
Grid Activities in KISTI

May 29, 2012

Jysoo Lee and Soonwook Hwang

KISTI, KOREA

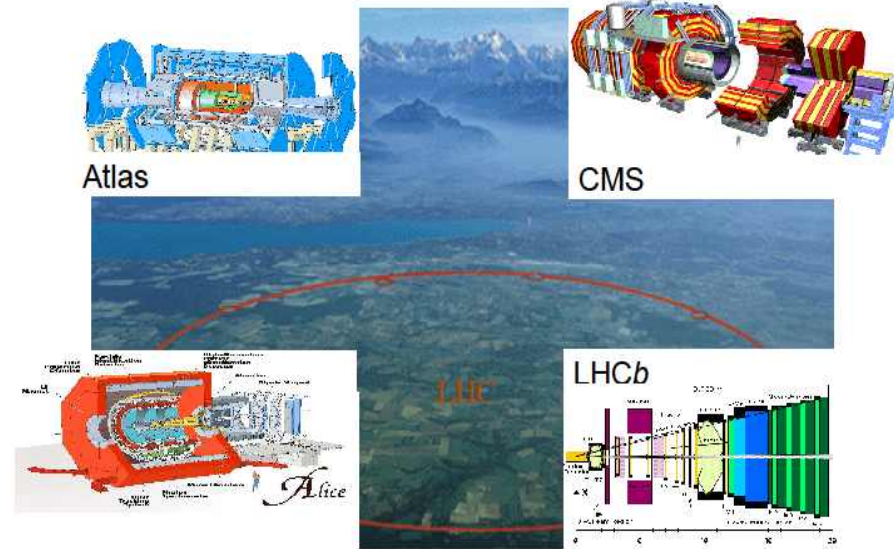
Outline

- **Grid Operation and Infrastructure**
 - KISTI ALICE Tier2 Center
 - France-Asia VO: Production Grid Infrastructure
 - Global Science Experimental Data Hub Centre
 - Korea-Japan NAREGI Federation
- **Development of AMGA within EMI and its Use as a Metadata service for Belle II**

KISTI ALICE Tier2 Center

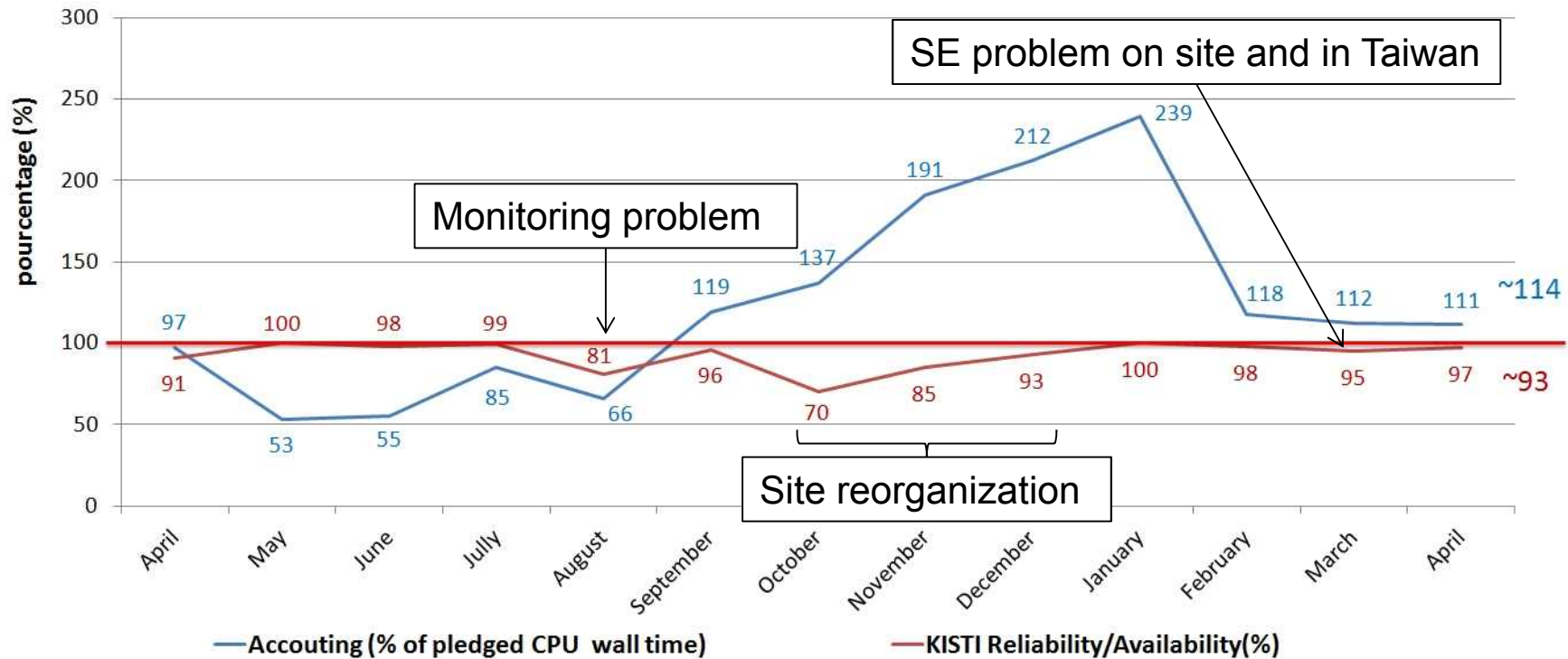
KISTI ALICE Tier-2 Center

- Signing of WLCG MoU for the ALICE Tier-2 center ('07.10.23)
- Has been part of ALICE distributed computing grid as an official T2
- Providing a reliable and stable node in the ALICE Grid
- Funded by MEST
 - ~200,000 US dollars/year



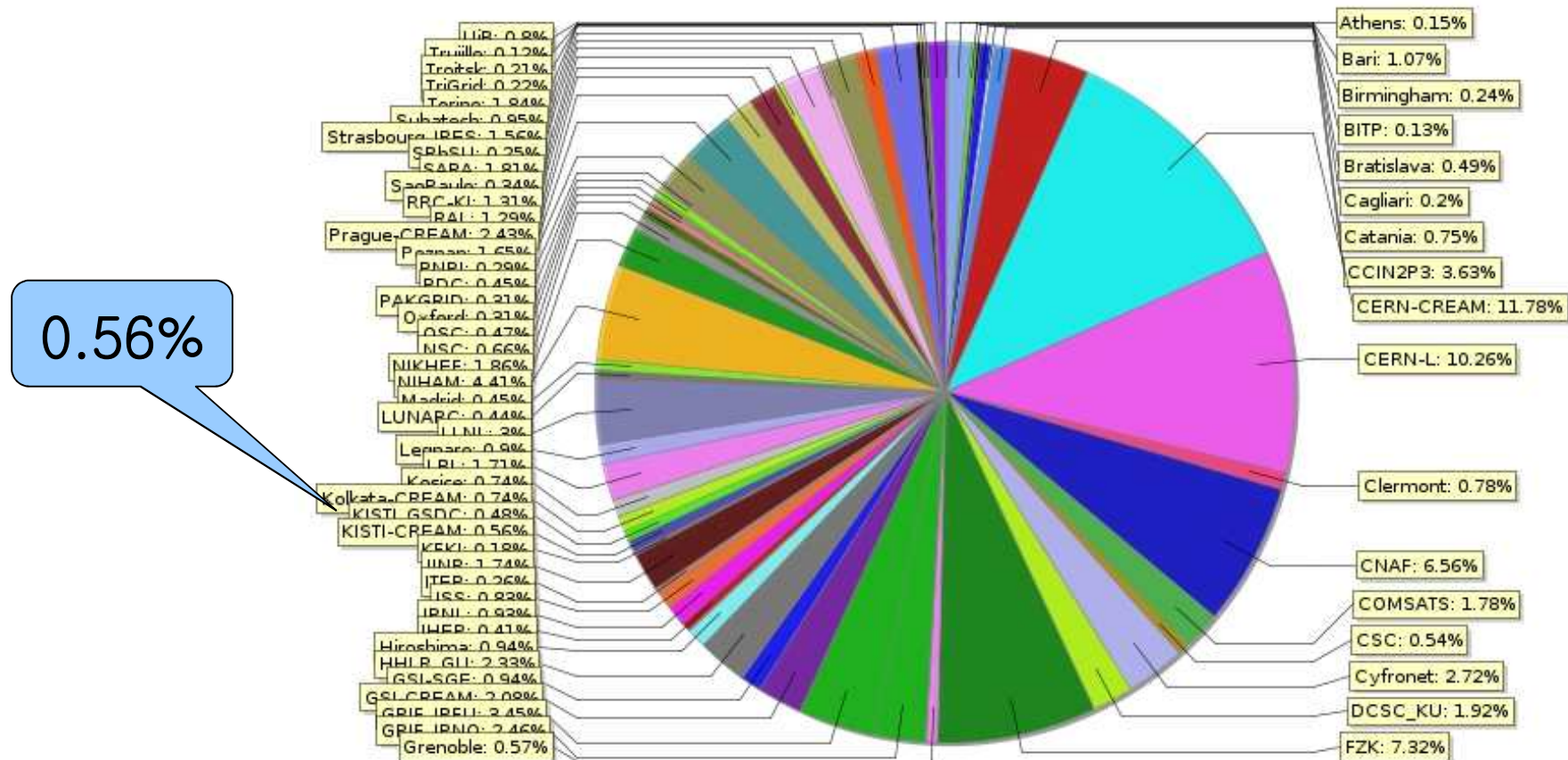
Korea, KISTI, Daejeon	Pledged	Planned to be pledged					Comments
	2007	2008	2009	2010	2011	2012	
CPU (kSI2K)	50	100	150	150	150	150	
Disk (Tbyte)	15	30	50	50	50	50	
Nominal WAN (Mbits/sec)	10000	10000	10000	10000	10000	10000	

Accounting and Reliability of KISTI CREAM



KISTI's Contribution to ALICE Computing

- 0.56% contribution to ALICE computing in the total job execution for last 6 Months
- Processing near 30000 jobs per month in average



Status of Storage Element

SE Name	AliEn SE AliEn name	Statistics				
		Size	Used	Free	Usage	No. of files
10. CERN - SETEST	ALICE::CERN::SETEST	542.9 GB	0.339 GB	542.5 GB	0.062%	25
11. Clermont - SE	ALICE::Clermont::SE	179.9 TB	164.5 TB	15.4 TB	91.44%	2,491,981
12. CNAF - SE	ALICE::CNAF::SE	989.7 TB	835.8 TB	153.9 TB	84.45%	8,211,844
13. CyberSar_Cagliari - SE	ALICE::CyberSar_Cagliari::SE	53.15 TB	40.94 TB	12.21 TB	77.02%	1,063,234
14. Cyfronet - SE	ALICE::Cyfronet::SE	10 TB	9.625 TB	384 GB	96.25%	233,938
15. FZK - SE	ALICE::FZK::SE	1,786 PB	1,017 PB	787.4 TB	56.95%	11,712,018
16. Grenoble - DPM	ALICE::Grenoble::DPM	72 TB	5.554 TB	66.45 TB	7.714%	80,442
17. Grenoble - SE	ALICE::Grenoble::SE	31 TB	26.61 TB	4.391 TB	85.84%	418,668
18. GRIF_IPNO - SE	ALICE::GRIF_IPNO::SE	211.4 TB	181 TB	30.37 TB	85.63%	2,711,504
19. GRIF_IRFU - DPM	ALICE::GRIF_IRFU::DPM	171 TB	37.46 TB	133.5 TB	21.91%	359,802
20. GSI - SE	ALICE::GSI::SE	111 TB	280.1 TB	-	252.4%	3,297,935
21. GSI - SE2	ALICE::GSI::SE2	28 TB	324.1 GB	27.68 TB	1.13%	3,754
22. HHLR_GU - SE	ALICE::HHLR_GU::SE	100 TB	40.61 TB	59.39 TB	40.61%	817,384
23. Hiroshima - SE	ALICE::Hiroshima::SE	118.2 TB	68.81 TB	49.39 TB	58.21%	1,562,643
24. IHEP - SE	ALICE::IHEP::SE	36.38 TB	18.81 TB	17.57 TB	51.69%	663,705
25. IPNL - SE	ALICE::IPNL::SE	37.3 TB	49.44 TB	-	132.5%	843,143
26. ISS - FILE	ALICE::ISS::FILE	136.1 TB	113.4 TB	22.65 TB	83.35%	2,291,056
27. ITEP - SE	ALICE::ITEP::SE	140 TB	83.7 TB	56.3 TB	59.79%	1,652,456
28. JINR - SE	ALICE::JINR::SE	269 TB	174 TB	94.98 TB	64.69%	3,881,824
29. KFKI - SE	ALICE::KFKI::SE	73 TB	24.6 TB	48.4 TB	33.7%	295,799
30. KISTI_GSDC - SE	ALICE::KISTI_GSDC::SE	100 TB	49.06 TB	50.94 TB	49.06%	1,145,790
31. KISTI_GSDC - SE2	ALICE::KISTI_GSDC::SE2	966.8 TB	30.64 TB	936.2 TB	3.169%	878,124
32. KISTI - SE	ALICE::KISTI::SE	49.95 TB	35.58 TB	14.37 TB	71.23%	864,334
33. Kolkata - SE	ALICE::Kolkata::SE	223.2 TB	33.34 TB	189.9 TB	14.94%	782,198
34. Kosice - SE	ALICE::Kosice::SE	60 TB	43.98 TB	16.02 TB	73.31%	1,046,413
35. LBL - SE	ALICE::LBL::SE	644.5 TB	92.21 TB	552.3 TB	14.31%	2,304,594

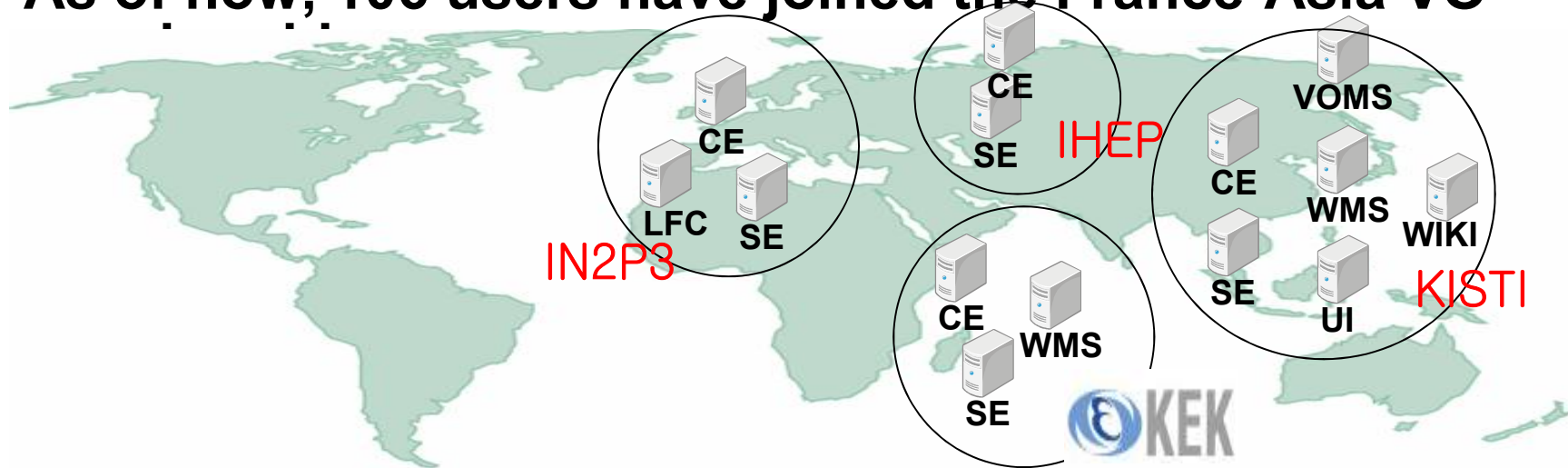
Status of KISTI SE

- Size: 50TB
- Used: 35.58TB
- no of files: 864,334

France-Asia VO: Production Grid Infrastructure

France-Asia VO Grid

- **Successfully deployed in 2011 and now fully functional at four sites**
 - KISTI (Korea), KEK (Japan), IHEP(China), CC-IN2P3 (France)
 - ~25000 CPU cores, ~8 TB of Disk
- **Completed the Migration of the FKPPL VO to France-Asia VO**
 - share computing resources to make them accessible to multidisciplinary scientific projects and scientists of other Asian countries
- **As of now, 106 users have joined the France-Asia VO**



Applications on the France-Asia VO

- ***In-Silico* Drug Discovery**
 - A large-scale deployment of docking simulations, with hundreds of thousands of potential chemical compounds against
 - In collaboration with Prof. Doman Kim from Chonnam National University
- **Geant4 Simulations for Medical Applications**
 - Used extensively by the National Cancer Center in Korea to carry out compute-intensive simulations relevant to cancer treatment planning
 - In collaboration with Dr. Se-Byeong Lee from National Cancer Center in Korea
- **Two-color QCD (Quantum ChromoDynamics) simulation in theoretical Physics**
 - Several hundreds or thousands of QCD jobs are required to be run on the Grid, with each jobs taking about 10 days.
 - In collaboration with Prof. Seyong Kim from Sejong University
- **Three Journal Papers were published in 2011**
 - two papers from the In-Silico Drug Discovery (@Bioorganic & Medicinal Chemistry Letters(BMCL))
 - one paper from the QCD simulation (@CPC)

Grid Training

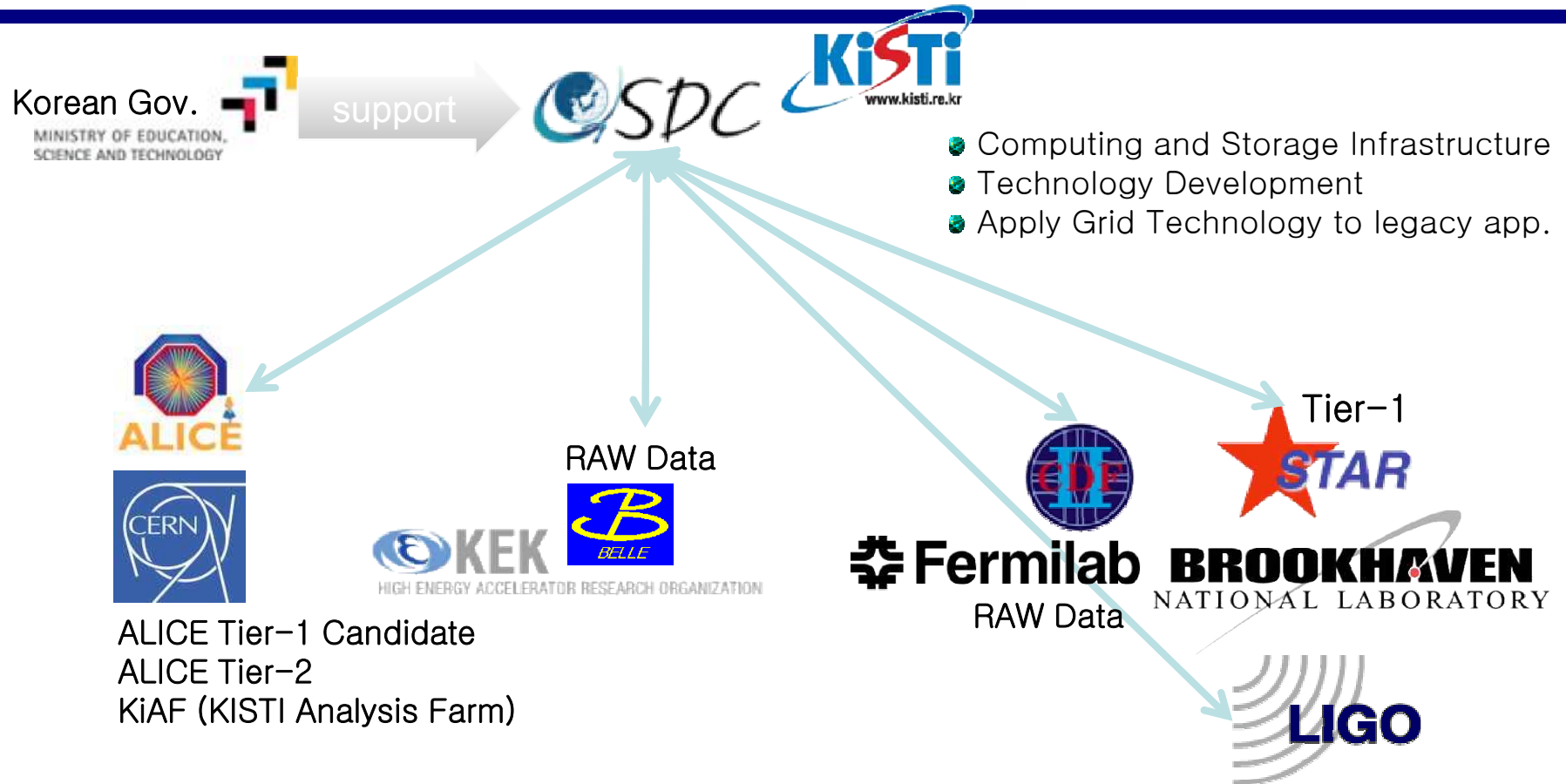
◆ “2011 Geant4, GATE and Grid Tutorial for Medical Applications” held in Seoul in October

- ~45 participants from ~15 institutes in Korea
- 7 lecturers from France, the US, Japan and Korea



Global Science Experimental Data Hub Center

KISTI GSDC Center

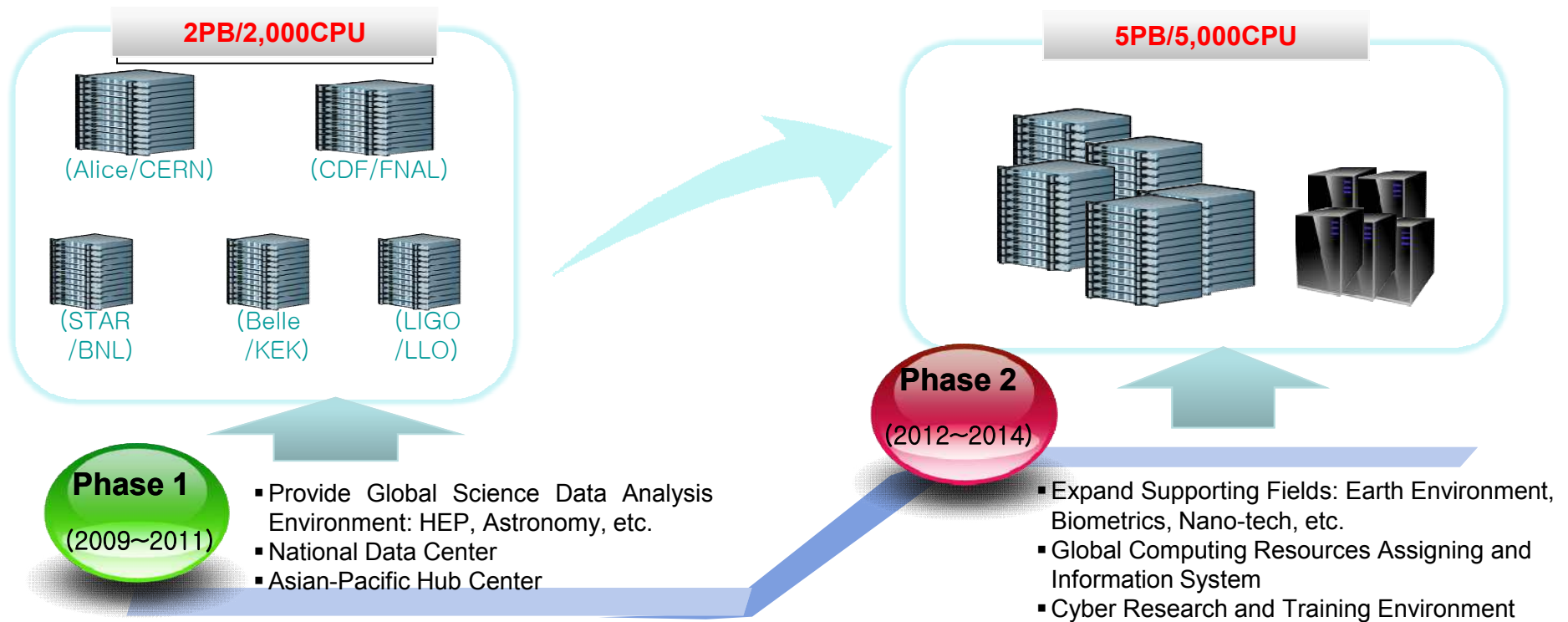


Supporting Data Centric Research Communities
&

Promotion of Research Collaboration

Roadmap

Providing Cyber Environment for Science Research

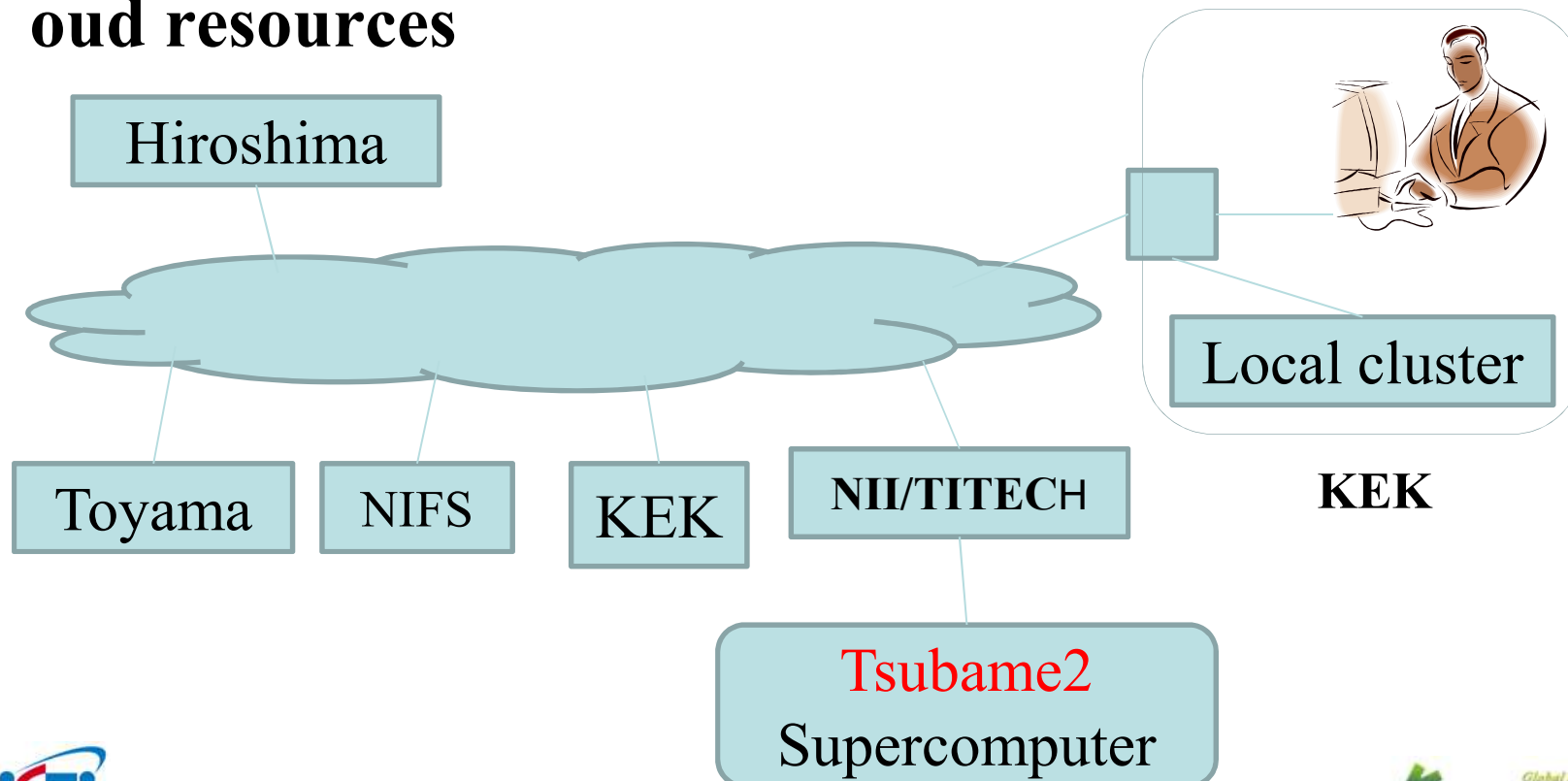


Anywhere and Anytime, you can use science data what you want

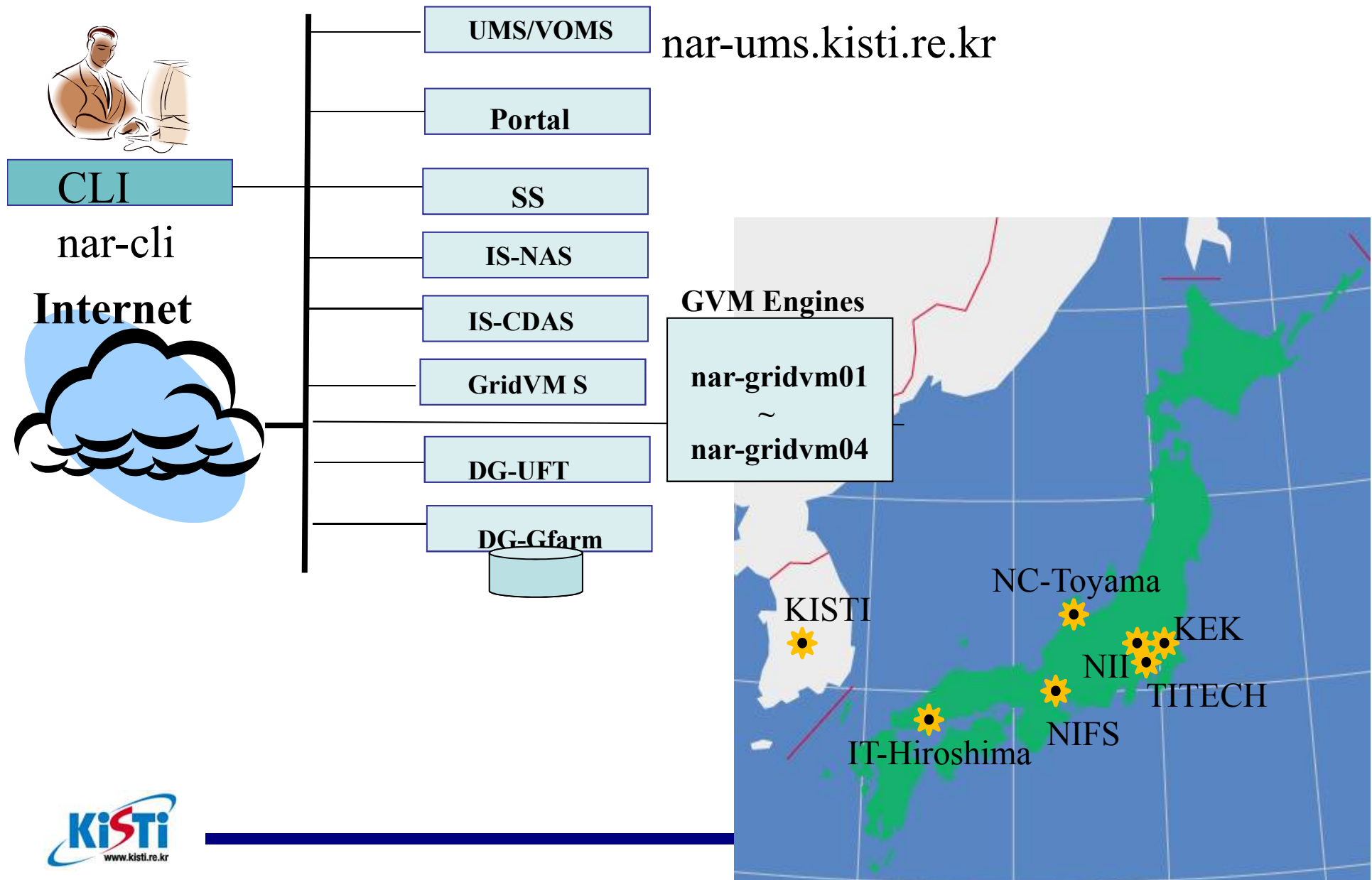
Korea-Japan NAREGI Federation

RENKEI: Seamless Resource Usage

- Testbed for e-Science Infrastructure built based on the NAREGI Middleware
- Seamless Usage between Local and Remote Grid/Cloud resources



KISTI NAREGI site set up in January

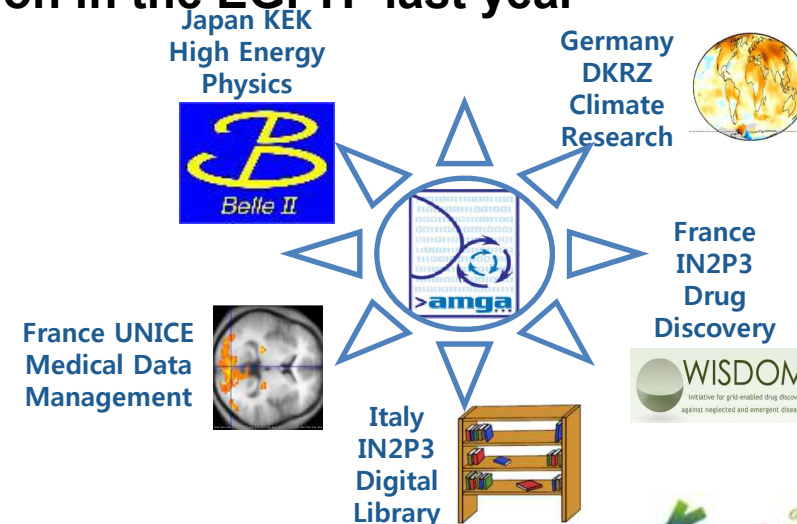
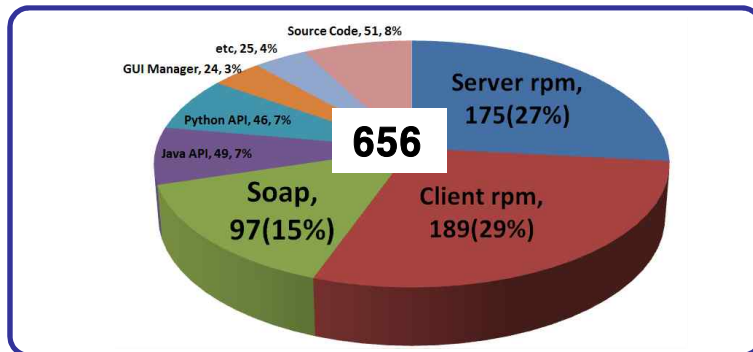


Development of AMGA and Its Use in Belle II

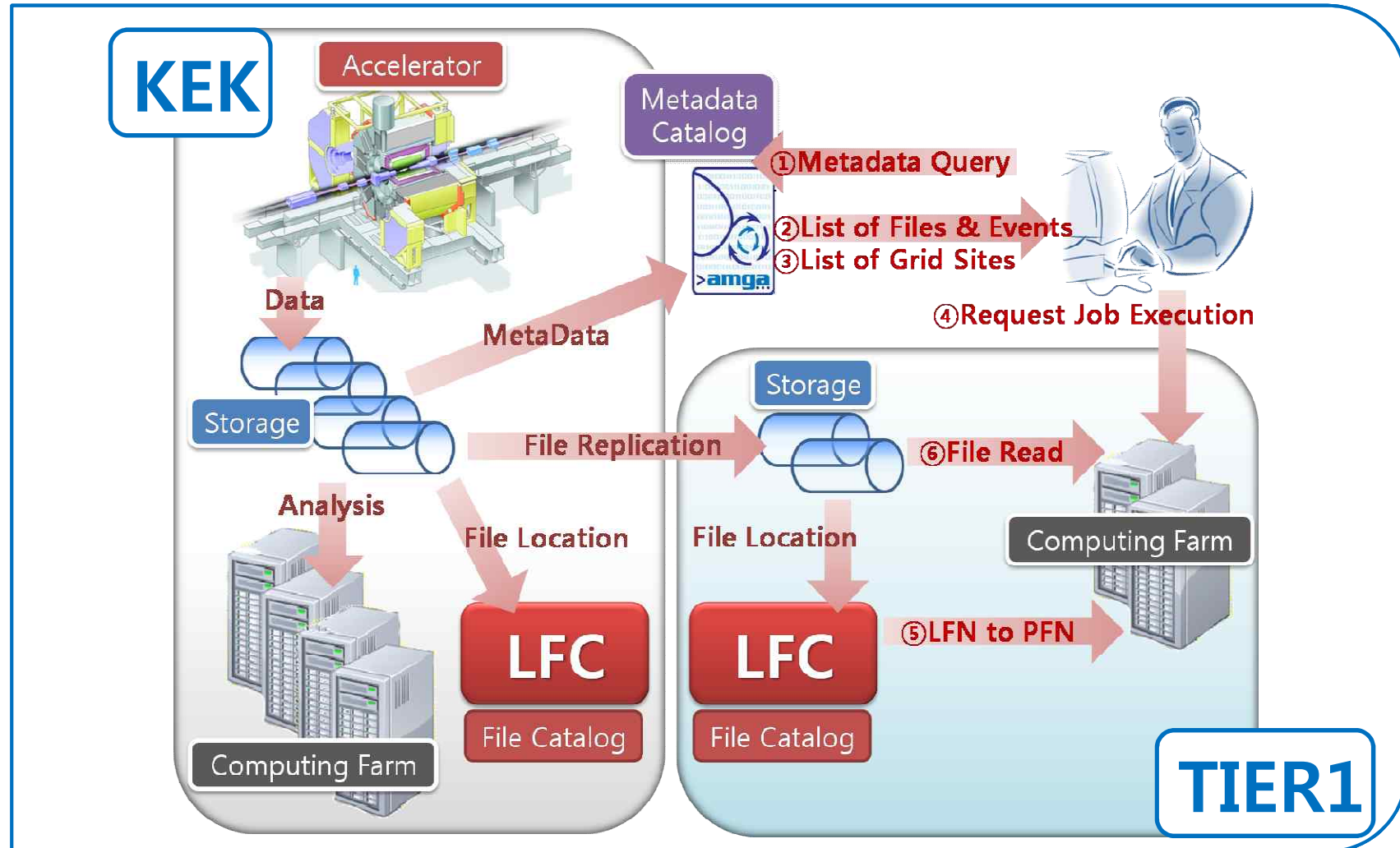
AMGA

- The EMI Metadata Catalogue Software
- AMGA provides:
 - Access to metadata for files distributed on the grid
- The 2.1.2 version of AMGA was released as part of the EMI-1 distribution in April 2011
- AMGA 2.3.0 version was released as part of EMI-2
 - Publishing Service Information in the BDII
 - Nagios Monitoring enabled
 - SL6, Debian Support (rpm. tar ball)
- AMGA Training Session held in Lyon in the EGI TF last year

of downloads in 2011



The Use of AMGA for Belle-II Metadata Service



KISTI's Role in Belle II Computing

- **Leading the Data Handling WG as part of Belle II computing activities**
- **Design of Metadata Schema for Belle II Experiment**
- **Data Registration**
 - Metadata extraction from the datasets and registration into the AMGA server
 - Integration of data registration module into Basf for Belle and Basf2 for Belle 2 experiment
- **Setting up and Operation of Belle II Metadata Service at KEK**

Summary

- **With a decade-long experience on Grid computing, we have accumulated some expertise and we are quite good at Grid operation**
 - KISTI ALICE Tier2 Center as part of ALICE Computing Grid
 - France-Asia VO
 - GSDC
 - KISTI NAREGI site as part of Japan's RENKEI Infrastructure
- **It is still our homework to attract more Korean scientists/researchers to make full use of those infrastructures for their applications development**
- **We have been working on the development and evolution of AMGA in EEGE and EMI for ~5 years**
 - Now, we are moving one step further and taking on the leadership for the development of Metadata Service for Belle II with our experience around the AMGA development.

Thank you for your attention!