The latest development and new core site of HKIX

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HKNOG 10.0

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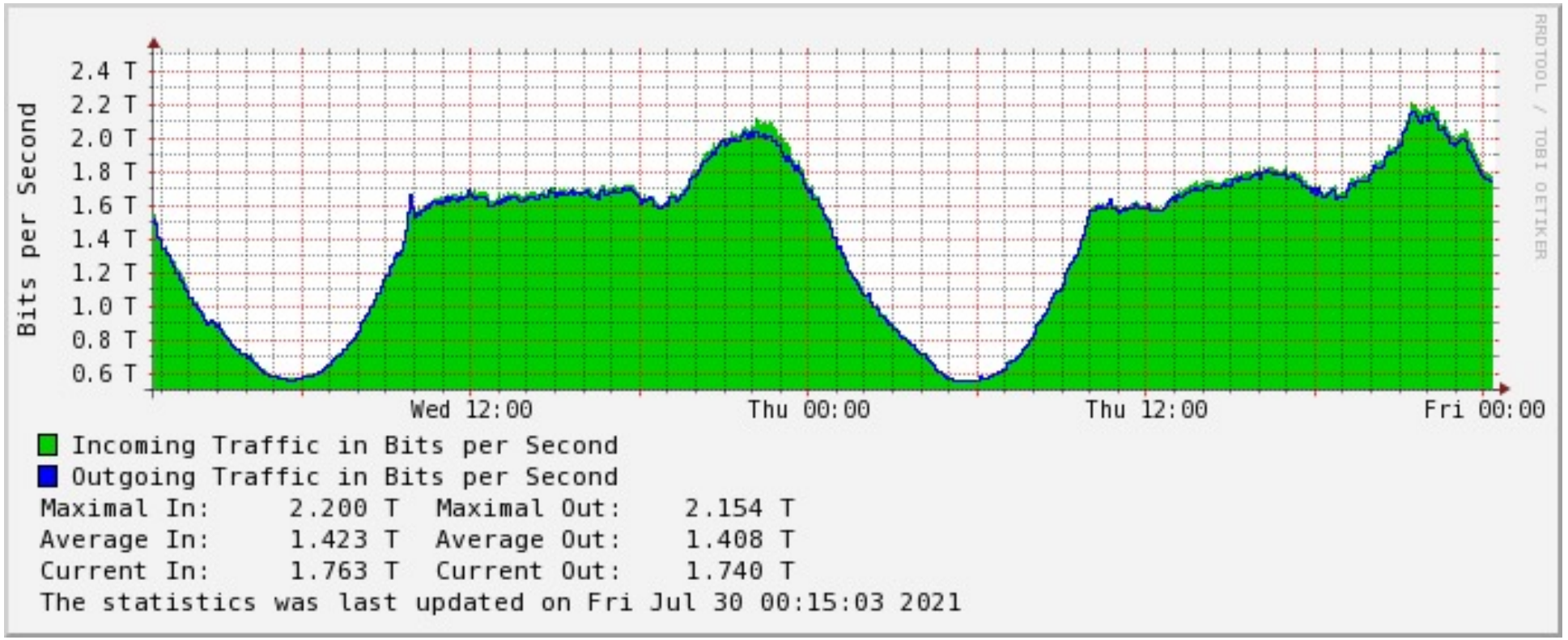
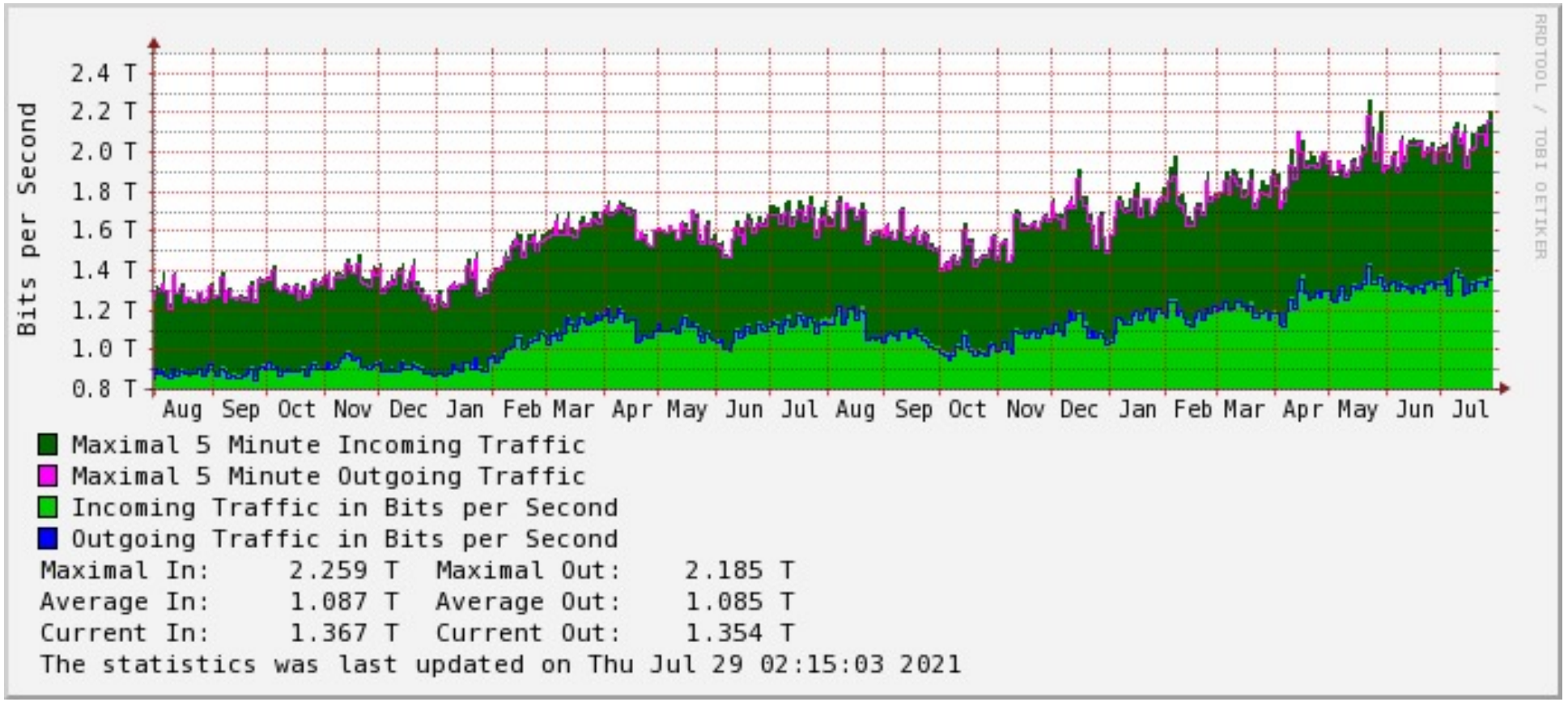
HKIX Today

- Supports both MLPA (Multilateral Peering) and BLPA (Bilateral Peering) over layer 2
- Supports IPv4/IPv6 dual-stack
- More and more non-HK participants
- ~340 different networks (autonomous systems) connected
- 560+ physical connections in total
  - 96 **100GE**, 330+ **10GE** & 130+ **GE**
- 2.29+Tbps (5-min) total traffic at peak
- Annual Traffic Growth ~30%

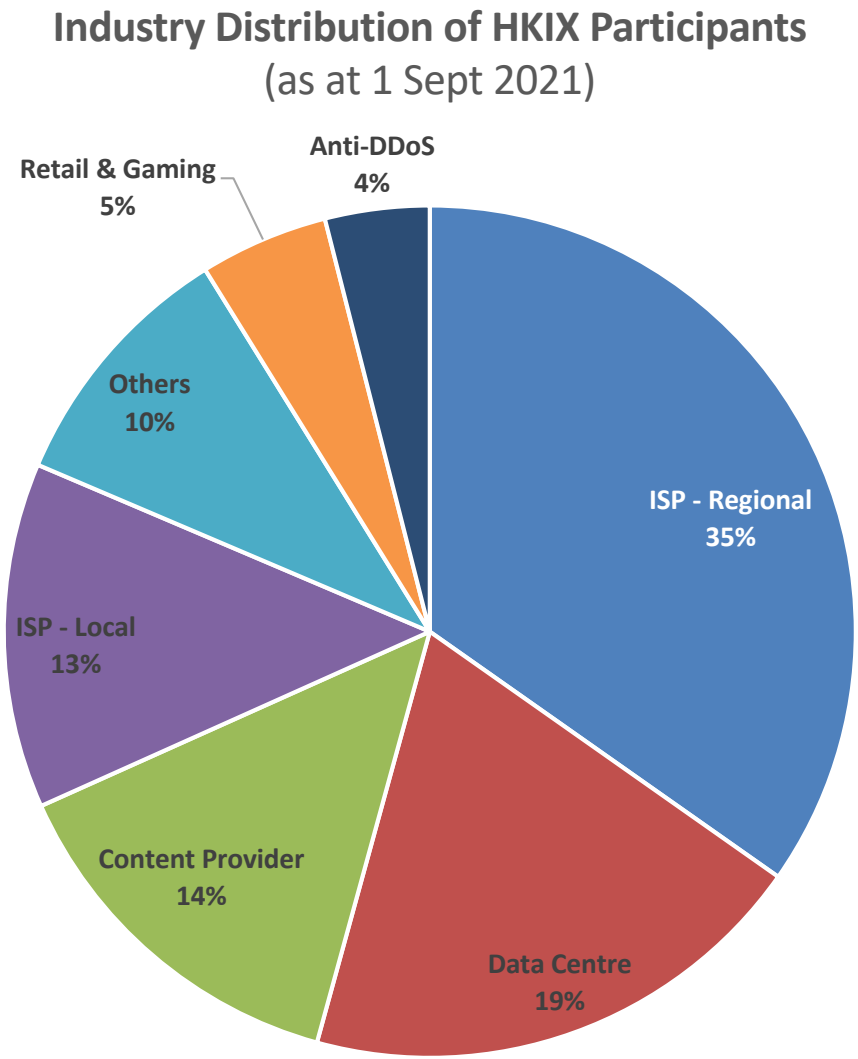
Current HKIX Traffic
Daily Graph (5-min average)



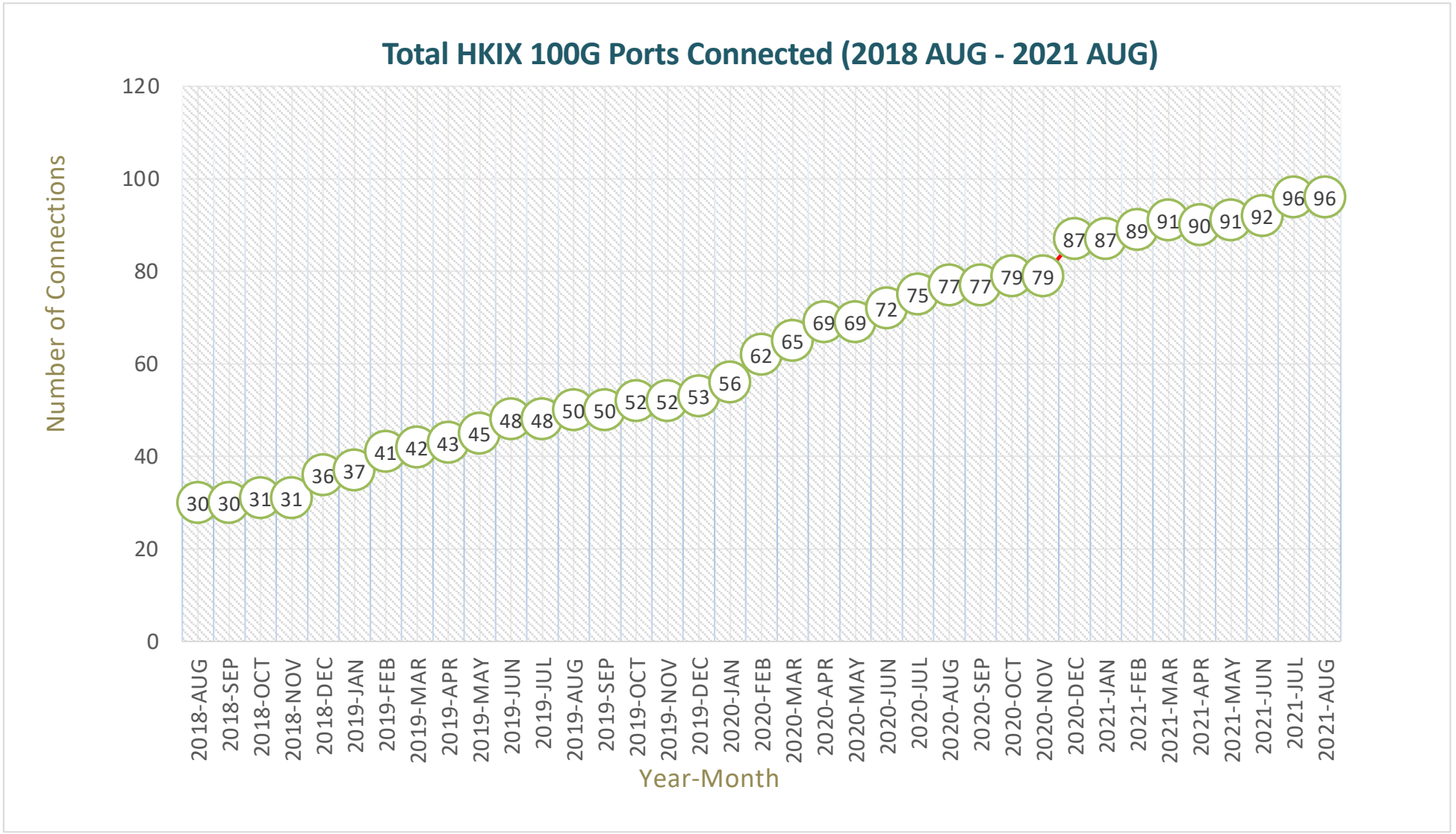
Current HKIX Traffic
Yearly Graph (1-day average)



Industry Distribution



100GE Connections at HKIX



HKIX 100GE Participants (1/2)

- Akamai
- Alpha Network
- Amazon
- BGP Consultancy
- BIGO
- China Mobile HK
- China Mobile International
- CloudFlare
- Continent
- Converge ICT Solution
- Dataweb Global Group
- DDoS-Guard
- DITO Telecommunity
- Facebook
- FPT Telecom
- G-Core Labs
- Google
- HGC
- HKBN
- HKT
- Huawei International
- Hurricane Electric
- Hutchison Telephone

HKIX 100GE Participants (2/2)

- Limelight
- Microsoft
- Mytek
- Netflix
- Netvigator
- NexusGuard
- PCCW Global
- RETN
- SK Broadband
- Sky Cable
- Taobao
- Telin
- Telekom Malaysia HK
- Telstra
- Tencent
- TVB
- Udomain
- Unicom
- Value
- XLC Global
- Yahoo
- Zscaler

HKIX's 100GE participants at a glance -1

Content Provider

Tencent 腾讯
NETFLIX
facebook
Akamai
Google
amazon
YAHOO!
Microsoft
TVB
Limelight NETWORKS
BGPNet BGP Network (M) Sdn Bhd
zscaler
BIGO
SKYCABLE
G·CORE LABS

ISP Regional

TELSTRA
中国移动 China Mobile International
TM
PCCW Global
Telin
China unicom 中国联通
HURRICANE ELECTRIC INTERNET SERVICES
RETN
CONVERGE
DITO TELECOMMUNITY
FPT
SK broadband

ISP Local

HKT
網上行 netvigator
香港寬頻 HONG KONG BROADBAND NETWORK
ais
中國移動 China Mobile
HGC 寬頻
3

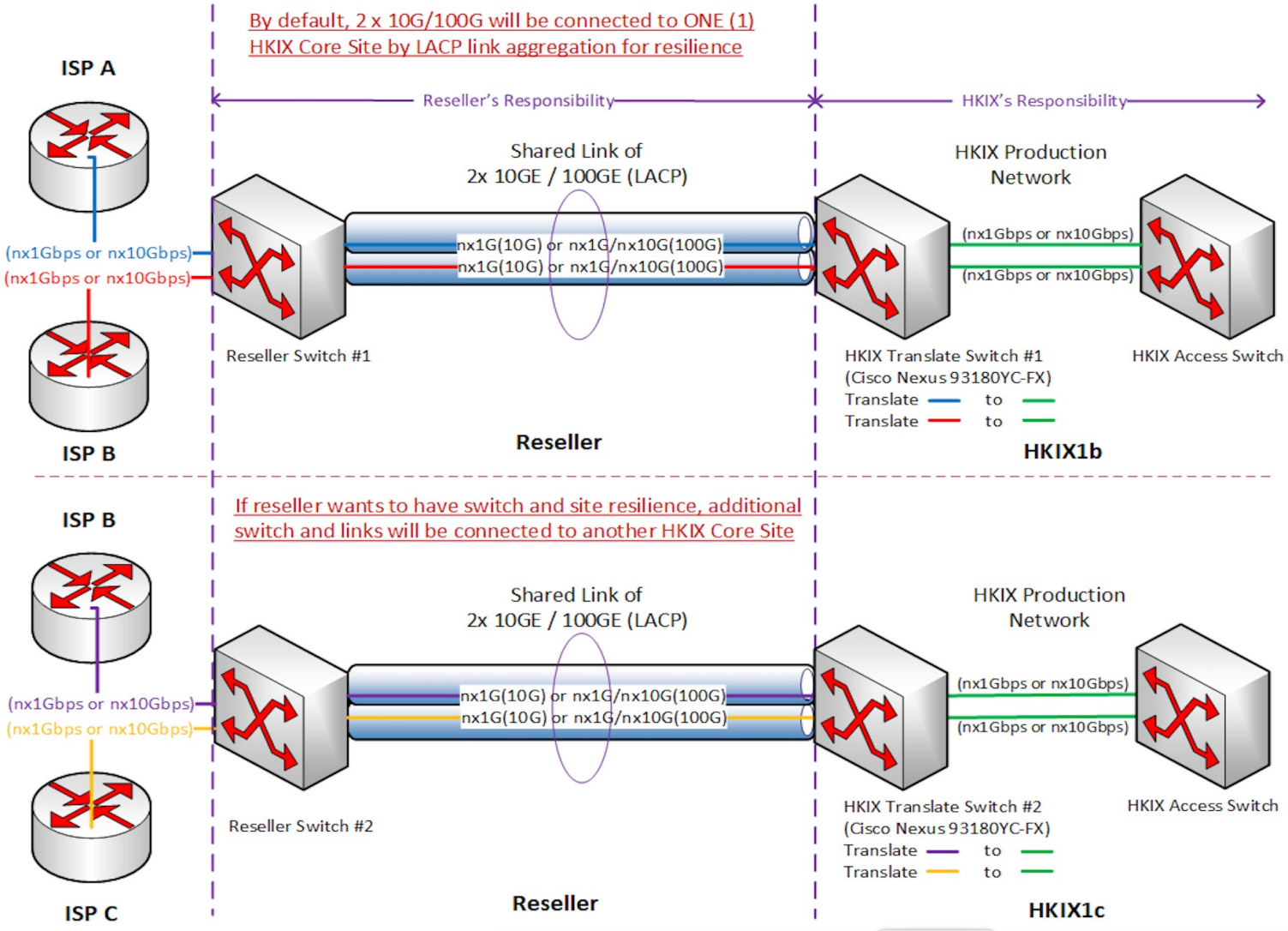
HKIX's 100GE participants at a glance -2

Retail & Gaming	Anti-DDoS Provider	Data Centre	Others
淘宝网 Taobao.com	CLOUDFLARE	UDomain	HUAWEI
VALVE	NEXUSGUARD	ALPHANETWORKS Solution Pte Ltd	XLC GLOBAL
	DDOS-GUARD		CONTINENT8 technologies
			DGG Dataweb Global Group
			MYTEK Trading

HKIX Reseller Program

- Phase 2 of HKIX reseller program has been launched in Q4/2020 and available for resellers connecting to HKIX Core Sites
- Non-exclusive arrangement / resellers can be IXPs, Data Centers, local and regional ISPs
- Target for remote peering
- One-stop-shop, flexibility bandwidth, cost efficiency and swift provision of services by resellers
- Authorised Resellers: JPIX, iAdvantage, OneAsia, CommVerge, KDDI and Console Connect
- See https://www.hkix.net/hkix/Resellers.htm for details

Reseller Network Topology Diagram



HKIX MLPA Route Servers

IPv4 Route Servers (RS1 & RS2) have been upgraded to ASR1002-HX in Mar 2021.

Routing security is tightening on HKIX route servers:

AS number filtering is no longer supported. Please change to use **IRR filtering** if you would like to update the filters for BGP route announcement.

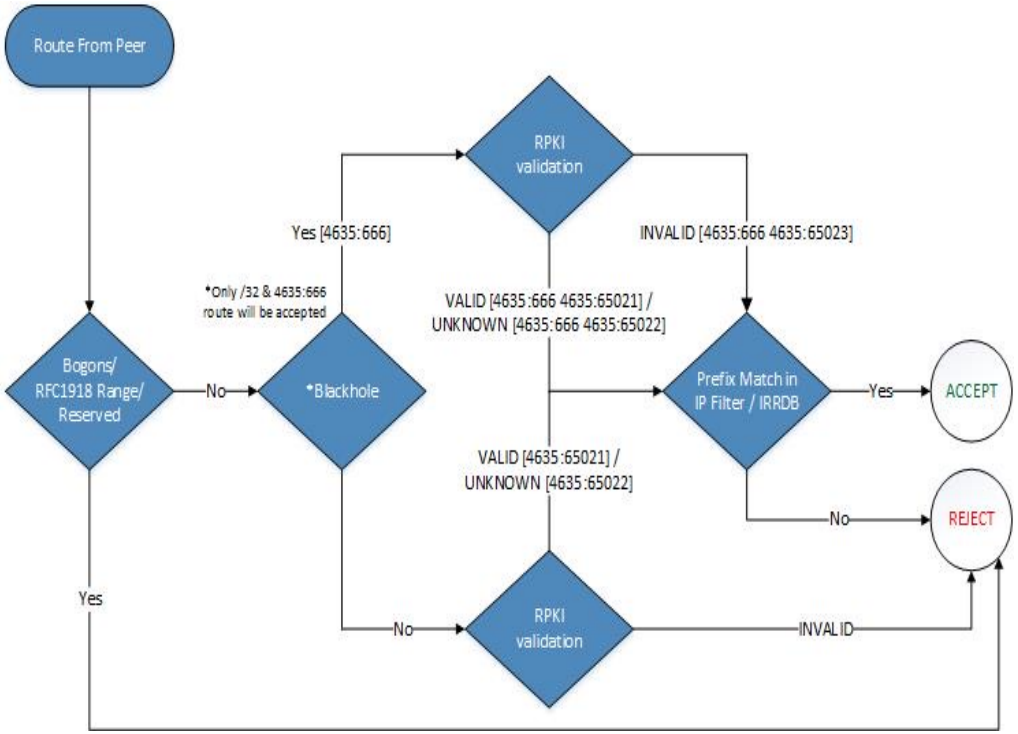
- **IRR filtering (recommended)**
  - Applicable to general HKIX members
  - Use IP prefix list instead of IP address list
  - Filtering by AS-SET and cross check the route advertised by participant
  - Automatically update from Internet Routing Registry database (Please remember to keep your AS-SET updated on IRR database)
  - Participant's AS-SET will be included into HKIX's AS-Set: **AS-HKIX** for announcement

- **IP address filtering (not recommended)**
  - Manual processes are involved
  - Participant needs to submit the change and wait for approval
  - Use IP address for filtering
  - Some participants may not accept your announcement if no AS-SET provided

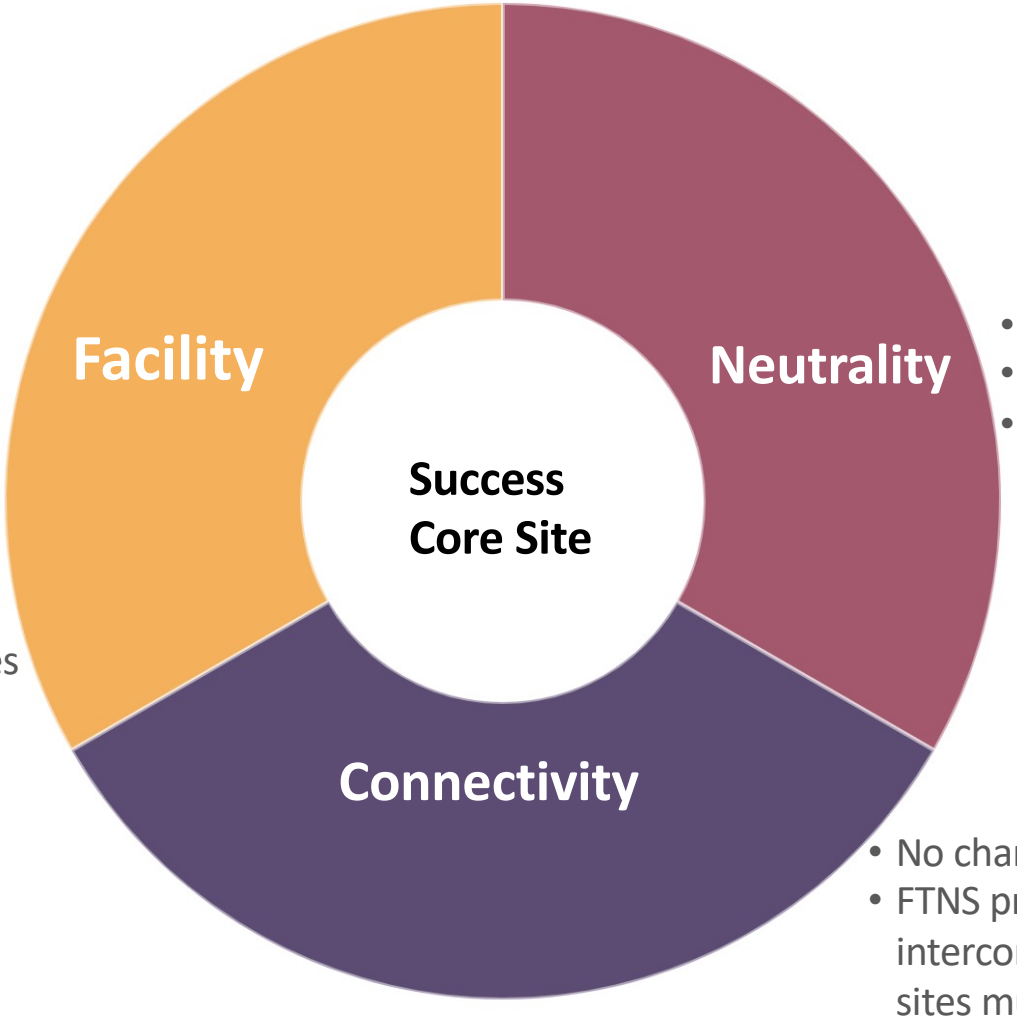
RPKI Deployment at HKIX

- Fully Implemented on HKIX route servers in June 2020
- Check BGP routes with PRKI validators and drop invalids
- Accept and tag valid and unknown routes with 4635:65021 and 4635:65022 respectively
- Blackhole /32 route will be accepted

	2020		2021	
RPKI Validation	**No. of Routes**	**%**	**No. of Routes**	**%**
RPKI Valid	100,497	25.7%	162,860	37.3%
RPKI Not Found	289,070	73.9%	271,506	62.2%
RPKI Invalid (Dropped)	1,776	0.45%	2,031	0.47%
Total Routes Recevied	391,343	100.0%	436,397	100.0%



3 Key Principles for Setting Up HKIX Core Site



- **Data Centre Specifications:**
  - UPS, FM200, CRAC Units
  - Tier 3 or above
  - 24x7 Security control, CCTV
  - 24x7 Remote Hands and Eyes
  - ISO27001

- Carrier Neutral
- Data Centre Neutral
- ISP Neutral

- No charge for cross connect
- FTNS providers and interconnect to all HKIX sites must be sufficient and at lower cost

HKIX New Core Site

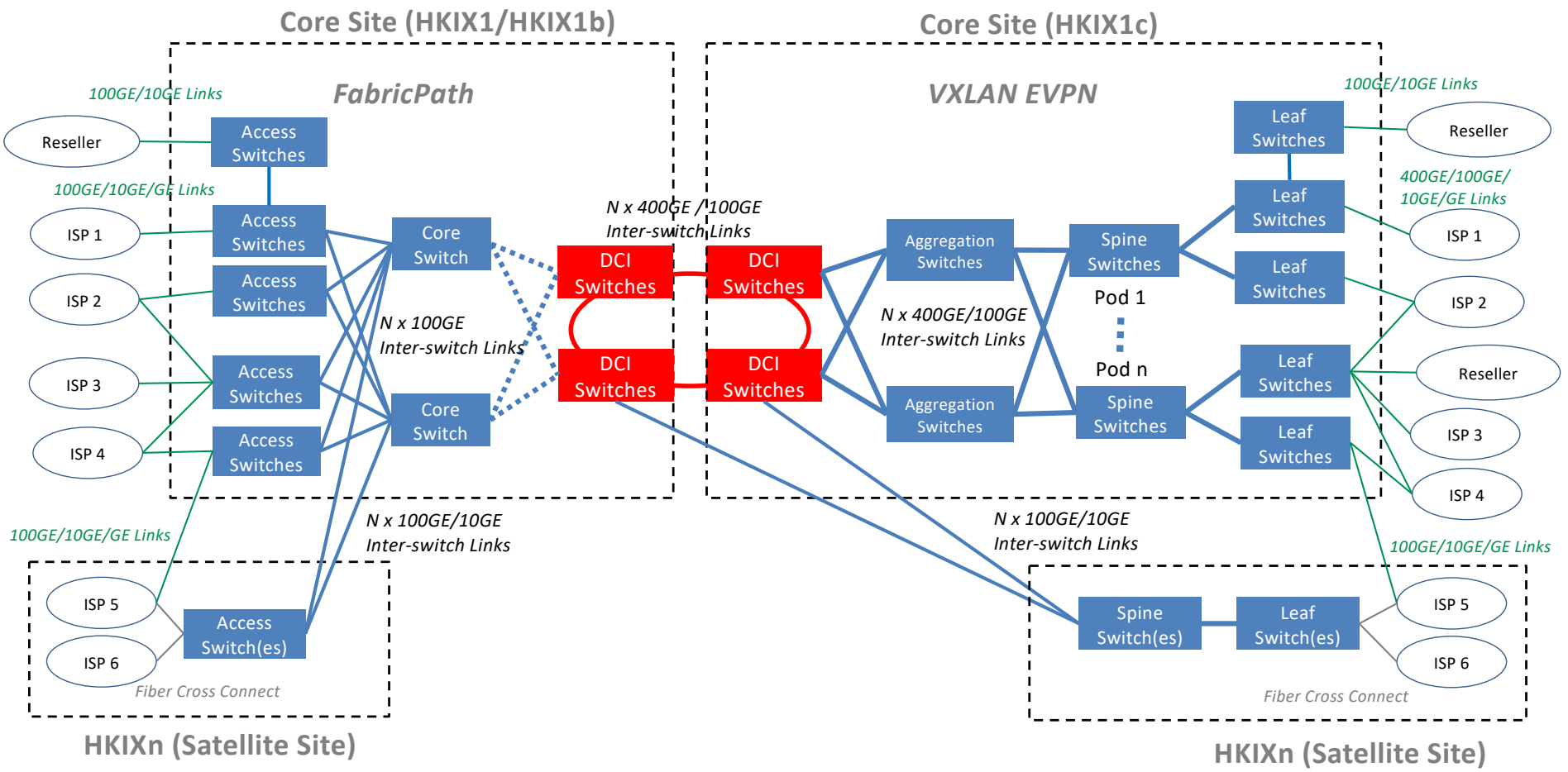
- The new core site HKIX1c is located on Hong Kong Island with independent power grid of core sites of HKIX1 and HKIX1b
- All core sites contain Core Switches and Access Switches interconnected by multiple 100GE/400GE links
- All sites are running in Active-Active mode
- Access Switches at HKIX1, HKIX1b and HKIX1c can serve connections of GE/10GE/100GE and 400GE (HKIX1b & HKIX1c) coming soon from participants
- All sites together provide power resilience, chassis resilience as well as site resilience
- The architecture is highly scalable and can support more satellite sites and resellers outside of CUHK campus

HKIX VXLAN EVPN deployment

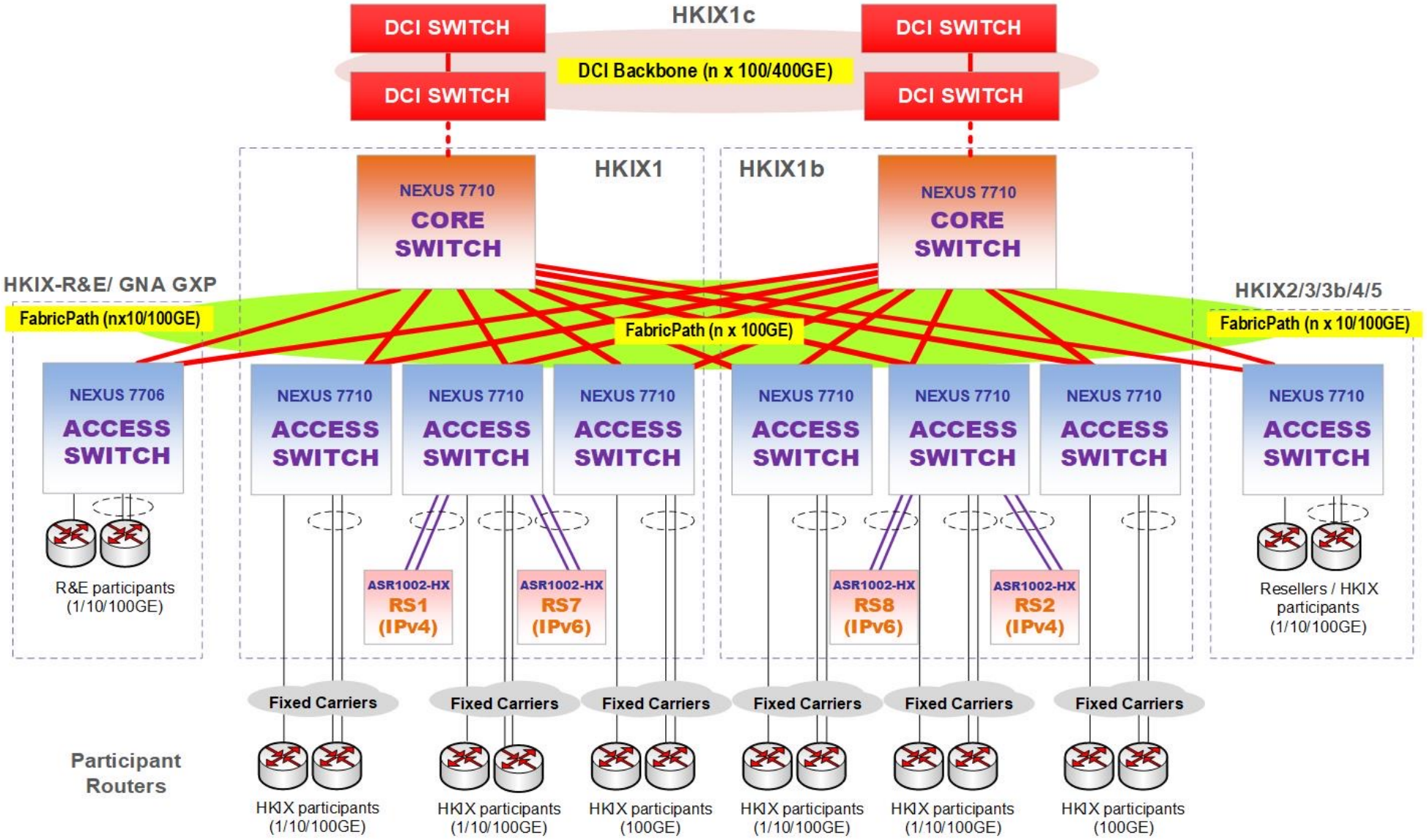
Considerations:

- Underlay routing protocol:
  - BGP vs IGP (OSPF/ISIS)
- Link/Loopback/Management IP assignment
- Interoperability between vendors

HKIX New Architecture



HKIX Network Diagram (Aug 2021)



1. **HKIX1** and **HKIX1b** are the two core sites of HKIX at CUHK while **HKIX1c** is the core site and **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.

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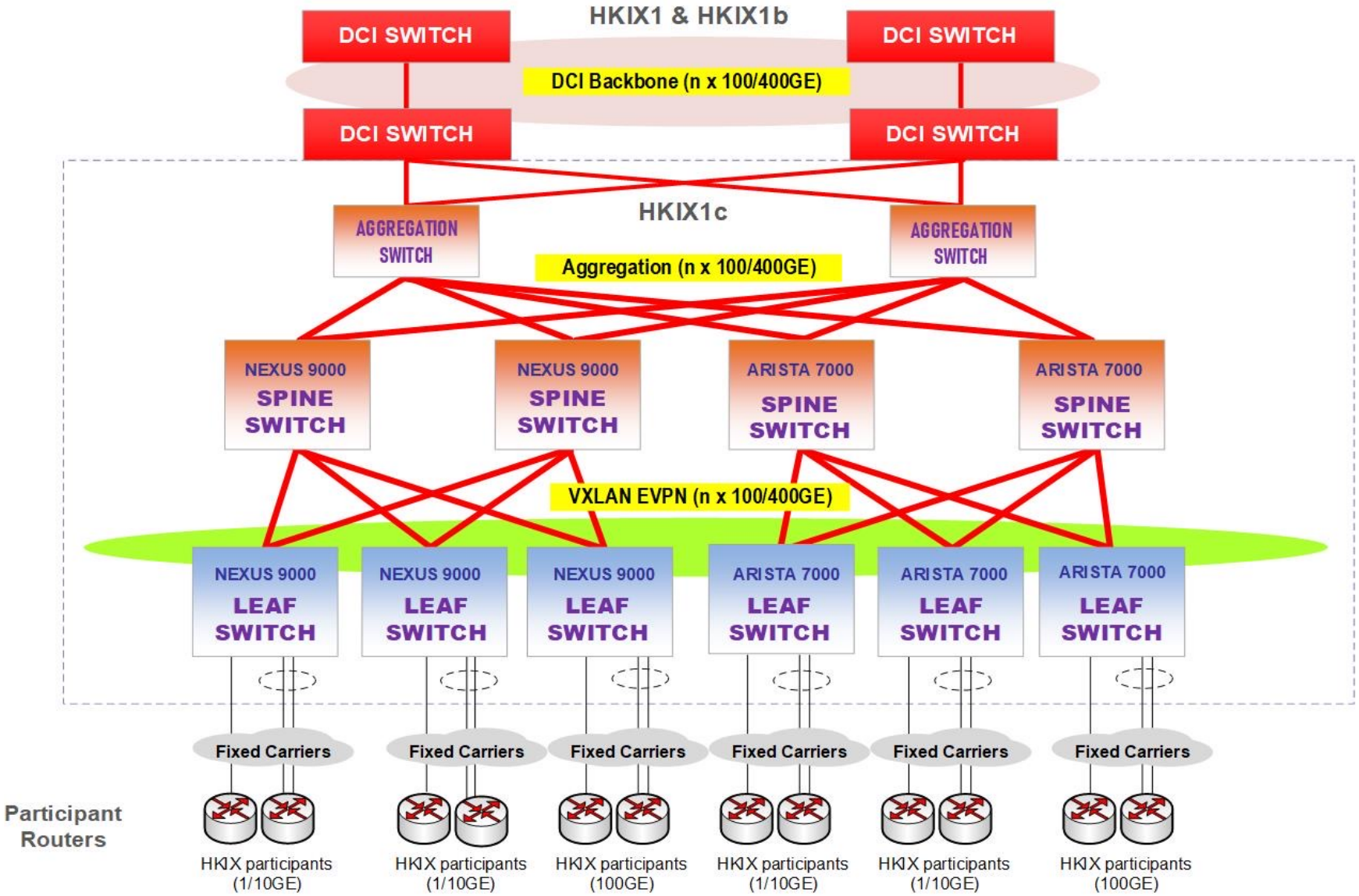

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HKIX1c Migration Schedule

Support and Services	Schedule
Production of HKIX1c	August 2021
Support GE and 10GE Participants	August 2021
Route Servers (IPv4 & IPv6) Migration	Late/2021
Support 100GE Participants	Early/2022
HKIX1 Connections Migration	Mid/2022 – Mid/2024
Support 400GE Participants	Mid/2022
End-of-support and Decommission of HKIX1	Mid/2024

HKIX Planned Works for 2021-22

400GE support at HKIX Core Sites	DWDM and dark fibers between HKIX Core Sites	New open-source route server implementation
NTP servers for HKIX participants	Enhanced portal services for participants	HKIX1 migration to HKIX1b/HKIX1c

Thank You!

For enquiries, please contact us at

info [@] hkix.net