

HKIX Development and HKIX-R&E Updates at APAN 48

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www.hkix.net

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What is HKIX?

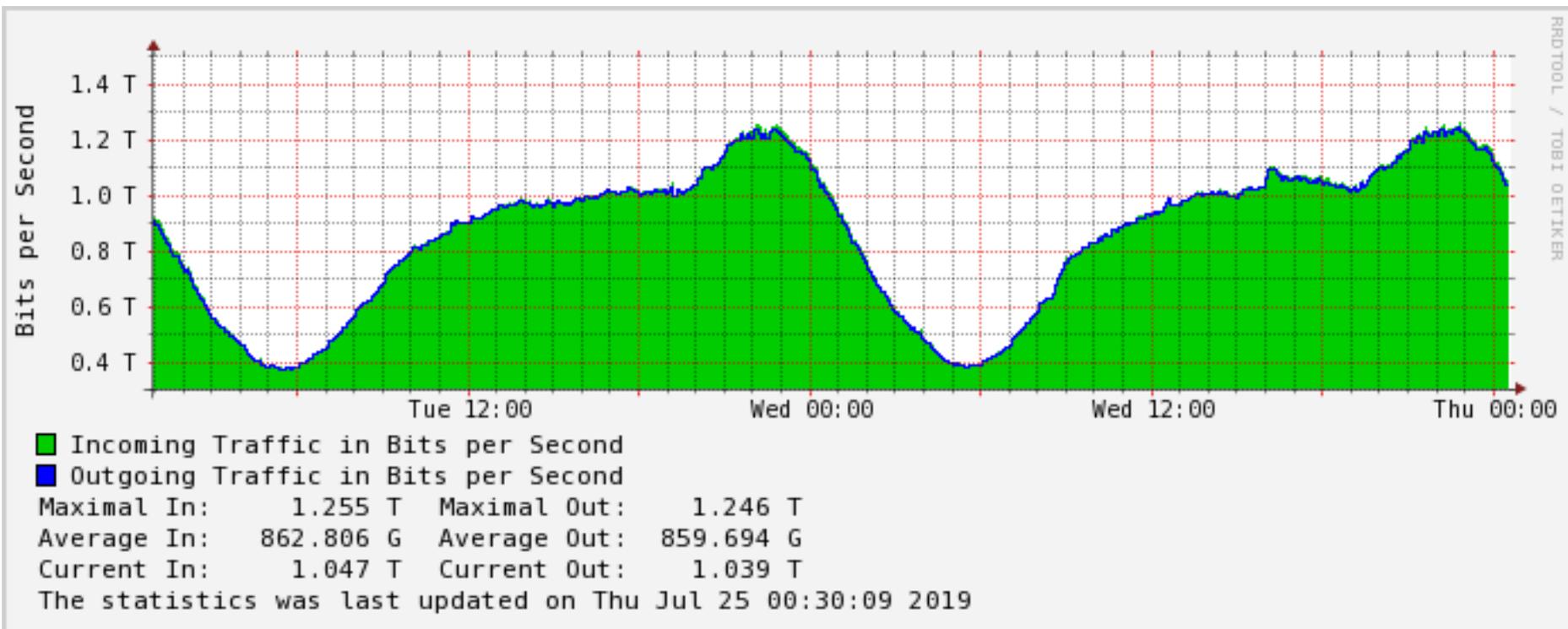
- Established in Apr 1995, [Hong Kong Internet eXchange \(HKIX\)](#) is the main layer-2 Internet eXchange Point (IXP) in Hong Kong where various autonomous systems interconnect with one another and exchange traffic
- HKIX is now owned and operated by the Hong Kong Internet eXchange Limited (a wholly-owned 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 Today

- Supports both MLPA (Multilateral Peering) and BLPA (Bilateral Peering) over layer 2
- Supports IPv4/IPv6 dual-stack
- More and more non-HK participants
- 310+ different networks (autonomous systems) connected
- 510+ physical connections in total
 - 48 **100GE**, 310+ **10GE** & 150+ **GE**
- 1.34+Tbps (5-min) total traffic at peak
- Annual Traffic Growth **~30%**

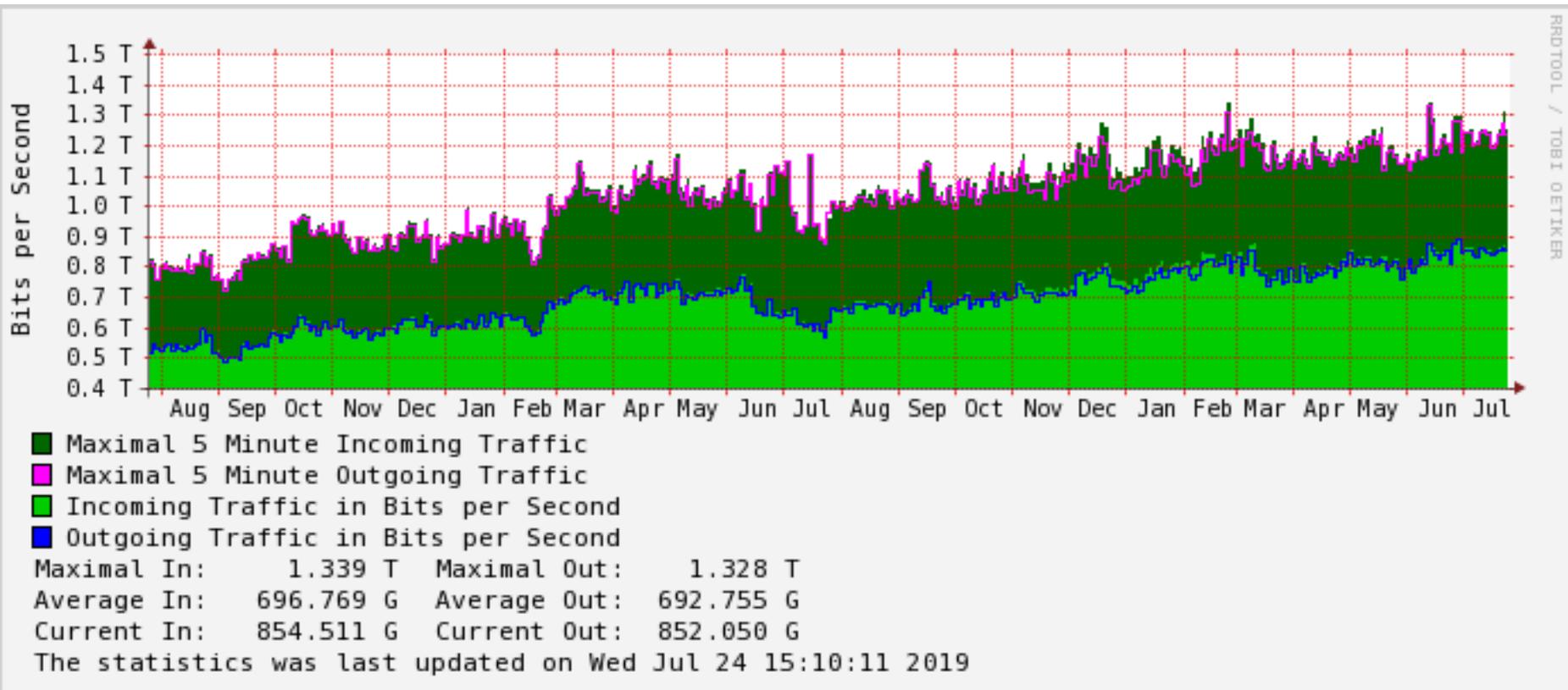
Current HKIX Traffic

Daily Graph (5-min average)



Current HKIX Traffic

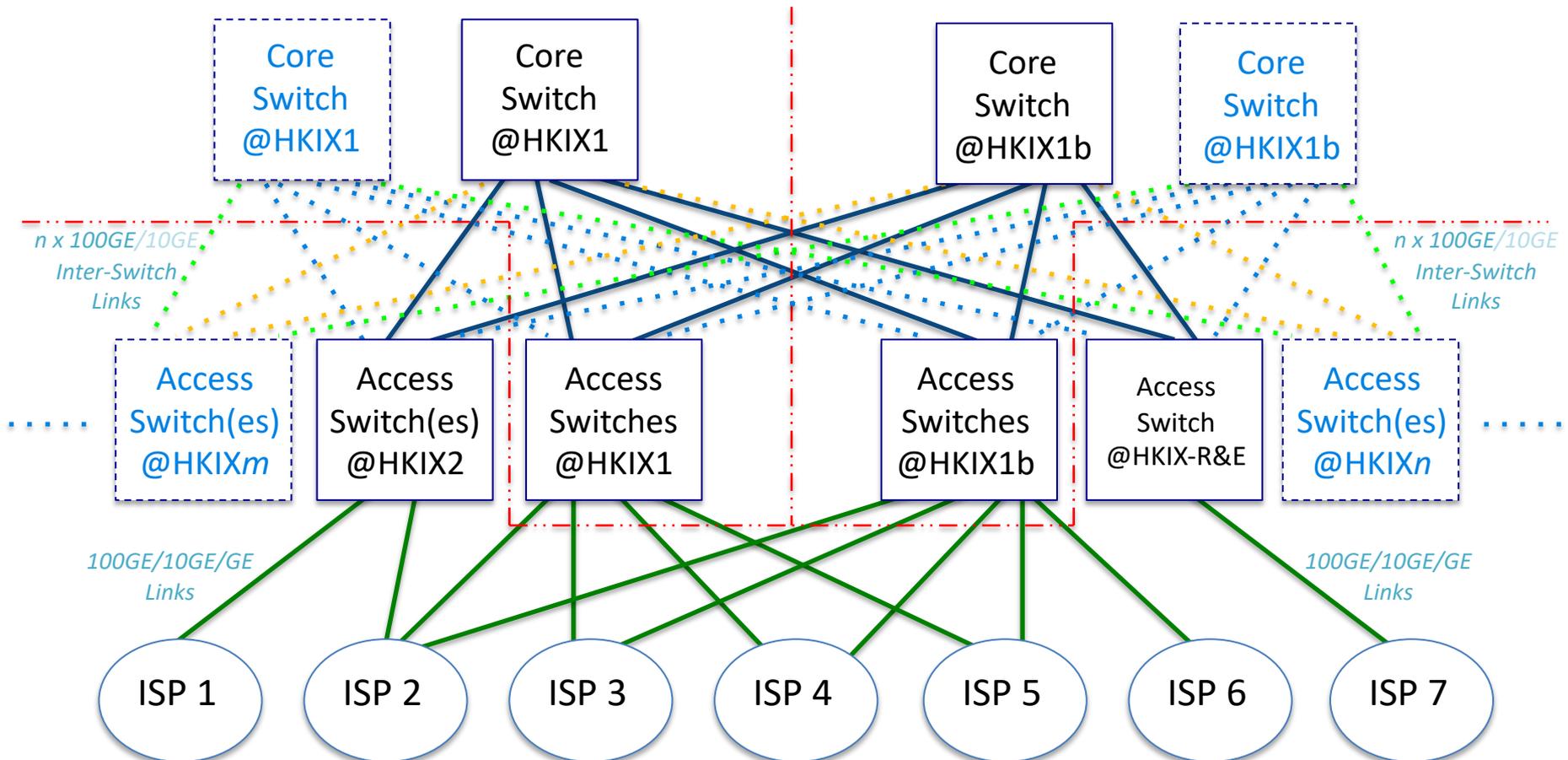
Yearly Graph (1-day average)



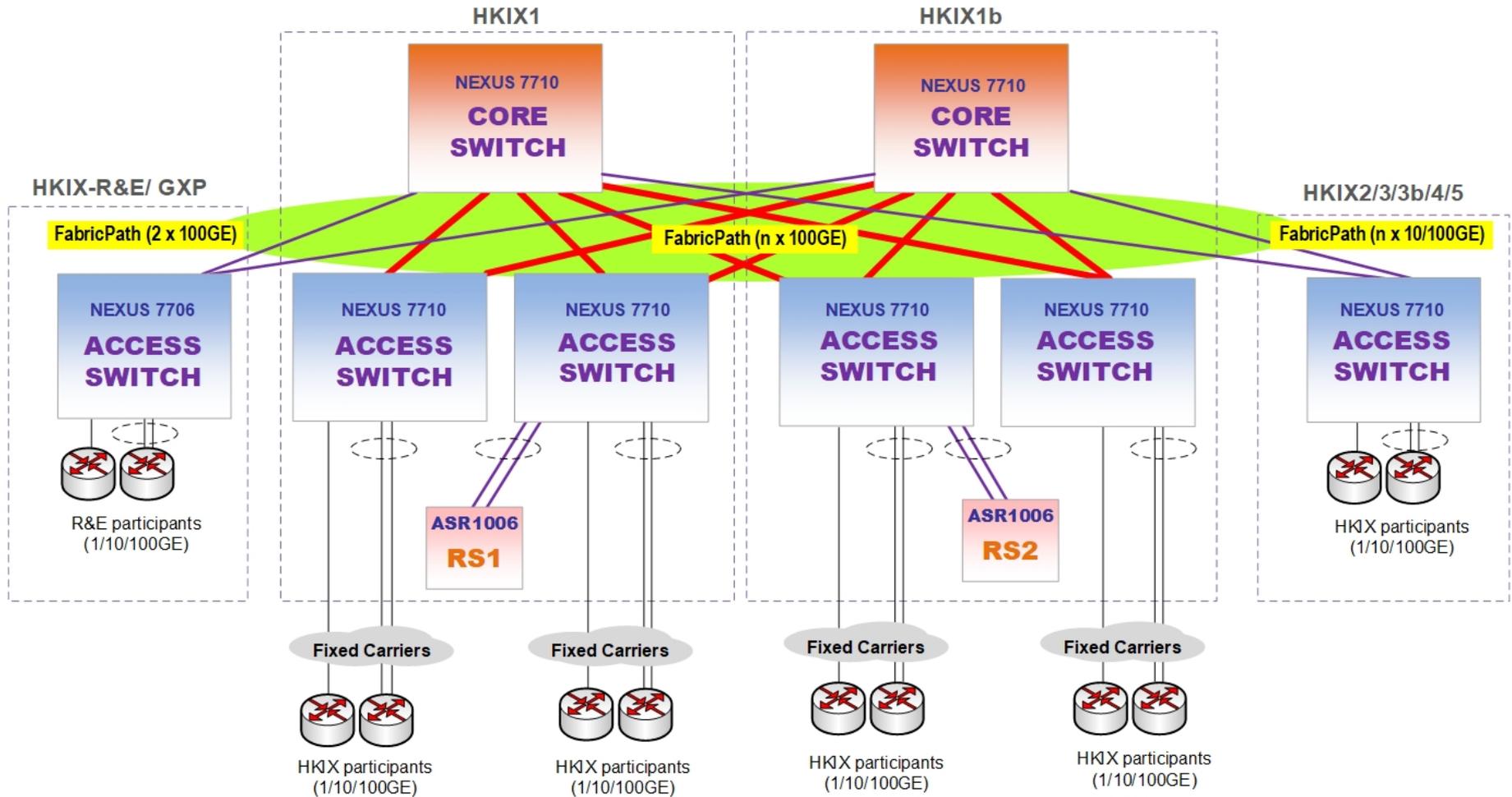
New HKIX Dual-Core Two-Tier Spine-and-Leaf Architecture For 2014 and Beyond



HKIX1 Core Site @CUHK -----(<2km)----- HKIX1b Core Site @CUHK



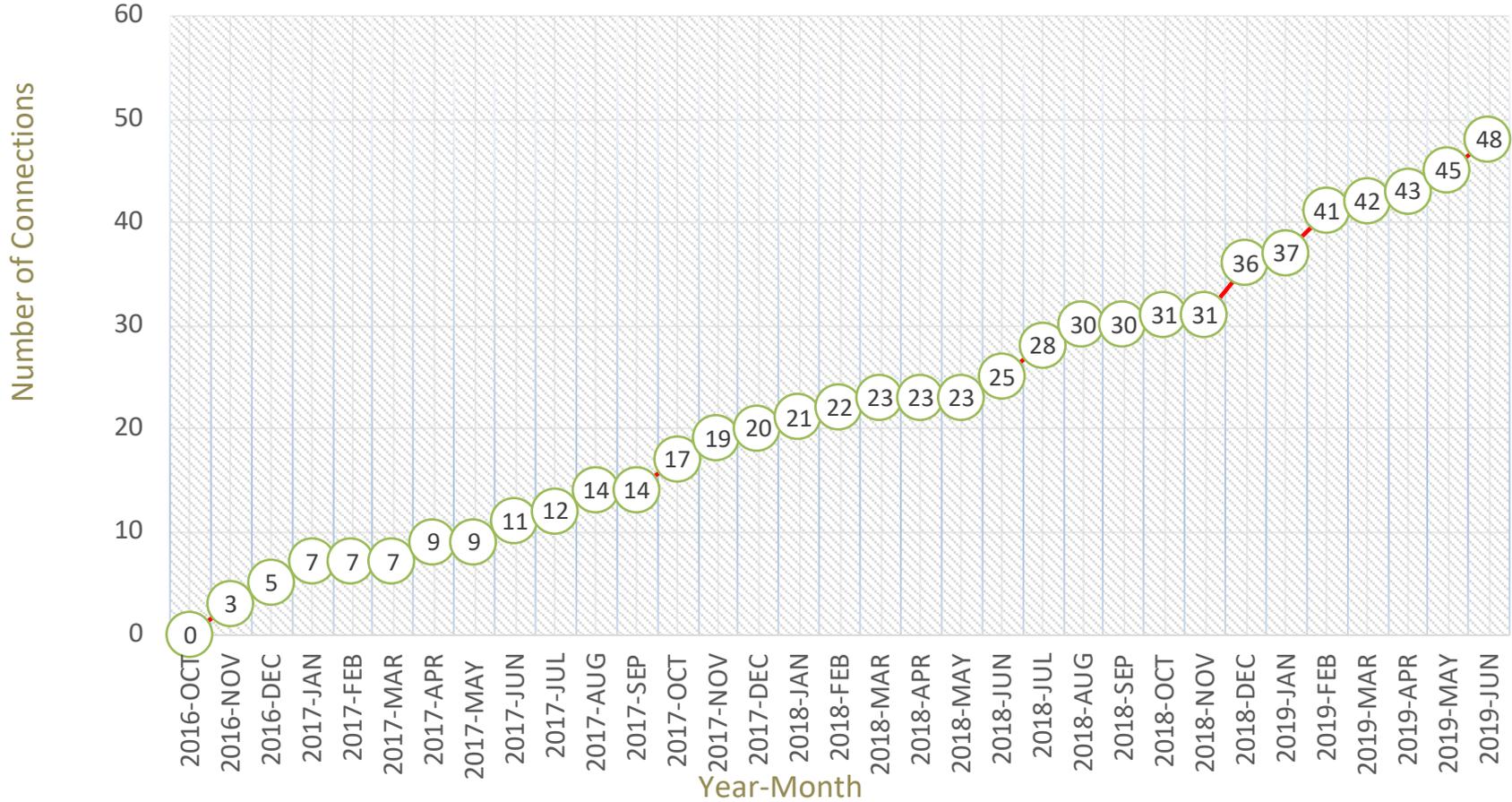
HKIX Network Diagram (May 2019)



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

100GE Connections at HKIX

Total Number of 100G Ports Connected (2016 OCT - 2019 JUN)



HKIX 100GE Participants (1/2)

- Akamai
- Amazon
- ANSONNET
- AOFEI
- BGP Consultancy
- China Mobile HK
- China Mobile International
- CloudFlare
- Facebook
- Google
- HKBN
- Hurricane Electric
- Level 3

HKIX 100GE Participants (2/2)

- Limelight
- Microsoft
- Mytek
- Taobao
- Telin
- Telstra
- Tencent
- TVB
- Udomain
- Value
- XLC Global
- Yahoo

HKIX's 100GE participants at a glance



Content Provider



ISP Regional



ISP Local



Retail & Gaming



DDoS Provider



Data Centre



Others

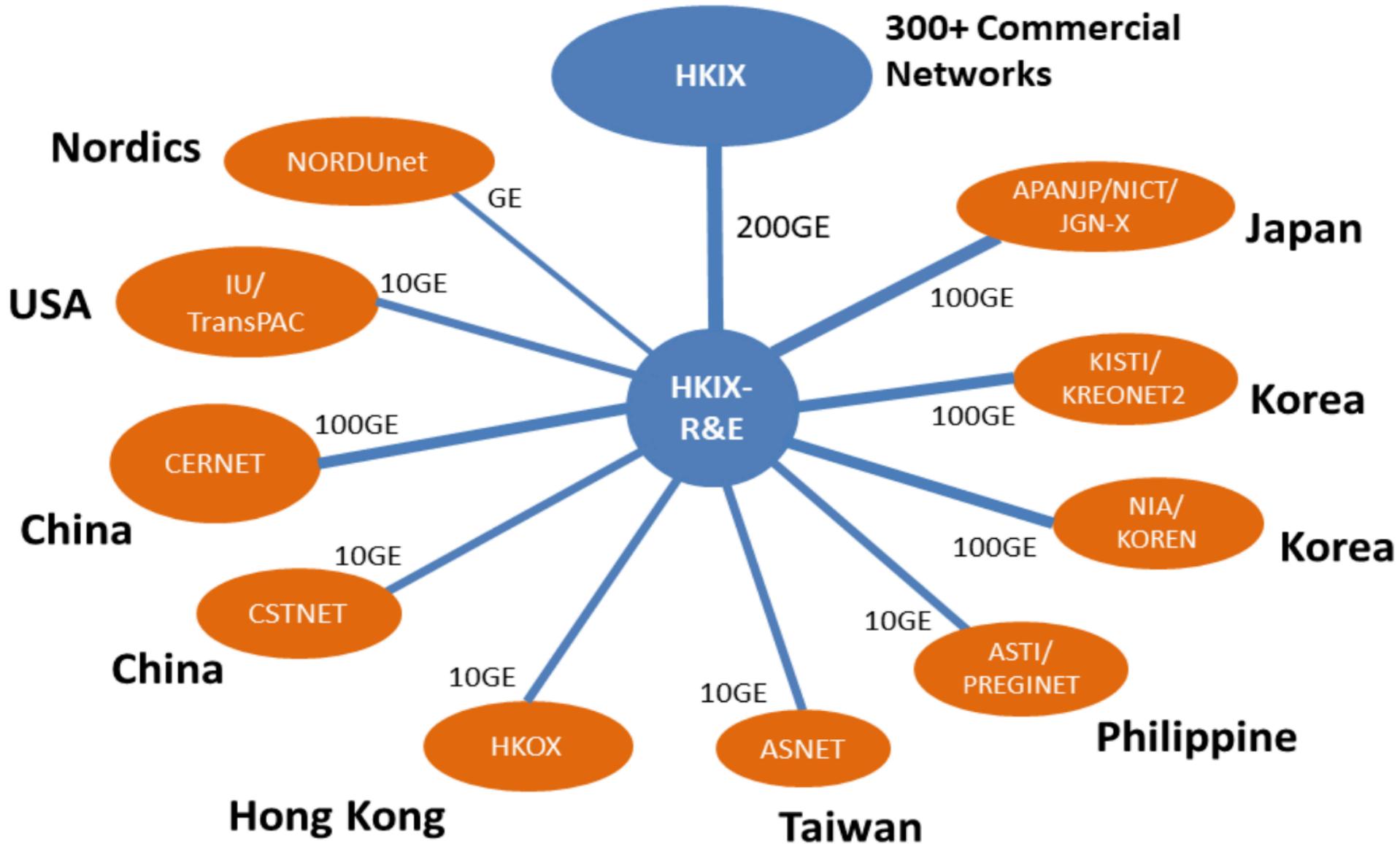




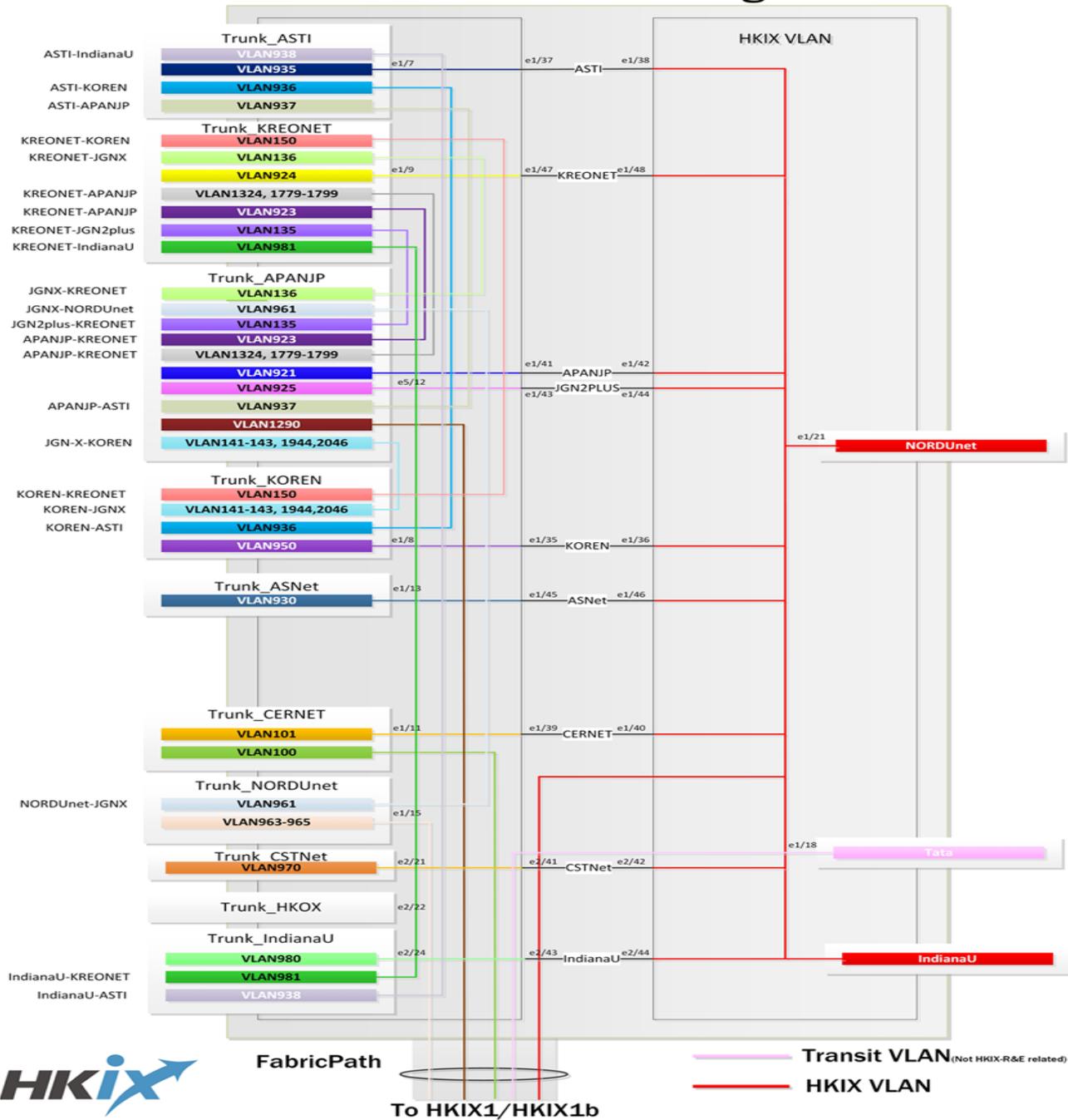
HKIX-R&E – Special Support for R&E Networks Having Presence in HK

- 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 Network Diagram



HKIX-R&E Network Diagram



HKIX-R&E Updates

- KISTI/KREONET2 upgrade to 100G at Jul/2019
- HKIX perfSONAR server upgrade to 10G
 - IP address: 202.45.188.76
- 100G Connections from MEGA-i to HKIX
 - Upgrade existing 4x10G connections to 2x100G at Feb/2019

HKIX 100GE R&E Participants

- APANJP/NICT/JGN-X
- CERNET
- KOREN
- KISTI/KREONET2 (Jul/2019)

HKIX perfSONAR Server



perfSONAR Toolkit on 202.45.188.76

Log in

Configuration

Help

202.45.188.76

Edit

Organization: the Hong Kong Internet eXchange (HKIX)

Address: Hong Kong HK ([map](#))

Administrator: Ryan Ng (ryan@hkix.net)

Services

SERVICE	STATUS	VERSION	PORTS	SERVICE LOGS
esmond	Running	2.1.3-1.el7		View
lsregistration	Running	4.1.6-1.el7		View
owamp	Running	3.5.8-1.el7	861	View
pscheduler	Running	1.1.6-2.el7		View
psconfig	Running	4.1.6-1.el7		View
twamp	Running	3.5.8-1.el7	862	View

Test Results (5 Results)

Configure tests

Search:

Results for the last...

1 week

SOURCE	DESTINATION	THROUGHPUT	LATENCY (MS)	LOSS
202.45.188.76 Details Traceroute	nms1-10g.jp.apan.net 203.181.249.186	→ 1.49 Gbps ← 293 Mbps	→ 25.7 ← 25.9	→ 0 ← 0.594%
202.45.188.76 Details Traceroute	ps.honk.kreonet2.net 134.75.253.98	→ 901 Mbps ← n/a	→ 0.653 ← 147	→ 0 ← 0.513%
202.45.188.76 Details Traceroute	ps.seul.kreonet.net 134.75.32.18	→ n/a ← n/a	→ 19.5 ← 130	→ 0.001% ← 0.478%
202.45.188.76 Details Traceroute	ps1.itsc.cuhk.edu.hk 137.189.192.25	→ 2.11 Gbps ← 886 Mbps	→ 1.33 ← 0.380	→ 0.003% ← 0.522%
202.45.188.76 Details Traceroute	ps2.itsc.cuhk.edu.hk 137.189.192.49	→ 2.42 Gbps ← 1.24 Gbps	→ 0.734 ← 0.861	→ 0.000% ← 0.551%

Show 10 entries

Showing 1 to 5 of 5 entries

Previous **1** Next

Host Information (Log in for more info)

Interfaces	Details
Primary Interface	em1
NTP Synced	Yes
Globally Registered	Yes
Node Role	Exchange Point
Access Policy	Public
Virtual Machine	No
RAM	31 GB
More Info	Details

Communities

- 10G
- HKIX

On-demand testing tools

- [Reverse ping](#)
- [Reverse traceroute](#)
- [Reverse tracepath](#)
- [Traceroute Visualization](#)

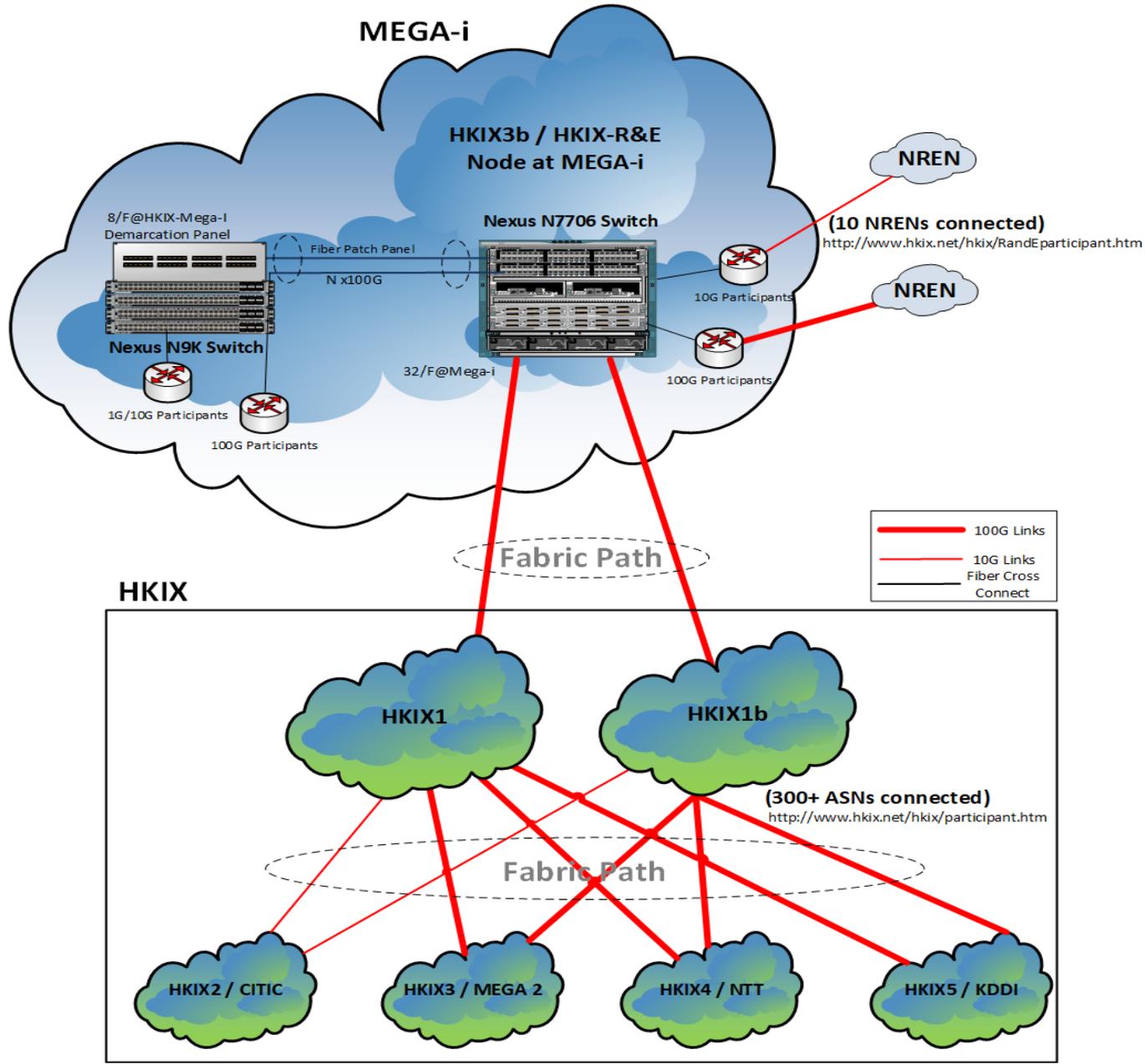
Other services

- [Global node directory](#)

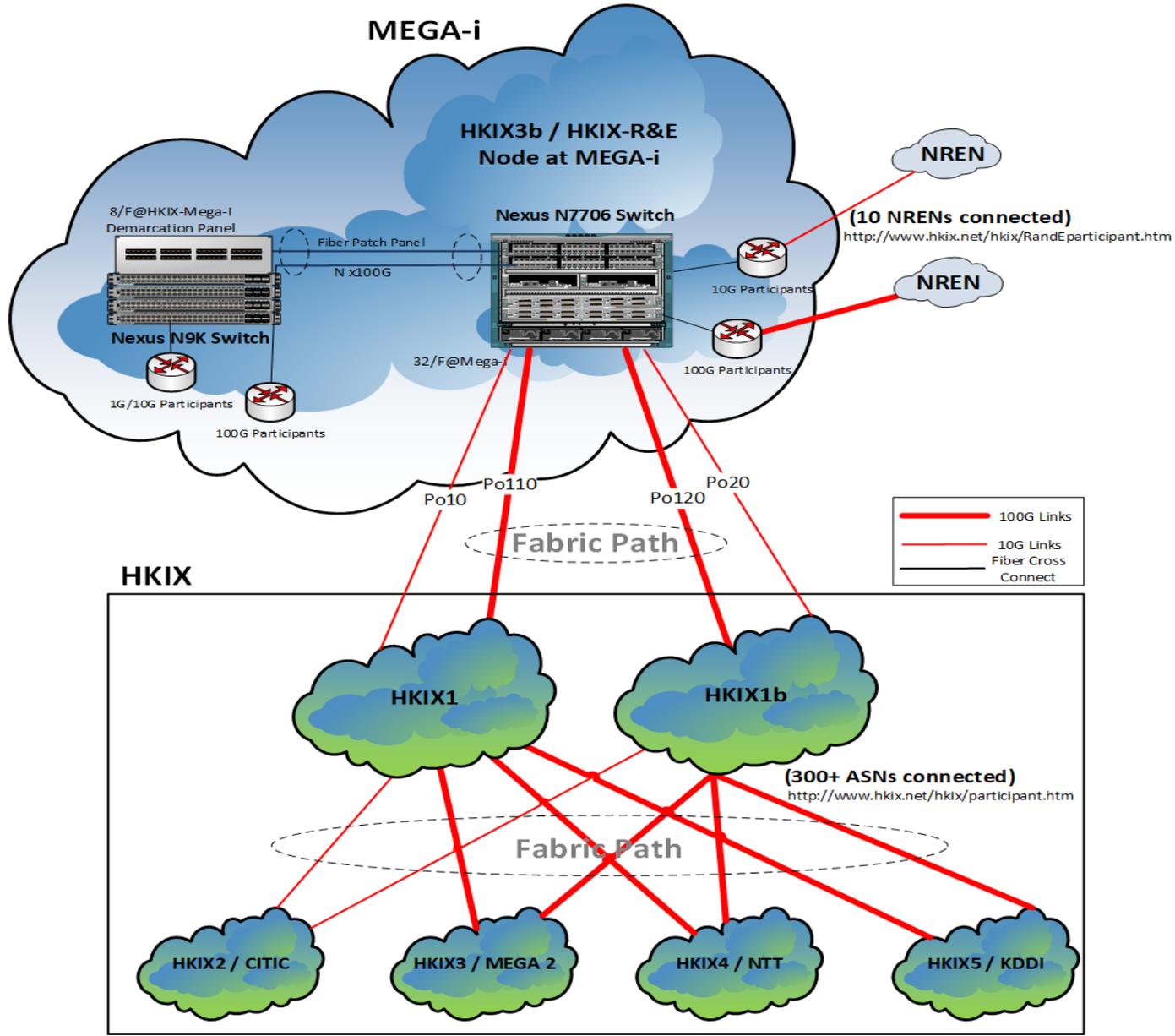
HKIX Planned Works for 2019

- 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
 - perfSONAR server
 - Automatic network filter update (support updates from IRR)
 - New HKIX Route Server
- 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

HKIX Infrastructure @MEGA-i



Upgrade 4x10G to 2x100G @MEGA-i Experience Sharing



Upgrade 4x10G to 2x100G @MEGA-i

Experience Sharing



- FabricPath Layer 2 IS-IS Metric:

10 GB	40
100 GB	4

- Tune 10G IS-IS Metric as 100G to maintain ECMP before enabling 100G interfaces:
#interface Po10
#fabricpath isis metric 4
#interface Po20
#fabricpath isis metric 4
- Enable 100G interfaces:
#interface Po110
#no shutdown
#interface Po120
#no shutdown
- Shutdown 10G interfaces:
#interface Po10
#shutdown
#interface Po20
#shutdown

HKIX Future Upgrade Plan

- Support of 400G connections
- Network traffic visibility
- Network automation
- EVPN (VXLAN)
 - Multiple vendors support
 - Unknown unicast suppression
 - VLAN translation

IX name	Hong Kong Internet eXchange (HKIX)
City, Country	Hong Kong
Point of Presence	Core Sites: HKIX1 & HKIX1b @CUHK HKIX-R&E: HKIX-R&E@MEGA-i Satellite Sites: HKIX2 @CITIC, HKIX3/HKIX3b @iAdvantage, HKIX4 @NTT, HKIX5 @KDDI
# of connected ASN	312
Peak traffic	1.34 Tbps
Route Servers	Yes (Cisco ASR1006)
Remarks	Website: https://www.hkix.net PeeringDB: https://www.peeringdb.com/ix/42

For enquiries, please email us at info@hkix.net

Thank You!

For enquiries, please contact us at
info [at] hkix.net