

## Next-Generation Network (NGN) and Services

Hong Kong Network Operators' Group 0.2 (HKNOG 0.2) 14 April 2014



> Next Generation Network (NGN)

> Next Generation Services

#### **HKBN at a Glance**



- One of the major fixed network operators in Hong Kong
  - ✓ Covering ~ 80% of household
  - ✓ With ~ 33% market share in residential broadband market
- > We have built our network from scratch since Feb 2000
- > Network development policy
  - ✓ Self Build Policy: We own the end-to-end connection
  - ✓ IP base

#### **The PSTN Design**







# The HKBN's NGN Design



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## **Network Dimensioning**

- 650,000 users with
  100Mbps each =
  65,000Gbps?
- Erlang B is no longer applicable
- Bandwidth guarantee (minimum 80Mbps to HKIX 24 hours a day)





## **The In-Building Blocking**





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#### **The Access Network**





Use of G657A fibre is therefore required for FTTH















## **The Underground Fibre**





> Next Generation Network (NGN)

> Next Generation Services

#### **Beauty of our Network Design**



#### **"Our Difference"**

#### Traditional Network

- Telco or Cable TV infrastructure
- > xDSL via telephone line, DOCSIS via HFC (Cable TV)
- Asymmetric (for ADSL), Shared basis (for DOCSIS)
- Low Speed Rate (e.g. ADSL: Downlink at 2/6/8/10M, Uplink at 512Kbps)

#### Next Generation Network by HKBN

- FTTB model with in-building Cat-5E structural cable / FTTH
- Dedicated and Symmetric Broadband Service
- > 100Mbps level in the FTTB model (Even 1Gbps in the FTTH model)

#### Different Network Services and Traffic Profile Different Network Design Policy



#### **Next Generation Services**



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#### **Next Generation Services**









## The HKBN's NGN Design





#### **HKBN Internet Connectivity**



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# Network Dimensioning



- > The traffic pattern varies from time to time. New applications are also introduced from time to time.
- > Erlang Formula is no longer applicable.
- Traffic dimensioning information is useful only before the implementation. The actual traffic measurement is more important.
- > Two major references
  - The 60% rule
  - > User Experience

#### **HKBN Community**



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#### **Faster than the Fastest**

#### Average Peak Connection Speed (APCS)

Country/Region		Q3 '13 Peak Mbps	QoQ Change	YoY Change
-	Global	17.9	-5.2%	13%
1	Hong Kong	65.4	0.5%	21%
2	South Korea	63.6	19%	30%
3	Japan	52.0	6.4%	23%
4	Singapore	50.1	9.9%	63%
5	Israel	47.7	19%	55%
6	Romania	45.4	-4.4%	22%
7	Latvia	43.1	-3.3%	15%
8	Taiwan	42.7	8.2%	50%
9	Netherlands	39.6	1.9%	29%
10	Belgium	38.5	-3.6%	18%

- Hong Kong's APCS ranks number 1 in the world
- HKBN's speed is faster than Hong Kong's APCS
- All HKBN users enjoy the fastest connection speed

Source: Akamai Technologies' State of the Internet Report (Q3, 2013)



#### **Contents Localization**









#### **Bringing contents closer to HKBN**

#### **Enhancing Customers' experience**



\*Yearly statistics from HKBN (Sample on 1-day average)

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#### **Contents Acceleration**



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#### **Contents Acceleration**



Source address: 61.244.192.254 Type escape sequence to abort.	Server IP Address
Type escape sequence to abort.	Server IP Address
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Tracing the route to 115 238 1 21	
1 061003151053 ctinets com (61 03 151 53) 0 mea	s 8 msec 0 msec
2 061238168085 static ctinets com (61 238 168 8	Target IP address: 115 238 1 21
3 061238224138 static ctinets com (61 238 224 1	Source address: 61 244 192 254
A 061230224130.Static.ctinets.com (61.230.224.1	Type escape sequence to abort
5 06124/232033 static ctinets com (61 244 222 3	Tracing the route to 115 238 1 21
6 061244232033.Static.ctinets.com (61 244.232.3	
7 061244232140.Static.ctinets.com (61 244.232.1)	1 061093151053 ctinets com (61 93 151 53) 0 msec 0 msec 0 msec
2 202 07 122 5 0 maga 0 maga 8 maga	2 061238168085 static ctinets com (61 238 168 85) 8 msec 0 msec 0 msec
0.202.97.122.00 mset 0 mset 0 mset	3 061238224138 static ctinets com (61 238 224 138) 0 msec 0 msec 8 mse
9 202.97.01.01 159 IIISec 100 IIISec 105 IIISec	4.061238224130.3tatic.ctinets.com (61.238.224.130) 0 msec 0 mse
10 202.97.35.255 159 IIISec 151 IIISec 151 IIISec	5.06124A232033 static ctinets com (61.230.224.114) 0 msec 0 msec 0 msec
11 202.97.33.109 33 INSEC 23 INSEC 34 INSEC	6.061244232033.3tatic.ctinets.com (61.244.232.33) 0 msec 0 msec 0 msec $*$
12 202.97.33.213 251 msec 252 msec 243 msec	-0.001244232137.5tatic.ctinets.com (61.244.232.137) 0 msec 0 ms
13 202.97.55.10 126 MSec 143 MSec 134 MSec	7 001244232100.5tatic.ctimets.com (01.244.232.100) 0 msec 9 msec 0 mse
14 220.191.135.158 142 msec 134 msec 143 msec	0.202.97.122.30 msec $3$ msec $0$ msec 0.202.07.61.127.32 msec $34$ msec $25$ msec
15 220.191.155.110 142 msec 125 msec 135 msec	9 202.97.01.137 33 IIISEC 34 IIISEC 23 IIISEC 10 202 07 25 24 24 msoc 25 msoc 23 msoc
	10 202.37.33.34 34 misec 23 misec 33 misec
1/ ^ ^ ^	11 202.97.34.49 34 IIISEC 23 IIISEC 34 IIISEC 12 202 07 25 5 67 maaa 67 maaa 94 maaa
Before Acceleration	12 202.97.33.3 07 IIISEC 07 IIISEC 04 IIISEC 12 202.07 24 229 94 maga 75 maga 76 maga
(1  stoney - 12  Ems)	13 202.37.34.230 04 IIISEC 73 IIISEC 70 IIISEC 14 220 101 125 122 67 maaa 67 maaa 67 maaa
	14 220.191.133.122 07 IIISEC 07 IIISEC 07 IIISEC 15 330 404 455 08 76 maaa 84 maaa 76 maaa
After acceleration	15 220.191.155.96 / 6 MSec 84 MSec / 6 MSec
(Latency = 76ms)	



#### **HKBN Overseas Platform**





Local contents in Hong Kong [Bandwidth = 100G]





