HKIX Development and HKIX-R&E Updates at APAN 46

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www.hkix.net

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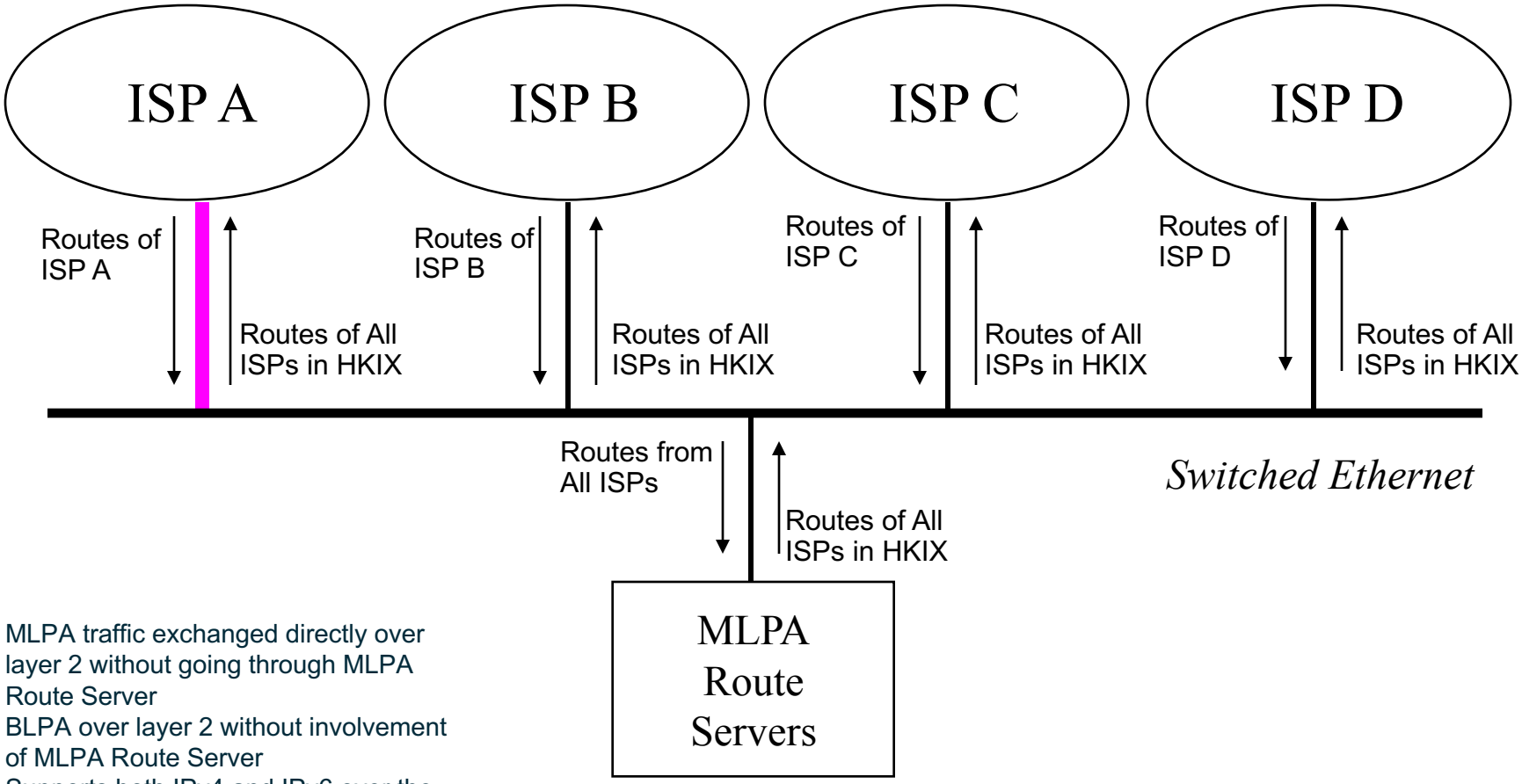
What is HKIX?

- Established in Apr 1995, Hong Kong Internet eXchange (HKIX) is the main layer-2 Internet eXchange Point (IXP) in Hong Kong where various autonomous systems interconnect with one another and exchange traffic
- HKIX is now owned and operated by the Hong Kong Internet eXchange Limited (a wholly-owned subsidiary of The Chinese University of Hong Kong Foundation Limited) in collaboration with Information Technology Services Centre of The Chinese University of Hong Kong
- HKIX serves both commercial networks and R&E networks
- The original goal is to keep intra-Hong Kong traffic within Hong Kong

HKIX Model — MLPA over Layer 2 + BLPA



- MLPA traffic exchanged directly over layer 2 without going through MLPA Route Server
- BLPA over layer 2 without involvement of MLPA Route Server
- Supports both IPv4 and IPv6 over the same layer 2 infrastructure

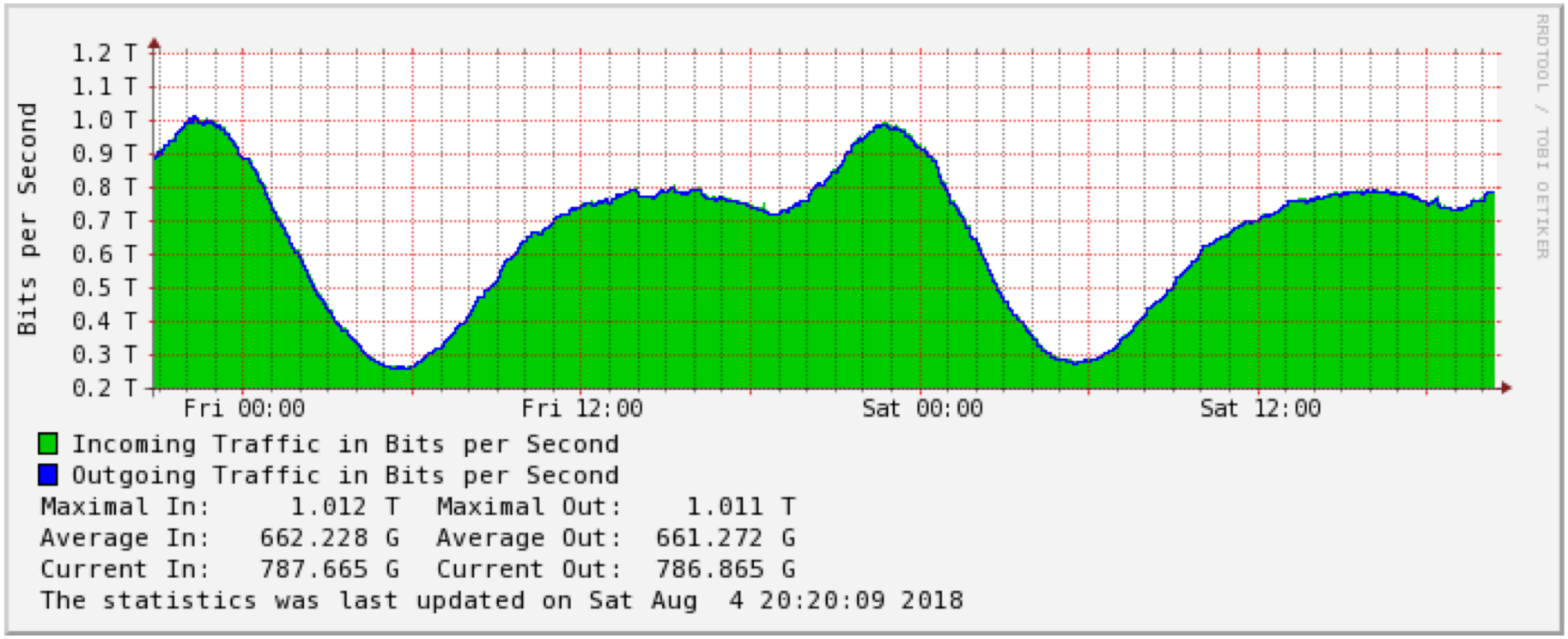
HKIX's Advantages

- **Location**
  - Hong Kong is a good central location in Asia
    ~50ms to Tokyo and ~30ms to Singapore
- **Neutral**
  - Treat all partners equal, big or small
  - Neutral among ISPs / telcos / local loop providers/ data centers / content providers / cloud services providers
- **Trustable**
  - Treat all partners fair and consistent
  - Respect business secrets of every partner / participant
- **High Performance**
  - No internal performance bottleneck, no internal packet loss
- **Not for Profit**
  - Charging mainly for equipment upgrade and long-term sustainability, not for profit-making

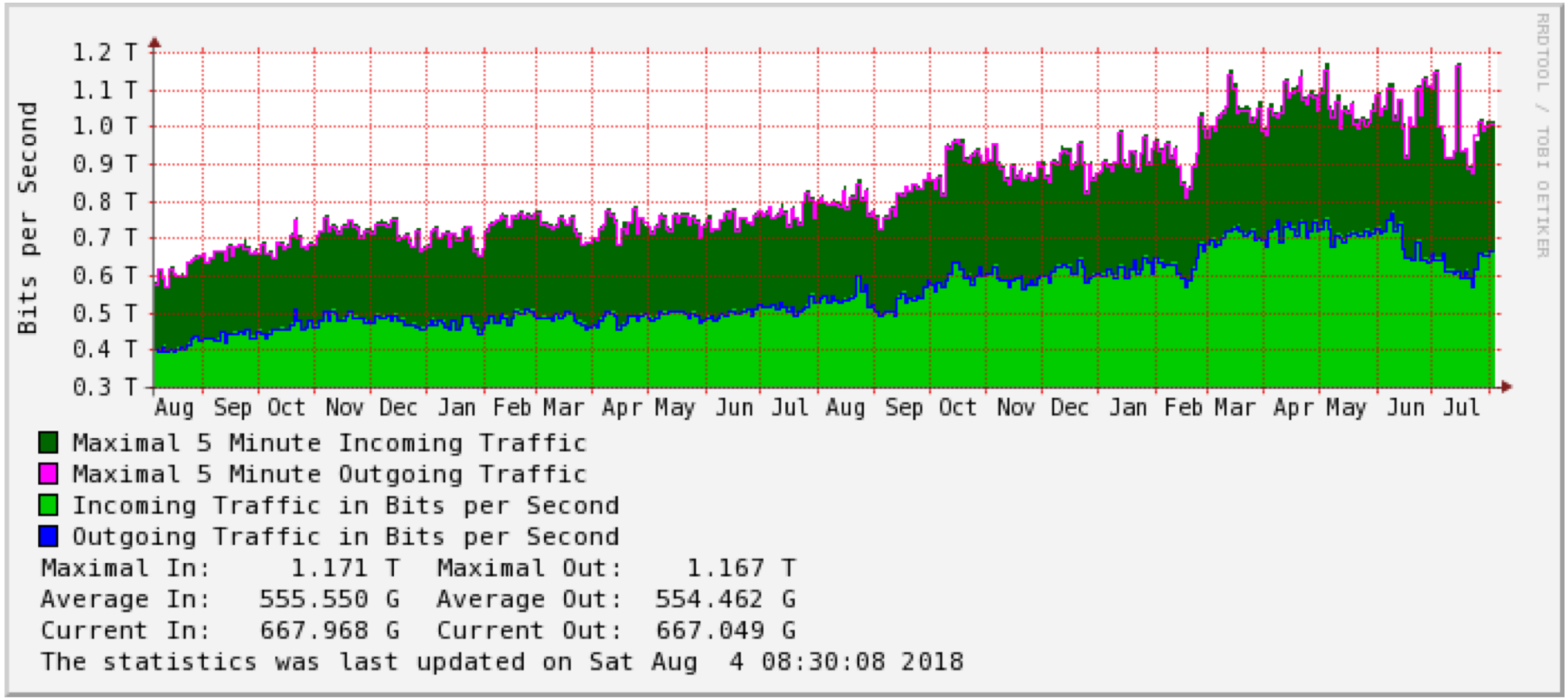
HKIX Today

- Supports both MLPA (Multilateral Peering) and BLPA (Bilateral Peering) over layer 2
- Supports IPv4/IPv6 dual-stack
- More and more non-HK participants
- 280+ different networks (autonomous systems) connected
- 490+ physical connections in total
  - 30 **100GE**, 300+ **10GE** & 150+ **GE**
- 1.17+Tbps (5-min) total traffic at peak
- Annual Traffic Growth ~30%

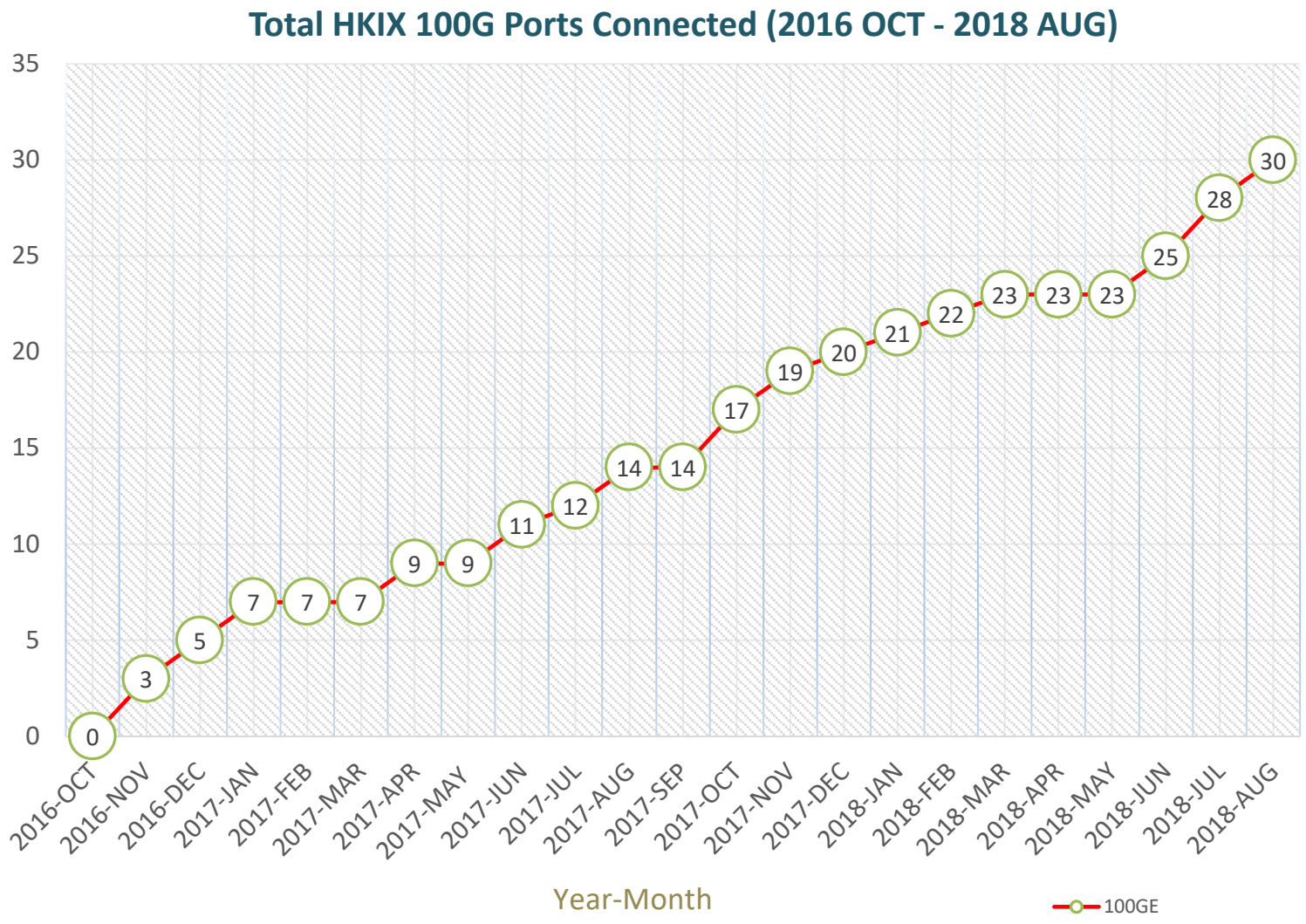
Current HKIX Traffic
Daily Graph (5-min average)



Current HKIX Traffic
Yearly Graph (1-day average)



Trend of 100GE connections



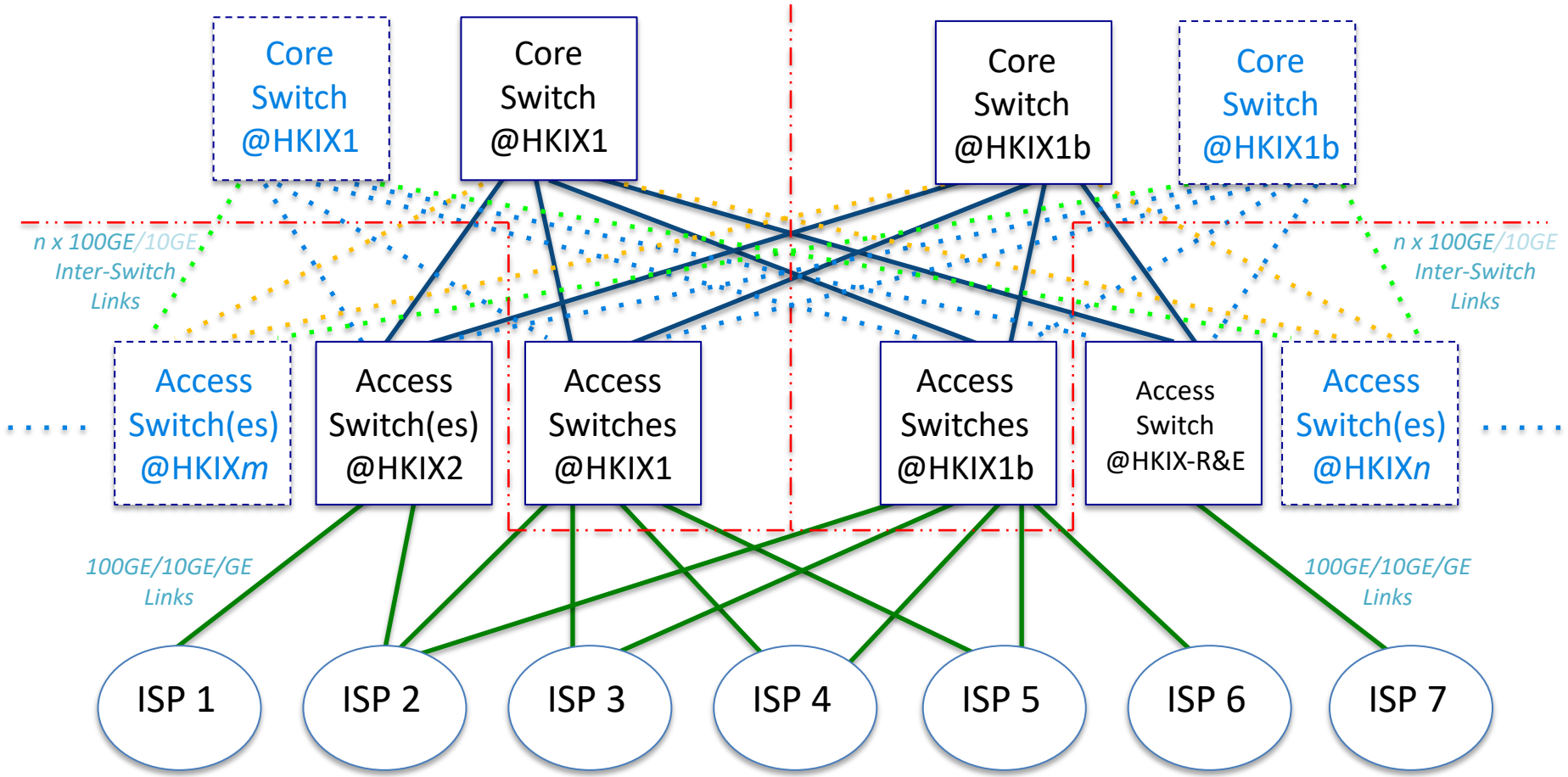
HKIX 100GE Participants

- Akamai
- Amazon
- AOFEI
- BGP Consultancy
- China Mobile International
- CloudFlare
- Facebook
- Google
- HKBN
- Hurricane Electric
- Limelight
- PCCW IMS
- Telstra
- Tencent
- TVB
- Udomain
- Valve
- Yahoo

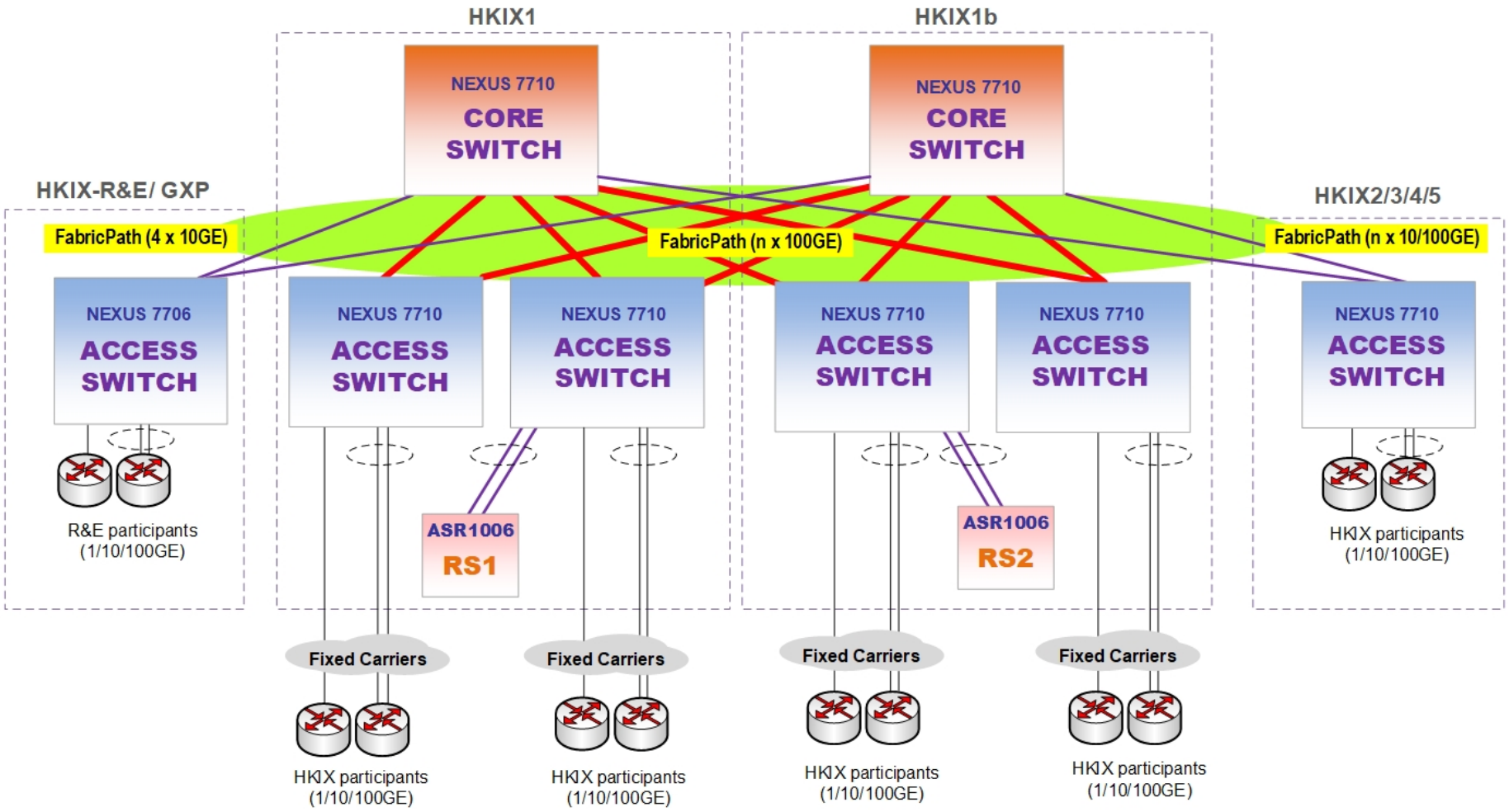
HKIX 100GE R&E Participants

- APANJP/NICT/JGN-X
- CERNET

New HKIX Dual-Core Two-Tier Spine-and-Leaf Architecture For 2014 and Beyond



HKIX Network Diagram (Apr 2018)



1. **HKIX1** and **HKIX1b** are the two core sites of HKIX at CUHK while **HKIX2/3/4/5** are HKIX satellite sites outside of CUHK.
2. HKIX participants are encouraged to connect to multiple sites for site resilience.

Setup Multiple HKIX Satellite Sites

Hong Kong, 08 Feb 2017

HKIX announces that 3 new satellite sites will be established in collaboration with 3 commercial data centres which provide colocation services as well as easy connections to HKIX.

Satellite Site	Satellite Site Collaborator	District	Ports Supported	Status
HKIX2	CITIC Telecom International	Kwai Chung	GE/10GE	Ready for Service
HKIX3	SUNeVision / iAdvantage	Fo Tan	GE/10GE/100GE	Ready for Service 28 Feb 2017
HKIX4	NTT Com Asia	Tseung Kwan O	GE/10GE/100GE	Ready for Service 19 Jun 2017
HKIX5	KDDI / Telehouse / HKCOLO.net	Tseung Kwan O	GE/10GE/100GE	Ready for Service 24 Mar 2017

- For connections to HKIX at Satellite Sites, special connection charges will be charged by relevant operators, in addition to the port charges charged by HKIX.
- For HKIX participants not co-located at HKIX satellite sites, they can still connect to any of the two HKIX core sites, i.e. HKIX1 and HKIX1b sites by local loops via local loop providers.

Setup Multiple HKIX Satellite Sites

- Allow participants to **connect to HKIX more easily at lower cost** from those satellite sites in Hong Kong
- Open to commercial data centres in HK which fulfil minimum requirements so as to maintain neutrality which is the key success factor of HKIX
- Create a win-win situation with satellite site collaborators
- To be named HKIX2/3/4/5/6/etc

  Recent updates:
  - HKIX2 has been migrated from old model to HKIX Satellite Site
  - HKIX3/4/5 are new Satellite Sites and they are **Ready for Service** now
- ***HKIX1*** *and* ***HKIX1b*** *(the two HKIX core sites* ***located within CUHK Campus****) will continue to serve participants directly*

HKIX-R&E – Special Support for R&E Networks Having Presence in HK

- **HKIX helps those R&E Networks interconnect among themselves and with commercial networks without restrictions via HKIX-R&E switch at MEGA-i**

- The main purpose is to facilitate those National R&E Networks having presence in Hong Kong to do interconnections among themselves ***and*** do peering with commercial networks at HKIX more easily and at a lower cost.

- Started in 2008
- **Free of charge** (no port charge on HKIX-R&E switch and the connection to HKIX)
- Support GE/10GE/100GE Trunk Ports for R&E networks
- Support Point-to-point VLANs for R&E networks
  - For private interconnections among any 2 R&E networks
  - Jumbo Frame support
- Fiber Cross Connect to be provided by R&E networks
- 7x24 NOC support
- Operate by HKIX with the HKIX-R&E switch at MEGA-i

HKIX-R&E Updates

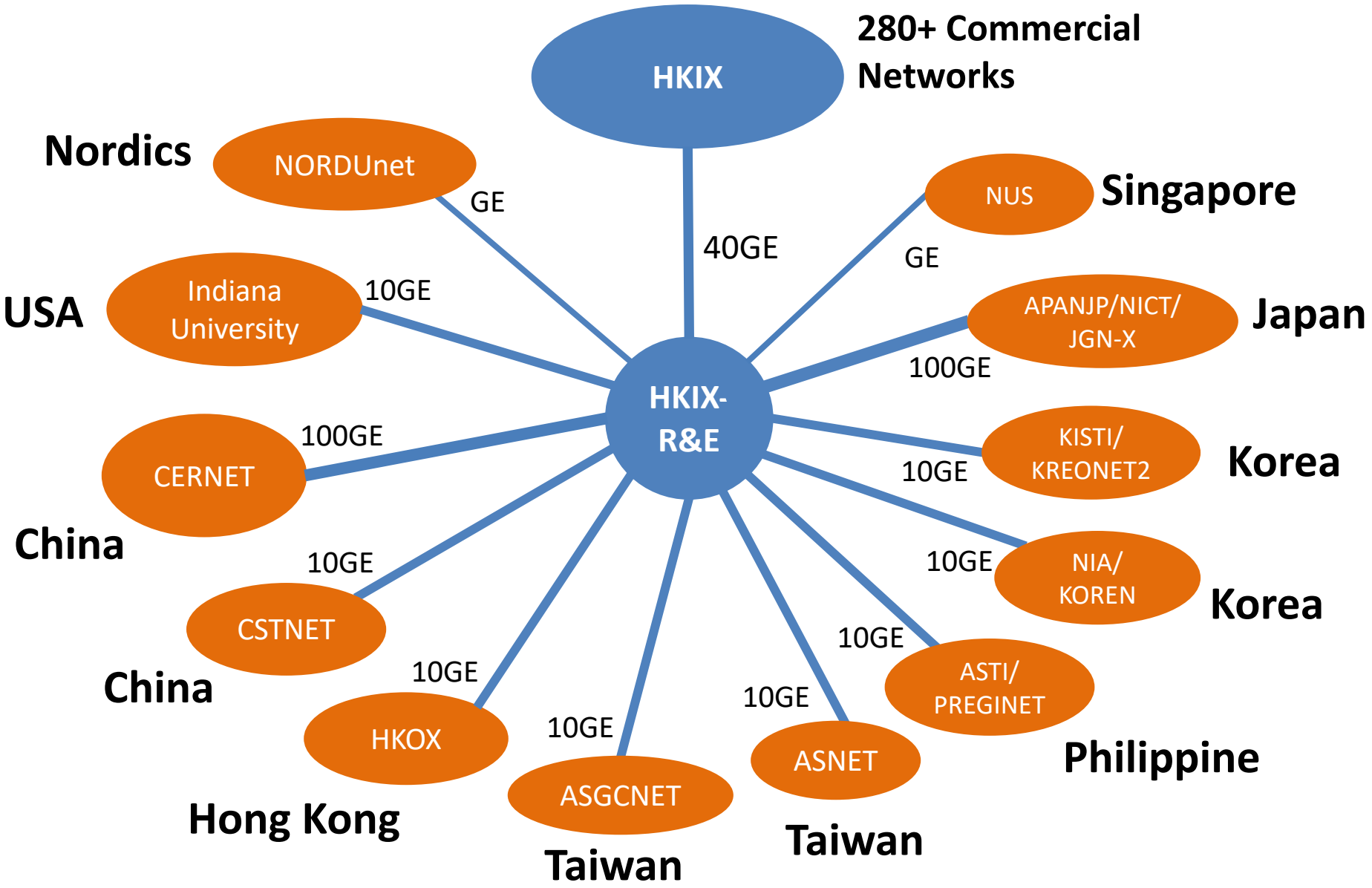
- New R&E participants
  - HKOX (2018 Jun)
  - Indiana University (2018 Aug)

- HKIX Portal for HKIX-R&E participants
  - View MRTG (HKIX VLAN, trunk port will be available later)
  - Change port-security MAC address (HKIX VLAN)
  - Schedule Maintenance Window

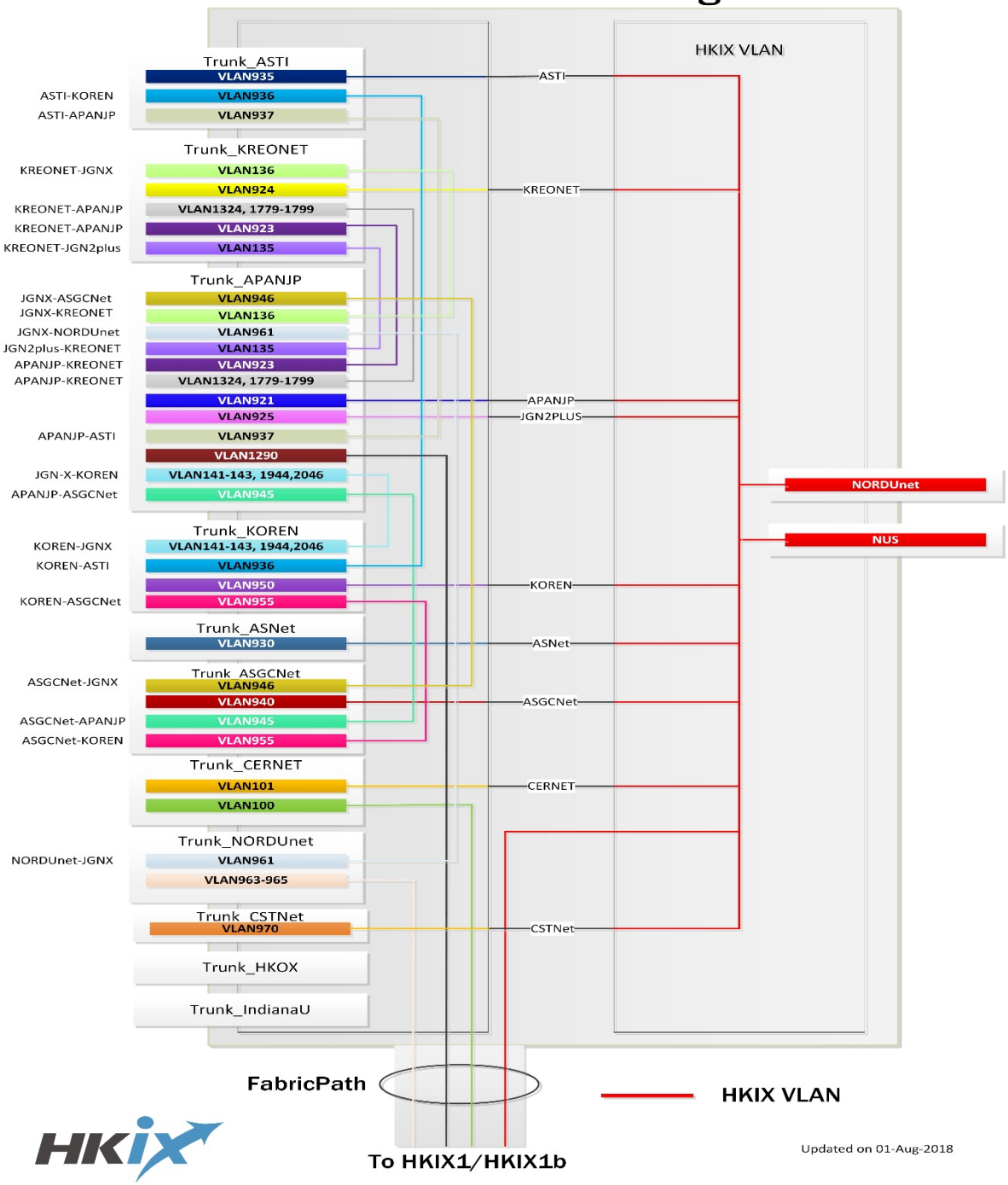
- More Resilience
  - 100G Line Cards
  - New Rack Space in MEGA-i

- 100G Connections from MEGA-i to HKIX
  - Upgrade existing 4x10G connections to 2x100G (Target by 2018)

HKIX-R&E Network Diagram



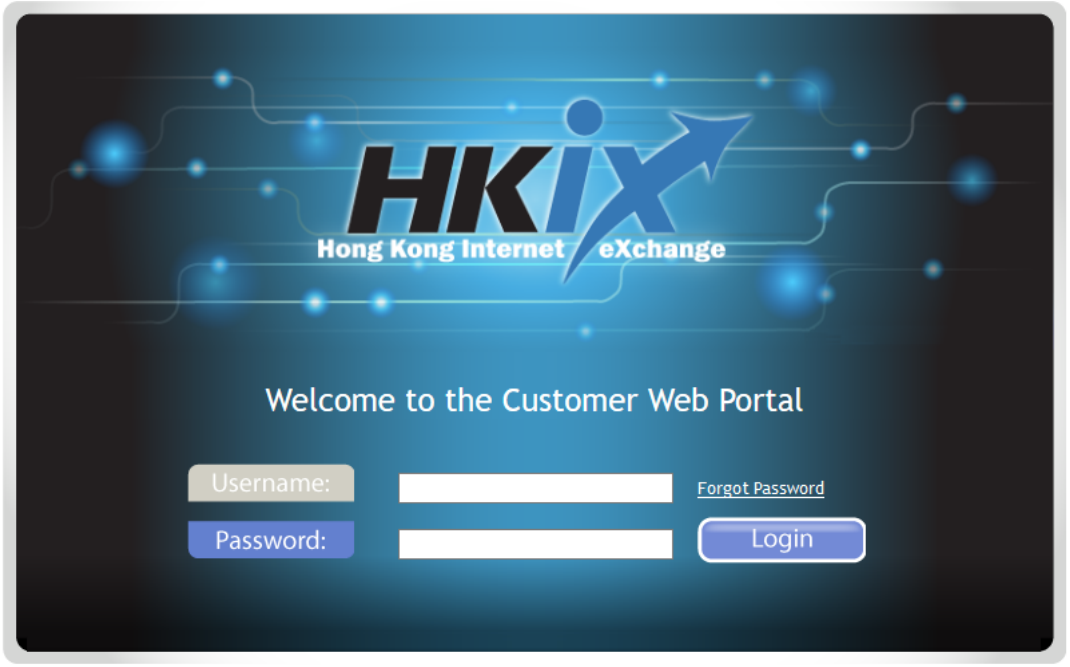
HKIX-R&E Network Diagram



Updated on 01-Aug-2018

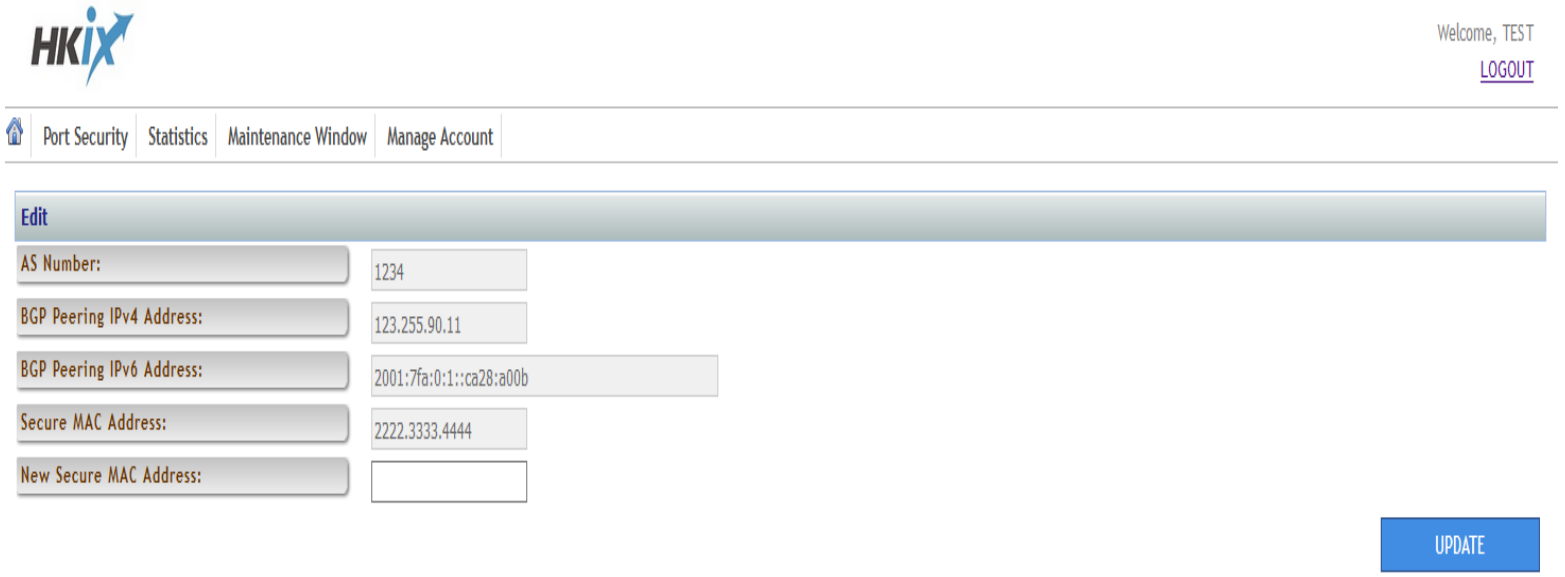
Portal for HKIX-R&E Participants

- Login Page (URL: https://portal.hkix.net/)



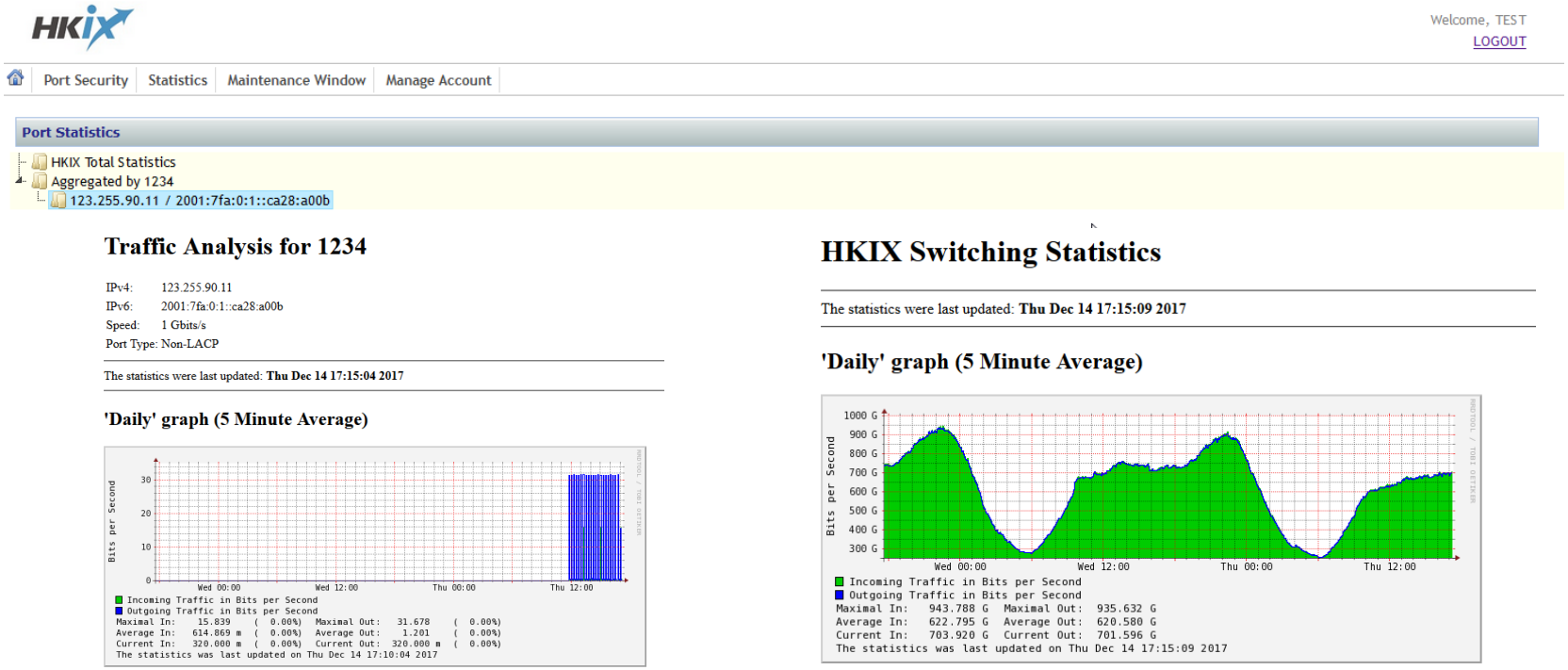
HKIX Portal – Port Security

- Change port security



HKIX Portal – MRTG Statistics

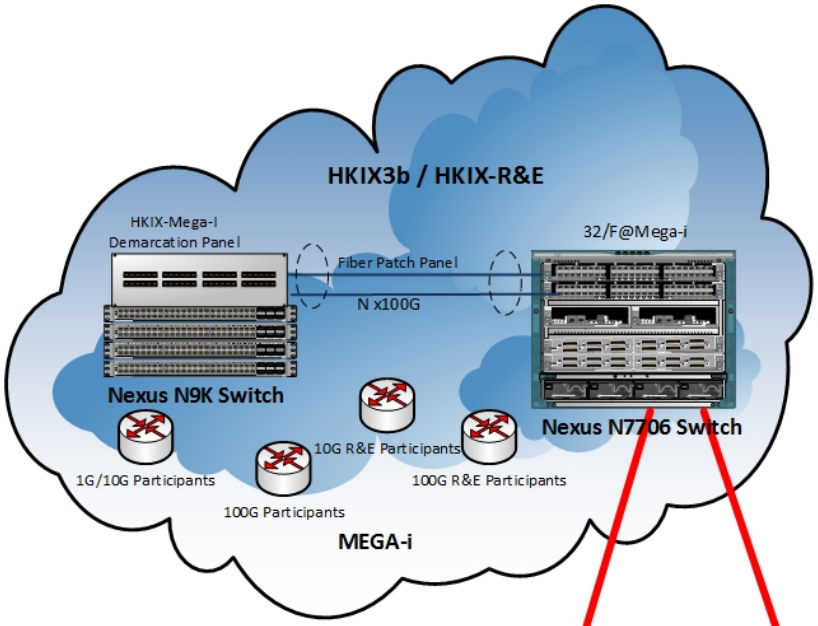
- Review an individual statistics / HKIX total statistics



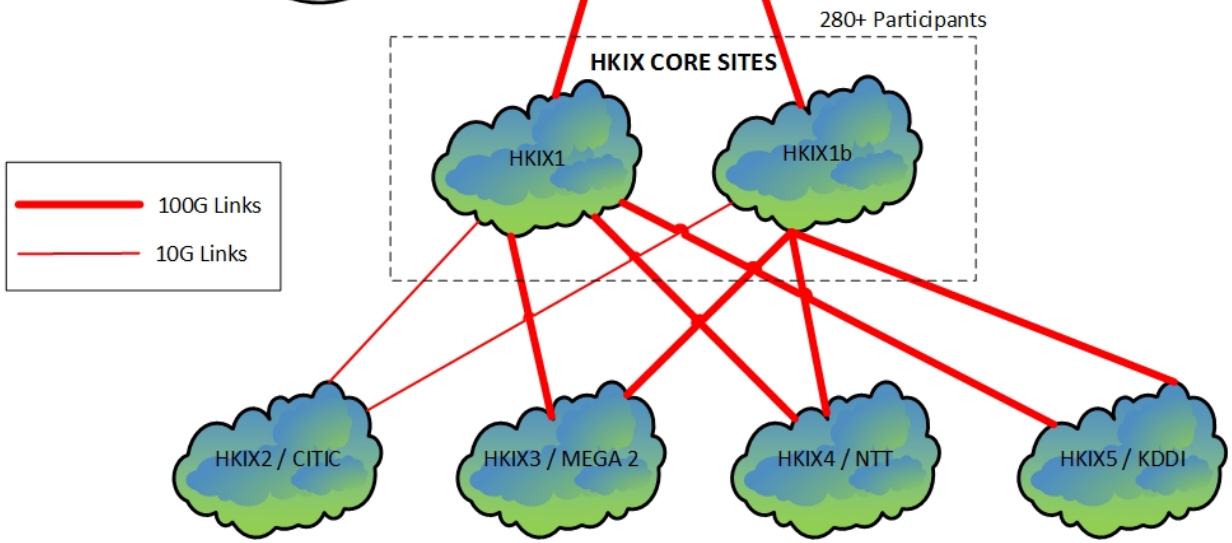
HKIX Portal - Maintenance Window

- Schedule Maintenance Window

HKIX Infrastructure Upgrade Plan @MEGA-i



More rack space
More resilience
More bandwidth



HKIX Planned Works for 2018/19

- Improved Stability
  - Better Control of Proxy ARP
- Improved Services
  - Rollout portal for HKIX participants / R&E participants
  - True 24x7 NOC (both email & hotline support)
  - Improve after-hour support
  - Introduce advanced Route Server functions
  - Automatic network filter update (support updates from IRR)
- Improved Security
  - ISO27001
  - Better support for DDoS mitigation
  - Implement MANRS IXP Programme for routing security
  - Implement RPKI on HKIX Route Servers to enhance routing security

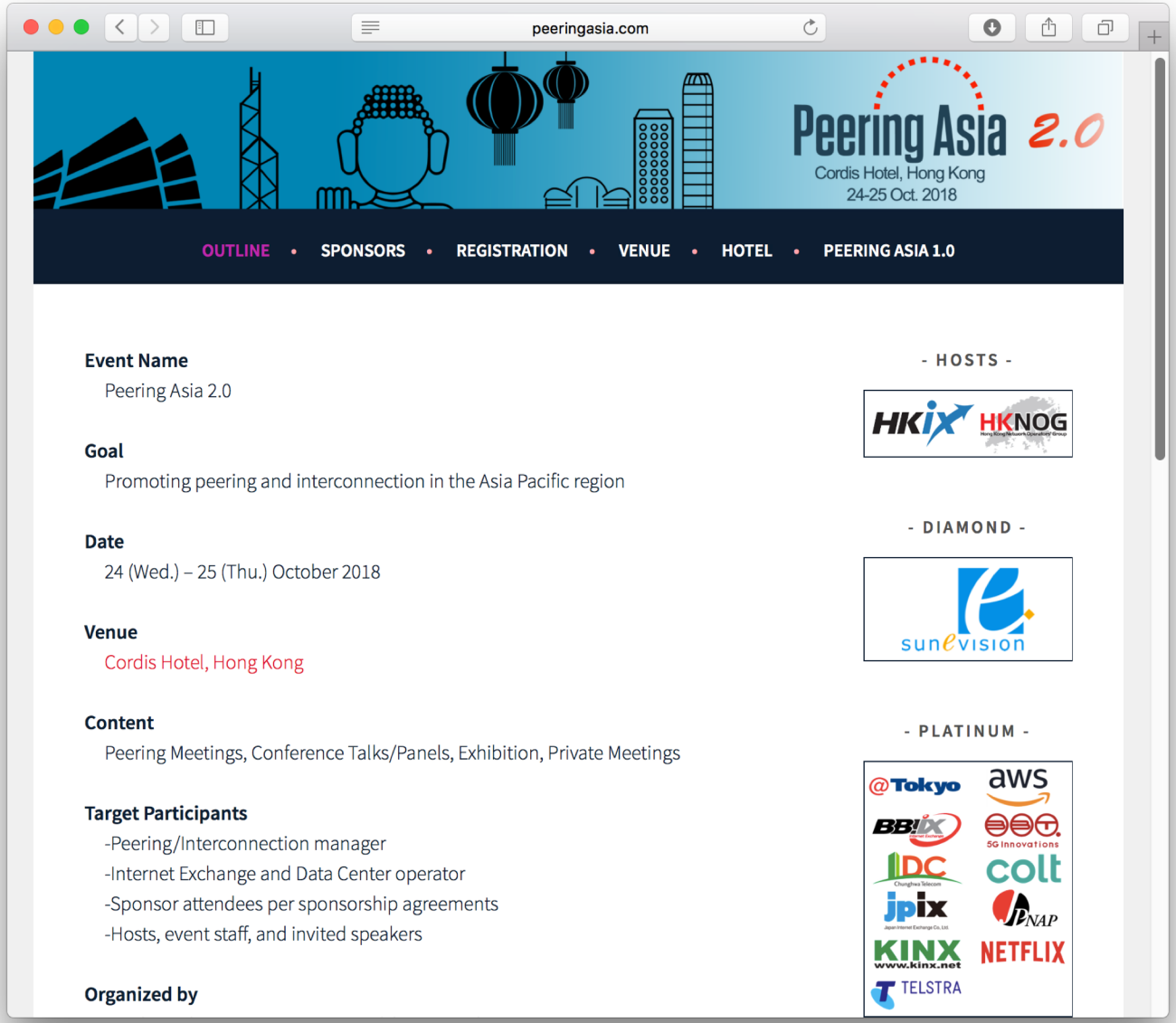
Sharing of operating a GXP

- Importance of Resilience
  - Sites (Spine and leaf architecture to support active-active topology)
  - Switches (Cisco Nexus N7710 with full redundancy of supervisors, 10G&100G line cards, power supplies)
  - Multiple Route Servers
- Tools for participants
  - HKIX Looking Glass (Ping test, check BGP routes, BGP summary, etc.)
  - User portal for viewing MRTG, change port-security mac address
- Stability
  - Self-defending to Proxy-ARP
- NOC
  - True 7x24 NOC providing support via email and hotline
  - Skillset (Understanding of Exchange Point with adequate network knowledge)
  - Mindset (Task priority of Exchange Point vs Campus)

Peering Asia 2.0
Hong Kong co-host by HKIX and HKNOG

24th – 25th October, 2018

Peering Asia 2.0 Web Site



Peering Asia 2.0 details

- Date : 24th to 25th October (Wed & Thu)
- Venue : Cordis Hotel, Hong Kong
  - » Conference capacity of 250+
  - » 35+ tables for peering meeting
  - » 14+ rooms for private meeting
  - » Walking distance to wide range of accommodation choices
  - » Walking distance to subway & train stations
  - » Surround by numerous restaurants and bars

Please visit our web site at www.peeringasia.com for details

Thank You!

For enquiries, please contact us at

info@hkix.net