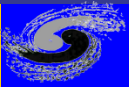# IHEP Computing Center Site Report

Shi, Jingyan (shi.jingyan@ihep.ac.cn)
Computing Center,
**IHEP**

IHEP at a Glance

- **~1000 staffs, 2/3 scientists and engineers**
- **The largest fundamental research center in China with research fields:**
  - **Experimental particle physics**
  - **Theoretical particle physics**
  - **Astrophysics and cosmic rays**
  - **Accelerator technology and applications**
  - **Synchrotron radiation and applications**
  - **Nuclear analysis technique**
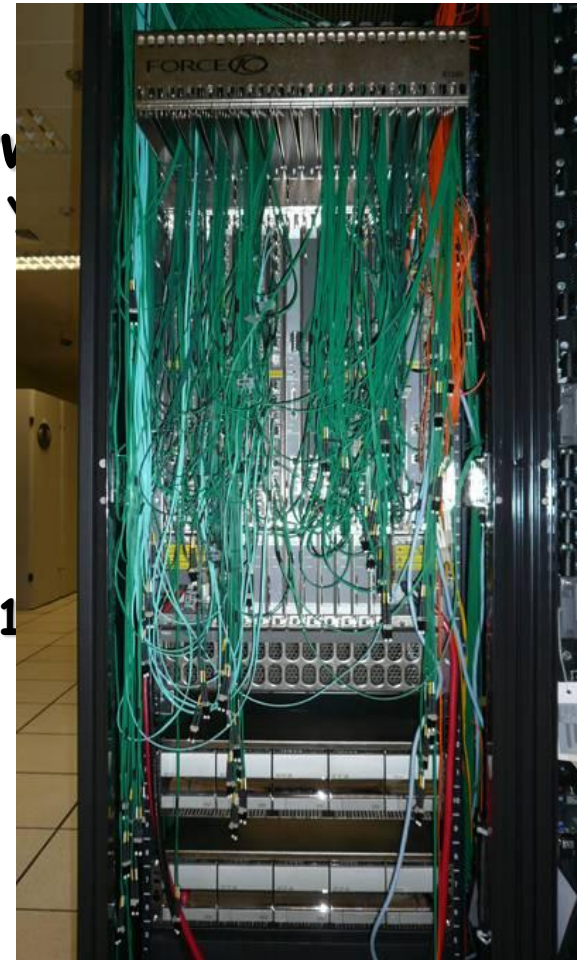 - **Computing and Network application**
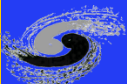
Computing Environment in IHEP
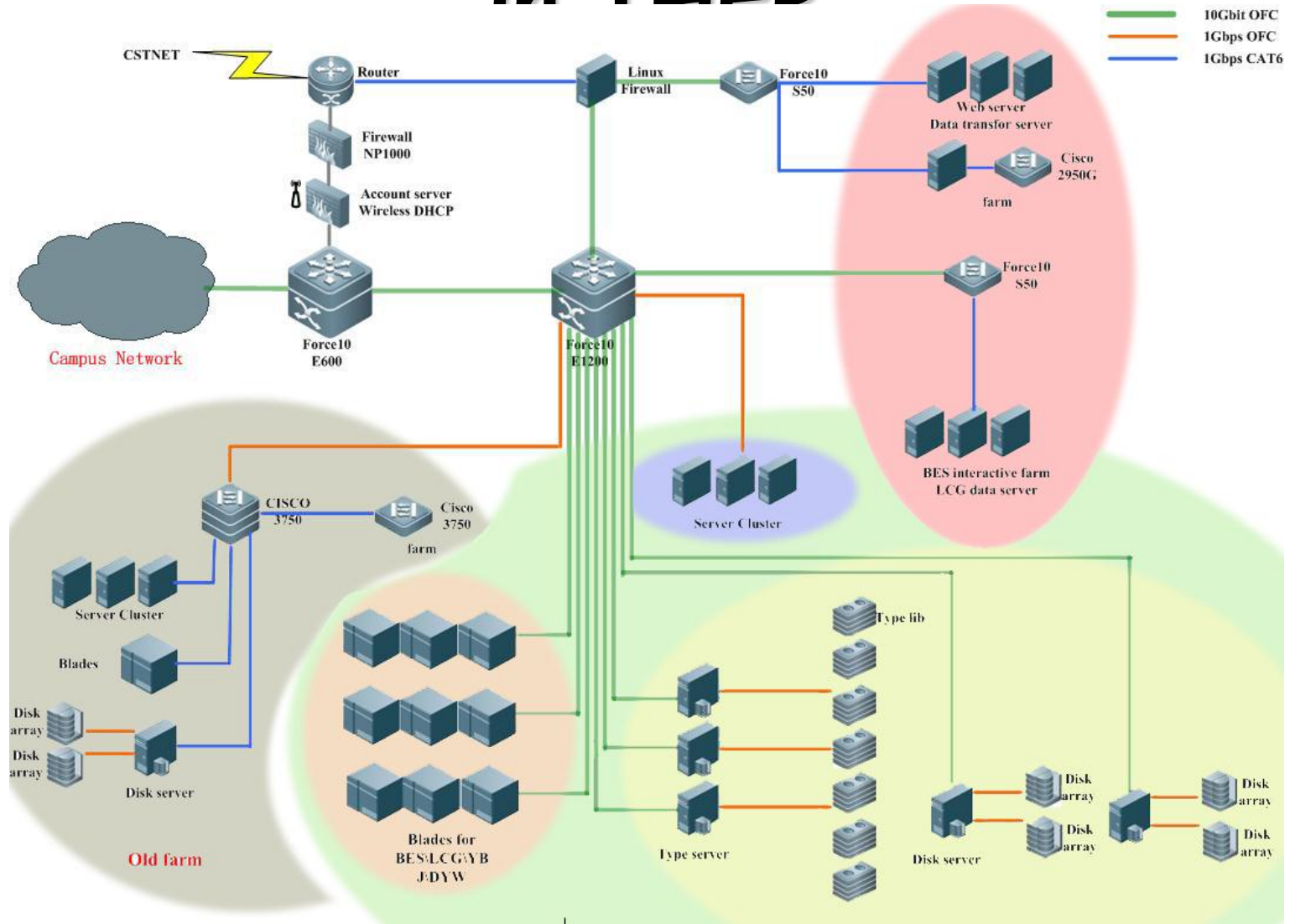
Computing Resources

- ...ores in tw...
  ...,BES-III, ...
  ...III
  ...wo months

- ...IP/Dell

...witch with 1...
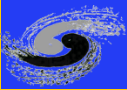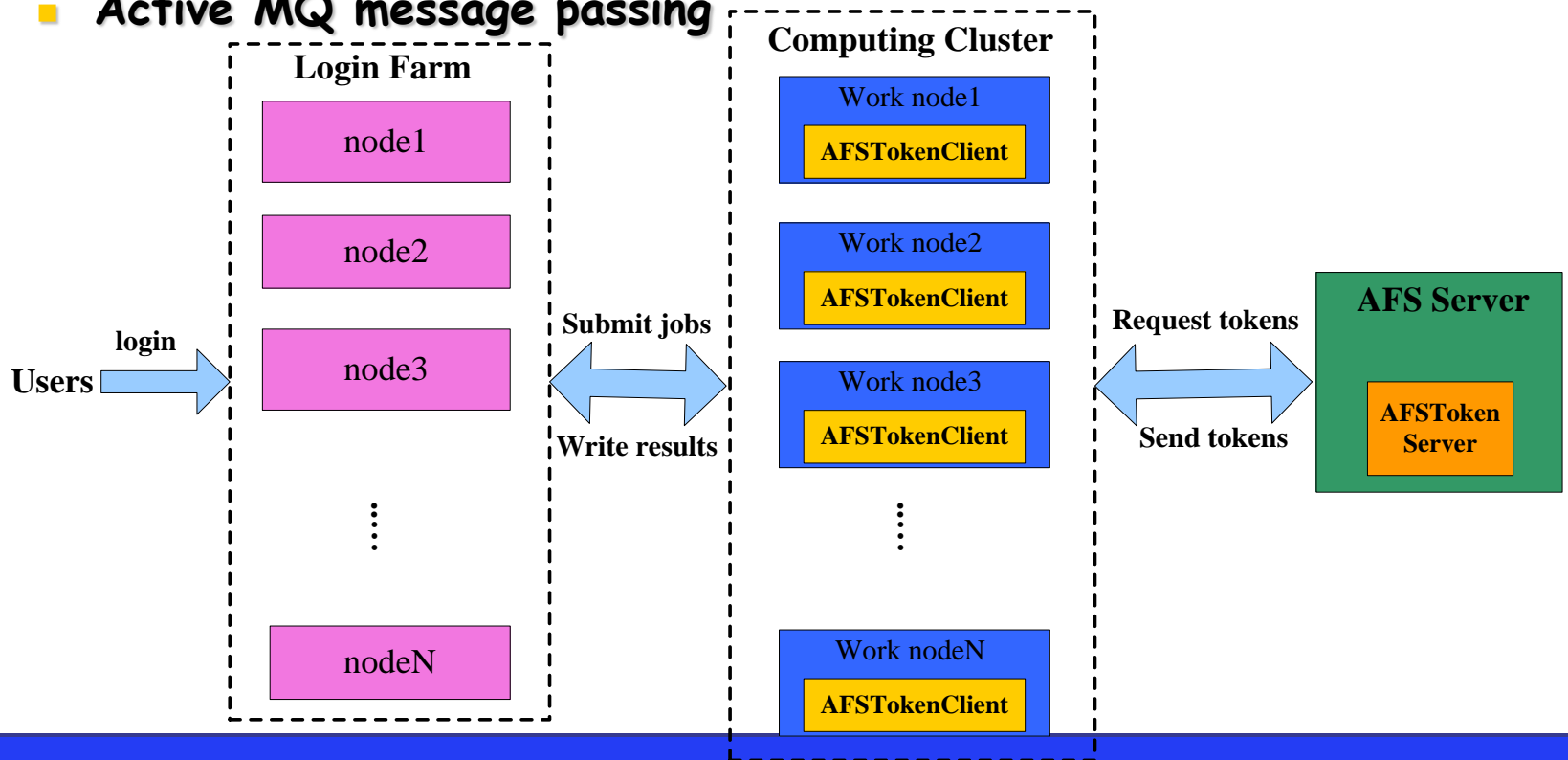
**PC farm built
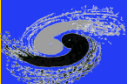with blades**

**Force10 E1200
Central Switch**

Batch System

- **Torque 2.5.5 + maui 3.2.6p21**

- **Merge torque & AFS**

  - **Client / Server architecture**

  - **Fake tokens dispatched by the server**

  - **Active MQ message passing**

Login Farm

node1

node2

node3

⋮

nodeN

Computing Cluster

Work node1
AFSTokenClient

Work node2
AFSTokenClient

Work node3
AFSTokenClient

⋮

Work nodeN
AFSTokenClient

AFS Server

AFSToken Server

Users login

Submit jobs

Write results

Request tokens

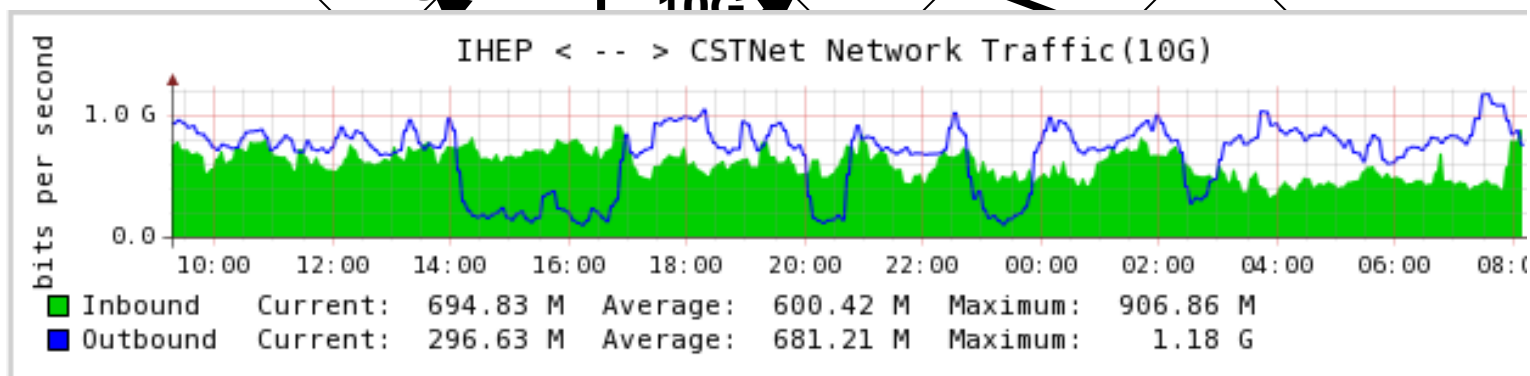**Send tokens**
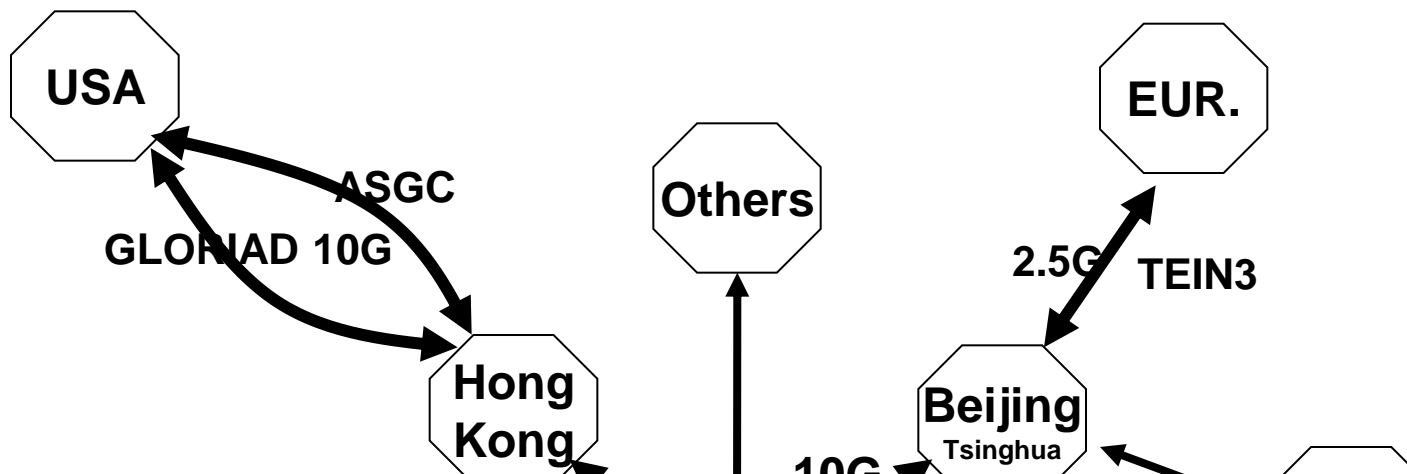
File system - Lustre

- 3 MDSs, 31 OSSs, 300+OSTs, 800 client nodes, 100 million files

- Lustre Version: 1.8.5 (upgraded in July)

- Capacity: 1.7PB (slight change since May)

- All login clients has been upgraded to 64bit, get fewer crashes of login nodes

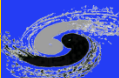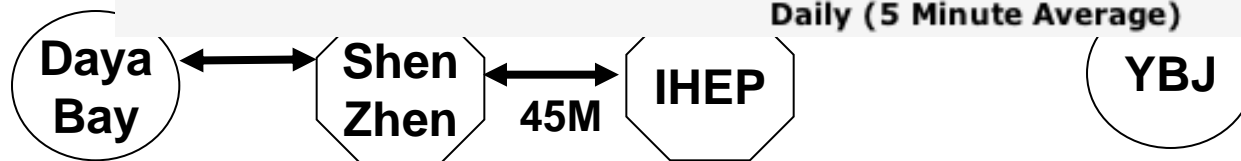- IHEP is considering binding Lustre with CASTOR 1.7 using the HSM function provide by Lustre 2.x

HSM Deployment

Network connection

USA

EUR.

ASGC

GLORIAD 10G

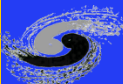Others

2.5G   TEIN3

Hong Kong

Beijing
Tsinghua

10G

IHEP < -- > CSTNet Network Traffic(10G)

bits per second

1.0 G

0.0

10:00 12:00 14:00 16:00 18:00 20:00 22:00 00:00 02:00 04:00 06:00 08:0

■ Inbound	Current:	694.83 M	Average:	600.42 M	Maximum:	906.86 M
■ Outbound	Current:	296.63 M	Average:	681.21 M	Maximum:	1.18 G

Daily (5 Minute Average)

Daya Bay ⟷ Shen Zhen ⟷ 45M IHEP

YBJ

8000 CPU/Cores

5PB Tape Lib

2PB+ Storage

IaaS/PaaS/SaaS

Work Nodes

Tape Lib

Storage Disk

IaaS/SaaS

Out of IHEP

Login Servers

Panasas

LUSTRE Servers

ON-line farm

1Gbps

10Gbps

IHEP Campus Network

10Gbps

10GE (computing. & Storage Network)

TPservers

10Gbps

10Gbps

FC

Home Dirs(AFS) +Monitoring +Scheduler

1GE

1GE

1GE

1Gbps

CPU farm

Tape Lib
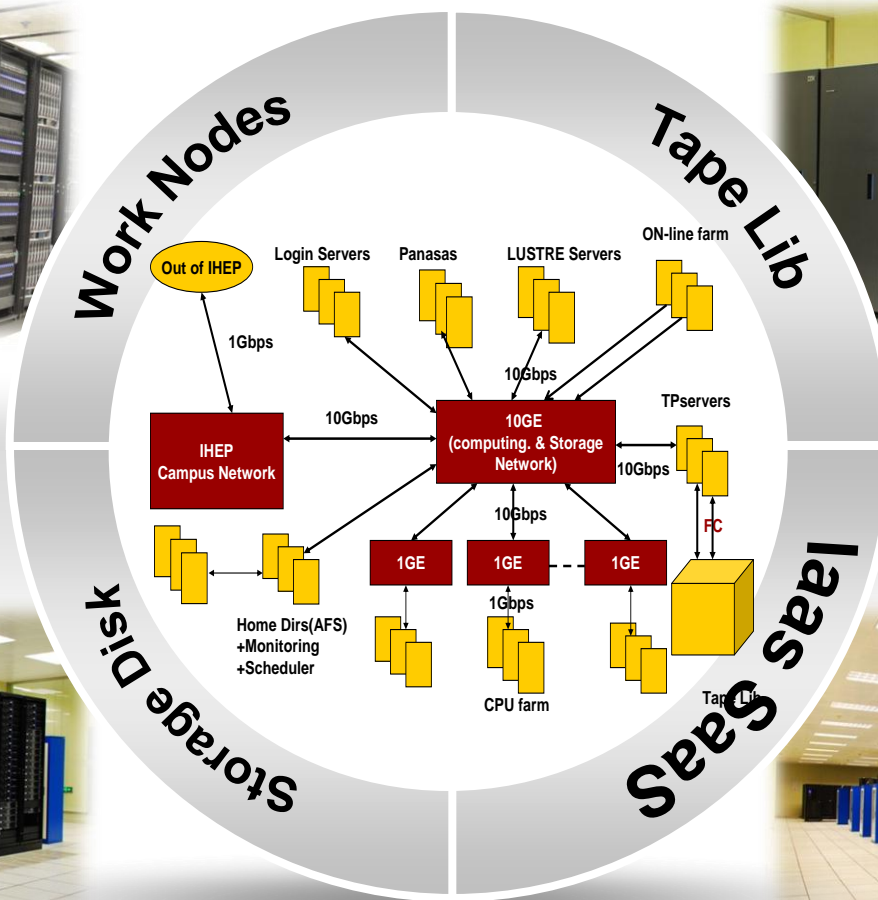
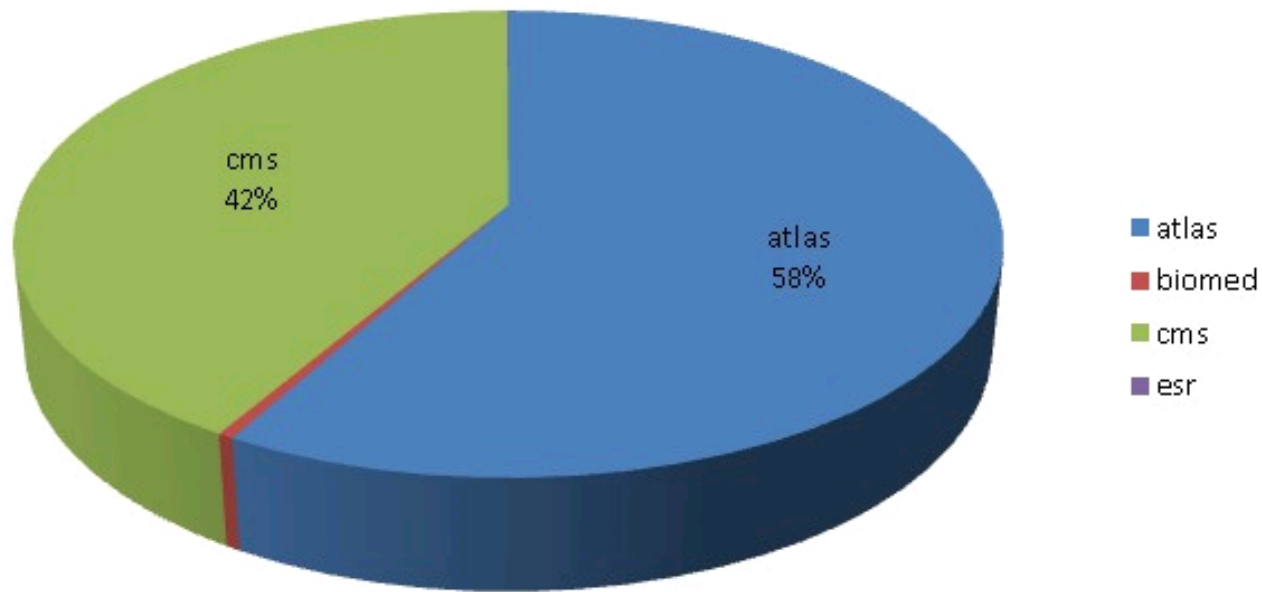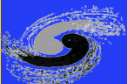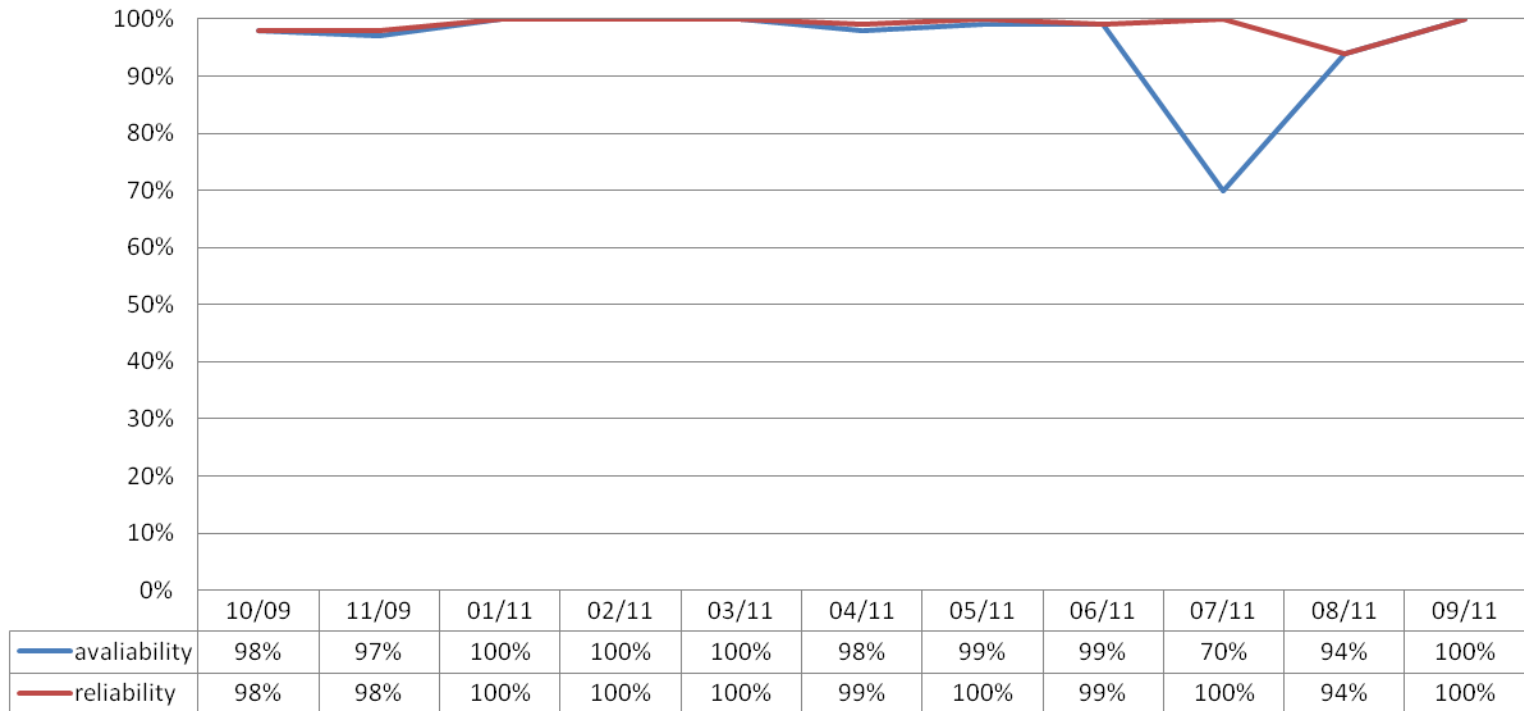# BEIJING-LCG2 Site Report
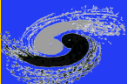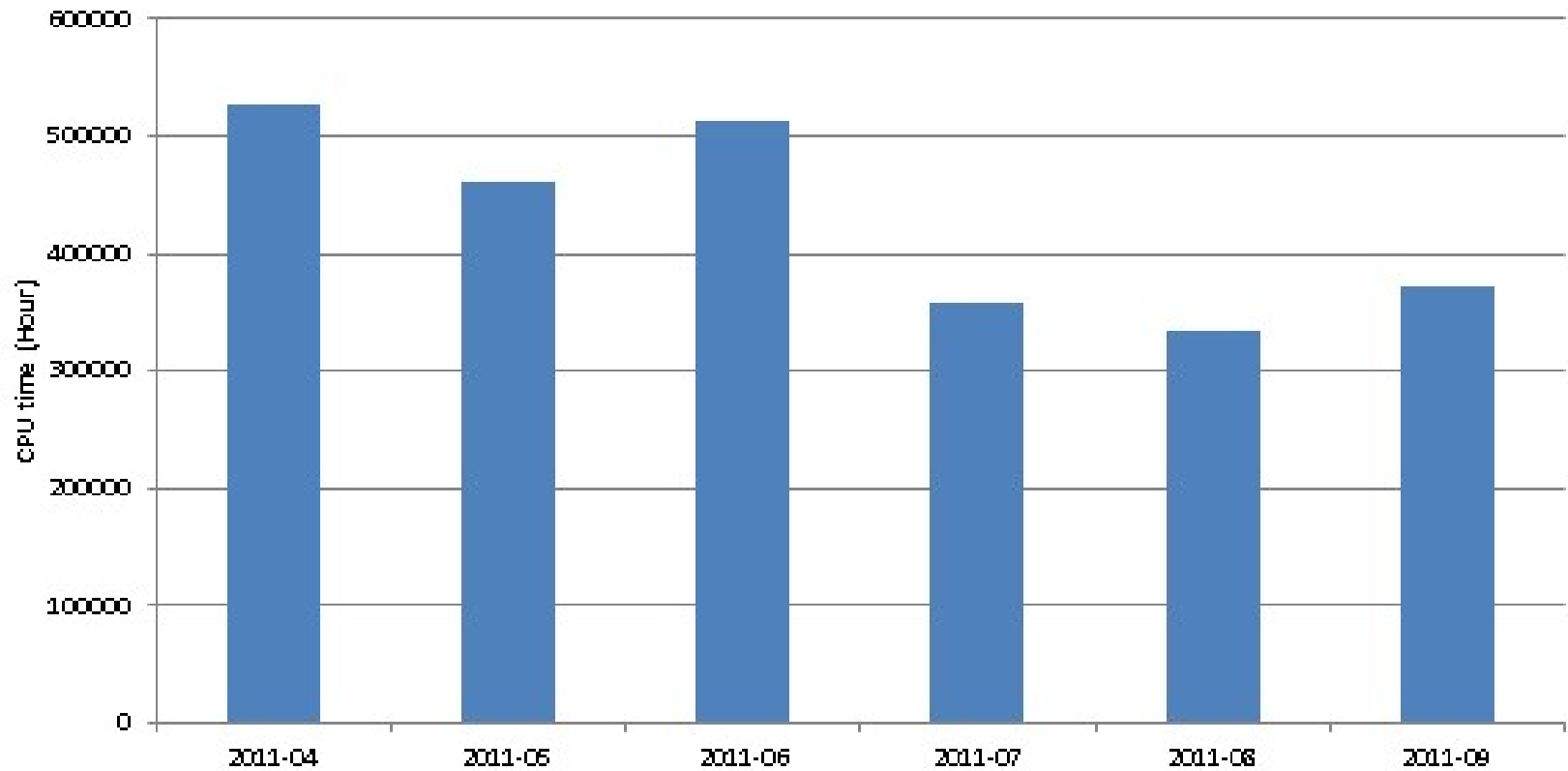
BEIJING-LCG2 Site report

Total CPU TIME used by SITE and VO
2011-1~ 2011-9
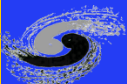
Reliability and Availability

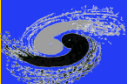## Site reliability and avalability

	10/09	11/09	01/11	02/11	03/11	04/11	05/11	06/11	07/11	08/11	09/11
avaliability	98%	97%	100%	100%	100%	98%	99%	99%	70%	94%	100%
reliability	98%	98%	100%	100%	100%	99%	100%	99%	100%	94%	100%

dCache Migration

- ## dCache In IHEP
  - **Total capacity was 320TB.**
  - **3 head nodes and 8 pool nodes**
  - **dCache server version 1.9.5-25.**
- ## Migrated from pnfs to chimera
 - **It takes about 40 hours to migrate.**
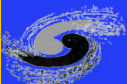
DPM Upgrade

- ## DPM in IHEP
  - DPM version : 1.7.4 update to 1.8
  - Total capacity was 320TB.
  - 1 head node and 8 pool nodes

- ## Upgraded DPM Server OS from SL4 to SL5

- ## Reinstalled DPM and restore the dpns database

CVMFS Deployed in IHEP

- Deployed cvmfs client on all the work nodes
- Setup a squid server as http proxy for the client
- Client version : 2.0.3-1
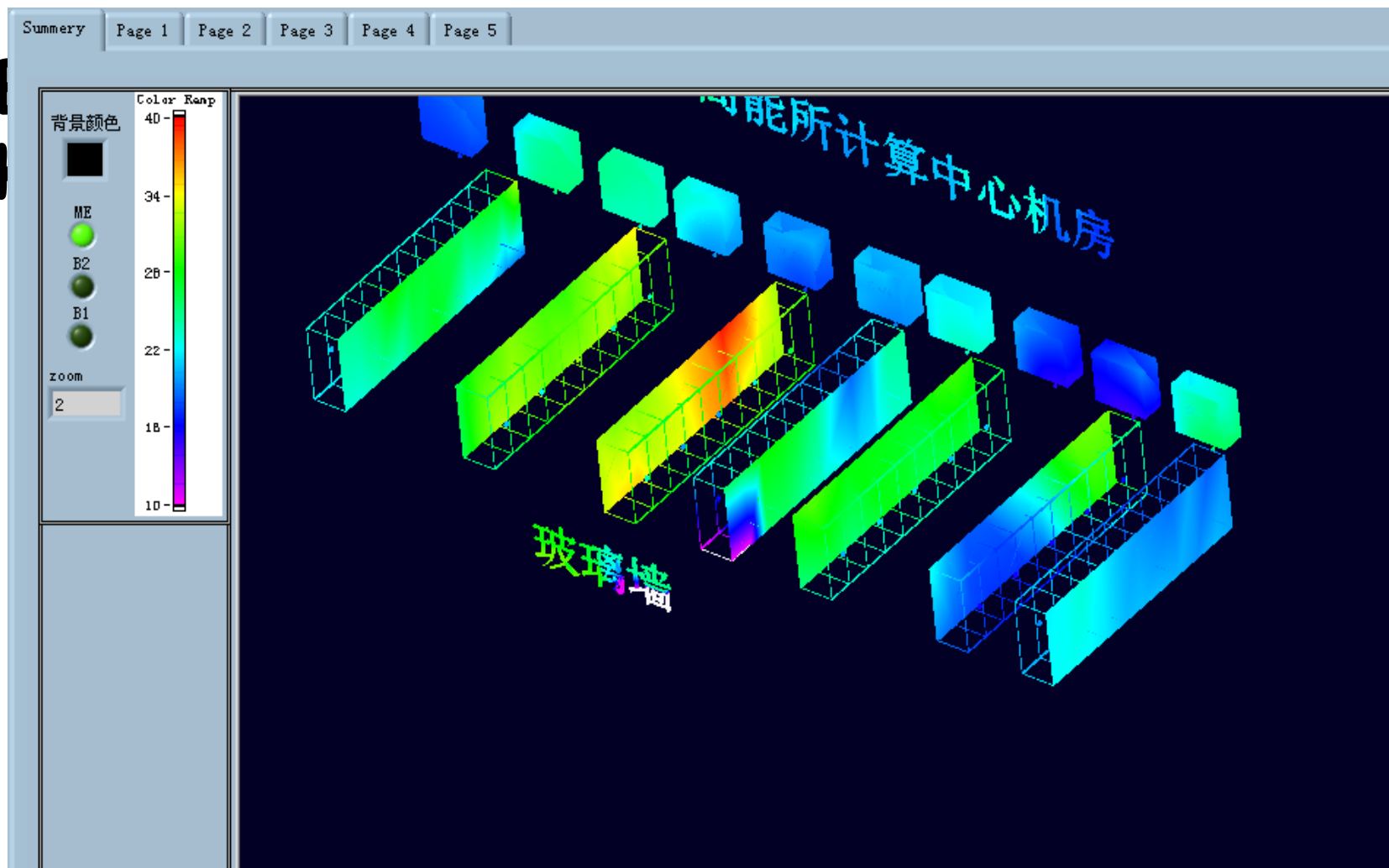- Supported VO : Atlas, CMS, BES
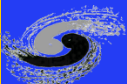
Cooling System

- Air Cooling system reached 75% of capacity
- Cool air partition was built in 2009 and 2010
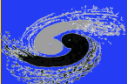- New machines are coming
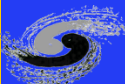
Cooling System Monitoring

Cooling system upgrade

- Under going
  - Water cooling rack: for blade server racks running
  - Power Capacity: 800kW -> 800kW *2
  - Power supply for one row (10 racks):
    - 100kW -> 270kW
  - 6 companies have entered the bid
  - Will be finished by the end of the year

Conclusion

- Farm works fine but more machines are coming
- Cooling system needs to be upgraded as soon as possible
- 32 bit OS (unstable) will be abandoned
- More machines => new problems?

Thank you!