IHEP Site Status

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Outline

- Infrastructure Update

- Local Cluster Status

- EGI Site Status

- Monitoring and IT Service

- Summary

Infrastructure Update

Local cluster

- Data Storage: 4.5PB -> ~5.3PB
  - Retired 760 TB disk servers and disk arrays which are 5+ years old
  - Added ~1.5PB
- New Network for DataCenter
  - Double Core switches & Firewalls
    - High Capability , Stability, Easy Management
  - Two networks
    - Data Network
      - » High Stability & Capability
    - Management Network
      - » High Stability

Data Center Topology
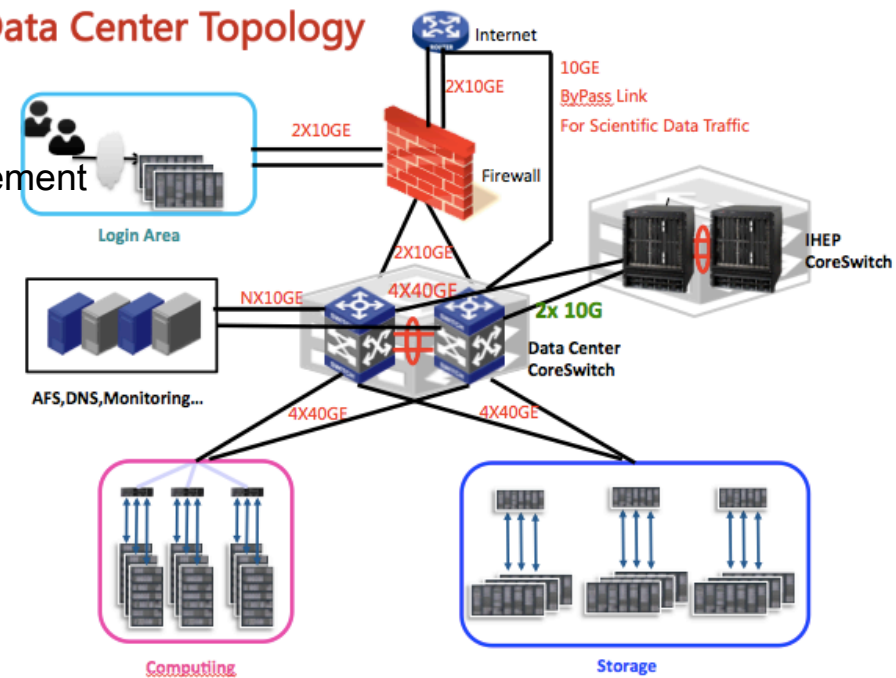
Internet and Domestic Network
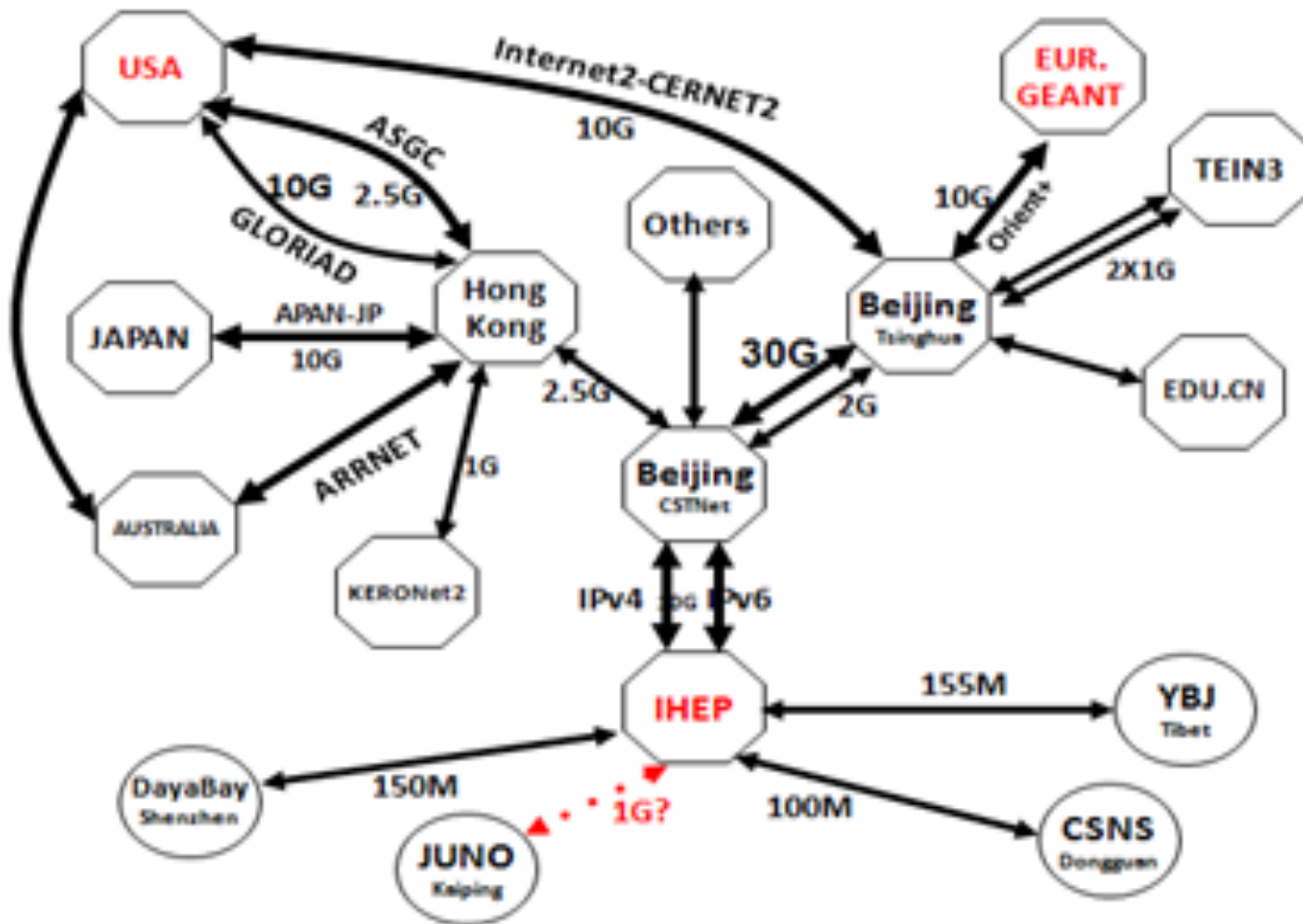
- **IHEP-EUR.:**
  - **10Gbps**
- **IHEP-USA:**
  - **10Gbps**
    - From the end of 2013, switch to the link (IHEP-USA), good performance
- **IHEP-Univ.:**
  - **30Gbps**
- **Performance improved**
  - RTT reduced **10%**
  - Data transfer performance improved **+40%**

Infrastructure Upgrade

- EGI Site: Hardware upgrade
  - Storage: 940TB(Atlas 400TB, CMS 540TB)
    - 24 Slot diskarray with 4TB disk
    - One box has to array, Each array has 12 disk with raid6
    - Really capacity 80TB per box.
  - Disk server:
    - 2 HP 380g9 and 1 Dell R620 (atlas)
    - 2 HP 380g9 and 2 Dell R620 (cms)
  - New Worknode: 29 HP blade bl460c gen9
    - CPU: 2 E5-2680 V3 12 core
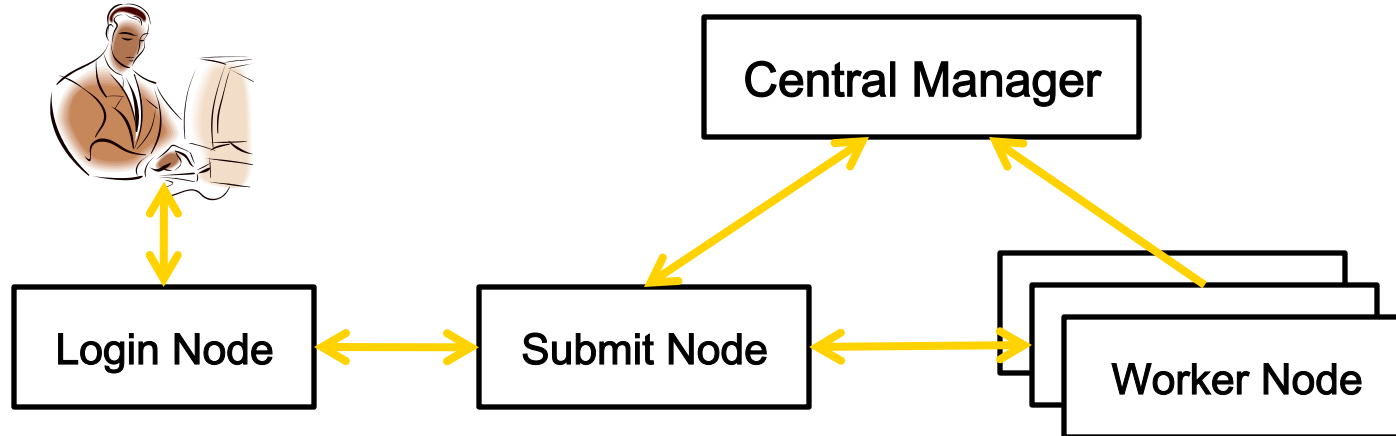   - MEM: 64GB
    - DISK: 1TB SATA

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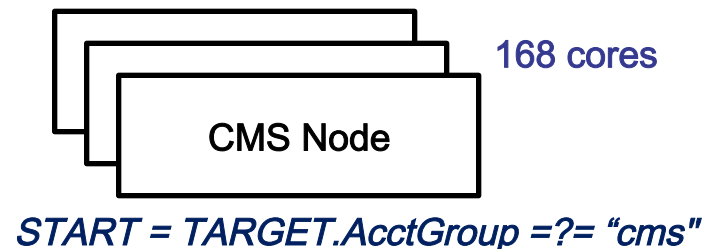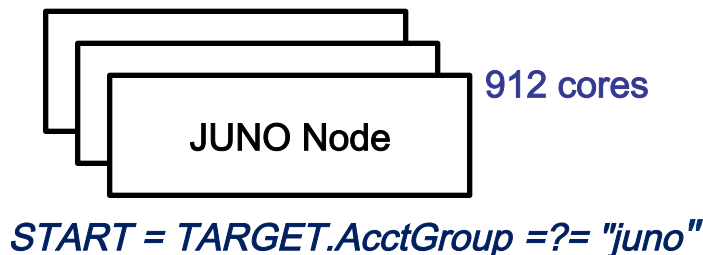- Monitoring and IT Service

- Summary

Status of HTCondor

- Version: 8.2.5 at present, 8.4.x very soon

- Submit jobs via login node in remote mode

- Resource: 1080 CPU cores
- Plan: 10,000+ CPU cores (local cluster), and several remote sites

Resource Restriction

- 2 separated experiments (JUNO and CMS) in 1 pool

- A wrapper of condor_submit guarantees:

  ✓ *"accounting_group"* is set by user, or else a default value is assigned

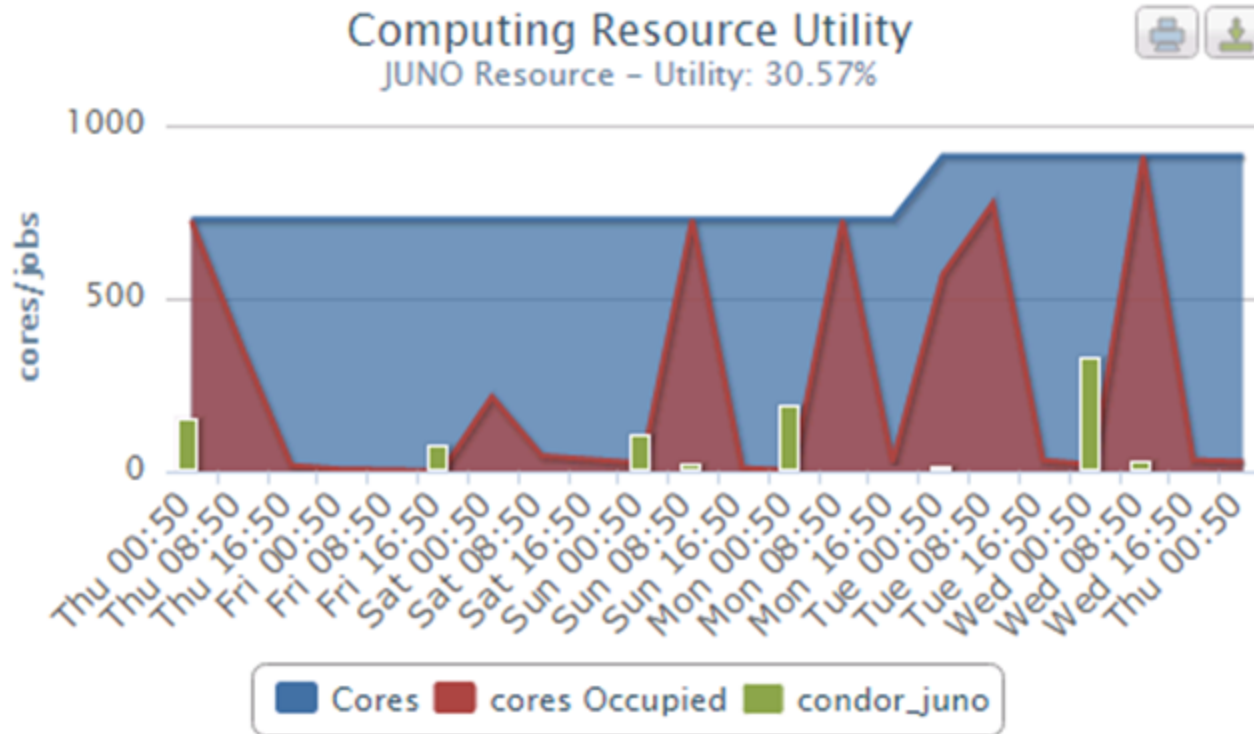 ✓ the user is a valid user in the *"accounting_group"*

- At the worker node side:

JUNO Node	912 cores

START = TARGET.AcctGroup =?= "juno"

CMS Node	168 cores

START = TARGET.AcctGroup =?= "cms"

- JUNO nodes run JUNO jobs, CMS nodes run CMS jobs …

Monitoring

- Integrated with the IHEP cluster monitoring system

Computing Resource Utility
JUNO Resource – Utility: 30.57%

Lustre Status

- Total capacity: 4.5PB, 8 instances, average usage: 67%, max 1.2 PB, min 14 TB, avg 560 TB, 52 OSSs
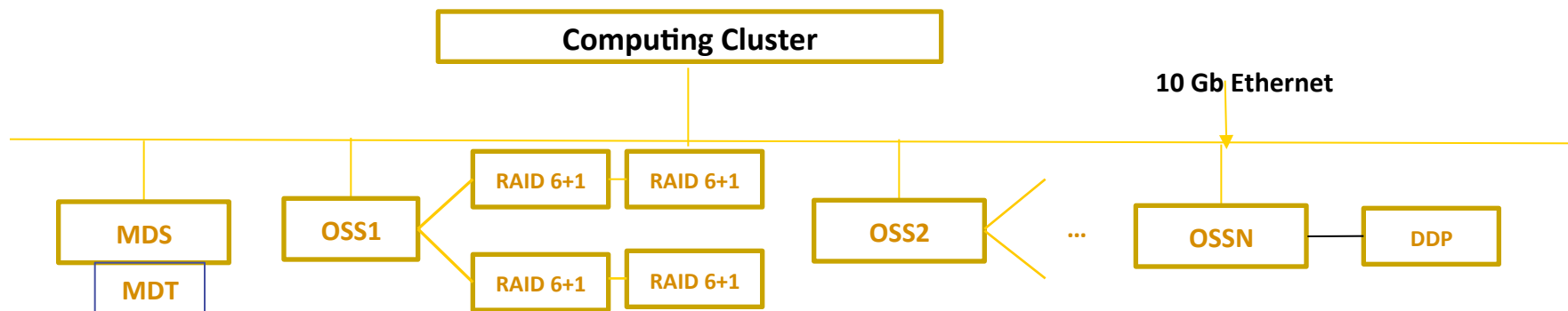

- Simple Architecture: disk arrays directly attached to OSS (Object Storage Server), OSS exports disk storage as Lustre objects
- Average disk space per OSS ~100TB, Read throughput per OSS 800 MB/s

Upgrade of Lustre

- **Hardware:** Replaced traditional RAID 6 disk arrays with DELL DDP

  ✓ rebuild time of 4 TB SATA disk largely reduced
  ✓ risk of simultaneous disk failure reduced
  ✓ Similar technologies such as HUAWEI RAID 2.0 is also under consideration

Rebuild Time (RT)
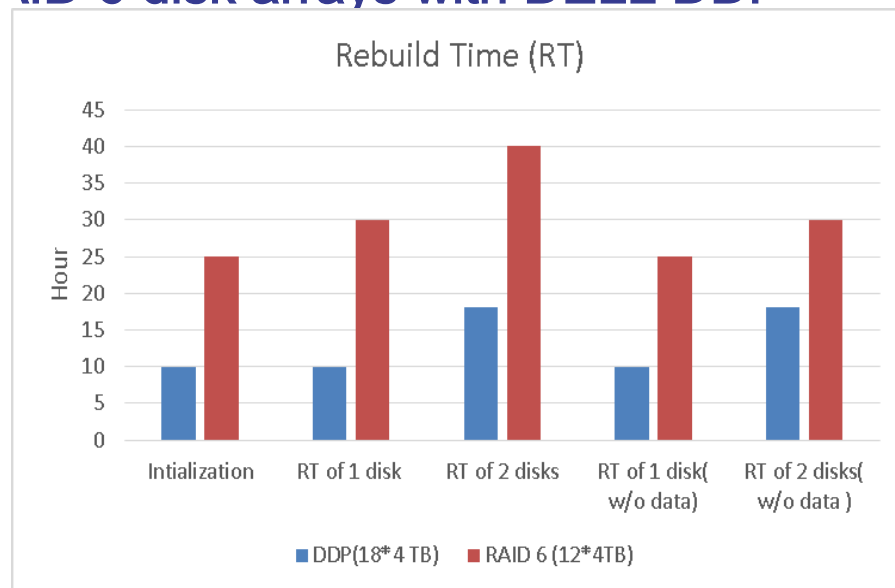
- **Software**

  ✓ Lustre servers: Lustre 1.8.8 → Lustre 2.5.3
  ✓ SL 6 computing nodes: Lustre-client-1.8.9 → Lustre-client-2.5.3

- **Old data is unaffected** and some management CLI changed slightly
- The earliest upgraded instance has been stably running for more than **6 months**

MDS stuck issue

- ## MDS stuck by large scale lock timeouts (>600s)

  LustreError: 0:0:(ldlm_lockd.c:344:waiting_locks_callback()) ### lock callback timer expired after 12300s: evicting client at 192.168.61.200@tcp ns: mdt-dybfs-MDT0000_UUID lock: ffff8807fd2f5b80/0x6b0381f861a50e6a lrc: 3/0,0 mode: PR/PR res: [0x166b0002:0x3efd81b4:0x0].0 bits 0x13 rrc: 323 type: IBT flags: 0x60200400000020 nid: 192.168.61.200@tcp remote: 0xddf7a5419061b23 expref: 7 pid: 13370 timeout: 5854515000 lvb_type: 0

- ## Error -107: Client evitions caused client reconnections frequently
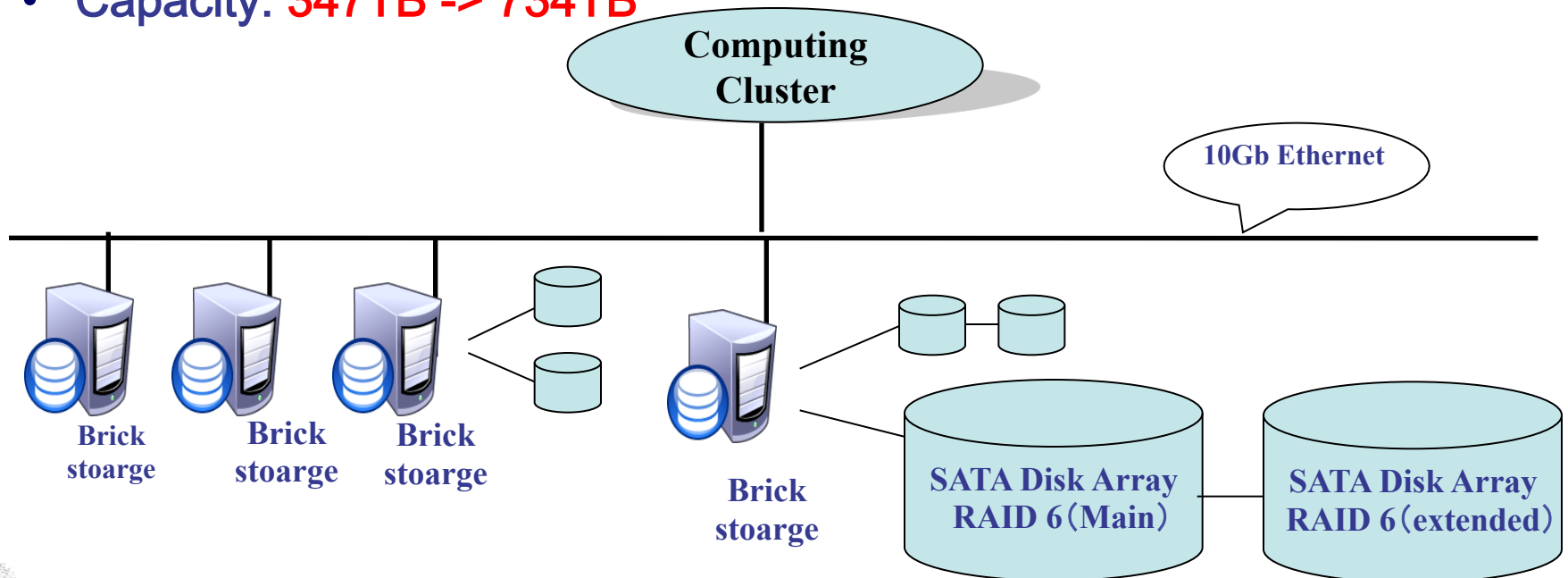
- ## Temporary solution

  - ### Remount of MDT to resume the MDS service

- ## Welcome any comments

Gluster Status

- Total capacity: 734TB, currently 2 instances
- Deployed 3 years old disk arrays(780TB) to a replication volume
- Scale upgrade
  - I/O servver: 5 -> 13
  - Bricks: 43 -> 107
  - Capacity: 347TB -> 734TB

Computing Cluster

10Gb Ethernet

Brick stoarge

Brick stoarge

Brick stoarge

Brick stoarge

SATA Disk Array RAID 6（Main）

SATA Disk Array RAID 6（extended）

AFS Status

- Total capacity:19TB
- 2 file servers were added with 9.2TB effective space
  - OS Kernel: SL 6.5 64bit
  - OpenAFS version: 1.6.11
- Upgrade one DB server, which serves more than 6 years
- Add monitoring to check replica consistence in Nagios

IHEPCloud status

- Released in 18 November, 2014

- Built on Openstack Icehouse

- 1 control node

- 20 computing nodes

  - 232 physical CPU cores / 464 Virtual CPU cores, 1.7TB memory, 10.1TB storage

- Active 229 VMs, 1TB memory
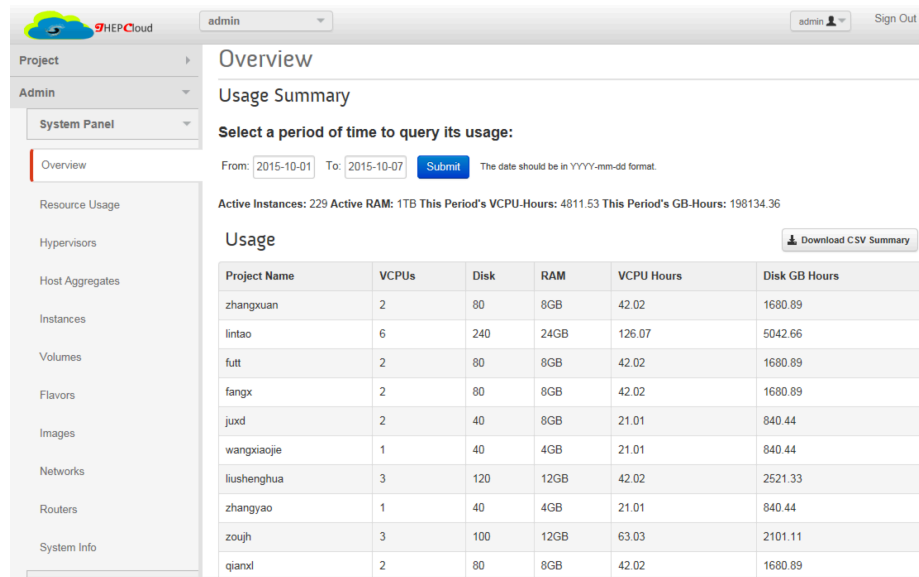
- >1000 users, >70 active users

VCPU Usage
Used 284 of 464

Memory Usage
Used 1.0TB of 1.7TB

Disk Usage
Used 9.4TB of 10.1TB

Overview

Usage Summary

Select a period of time to query its usage:

From: 2015-10-01 To: 2015-10-07 Submit The date should be in YYYY-mm-dd format.

Active Instances: 229 Active RAM: 1TB This Period's VCPU-Hours: 4811.53 This Period's GB-Hours: 198134.36

Usage

| Project Name	VCPUs	Disk	RAM	VCPU Hours	Disk GB Hours
zhangxuan	2	80	8GB	42.02	1680.89
lintao	6	240	24GB	126.07	5042.66
futt	2	80	8GB	42.02	1680.89
fangx	2	80	8GB	42.02	1680.89
juxd	2	40	8GB	21.01	840.44
wangxiaojie	1	40	4GB	21.01	840.44
liushenghua	3	120	12GB	42.02	2521.33
zhangyao	1	40	4GB	21.01	840.44
zoujh	3	100	12GB	63.03	2101.11
qianxl	2	80	8GB	42.02	1680.89

SDN@IHEP

- **Goals**
  - Improve the data exchange performance around China, based on the current
  - Network infrastructure Applications

- **Thoughts**
  - Overlay: use IPv4 & IPv6 network link
  - Automatically and Dynamically network path choosing based on the application requirements and network performance status

- **Current Status**
  - 4 Sites Deployed: SJTU,SDU,IHEP,CCNU
  - IPv6 & IPv4 Supported
  - Path Choosing automatically
  - Stable & Good performance for the stress test
  - More performance data will be released soon
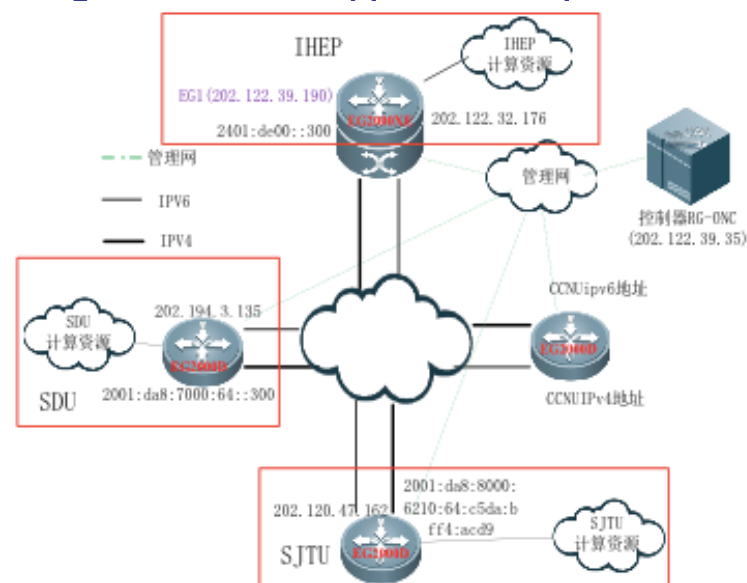
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BEIJING-LCG2 Site report

BEIJING-LCG2 Site report

Developed by CESGA 'EGI View': / normelap-HEPSPEC06 / 2015:3-2015:10 / SITE-VO / lhc (x) / GRBAR-LIN / I
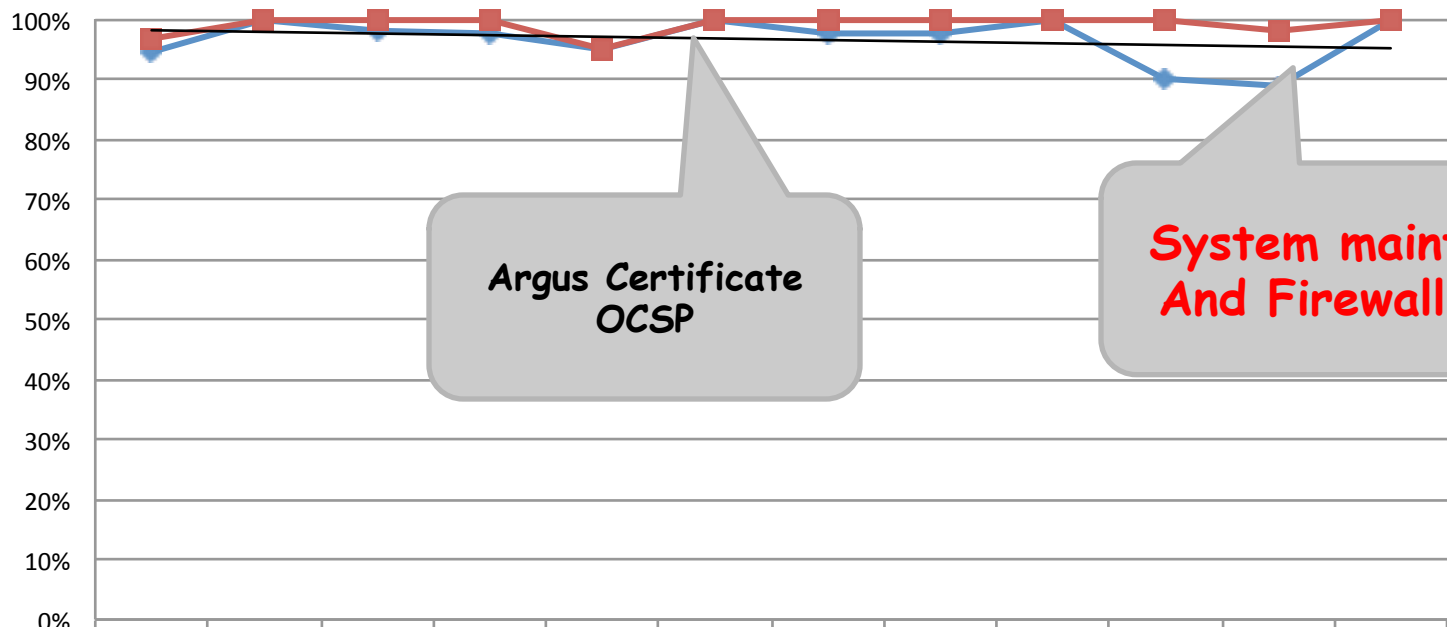2015-10-07 21:11

BEIJING-LCG2 Normalised Elapsed time (HEPSPEC06) per VO
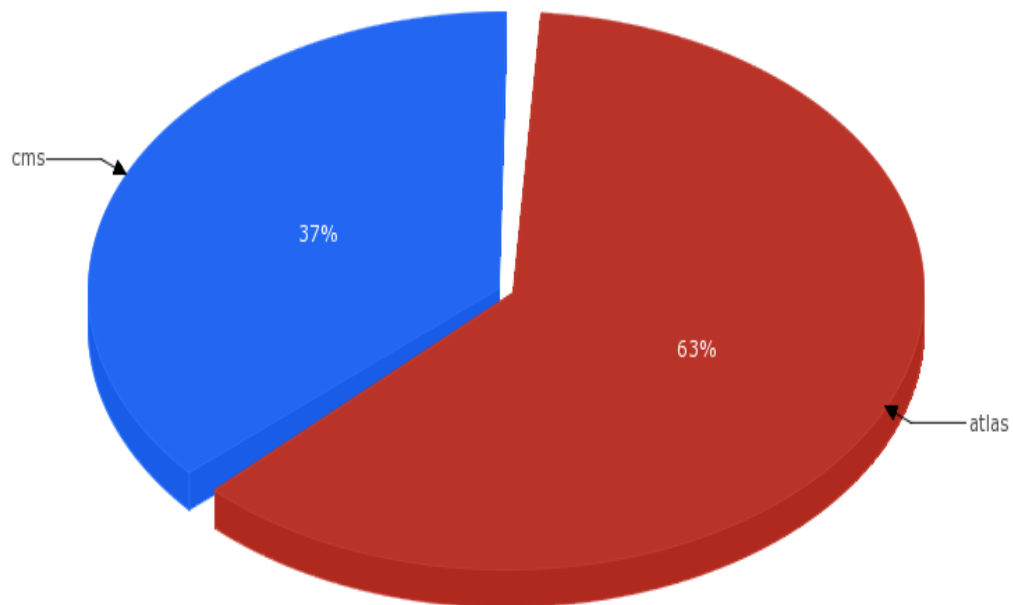
Reliability and Availability

2015 Availability and Reliability

	10/14	11/14	12/14	01/15	02/15	03/15	04/15	05/15	06/15	07/15	08/15	09/15
Availability	94.53%	99.95%	97.94%	97.71%	95.02%	100.00%	97.81%	97.81%	100.00%	89.95%	88.87%	100%
Reliability	96.91%	99.95%	99.95%	99.95%	95.02%	100.00%	100.00%	100.00%	100.00%	99.66%	97.96%	100%

Argus Certificate OCSP

System maintain And Firewall pb

Site Trouble Shooting

- 2015.2.26 Creamce timeout. Argus use ocsp to update certificates. Upgrade argus pkg.

- 2015.4.25 SAM test failed only happend in midnight. Sync uid and gid all the server.

- 2015.5.18 SAM test timeout. It was DNS problem. Change DNS to another server.

- 2015.6.1 SAM test failed. Network have high packet lost between China and Europe.

- 2015.8.10 Could not update Cern CA. Connected to Cern was blocked by upper network service.

- 2015.9.10 cvmfs warning. Clean cvmfs cache.

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Log Analysis

- Deployed Flume+Elasticsearch+Kibana to collect logs generated by servers and work nodes
  - syslog/Lustre log/AFS log/Gluster monitoring log
  - Logs collected from 1500+ devices in parallel

	Elasticsearch cluster	Flume-server
CPU	E5-2640 v3 @ 2.60GHz	E5420 @ 2.50GHz
RAM	64G	16G
OS	Scientific Linux 6.2	Scientific Linux 6.2
Servers	2	1

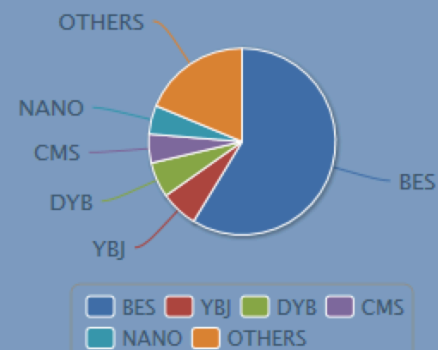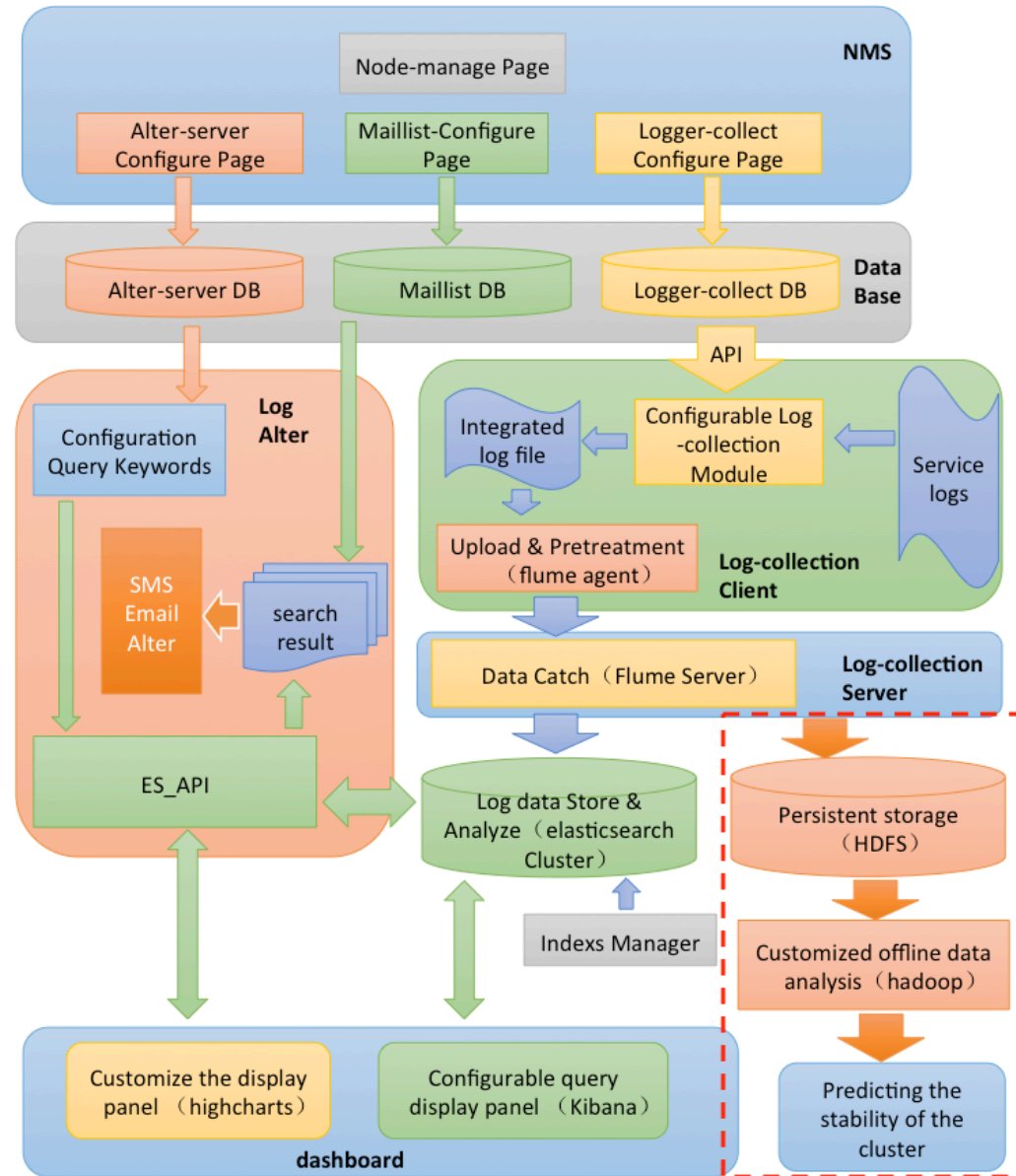# Dashboard
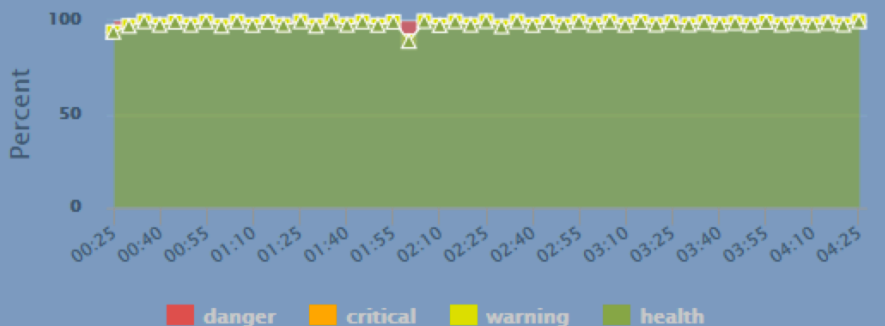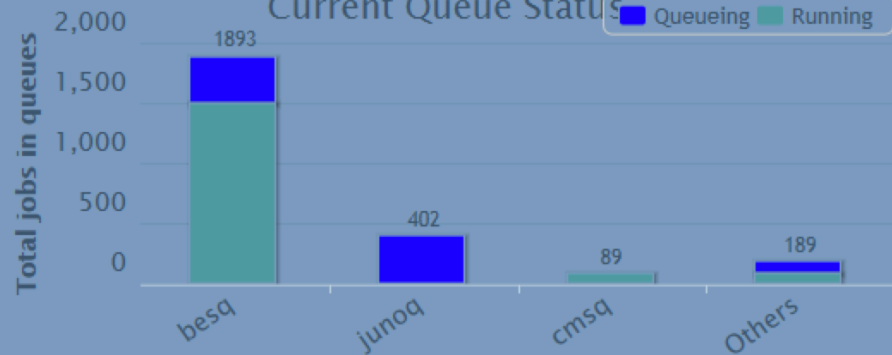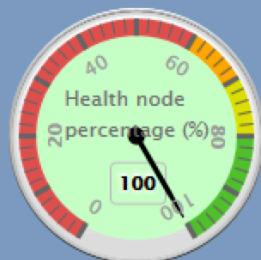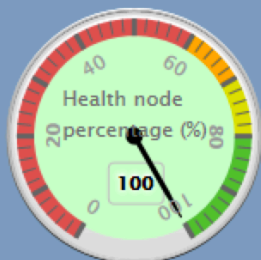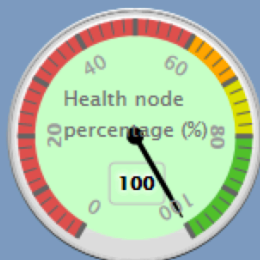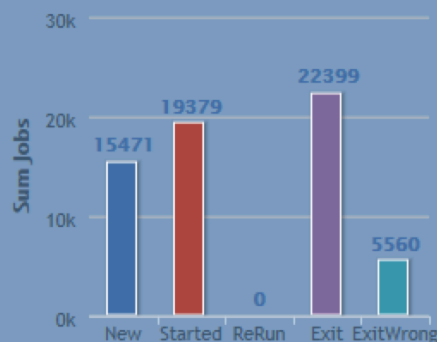
Next plan

- More information will be collected.

- Trends and detailed analysis will be provided based on data mining in huge and long term logs by Map-Reduce technology (Hadoop)

IHEP IT Services

- **IHEP has officially joined the EDUROAM community since March 2015.**
- **Currently, IHEP EDUROAM supports username/password auth.And The CA auth Will be supported soon**
  - Please refer to: http://eduroam.ihep.ac.cn/eduroam
- **Service Desk（ More Functions are in developing ）**
  - **24/7 coverage (someone will take the call)**
  - **Request/Incident/Problem submit/tracking/…**
  - **Services Board/Services Maintenance/…**
  - **Authentication with the IHEP SSO (Email account and password)**
  - **Service Catalogue**
    - Computing & Storage
    - Network & Public network services
    - ARP & Database
    - Others
- **Vidyo@IHEP: personal and group video conferencing**
  - **Website: vidyoguide.ihep.ac.cn**
- **IHEPBox:Upload/download/Sharing Files/Version Control**

Summary

- Our site is running well

- Constructed the new network for Data Center

- Map-reduce will be applied in Log analysis to obtain correct forecasting information

- Provide better and better IT Services for physicists

- Lustre MDS stuck is still under research

Thank you
Any Question?