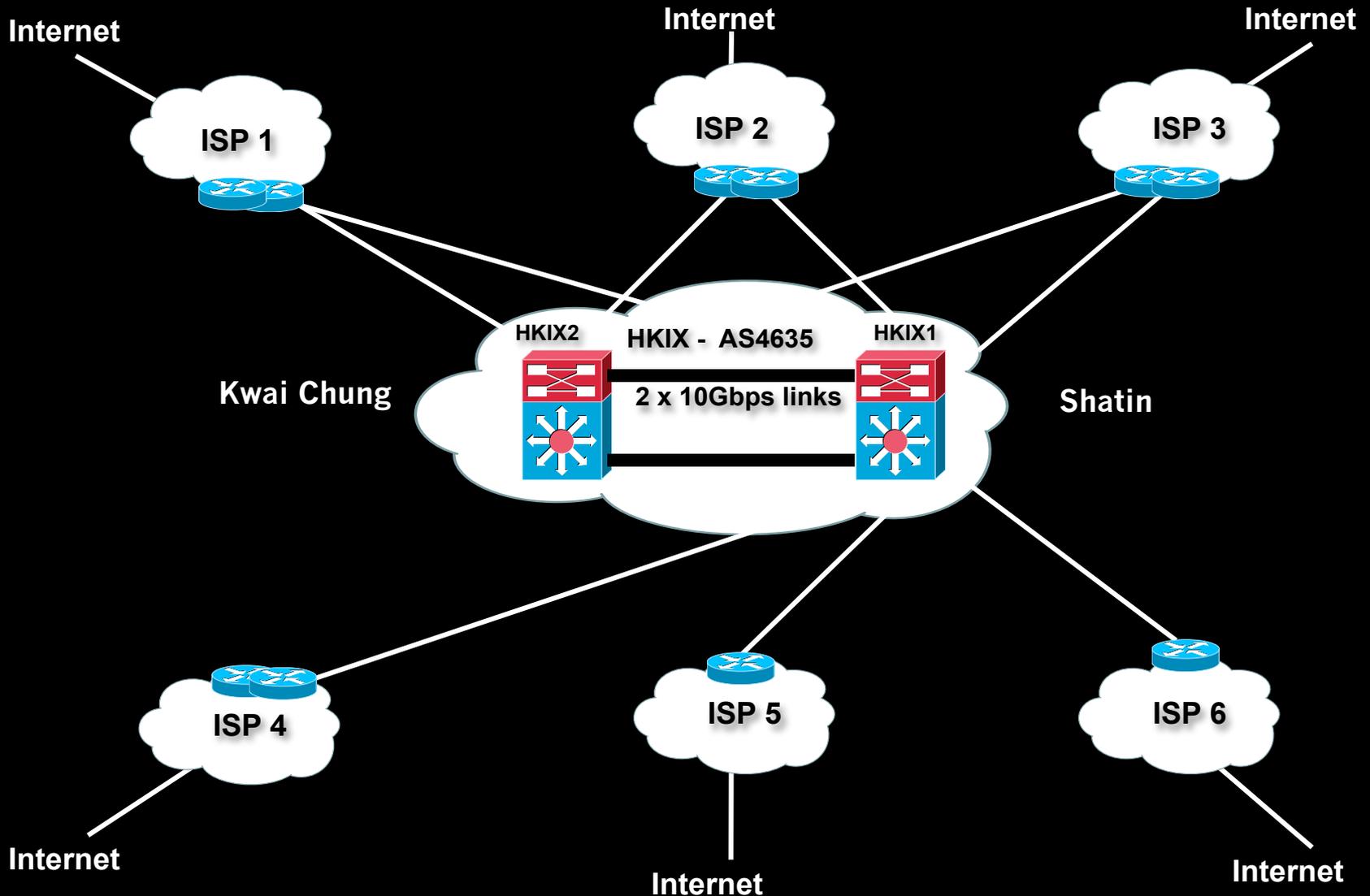




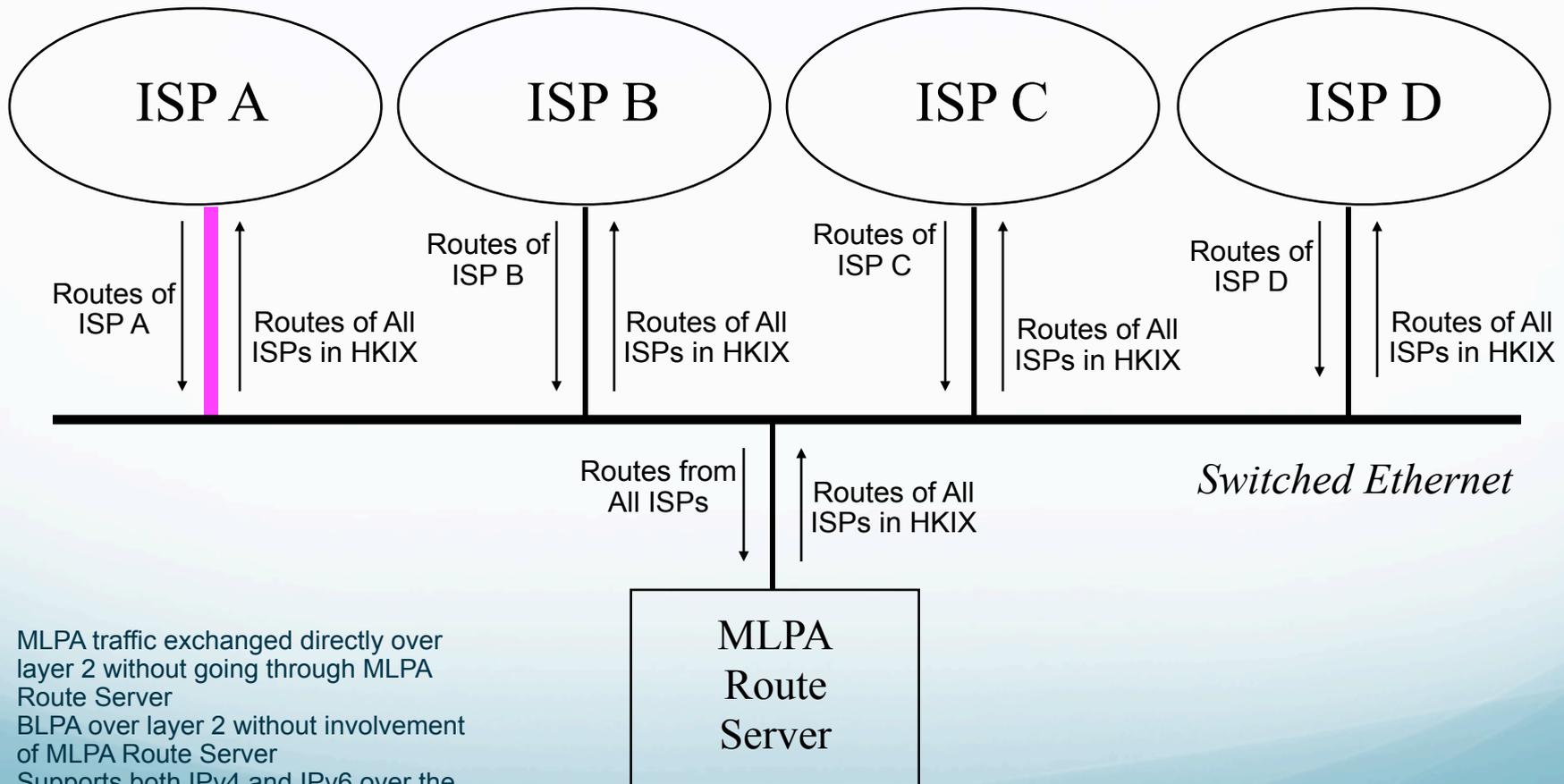
Hong Kong Internet Exchange (HKIX)

<http://www.hkix.net/>

Current HKIX Infrastructure



HKIX Model — MLPA over Layer 2 (with BLPA support)



- 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

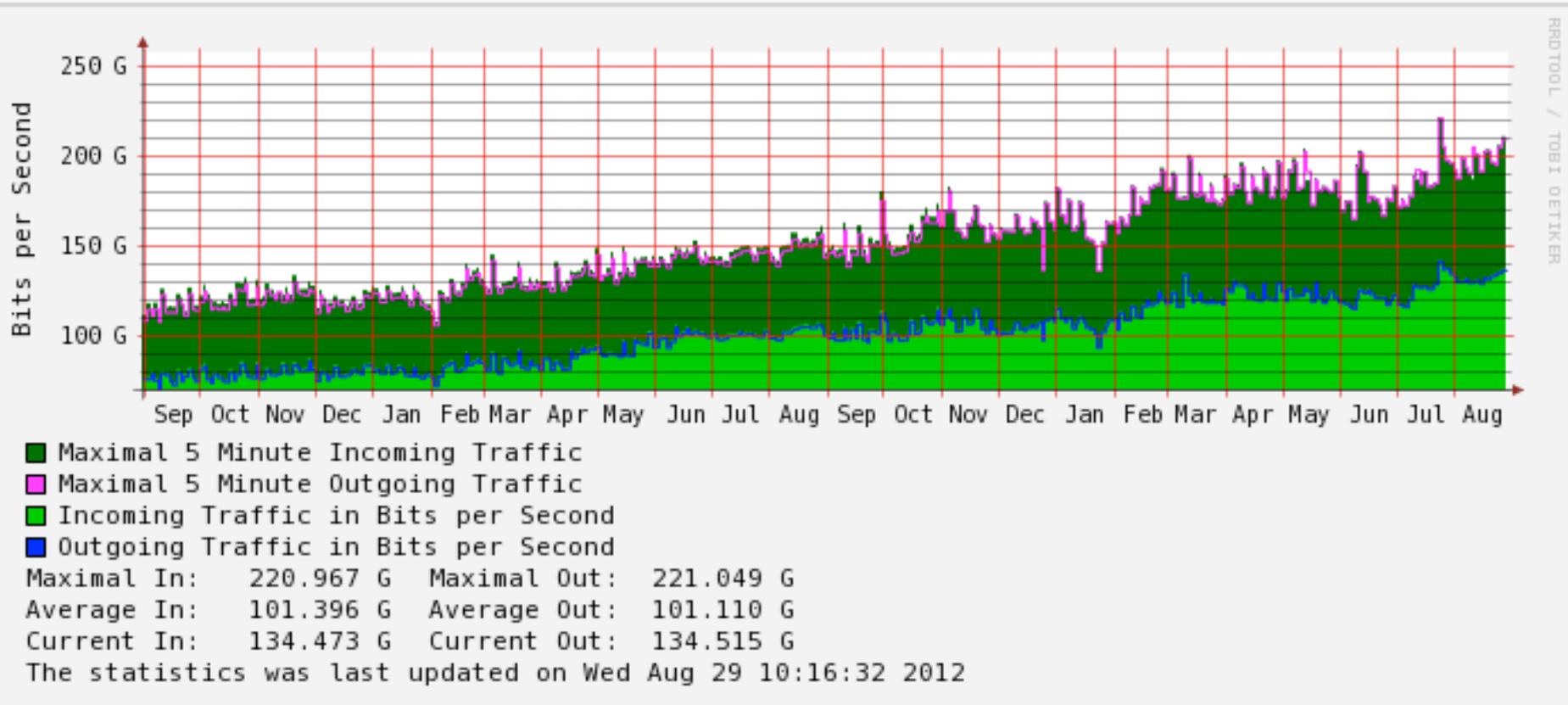
Current Charging Model

- An evolution from the free-of-charge model adopted at the very beginning
- HKIX provides two GE ports at each HKIX site for each member free of charge as Basic Setup
 - No formal agreement is needed for Basic Setup
- Requesting for 10GE ports or additional GE ports involves formal agreement
 - If port utilization is lower than 50%, there will be charges
 - If higher, no charges
 - This is to curb abuse
- Co-location service is chargeable
- Not for profit
 - HKIX Ltd (100% owned by CUHK) to sign agreement with participants
 - Target for self-sustained operations

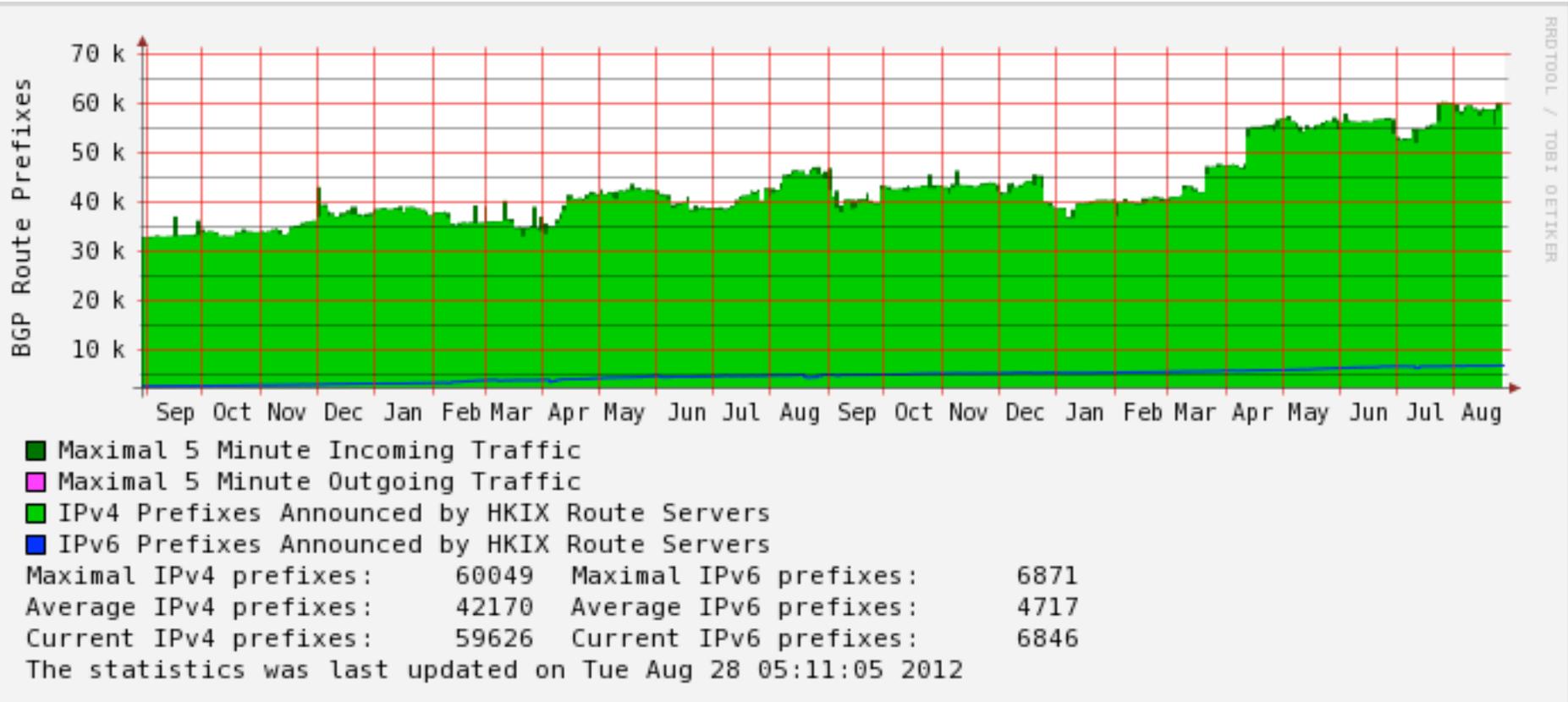
Connection Updates

- **> 220 Gbps (5-min) traffic at peak**
- **~ 175 AS'es connected in total**
- **~ 59 x 10GE connections in total**
- **~ 255 x 10ME/100ME/GE connections in total**

Some Statistics - Yearly



Some Statistics - Number of Routes on MLPA



HKIX Members – Beyond Asia



Help Keep Intra-Asia Traffic within Asia

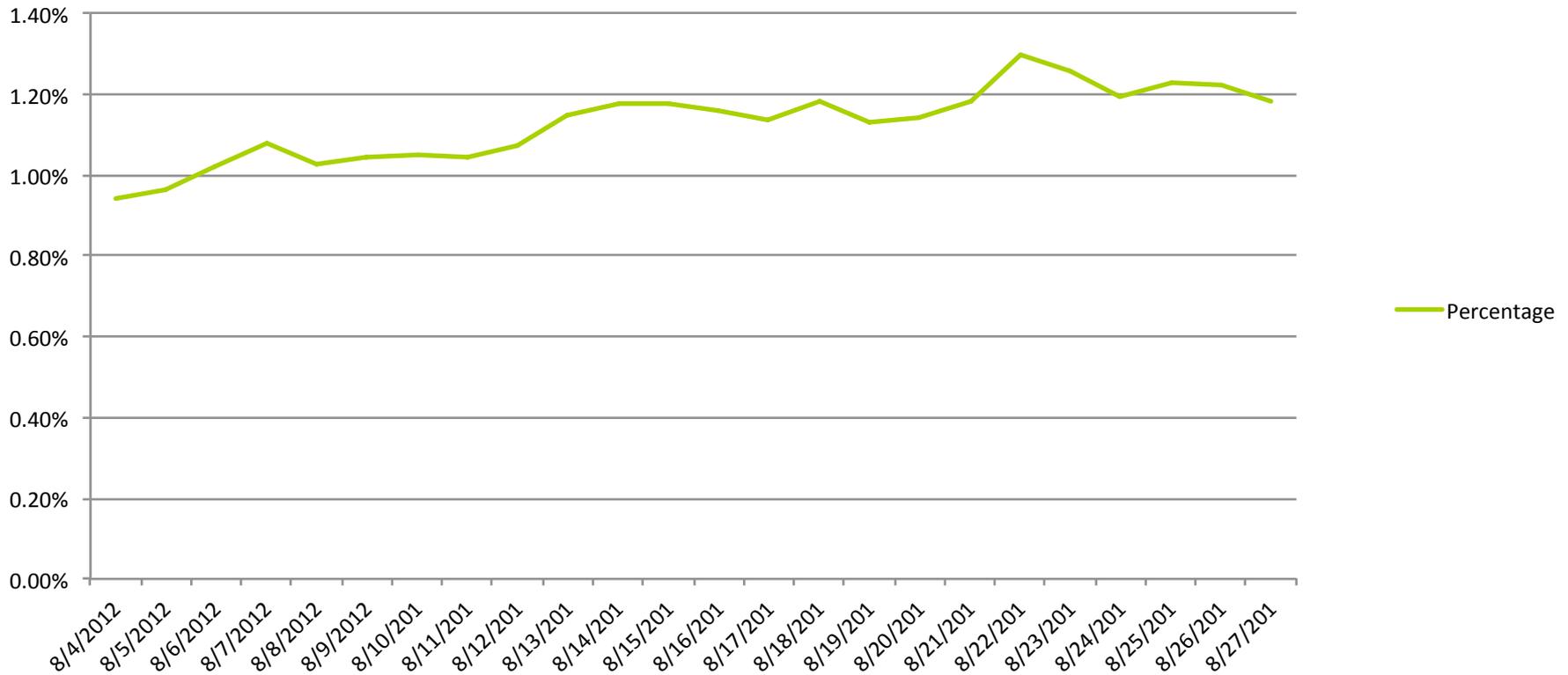
- We have members from Cambodia, Mainland China, Taiwan, Korea, Japan, Singapore, Malaysia, Thailand, Vietnam, Indonesia, Philippines, India, Bhutan, Qatar and other Asian countries
- We carry more non-Hong Kong routes than Hong Kong routes
- So, we do help keep intra-Asia traffic within Asia
- In terms of network latency, Hong Kong is a good central location in Asia
 - ~50ms to Tokyo
 - ~30ms to Singapore
- HKIX is good for intra-Asia traffic

IPv6 at HKIX

- IPv4 address space is really running out
- CUHK/HKIX is committed to help Internet development in HK
- IPv6 supported by HKIX since Mar 2004
- HKIX participates in initiatives to push for IPv6 development in HK together with ISOC-HK, IPv6 Forum HK Chapter and DotAsia
- Today, >60% of HKIX participants have IPv6 enabled
 - Expect more will do so as IPv6 deployment becomes more and more urgent

IPv6 Traffic at HKIX

HKIX/AS4635 IPv6 vs Total Traffic (%)



Our Edges

- Neutrality
 - Treating all partners alike, big or small
 - No settlement for exchange of traffic
 - Accessible to all local FTNS operators
 - ISP / telco / data centre / content provider neutral
- Confidentiality
 - Respect business secrets of every partner
- Not for Profit
 - Still a free service for basic setup
 - Not compete with our partners

CUHK's Vision

- CUHK has a strategic uniqueness in running HKIX in a long-term
- While CUHK does not have a service provider role, we are still obligated to continue managing it as a public service
- Support from HKSARG is needed to make it prosper, and to maintain it as an Asian information hub
- *HKIX is very much like road infrastructure and airport in Hong Kong*

2013 and Beyond?

- A lot of new data centers will be in operations in Hong Kong starting 2013
- Cloud services will drive the demand of bandwidth
- High speed mobile access will also drive the demand of bandwidth
- What else will happen to the industry and the market?

In Need of Continuous Upgrades for HKIX

- Peak total traffic hit 220Gbps level and is growing continuously
- Not many ports left at **HKIX1** for new connections
 - Only <10 10GE ports and <40 FE/GE ports available
 - ~55 10GE ports and ~230 FE/GE ports are being used to serve ~170 participants
- Need to support 40G/100G interfaces soon
- Resilience is becoming a bigger concern to HKIX participants
- **We cannot afford any performance bottleneck**
- **We must cope with the continuous technology changes**

Problems Faced

- Although HKIX is charging for services
 - Current charging model is evolved from original free model
 - Income can cover Operating Expenses mainly
 - Including manpower
- HKIX needs to spend **Capital Expenses** to upgrade the core equipment from time to time
 - Which is getting more and more expensive because the equipment is high-end high-speed equipment and high availability is important
- The current income level cannot cover such level of Capital Expenses needed which are growing continuously

The Plan

- Establish **Dual Core** within CUHK in 2013 taking advantage of new data center
 - HKIX1 + HKIX1b
 - Provide site resilience, chassis resilience in addition to card resilience
 - Support 40G/100G connections
- Government to provide one-off funding for capital expenses of network equipment at HKIX1b
- **In order to ensure self-sustained operations, will gradually change to simple port charge model starting 2013**
- *Possible Long-Term Plan*
 - *HKIX3, HKIX4, HKIX5 and so on at major commercial data centers as satellite sites for ease of connections*

Questions?