

Quick Introduction of HKIX

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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**

Help Keep Intra-Asia Traffic within Asia

- HKIX has almost all the Hong Kong networks
- So, HKIX can attract participants from Mainland China, Taiwan, Korea, Japan, Singapore, Malaysia, Thailand, Indonesia, Philippines, Vietnam, Cambodia, India and other Asian countries
- HKIX now has more non-HK routes than HK routes
- HKIX does help keep intra-Asia traffic within Asia
- In terms of network latency, Hong Kong is a good central location in Asia
- **HKIX does help HK maintain as one of the Internet hubs in Asia**
- **HKIX supports both domestic and international traffic**

HKIX Services

- HKIX Ports (with MLPA Peering Service)
 - GE / 10GE / 100GE Ports
- Colocation Service (limited offer)
 - Limited to strategic partners only (e.g. critical Internet infrastructure such as Root/TLD DNS Servers)
- SpeedTest Service for OFCA
 - speedtest.ofca.gov.hk

Charging Model

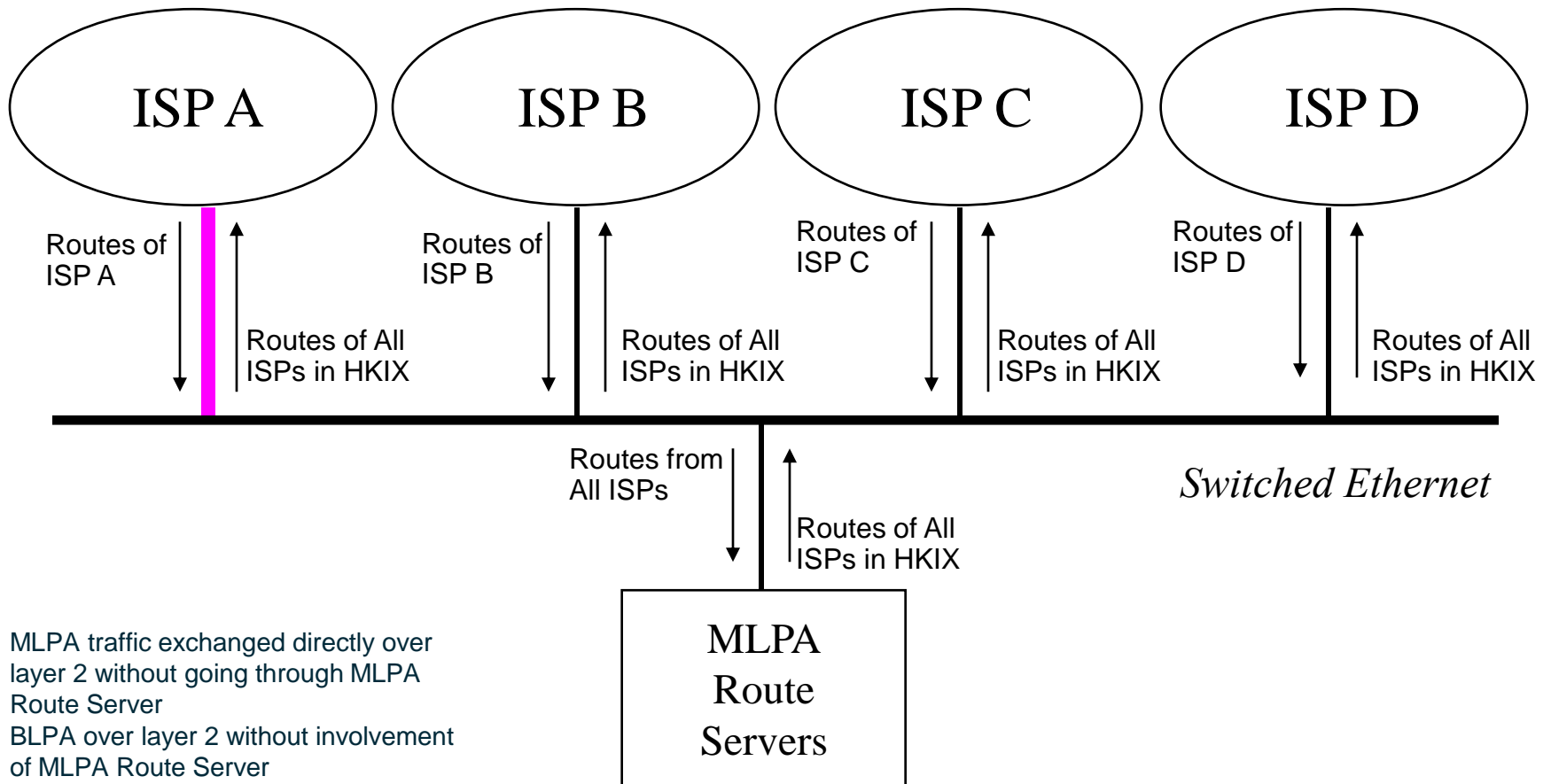
- An **evolution** from free-of-charge model adopted at the very beginning, to penalty-based charging model based on traffic volume for curbing abuse, to now simple port charge model for fairness and sustainability
- **HKIX has started simple port charge model since 01 Jan 2013**
- Not target for profit
 - the Hong Kong Internet eXchange Ltd (100% owned by CUHK) to sign agreement with participants
 - Target for long-term sustainability

HKIX Charge Table (v1.3.2)

Standard Port Charges						NRC	MRC
Port	Interface	Standard Interface	Availability			USD	USD
			HKIX1	HKIX1b	Satellite Sites		
GE	T	Yes	Yes			Waived	120
	SX	Yes			Yes		
	LX/LH	Yes		Yes	Yes		
	EX	No		Yes		1,200	
	ZX	No		Yes		2,000	
10GE	SR	Yes			Yes	1,300	1,000
	LR	Yes	Yes	Yes	Yes	2,300	
	ER	No	Yes	Yes		5,000	
	ZR	No	Yes	Yes		8,000	
100GE	LR4	Yes	Yes	Yes	Some	10,000	4,000
	ER4-Lite	No	Yes	Yes		40,000	

1. E/FE(10ME/100ME) connections are no longer supported
2. There may be long lead-time for non-standard interfaces (GE-EX, GE-ZX, 10GE-ER, 10GE-ZR and 100GE-ER4-Lite)
3. The port charges listed do **NOT** cover local circuit/loop charges, cross-connect charges, satellite-site special connection charge or any other charges needed for making the connection
4. For connections at Satellite Sites, special connection charges will be charged by relevant Satellite Site operators, in addition to the port charges charged by HKIX

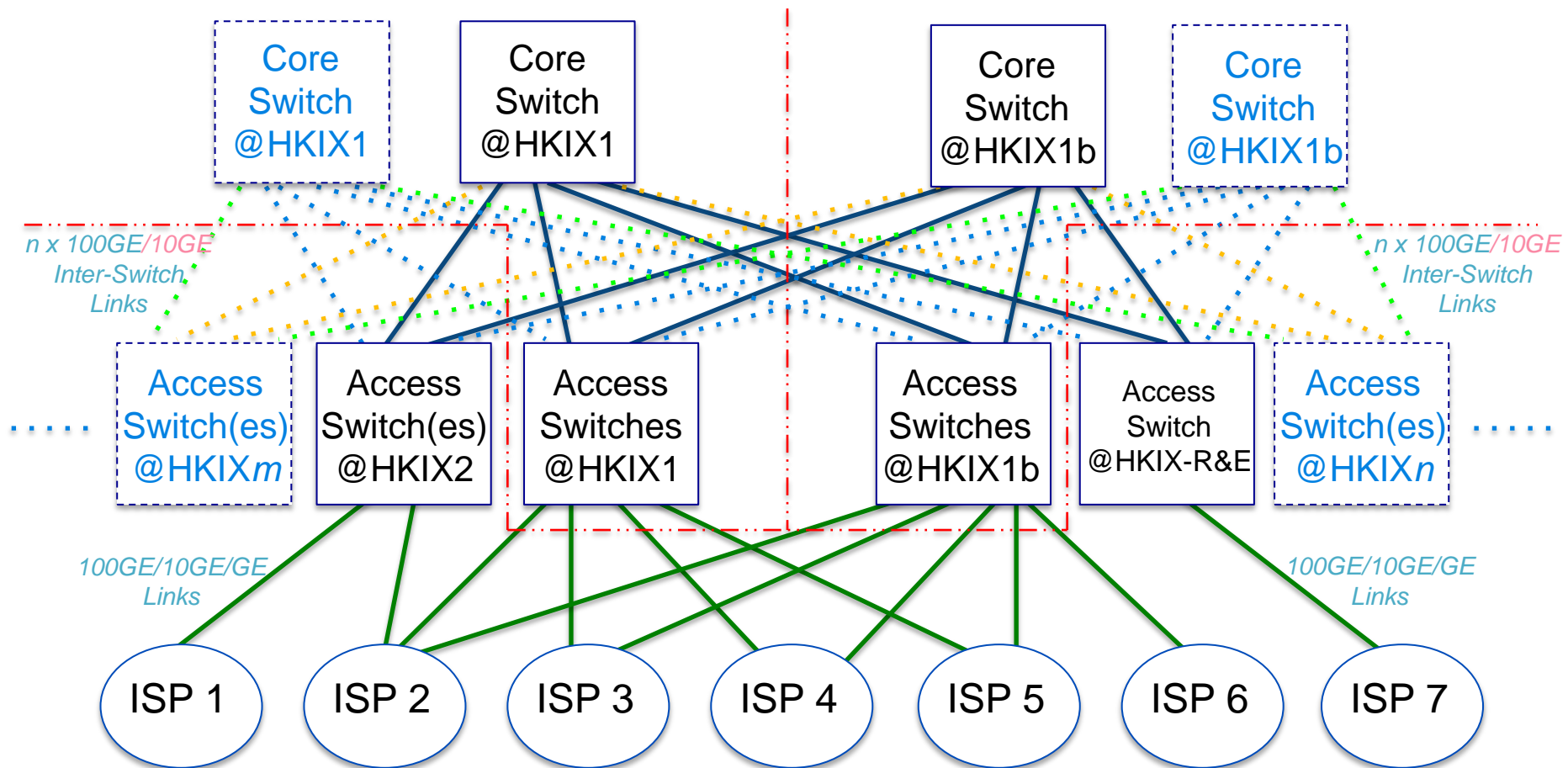
HKIX Model — MLPA over Layer 2 + BLPA



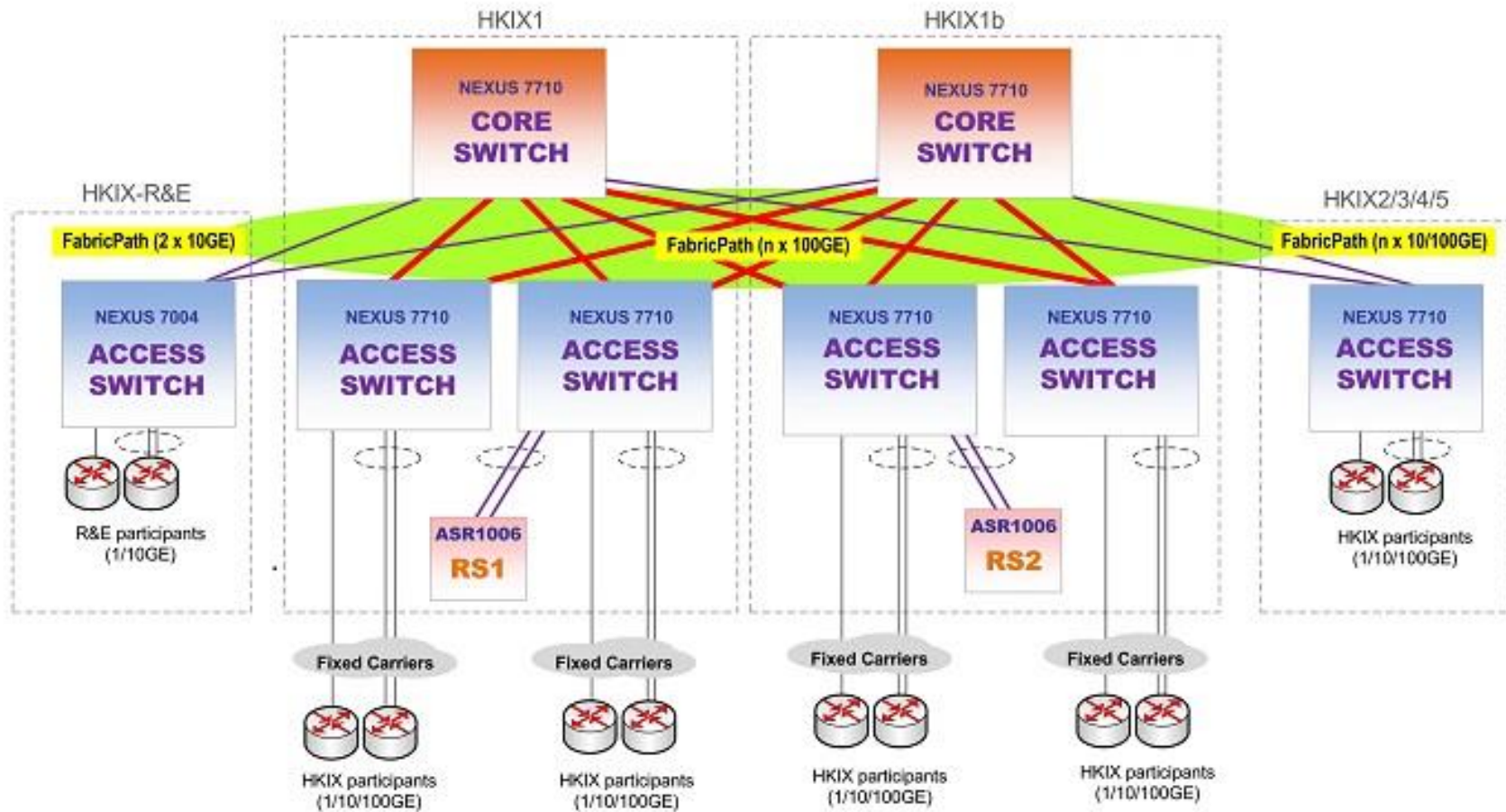
- MLPA traffic exchanged directly over layer 2 without going through MLPA Route Server
- BLPA over layer 2 without involvement of MLPA Route Server
- Supports both IPv4 and IPv6 over the same layer 2 infrastructure

Current HKIX Dual-Core Two-Tier Spine-and-Leaf Architecture (2014-)

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



HKIX Network Diagram (Feb 2017)



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.



Setting up 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 basic requirements so as to maintain neutrality which is the key success factor of HKIX
- Intend to create win-win situation with satellite site collaborators
- 4 Satellite Sites as of today:

Satellite Site	Satellite Site Collaborator	District	Ports Supported	Status
HKIX2	CITIC Telecom International Limited	Kwai Chung	GE/10GE	Ready for Service on 14 Aug 2016
HKIX3	SUNeVision Holdings Limited	Fo Tan	GE/10GE/100GE	Ready for Service on 28 Feb 2017
HKIX4	NTT Com Asia Limited	Tseung Kwan O	GE/10GE/100GE	Coming Soon
HKIX5	KDDI Hong Kong Limited	Tseung Kwan O	GE/10GE/100GE	Ready for Service on 24 Mar 2017

- *HKIX1 and HKIX1b (the two HKIX core sites **located within CUHK Campus**) will continue to serve participants directly*

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
- 260+ autonomous systems connected
- 490+ connections in total
 - **9 100GE**, **280+ 10GE** & 200+ GE
- 780+Gbps (5-min) total traffic at peak
- Annual Traffic Growth = 30+%

Planned Work in 2017-18

- Improving Stability
 - *Better Control of Proxy ARP*
 - *More L2 ACL on HKIX peering LAN*
- Improving Services
 - *Set up Satellite Sites in multiple commercial data centres*
 - *Set up portal for HKIX participants*
 - *Improve after-hour support for 24 x 7 NOC*
 - *Introduce advanced Route Server functions*
- Improving Security
 - *ISO27001*
 - *Better support for DDoS Mitigation*

Why HKIX is successful

- Neutral
 - Treat all partners equal, big or small
 - Neutral among ISPs / telcos / local loop providers / data centres / content providers / cloud services providers
- Trustable
 - Fair and consistent
 - Respect business secrets of every partner / participant
- Not for Profit
- **HKIX started very early, well before incumbent telcos started to do ISP business**

Thank You