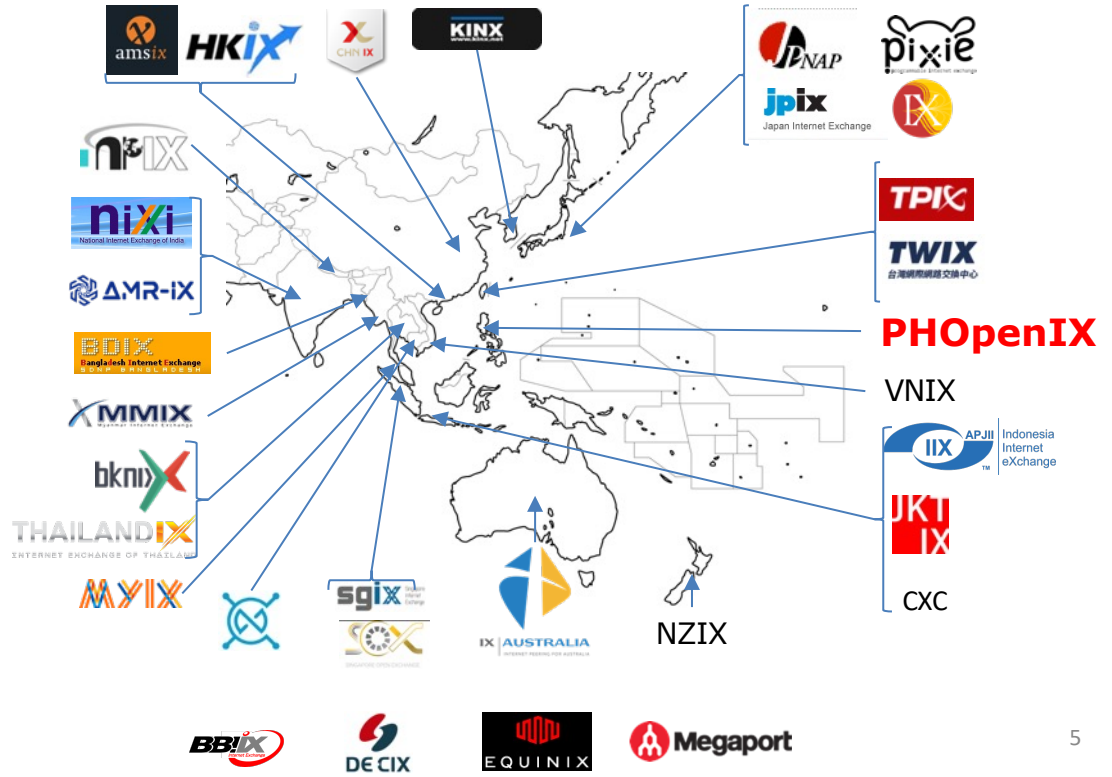


APIX

- An IXP association in Asia-Pacific region
 - Established in 2010, acting more than 10 years
- One of the founders of IX Federation (IX-F)
 - with LAC-IX and Euro-IX

APIX Members

- **33** IXPs,
from **18** countries
and economies
 - Australia, Bangladesh, Cambodia, China, Hong Kong, India, Indonesia, Japan, Korea, Malaysia, Myanmar, Nepal, New Zealand, Philippine, Singapore, Taiwan, Thailand, Vietnam



APIX members: 33

AMR-IX (IN)	Equinix AP (AU/HK/JP/SG)	NIXI (IN)
AMS-IX Hong Kong (HK)	HKIX (HK)	NPIX (NP)
BBIX (HK/JP/SG/TH/EU/US)	IIX (ID)	NZIX (NZ)
BDIX (BD)	IX Australia (AU)	PHOpenIX (PH)
BKNIX (TH)	JKT-IX (ID)	Ryukyu-IX (JP)
CHN-IX (CN)	JPIX (JP)	SGIX (SG)
CNX (KH)	JPNAP (JP)	SOX (SG)
CXC (ID)	KINX (KR)	TH-IX (TH)
DE-CIX India (IN)	MegaIX (AU/HK/SG)	TPIX (TW)
DE-CIX Malaysia (MY)	MM-IX (MM)	TWIX (TW)
Dix-ie (JP)	MYIX (MY)	VNIX (VN)



- The largest internet exchange in Japan since 2001
- Operating in Tokyo and Osaka
 - opened Fukuoka and Sendai in 2021

Fukuoka

Sendai

Tokyo

2.32T

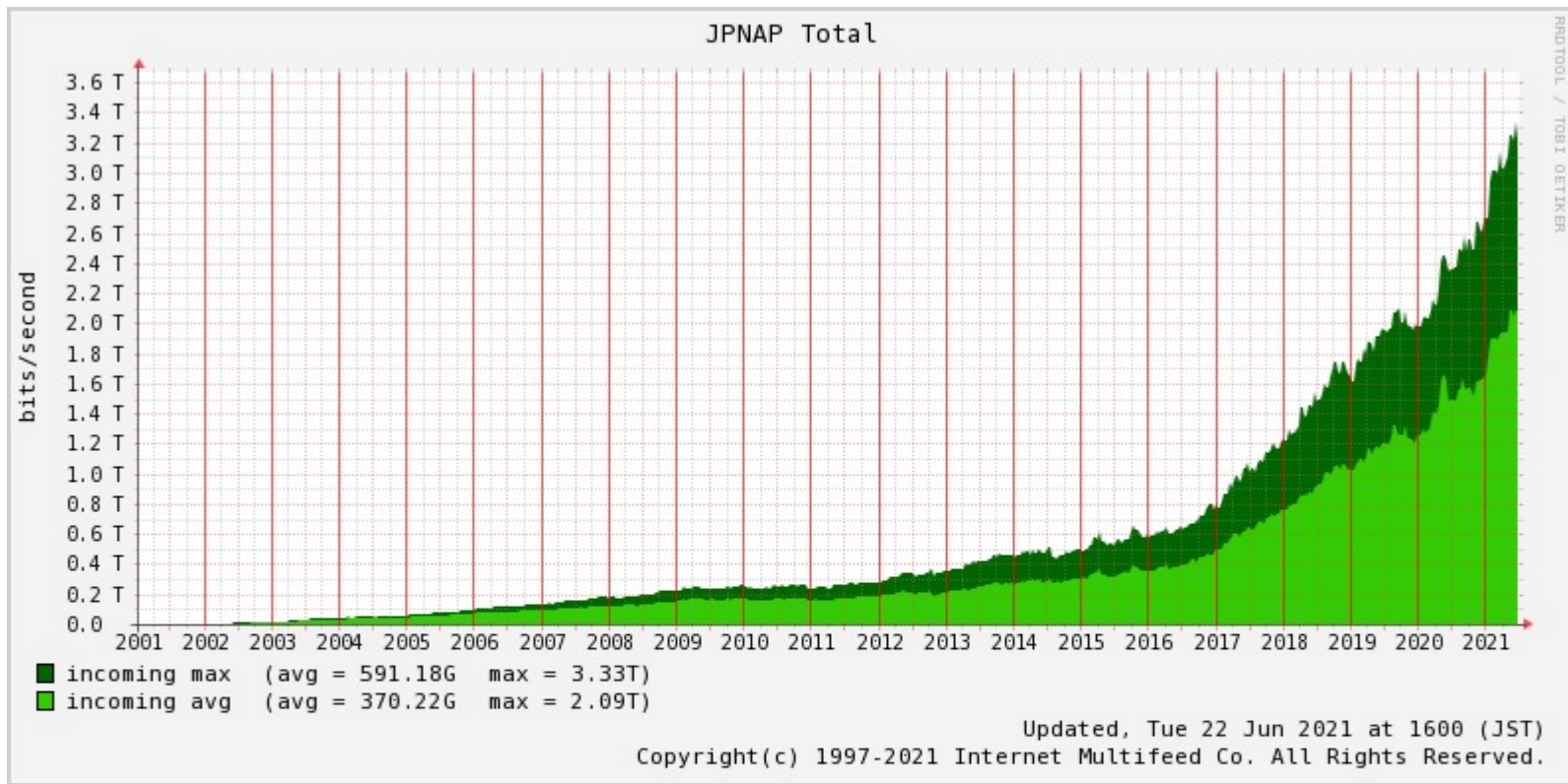
Osaka

1.01T

- **JPNAP Tokyo:** 180 AS
- **JPNAP Osaka:** 80 AS

Total: 3.33Tbps

Total traffic of JPNAP = 3.33 Tbps



Internet Landscape in APAC

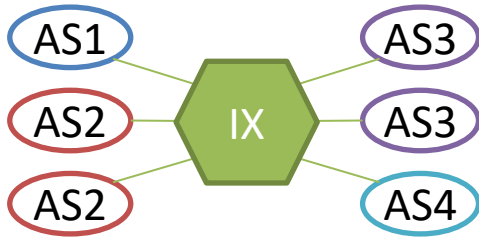
From IXP perspective

Internet Landscape in APAC region

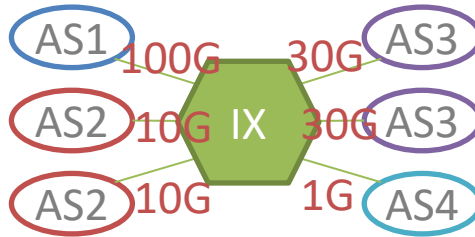
- Internet exchanges are reflecting current trend of its city or country/economy
 - Data is open to public
 - Number of connected networks (ASNs)
 - Capacity
 - Traffic graph (Daily, Weekly, Monthly, Yearly)

Comparing IXPs in APAC region

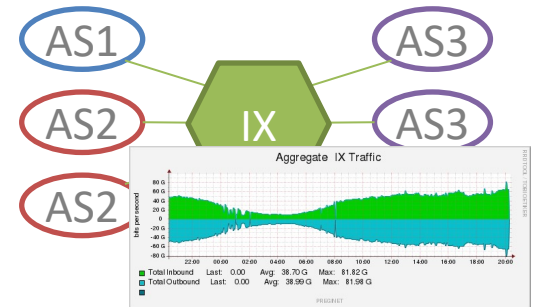
- **Number of ASNs** and **capacities** are from **PeeringDB**
- **Traffic data** (peak and average) is from the **website** of each IXP



ASNs
= 4



Capacity
= 181G



Peak traffic
= 90G

Disclaimer

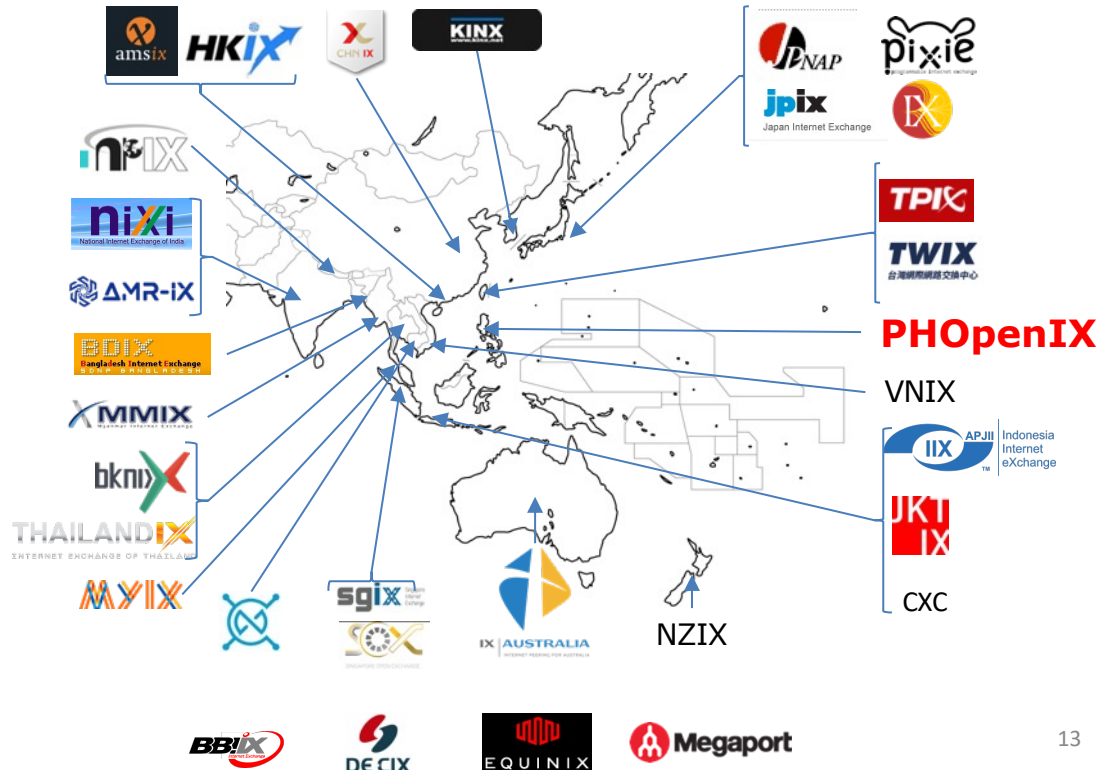
- The comparison here may not reflect the reality
 - PeeringDB data
 - Not every connected network makes its info on PeeringDB
 - Even if an entry exists, some data is hidden; such as capacity and IP address
 - Traffic data on the web
 - Sometimes unrealistic peak traffic is shown

My suggestion:

*Not for study, but for peering purposes, **every AS holder would input its info on PeeringDB**, because it's very important database for peering with other networks*

Compare APIX Member IXPs

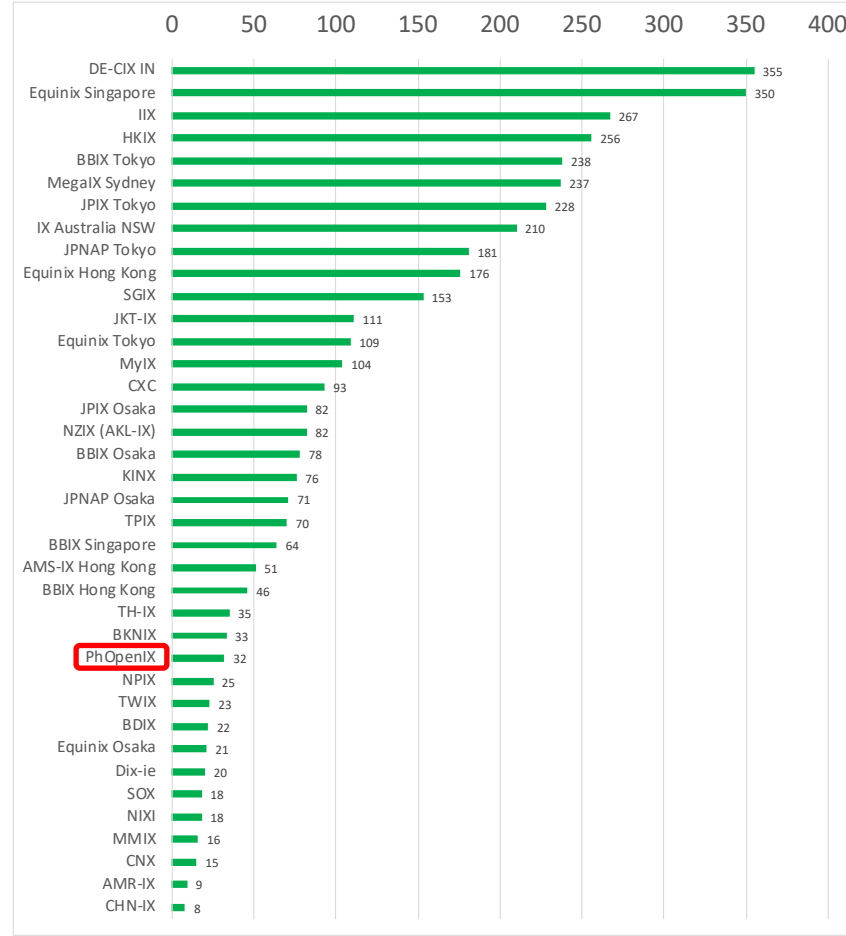
- **33 IXPs**,
from **18 countries** and
economies
 - Excluded some IXPs as
no data in PeeringDB or
no traffic data on the
web



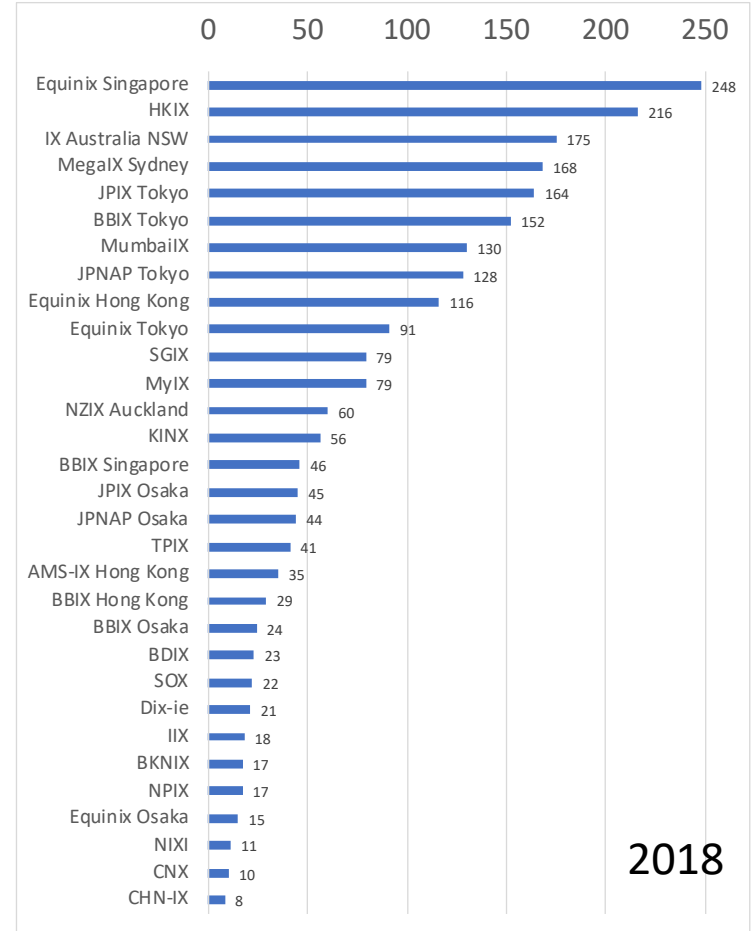
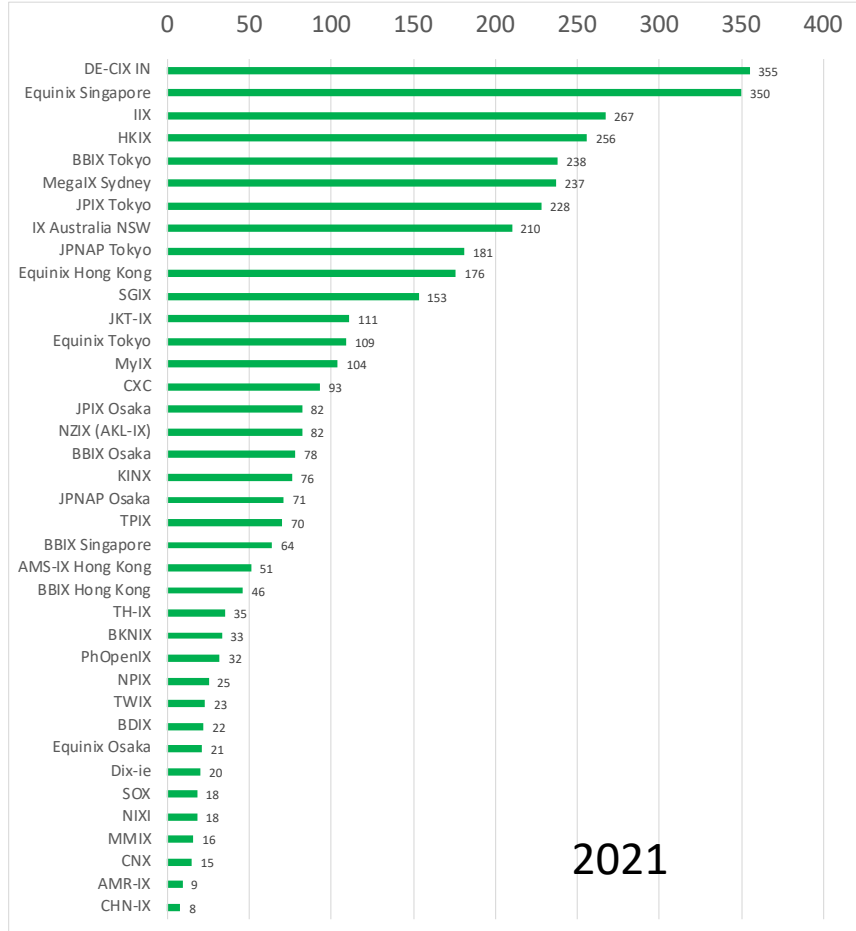
Comparison points

- Number of ASNs
 - 2021
 - 2018 to 2021
- Peak traffic
 - 2021
 - 2018 to 2021

ASN ranking: 2021

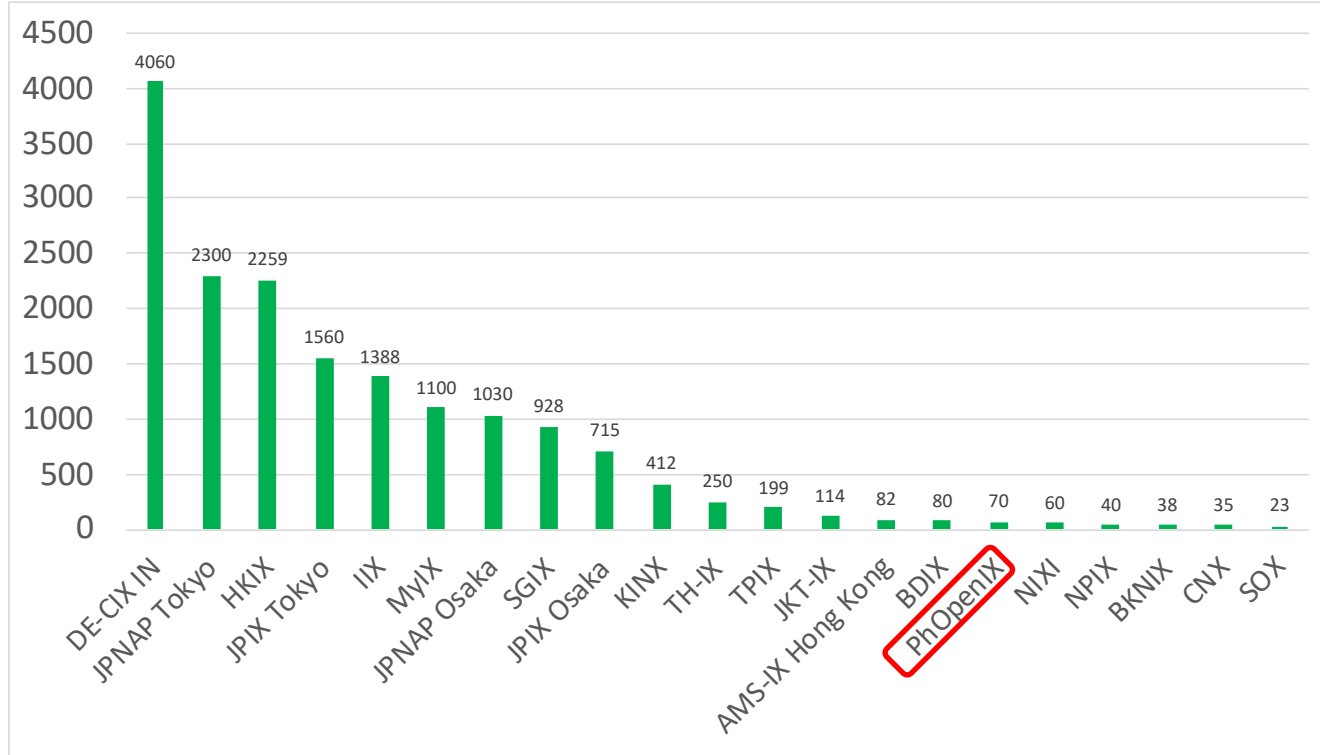


ASN ranking: 2018 to 2021



Peak Traffic ranking

Gbps



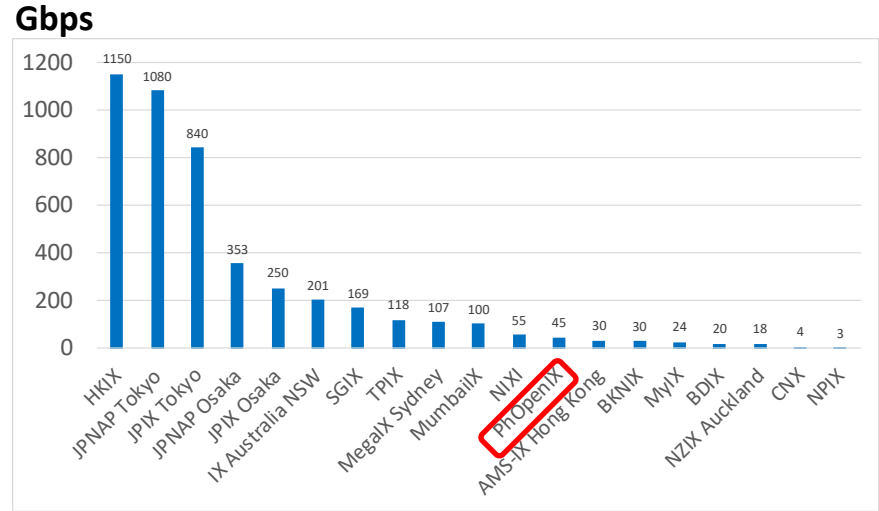
Peak Traffic ranking (2018 to 2021)

- Mumbai jumped up
- Tokyo and Hong Kong doubled

- PHOpenIX is 55% increase



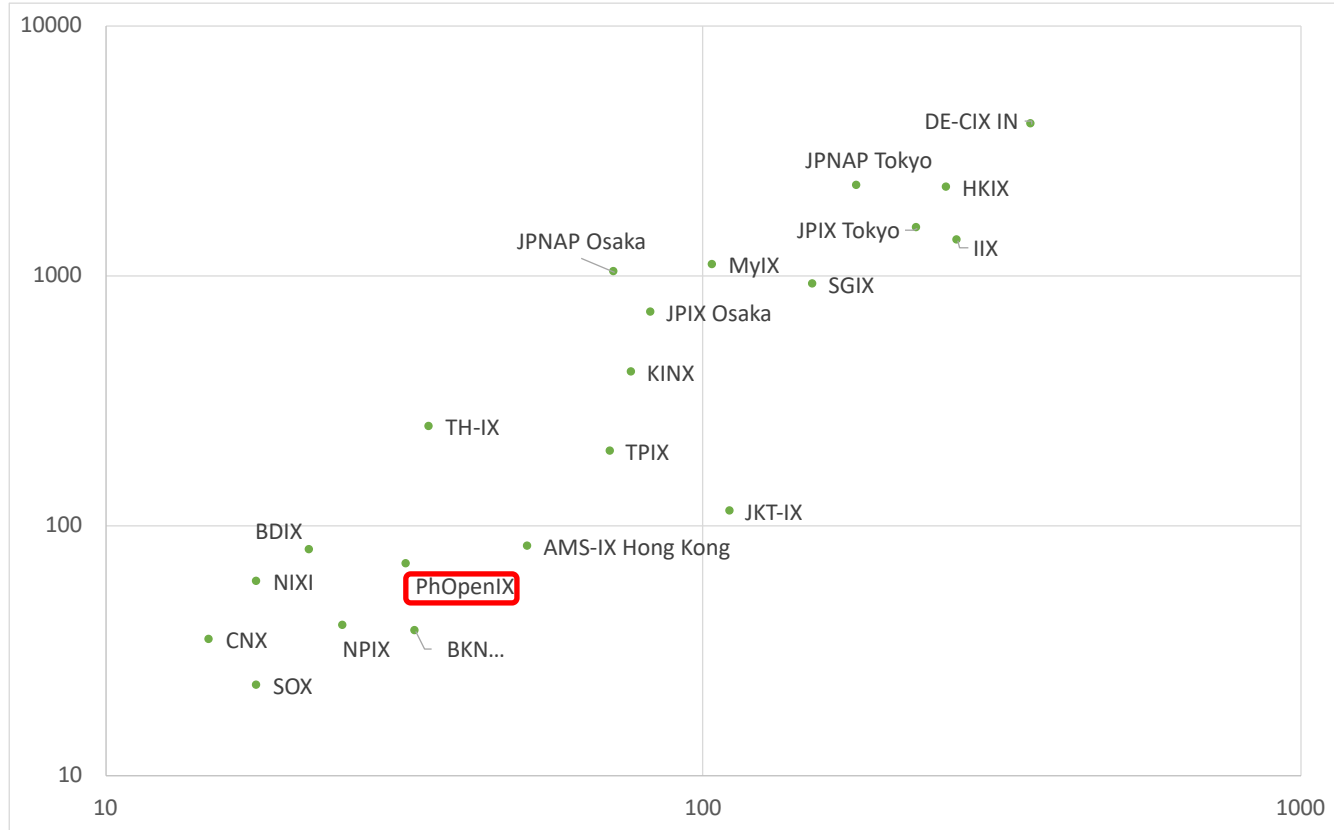
2021



2018

Scatter graph (ASN x Peak traffic)

Peak
(Gbps)



ASNs

Comparison on hub cities

Hong Kong

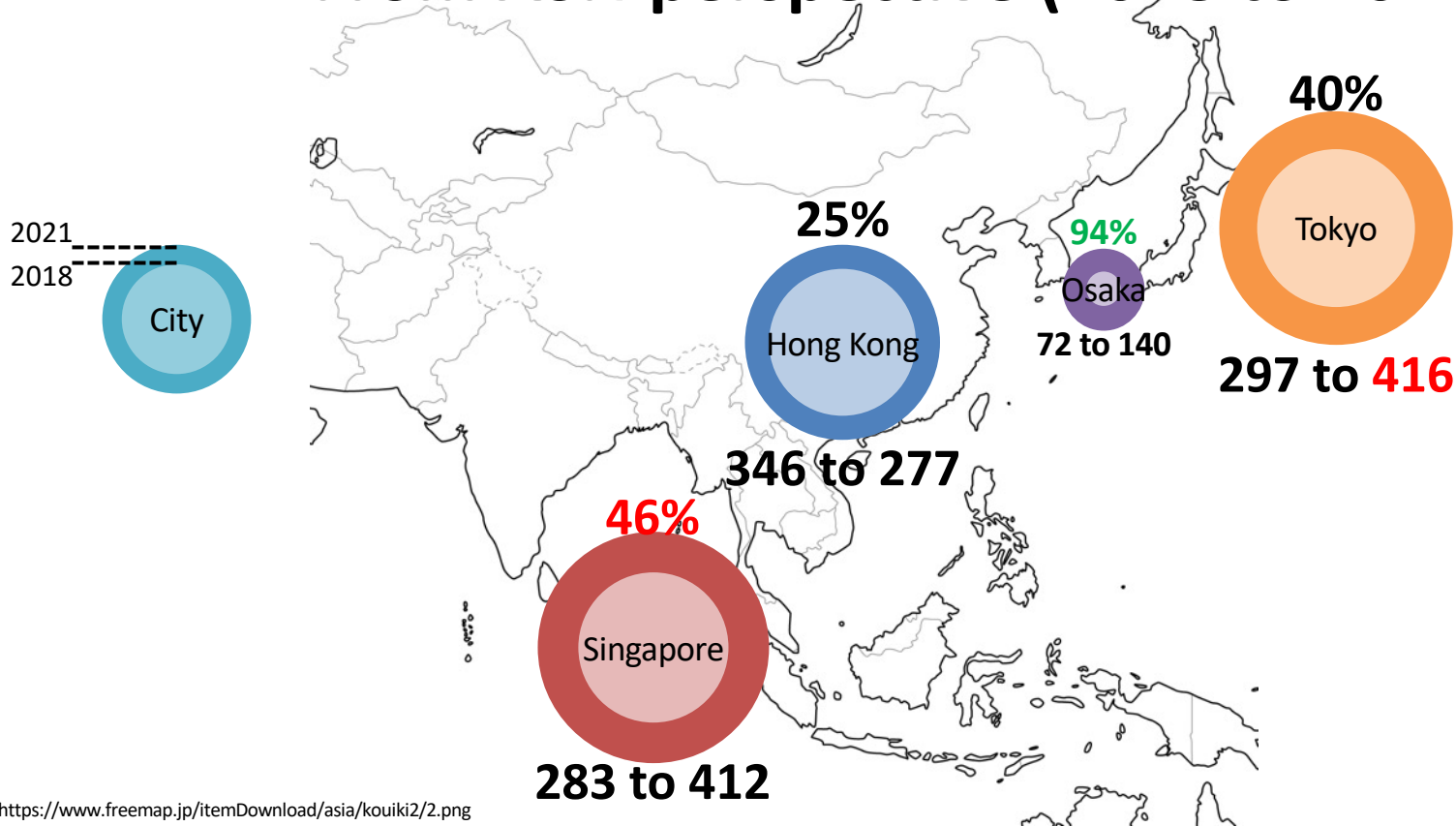
Singapore

Tokyo

(Osaka)

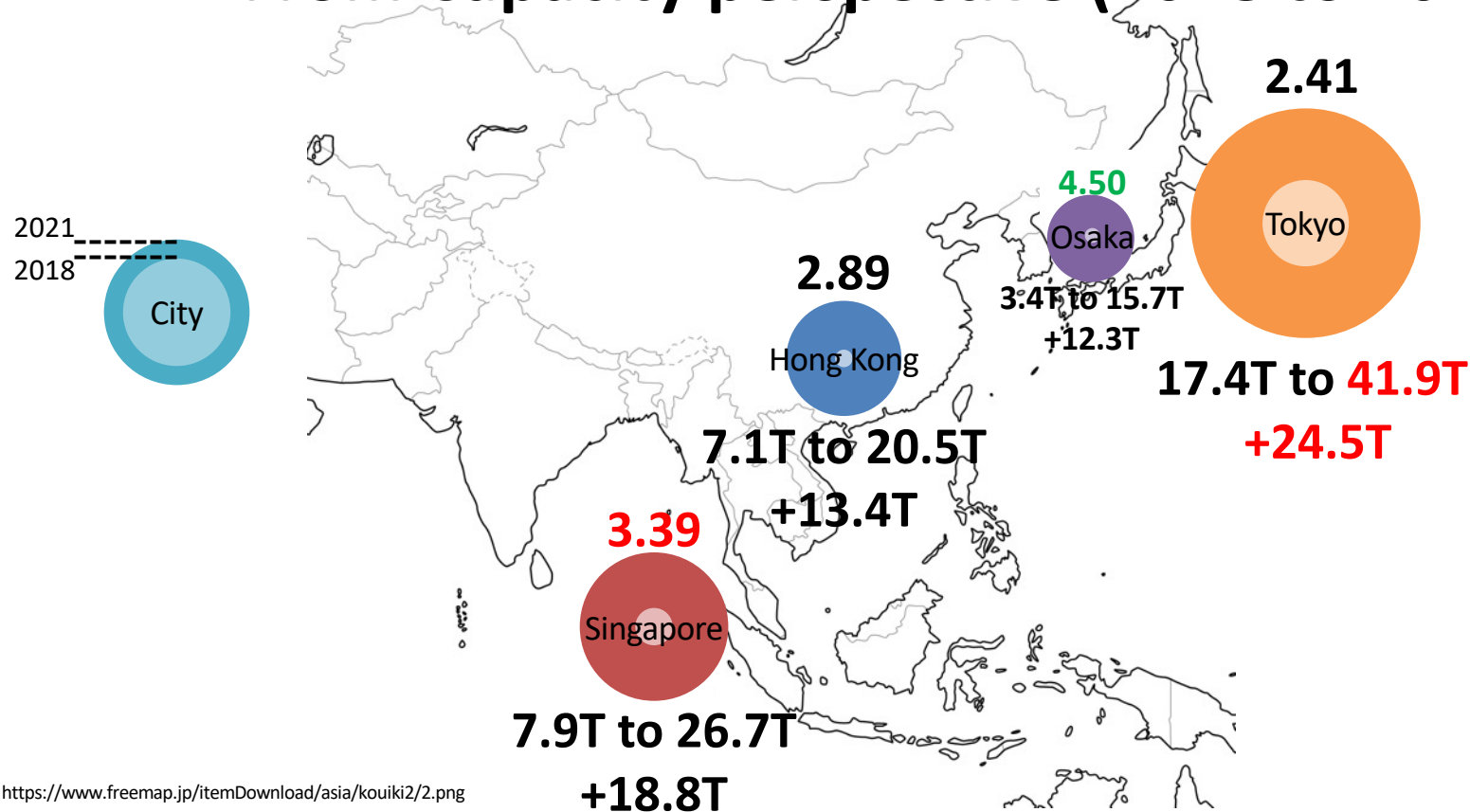
Asian Hub Cities

From ASN perspective (2018 to 2021)



Asian Hub Cities

From Capacity perspective (2018 to 2021)



Comparison on growing IXPs in APAC

DE-CIX India (Mumbai, India)

MyIX (Kuala Lumpur, Malaysia)

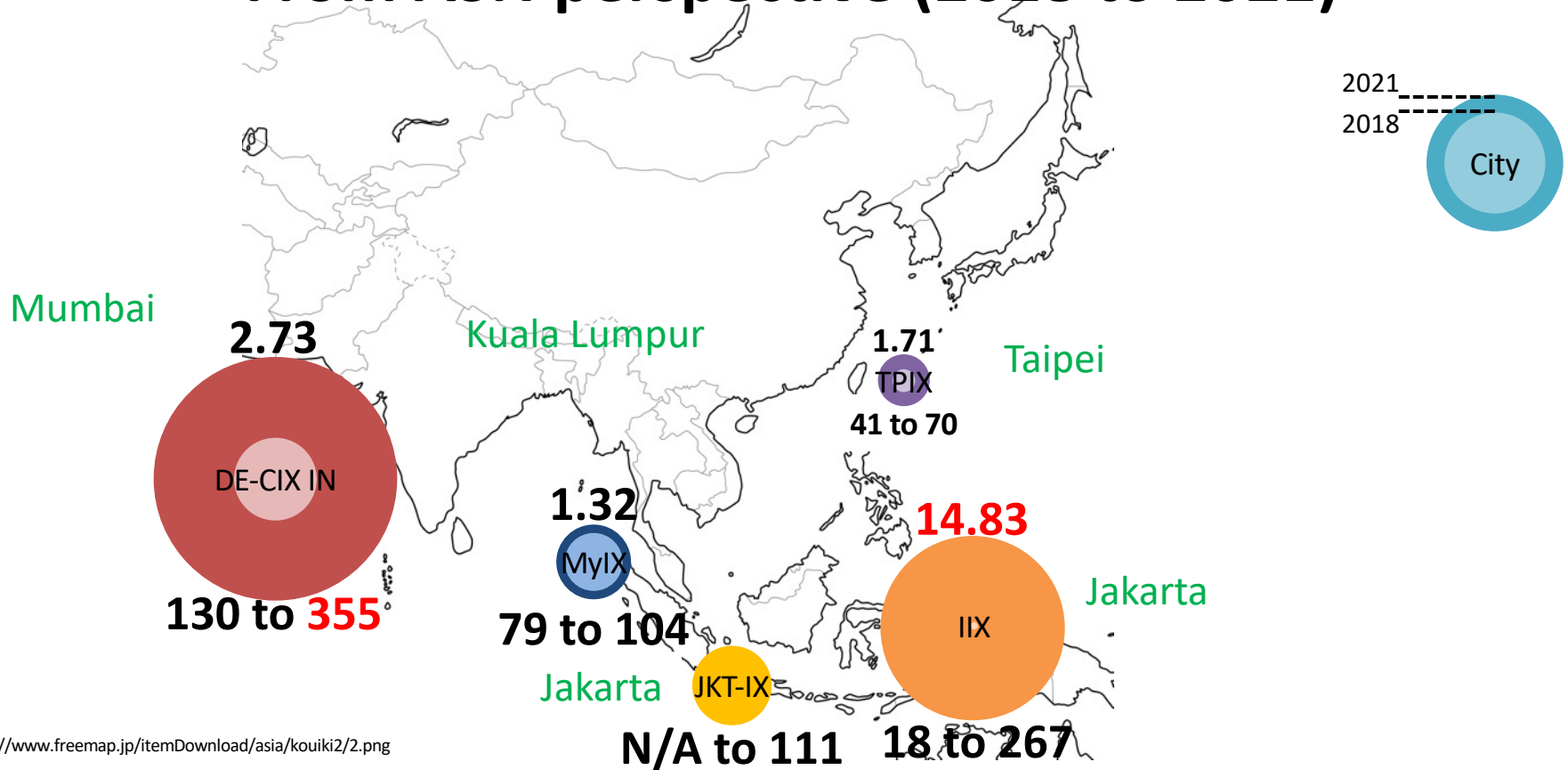
IIX (Jakarta, Indonesia)

JKT-IX (Jakarta, Indonesia)

TPIX (Taipei, Taiwan)

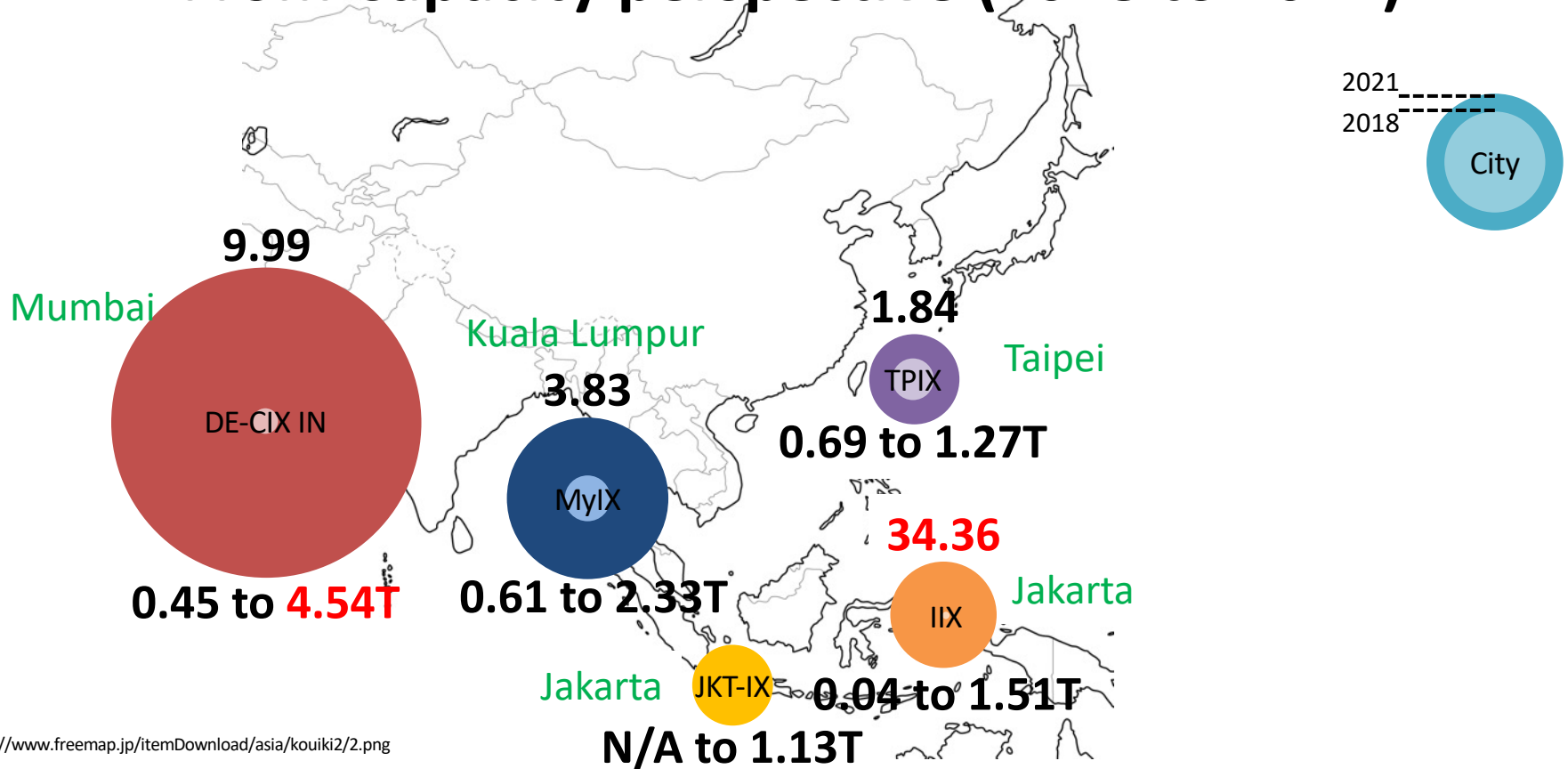
Grown IXPs in APAC

From ASN perspective (2018 to 2021)



Grown IXPs in APAC

From Capacity perspective (2018 to 2021)



Summary

- Internet in APAC is growing
 - Almost IXPs in APAC is expanding its ASNs, Capacity, and actual traffic
 - Hub cities
 - Growing, but Hong Kong looks slow down?
 - Singapore and Tokyo might have taken over the connections to Hong Kong?
 - Growing IXPs
 - DE-CIX India (Mumbai, India) and IXPs in Jakarta (IIX and JKT-IX) are rapidly growing ... due to population and penetration of the internet?
- > Need deeper study about them

Study on IXPs in APAC

ISOC published, supported by APIX

“Effective IXP strategies for the Asia-Pacific”



<https://www.internetsociety.org/resources/doc/2021/effective-ixp-strategies-for-the-asia-pacific/>



IXP case studies

In APAC region

- Hong Kong Internet Exchange (**HKIX**), Hong Kong. 1995
- Internet Exchange Australia (**IX-Australia**), Australia. 1997
- Korea Internet Neutral Exchange (**KINX**), Republic of Korea. 2000
- Japan Network Access Point (**JPNAP**), Japan. 2001
- National Internet Exchange of India (**NIXI**), India. 2003
- Bangladesh Internet Exchange (**BDIX**), Bangladesh. 2004
- Singapore Internet Exchange (**SGIX**), Singapore. 2010
- Bangkok Neutral Internet Exchange (**BKNIX**), Thailand 2015
- Myanmar Internet Exchange (**MMIX**), Myanmar. 2017

In the other regions

- Deutscher Commercial Internet Exchange (**DE-CIX**), Germany. 1995
- **Equinix**, United States. 1996
- Kenya Internet Exchange Point (**KIXP**), Kenya. 2000
- Internet Exchange Brazil (**IX.br**), Brazil. 2002



The content



- Objectives/Movitations
 - “How do these vastly different exchanges fit into their local environment?”
 - “Where are they headed?”
 - “How do they compare with IXPs in other regions? ”
- Key messages
 - “Rather than focusing only on the usual metrics used to compare exchanges (number of ASNs, total port capacity, peak/average traffic), case studies provide an opportunity for deeper insight into how those metrics reflect the history, business model, current operations, and future directions of an Internet exchange. ”

Good to read in order to understand how an IXP grows and evolves in a country/economy; and to arrange strategies for your country/economy.

Peering Asia

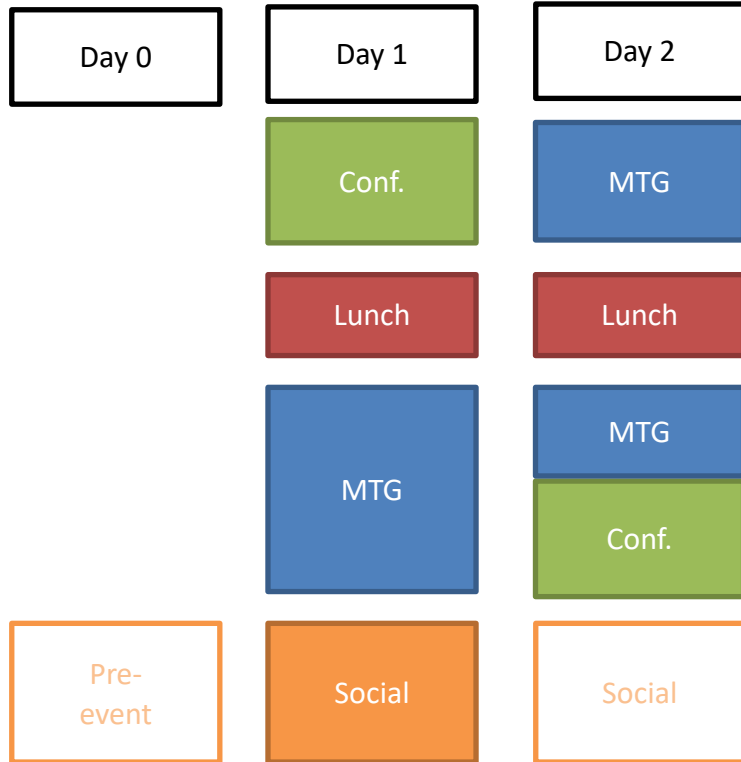
An opportunity for peering community to get together

Do you know **Peering Asia** ?

Peering Asia is an open and neutral peering event (forum)

- Similar open and neutral events in the world:
 - **Global Peering Forum (GPF)** in April, North America
 - **European Peering Forum (EPF)** in September, Europe
 - **LAC-IX Peering Forum** in May, Latin America
 - **African Peering and Interconnection Forum (AfPIF)** in August, Africa
- Asia Peering Forum (APF) is the event by Equinix
 - We always respect their great contribution to peering/interconnection community

Overview of Peering Asia



- **Peering meetings**
 - 30 minute meeting between two organizations to negotiate about peering, interconnection, use of an IX and/or a Datacenter, and so on
 - approximately 10 slots per day
- **Conference & Peering Personals**
 - Presentations and panel discussions mainly regarding to peering and interconnection
 - 1 minute self-introduction of peering/interconnection managers
 - In 90 minutes per day
- **Lunch, Social party, Coffee break**
 - Socializing between attendees (and sponsors)

Peering Asia 1.0 @ Kyoto, Japan

114 AS / 239 attendees

Hosted by

BBIX / Equinix Japan / JPIX / JPNAP



Peering Asia 1.0 @ Kyoto, Japan

“Internet Landscape in Philippine”

presented by Achie



2018

Peering Asia 2.0 @ Hong Kong

149 AS / 328 attendees

Hosted by
HKIX / HKNOG



Peering Asia 3.0 @ Kuala Lumpur

177 AS / 364 attendees

Hosted by
MyIX / MYNOG



Peering Asia 3.5v (virtual)

128 AS / 267 attendees

Hosted by
Peering Asia WG + APNIC

2021

Peering Asia 4.0 @ Bangkok, Thailand

Hosted by
Thailand IX / BBIX Thailand

Postponed to 2022

No “Peering Asia” in 2021??

Please do not release your time on
3-4 Nov 2021

Stay tuned!

Thank you very much!

Any questions or comments?