

KEK GRID for ILC Experiments

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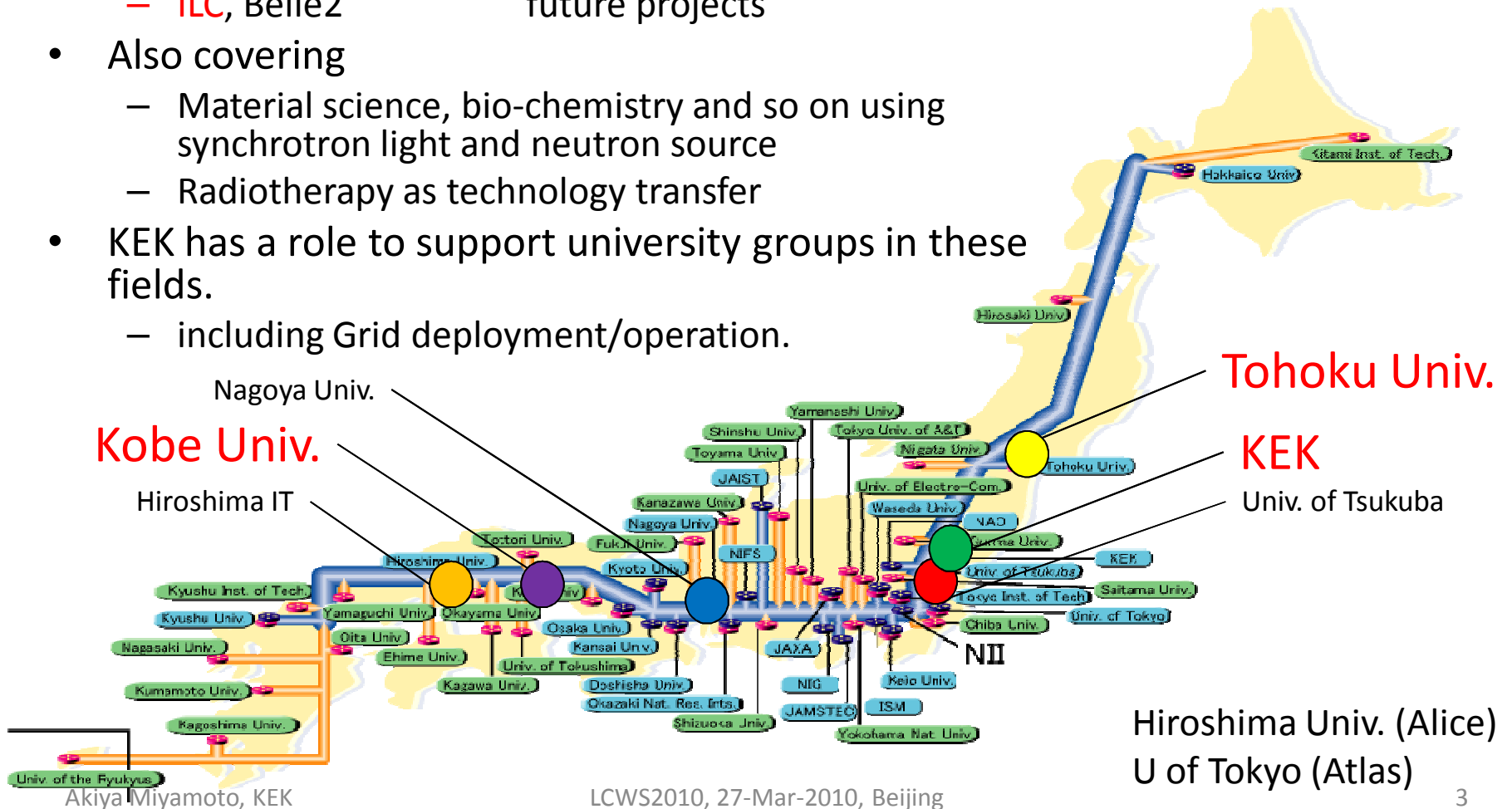
LCWS 2010
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Introduction

- GRID is an infrastructure for a large scale international researches
- GRID provides
 - ◆ Resources for
 - Large scale computing
 - Large scale data storage
 - ◆ International/Inter-regional communication basis
- GRID have been used extensively in ILD LOI studies
 - ◆ for MC productions
 - ◆ Data sharing between Japan – Germany/France/UK

Network in Japan and GRID

- Major HEP projects:
 - Belle, J-PARC, ATLAS ongoing projects
 - ILC, Belle2 future projects
- Also covering
 - Material science, bio-chemistry and so on using synchrotron light and neutron source
 - Radiotherapy as technology transfer
- KEK has a role to support university groups in these fields.
 - including Grid deployment/operation.



SINET3

<http://www.sinet.ad.jp/>



Round Trip Time: KEK → IHEP/KISTI ~ 100msec
→ FNAL ~ 200msec
→ DESY/IN2P3 ~ 300msec

GRID infrastructures



Middle ware	gLite	NAREGI	Gfarm	SRB	iRODS
Belle (Belle2)	Using	Planning	Using	Using	
Atlas	Using				
Medical Apps	Using	Developing	Planning		
ILC	Using	Planning	Planning		
J-PARC	Planning	Planning	Planning		Testing

- KEKCC supports both LCG and NAREGI/RENKEI
- Many Japanese HEP groups are joining LCG
- NAREGI middleware is being deployed as the general purpose e-science infrastructure in Japan
- RENKEI is developing a system to provide a seamless user environment between the local resources and multiple grid environment

GRID for ILC

■ Two VOs have been used:

◆ CALICE-VO:

- Test beam data analysis and MC. Standard data processing in GRID

◆ ILC-VO:

- Needs huge CPU resources for the studies. Available only on GRID
- Standard MC samples (~ 50TB) are on GRID for sharing

■ Status:

◆ A typical data transfer rate from IN2P3/DESY to KEK: ~ 200kB/sec/port

- a frequent timeout for transfer of ~ 2GB:
Cured by removing a time out at IN2P3

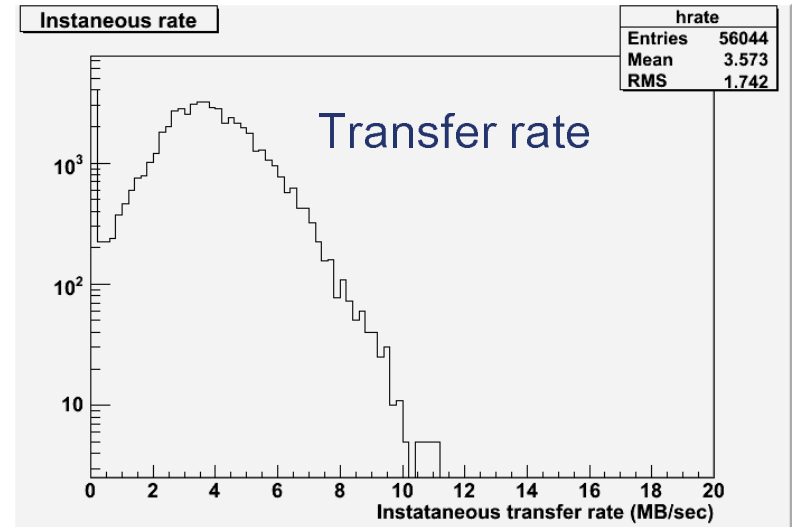
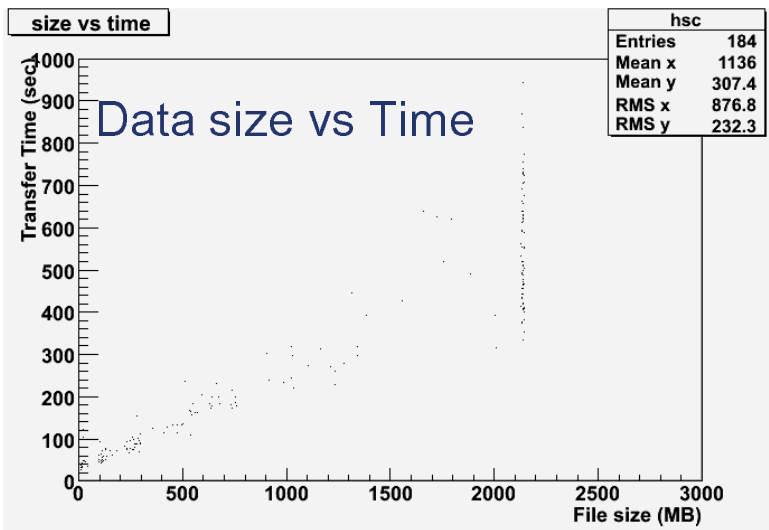
◆ Overhead of catalog access

- ILD DST: many small size DSTs, limited by CPU time for a MC job.
- MC and DST production at DESY/IN2P3
→ Merge DSTs to create a large size file, then replicated to KEK

A typical GRID performance

File transfer: IN2P3 → Kobe, 184 files/210 GB in 13 hours

- part of ILD LOI study, in Dec. 2008
- 10 ports/job



- Pedestal in transfer time ~ 20~60sec. → < 100MB is not effective.
- Instantaneous transfer rate: average 4 MB/sec, Max. 10 MB/sec
→ not great, but has been used for real works successfully

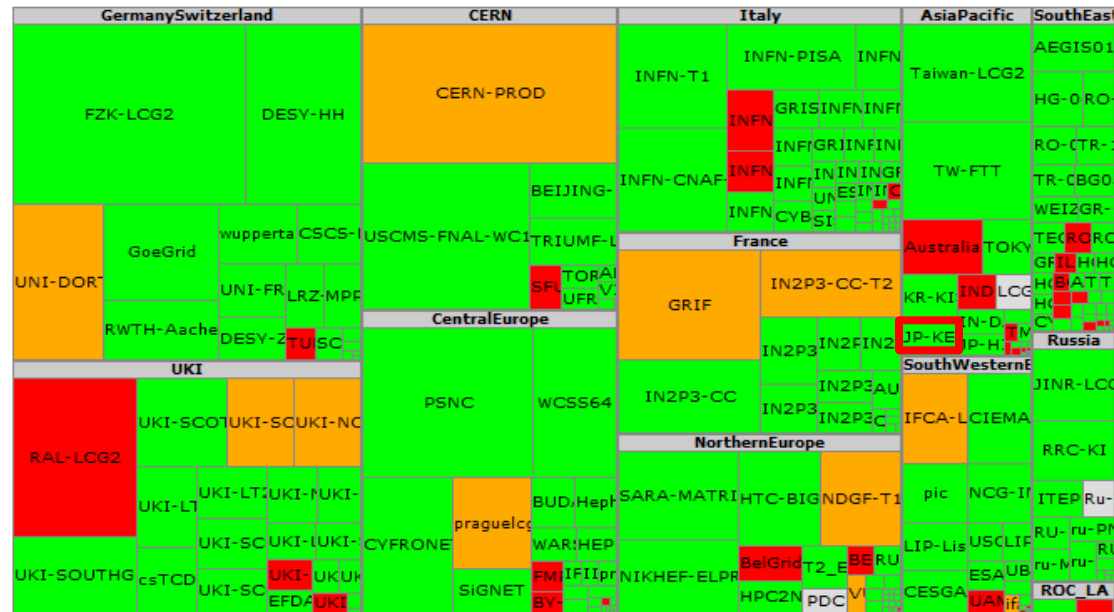
During Dec. '08 to Feb. '09, O(10TB) data have been exchanged through GRID. It was crucial for the successful LOI studies.

Resource scale at KEK

(Focused only on LCG, other infrastructures are exclusive)

- CPU resources in Oct. 2009

~ 0.3 MSI2K



Latest SAM results, Site Status, for 'OPS' VO, 09 Oct 2009 08:42 GMT.

Size of site rectangles is Installed Capacity.
Certified Production sites, grouped by regions.

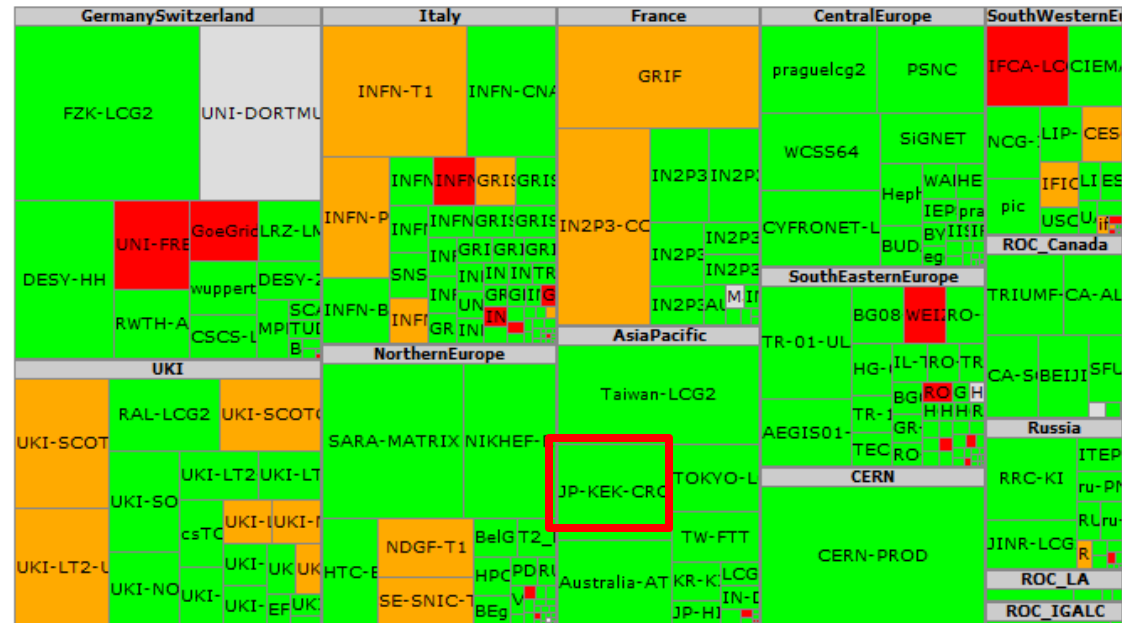


Oct 2009

Resource scale at KEK

(Focused only on LCG, other infrastructures are exclusive)

- 6MSI2K computing resource (recently updated)
 - 5 computing elements
 - Migrated half of nodes from SL4 to SL5
 - ~200 nodes
 - ~1,600 cores/~400 CPUs



Latest SAM results, Site Status, for 'OPS' VO, 18 Mar 2010 10:25 GMT.

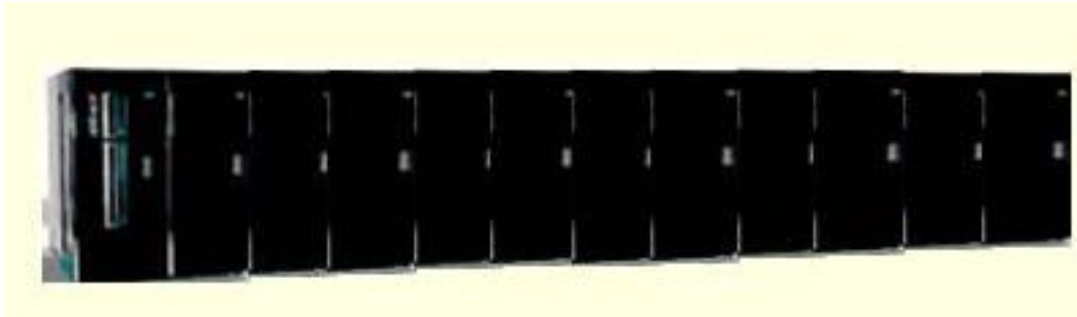
Size of site rectangles is Installed Capacity.
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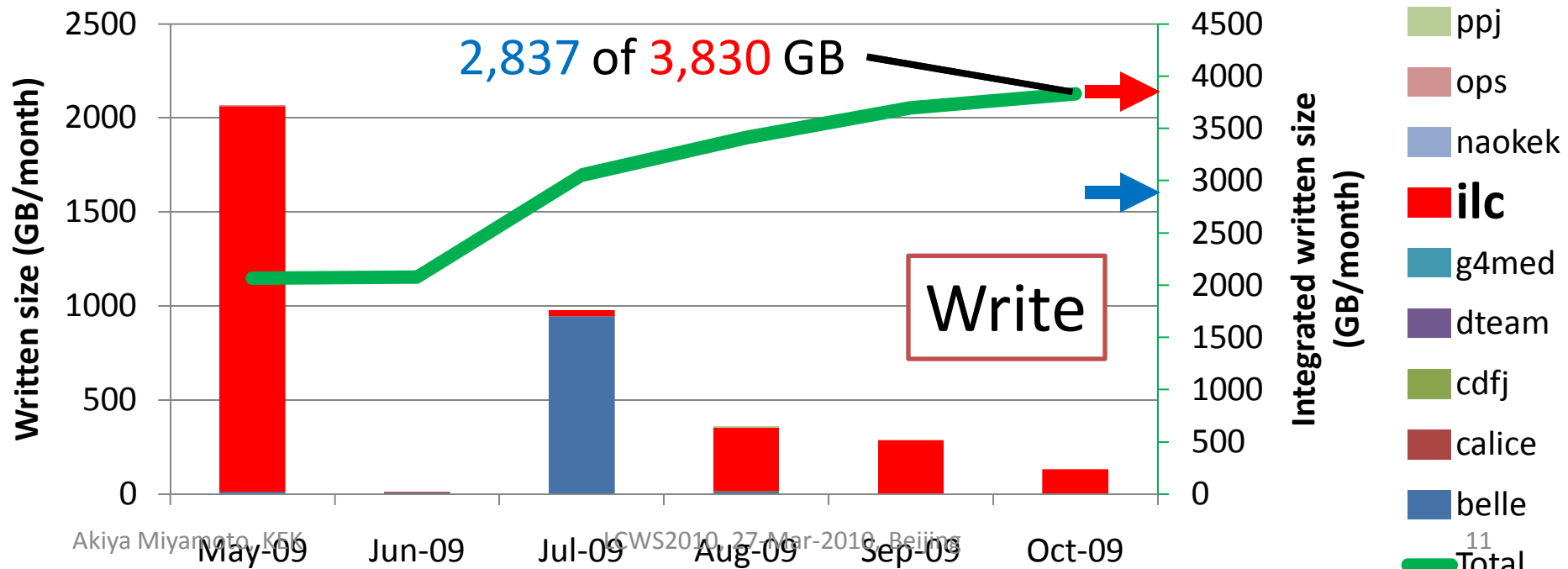
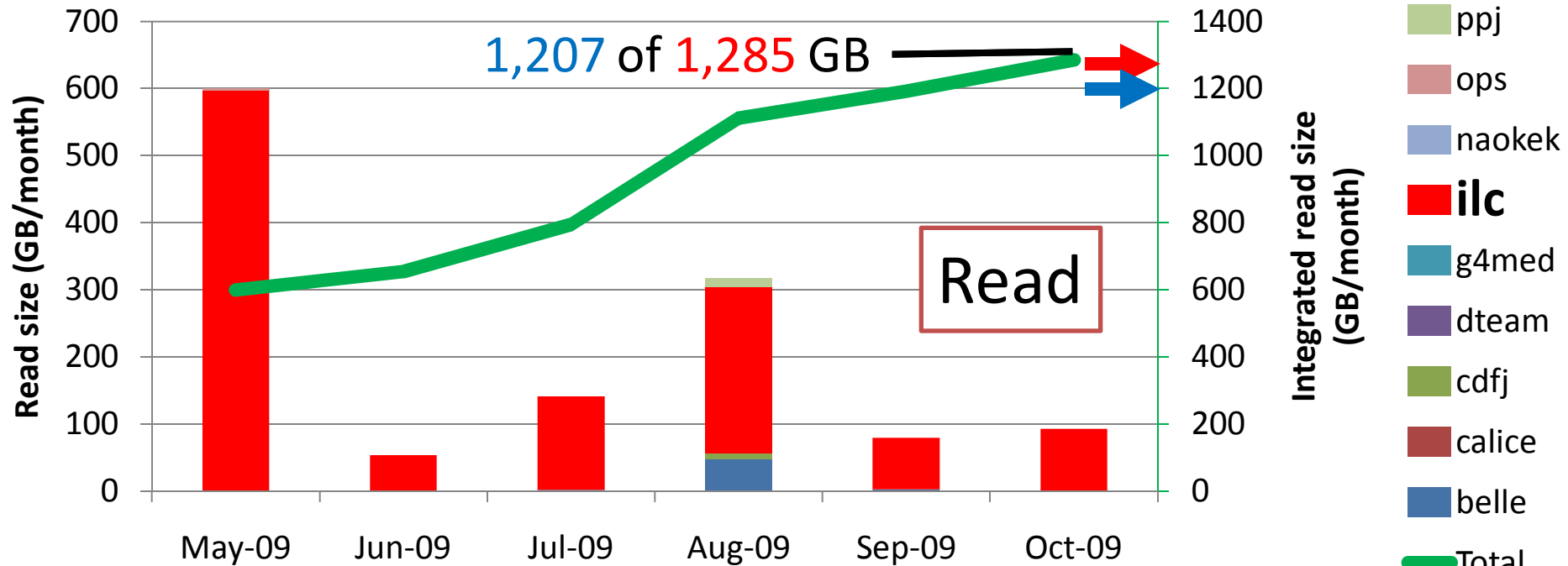
Mar 2010

Storage Resource at KEK

- DPM as a SRM
- Backend storage device: IBM HPSS, TS3500,
max 3000 TB capacity shared by other Vos and batch server users.



- ILC dedicated space are now in preparation



Conclusion

- GRID had been used successfully during the LOI era
 - ◆ GRID played the important role for data transfer between Japan and Europe.
- In last 12 months, GRID resources in KEK has increased significantly.
- We hope be able to contribute significantly in coming MC production.

BACKUP