



# KRLight Updates

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KREONET Center  
KISTI

## ▪ A GOLE

- Managed and operated by KISTI

## ▪ Supports Hybrid Networking Service

- Lightpath Service: : SDH Containers (VCAT/LCAS and GFP), Carrier Ethernet (802.1ah and 802.1Qay), VLAN
- IP routed Service: KREONet2 (AS 17579)

## ▪ Covers Asia-pacific area

- Daejeon and Seoul, South Korea
- Seattle, USA
- Hong Kong, China

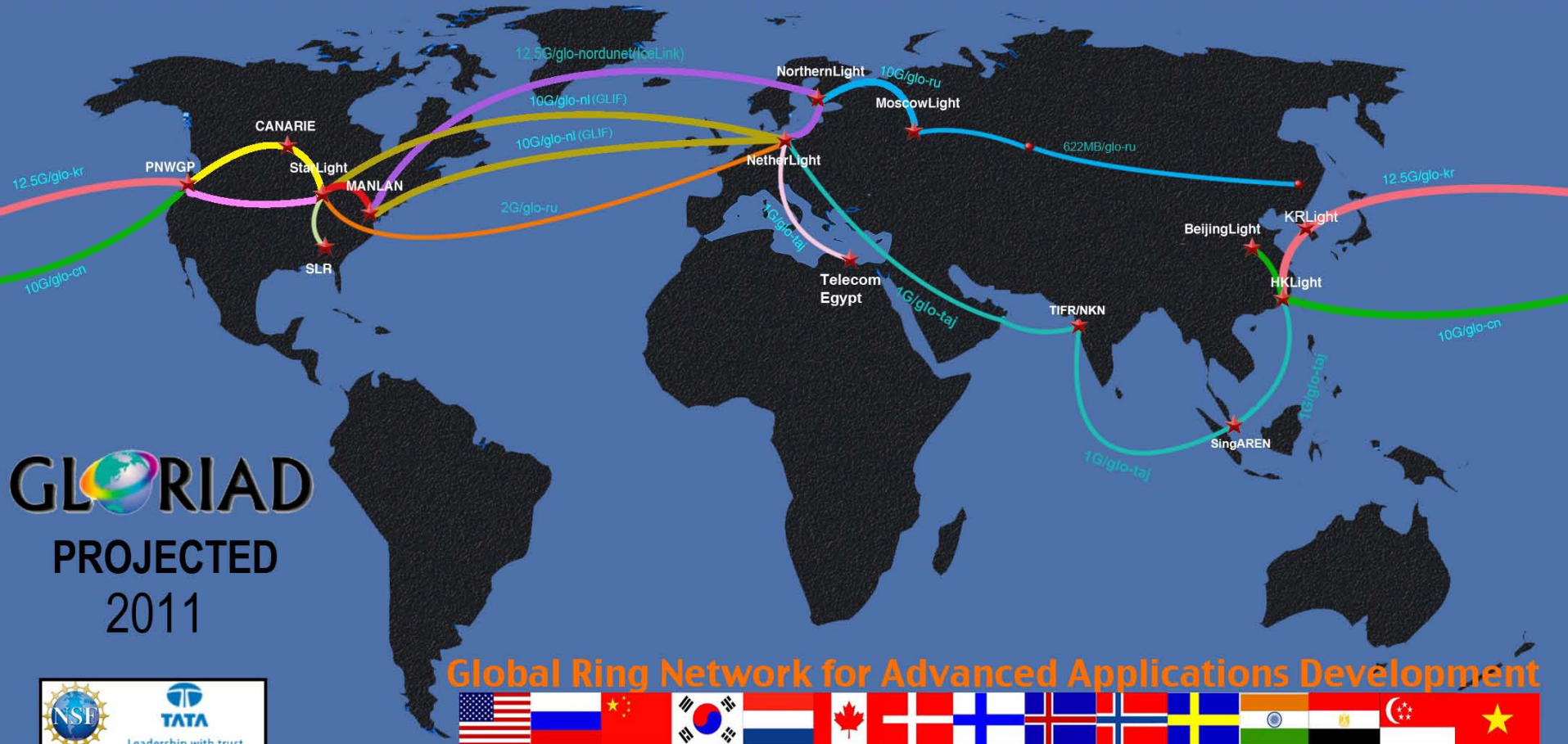
## ▪ Policy of KRLight as OLE (Open Lightpath Exchange)

- Policy-free lightpath stitching
- Non-blocking



# GLORIAD and GLORIAD-Taj

USA-RUSSIA-CHINA-KOREA-NETHERLANDS-CANADA-DENMARK-FINLAND-ICELAND-NORWAY-SWEDEN-INDIA-EGYPT-SINGAPORE-VIETNAM

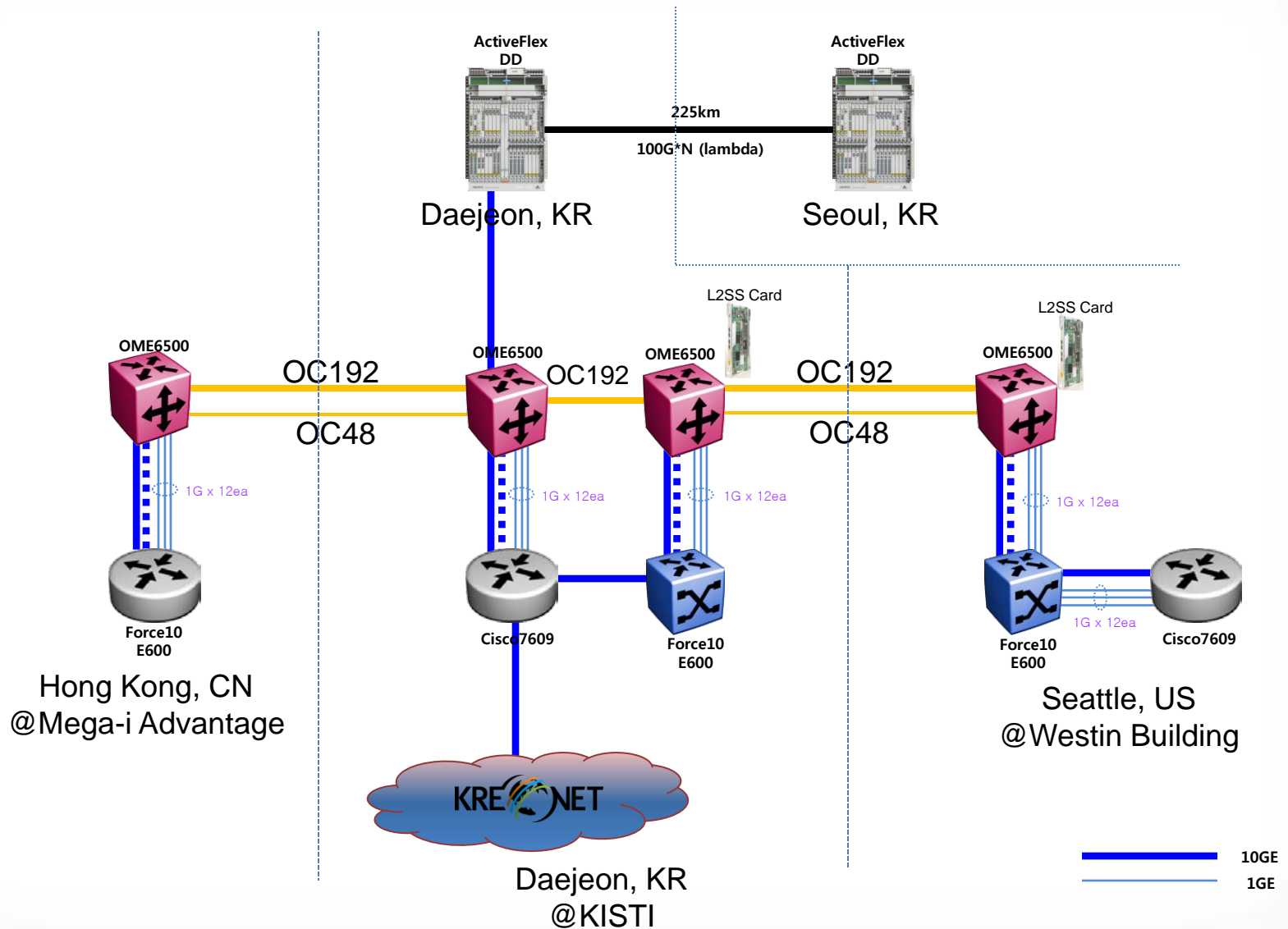


Partners: SURFnet, NORDUnet, CSTNet (China), e-ARENA (Russia), KISTI (Korea), CANARIE (Canada), SingaREN, ENSTInet (Egypt), National Knowledge Network (NKN), NLR/Internet2/NLR/NASA/FedNets

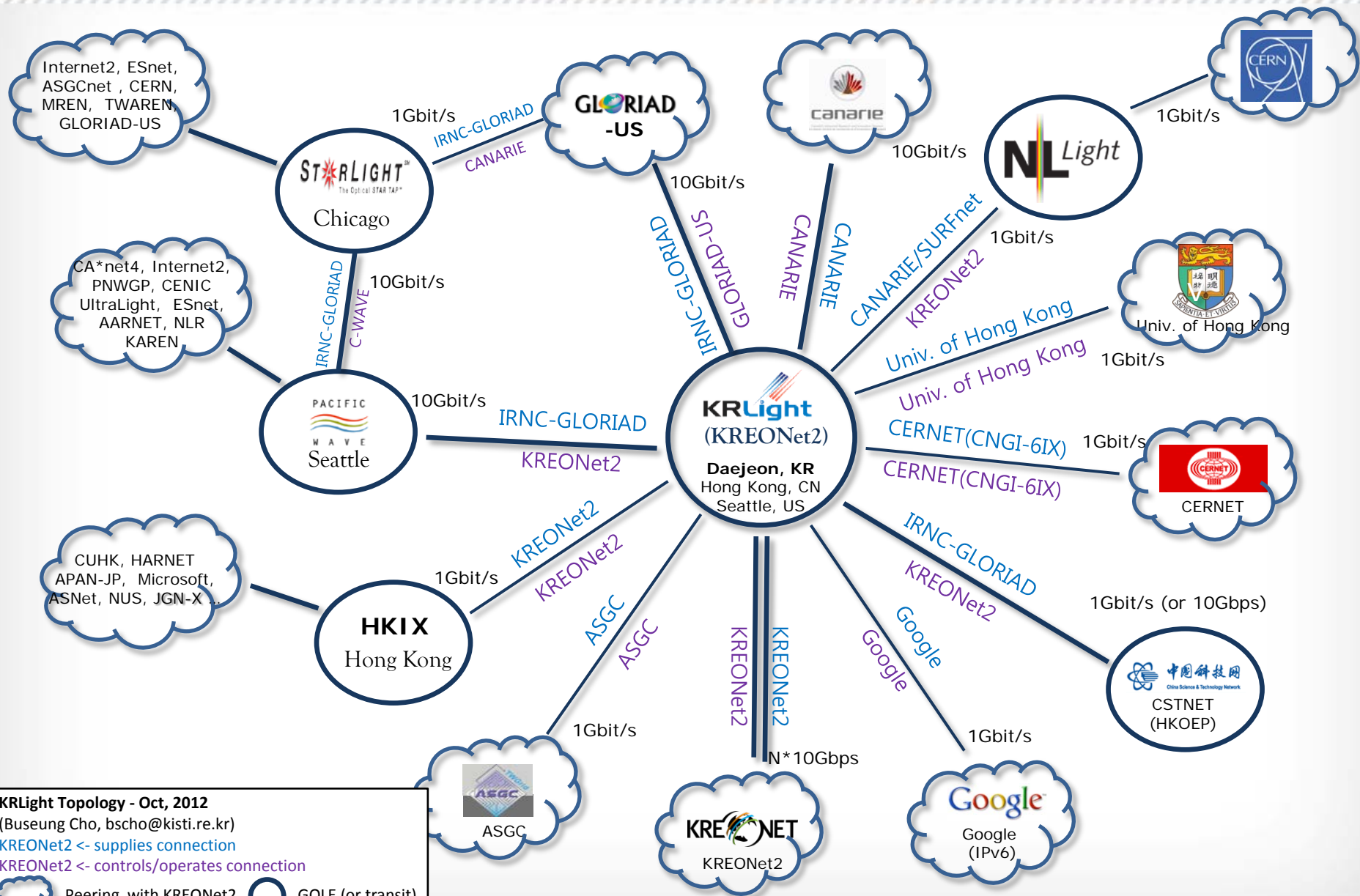
# GLORIAD-KR Connectivity (AS-IS)



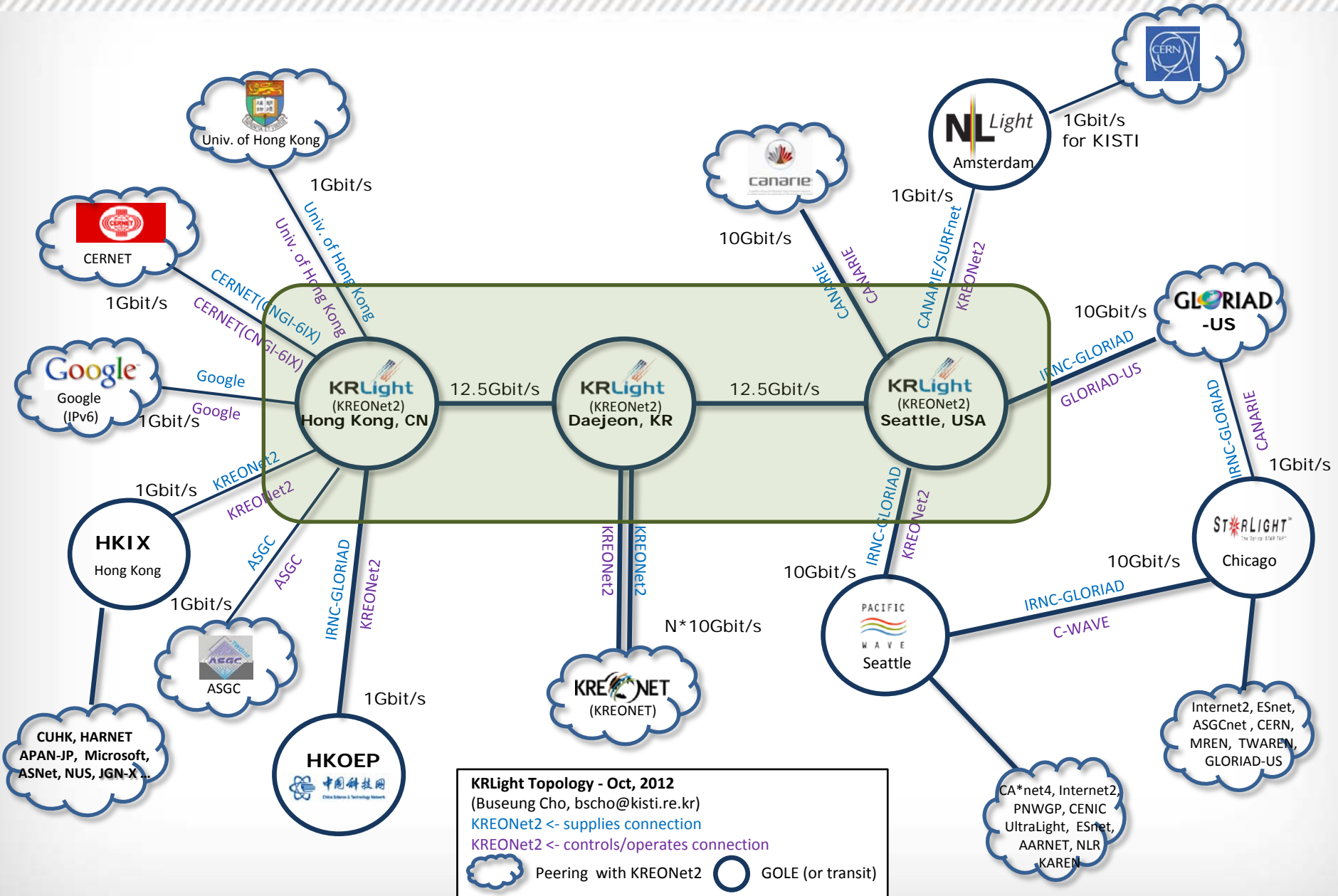
# GLORIAD-KR Facilities



# KRLight Topology (AS-IS)

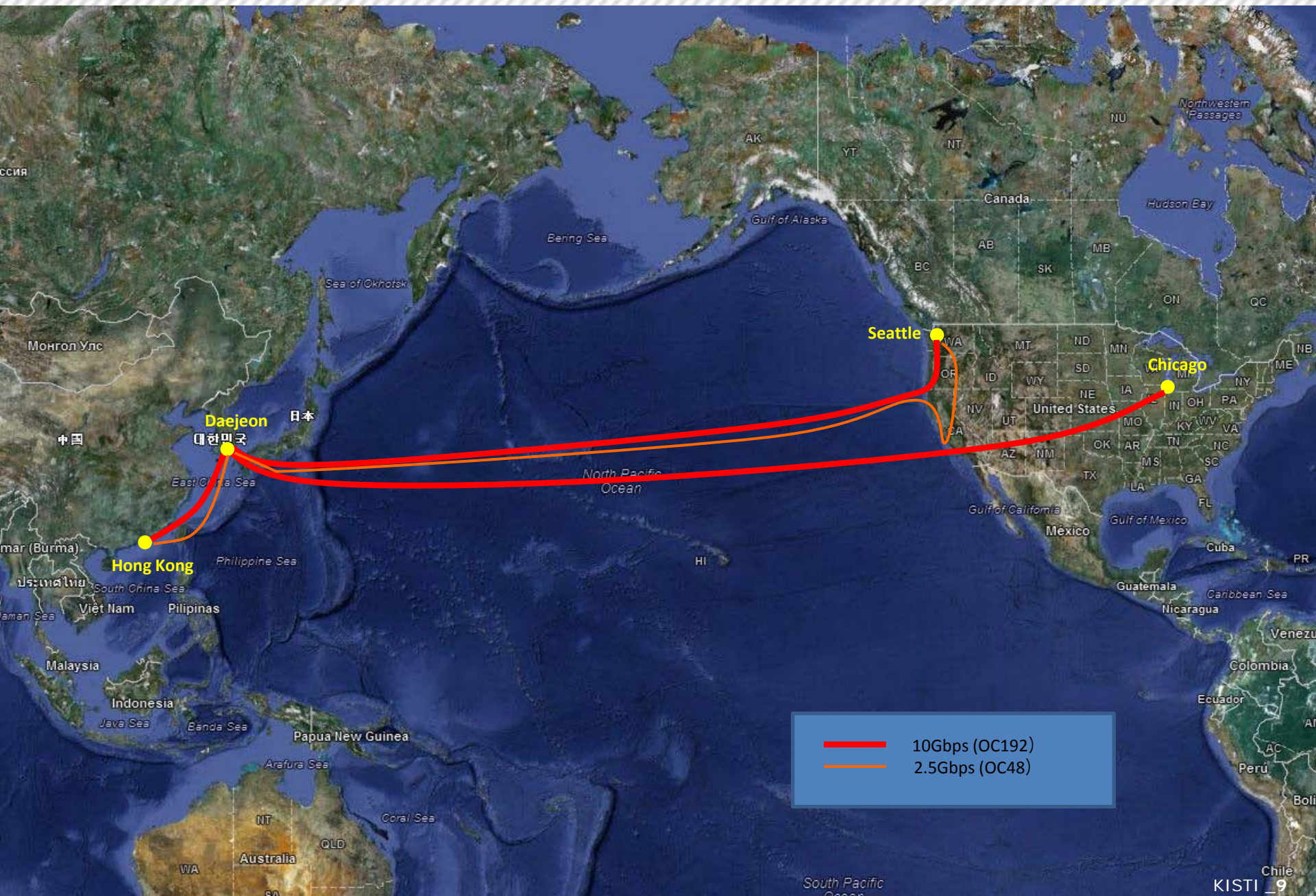


# KRLight Topology (AS-IS)

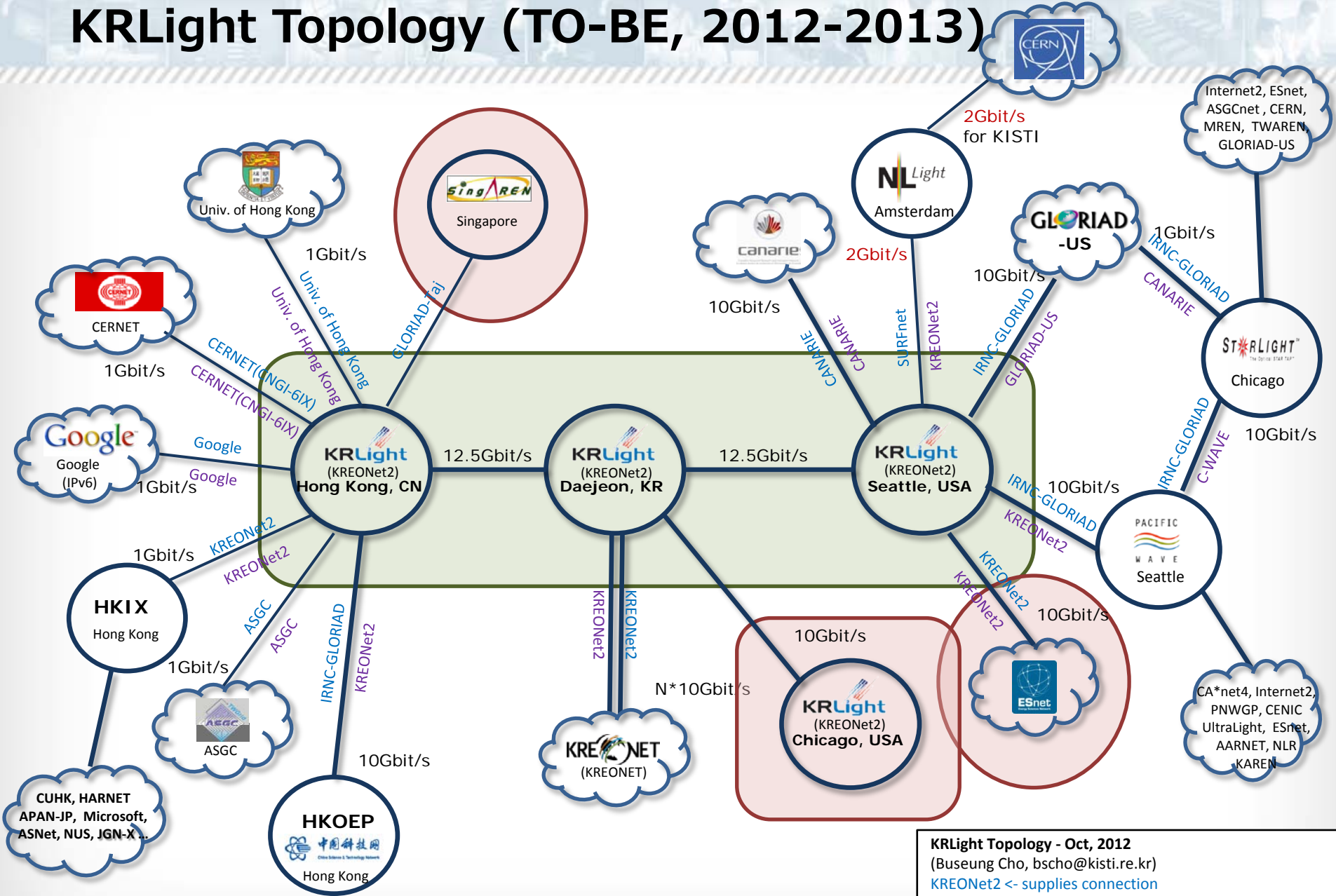




# GLORIAD-KR Connectivity (TO-BE)



# KRLight Topology (TO-BE, 2012-2013)



**KRLight Topology - Oct, 2012**  
 (Buseung Cho, bscho@kisti.re.kr)  
 KREONet2 <- supplies connection  
 KREONet2 <- controls/operates connection

☁ Peering with KREONet2    ○ GOLE (or transit)

# KREONET

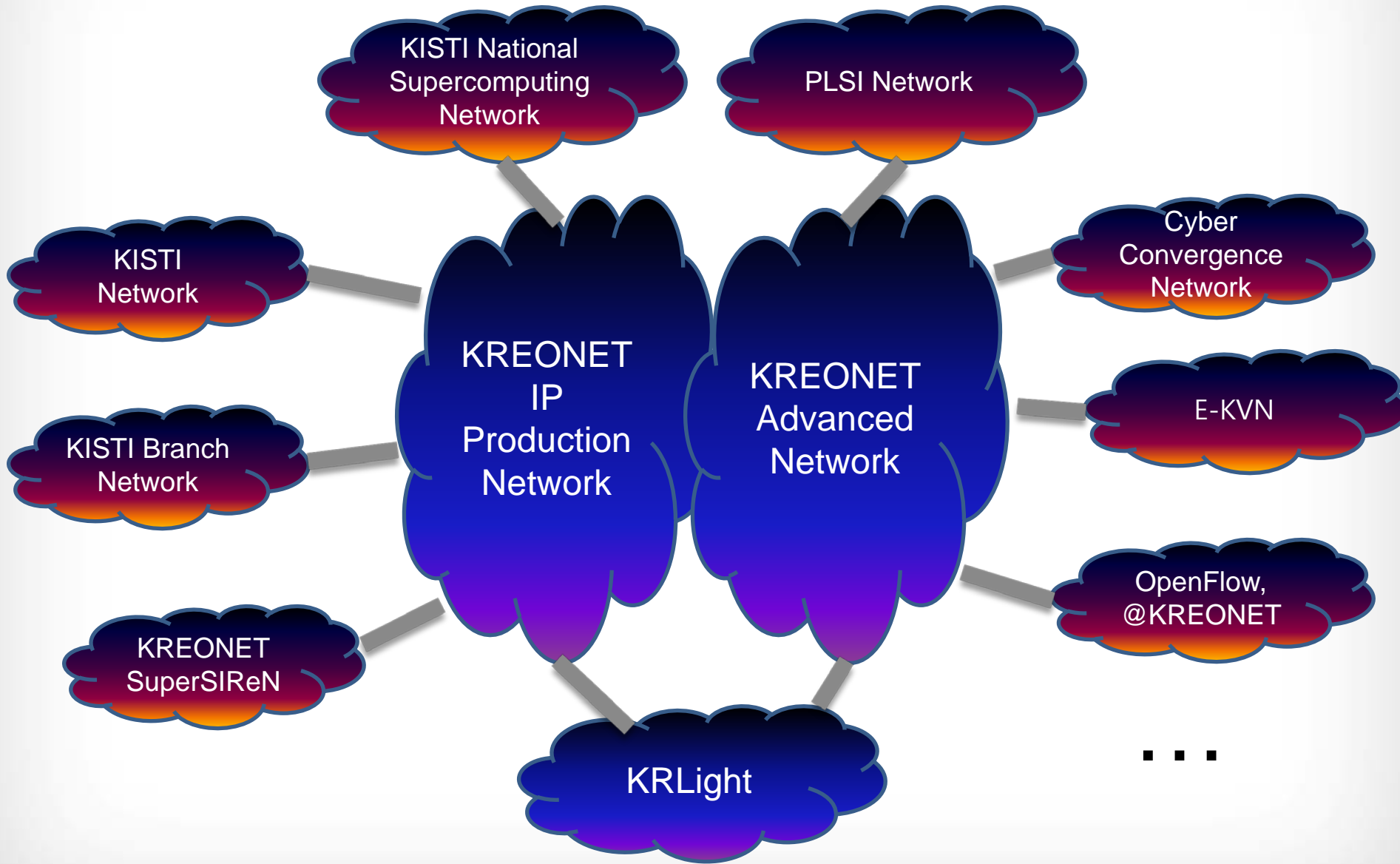


12.5G/GLORIAD-KOREA

12.5G/GLORIAD-KOREA

- KT 인터넷 교환노드 (1Gx3)
- DACOM 인터넷 교환노드 (1G)
- SejongNet 인터넷 교환노드 (1G)
- SK broadband 인터넷 교환노드 (1Gx3)

# KREONET and KRLight

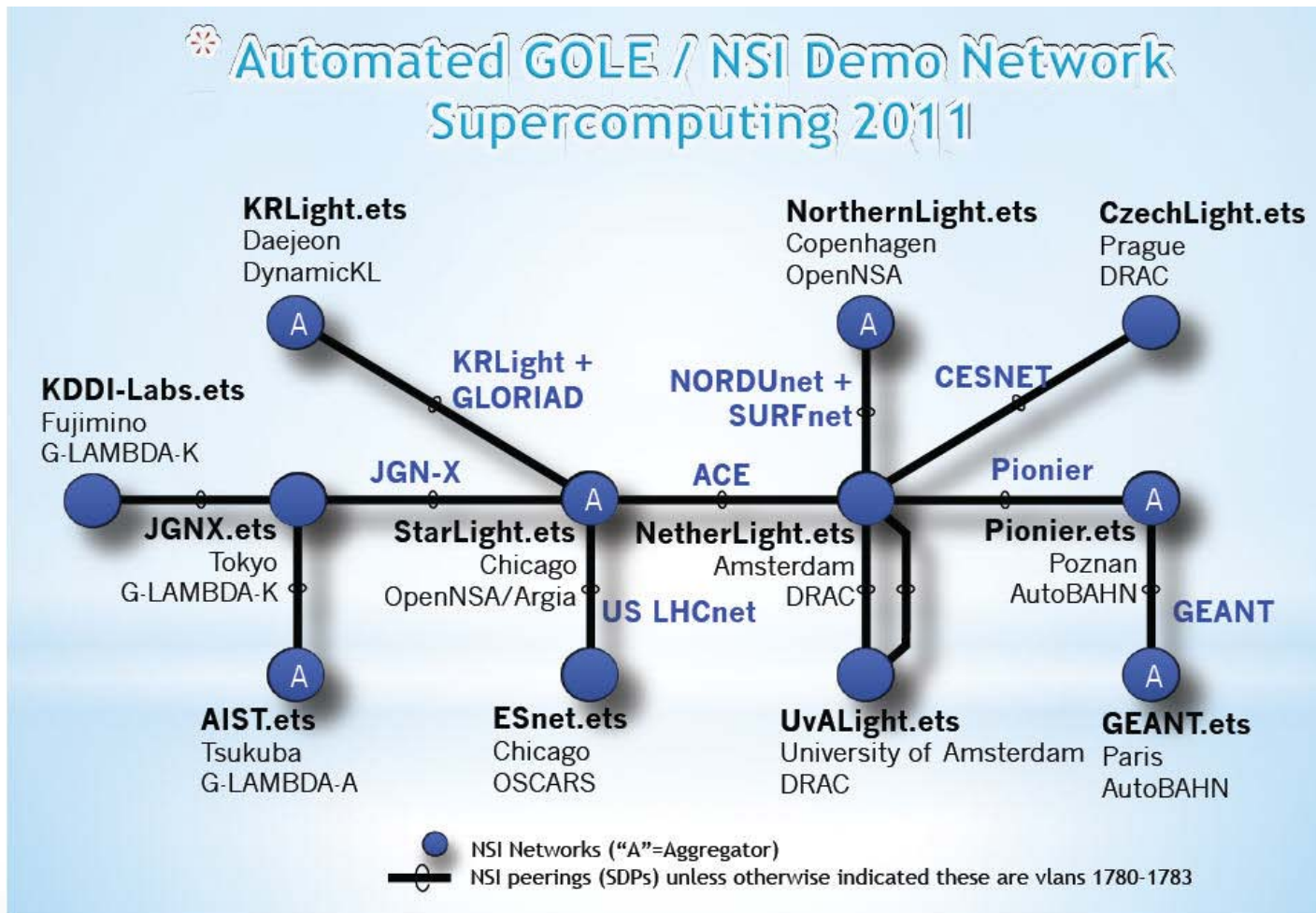


# Dynamic Lightpath Provisioning System

- **Multiple Dynamic Lightpath Provision Systems have been deployed**
- **DynamicKL**
  - Developed by KISTI
  - Participated GLIF Automated GOLE Pilot Project with NSI Implementation
  - Prototype has been tested until this year
- **OSCARS (On-Demand Secure Circuits and Advance Reservation System)**
  - Developed by ESnet
  - Deployed in Seattle and Daejeon node of KRLight and also Seoul, Daejeon, Gwangu and Busan node of KREONET
  - Juniper MX80, MX240
  - Service federation with ESnet
- **OpenDRAC**

# GLIF Automated GOLE Pilot Project

Demonstration the OGF **Network Services Interface (NSI)** architecture for standardized global inter-domain provisioning of high performance network connections



# Applications and Demonstrations

- 10 Strategic R&D Support Programs
- **KISTI's CERN Tier1 candidate activities**
- E-KVN (Korean e-VLBI Network)
- Korean Data Center for SDO
- OpenFlow@KREONET
- Sharing National Large-scale Experiment Facility
- PLSI (Partnership and Leadership for the nationwide Supercomputing Infrastructure)
- Cyber LAB Project
- **Cyber Performance, three continent networked music and dance performance**
  - APAN 33<sup>th</sup> in Chiang Mai, 2012
  - APAN 34<sup>th</sup> in Colombo, 2012
  - APAN 35<sup>th</sup> in Hawaii, 2013 (To-Be)

# 10 Strategic R&D Support Programs

Supporting High-performance Private Networks  
to Scientific and Educational R&D Applications as  
Service-enabled e-Science Infrastructure



High Energy Physics



Weather&climate



Education & Collaboration



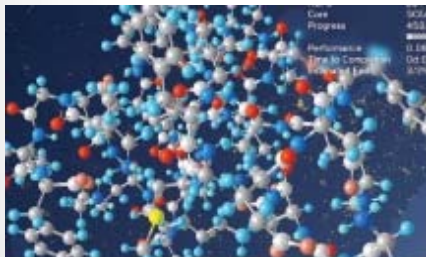
Medical Science



Future Internet



astronomy



New Medicine/Bio



Culture & Art



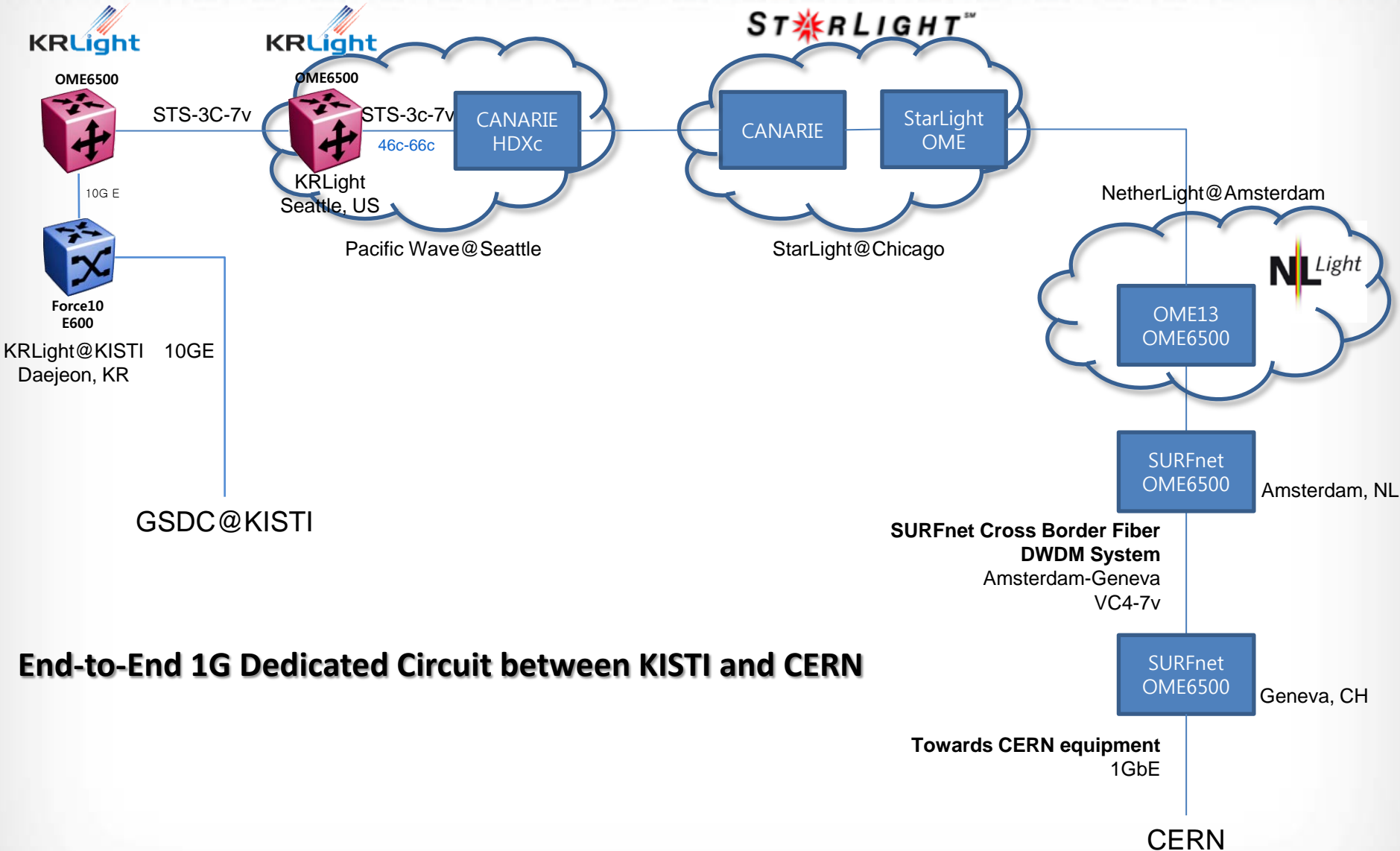
Constructions



Supercomputer



# Candidate Alice Tier1 Center, GSDC in KISTI



**End-to-End 1G Dedicated Circuit between KISTI and CERN**

# e-KVN over KREONET and KRLight

- e-KVN: Korean e-VLBI (electronic Very Long Baseline Interferometry) Network
- Participants: Korea Astronomy & Space Science Institute (KASI), KISTI

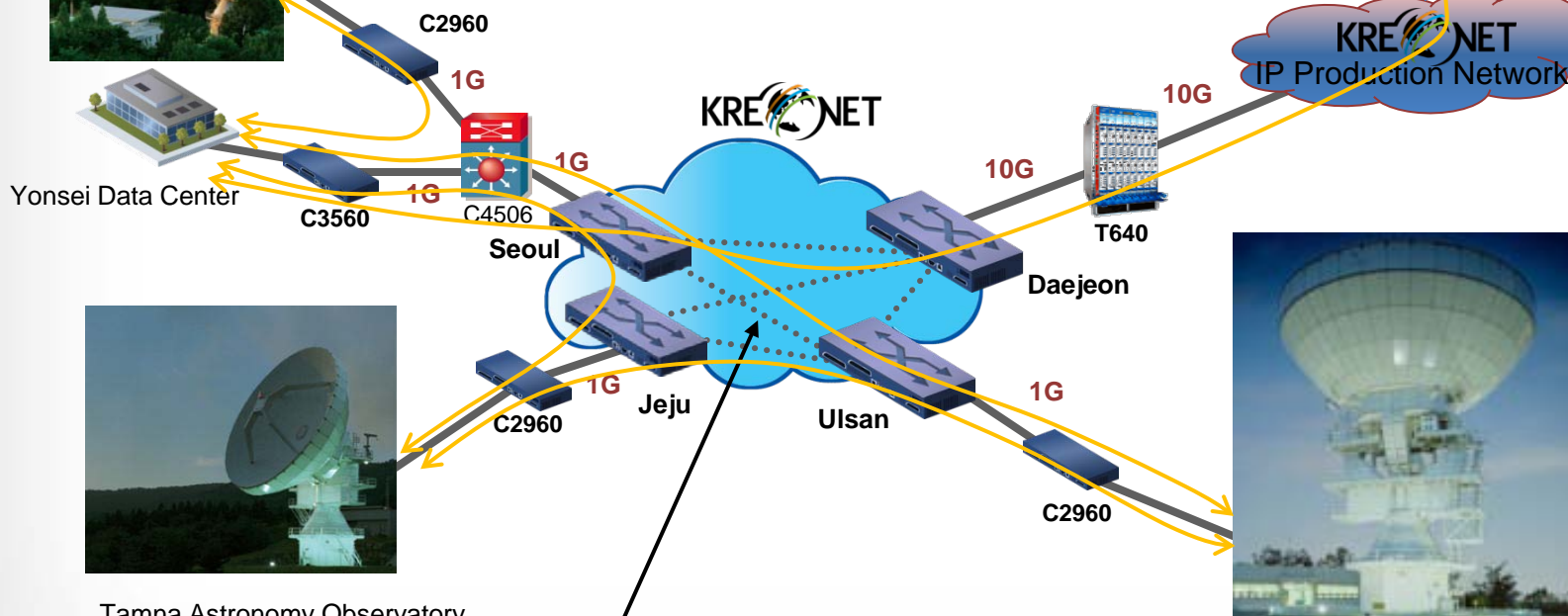
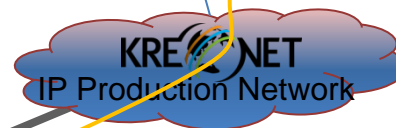
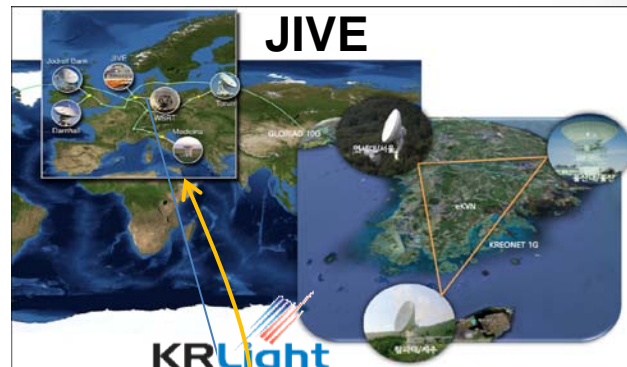
Yonsei Astronomy Observatory



Yonsei Data Center



Tamna Astronomy Observatory



**E-LAN Service type**  
(Multipoint-to-Multipoint EVC)

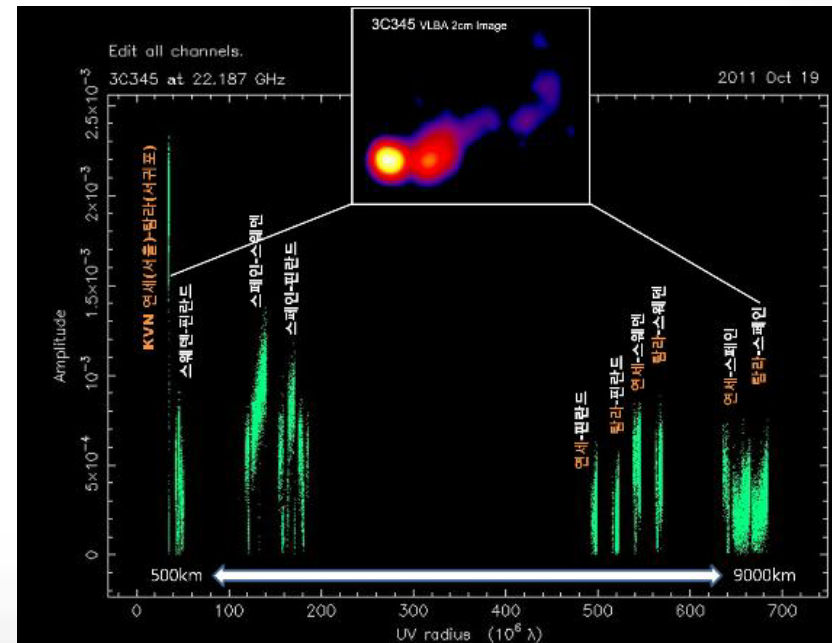


Ulsan Astronomy Observatory

# Real-time Observations on e-KVN

- First real-time observation (Oct. 2011)
  - ✓ International Participant: JIVE (in Netherland)
  - ✓ Observatories: Yonsei & Tamna Astronomy Observatory , Spain  
Yebees 40m Astronomy Observatory, Sweden Onsala and Finland  
Metahovi Astronomy Observatory
  - ✓ Distance between observatories : 9,245 Km
  - ✓ AGN(Active Galactic Nuclei) Observation
    - ❖ 3C345 and 1308+326

- Second real-time observation (2012)
  - ✓ International Participant: ATNF (Australia Telescope National Facility)



# Korean Data Center for SDO

(Cooperation between NASA and KASI via KRLight)



## ■ SDO (Solar Dynamics Observatory)

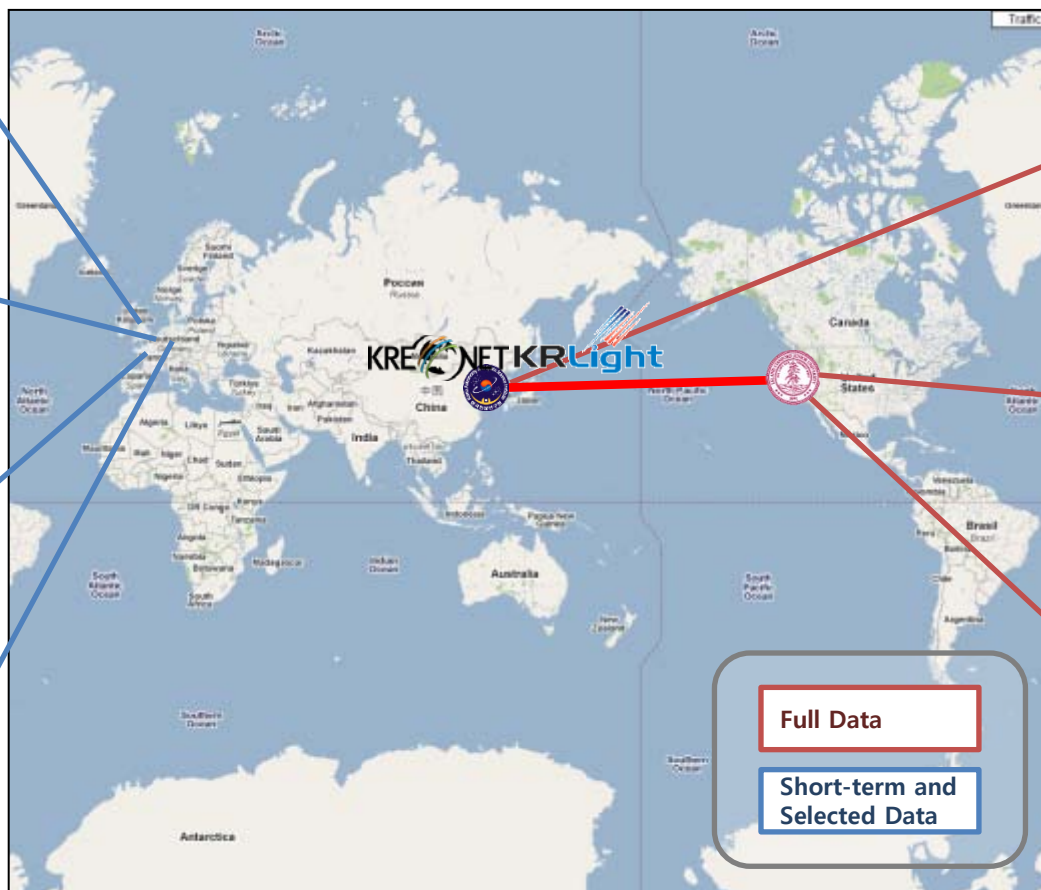
Launched on 11 February 2010

 UCLan,  
United Kingdom

 SDO at SIDC  
ROB, Belgium

 IAS,  
France

 GDC for SDO  
DLR, Germany



**KDC for SDO**  
KASI, Korea 

**JSOC (AIA and HMI)**  
Stanford Univ. and  
LMSAL, USA 

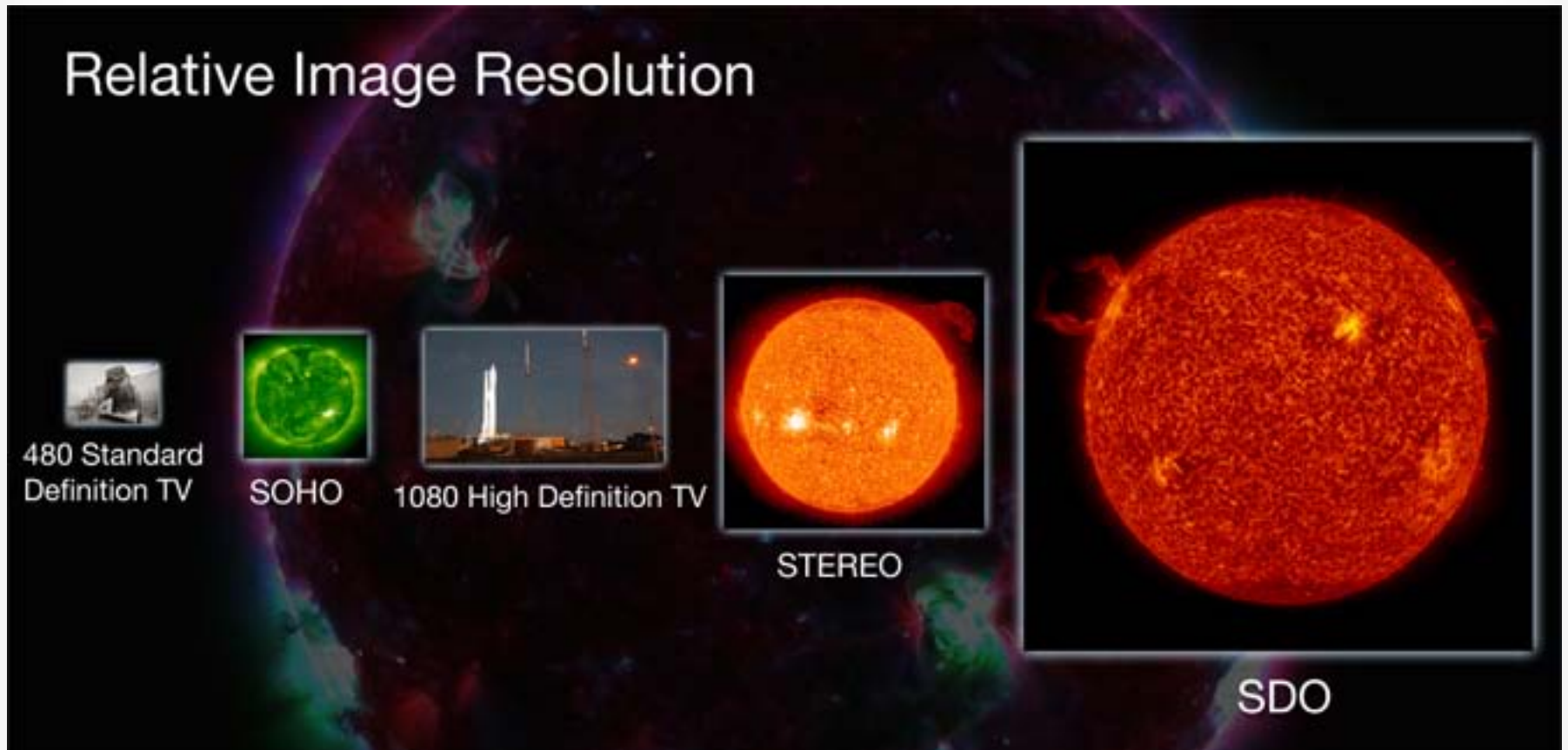
**EVE**  
Univ. of Colorado  
at Boulder, USA 

DLR, Deutsches Zentrum für Luft- und Raumfahrt  
(German Aerospace Center)  
GDC, German Data Center  
IAS, Institut d'Astrophysique Spatiale  
JSOC, Joint Science Operations Center

KDC, Korean Data Center  
LMSAL, Lockheed Martin Solar and Astrophysics Lab  
ROB, Royal Observatory of Belgium  
SIDC, Solar Influences Data Center  
UCLan, University of Central Lancashire

Refer to Seongwan Choi and Eunmi Hwang (KASI)

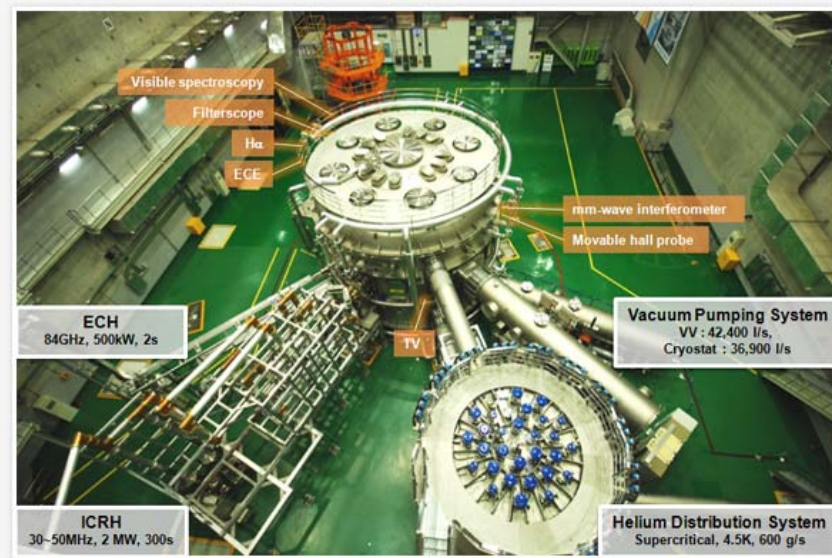
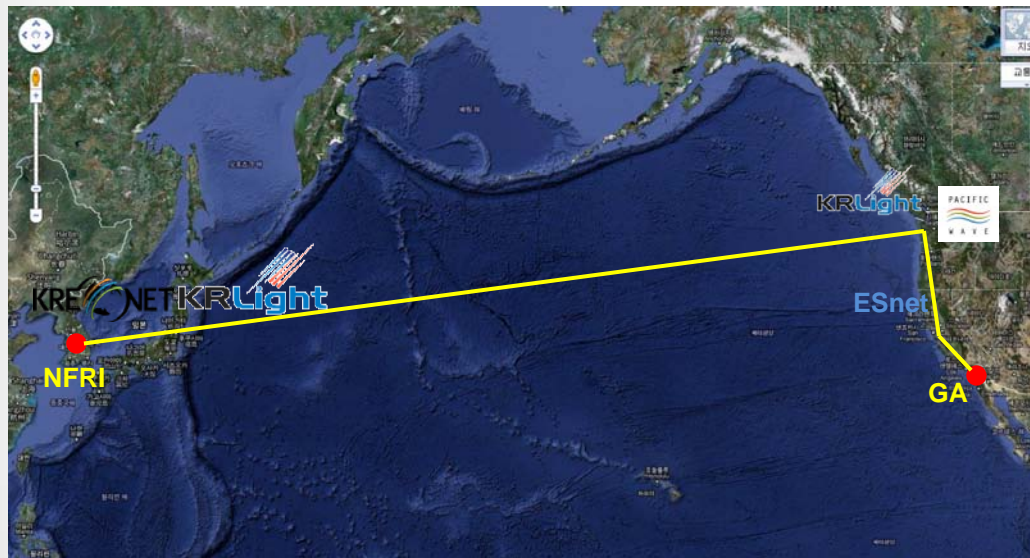
## Relative Image Resolution



SDO will send 1.5 terabytes of data back to Earth each day, which is equivalent to a daily download of half a million songs onto an MP3 player.

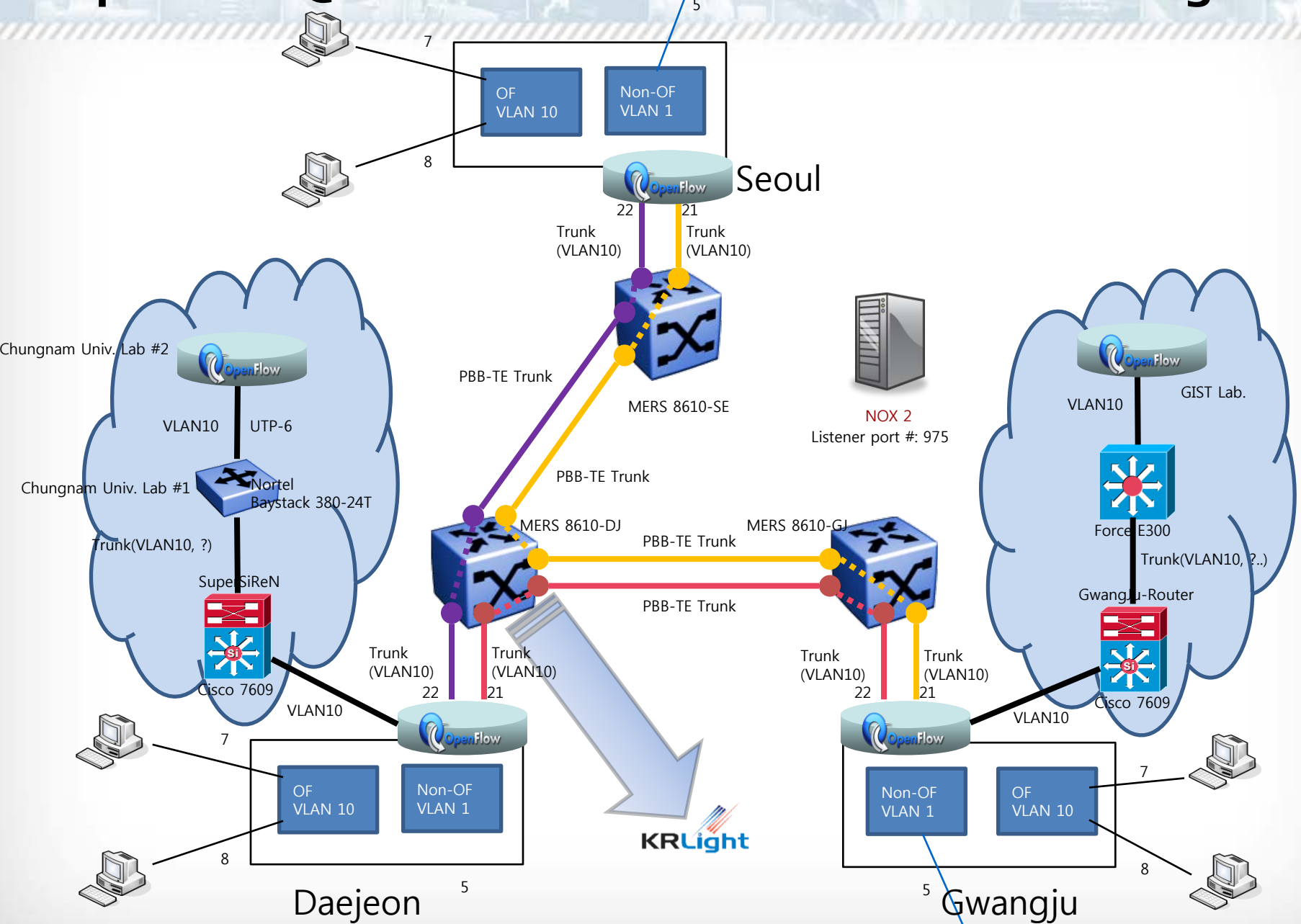
# KSTAR Project of NFRI

- KSTAR : Korea Superconducting Tokamak Advanced Research
- KSTAR first plasma occurred, in 2009
- World-wide fusion research center as an ITER pilot device
- Sharing the experimental data and remote-controlling the experiment
  - ✓ International Partners: NFRI (National Fusion Research Institute), GA (General Atomics)



# OpenFlow@KREONET over KROENET and KRLight

OF Seoul (~ A540)  
5



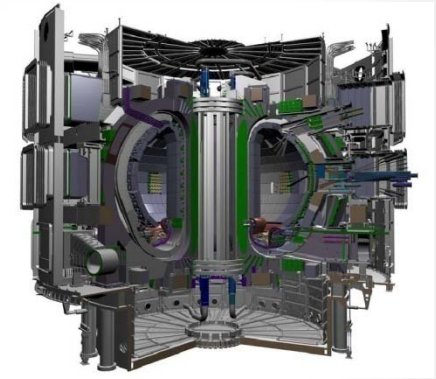
# Sharing National Large-scale Experiment Facility



**HF-NMR (High Field-Nuclear Magnetic Resonance)@Korea Basic Science Institute**



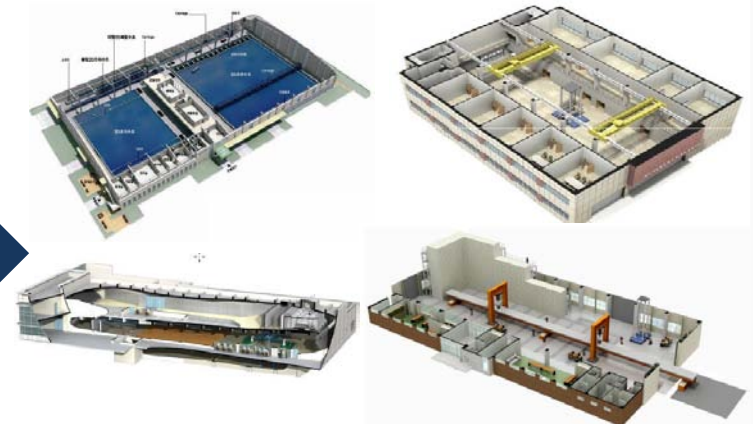
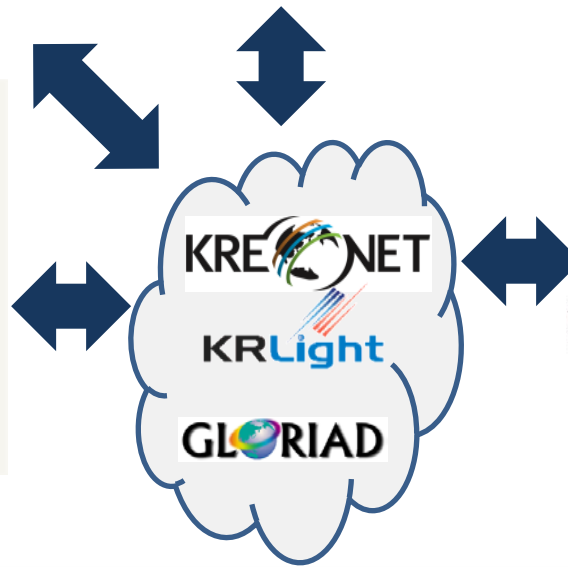
**KSTAR (Korea Superconducting Tokamak Advanced Research)@National Fusion Research Institute**



**ITER, World's largest Tokamak**



**HVEM (High Voltage Electron Microscope) @Korea Basic Science Institute**

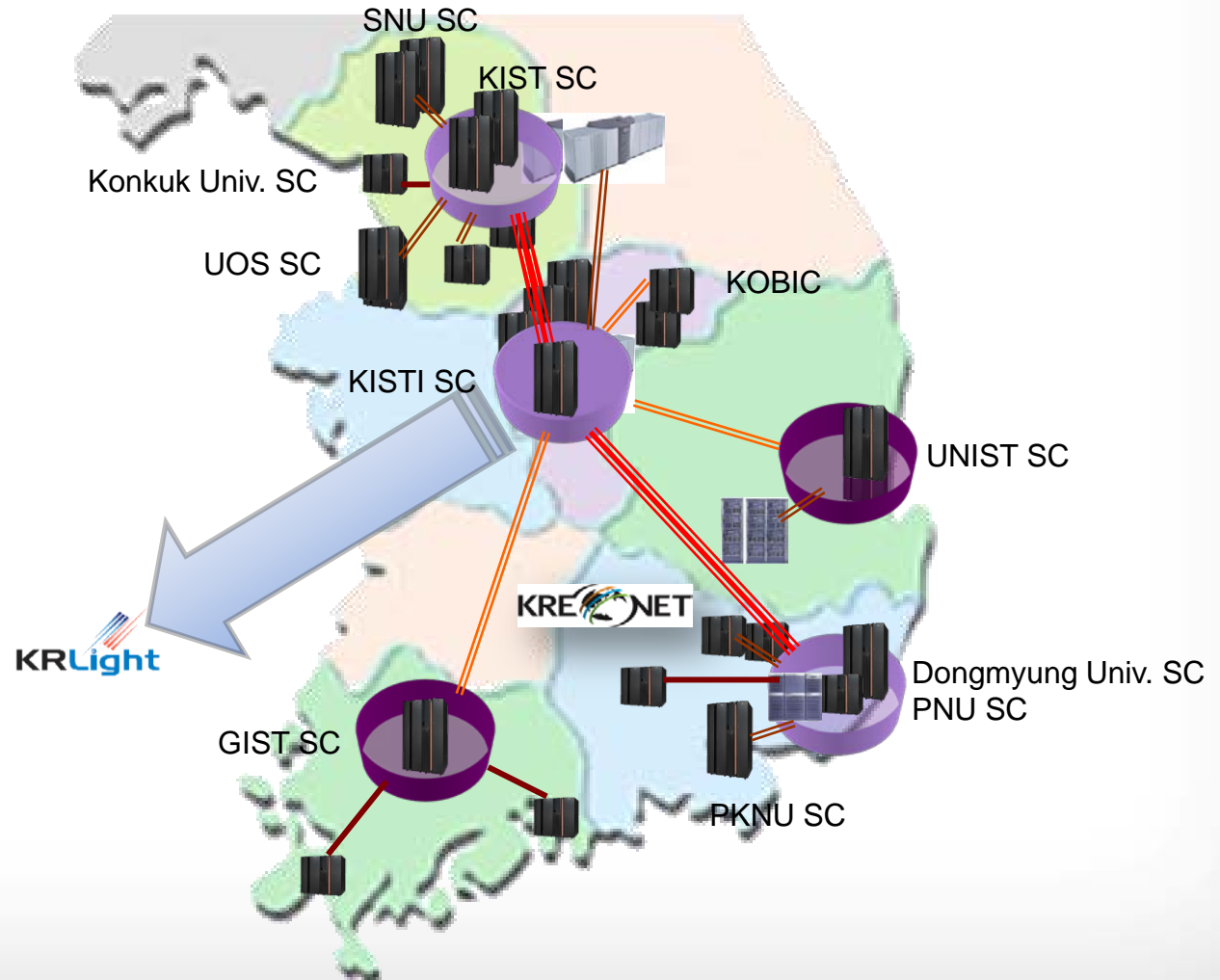


**Hybrid Structural Testing Center  
Wind Tunnel Center  
Wave Simulation & Research Center  
Geotechnical Centrifuge Testing Center  
Advanced Construction Materials Testing Facility  
Multi-platform Seismic Simulation Center  
@KOCED**



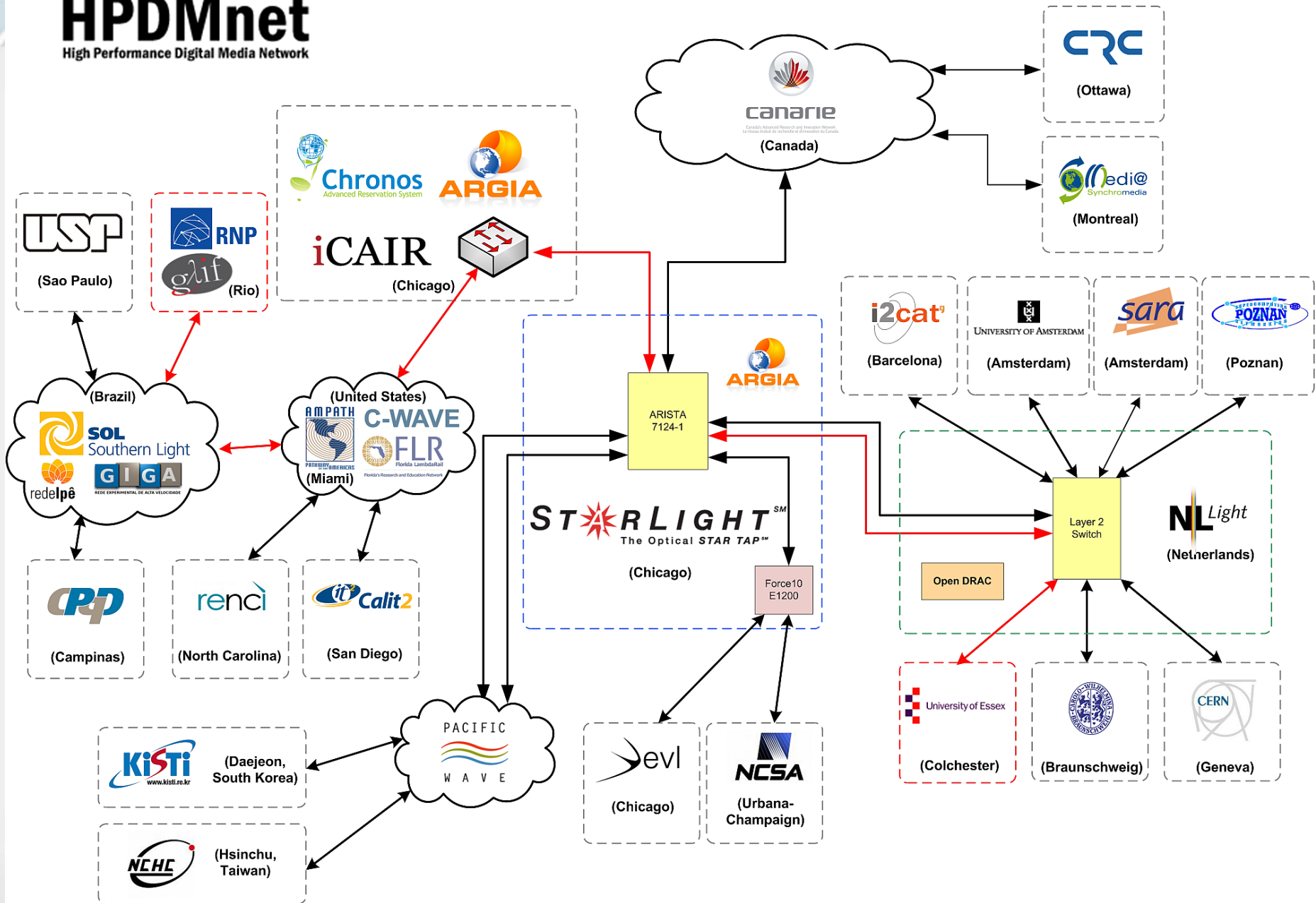
# PLSI (Partnership and Leadership for the nationwide Supercomputing Infrastructure)

- Collecting distributed Supercomputing resource and sharing as nationwide Supercomputing Infrastructure over KREONET
- 5 Base (Regional) Centers, 10 SC Partners (Organizations)
- 380.676 TFlops



# HPDMnet

High Performance Digital Media Network





## DQ 12-I

**Three continent networked music and dance performance  
Barcelona(ES)-Salvador(BR)-ChiangMai(TH)-Daejeon(KR)**

Draft Ver. 0.9

Feb 13<sup>th</sup>, 2012

**APAN e-Culture WG**

# Summary of DQ12-I

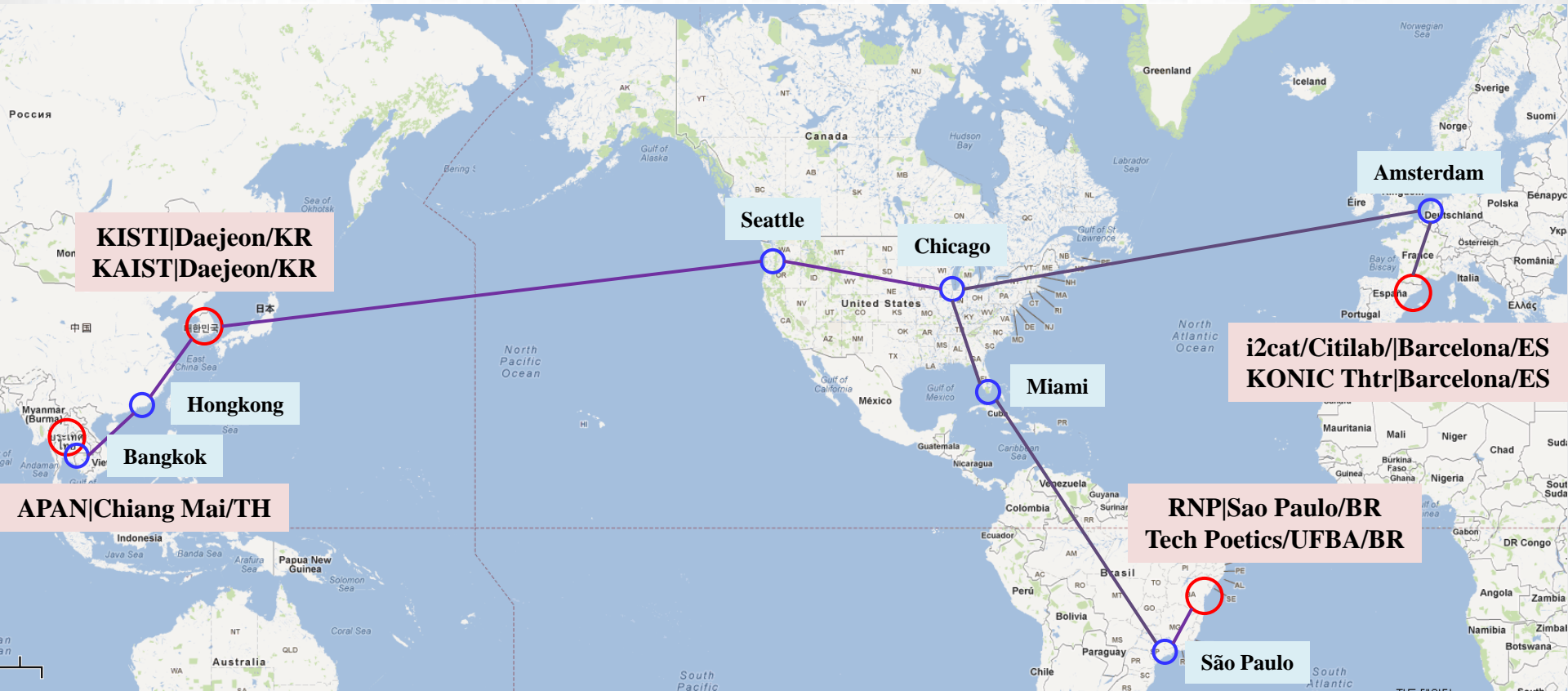
## ■ Introduction

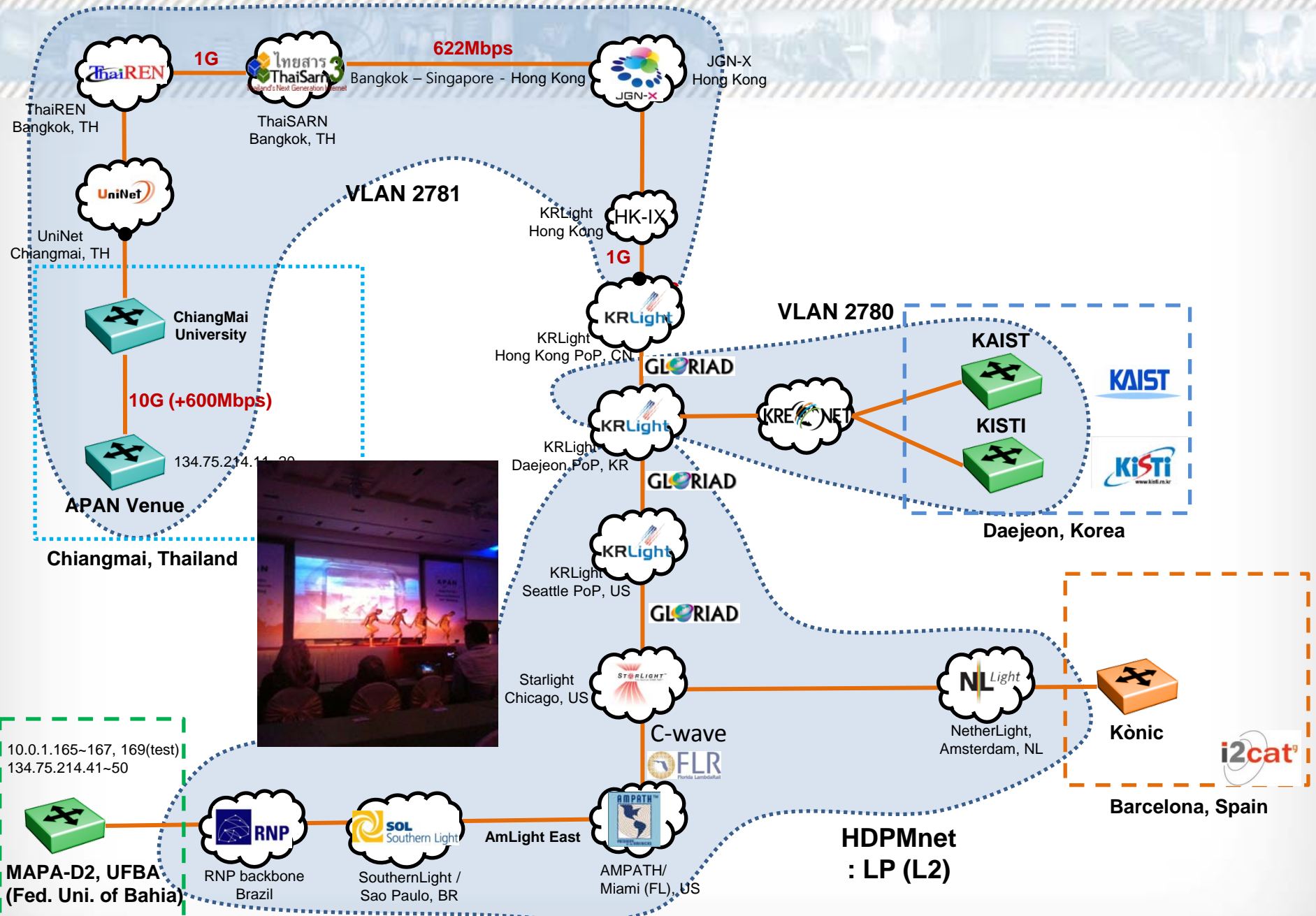
- During the APAN 2012 congress, there was a Live Music and Dance performance with interactive participation of people and organizations in three different continents / four sites: Chiang Mai/Thailand, Barcelona/Spain, Salvador/Brazil and Daejeon/Korea. The full shot of the main stage at Chiang Mai was streamed to KISTI/Korea in real time.
- Date: Monday, 13-Feb-2012
- Venue: APAN 2012 Main auditorium (Same as the APAN 2012 Opening Plenary)

## ■ Sites

- Barcelona : Konic Thtr / i2cat
- Chiang Mai : APAN main auditorium
- Salvador : Technological Poetics/UFBA, LAViD/UFPB, RNP PoP-BA, RNP PoP-RJ
- Daejeon : KISTI

# Dedicated Path and Partners of DQ12-I





Designed by Buseung Cho  
 Modified at Feb 7<sup>th</sup> 2012

# DQ12- II



- Title : Good-bye Mr. Tom
- The performance tells the story of communications and interactions between ground control station (Sri Lanka) and a spaceship (Korea) set in a space exploration
- The BGM is re-arranged from David Bowie's original song "Space Oddity" (1969)
- Sites : Colombo/Sri Lanka, Daejeon/Korea



Daejeon

Self  
Monitoring

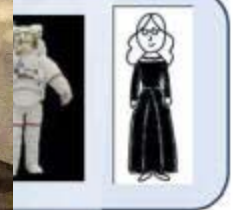
Video from  
Colombo

Colombo

ed  
(Colombo)



Actress



“An evolving cyber performance of e-Culture WG”, Boncheol Goo, APAN 34TH



# Thank You!

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