HKIX Updates at HKNOG 4.0

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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
Help Keep Intra-Asia Traffic within Asia

- We have almost all the Hong Kong networks
- So, we can attract participants from Mainland China, Taiwan, Korea, Japan, Singapore, Malaysia, Thailand, Indonesia, Philippines, Vietnam, India and other Asian countries
- We now have more non-HK routes than HK routes
- We do 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 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
- 480+ connections in total
  - 7 100GE, 270+ 10GE & 200+ GE
- 770+Gbps (5-min) total traffic at peak
- Annual Traffic Growth = 30+%
Daily Traffic Statistics

- **Incoming Traffic in Bits per Second**
- **Outgoing Traffic in Bits per Second**

**Maximal**
- In: 773.689 G
- Out: 768.559 G

**Average**
- In: 501.962 G
- Out: 500.539 G

**Current**
- In: 480.953 G
- Out: 478.914 G

The statistics was last updated on Tue Feb 21 10:55:04 2017
Yearly Traffic Statistics

Maximal 5 Minute Incoming Traffic
Maximal 5 Minute Outgoing Traffic
Incoming Traffic in Bits per Second
Outgoing Traffic in Bits per Second
Maximal In: 773.689 G  Maximal Out: 768.559 G
Average In: 372.967 G  Average Out: 372.788 G
Current In: 501.176 G  Current Out: 499.841 G
The statistics was last updated on Tue Feb 21 09:10:04 2017
New HKIX Dual-Core Two-Tier Spine-and-Leaf Architecture For 2014 and Beyond

HKIX1 Core Site @CUHK  
HKIX1b Core Site @CUHK

- Core Switch @HKIX1
- Core Switch @HKIX1b
- Access Switch(es) @HKIX2
- Access Switch(es) @HKIX1
- Access Switches @HKIX1
- Access Switches @HKIX1b
- Access Switches @HKIXm
- Access Switch(es) @HKIXn

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ISP 1  
ISP 2  
ISP 3  
ISP 4  
ISP 5  
ISP 6  
ISP 7
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 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 already been migrated from old model to new Satellite Site model
- HKIX3/4/5 site will be Ready for Service by Apr 2017

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

<table>
<thead>
<tr>
<th>Satellite Site</th>
<th>Satellite Site Collaborator</th>
<th>District</th>
<th>Ports Supported</th>
<th>Status</th>
</tr>
</thead>
<tbody>
<tr>
<td>HKIX2</td>
<td>CITIC Telecom International</td>
<td>Kwai Chung</td>
<td>GE/10GE</td>
<td>Ready for Service</td>
</tr>
<tr>
<td>HKIX3</td>
<td>SUNeVision / iAdvantage</td>
<td>Fo Tan</td>
<td>GE/10GE/100GE</td>
<td>Coming (by Feb 2017)</td>
</tr>
<tr>
<td>HKIX4</td>
<td>NTT Com Asia</td>
<td>Tseung Kwan O</td>
<td>GE/10GE</td>
<td>Coming (by Apr 2017)</td>
</tr>
<tr>
<td>HKIX5</td>
<td>KDDI / Telehouse / HKCOLO.net</td>
<td>Tseung Kwan O</td>
<td>GE/10GE/100GE</td>
<td>Coming (by Apr 2017)</td>
</tr>
</tbody>
</table>

- 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 colocated 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.
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.
Support of Blackholing for Anti-DDoS on HKIX Route Servers

HKIX route servers support **Remote Triggered Black Hole Filtering (RTBH)** for announcement of black-hole filtering

No. of ASNs Participated : 27

**How it works?**

- The victim’s address must be included in the participant filter on the HKIX route servers for BGP announcement
- Participant tag the /32 prefix with 4635:666 for its customer
- HKIX route servers set the prefix with next hop 123.255.90.66
- Other HKIX participants accept the /32 prefix and set the next hop address for 123.255.90.66 to null

**Expected Results:**

- Only the victim (/32) will be unreachable via HKIX network while saving the others
- The DDoS traffic will be black-holed at the side of the participating routers which are closer to the DDoS traffic sources
Support of Hiding AS4635 on HKIX Route Servers

- Hiding AS4635 (ASN of HKIX RS) on the AS Path in the BGP announcement
- Support both IPv4 and/or IPv6

Steps:
1. Disable BGP Enforce the First Autonomous System Path on your HKIX peering router
   - configuration:
     
     Router(config)# router bgp <Your-ASN>
     Router(config-router)# no bgp enforce-first-as

2. Notify HKIX for hiding AS4635 in the BGP announcement
3. Soft reset the BGP session
4. HKIX will hide the AS4635 on the AS Path for the IPv4 and/or IPv6 routes sending from HKIX route servers to your HKIX peering
Near-Term Plan

• 1Q2017 – True 24x7 NOC
• 3Q2017 – More BGP Communities will be supported on Route Servers for Routing Control
• 3Q2017 – HKIX Portal for Participants
Thank You!

For enquiries, please contact us at
info AT hkix.net