# Recent KEK network change

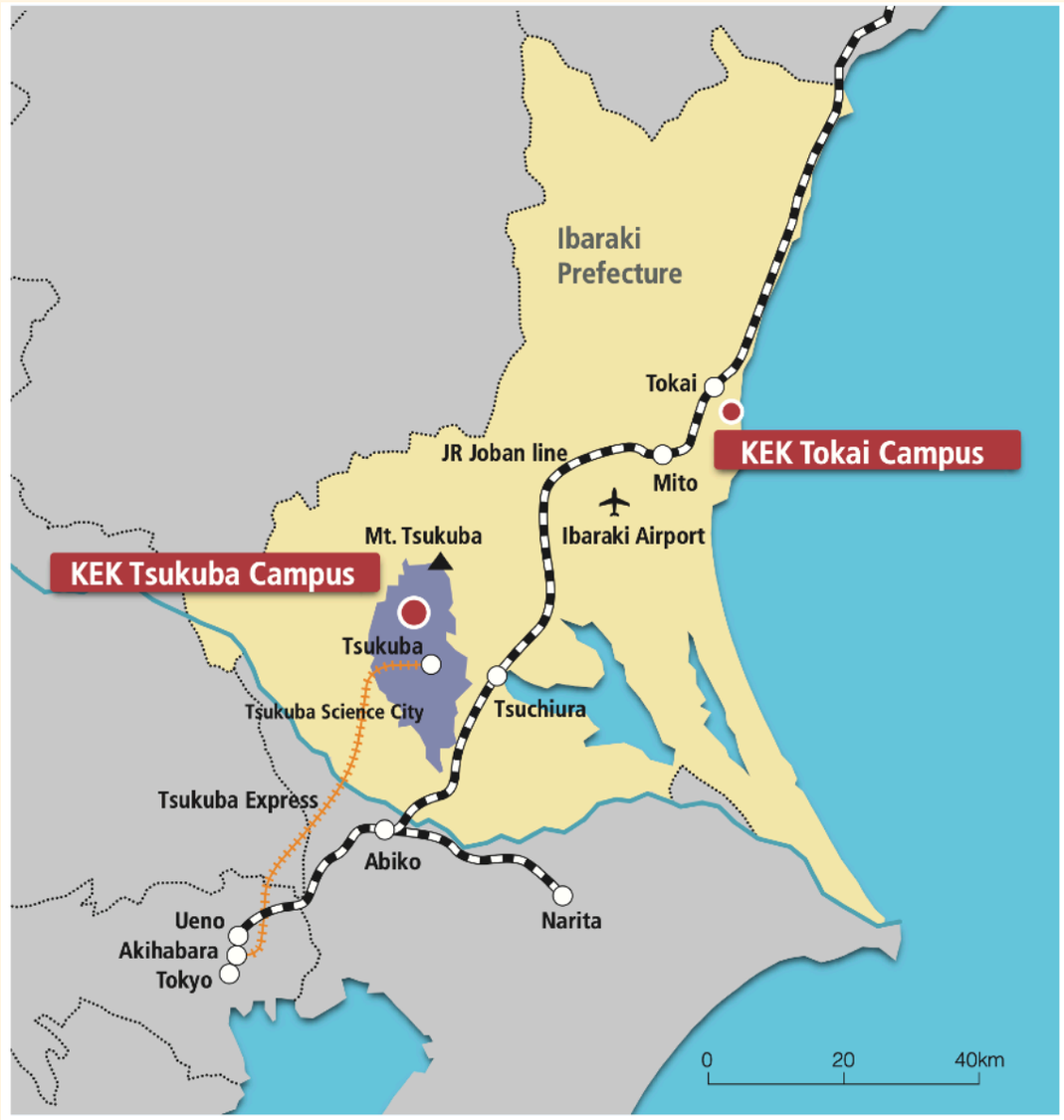
S.Y.Suzuki, G.Iwai, T.Nakamura (KEK)

# About KEK

- Already reported about the computing facility at yesterday,
- let me start from not-computing

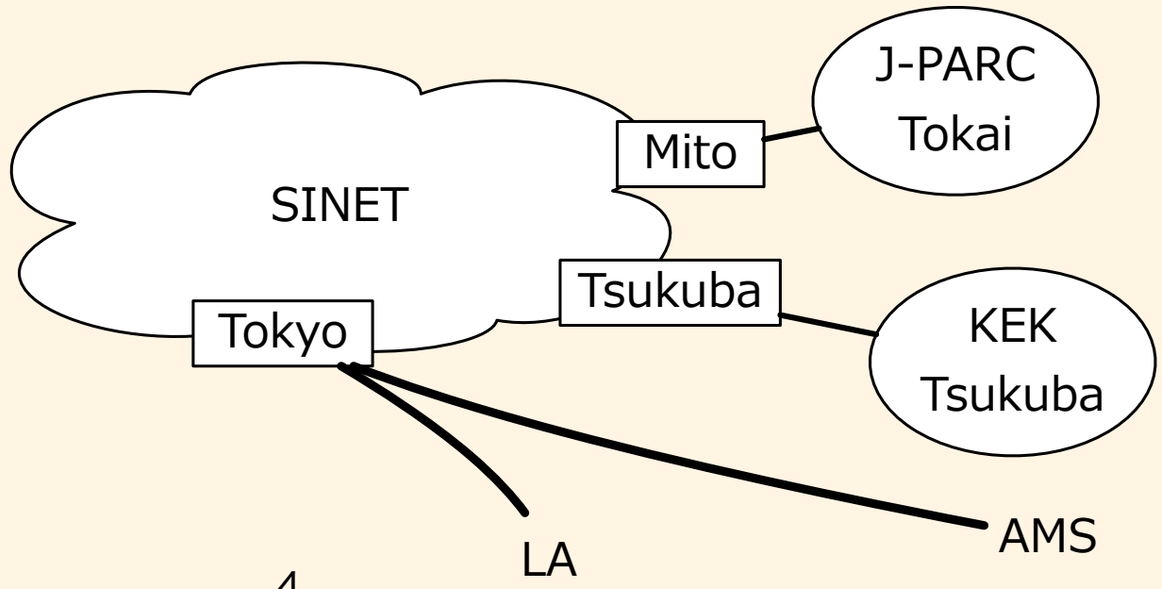
# Location of KEK

- KEK has two campus at Tsukuba and Tokai
- Main site is Tsukuba
- Tokai is relatively newer and mainly for J-PARC
  - joint project of KEK and JAEA (Japan Atomic Energy Agency)
- Inter-campus data transfer is from Tokai to Tsukuba

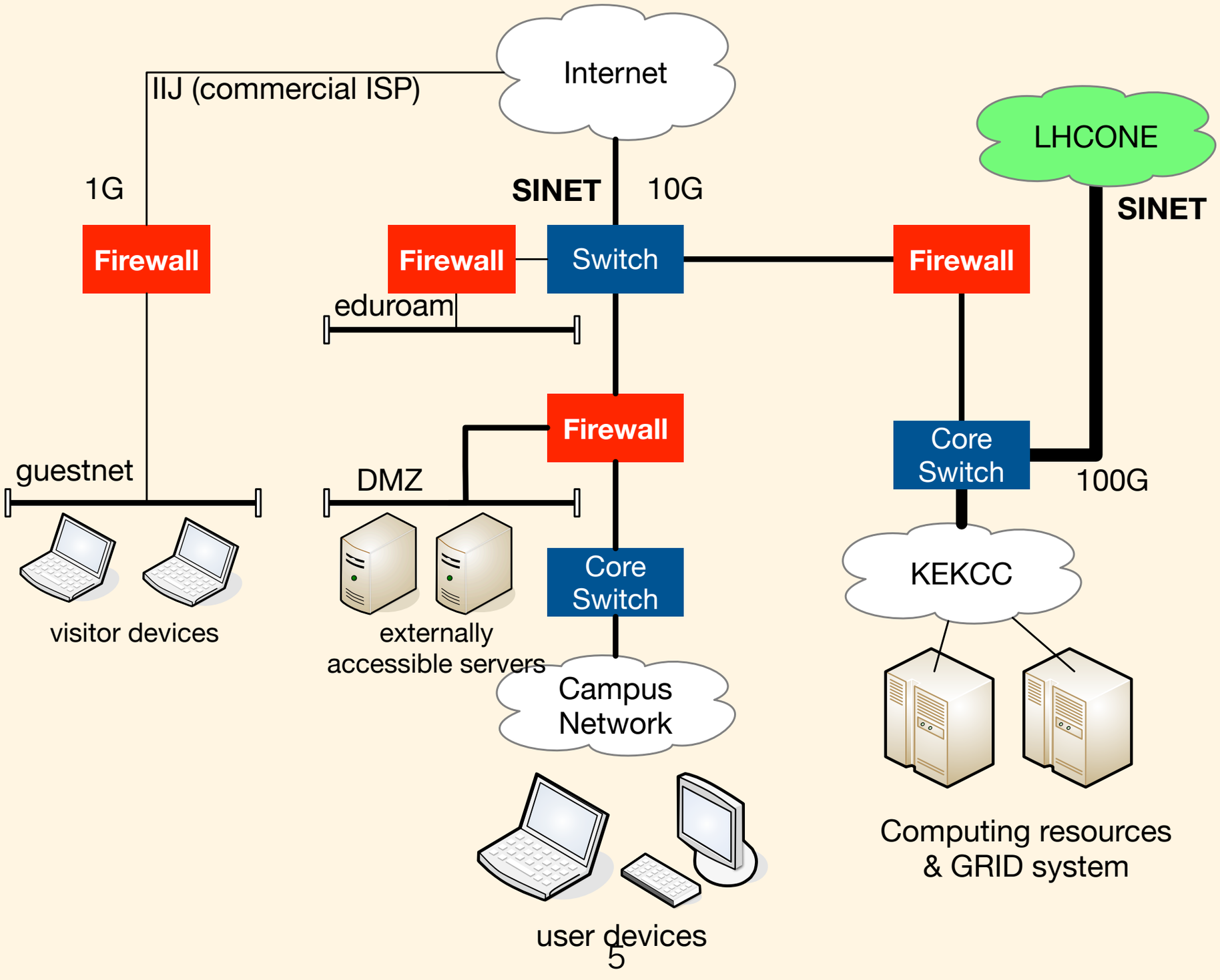


# Network reachability

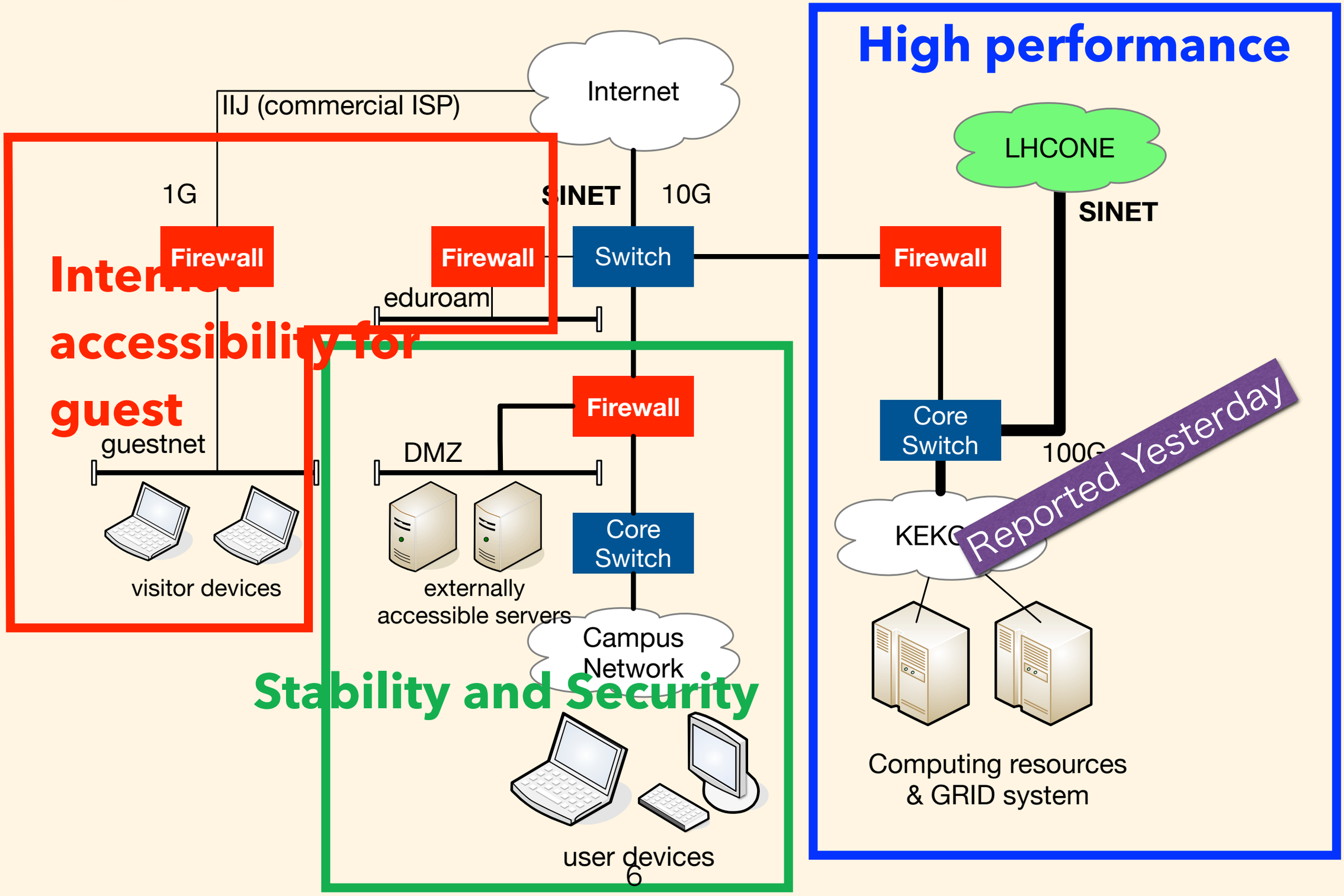
- Tsukuba is far from the Capital area, support by NREN is very important
  - Not only Tokyo-Tsukuba but also Tsukuba-Tokai is similarly long-distance
- SINET kindly established a new DC in Mito



# Logical map of KEK network



# Logical map of KEK network



# Renewal in these years

- FY2024
  - J-PARC Tokai network
  - KEKCC
- FY2025
  - KEK Tsukuba network
    - only wired part

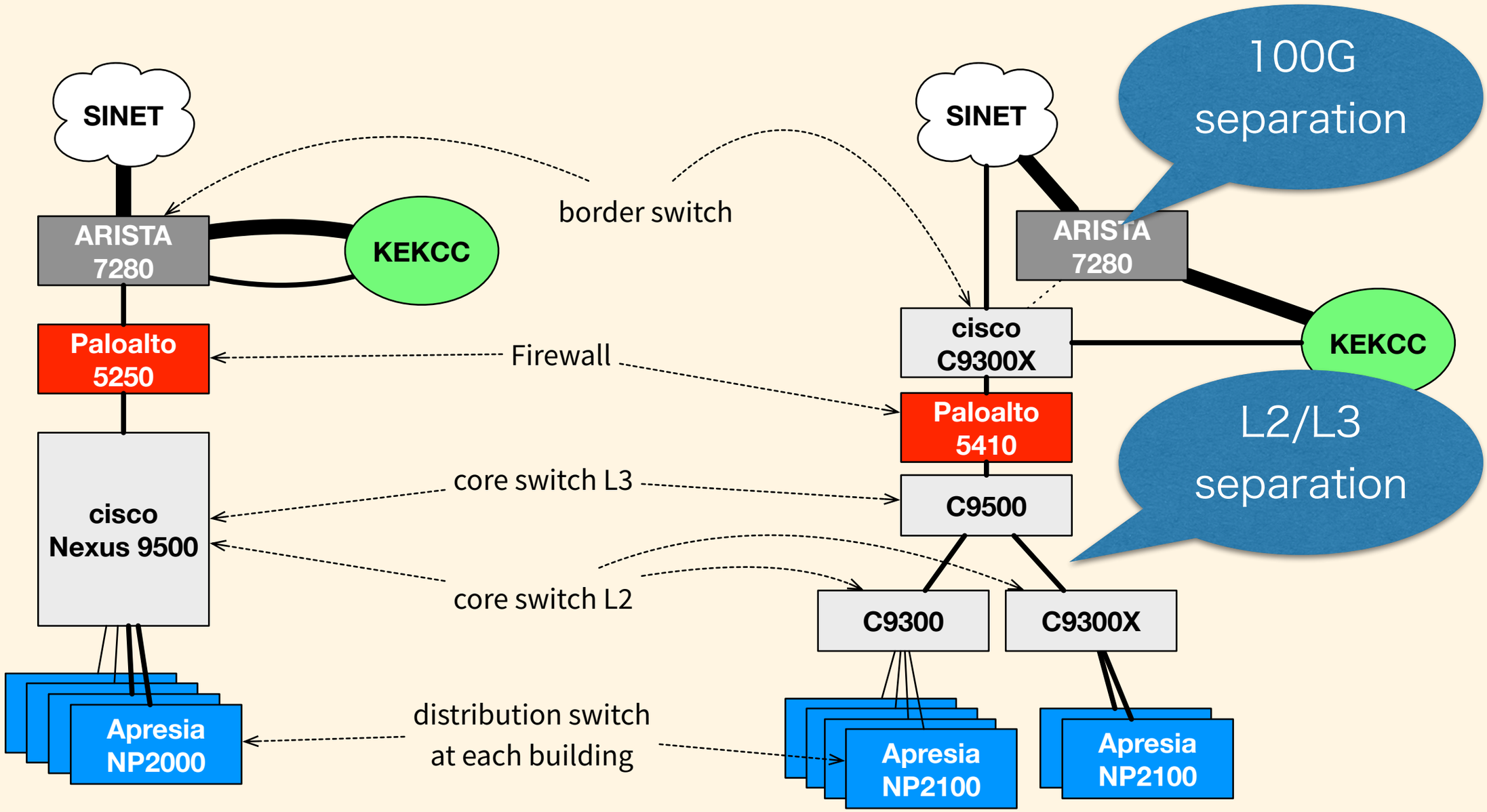
# Changes

- Be more cost effective

- Separation
  - 10G for internet / 100G for LHCONE
  - L2 / L3

- Virtualization middleware
  - vSphere → NUTANIX + KVM

# Separation


SINET
ARISTA
7280
KEKCC
Paloalto
5250
cisco
Nexus 9500
Apresia
NP2000
border switch
Firewall
core switch L3
core switch L2
distribution switch
at each building
SINET
100G
separation
ARISTA
7280
cisco
C9300X
KEKCC
Paloalto
5410
C9500
L2/L3
separation
C9300
C9300X
Apresia
NP2100
Apresia
NP2100

# L2/L3 separation

- Still 10G is minority for inter-building connection in KEK
  - Many buildings have only very old MM cable.
    - no huge data traffic, but need reachability and redundancy
  - Half of them are reachable by 1000LH (< 550m)
  - Others are reachable only by 1000SX2 (< 2km)

- Chassis switches are not cost effective to distribute a lot of 1G link anymore
  - 1G line-cards are disappearing

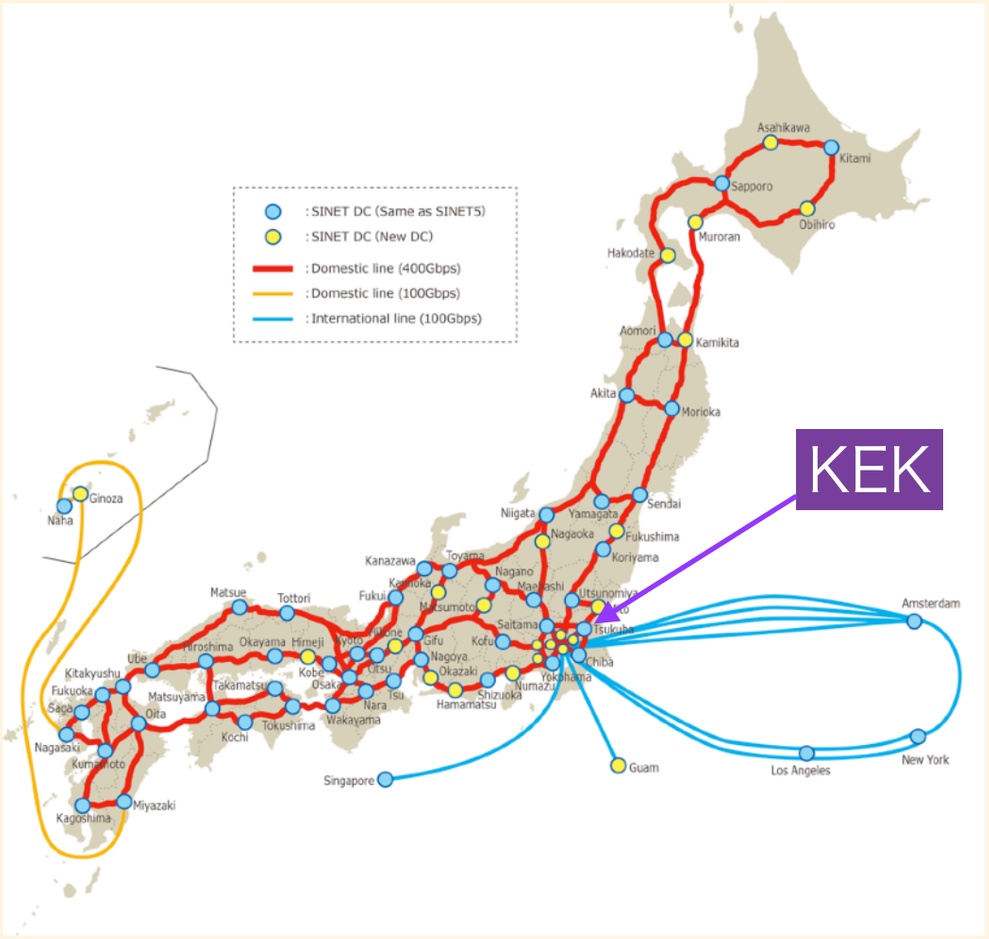
- Thus, we separated L2 and L3 then replaced them by stacking-box switches
  - 2 for L3, 2 for L2-10G, and 4 for L2-1G.

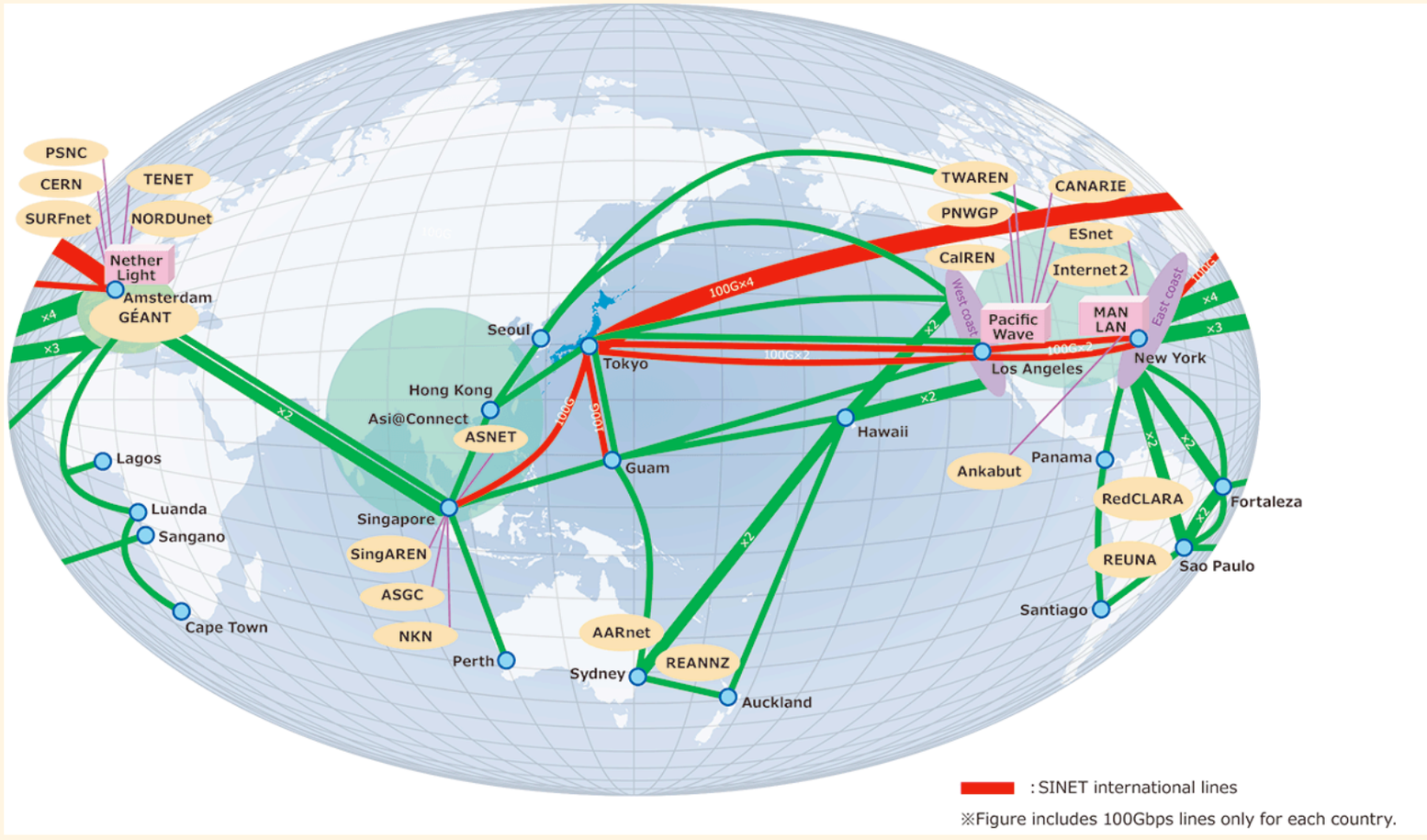
# 100G separation for LHCONE

- Past years, mass data transfer faster than 10G is observed only from/to KEKCC
- Others use ordinary internet for data transfer and our FW links are LAG of 10G
- So no need to feed ordinary internet traffic to 100G, 100G SW can be almost dedicated to LHCONE.
  - to avoid packet loss on speed gaps in our switches
- KEKCC connection is upgraded from 2x40G to 100G, we should avoid making bottleneck on the switch. L2 is enough

# Outside of KEK

- Now all external connections of KEK except that for visitors depend of SINET



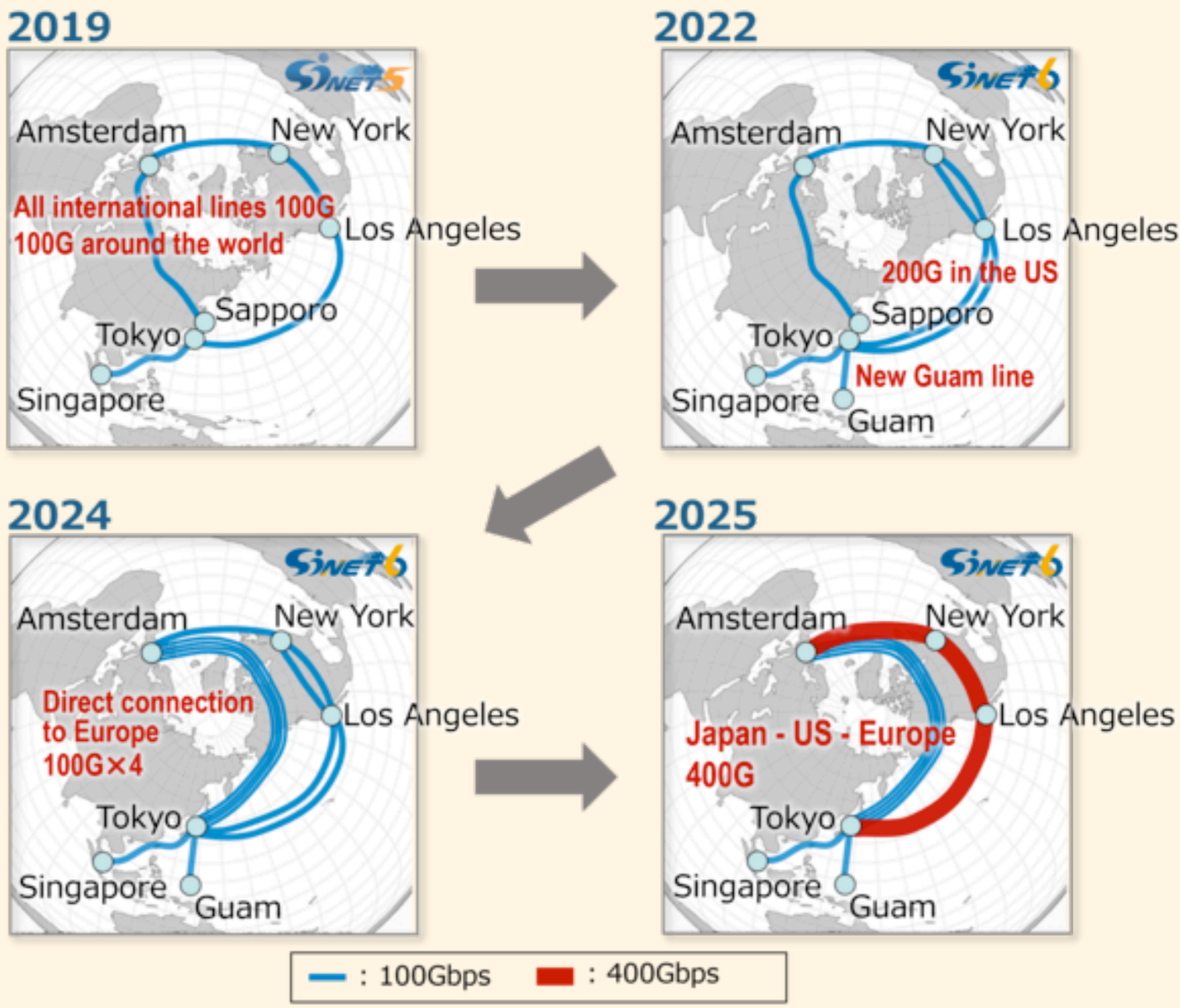

https://www.sinet.ad.jp/en/news_en/sinet6-upgraded-japan-amsterdam-lines-to-400gbps-april-1-2024

# International links by SINET

- SINET upgrades International links step-by-step

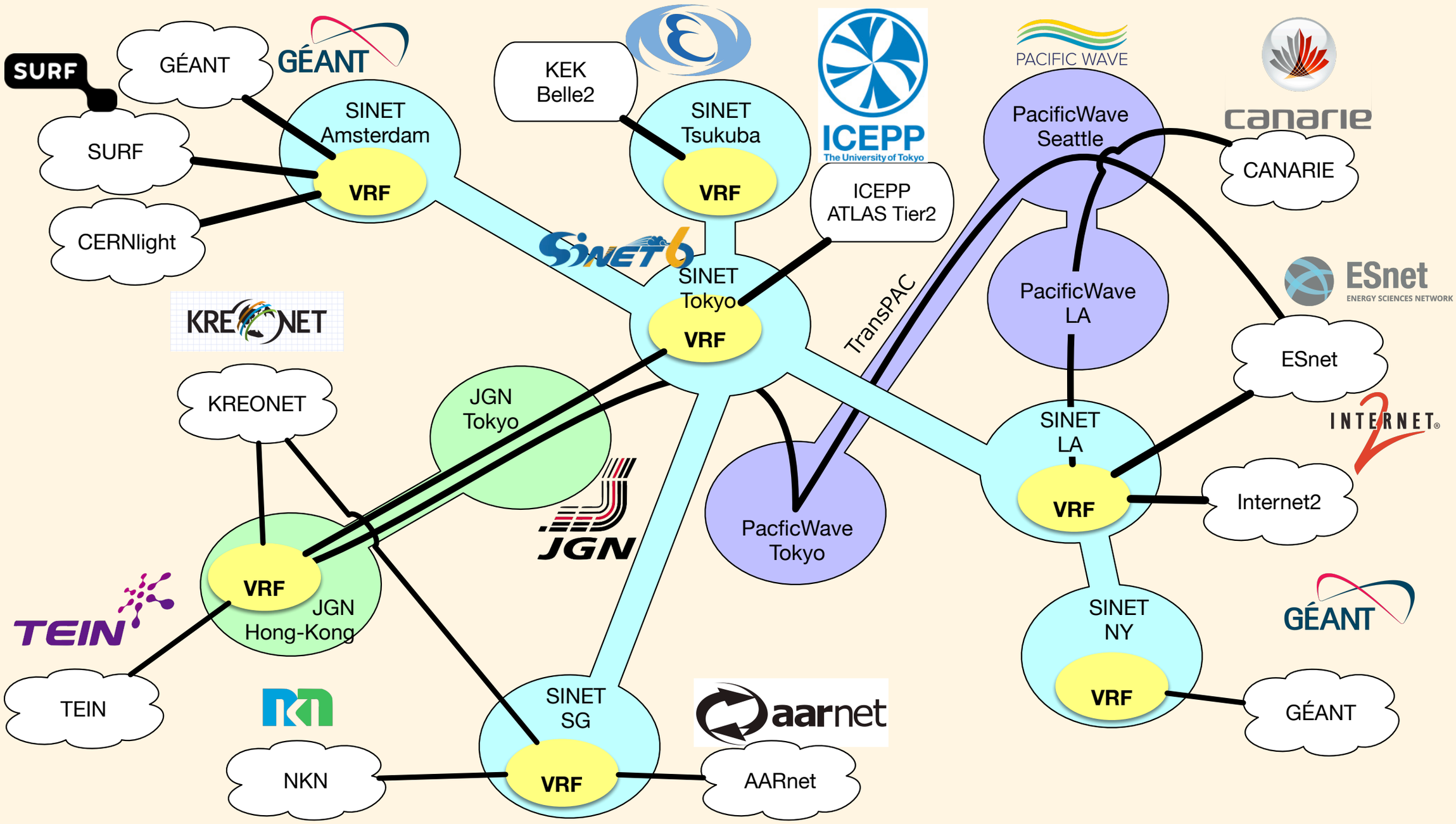
- Route to EU has backed to longer, but more wider, now it reaches 400G.

- Sufficiently wide and no interfere with activity of ATLAS-T2 in ICEPP




https://www.nii.ac.jp/en/news/release/2025/0401.html

# LHCONE from Japan also exists on SINET and JGN



# LHCONE via JGN

- JGN is another NREN in Japan
- Some asian NRENs have link to HKIX
- JGN also has a link, and permit LHCONE traffic
- Reachability to asian sites depends on this

# JGN will withdraw from the operation of JP-HK link

- Currently VRF is operated by JGN
  - so peers for LHCONE will be also affected
- Thanks for the long and stable operation since 2017

# New player in LHCONE

- APAN-JP (AS7660)
- will resume support the connectivity of JP-HK provided by JUCC/SingAREN

- LHCONE Map items related JP-HK link should be updated (TBD)

# Summary

- Now KEK is ready to use 100G bandwidth for LHCONE
- JGN's HK VRF will be taken over by APAN-JP
- Today, APAN-JP staff is joining at here