Asia Tier Center Forum

6th meeting @ Krabi, Thailand
21 - 24 November 2022

Sang-Un Ahn
On behalf of ATCF Organizers

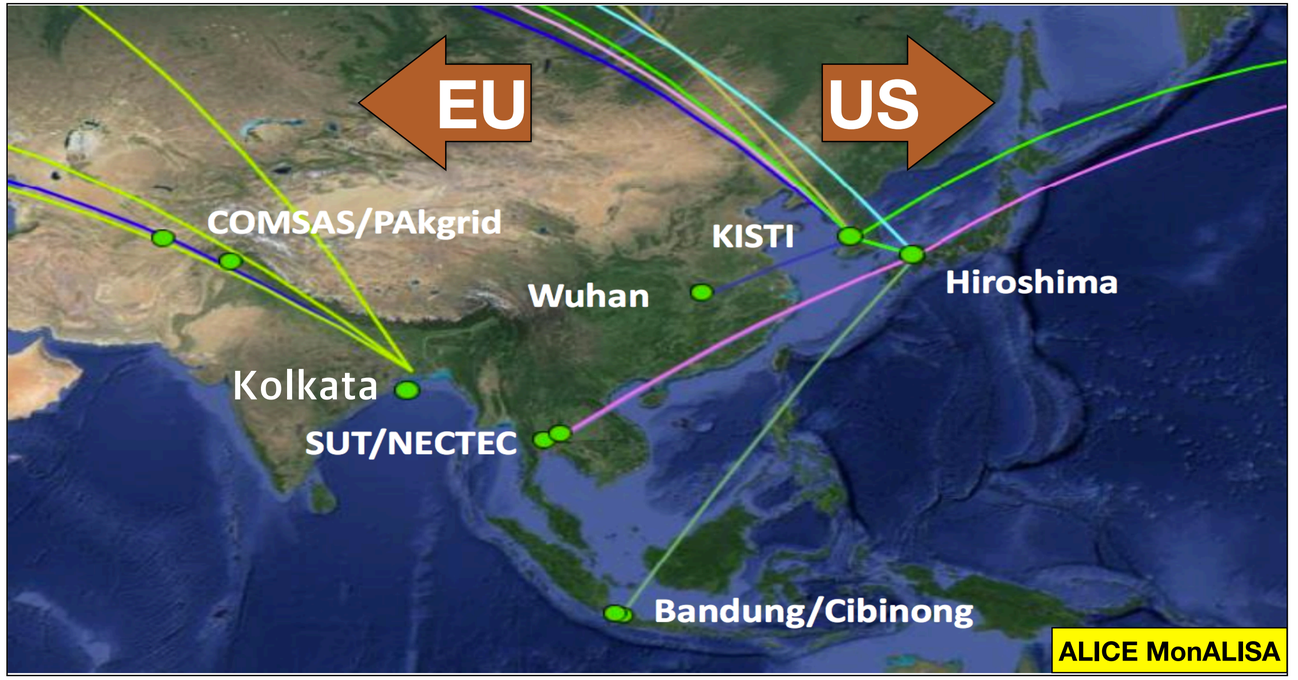
ATCF Goals

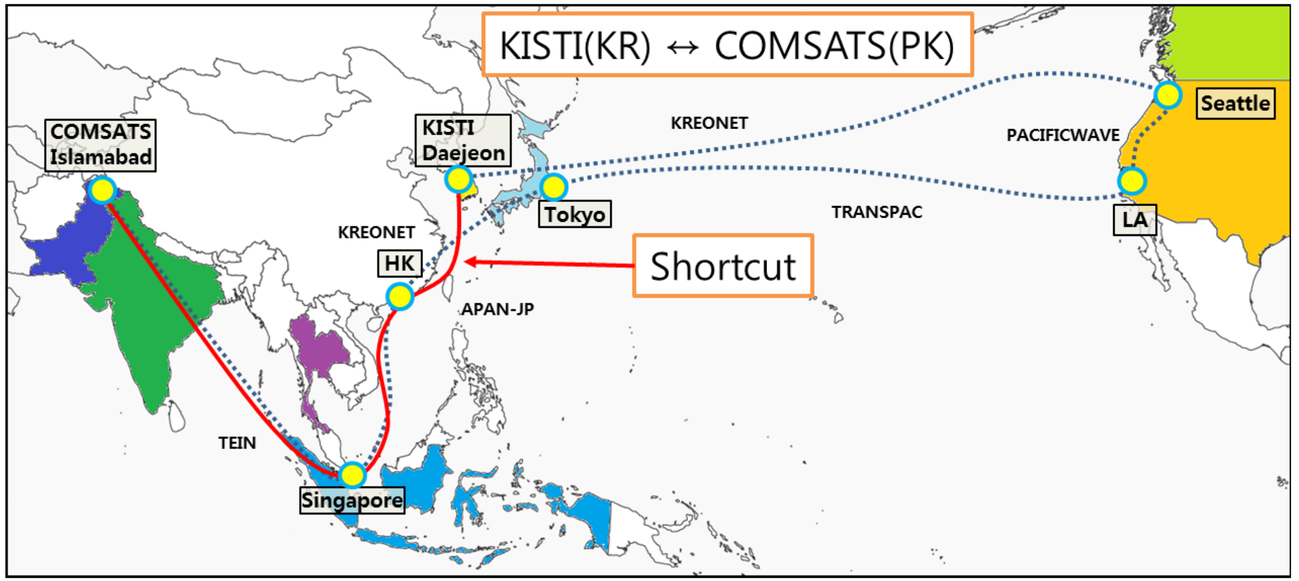
- *(Short-term)* To discuss on the possible solutions for the improvement of connectivity among Asian Tier sites and their domestic network environment, and to monitor periodically the status of the established network environment

  - The first principle is to keep the traffics among Asian sites within the region

Status in 2015

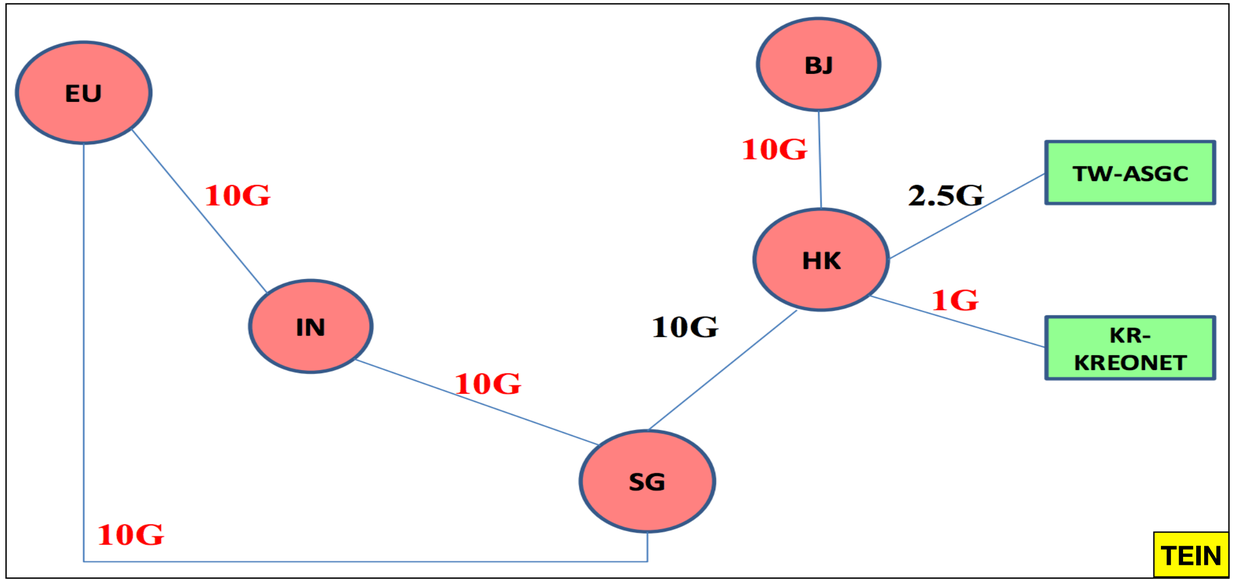
- Traffics to Asian sites for ALICE experiment was easily detoured through Europe or Unite States
  - High latency with over hundreds of milliseconds to Asian sites was observed, which is worse than that of EU or US
- Network connectivity in terms of LHCONE had to be improved to keep traffics within the region
  - Asian backbones -- TEIN (Southern Asian sites), ASGCNet, SINET (APAN-JP), KREONet, etc. -- were not peered or in transit mutually

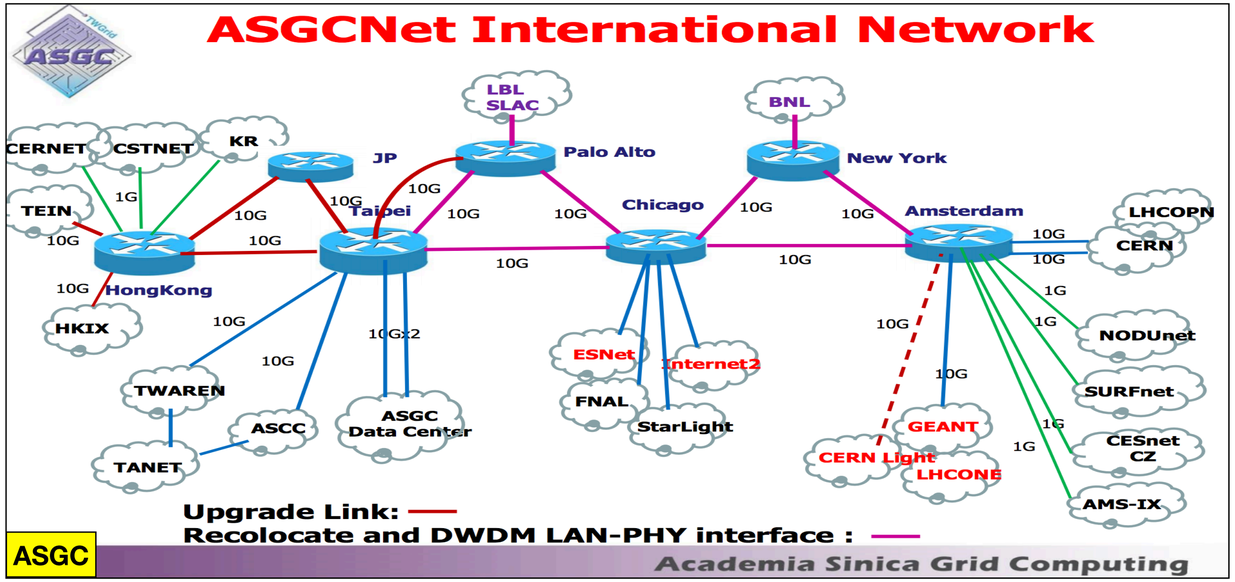


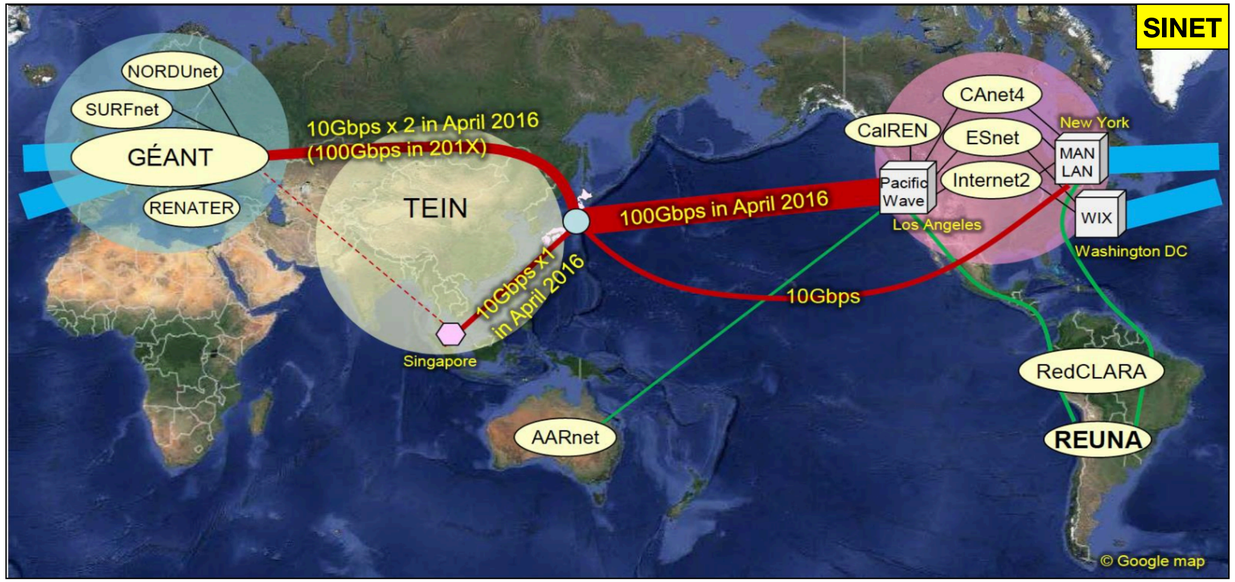


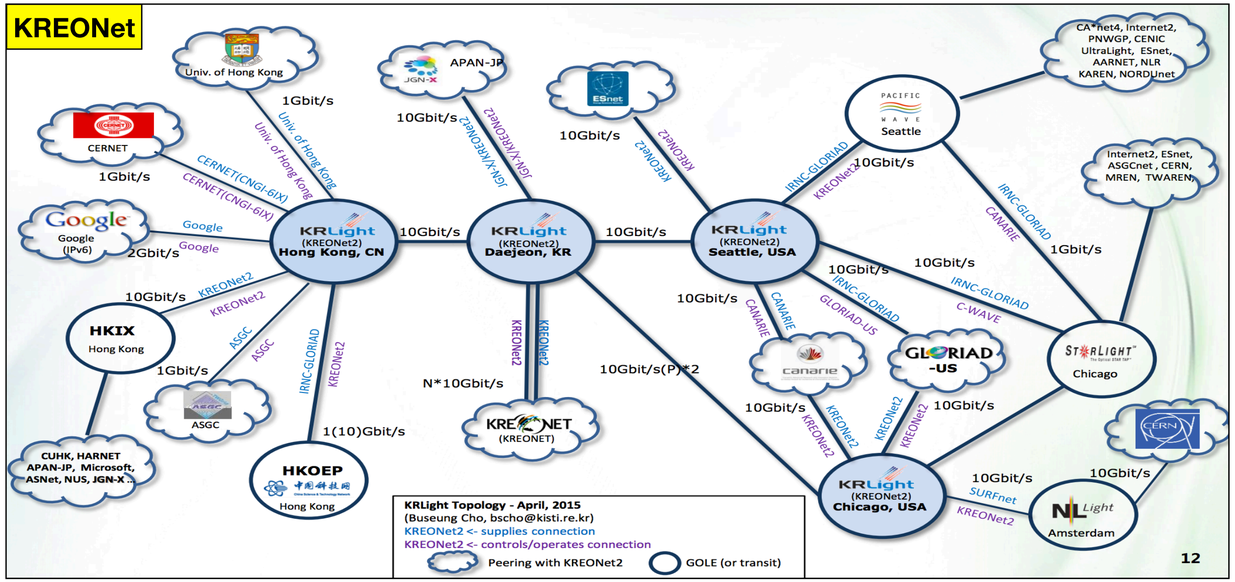
Asian Backbones in 2015

- Good Connectivity to either EU or US for Asian Backbones
- No connection from TEIN to US
- 10 T2 sites (ALICE, CMS) connected to TEIN



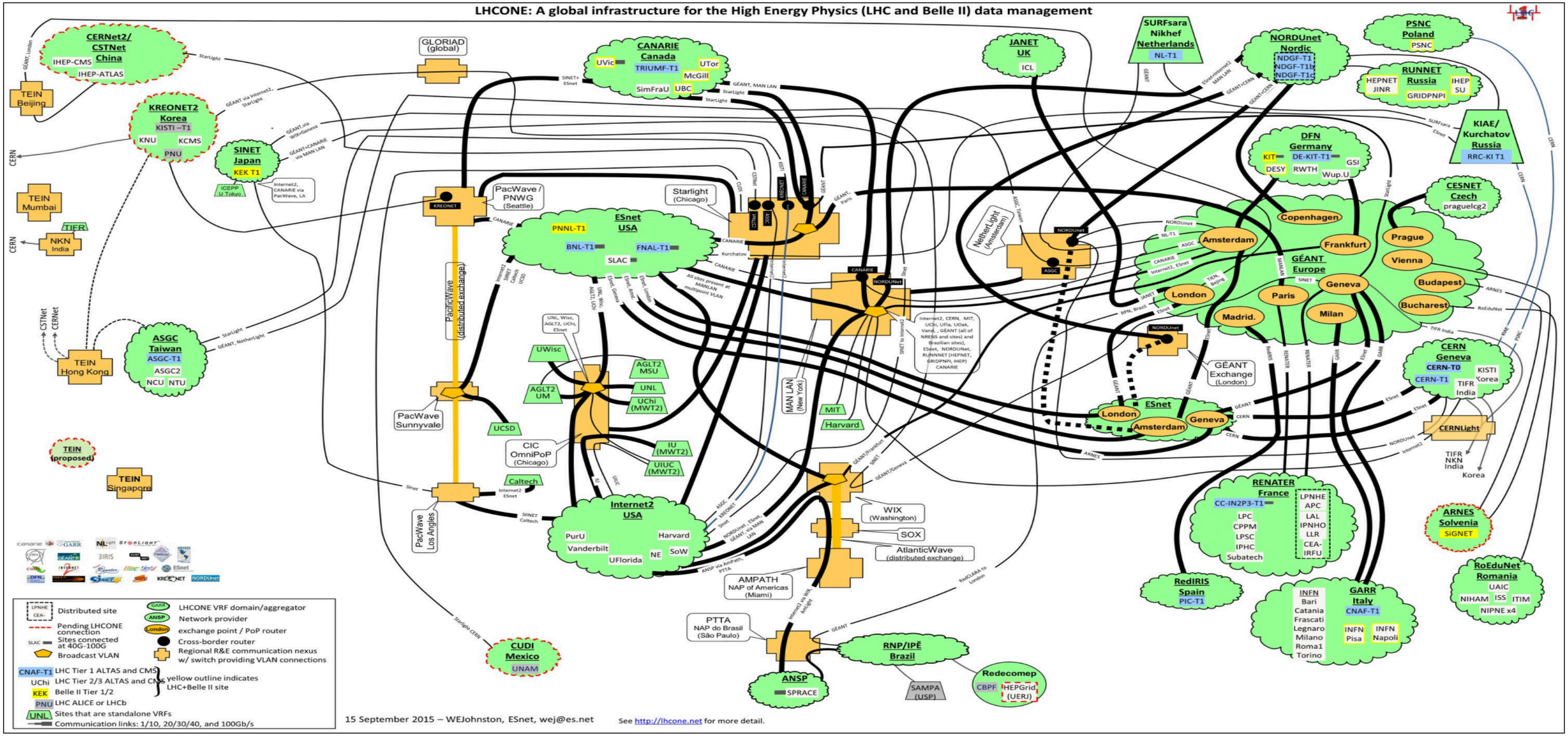






LHCONE Connectivity in 2015

As of 15 September 2015

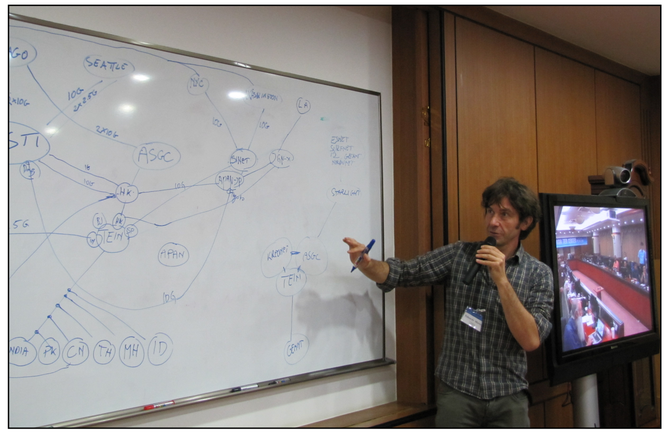


...@ ATCF1

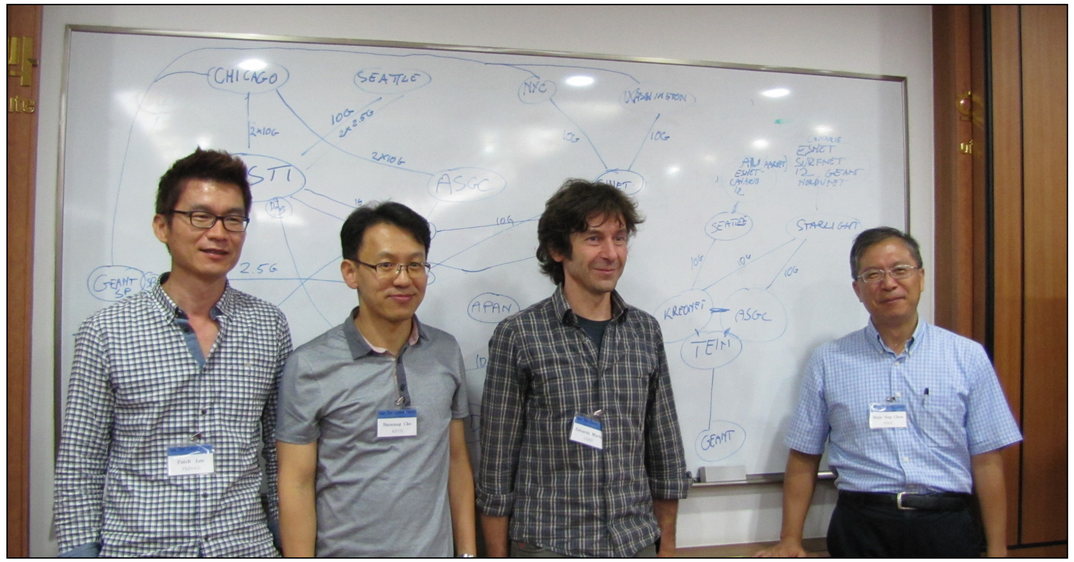
- **Intensive discussion focusing on how to improve the network connectivity in Asia with the given conditions:**
  - Local network environment as well as the connection to backbone for each site
  - Status of backbones for LHCONE
  - LHCONE implementation in US
  - Implementation model of LHCONE in Asia
  - LHCONE guidance for site configuration







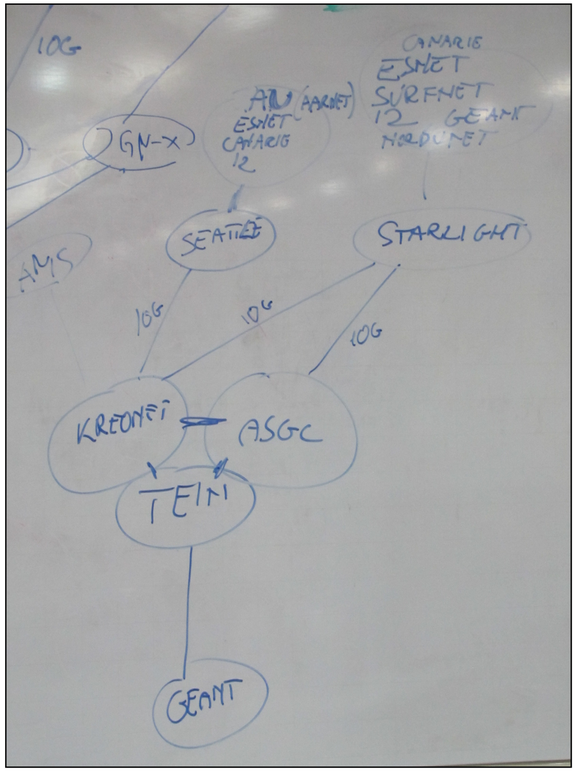
The Outcome @ ATCF1



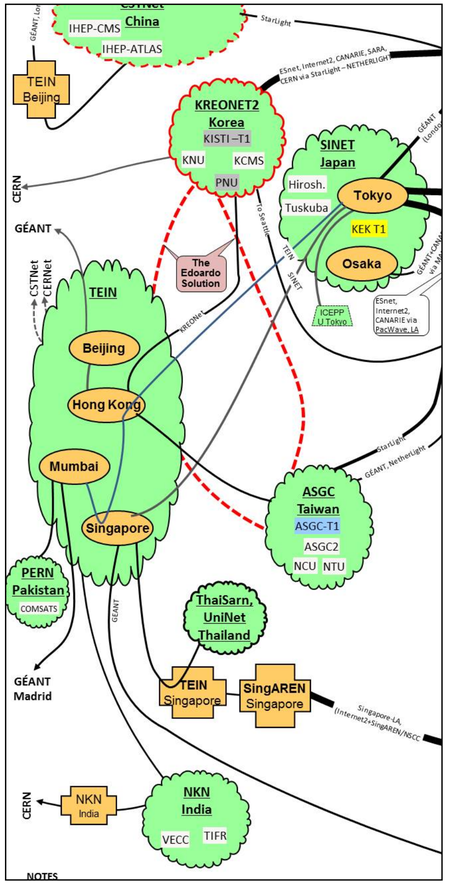
- Edoardo Martelli(CERN) brokered the following:
- TEIN, ASGC and KREONet have agreed to implement LHCONE VRFs in their networks, to interconnect the VRFs in HK, and to give each other transit over their peering links to GÉANT, Starlight and Seattle

From William Johnston's ATCF report at LHCONE/LHCOPN workshop in Oct 2015

The Edoardo Solution



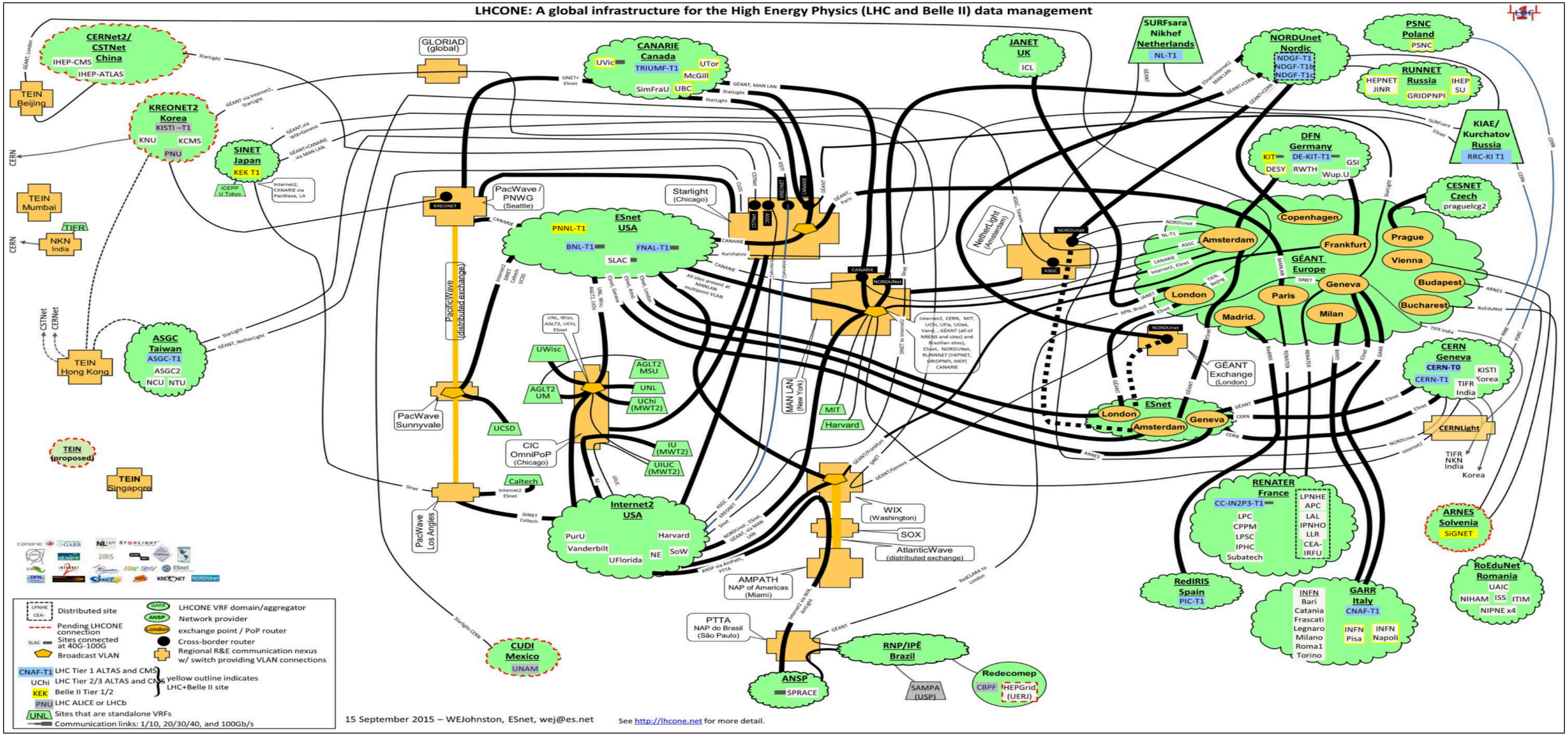
In the context of LHCONE VRF rules and inter-VRF connections



A part of LHCONE Map (v3.0)
William Johnston, ESNET

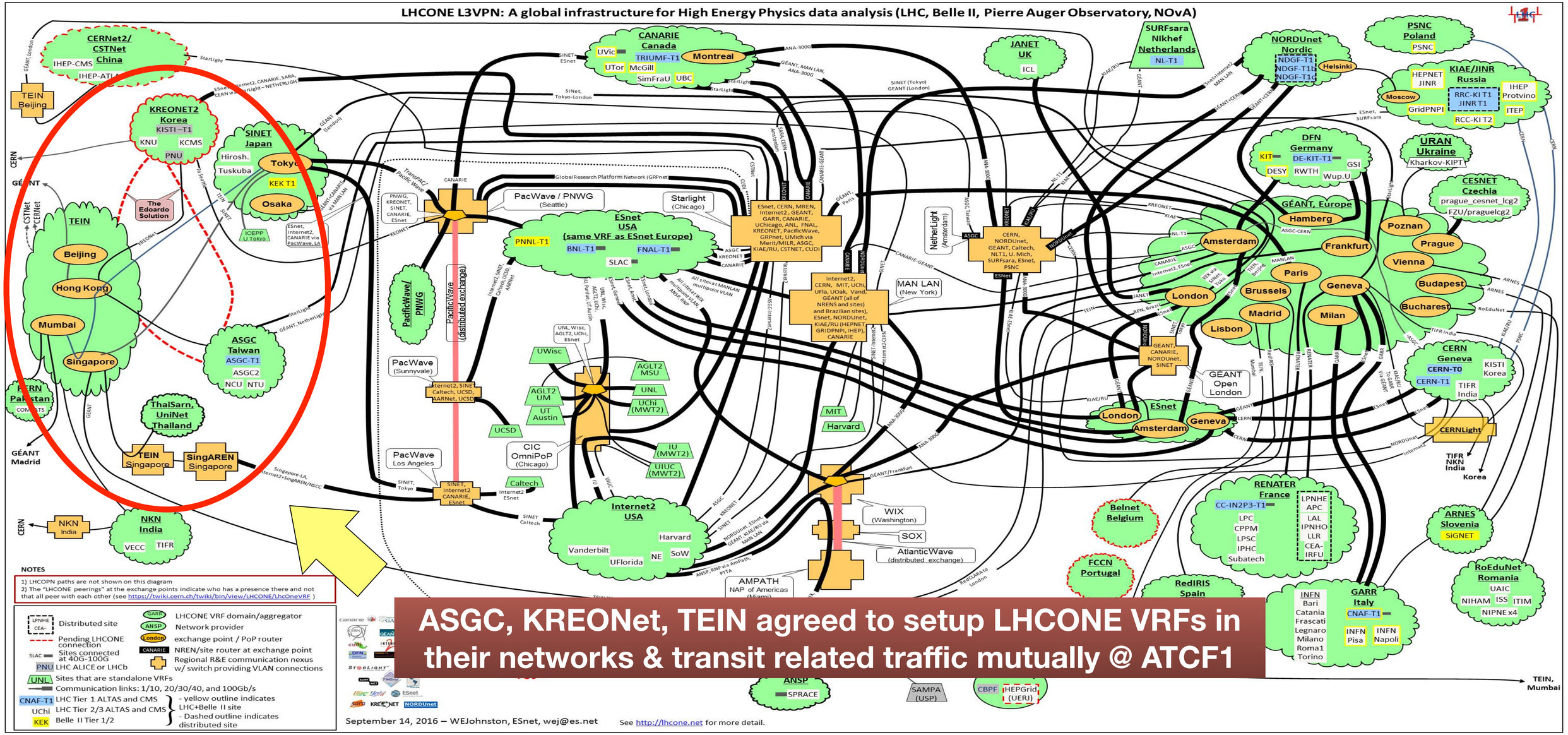
Before ATCF1

As of 15 September 2015



After ATCF1

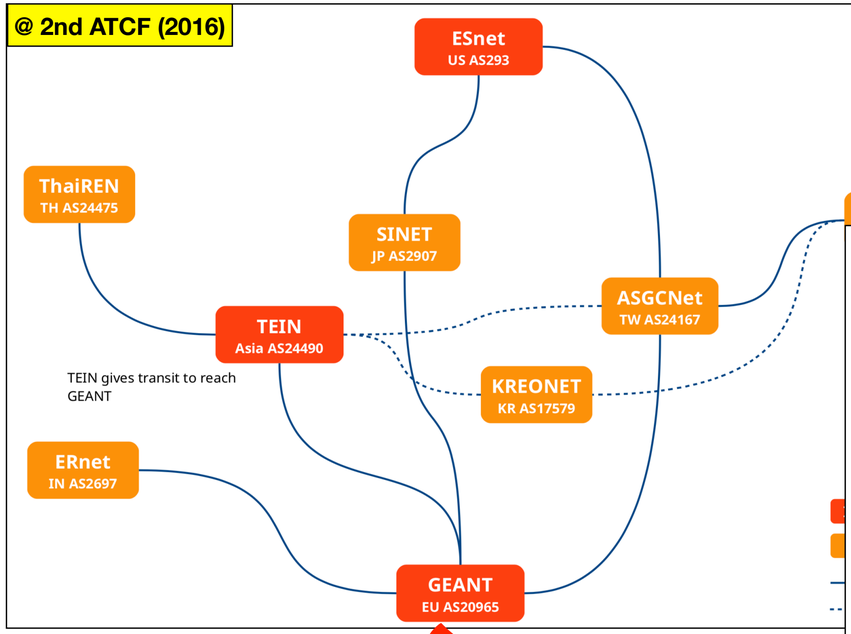
As of 14 September 2016



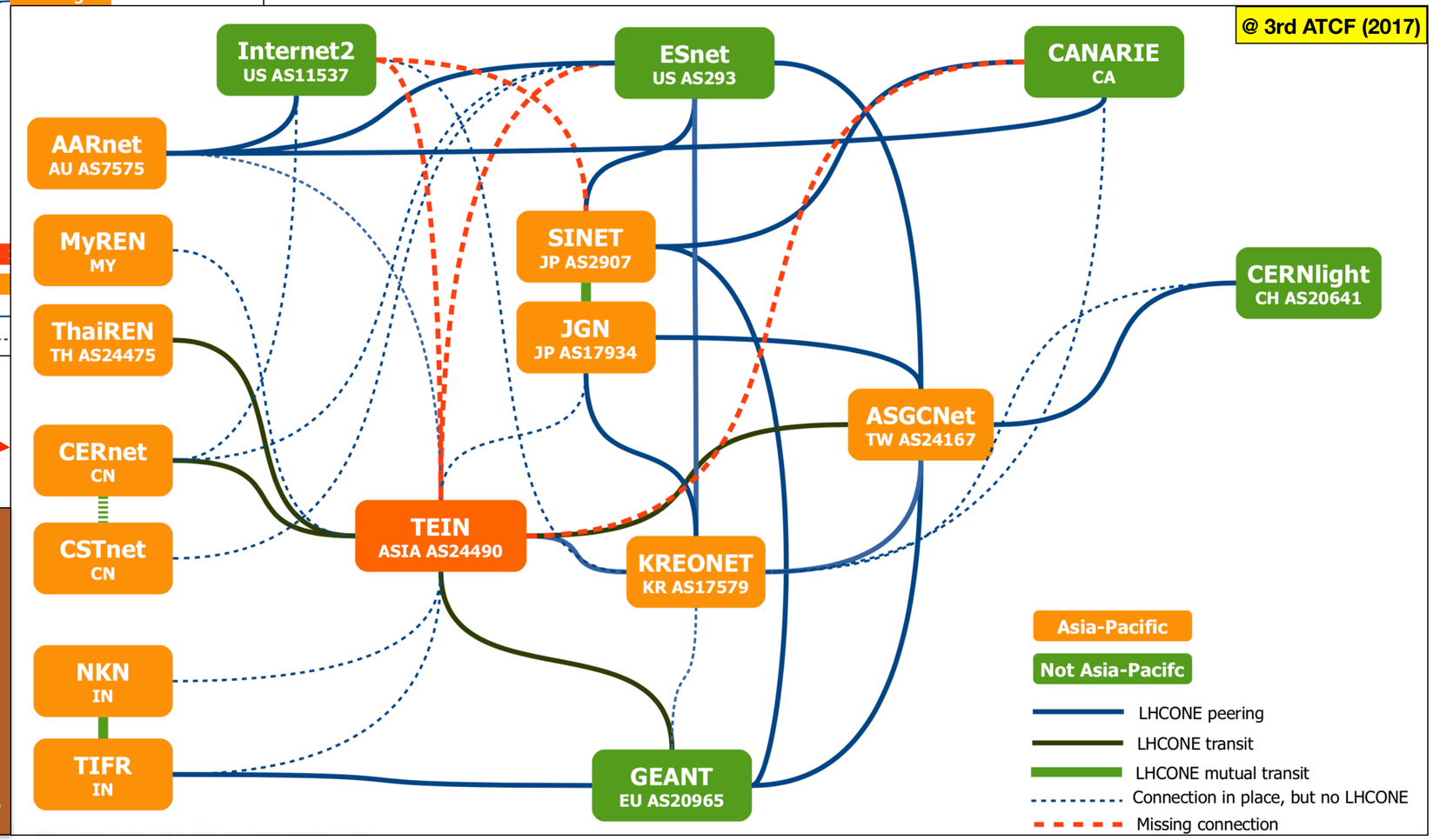
ASGC, KREONet, TEIN agreed to setup LHCONE VRFs in their networks & transit related traffic mutually @ ATCF1

From ATCF2 to ATCF3

By courtesy of Edoardo from his report @ LHCONE-LHCOPN Joint Workshop



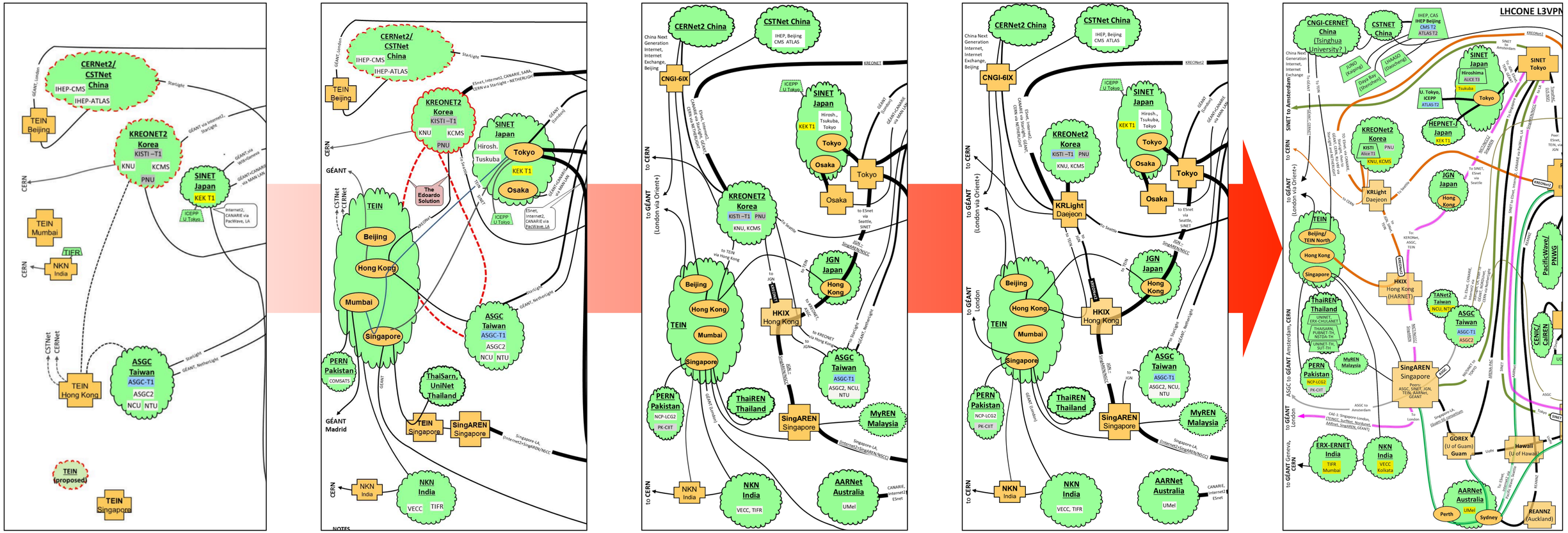
- TEIN VRF is not visible outside GEANT domain (no transit through GEANT VRF)
- KREONet VRF not peering with anything
- ASGCNet VRF not connected to TEIN, KREONet, SINET
- SINET VRF not connected to any Asian VRF



- TEIN VRF peering with GEANT, TW, KR, CN, TH
- KREONet VRF peering with JP, TW, TEIN, ESnet
- ASGC VRF peering with KR, JP, ESnet, TEIN, CERN
- JGN & SINET VRFs peering with KR, TW, TEIN, ESnet, CANARIE
- AARNet VRF peering with ESnet
- CERnet implemented VRF to be connected IHEP

Evolution of LHCONE in ASIA

15 Sep 2015 | v3.0 | v4.1 | v4.31 | v5.9



As of Today

Great thanks to network experts for their efforts and supports

Latest update will be given in the morning session tomorrow !!

LHCONE map, ©WEJ

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Almost accomplished but needs optimized

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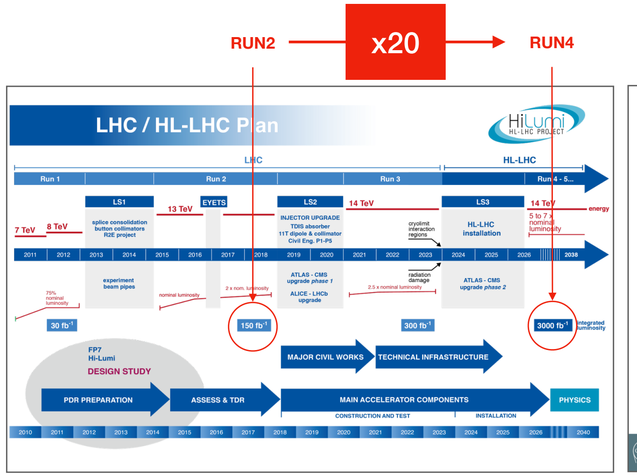
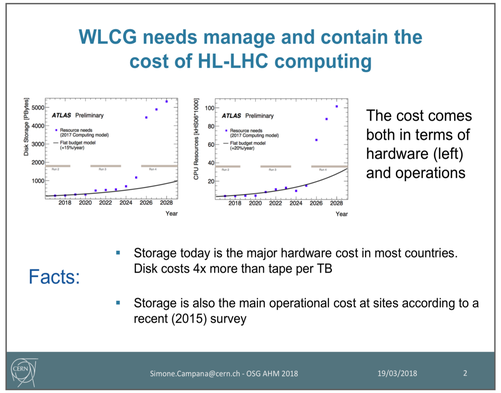
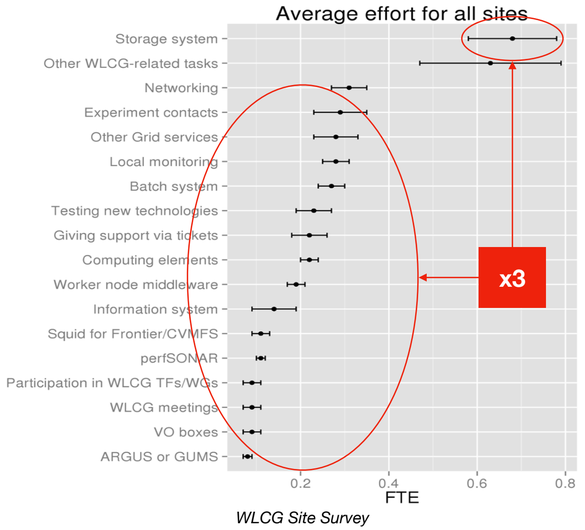
  - It provides a place where the Asian sites can share and discuss any issues to resolve in a collective way

Data Challenges for Upcoming LHC RUNs

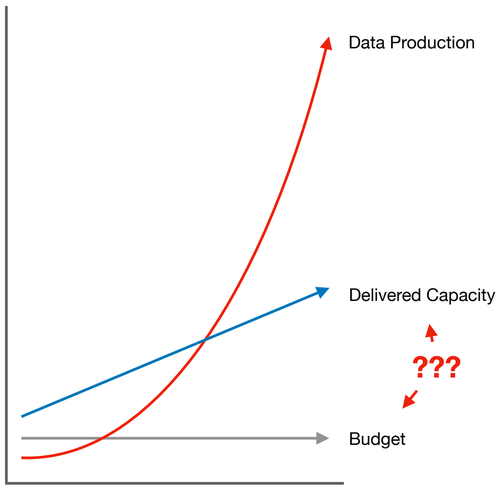
- Data challenges foreseen in HL-LHC (RUN4)
  - x10 more integrated luminosity compared to RUN3 (x20 than RUN2)
    * Lots of efforts on optimization of data/computing models from the experiments
  - Demanding significant increase of compute and storage capacities
  - How do to deliver them in flat-budget scenarios? *(still effective??)*
- *"Storage is the main operational cost at sites"*
  - WLCG 2015 Survey(https://twiki.cern.ch/twiki/bin/view/LCG/WLCGSiteSurvey)
  - Disk costs 4x more than tape per TB
- WLCG initiated DOMA to cope with the challenges
- Distributed storages implementing data-lake models
  - Open Storage Network (US, Ceph), CloudStor of AARNet (AU, EOS), ESCAPE Data Lake (EU)
    European Science Cluster of Astronomy & Particle physics ESFRI (European Strategy Forum on Research Infrastructure)
  - Advanced technology and large bandwidth networking are mandatory







WLCG Site Survey



Asian Sites Collaboration

- A strong one to cope with Data Challenges foreseen in LHC, post-LHC and emerging Big sciences (e.g. DUNE, SKA, LSST, etc.)
  - Computing resources contribution is essential to participate in such big science collaborations
  - Operational costs reduction is the key: technological advances, resource consolidation, or collective operations
- A Distributed Storage project across Asian sites as a pilot
  - A test-bed was established together at KISTI-ICEPP-SUT (2018-2020)
  - *A handful tool to exploit and evaluate the advanced networking in Asia*

Review on the pilot project will be presented tomorrow

- Propose a session to discuss any ideas or ways to support each individual site and collective activities in Asia
  - Developing support models towards a strong collaboration in the region to cope with challenges

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Initiated but needs momentum

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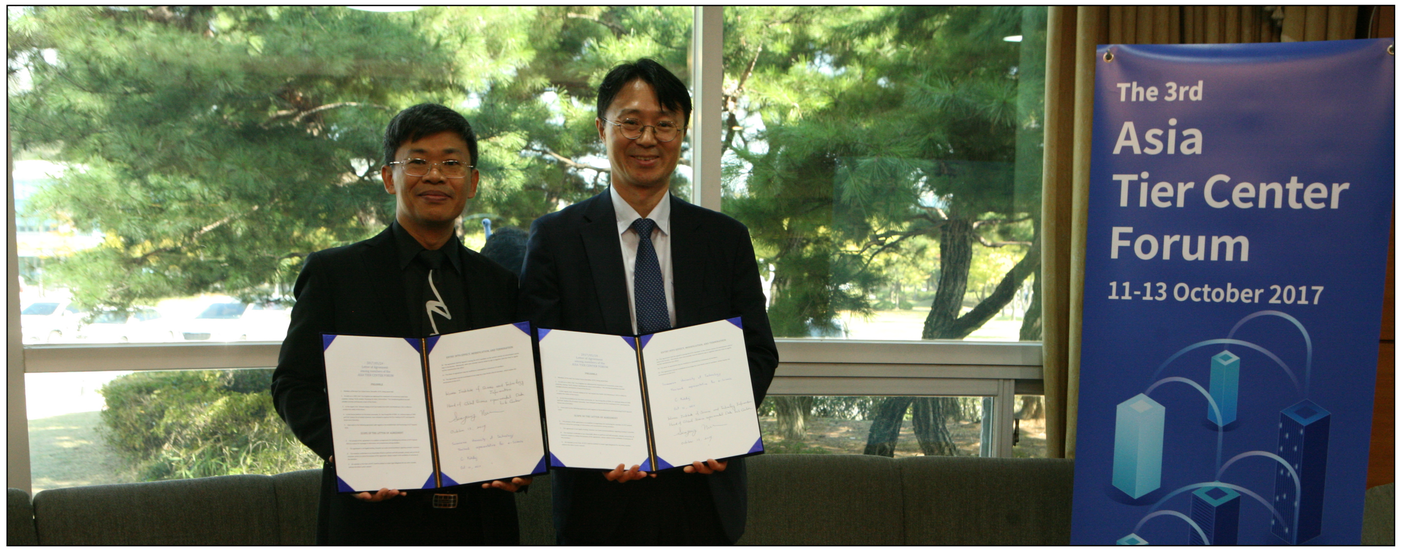
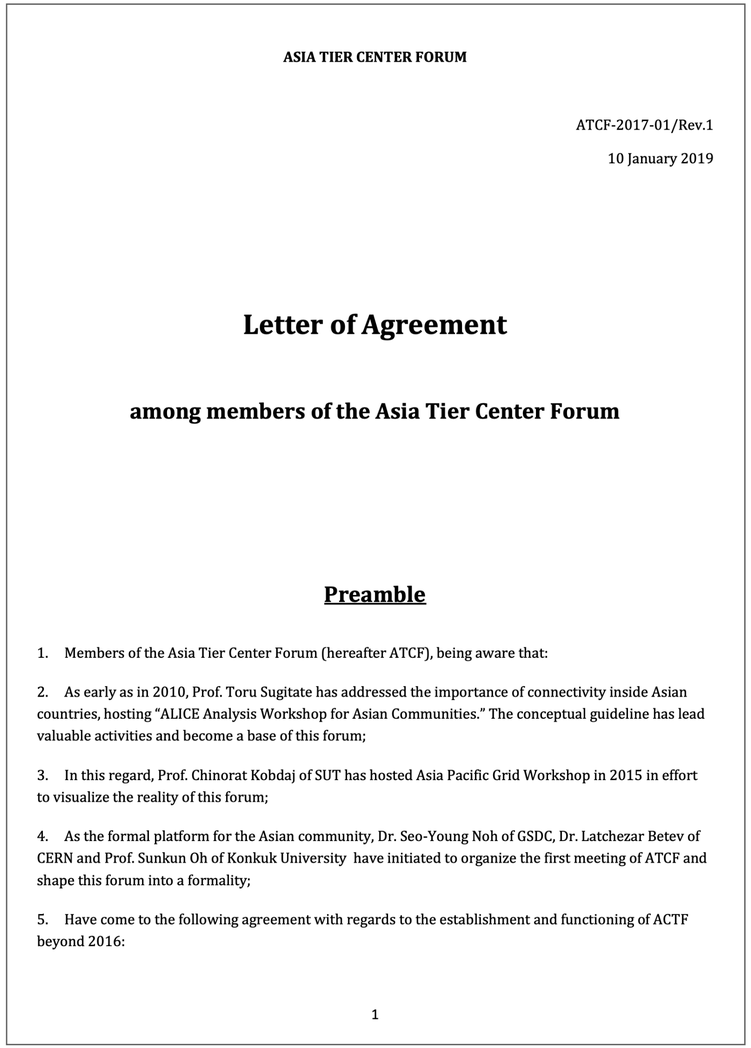
- *(Target)* Asian (LHC) Tier sites however, open to all interested parties

Membership

- SUT and KISTI jointly signed on the Letter of Agreement and the membership of ATCF was initiated in 2017
  - SUT is representing e-Science of Thailand
  - KISTI is representing the national datacenter for fundamental research in South Korea
- The purpose of the LoA is to promote a membership among Asian sites, who agree with the principles of ATCF, regardless of VO





ASIA TIER CENTER FORUM

ATCF-2017-01/Rev.1

10 January 2019

Letter of Agreement

among members of the Asia Tier Center Forum

Preamble

1. Members of the Asia Tier Center Forum (hereafter ATCF), being aware that:

2. As early as in 2010, Prof. Toru Sugitate has addressed the importance of connectivity inside Asian countries, hosting "ALICE Analysis Workshop for Asian Communities." The conceptual guideline has lead valuable activities and become a base of this forum;

3. In this regard, Prof. Chinorat Kobdaj of SUT has hosted Asia Pacific Grid Workshop in 2015 in effort to visualize the reality of this forum;

4. As the formal platform for the Asian community, Dr. Seo-Young Noh of GSDC, Dr. Latchezar Betev of CERN and Prof. Sunkun Oh of Konkuk University have initiated to organize the first meeting of ATCF and shape this forum into a formality;

5. Have come to the following agreement with regards to the establishment and functioning of ACTF beyond 2016:

1

List of Asian sites - 17 from 9 Nations

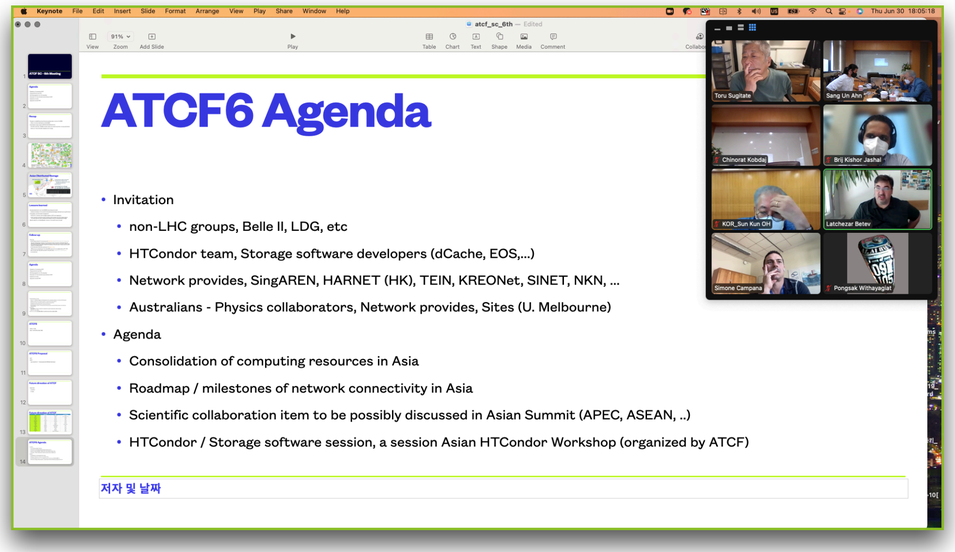
	Site	Nationality	City	VO (LHC only)
1	CUHK	China	Hong Kong	ATLAS
2	IHEP		Beijing	ATLAS, CMS, LHCb
3	Wuhan		Wuhan	ALICE
4	Kolkata	India	Kolkata	ALICE
5	TIFR		Mumbai	CMS
6	Cibinong	Indonesia	Cibinong	ALICE
7	Hiroshima	Japan	Hiroshima	ALICE
8	ICEPP		Tokyo	ATLAS
9	Tsukuba		Tsukuba	ALICE
10	KISTI	Republic of Korea	Daejeon	ALICE, CMS
11	UPM	Malaysia	Seri Kembangan	CMS
12	COMSATS	Pakistan	Islamabad	ALICE
13	NCP		Islamabad	CMS
14	ASGC	Taiwan	Taipei	ATLAS
15	NCHC		Hsinchu	CMS
16	CUNSTDA	Thailand	Bangkok	CMS
17	SUT		Nakhon Ratchasima	ALICE

Some sites could be missing... there should be more considering non-LHC VOs, e.g. Belle II, LDG, etc.

Organization

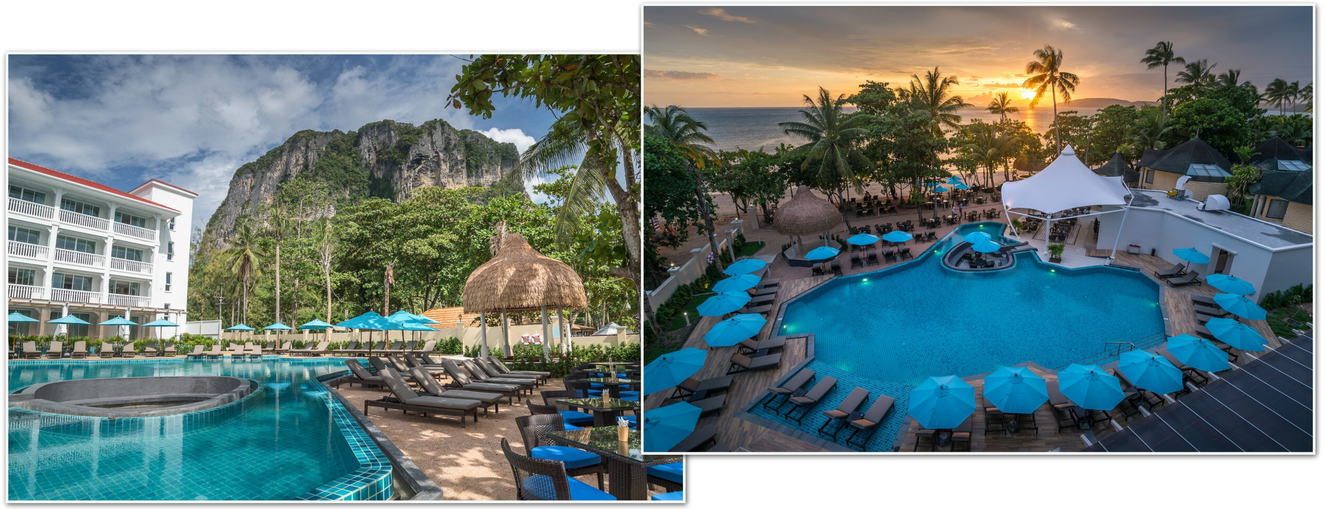
- Co-chairs of Asia Tier Center Forum
  - Suranaree University of Technology (represented by Prof. Chinorat Kobdaj)
  - Korea Institute of Science and Technology Information (Represented by Dr. Heejun Yoon)
- Local Organization Chair for ATCF6 : Prof. Chinorat Kobdaj
- Steering Committee
  - SUT (represented by Chinorat Kobdaj),
    Hiroshima U. (represented by Toru Sugitate),
    TIFR (represented by Kajari Mazumdar),
    Konkuk U. (represented by Sun Kun Oh),
    KISTI (represented by Hee Jun Yoon)

SC meeting (Hybrid) @ SUT Bangkok



The 6th ATCF meeting

- Centara Ao Nang, Krabi, Thailand
  - Co-hosted by SUT and KISTI-GSDC
- 24 registered participants (+4 remote)
  - 15 institutes from 8 countries
  - SUT(TH), Chulalongkorn U.(TH), Rajamangala University of Technology Isan (TH), BRIN(ID, former LIPI), VECC(IN), TIFR(IN), ASGC(TW), *Fudan U.(CN), *CCNU(CN), Hiroshima U.(JP), ICEPP(JP), *TEIN-CC(KR), KEK(JP), CERN(CH), KISTI(KR)



(*) Remote participation

ATCF6 Agenda

- Round table of Asian sites
  - Site-specific issues regarding resources, operations, R&D, networking, etc.
- Experiments perspectives and updates
  - WLCG, ALICE and Belle II
- LHCONE updates: Asian NRENs and CERN
  - The latest view of LHCONE and related R&D projects
  - The current status of collaborative works within WLCG for LHC data challenges
- Discussion: Distributed Storage & Asian Collaboration
- Special sessions: EOS Storage (Andreas Joachim Peters) & HTCondor mini-workshop (Sites contributions)

Previous Meetings

- ATCF1 @ KISTI in Daejeon, South Korea, September 2015
  - 24 participants from 10 Asian sites (ASGC, COMSATS, Hiroshima U., U. Tsukuba, CCNU, SUT, LIPI, VECC, TIFR, KISTI), TEIN*CC, KREONet, ESnet and CERN
- ATCF2 @ SUT in Nakhon Ratchasima, Thailand, November 2016
  - 20 participants from 7 Asian sites (*COMSATS, Hiroshima U., *CCNU, NECTEC, SUT, LIPI, KISTI), *TEIN*CC, KREONet, ThaiREN, UniNET, GÉANT and CERN
- ATCF3 @ KISTI in Daejeon, South Korea, October 2017
  - 30 participants from 13 Asian sites (ASGC, COMSATS, Hiroshima U., IHEP, KISTI, *VECC, LIPI, U. Malaya, SUT, TIFR, ICEPP, U. Tsukuba, *CCNU), ESnet, KREONet, MYREN, SINET, TransPAC, TEIN*CC and CERN
- ATCF4 @ SUT office in Bangkok, Thailand, November 2018
  - 30 participants from 13 Asian sites (CCNU, IHEP, *LIPI, VECC, *TIFR, U. Tsukuba, KEK, ICEPP, Hiroshima U., KISTI, COMSATS, NCP, SUT), TEIN*CC, KREONet, NDGF and CERN
- ATCF5 @ TIFR in Mumbai, India, October 2019
  - 34 participants from 7 Asian sites (*LIPI, VECC, TIFR, ICEPP, Hiroshima U., KISTI, SUT), TEIN*CC, KREONet, U. Wisconsin-Madison and CERN
- Visit website for more details : www.atcforum.org

(*) Remote participation

ATCF Summary Talks

- ATCF1 Summary Report
  - LHCOPN/LHCONE Meeting, October 2015 (William Johnston)
- ATCF2 (+ATCF1) Summary Report
  - WLCG GDB @ ISGC2017, 8 March 2017
- ATCF3 Summary Reports
  - LHCOPN/LHCONE Meeting @ HEPiX Fall 2017, 16 October 2017 (Edoardo Martelli)
  - Belle II Network Meeting @ SC17, 16 November 2017
  - WLCG GDB @ CERN, 13 December 2017
- ATCF4 Summary Report
  - WLCG GDB @ CERN, 12 December 2018

Upcoming Events in Asia

- ISGC 2023 @ ASGC (19-24 March)
  - International conference for multidisciplinary topics
  - Co-located workshops: APGridPMA, WLCG GDB, etc.

- HEPiX Spring 2023 @ ASGC (26-31 March)
  - ICT-wise useful venue for site operations and administration

- ATCF7 @ Jeju Island, South Korea (proposed)

Thanks to all participants and speakers for the contribution !

Enjoy the forum and we hope to have a fruitful discussion for Asian collaboration.

Special thanks to Prof. Chinorat Kobdaj and SUT staff !!!