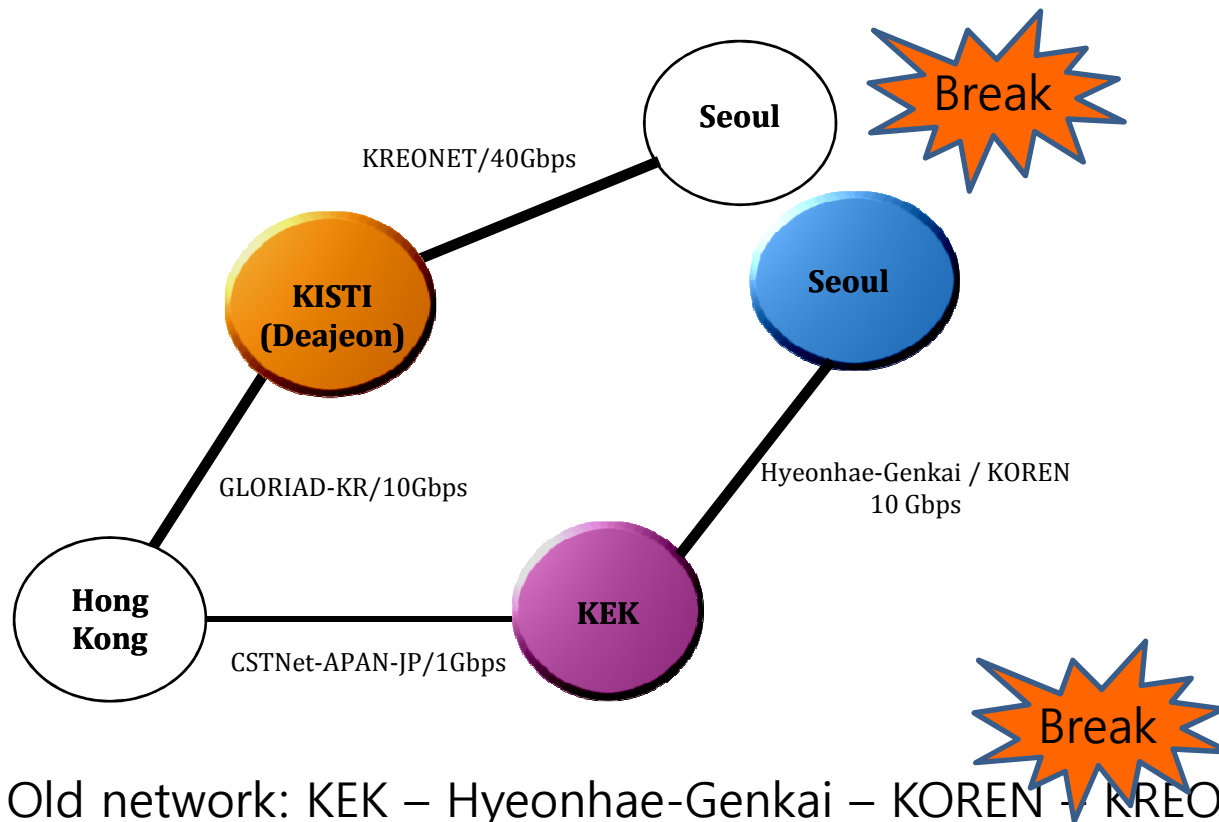# Network connection KEK-KISTI

Kihyeon Cho
(High Energy Physics Team, KISTI)

Current Networks between KISTI and KEK

Seoul

Break

KREONET/40Gbps

Seoul

KISTI
(Deajeon)

Hyeonhae-Genkai / KOREN
10 Gbps

GLORIAD-KR/10Gbps

Hong
Kong

KEK

CSTNet-APAN-JP/1Gbps

Break

- Old network: KEK – Hyeonhae-Genkai – KOREN - KREONET - KISTI
- Current: KEK – Hong Kong – KISTI

Network Study

- GLORIAD

Mathis Equation
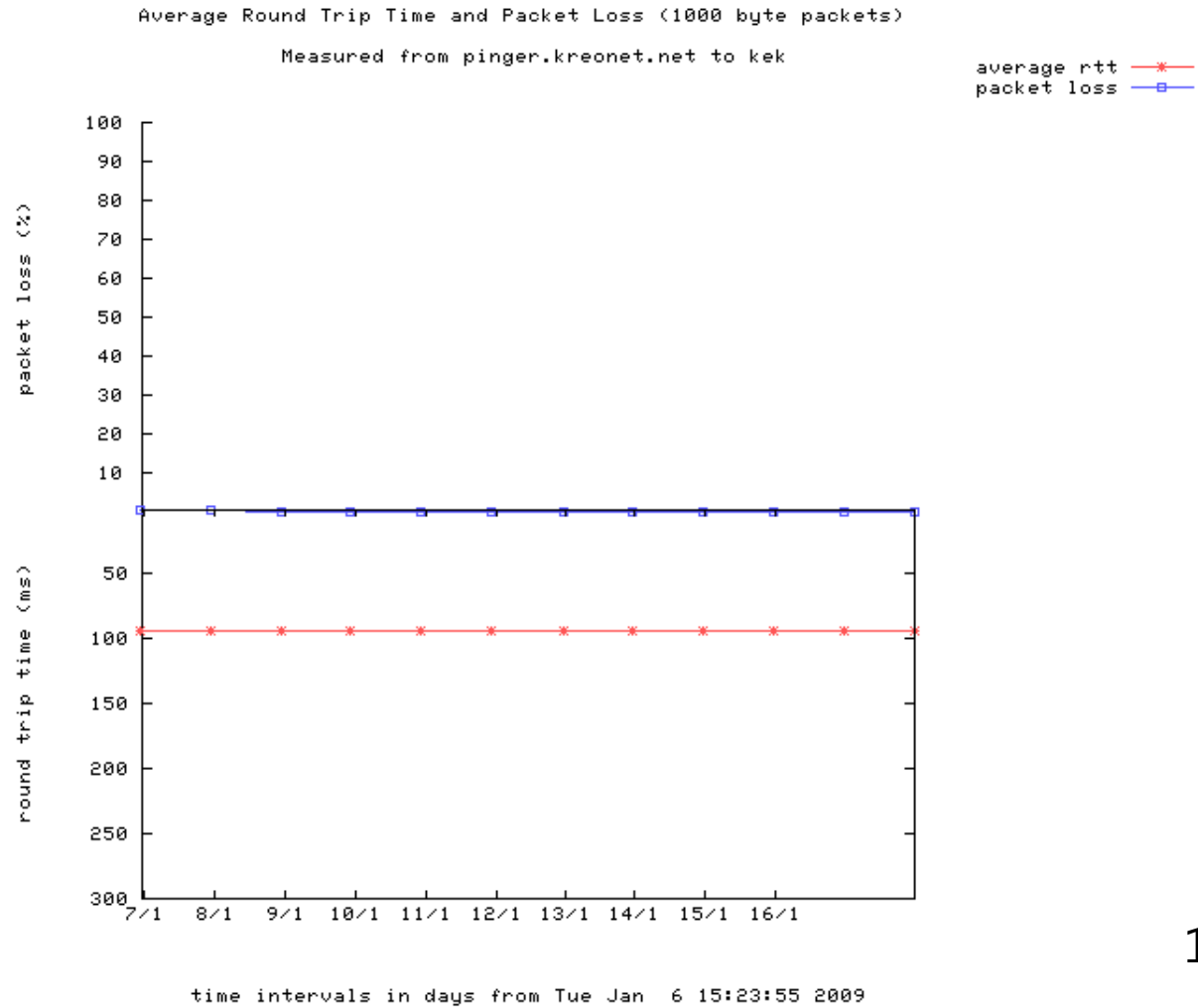
$$BW \leq \frac{MSS}{RTT} \frac{C}{\sqrt{p}}$$

BW: Upper bound of TCP throughput
MSS: Max Segment Size
RTT: Round Trip Time
P: Packet Loss

KISTI-KEK (Jan. 2009)

Average Round Trip Time and Packet Loss (1000 byte packets)

Measured from pinger.kreonet.net to kek

average rtt
packet loss

time intervals in days from Tue Jan 6 15:23:55 2009

100 ms?

Traceroute (July, 2009)
KEK-> KISTI

```
//2009-07-08
[kjcho@stolz ~]$ traceroute 134.75.28.21
traceroute to 134.75.28.21 (134.75.28.21), 30 hops max, 38 byte packets
 1   130.87.4.97 (130.87.4.97)   0.938 ms   0.817 ms   0.650 ms
 2   203.181.194.246 (203.181.194.246)   6.623 ms   6.637 ms   6.646 ms
 3   203.181.248.202 (203.181.248.202)   94.125 ms   93.949 ms   93.928 ms[GLORIAD-KR Vlan923]
 4   134.75.28.21 (134.75.28.21)   94.034 ms !<10>   94.003 ms !<10>   93.934 ms !<10>

//2009-07-27
[kjcho@stolz ~]$ traceroute 134.75.28.21
traceroute to 134.75.28.21 (134.75.28.21), 30 hops max, 38 byte packets
 1   130.87.4.97 (130.87.4.97)   0.968 ms   0.657 ms   0.556 ms
 2   tsukuba-dc-RM-AE-2-101.sinet.ad.jp (150.99.190.181)   0.641 ms   0.543 ms   0.560 ms
 3   tokyo1-dc-RM-AE-2-11.sinet.ad.jp (150.99.203.10)   5.481 ms   5.468 ms   5.351 ms
 4   TYO3-IX1-XGE-3-1.sinet.ad.jp (150.99.189.126)   5.579 ms   5.972 ms   5.552 ms
 5   jm-e600-v8.jp.apan.net (203.181.249.82)   19.056 ms   18.687 ms   18.007 ms
 6   tpr5-ge0-1-0-0.jp.apan.net (203.181.248.110)   6.032 ms   5.915 ms   5.929 ms
 7   kreonet2-hkix.jp.apan.net (203.181.248.202)   93.386 ms   93.213 ms   93.480 ms
 8   134.75.28.21 (134.75.28.21)   93.179 ms !<10>   93.264 ms !<10>   93.129 ms !<10>
```

Traceroute (July 2009)
KISTI -> KEK

```
//2009-07-08

[kjcho@daejeon ~]$ traceroute 130.87.4.98

traceroute to 130.87.4.98 (130.87.4.98), 30 hops max, 46 byte packets

 1   134.75.204.1 (134.75.204.1)   0.308 ms   0.241 ms   0.244 ms
 2   ge0-0-0-923.tpr5.jp.apan.net (203.181.248.201)   87.559 ms   87.686 ms   87.516 ms
 3   KEK-vlan988-tpr5.jp.apan.net (203.181.194.241)   94.680 ms   94.765 ms   94.587 ms


//2009-07-27

[kjcho@daejeon ~]$ traceroute 130.87.4.98

traceroute to 130.87.4.98 (130.87.4.98), 30 hops max, 46 byte packets

 1   134.75.28.1 (134.75.28.1)   1.573 ms   0.182 ms   0.182 ms
 2   ge0-0-0-923.tpr5.jp.apan.net (203.181.248.201)   87.586 ms   87.445 ms   87.454 ms
 3   KEK-vlan988-tpr5.jp.apan.net (203.181.194.241)   94.565 ms   93.821 ms   93.819 ms
 4   yucc4.kek.jp (130.87.4.98)   93.258 ms   93.092 ms   93.194 ms
```
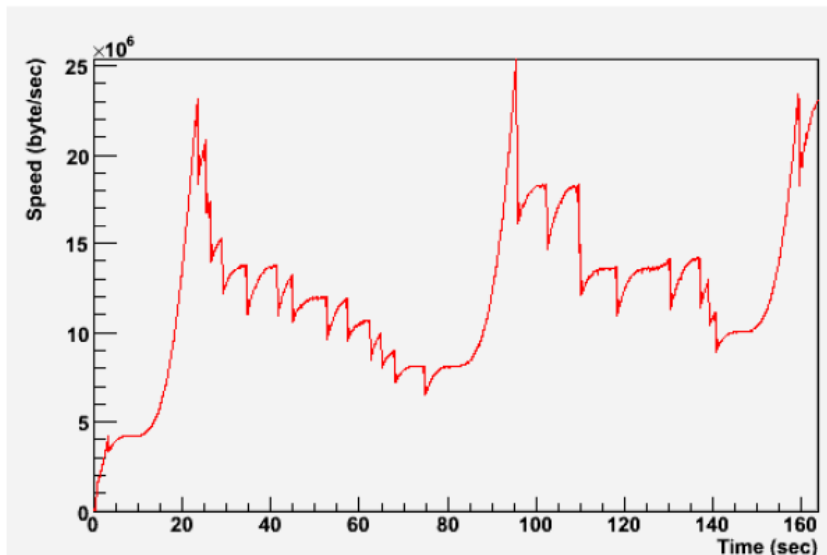
Iperf (Memory to Memory) test

- TCP throughput (2009-07-08)
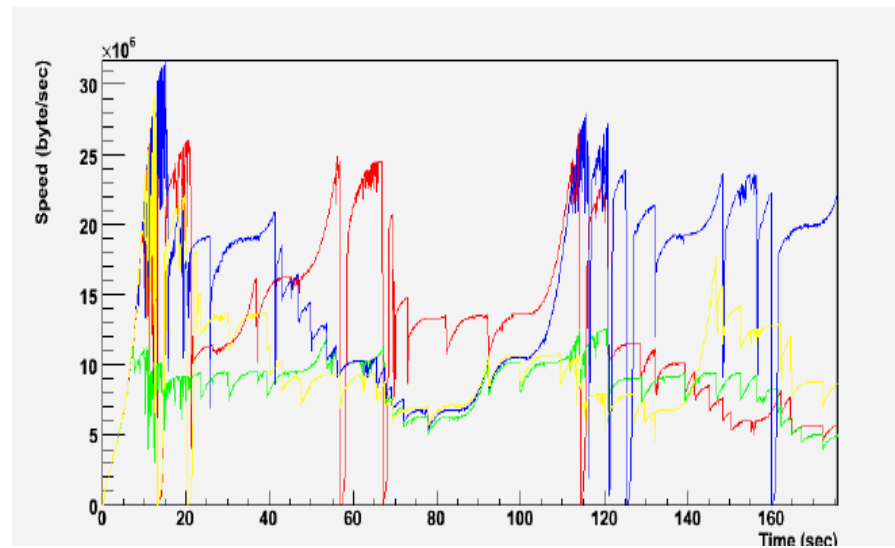 - 300 Mbps
- UDP throughput (2009-07-08)
  - 485 Mbps

=> Both of them show that the correlation between the total bandwidth and packet loss timing is small.

KEK-> KISTI

Bandwidth vs. Time

One TCP

Four TCP

Ref. Yamagata

Disk to Disk

- Dr. J.H.Kim moves mDST files from KEK to KISTI.
- 10 MB/sec (=13 Stream * 835 kB/sec)
- 100 TB => 127 days

Network request to APAN

- To Sasaki san (KEK) and Dr. Dongkyun Kim (KISTI)
- Asked to connect KREONET and KOREN
- Fiscal year (FY2009)
  - Belle data (DST) from KEK to KISTI
  - 1 TB a day Total 140 TB
  - Request bandwidth 300-400 Mbps in average
- FY2010-FY2011
  - 500 TB data a year will be transferred.
- FY2012
  - Depending on Belle II schedule