Day-3 on Sun 19 April
ACFA: Sim/Rec/Opt at Room 202 of Epochal

KEK
High Energy Accelerator Research Organization

Current Status and Recent Activities on Grid at KEK

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On behalf of KEK Data Grid Team

TILC09
Tsukuba, Japan
April 17 – 21, 2009

Outline

1. Current Status
   - Our role on Grid
   - Deployment Status
   - Operation Statistics
   - Ongoing works for ILC (and potentially other VOs)
2. Activities regarding Grid
   - SAGA: Simple API for Grid Applications
   - RNS: Resource Namespace Service
3. Summary

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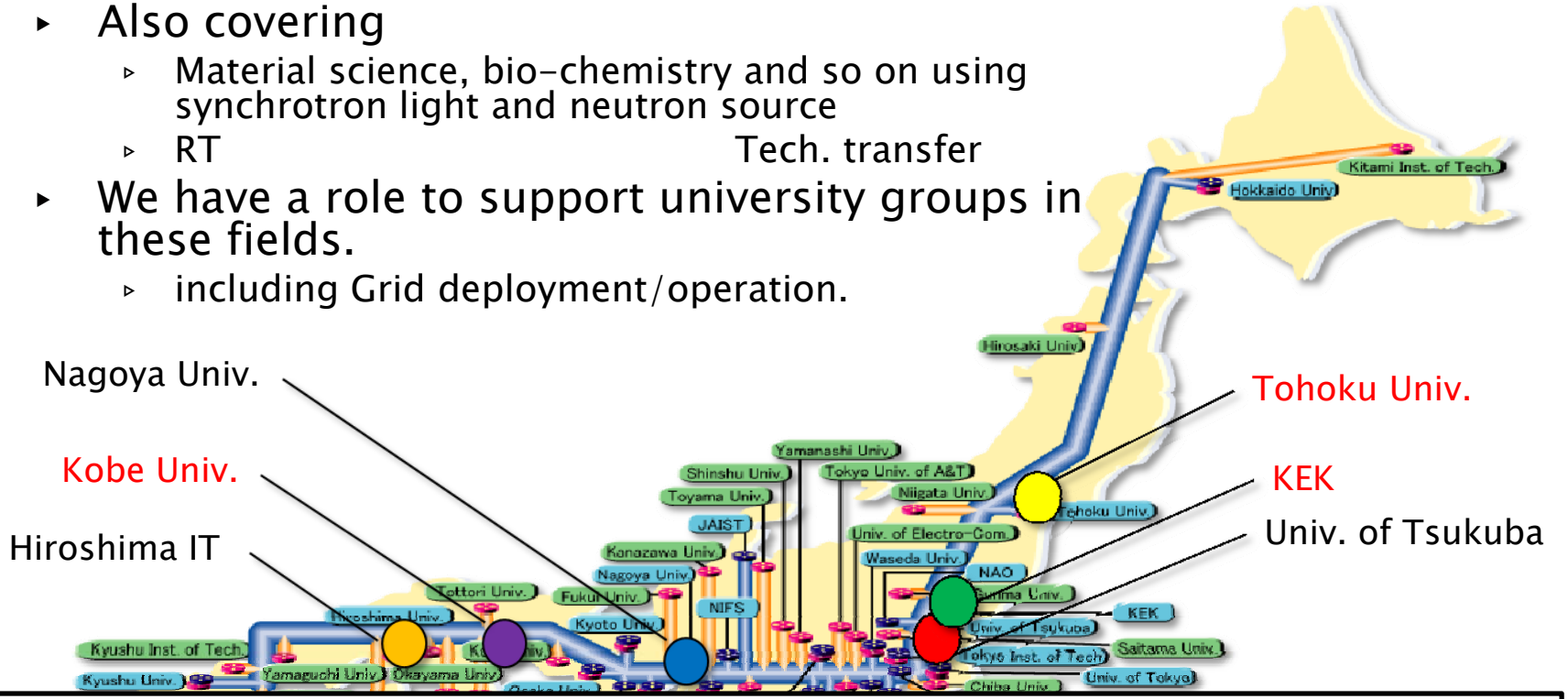
Current Status

- KEK's role on Grid
- Deployment status
- Resource scale
- Ops stats

Introduction

- Major HEP projects:
  - Belle, J-PARC, ATLAS — ongoing projects
  - ILC, Super-Belle — future projects
- Also covering
  - Material science, bio-chemistry and so on using synchrotron light and neutron source
  - RT — Tech. transfer
- We have a role to support university groups in these fields.
  - including Grid deployment/operation.



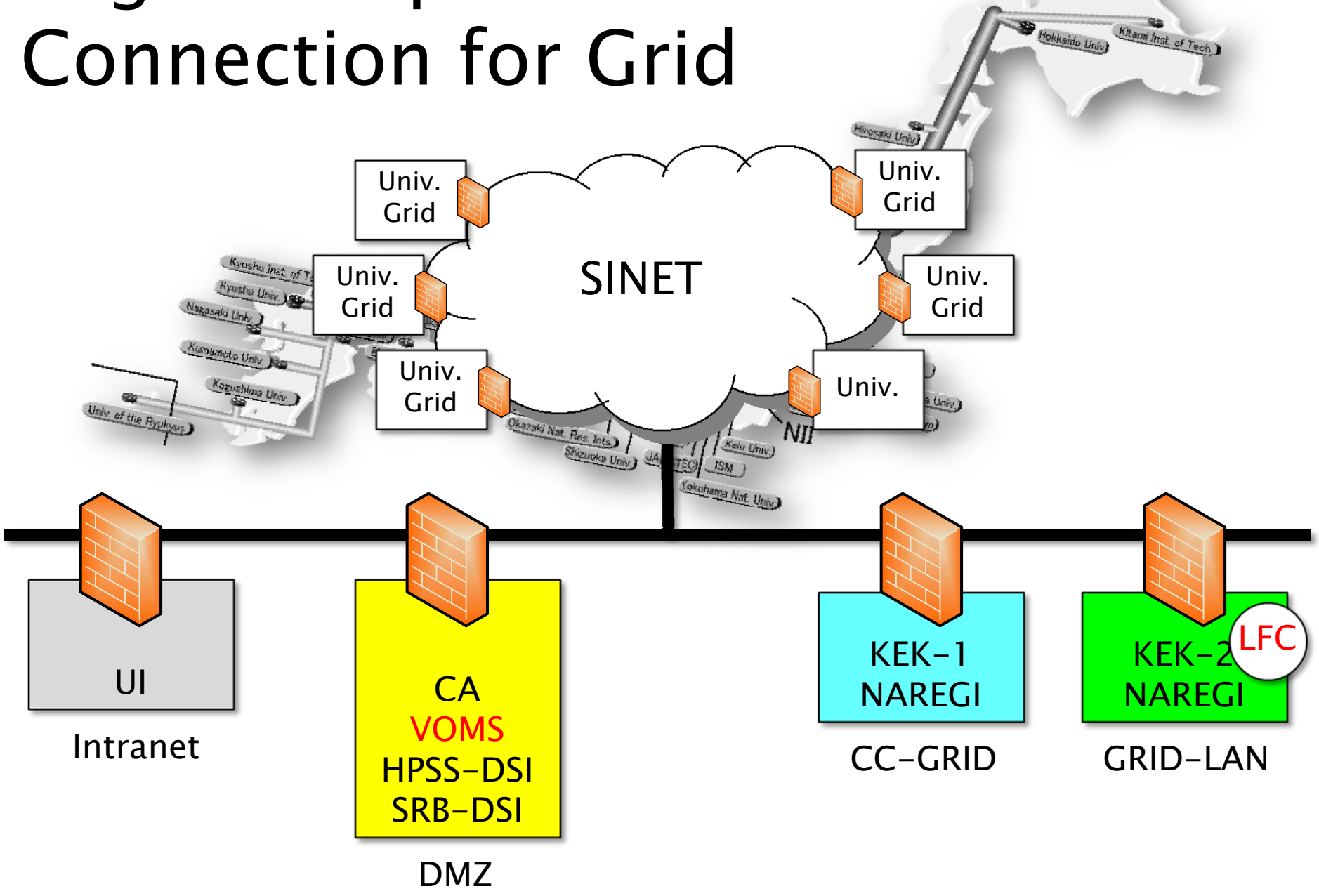

```
# Quoted from http://bdii-conf.cc.kek.jp/lcg2-sites.conf
# Kobe University
JP-KOBE-U-01        ldap://grid02.kobe.jp.hep.net:2170/mds-vo-name=JP-KOBE-U-01,o=grid

# Tohoku University
JP-TOHOKU-U-01      ldap://grorie02.awa.tohoku.ac.jp:2170/mds-vo-name=JP-TOHOKU-U-01,o=grid
```

KEK's Contribution in EGEE-III

- TSA1.1: Grid Management
  - Interoperability and collaboration
- TSA1.2: Grid operations and support
  - 1st line support for operations problems
  - Middleware deployment and support
    - a) Coordination of middleware deployment and support for problems.
    - b) Regional certification of middleware releases if needed (outside of PPS and SA3 involvement). This is anticipated to be very rare and will require specific justification.

Logical Map Focused on Network Connection for Grid



Brief Summary of LCG Deployment

JP-KEK-CRC-01 (KEK-1)

- Production in GOC since Nov 2005
- Mainly operated by KEK staffs
- Site Role:
  - Practical operation for KEK-2
  - Getting' started for university groups
- Resource and Component:
  - SL-3x or SL-4x
  - gLite-3.X
  - CPU: 14
  - Storage: ~7TB for disk and DSI for HSM, HPSS
  - Fully functional services
- Supported VOs:
  - belle apdg ail g4med dteam ops ppj ilc calice naokek

In plan to upgrade
In Q1 of FY2009

JP-KEK-CRC-02 (KEK-2)

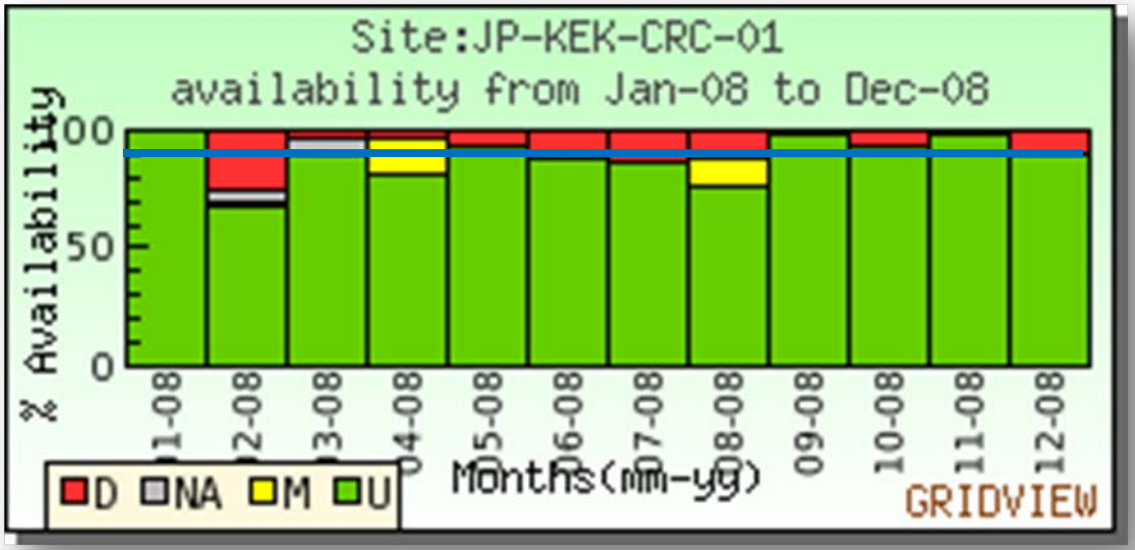
- Production in GOC since early 2006
- Site Role:
  - More stable services based on KEK-1 experiences.
- Resource and Component:
  - SL-3x or SL-4x
  - gLite-3.X
  - CPU: 48
  - Storage: ~1TB for disk
  - Fully functional services
- Supported VOs:
  - belle apdg ail g4med dteam ops ppj ilc calice naokek

Fully upgrade and up soon!

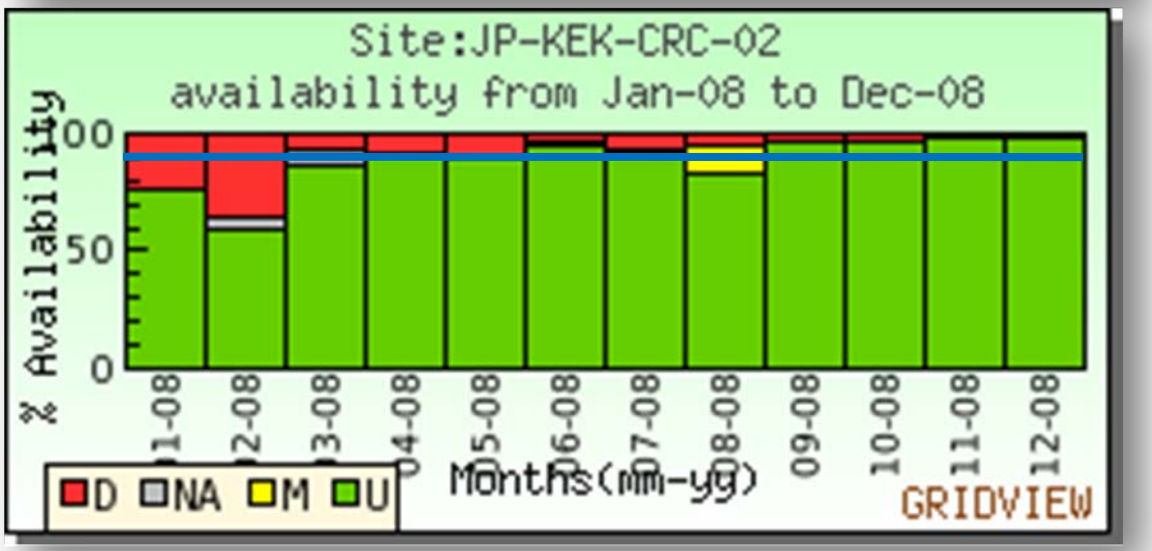
- ✓ 10WNs x 4 cores x 2CPUs x ~4kSI2K = 3.2MSI2K
- ✓ Storage capability on demand basis
  - ✓ HPSS virtually works as the backend disk of SE
  - ✓ ~200US$/1TB
- ✓ VM (Xen) technologies are widely supported in whole site
  - ✓ Higher availability & more robustness
- ✓Old blade servers (Belle Exp. Comp.) are integrated with KEK-2
  - ✓250 x 2CPUs x 1.9kSI2K = 1MSI2K

SD & GUS Ticketing Jan-Dec 2008

90% SA achievement between Jan and Dec 2008



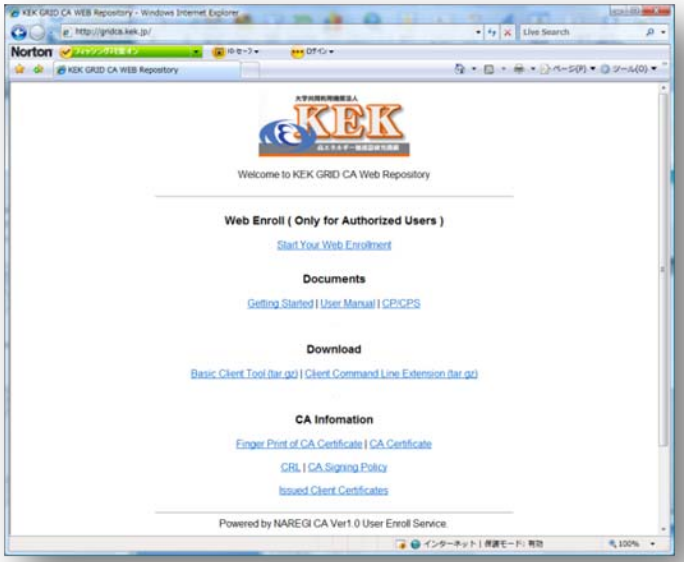
- 931H/12SD
- 13 tickets were opened, but solved all



- 127H/4SD
- 12 tickets were opened, but solved all

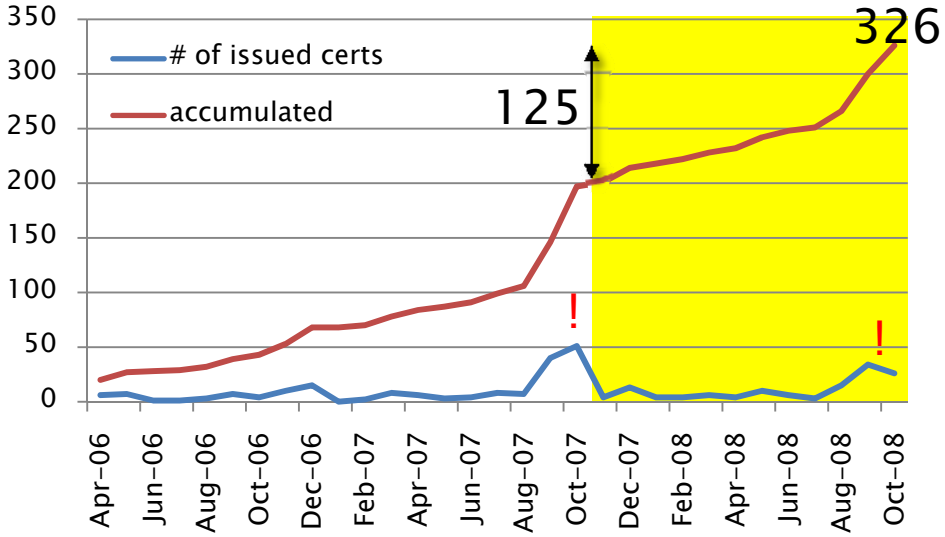
KEK Grid CA

gridca.kek.jp

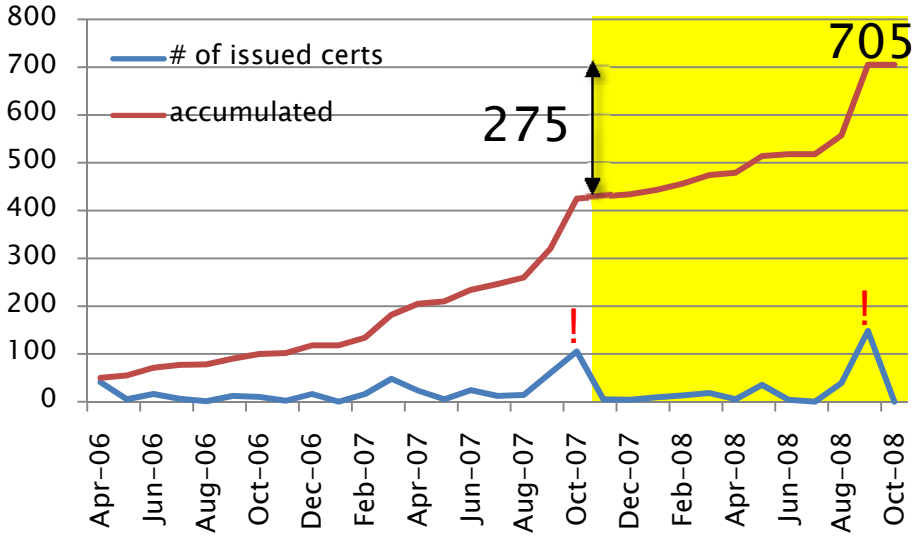


- Accredited by APGrid PMA
- Since Feb 2006
- Personal cert: 326
  - 125 of 326 for past 1 year (i.e. between Nov 2007 and Oct 2008)
  - Valid: 84 of 326
- Host cert: 705
  - 275 of 705 for past 1 year
  - Valid: 196 of 705

Personal Certificate as of Oct 2008

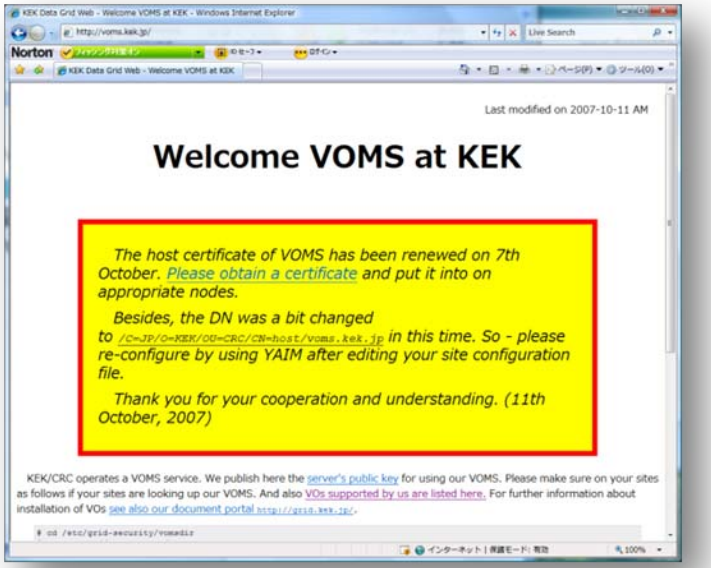


Host Certificate as of Oct 2008



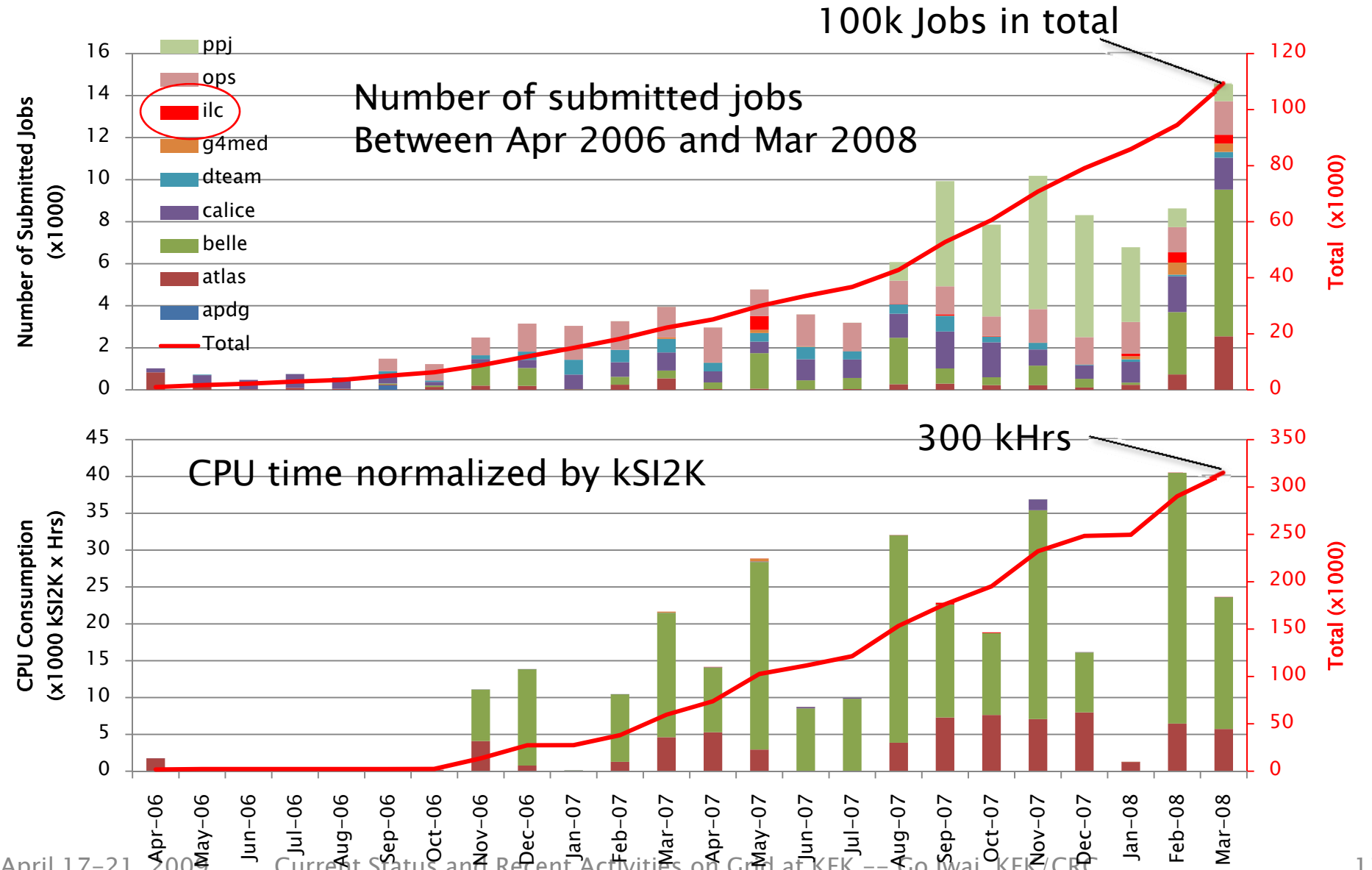
VOMS

- DN has been changed
  - /C=JP/O=KEK/OU=CRC/CN=host/voms.kek.jp
- Still on gLite-3.0 basis
  - Upgrade while next power cut on August 2009
  - Hostname will be renamed voms.cc.kek.jp
- Supported VOs
  - belle
  - ppj
  - naokek
  - g4med
  - apdg
  - ail
  - atlasj



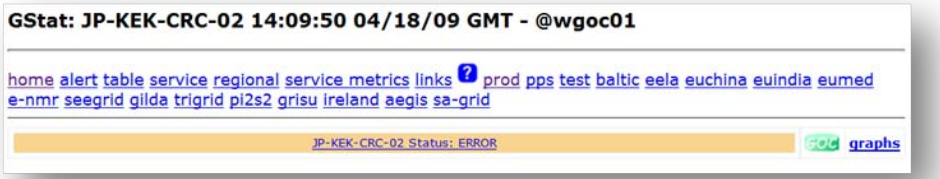
voms.kek.jp

Ops Stats: JFY2006 & JFY2007



Summary of Current Status

http://goc.grid.sinica.edu.tw/gstat/JP-KEK-CRC-02/



- Grid Infrastructure
  - gLite
    - KEK-1
      - Will be upgraded in Q1of FY2009
    - KEK-2
      - Upgraded on March 2009
        - Final state to pass certificate process
      - Storage capability by requirement on basis
      - 3.2 MSI2K sharing by every VOs
        - 1MSI2K only for belle so far
  - NAREGI
    - HIT (Computing Science), NAO (Astronomy) and KEK are ready to use
- Action Items and Ongoing Works
  - Slow file transferring between DESY and KEK
    - Investigating by Kars, Martin and Soh
  - Network Forecast
    - DESY-IN2P3-KEK
    - Basic metics: e.g. RTT/TCP/GridFTP
  - FTS dedicated transferring channel

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Recent Activities

- SAGA
- RNS

Grid Deployment at KEK Middleware/Experiment Matrix

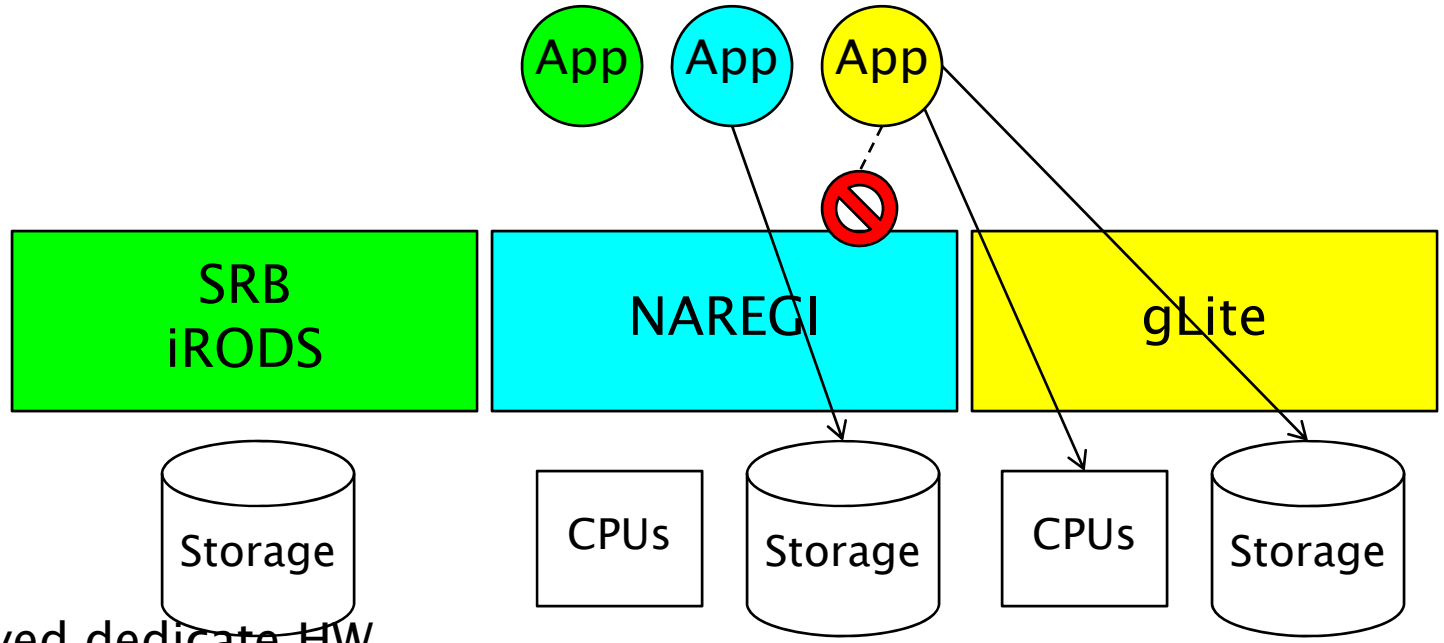
- Commonly most of experiment or federation are using gLite as the Grid middleware.
- NAREGI middleware is being deployed as the general purpose e-science infrastructure in Japan
  - Difficulties: e.g. human costs, time differences
  - Both interops among MWs are mandate for us (next a few slides)
    - To provide higher availability, reliability and to keep prod. quality

	gLite	NAREGI	Gfarm	SRB	iRODS
Belle	Using	Planning	Using	Using	
Atlas	Using				
Radio therapy	Using	Developing	Planning		
ILC	Using	Planning	Planning		
J-PARC	Planning	Planning	Planning		Testing
Super-Belle	To be decided by 2010				

Issues on Multi Middleware Apps

- For site admins:
  - Dedicate HW is deployed in each middleware
    - LRMS
    - OS
- For end users:
  - By ordinal way, same apps for each middle are developed to be enabled on Grid
  - They have to know which middleware they are using.

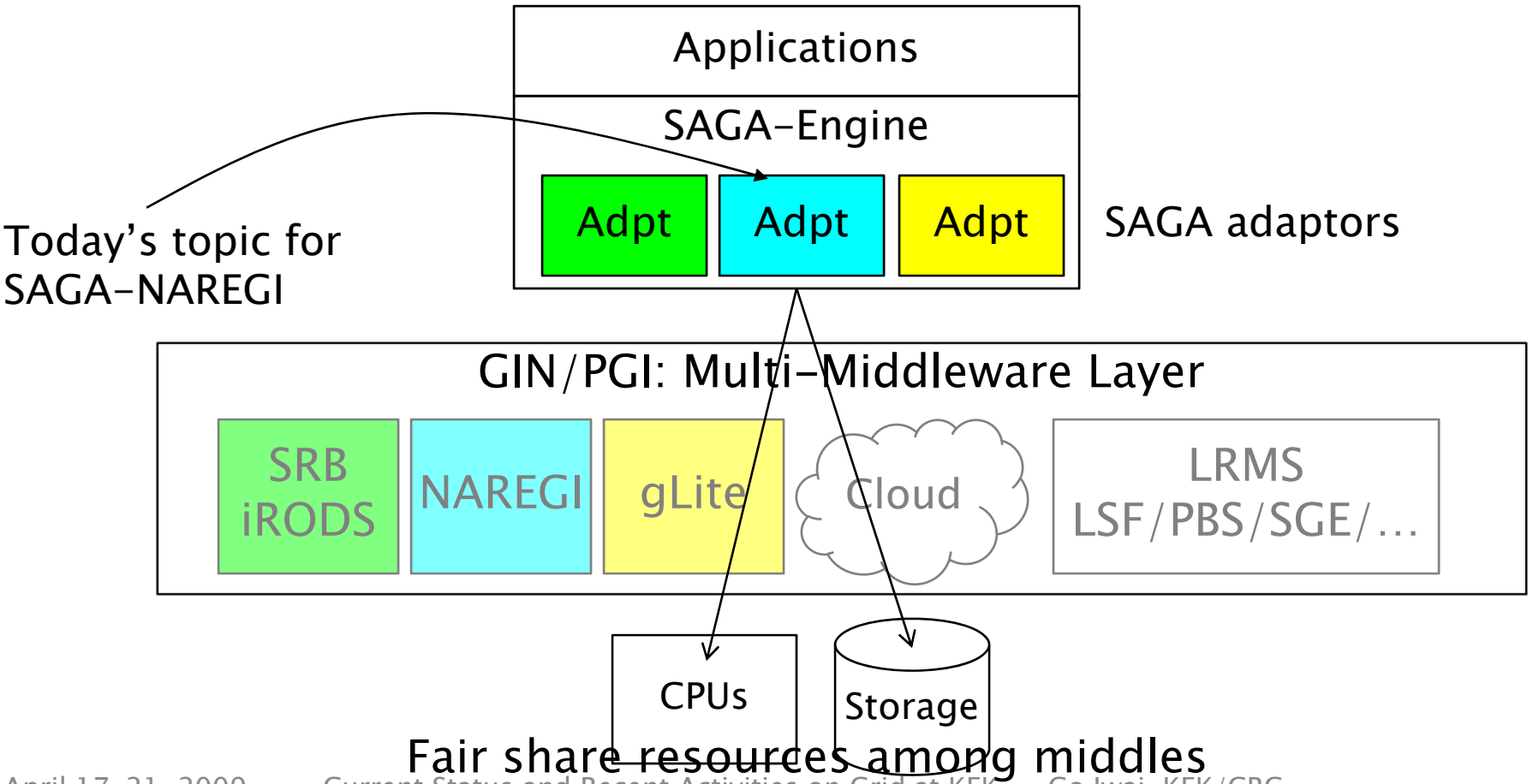
Users should be aware the underlying middleware-layer and hardware deployed



Deployed dedicate HW

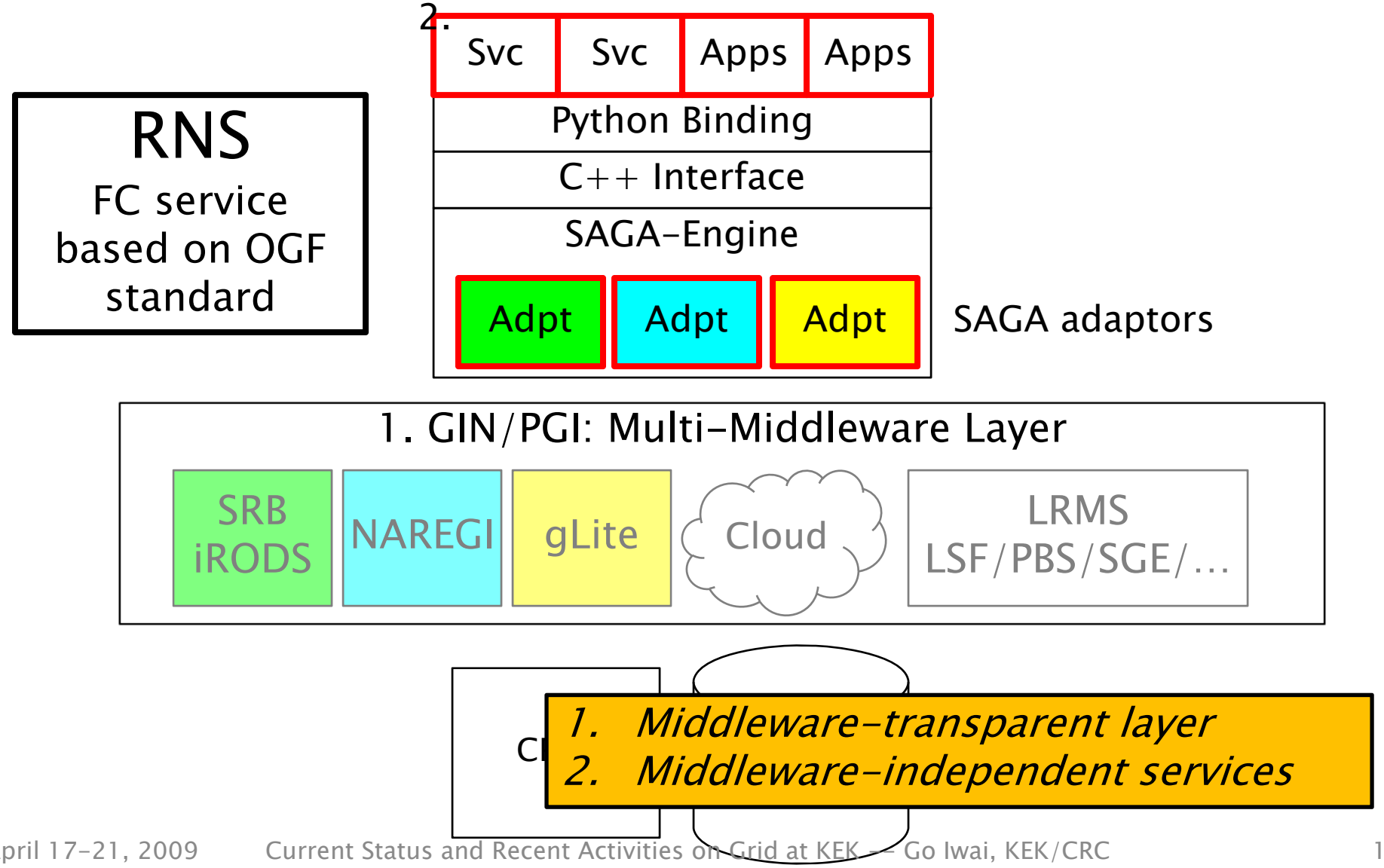
Motivation

- We need to operate multi Grid middleware at the same time.
  - Resource sharing among them is mandate
    - We are also contributing to GIN
- Virtualization of Grid middleware is our wish
  - The best scenario for the application developers



Project Goal (Funded collaboration with NII)

SAGA supports cloud & LRMS for local clusters



Current Status
SAGA-NAREGI Adaptor

- Only for the job adaptor
- Succeed to submit a job in NAREGI and to retrieve results

```
saga::job::description jd;
jd.set_attribute(sja::description_executable, "/bin/hostname");
jd.set_attribute(sja::description_working_directory, "/some/where/work/dir");
jd.set_attribute(sja::description_output, “std.out");
jd.set_attribute(sja::description_error, "std.err");
```

Job description

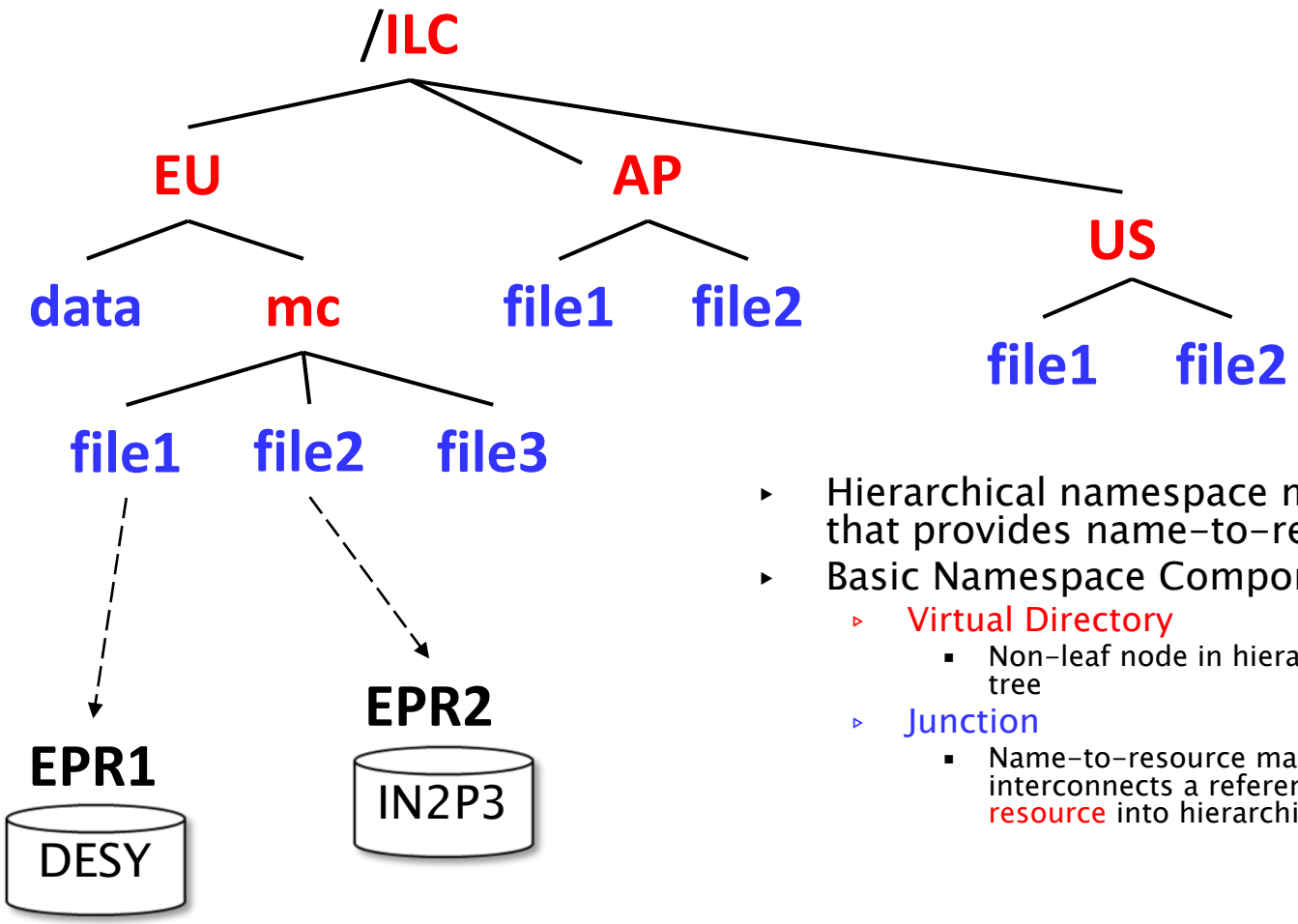
```
std::vector <std::string> ft;
ft.push_back("gsiftp://gfarm.cc.kek.jp/my/file.in > file.in");
ft.push_back("gsiftp://gfarm.cc.kek.jp/my/file.out < file.out");
jd.set_vector_attribute(sja::description_file_transfer, ft);
```

File stage-in/out

```
saga::job::service js("naregi://nrgvms.cc.kek.jp");
saga::job::job j = js.create_job(jd);
j.run();
while (j.get_state() != saga::job::Done) {
  std::cout << j.get_attribute(“JobID”) << std::endl;
  sleep(1);
}
```

Job Submission

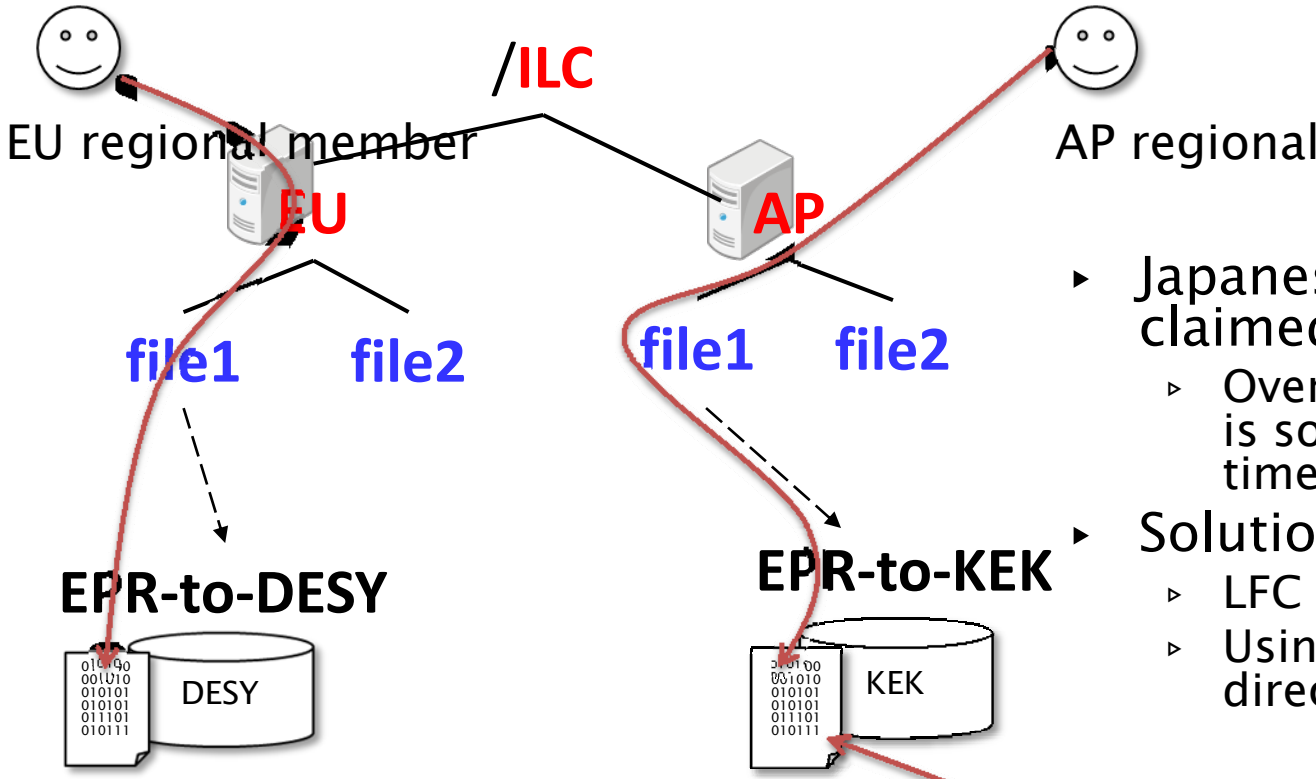
RNS: Resource Namespace Service



- Hierarchical namespace management that provides name-to-resource mapping
- Basic Namespace Component
  - Virtual Directory
    - Non-leaf node in hierarchical namespace tree
  - Junction
    - Name-to-resource mapping that interconnects a reference to any existing resource into hierarchical namespace

http://www.ogf.org/documents/GFD.101.pdf

Possible Scenario using RNS in ILC



- Japanese colleagues claimed to me
  - Overhead by LFC at DESY is sometimes waste of time
- Solution
  - LFC duplicated operation
  - Using RNS virtual directory

- Benefit for both local and Grid users
- No more catalogue overhead
- No need to move resources physically

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Summary

Summary

- In International collaboration, e.g. ILC
  - Software infrastructure might be complicated
- For more general purpose e-science infrastructure over the multi-Grid middleware, e.g. gLite, TeraGrid, NAREGI and so on
  - SAGA-NAREGI has been released and is committed in repository soon
    - SAGA-PBS is also
    - ! Only for job adaptor currently
    - This project has been funded for 3.5 years and end in March 2012.
  - RNS might be a technical candidate
    - Perhaps 50% of users will be happy using RNS
    - Need more detailed plan before integration with LFC