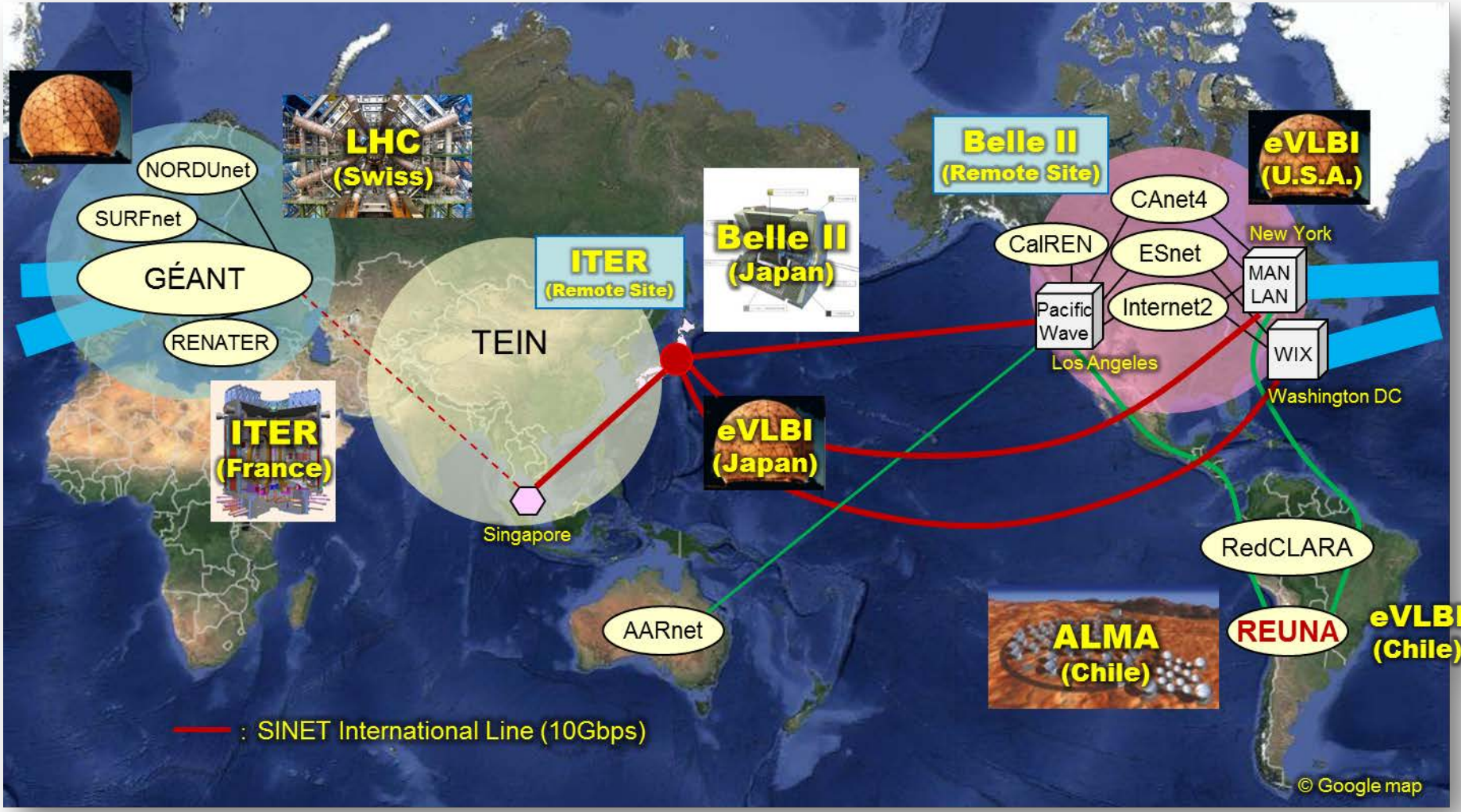
Networks at KEK-CRC status and plans

Tomoaki Nakamura

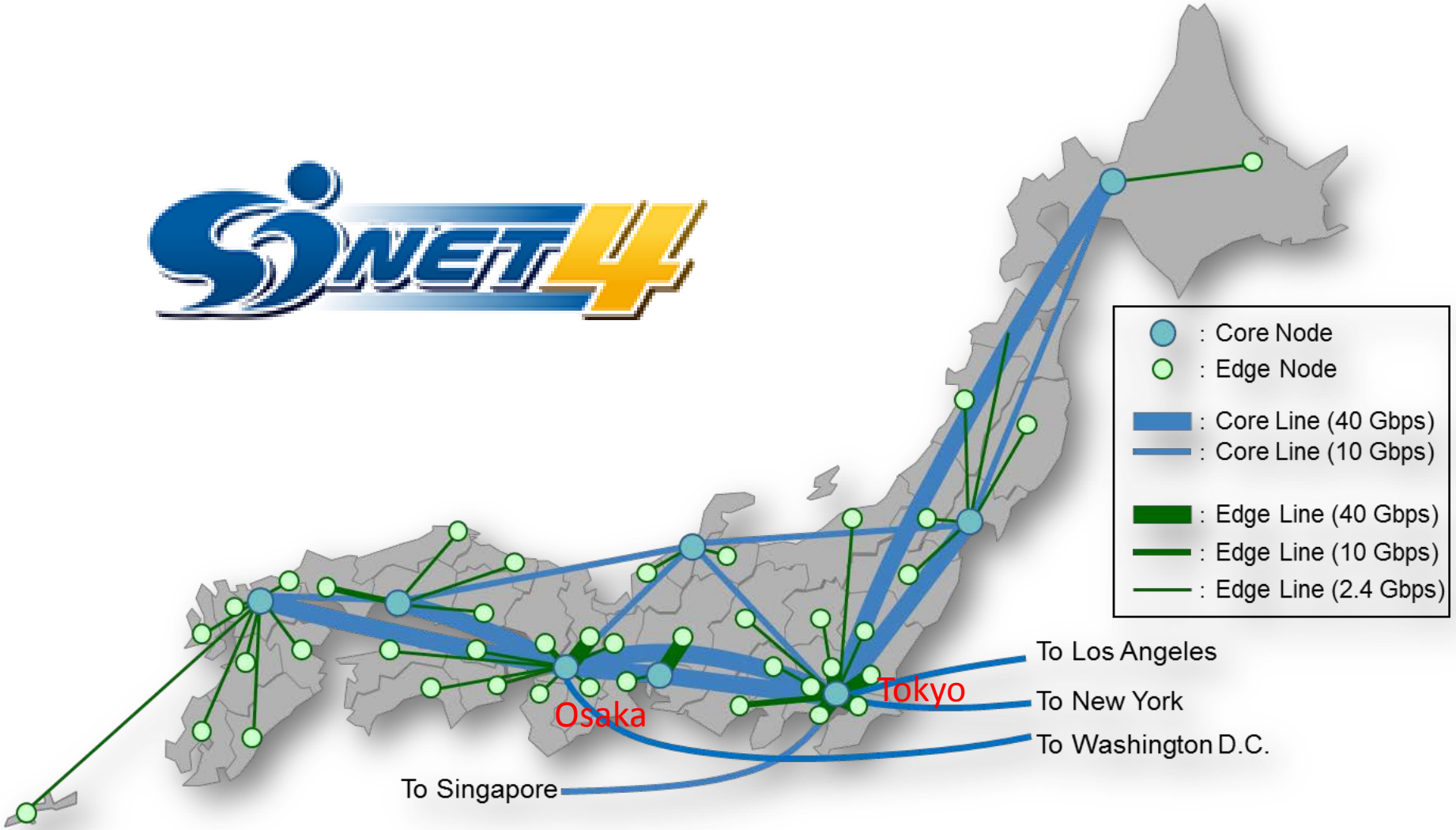
KEK-CRC

International network provided by NII



M. Nakamura (NII)

R&E network in Japan

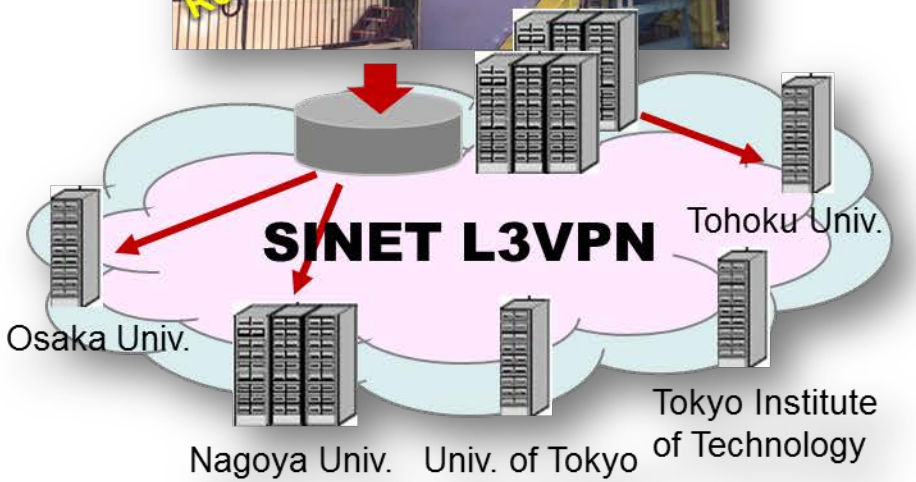


M. Nakamura (NII)

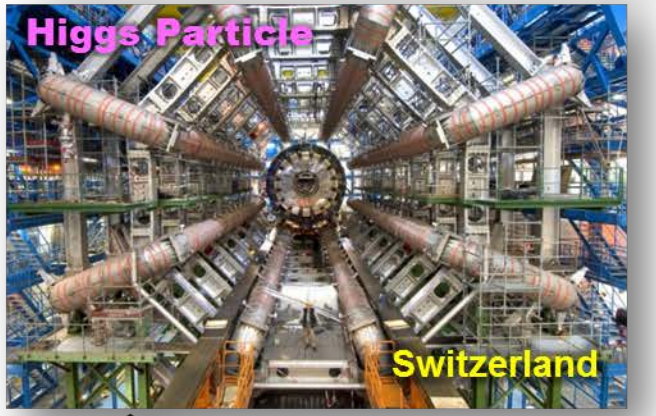
Belle II and ATLAS

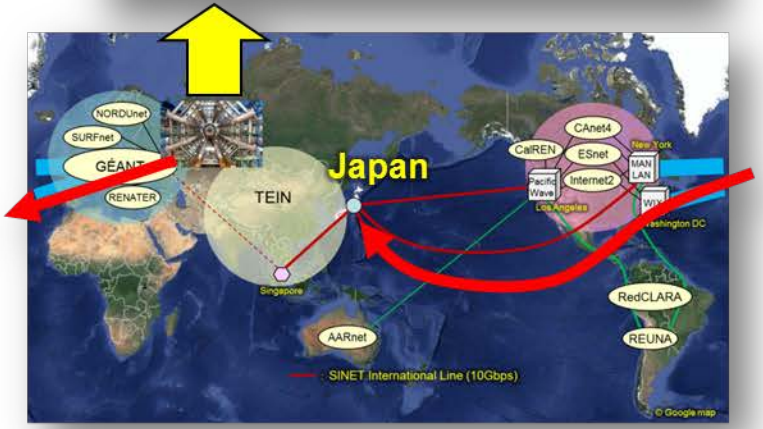
Source: High Energy Accelerator Research Organization (KEK)

Belle Measuring Device for KEKB



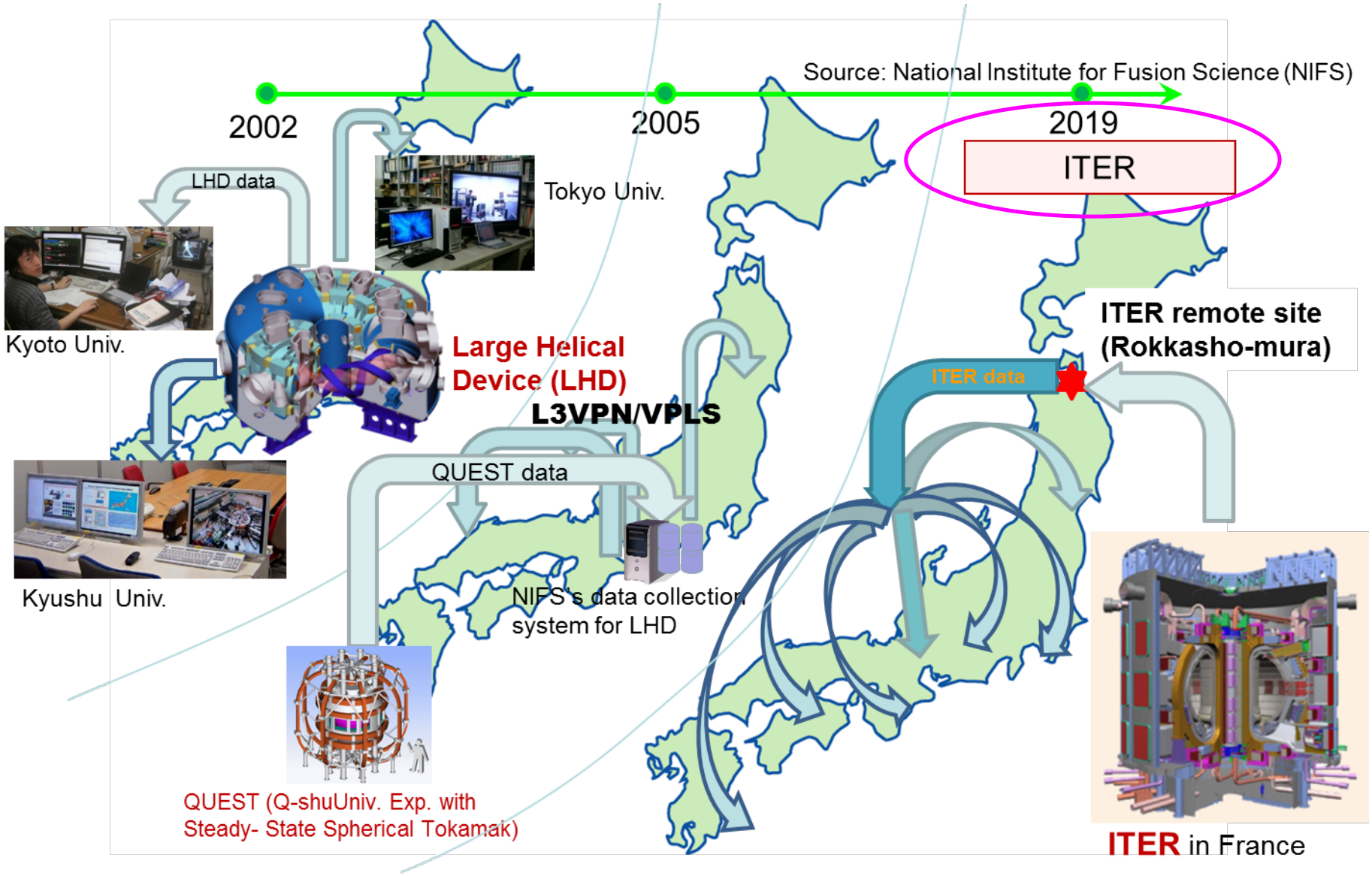
ATLAS Measuring Device for LHC



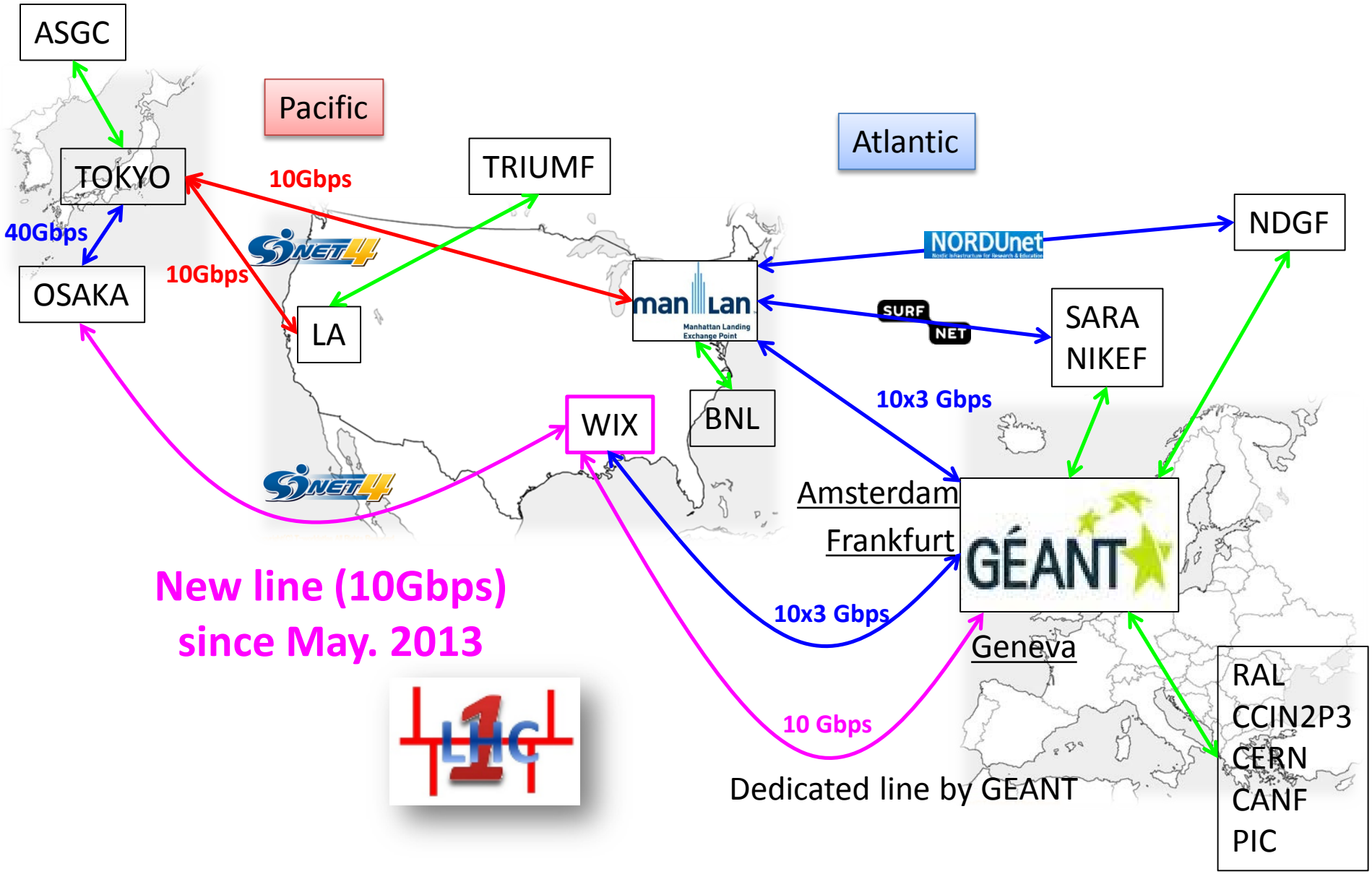


- International networks have already been well used for ATLAS (T2 at UTokyo).
- Belle II is going to distribute their massive data (~100PB) to Grid (~30 sites) from 2018.

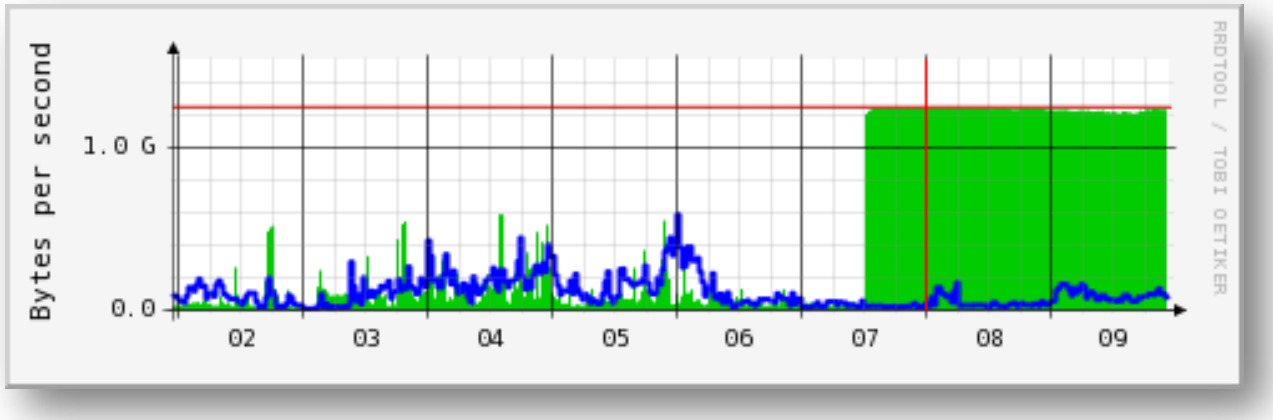
ITER


Source: National Institute for Fusion Science (NIFS)
2002
2005
2019
ITER
LHD data
Tokyo Univ.
Kyoto Univ.
Large Helical Device (LHD)
L3VPN/VPLS
ITER remote site (Rokkasho-mura)
ITER data
QUEST data
Kyushu Univ.
NIFS's data collection system for LHD
QUEST (Q-shuUniv. Exp. with Steady- State Spherical Tokamak)
ITER in France

LHCONE for Japanese institutes

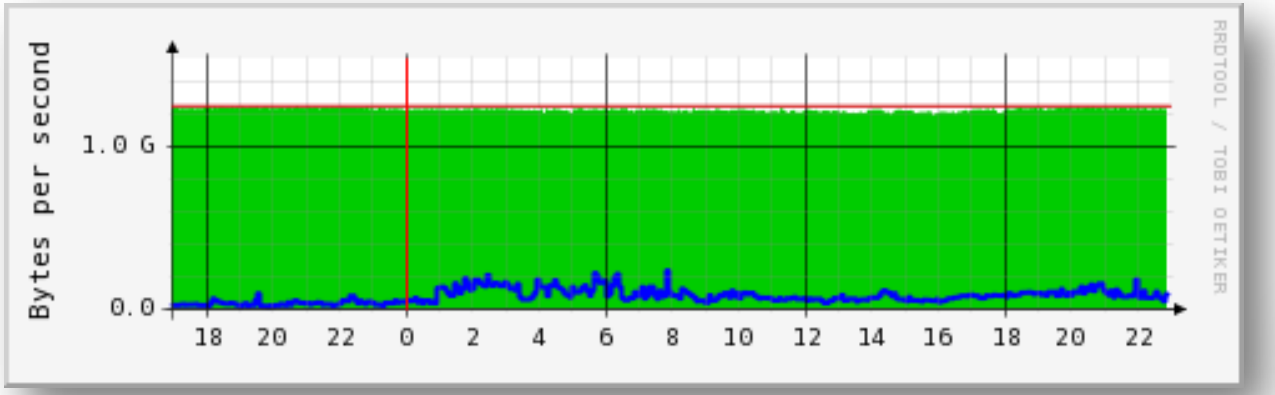


10Gbps bandwidth is already saturated at Tokyo T2



Dec. 7, 2014

User subscription of 150TB of Run1 ATLAS data (AOD)



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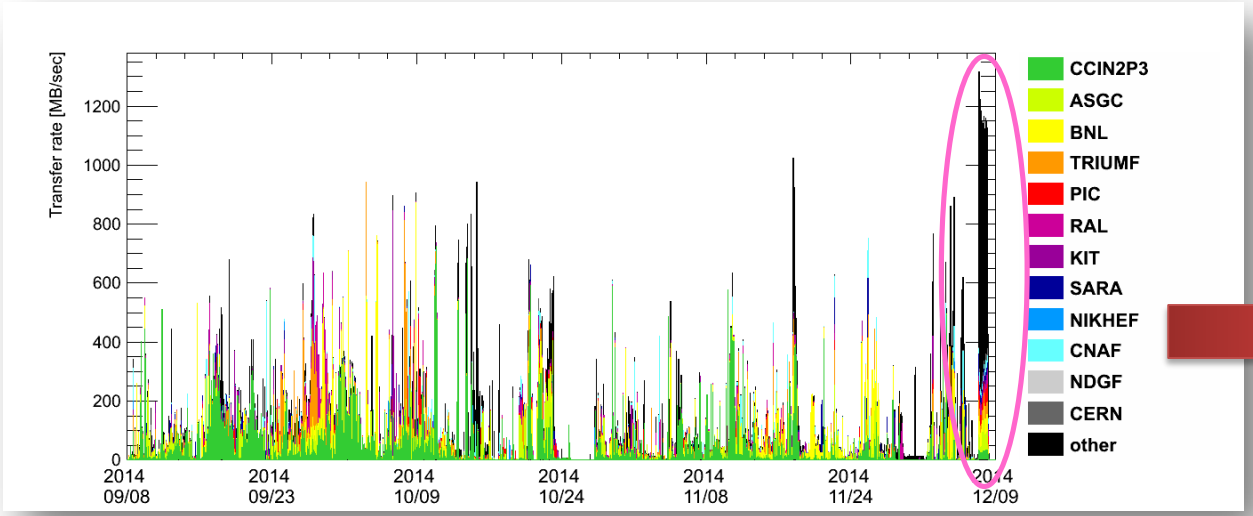
THE UNIVERSITY OF TOKYO

Breakdown w.r.t. source sites

10 min. bin



Part of LHCONE contribution

Mainly FTS3 and direct transfer from multiple sites

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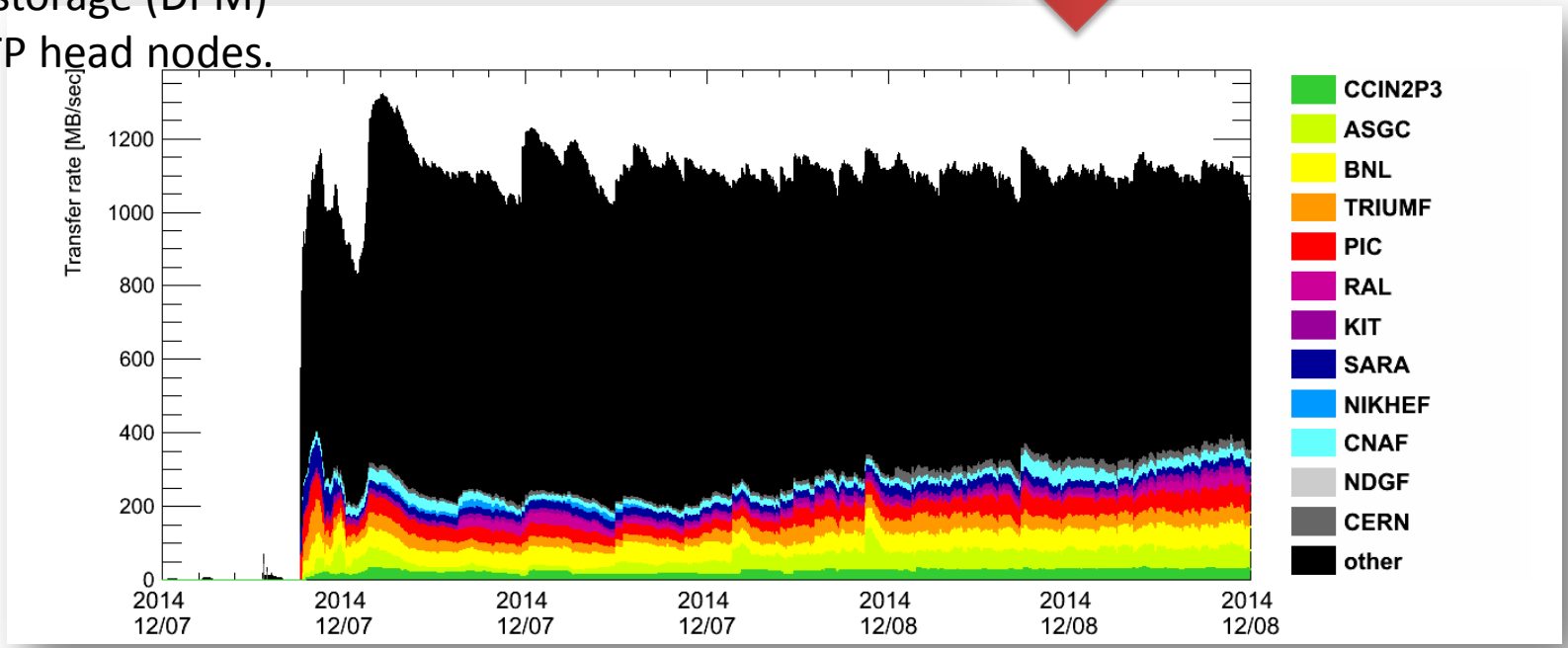
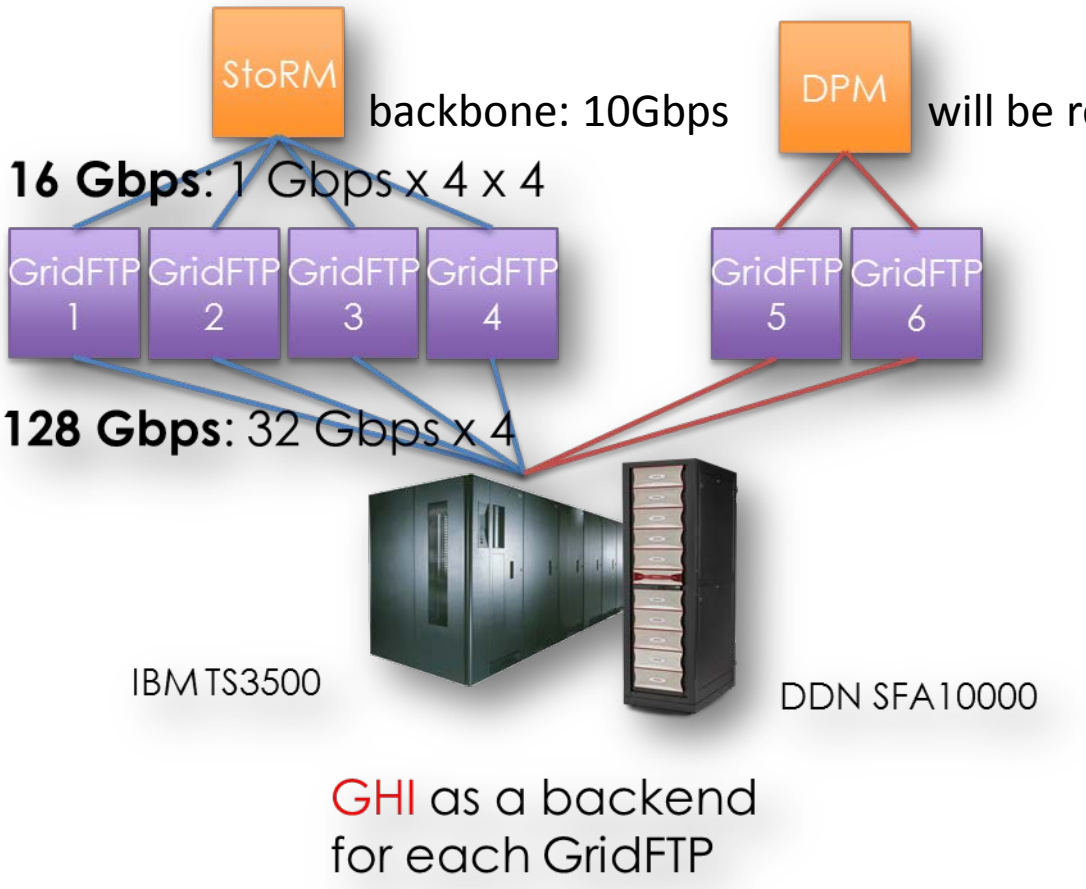
~3.2PB disk storage (DPM)
by 48 GridFTP head nodes.

1 min. bin



HSM for Grid in current KEK system



Disk storage (DDN): 7PB
Disk cache by GPFS: 2PB
Tape library: 16PB (maximum)
Migration policy:
migrate to tape and purged from disk cache for old files when 70% of total space is filled.

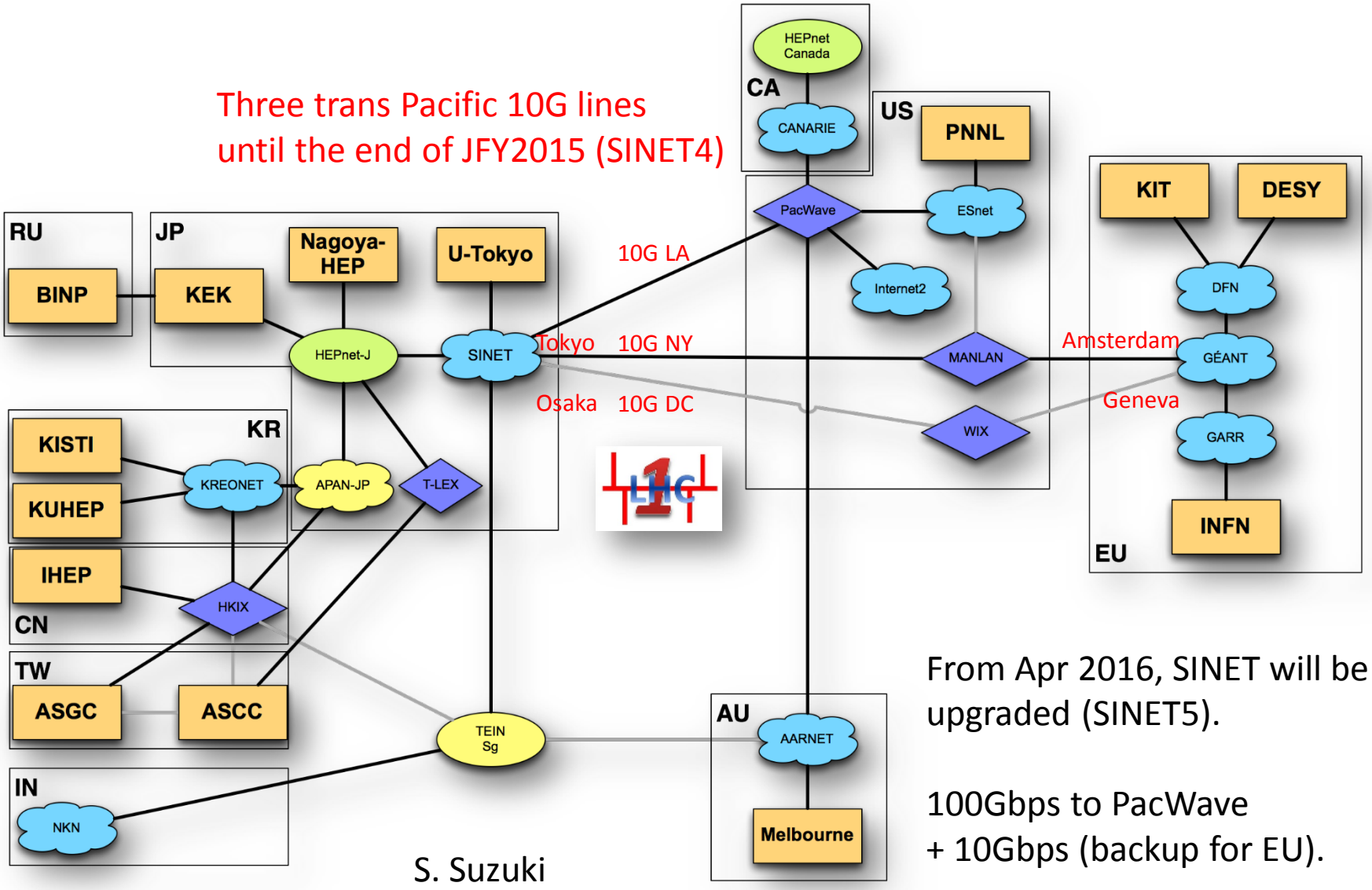
Connection to worker node:
InfiniBand 4xQDR (4GB/s)

Provide by StoRM and DPM for grid
4 servers (StoRM)
2 servers (DPM)

G. Iwai

System will be upgraded at summer in 2016.

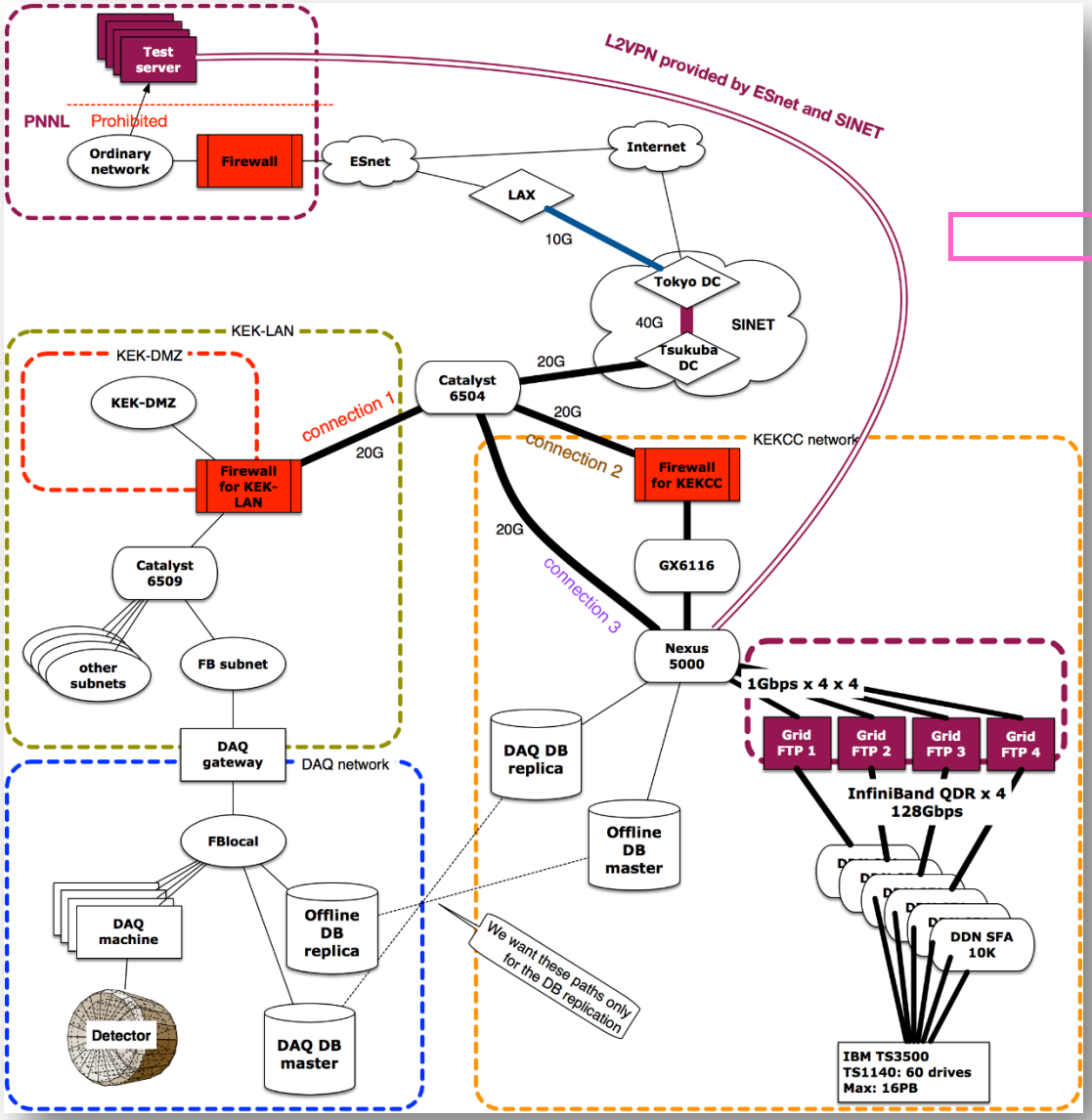
International Network by Japanese NREN



From Apr 2016, SINET will be upgraded (SINET5).

100Gbps to PacWave
+ 10Gbps (backup for EU).

Network for PNNL



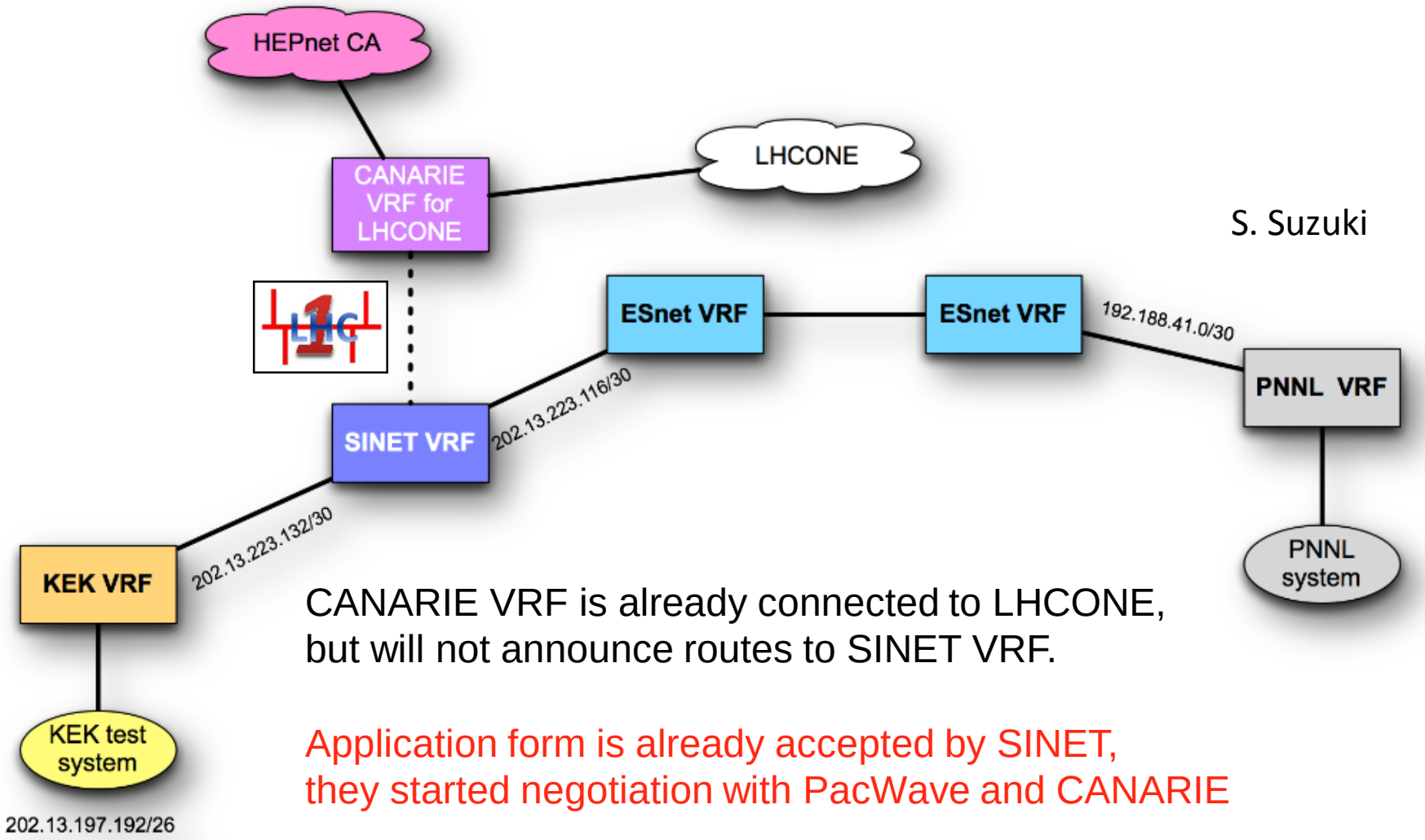
PNLL will archive Bell II raw data

L2VPN provided by SINET and ESnet to bypass FW of KEKCC

It will be replaced by L3VPN to join LHCONE

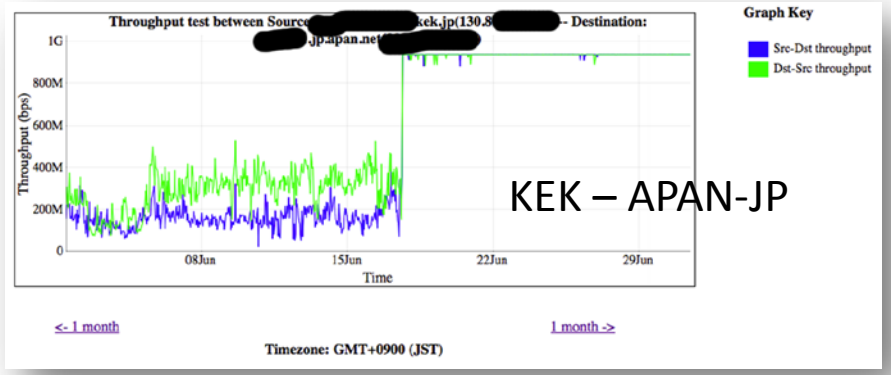
S. Suzuki

Network for Canadian sites

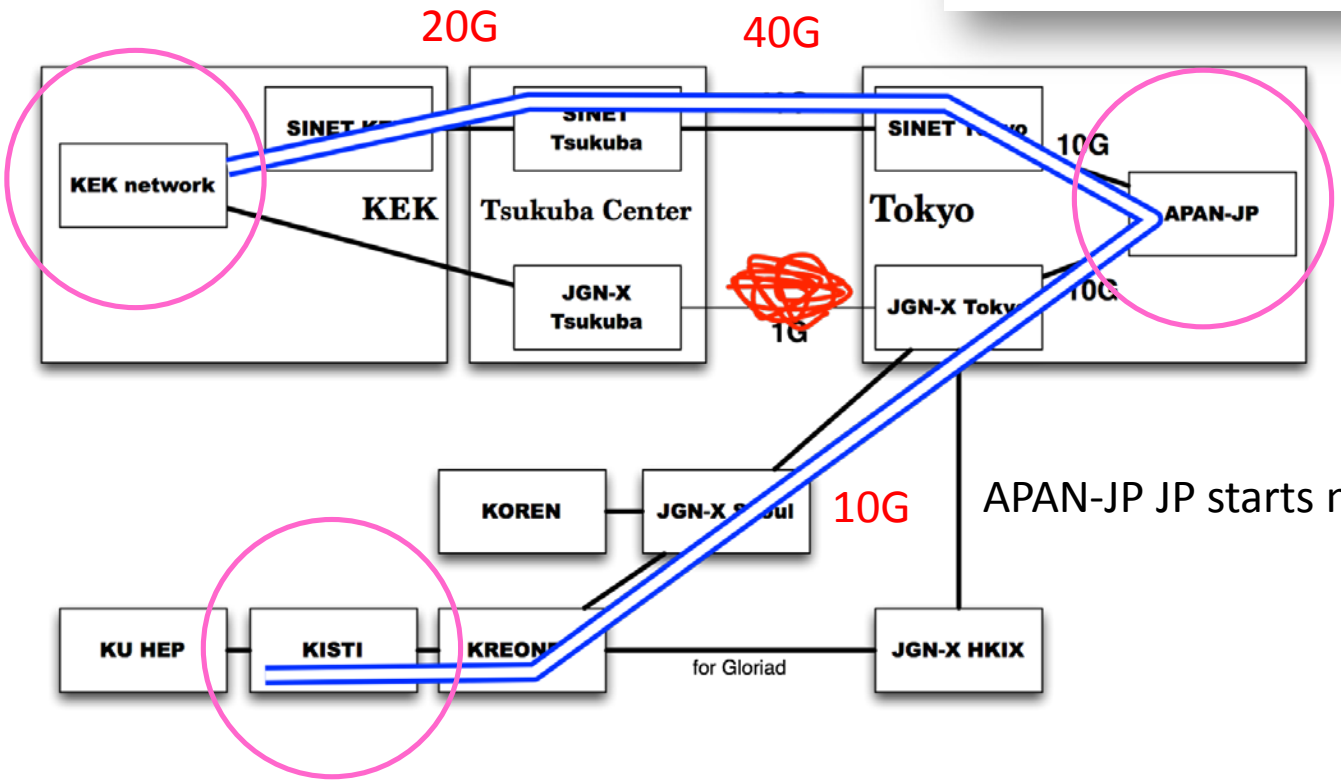


Network for Asian sites

SINET provides L2VPN from KEK to APAN



KEK – APAN-JP



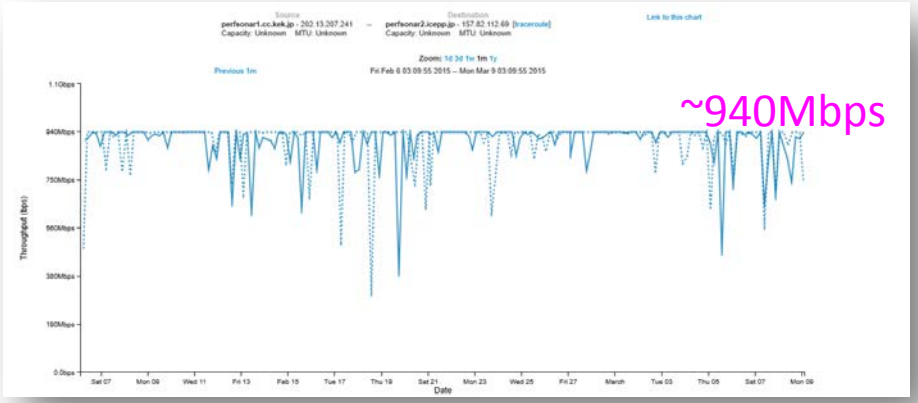
APAN-JP JP starts new peer with KREONET

S. Suzuki

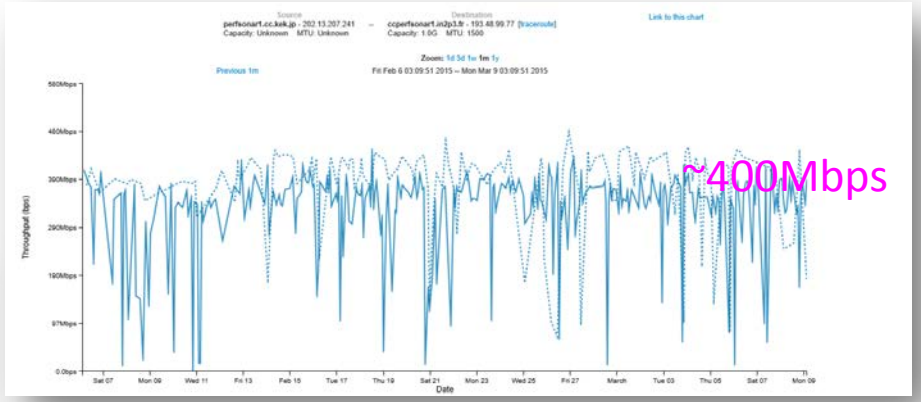
KEK/CRC, ICEPP/UTokyo, CC-IN2P3 (1G)

Latest month

KEK - UTokyo

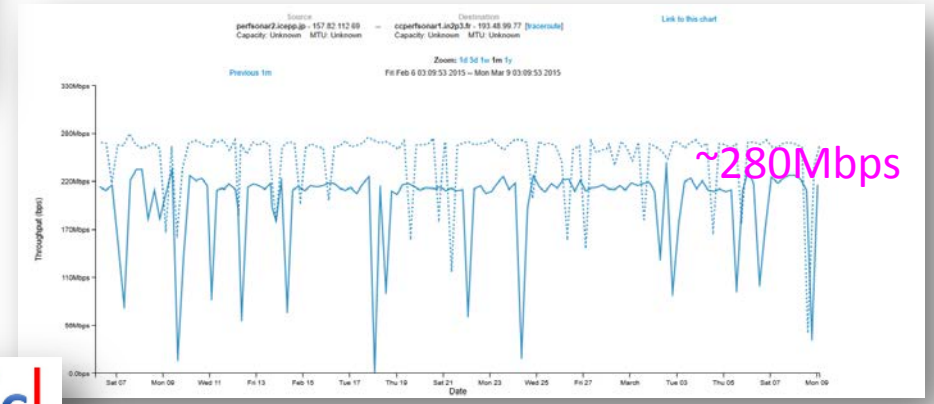


KEK – CCIN2P3



New York line

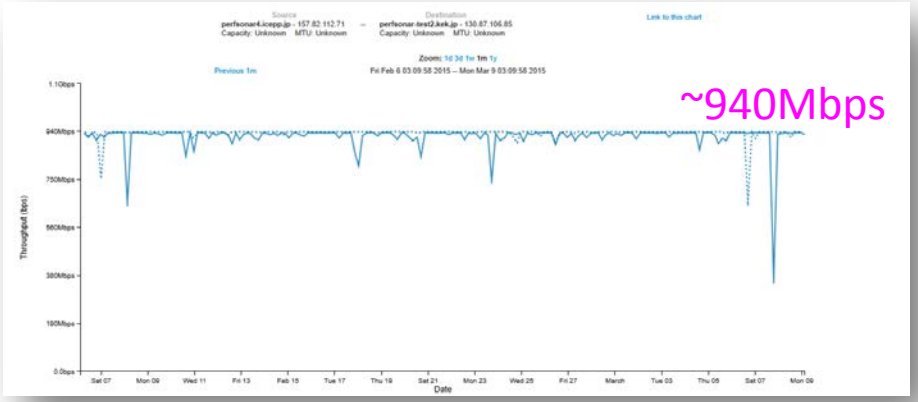
UTokyo – CCIN2P3



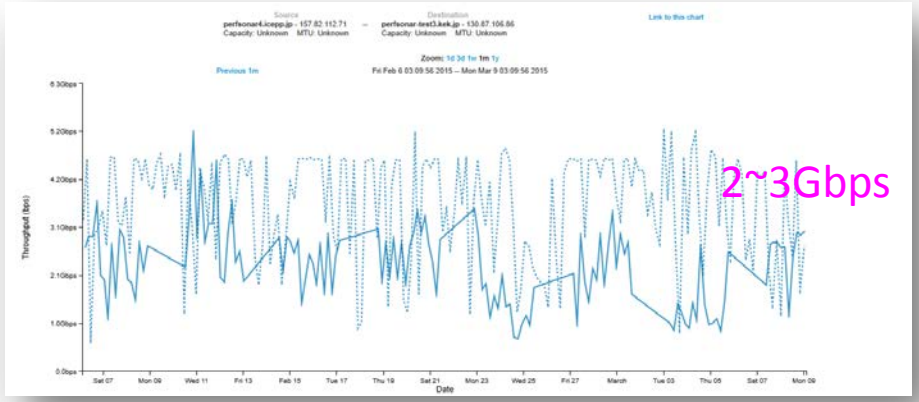
Washington/Geneva line

10G vs. 1G

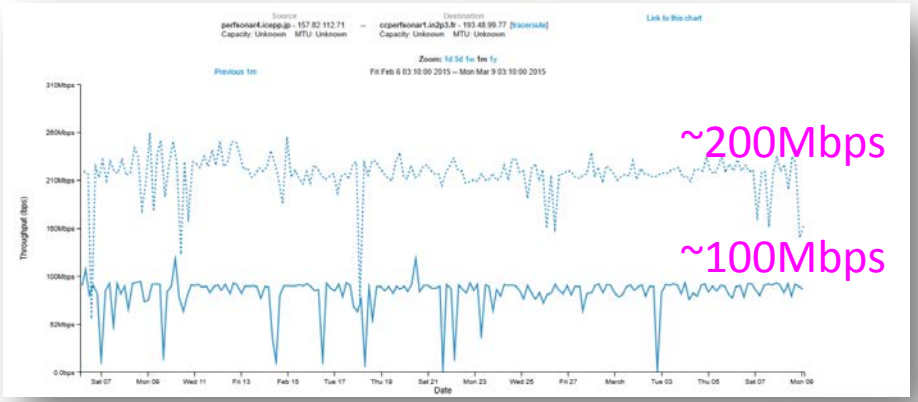
UTokyo (10G) – KEK (1G)



UTokyo (10G) – KEK (10G)



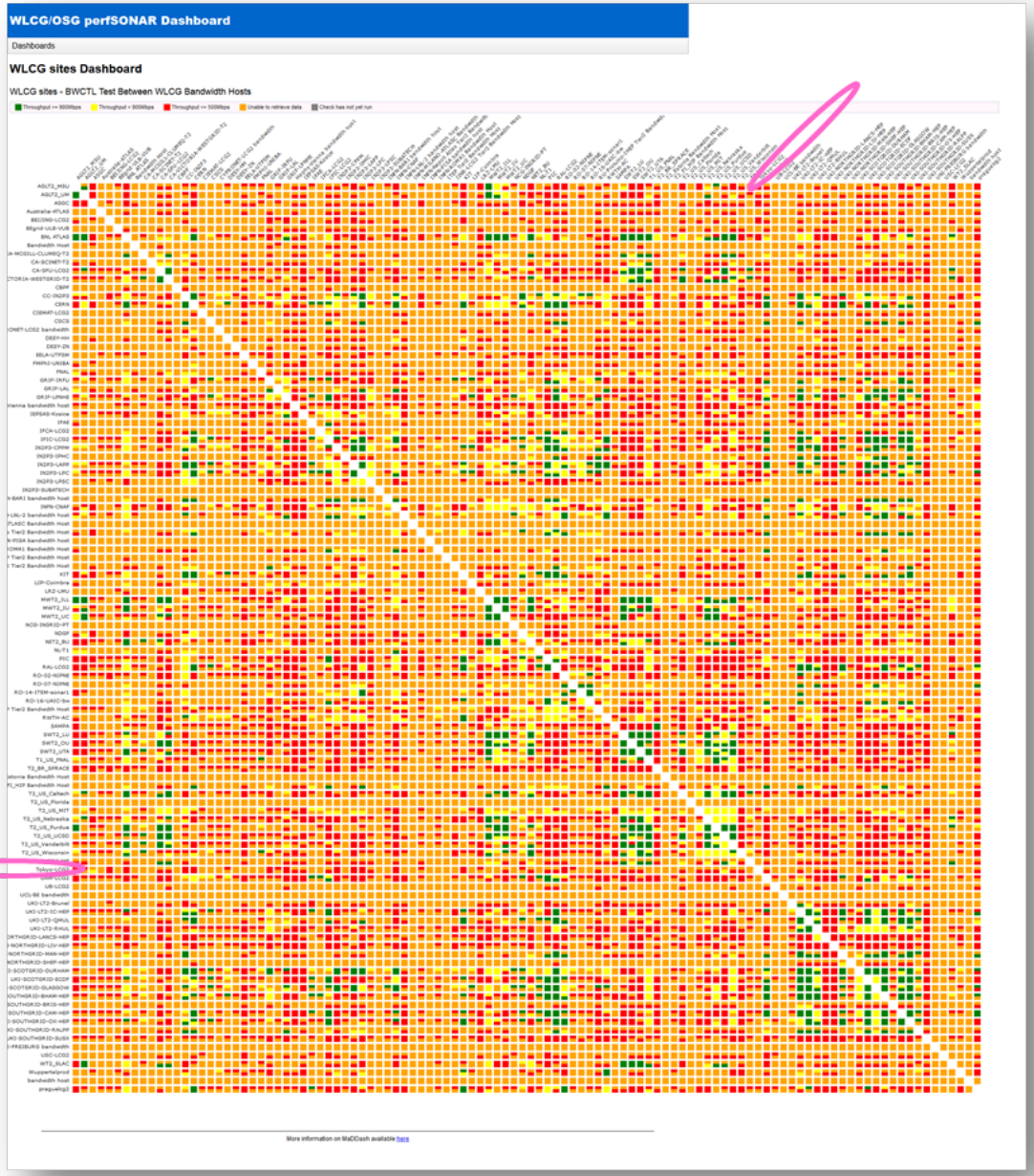
UTokyo (10G) – CCIN2P3 (1G)



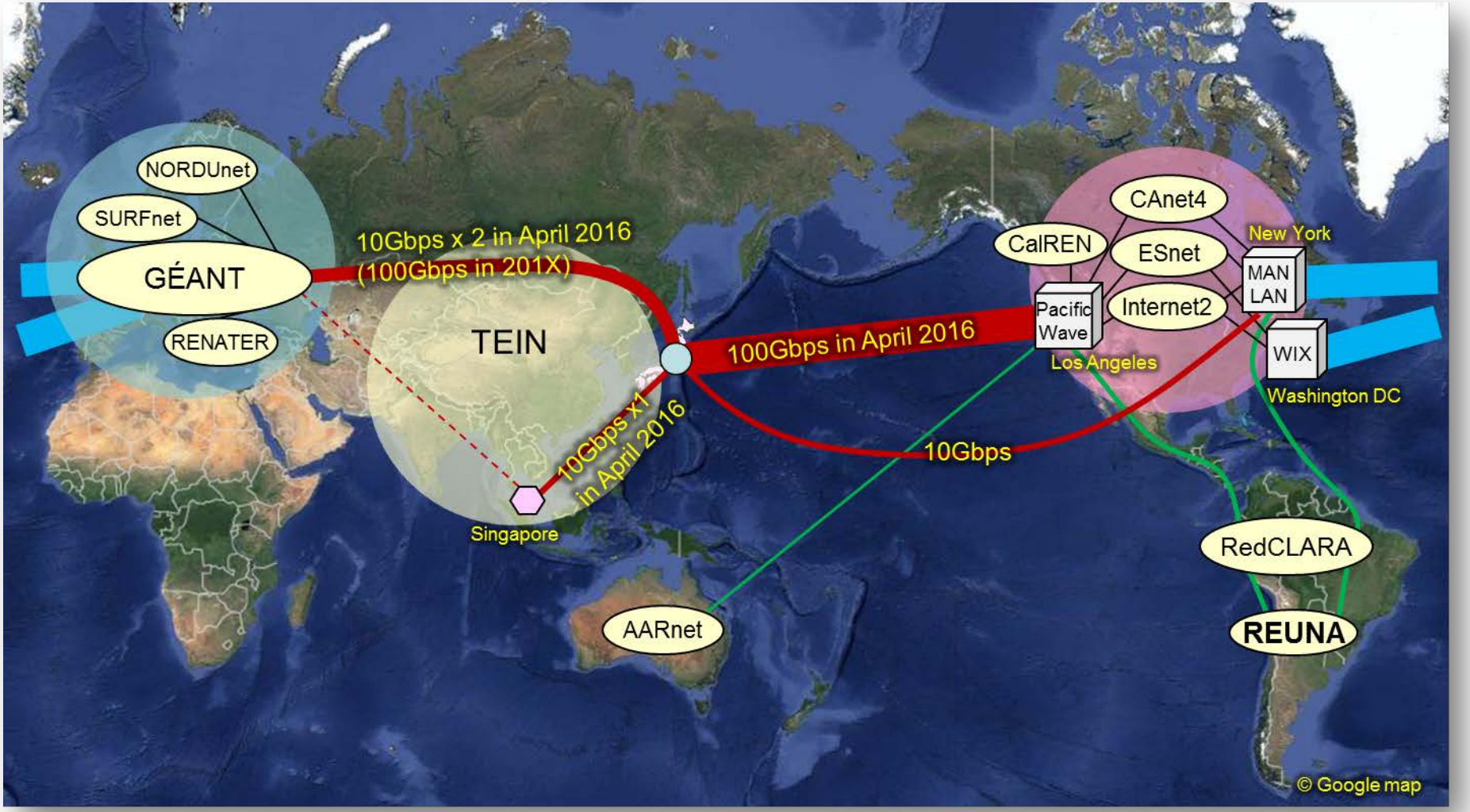
Washington/Geneva line

- Network monitoring is necessary for stable Grid operation in several points of view.
- 10G-10G test will be useful also between KEK and CC-IN2P3 to know the real network situation.
- The different settings are required e.g. duration time, for the 10G-10G test .

Meshed monitoring like WLCG



Upgrade from 2016 (international network)



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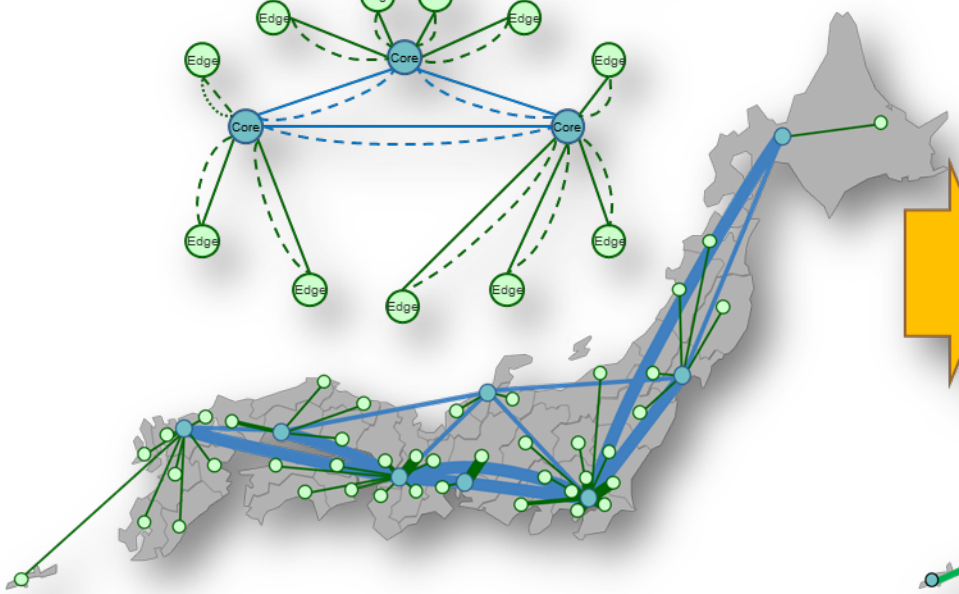
Upgrade from 2016 (inside Japan)

SINET4

- Connects nodes in a star-like topology
- Secondary circuits of leased lines need dedicated resources

: Leased Line (Primary Circuit)

: Leased Line (Secondary Circuit)

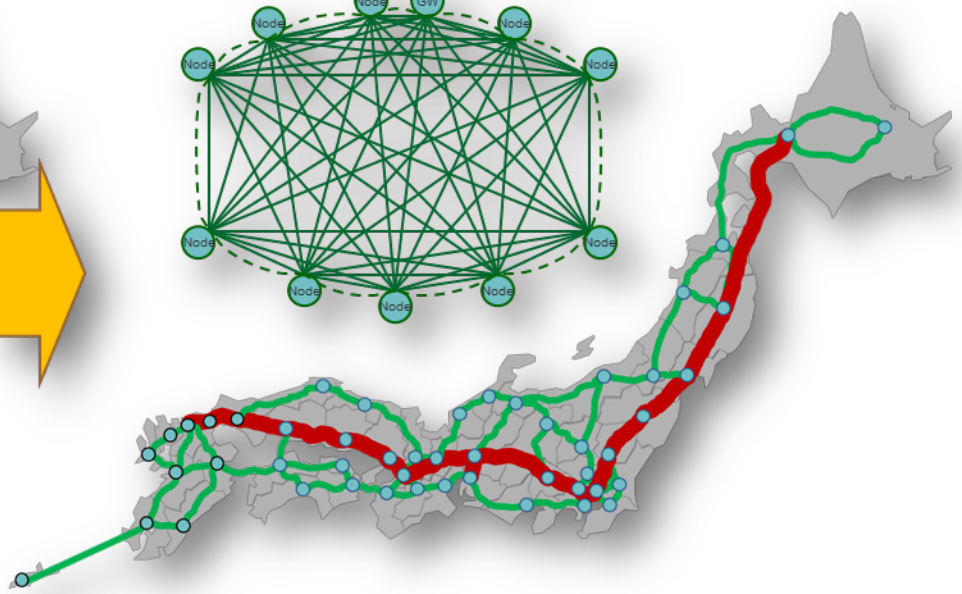


SINET5

- Connects all the nodes in a fully-meshed topology with redundant paths
- Secondary paths do not consume resources

: MPLS-TP Path (Primary)

: MPLS-TP Path (Secondary)



M. Nakamura (NII)

Summary

International network of Japan provided by Japanese NREN will be upgraded at April in 2016 (100Gbps + 10Gbps to US, 20Gbps to EU).

We can share the NRE network by more flexible and effective way after the upgrade among a lot of projects.

Network bandwidth of KEK will be also upgraded from the current 20Gbps to 40Gbps or 100Gbps (not yet determined).

Belle II sites including KEK have been approved to connect/peer LHCONE routing. LHCONE VRF will be set at WIX or MANLAN exchange point (not yet decided).

Anyway, several kinds of monitoring is highly useful e.g. multi-meshed monitoring and 10G-10G test and so on. It is important for further growing network bandwidth especially in long distance. This is not aimed for the measurement of the maximum bandwidth.