Introduction of GSDC project and activities

2011. 3. 23

Beob Kyun KIM
GSDC/KISTI

Outline

Introduction to GSDC

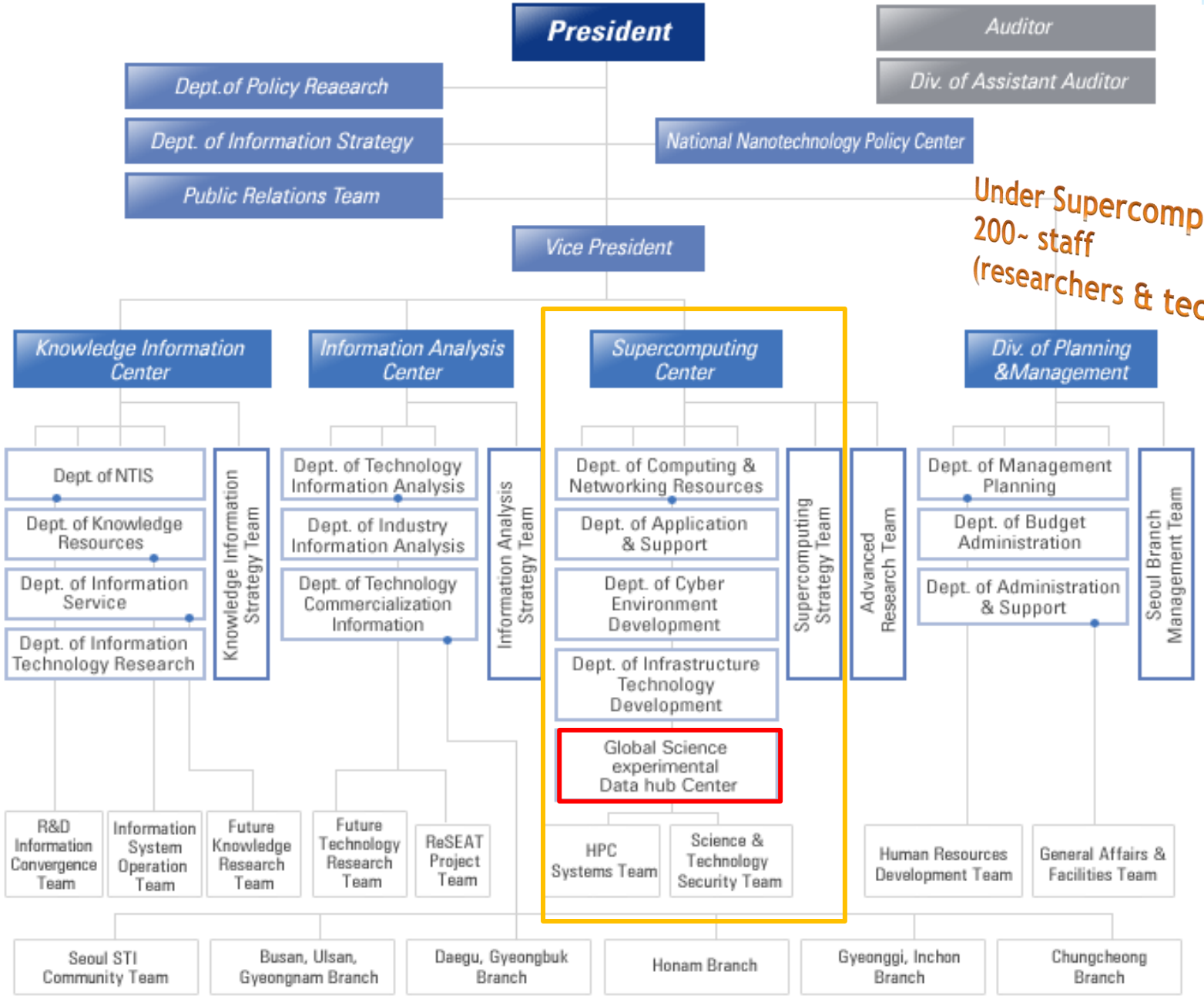
2010 Activities

GSDC Resources and Status

2011 Plan

Introduction to GSDC

Organization of KISTI

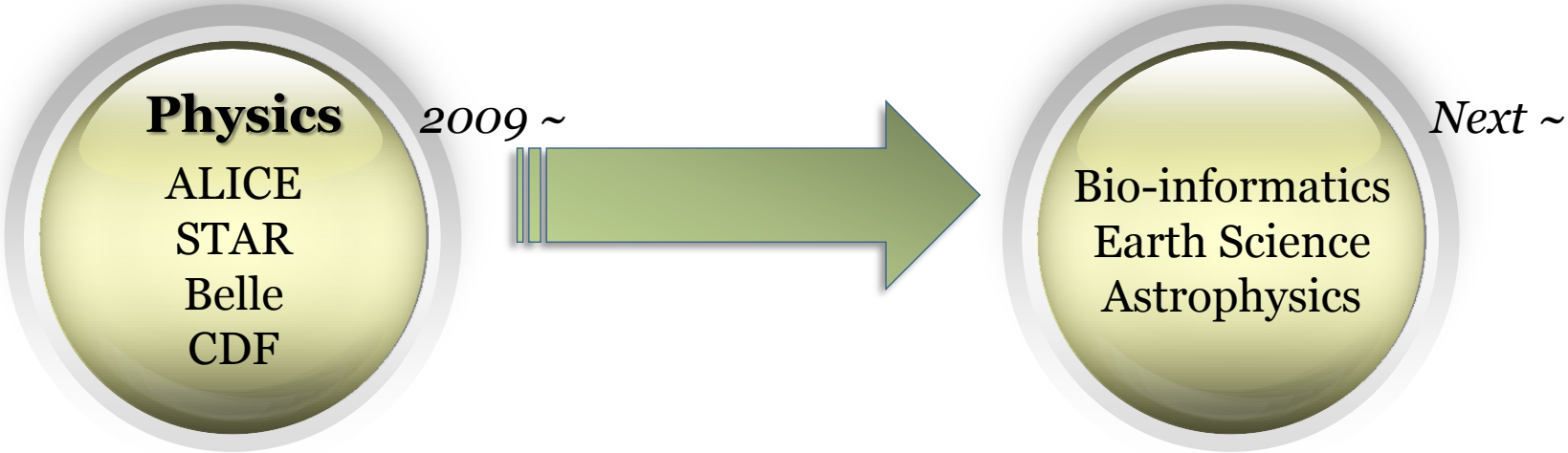


Under Supercomputing Center,
200~ staff
(researchers & technicians)

Introduction to GSDC

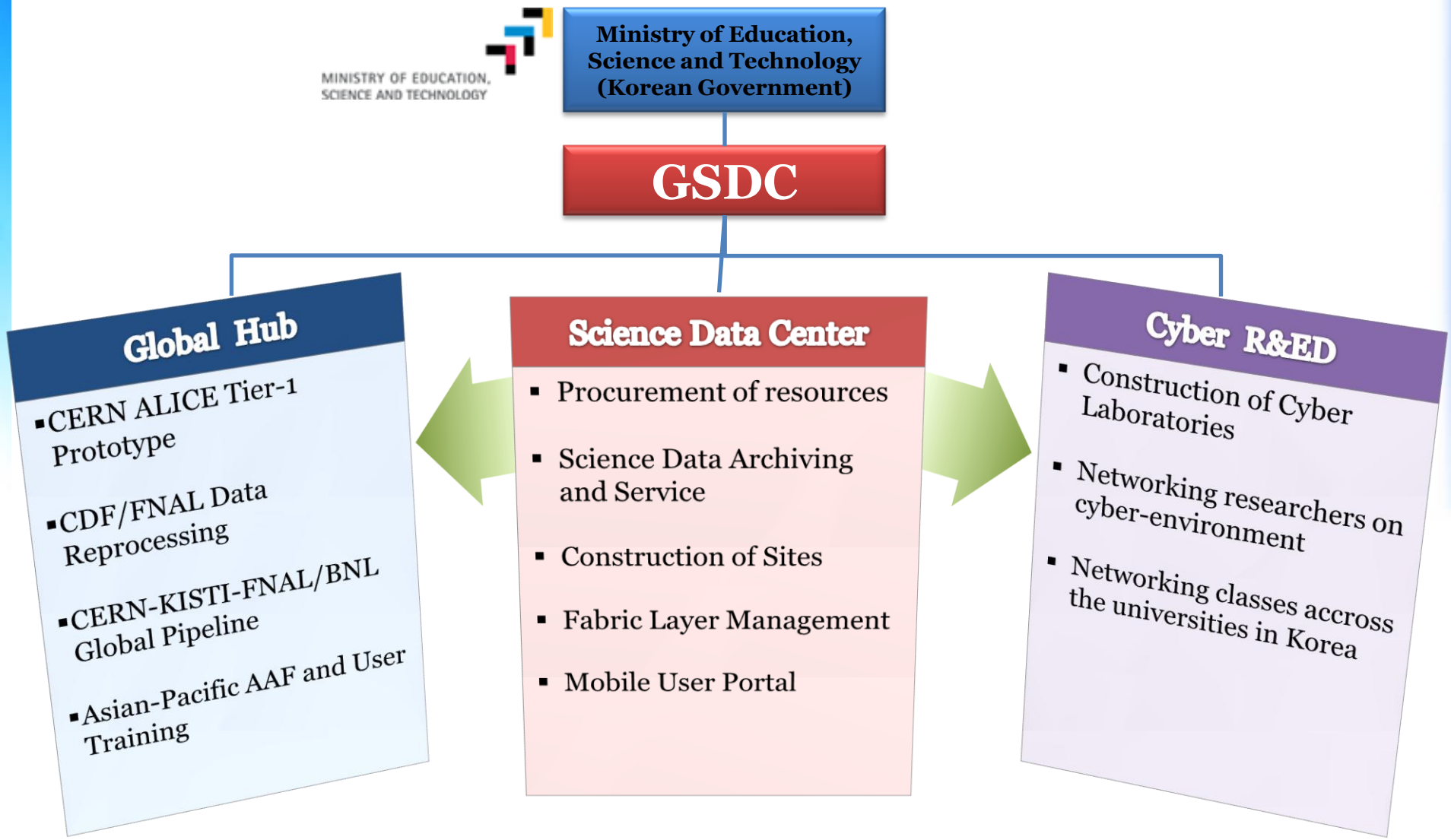
MISSION

Promotion of Data Intensive Researches by supporting cyber-environment



Driven by Government Master Plan (2009~)

Main Projects



Our Mission

Providing Cyber Environment for Science Research

2PB/2,000CPU


(Alice/CERN)


(CDF/FNAL)


(STAR /BNL)


(Belle /KEK)


(LIGO /LLO)

5PB/5,000CPU

Phase 1 (2009~2011)

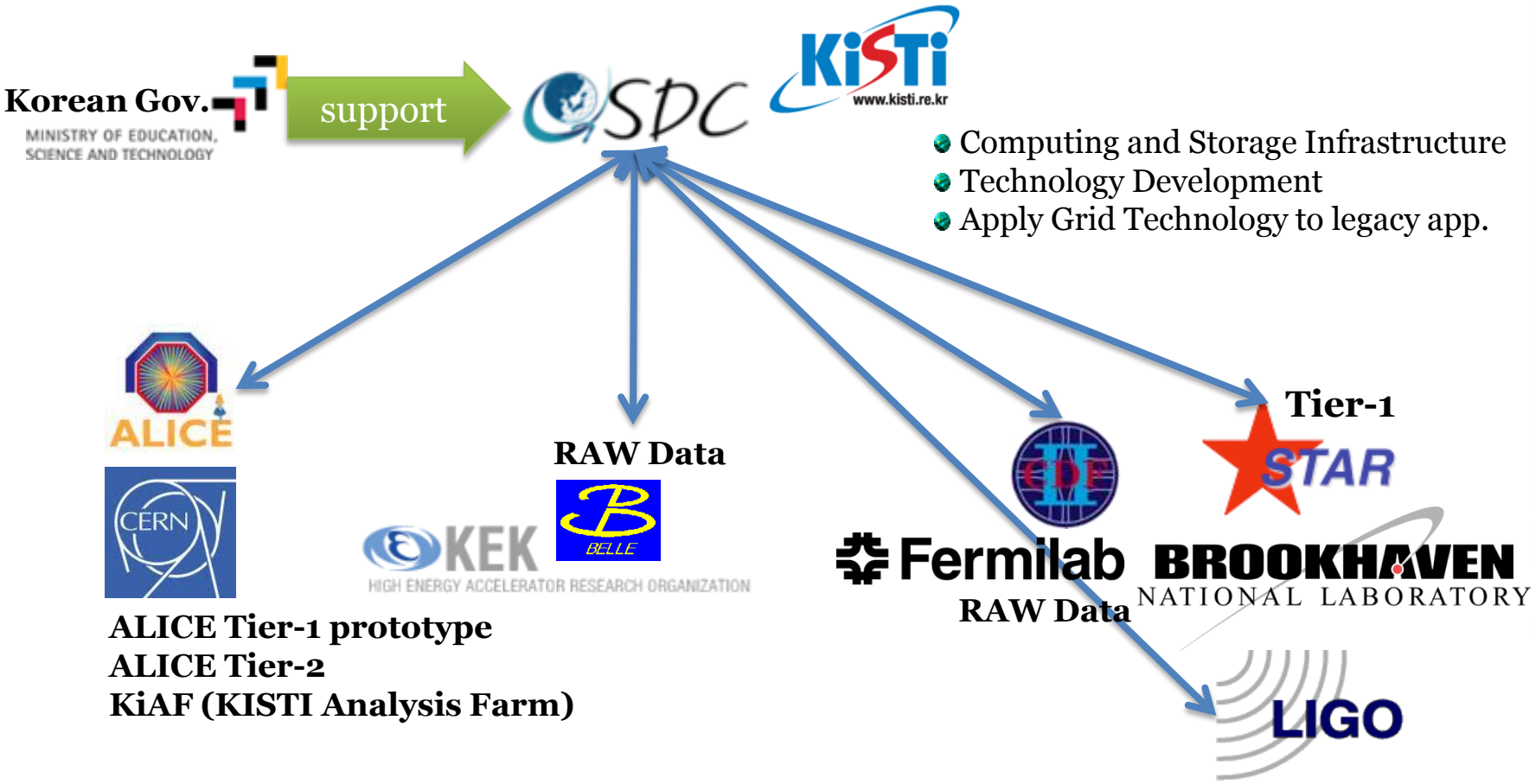
- Provide Global Science Data Analysis Environment: HEP, Astronomy, etc.
- National Data Center
- Asian-Pacific Hub Center

Phase 2 (2012~2014)

- Expand Supporting Fields: Earth Environment, Biometrics, Nano-tech, etc.
- Global Computing Resources Assigning and Information System
- Cyber Research and Training Environment

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

Current Status



Supporting Data Centric Research Communities
&
Promotion of Research Collaboration

Members

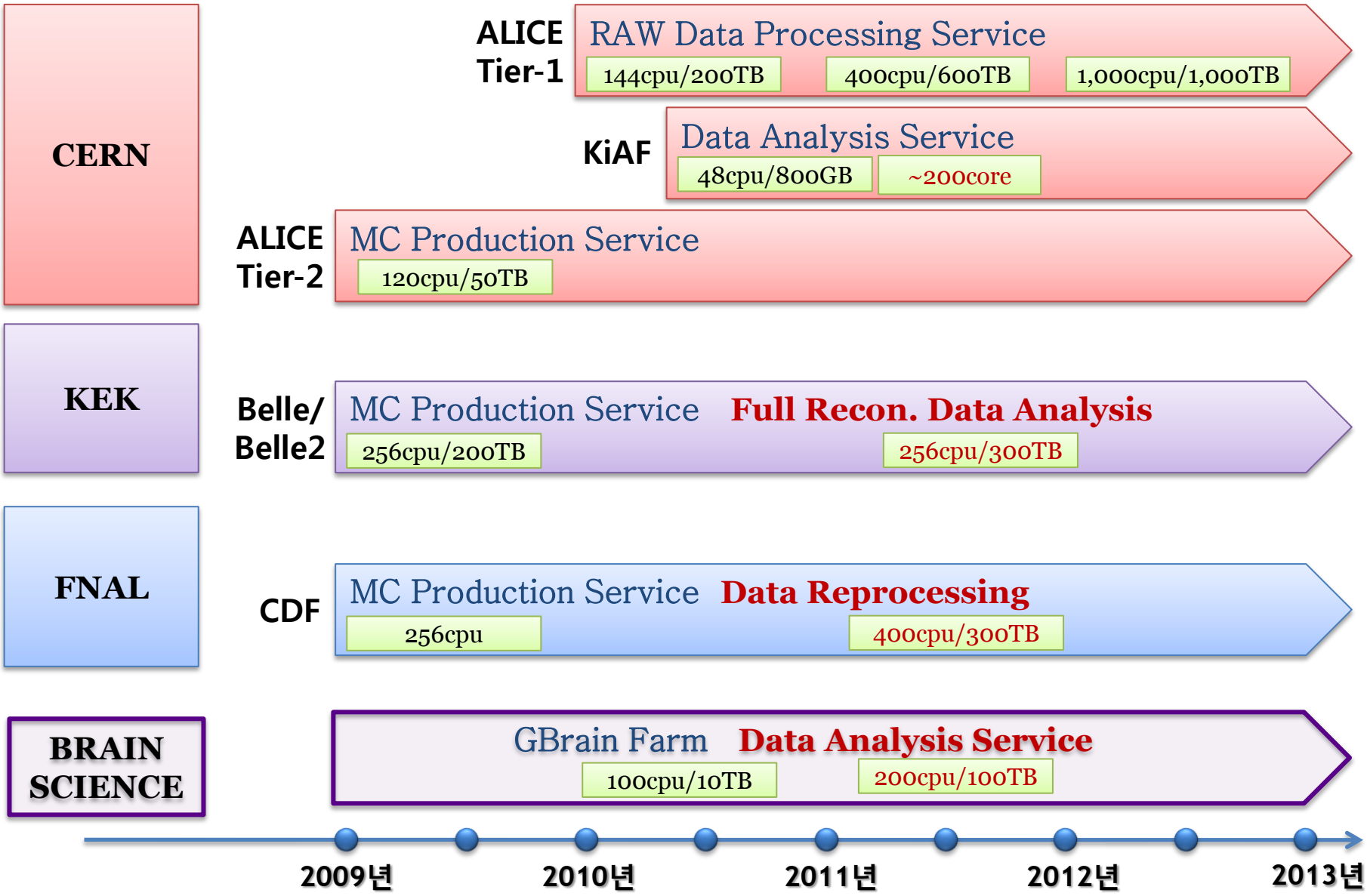
Name	Role
Dr. Haengjin Jang	Director of GSDC
Dr. Hyungwoo Park	Deputy
Dr. Sungyun Yu	Strategy
Mr. Heejun Yun	System admin.
Dr. Christophe Bonnaud	System admin.
Mr. Seunghee Lee	System admin & GBRAIN
Dr. Beobkyun Kim	Belle, ALICE Tier2, KiAF, LIGO
Dr. Seo-young Noh	CDF
Dr. Jonghu Lee	ALICE Tier1 & STAR
Mr. GyeongRyoon Kim	CDF
Ms. Tatyana Khan	Belle & KiAF
Dr. Sulah Ahn	ALICE Tier-1 (Physicist)
Dr. Seokmyun Kwon	Cyber R&ED
Mr. Jin Kim	Cyber R&ED
Mr. Jiwoong Kim	Cyber R&ED
Ms. Gooyeun Baek	General Affairs
Ms. Yongsuk Lee	General Affairs

Network , power , air conditioning support experts from within KISTI

2 more staffs are planned to be hire in 2011

2010 Activities

History of GSDC Service

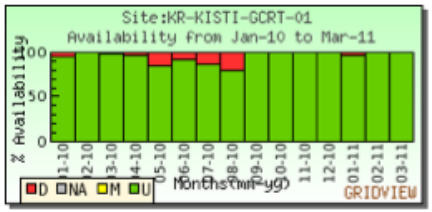


2010 Activities

ALICE Tier-1 prototype	• Completed set-up ALICE Tier-1 test-bed this year • Will provide official service in few years • KiAF (KISTI Analysis Facility for AP region)
ALICE Tier-2	• Site availability: 98% since Feb. 2009 • Served since 2008
Belle & Belle2	• Official Belle data service for Korean Researchers • Belle MC production on Grids (LCG) • Contribution to Belle2 Software Development
CDF	• Providing computing resources under NAMCAF • Supporting CDFSoft development • CDF Data Reprocessing
LIGO	• Testbed of LDG (LIGO Data Grid)
GBRAIN	• Computing resource provision for Neuro Science • Planning to extend CBRAIN to Grid version (mainly from McGill Univ. Canada)
Development	• Tokenless OTP based User Authentication system

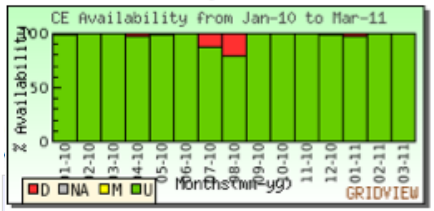
Service Status – EGI

Overall Service Availability for Site:KR-KISTI-GCRT-01 VO:OPS (Monthly Report)

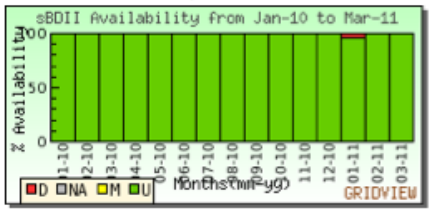


ndividual Service Availability for site:KR-KISTI-GCRT-01 VO:OPS (Monthly Report)

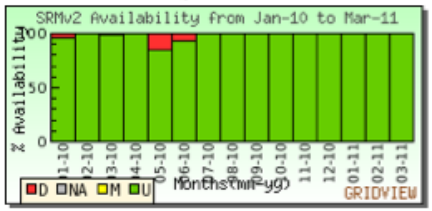
CE



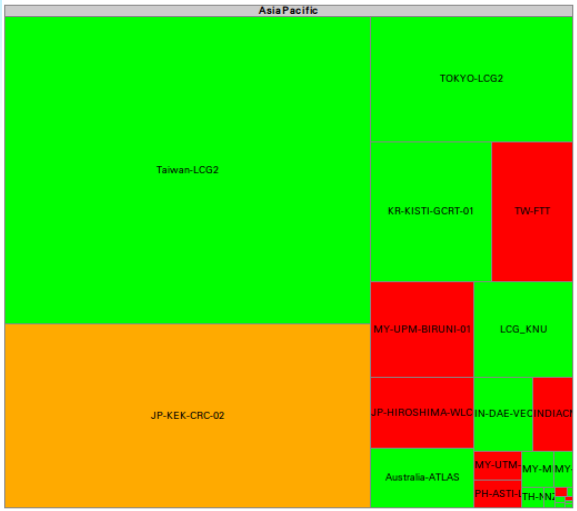
sBDII



SRMv2

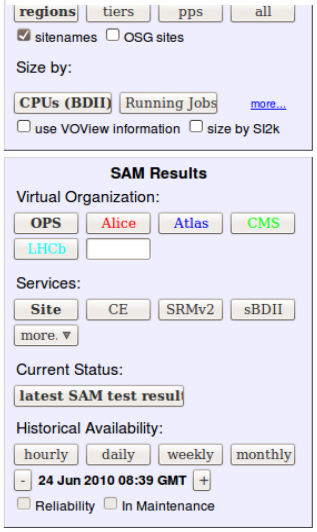


GridMap **– Visualizing the "State" of the Grid**

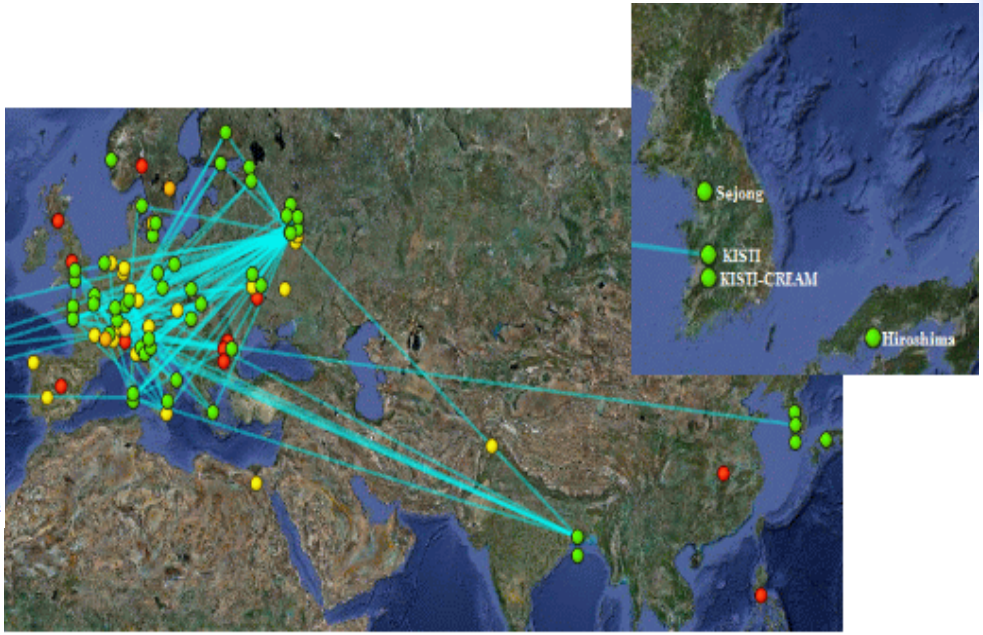


Latest SAM results, Site Status, for 'OPS' VO, 24 Jun 2010 08:39 GMT. Size of site rectangles is number of CPUs from BDII.

Maint Down Degraded Ok



see also EGEE'07 conference presentation on GridMaps and iSGTW article on GridMaps



Service Status - OSG

RSV Status History

Between Aug 1, 2010 and Feb 21, 2011

KISTI-NSDC-01 — OSG Production Resource Group

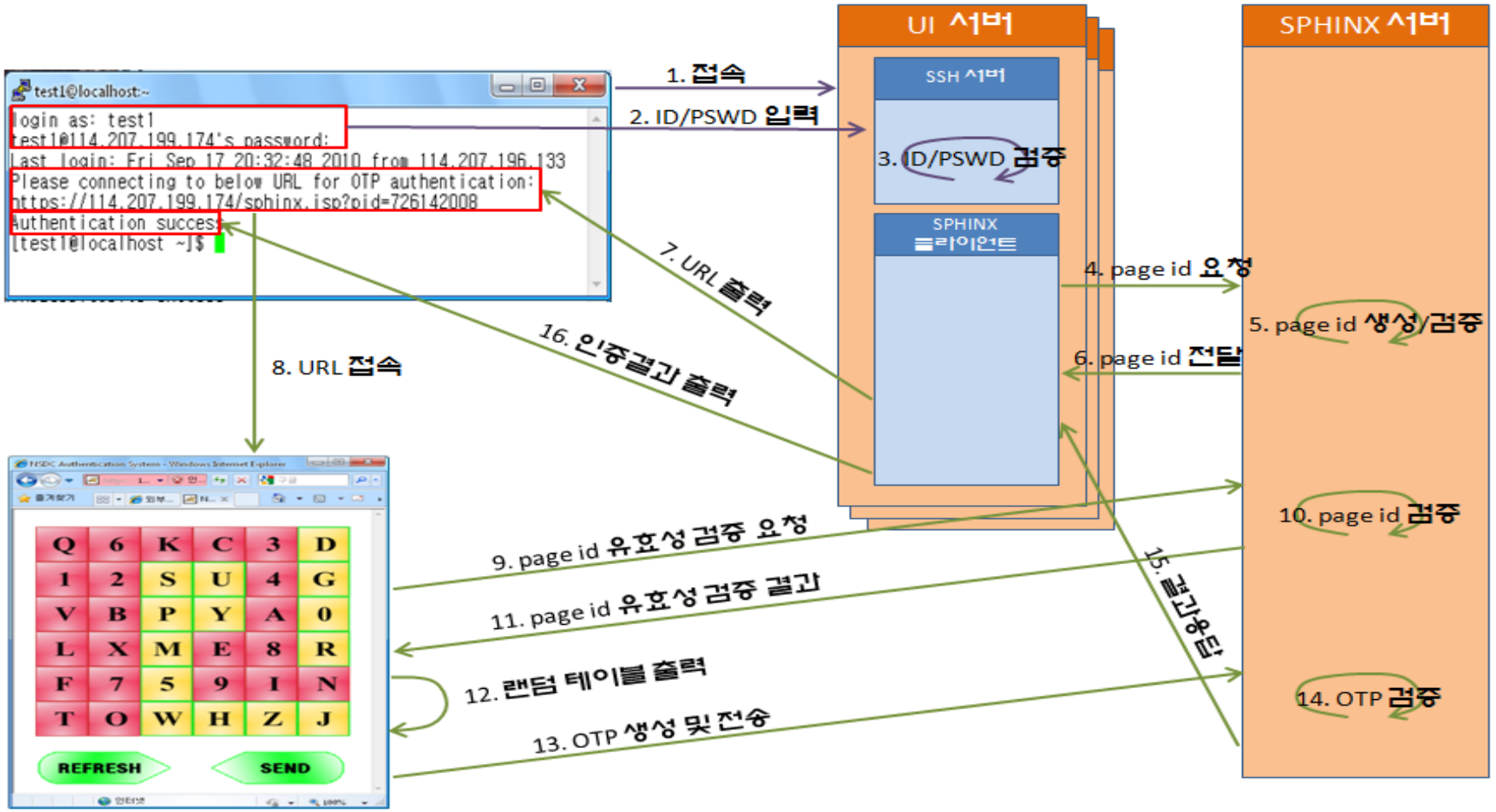
KISTI-NSDC-CE03

CE Service

Sep 21, 2010 | Nov 11, 2010 | Jan 1, 2011 | now |

Development of OTP based Athentication System

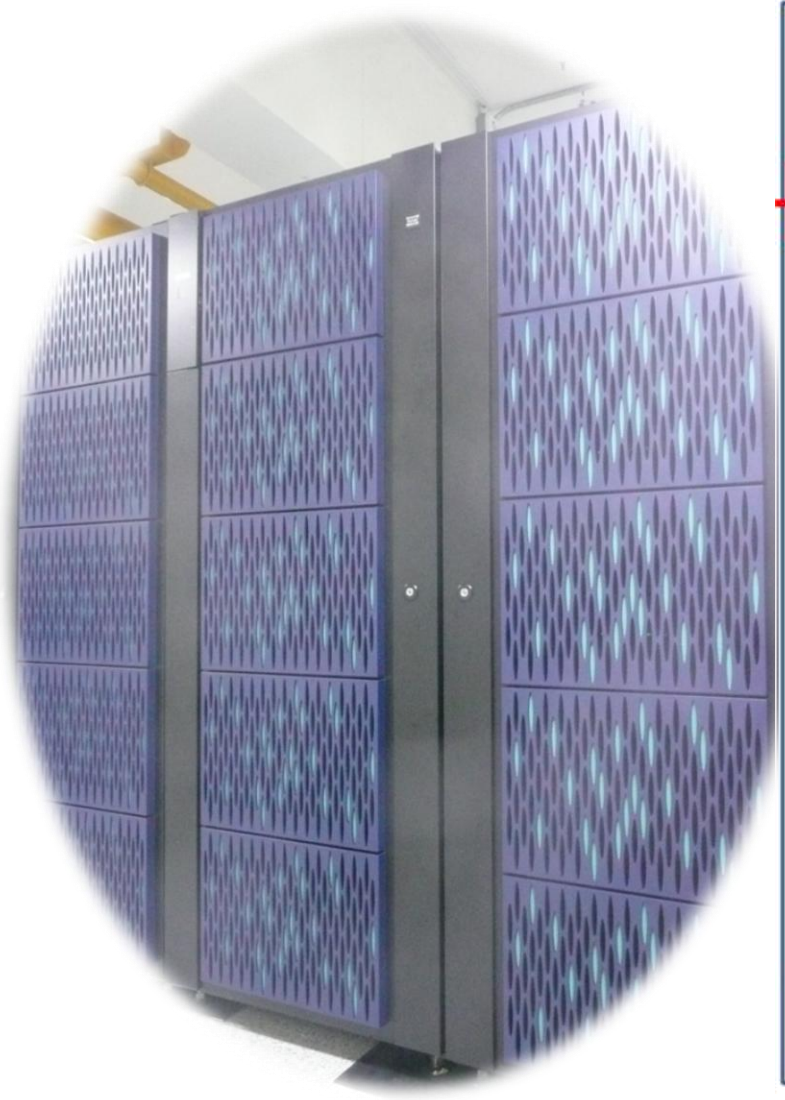
- Tokenless OTP generation by dragging
- Planned to apply in 2011 for local users



GSDC Resources and Status

GSDC Resources

Totally 144 servers (compute node + service node)



CHASSIS 3 192.168.200.144		CHASSIS 2 192.168.200.143		CHASSIS 1 192.168.200.142	
12 36	134.75.123.48	12 24	134.75.123.164	12 12	134.75.123.152
11 35	134.75.123.175	11 23	134.75.123.163	11 11	134.75.123.151
10 34	134.75.123.174	10 22	134.75.123.162	10 10	134.75.123.150
9 33	134.75.123.173	9 21	134.75.123.161	9 9	134.75.123.149
8 32	134.75.123.172	8 20	134.75.123.160	8 8	134.75.123.148
7 31	134.75.123.171	7 19	134.75.123.159	7 7	134.75.123.147
6 30	134.75.123.170	6 18	134.75.123.158	6 6	134.75.123.146
5 29	134.75.123.169	5 17	134.75.123.157	5 5	134.75.123.145
4 28	134.75.123.168	4 16	134.75.123.156	4 4	134.75.123.144
3 27	134.75.123.167	3 15	134.75.123.155	3 3	134.75.123.143
2 26	134.75.123.166	2 14	134.75.123.154	2 2	134.75.123.142
1 25	134.75.123.165	1 13	134.75.123.153	1 1	134.75.123.141
KIAF+CDF		Tier-1 WNs		CDF WNs	

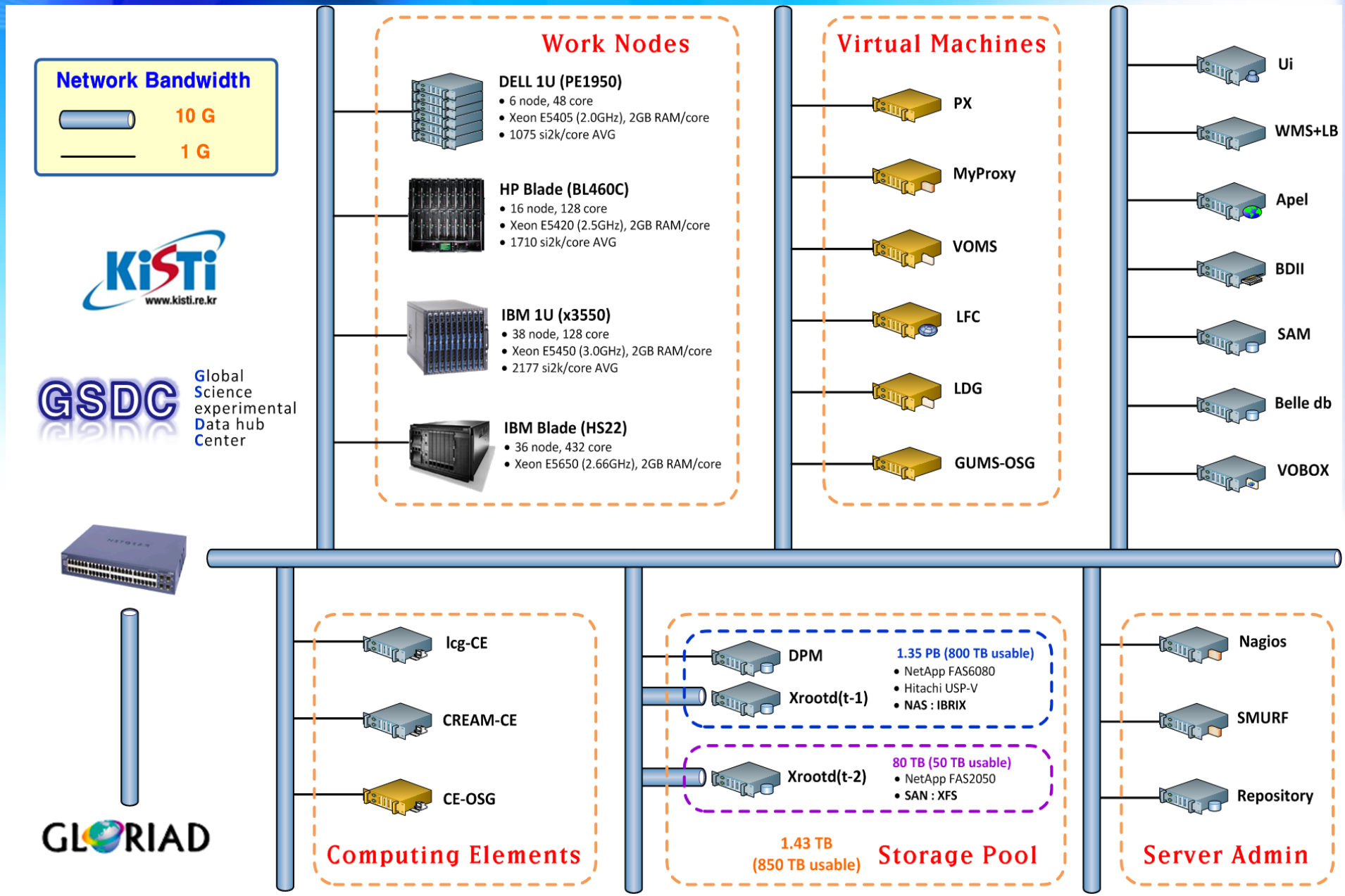
Current Computing Resources: CPUs

Experiment	Cluster	Specification	Memory	Node	Core
ALICE Tier-2	ce-alice	Dell Intel Xeon E5405 2.0 GHz Quad 2 CPU	16GB	6	48
ALICE Tier-2	ce-01	HP Intel Xeon E5420 2.5GHz Quad 2 CPU	16GB	16	128
Belle & etc.	ce-02	IBM Intel Xeon E5450 3.0GHz Quad 2 CPU	16GB	16	148
CDF	ce-03	IBM Intel Xeon E5450 3.0GHz Quad 2 CPU	16GB	16	148
		IBM Intel Xeon X5650 2.67GHz 6 Core 2 CPU	24GB	19	228
ALICE Tier-1 Prototype	ce-12	IBM Intel Xeon X5650 2.67GHz 6 Core 2 CPU	24GB	12	144
KiAF	afmaster01 (kiaf)	IBM Intel Xeon X5650 2.67GHz 6 Core 2 CPU	24GB	4	48

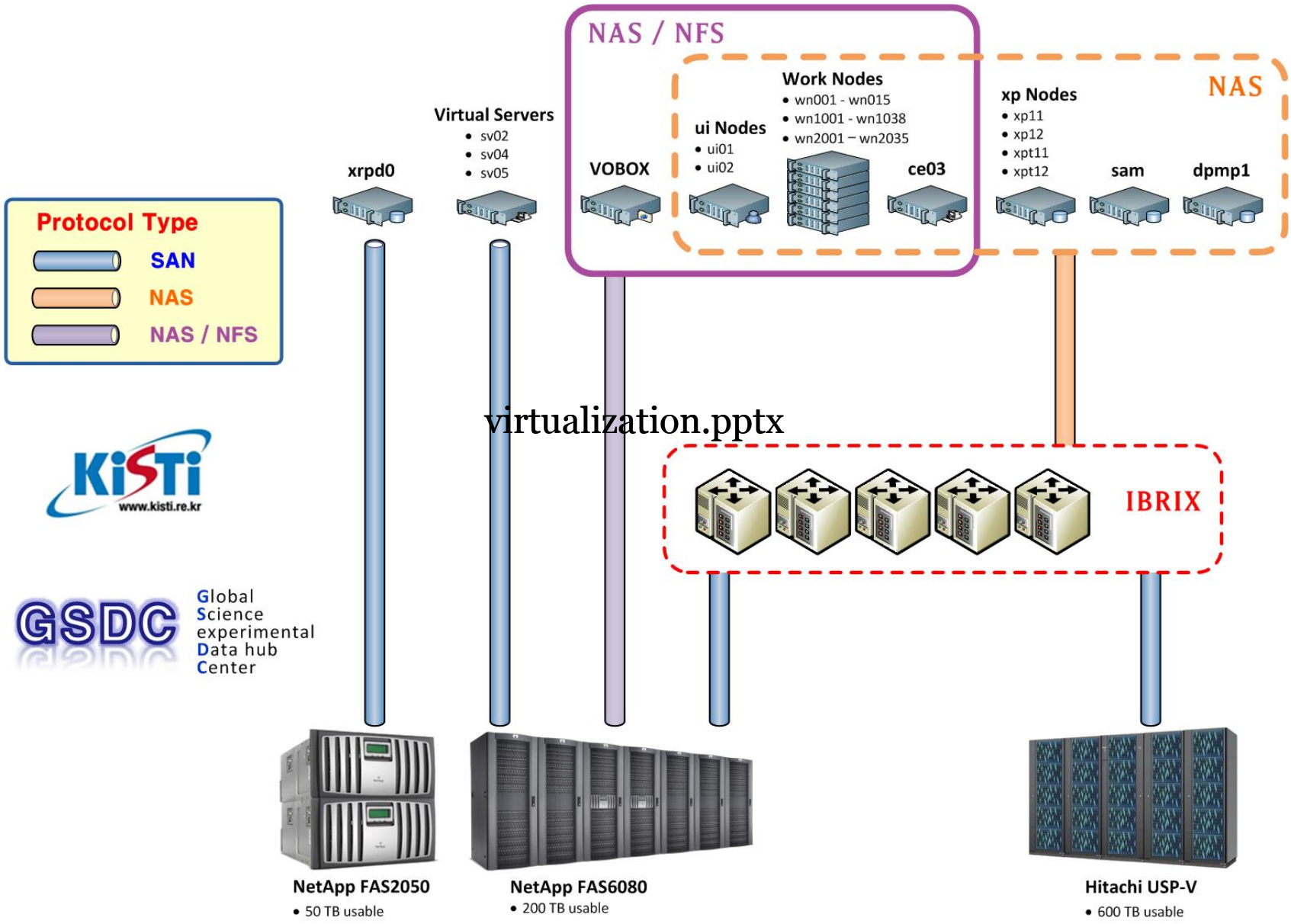
Current Computing Resources: Storage

Experiment	Model	Type	Usable Size
ALICE Tier-1 prototype	Hitachi USP-V	Disk (SAN)	100TB, disk (+100TB, tape emul.)
ALICE Tier-2	NetApp FAS2050	Disk (SAN)	50TB
CDF	Hitachi USP-V	Disk (SAN)	200TB
Belle	Hitachi USP-V	Disk (SAN)	200TB
STAR	NetApp FAS6080	Disk (SAN)	100TB
LIGO, gBrain, etc	NetApp FAS6080	Disk (SAN)	100TB
			850TB

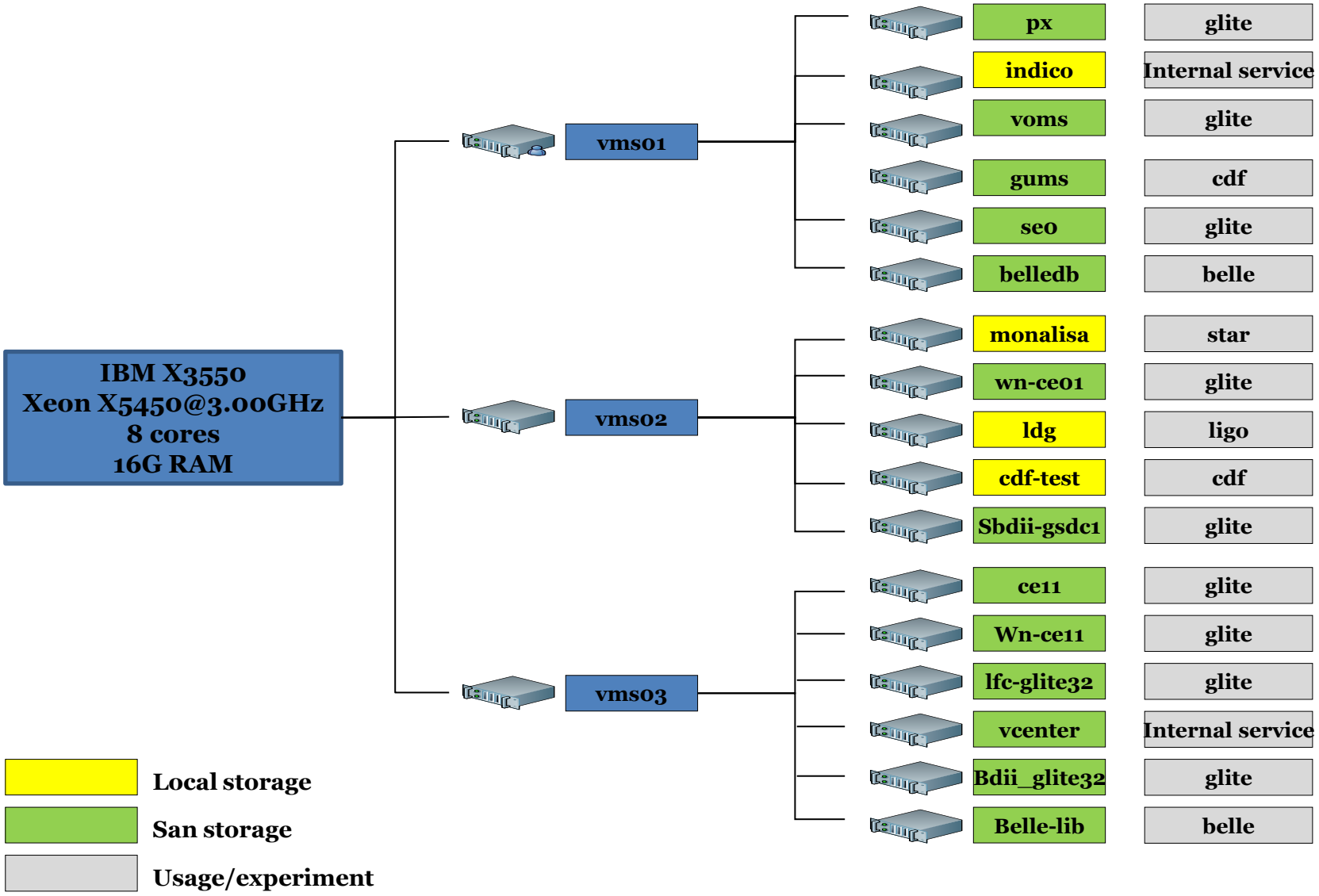
Internal network of resources



Storage architecture



Virtualization with VMWare



Cloud Computing

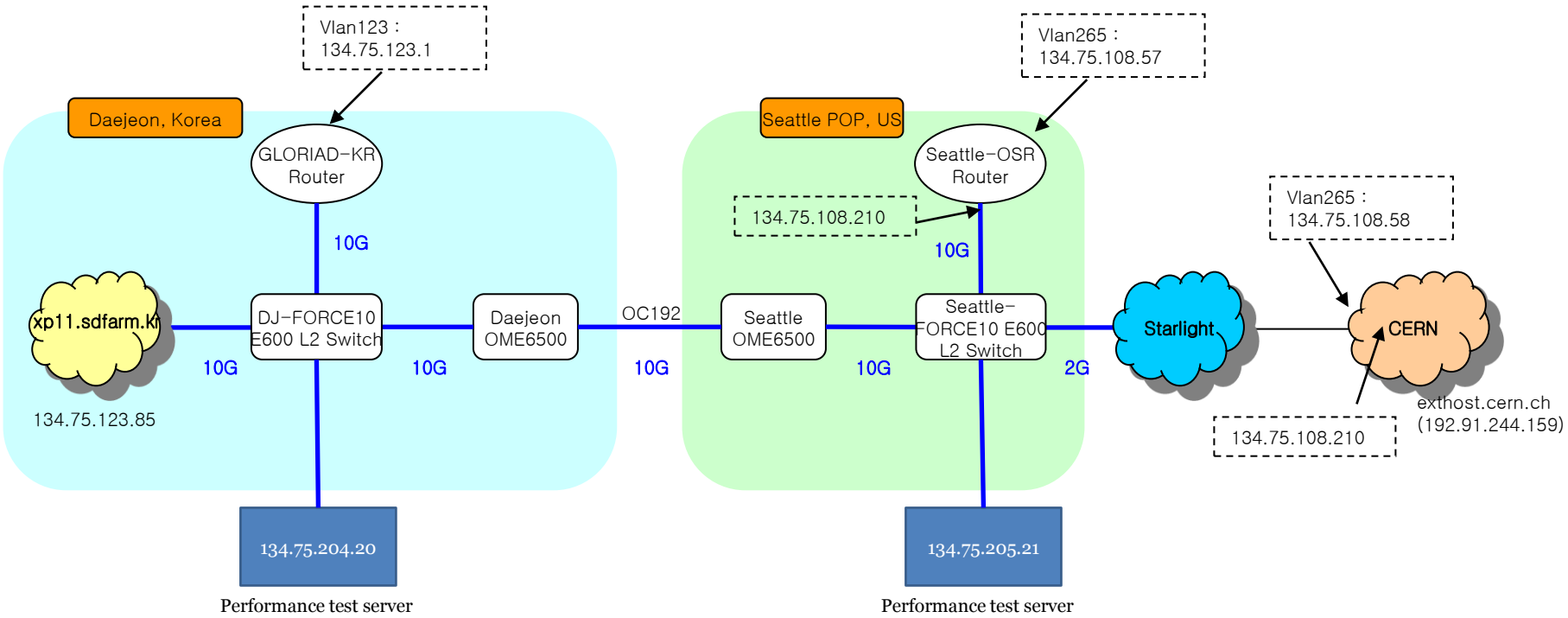
Motivation

- VMware far too expensive: limitation on physical servers
  - Need to be replaced by a free solution!
- Dynamic allocation of computing resources

Testbed

- Few resources for installation test
  - 1 master using OpenNebula
    - 1 client using private ip for VMs (KVM)
    - 1 client using public ip for VMs (KVM)
- More resources will be affected to simulate production environment.
- Need to test other solutions
  - Xen
  - Eucalyptus
  - Nimbus
  - Other?

Network from KISTI to CERN



Preliminary Tier1- Site Status

MonALISA Repository for ALICE

Catalogue browser | Repository Home | Administration Section | ALICE Reports | Events XML Feed | Firefox Toolbar | MonaLisa GUI

Select site: KISTI_GSDC >

MonALISA information Version: 1.9.2 (JDK 1.6.0_22)
Running on: vobox11.sdfarm.kr
Administrator: Jong Hu Lee ⟨jong.hu.lee@cern.ch⟩

Service health NTP: SYNC, offset: 0s

Services status
AliEn: v2-19.64
ClusterMonitor: **OK**
PackMan: **OK**
CE: **OK**
CE info: We could start 2 agents
Max running jobs: 1500
Max queued jobs: 100

Proxies status
AliEn proxy: **OK** (1 day, 23:45)
Delegated proxy: n/a (n/a)
Proxy server: n/a (n/a)
Proxy of the machine: n/a (n/a)

SAM tests
Delegated proxy duration: n/a
Proxy of the machine: n/a
Proxy renewal: n/a
Proxy server registration: n/a
RB status: n/a
Software area: n/a
User proxy registration: n/a
WMS stats: n/a

Current jobs status
Assigned: 0
Running: **105**
Saving: 1

Accounting (last 24h)
Success jobs: **608** (profile)
Failed jobs: **0**
Error jobs: **432**
kSI2k units: **0** / pledged

Site averages (last 24h)
Active nodes: 15.54
Average kSI2k/node:

Storages status

Name	Status	Size	Used	Free	Usage	No of files	Type	ADD test
ALICE::KISTI_GSDC::SE	OK	100 TB	8.566%	0 BB	8.566 TB	224.4 K	File	OK

VoBox health
CPUs: 4x 2000MHz
Mem usage: 38.98% of 3.862 GB
Processes: 157
Sockets: 67 TCP / 25 UDP
Uptime: 16 days, 21:46

CPU usage (last 1h avg)
Load: ***0.153***
User: 0.927%
System: 0.556%
IOWait: 1.012%
Idle: 97.4%
Int: 0.004%
Soft int: 0.056%
Nice: 0.047%
Steal: 0%

AliEn LDAP var	VoBox path	Size	Used	Free	Use%
TMP	/home/sgmalit1/ALICE/tmp	48.43 GB	8.034 GB	38.4 GB	18%
LOG	/home/sgmalit1/alien-logs	48.43 GB	8.034 GB	38.4 GB	18%
CACHE	/home/sgmalit1/ALICE/cache	48.43 GB	8.034 GB	38.4 GB	18%

Preliminary Tier1 - Jobs

Preliminary Tier1 - Storage

SE Name	AliEn name	Size	Used	Free	Usage	No. of files	Type	Size	Used	Free	Version
1. Bari - SE	ALICE::Bari::SE	893.4 TB	68.83 TB	824.6 TB	7.704%	1,923,073	File	1.679 PB	1.438 PB	247 TB	20100510-1509_dbg
2. Bratislava - SE	ALICE::Bratislava::SE	38.2 TB	22.98 TB	15.22 TB	60.16%	705,414	File	38.2 TB	26.49 TB	11.7 TB	20100510-1509_dbg
3. Catania - SE	ALICE::Catania::SE	100.4 TB	88.17 TB	12.23 TB	87.82%	1,978,904	File	100.4 TB	94.33 TB	6.117 TB	20100510-1509_dbg
4. CCIN2P3 - SE	ALICE::CCIN2P3::SE	96 TB	111 TB	-	115.6%	2,253,283	File	-	-	-	
5. CERN - ALICEDISK	ALICE::CERN::ALICEDISK	849.6 TB	713.5 TB	136.1 TB	83.98%	10,748,226	CASTOR	-	-	-	
6. CERN - GLOBAL	ALICE::CERN::GLOBAL	-	0	1.863 TB	-	4,373	root	-	-	-	
7. CERN - SE	ALICE::CERN::SE	20.49 TB	13.63 TB	6.855 TB	66.54%	3,378,942	File	20.46 TB	6.739 TB	13.72 TB	20100510-1509_dbg
8. Clermont - SE	ALICE::Clermont::SE	121 TB	112.8 TB	8.182 TB	93.24%	2,531,992	File	-	-	-	
9. CNAF - SE	ALICE::CNAF::SE	465.7 TB	261.7 TB	204 TB	56.18%	5,579,956	File	465.7 TB	172.6 TB	293.2 TB	20100510-1509_dbg
10. CyberSar_Cagliari - SE	ALICE::CyberSar_Cagliari::SE	30.83 TB	31.86 TB	-	103.3%	858,267	File	92.71 TB	84.52 TB	8.181 TB	20100510-1509_dbg
11. Cyfronet - SE	ALICE::Cyfronet::SE	10 TB	11.53 TB	-	115.3%	513,646	File	9.995 TB	9.36 TB	649.8 GB	20100510-1509_dbg
12. FZK - SE	ALICE::FZK::SE	762.4 TB	454.1 TB	308.3 TB	59.56%	7,583,567	File	762.4 TB	733.1 TB	29.29 TB	20100510-1509_dbg
13. Grenoble - DPM	ALICE::Grenoble::DPM	72 TB	5.897 TB	66.1 TB	8.191%	194,009	SRM	-	-	-	
14. GRIF_IPNO - DPM	ALICE::GRIF_IPNO::DPM	85.24 TB	76.45 TB	8.789 TB	89.69%	2,117,745	SRM	-	-	-	
15. GRIF_IPNO - SE	ALICE::GRIF_IPNO::SE	136.1 TB	93.33 TB	42.77 TB	68.58%	2,612,690	File	153.1 TB	99.05 TB	54.08 TB	20100510-1509_dbg
16. GRIF_IRFU - DPM	ALICE::GRIF_IRFU::DPM	171 TB	34.59 TB	136.4 TB	20.23%	705,289	SRM	-	-	-	
17. GSI - SE	ALICE::GSI::SE	312.6 TB	321.1 TB	-	102.7%	6,041,594	File	0	0	0	20100510-1509_dbg
18. HHLR_GU - SE	ALICE::HHLR_GU::SE	200 TB	2 KB	200 TB	0%	1	File	-	-	-	
19. Hiroshima - SE	ALICE::Hiroshima::SE	79 TB	15.63 TB	63.37 TB	19.78%	484,499	File	78.78 TB	17.87 TB	60.91 TB	20100510-1509_dbg
20. IHEP - SE	ALICE::IHEP::SE	35.55 TB	7.107 TB	28.44 TB	19.99%	453,677	File	36.38 TB	7.029 TB	29.35 TB	20100510-1509_dbg
21. IPNL - SE	ALICE::IPNL::SE	36 TB	46.94 TB	-	130.4%	1,061,518	File	37.3 TB	32.52 TB	4.772 TB	20100510-1509_dbg
22. ISS - FILE	ALICE::ISS::FILE	140.5 TB	50.29 TB	90.21 TB	35.79%	2,130,029	File	140.5 TB	53.99 TB	86.5 TB	20100510-1509_dbg
23. ITEP - SE	ALICE::ITEP::SE	100 TB	33.95 TB	66.05 TB	33.95%	887,059	File	99.93 TB	32.46 TB	67.47 TB	20100510-1509_dbg
24. JINR - SE	ALICE::JINR::SE	112.3 TB	47.81 TB	64.5 TB	42.57%	2,528,119	File	149.1 TB	43.64 TB	105.5 TB	20100510-1509_dbg
25. KFKI - SE	ALICE::KFKI::SE	39.34 TB	25.29 TB	14.04 TB	64.3%	622,778	File	36.38 TB	31.55 TB	4.825 TB	20100510-1509_dbg
26. KISTI_GSDC - SE	ALICE::KISTI_GSDC::SE	100 TB	8.574 TB	91.43 TB	8.574%	230,399	File	101.8 TB	12.13 TB	89.65 TB	20100510-1509_dbg
27. KISTI - SE	ALICE::KISTI::SE	49.95 TB	23.49 TB	26.46 TB	47.02%	570,164	File	49.95 TB	17.7 TB	32.25 TB	20100510-1509_dbg
28. Kolkata - SE	ALICE::Kolkata::SE	73.24 TB	11.61 TB	61.63 TB	15.86%	314,651	File	-	-	-	

KiAF (KISTI Analysis Facility) Testbed

ALICE PROOF Clusters

What is this about?

Cluster list

	Cluster					ROOT	Aggregated disk space			AF xrootd		xrootd
Name	Online	Status	Proof master	Workers	Users	Version	Total	Free	Used	Running	Latest	Version
1. CAF		Stable	alice-caf.cern.ch	160	2	v5-27-06c	115.7 TB	40.71 TB	74.96 TB	1.0.39	1.0.39	20100510-1509_dbg
2. JRAF		Maintenance sin...	jraf.jinr.ru	8	0	v5-27-06c	2.014 TB	1.858 TB	160 GB	1.0.38	1.0.38	20100510-1509_dbg
3. KIAF		Maintenance sin...	kiaf.sdfarm.kr	48	0	v5-27-06c	798.2 GB	199.2 GB	599 GB	1.0.38	1.0.38	20100510-1509_dbg
4. SAF		Maintenance sin...	nansafmaster.in2p3.fr	48	0	v5-27-06c	12.07 TB	2.6 TB	9.472 TB	1.0.39	1.0.39	20100510-1509_dbg
5. SKAF		Stable	skaf.saske.sk	60	1	v5-27-06c	53.72 TB	30.41 TB	23.32 TB	1.0.39	1.0.39	20100510-1509_dbg
6. SKAF_TEST		Testing	skaf-test.saske.sk	2	0	v5-27-06c	815.9 GB	676.7 GB	139.2 GB	1.0.38	1.0.38	20100510-1509_dbg
7. TAF		Open to local u...	pmaster.to.infn.it	16	0	v5-27-06c	3.914 TB	105.6 GB	3.811 TB	1.0.38	1.0.38	20100510-1509_dbg
Total				**342**	**3**		**189 TB**	**76.53 TB**	**112.4 TB**			

2011 Plan

Resource Plan

The procurement of resources in every year

Planned new resources

- 800~ cores
- Around 1PB usable disk space
- KiAF resources
  - ❖ Now, under negotiation with enterprises
- Re-arrangement of internal network

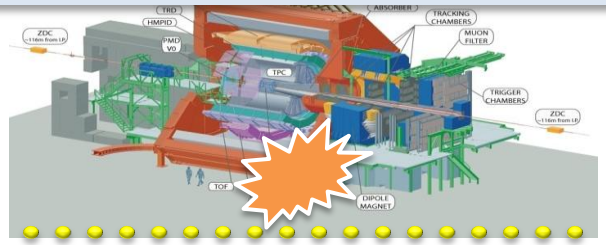
Allocation plan

- Preliminary ALICE Tier1
  - ❖ 400~500 cores (144 (2010) + 300~400 (new))
  - ❖ 1PB disk (200TB (2010) + 800TB (new))
- KiAF resources designed for AF

Preliminary Tier1

Preliminary Tier1 in 2011

- Will be mainly focused on collaborative processing of ESD Data between KISTI, GWNU, INFN



RAW Data

Tier-0 (CERN)

ESD

KISTI

ESD Analysis

Tier-1

Simulation

Tier-2

KISTI – GWNU – INFN

KiAF (KISTI Analysis Facility for ALICE)

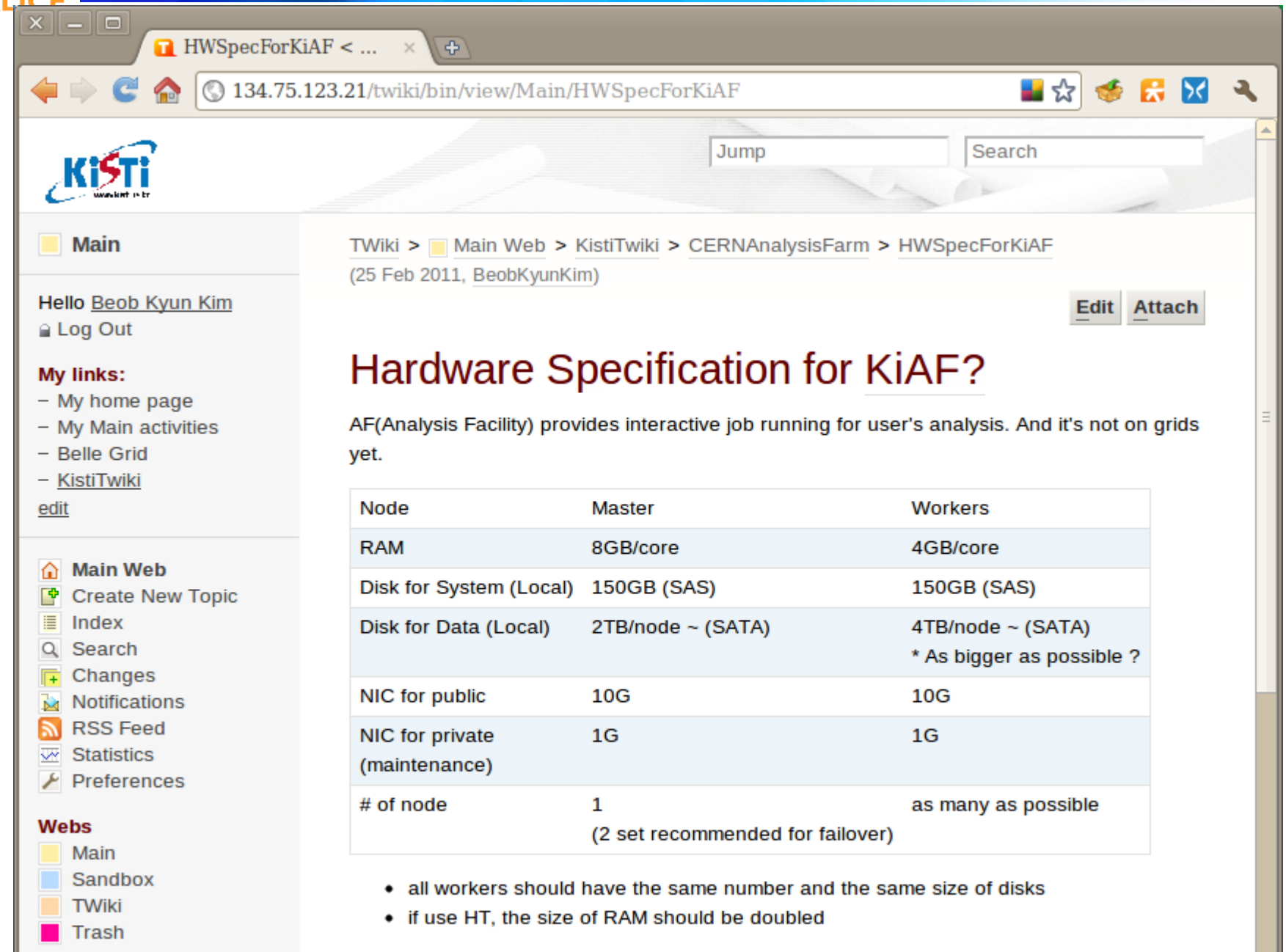
KiAF 2010

- Resources that used for KiAF testbed were not designed for AF
  - Insufficient memory and disk

KiAF 2011

- Test on the use of networked storage for AF
  - Recommendation : Infiniband
  - Test if parallel filesystem can cover this requirement
- New resources designed for AF will be introduced
  - 100~ cores
  - 4GB/core RAM, 4~8TB/node Disk, 10Gb x 2 Ethernet
- Will be tested by Korean Researchers first
- And will be open to ALICE users in AP region
- Initiative researches with GWNU & Konkuk Univ. Team

Planned Hardware for KiAF



HWSpecForKiAF < ...

134.75.123.21/twiki/bin/view/Main/HWSpecForKiAF

KiSTi

Jump Search

Main

Hello Beob Kyun Kim
Log Out

My links:
- My home page
- My Main activities
- Belle Grid
- KistiTwiki

edit

Main Web
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Sandbox
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Trash

TWiki > Main Web > KistiTwiki > CERNAnalysisFarm > HWSpecForKiAF
(25 Feb 2011, BeobKyunKim)

Edit Attach

Hardware Specification for KiAF?

AF(Analysis Facility) provides interactive job running for user's analysis. And it's not on grids yet.

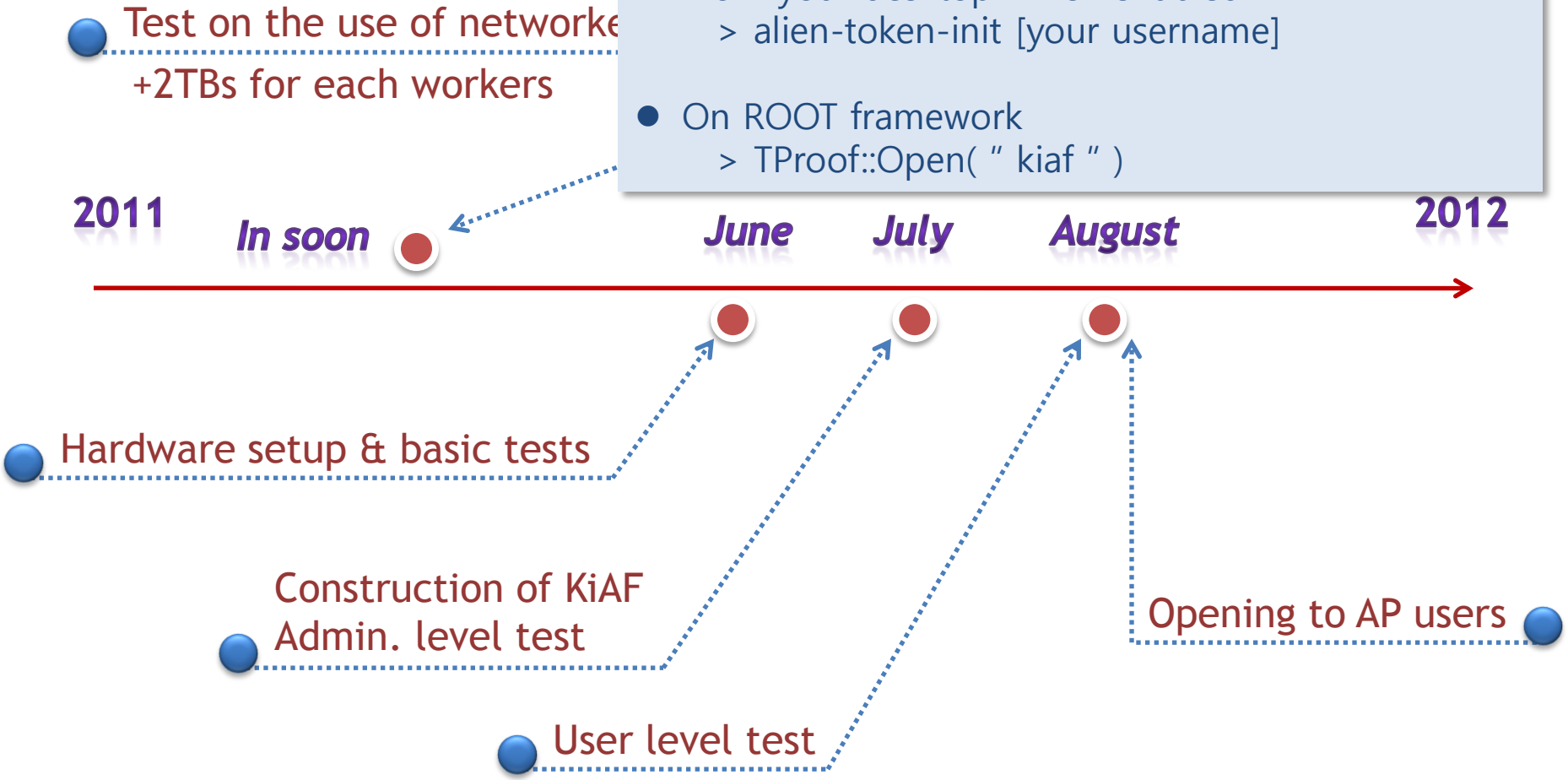
Node	Master	Workers
RAM	8GB/core	4GB/core
Disk for System (Local)	150GB (SAS)	150GB (SAS)
Disk for Data (Local)	2TB/node ~ (SATA)	4TB/node ~ (SATA) * As bigger as possible ?
NIC for public	10G	10G
NIC for private (maintenance)	1G	1G
# of node	1 (2 set recommended for failover)	as many as possible

- all workers should have the same number and the same size of disks
- if use HT, the size of RAM should be doubled

Expected timeline for KiAF resources

How to access KiAF from your desktop

- From your desktop which enabled AliEn
  > alien-token-init [your username]
- On ROOT framework
  > TProof::Open(" kiaf ")



CDF Data Reprocessing

- Continue supporting CDF Data Reprocessing, since 2010
  - 1 SAM expert, 1 OSG expert, and sysadmin Group support

Visiting Research to FNAL

- Planned to visit FNAL for around 3 months
  - topics are being narrowed down
  - Adapt developed technology to support GSDC users

User Support

- SAM & CDFSoft enabled
- With 404 core & 200TB disk

Full-recon Data Analysis Support

- Generation of full-recon data of Belle
- Support full-recon data analysis
  - Yonsei Univ. team

Support Belle2 Software

- Continue supporting Belle2 LSDH Software & DS computing

Support Belle Grid Activity

- MC production and User analysis on Grid

User Support

- belledb & CDFSoft enabled
- With 104 core & 200TB disk

Continue supporting Data Intensive Researches

LDG (LIGO)

- Extend LDG testbed with Storage
- An initiative research on Gravitational-wave signals

STAR

- Asian Hub for STAR experiment

GBRAIN

- Extend Neuro science support on Grids
- Development of neuro image banking system (with Hanyang Univ.)

RENO

- Reactor experiment for neutrino oscillation at Yonggwang plant
- Provide Tier0 function / 10G connection KISTI-plant
- Support SNU team

Development

- Deployment of Tokenless OTP authentication service
- Some issues that are now in negotiation with CERN, FNAL, and others


Thank you!