KISTI-GSDC SITE REPORT

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On the behalf of KISTI GSDC

18 April 2016

HEPiX Spring 2016 Workshop
DESY Zeuthen, Germany

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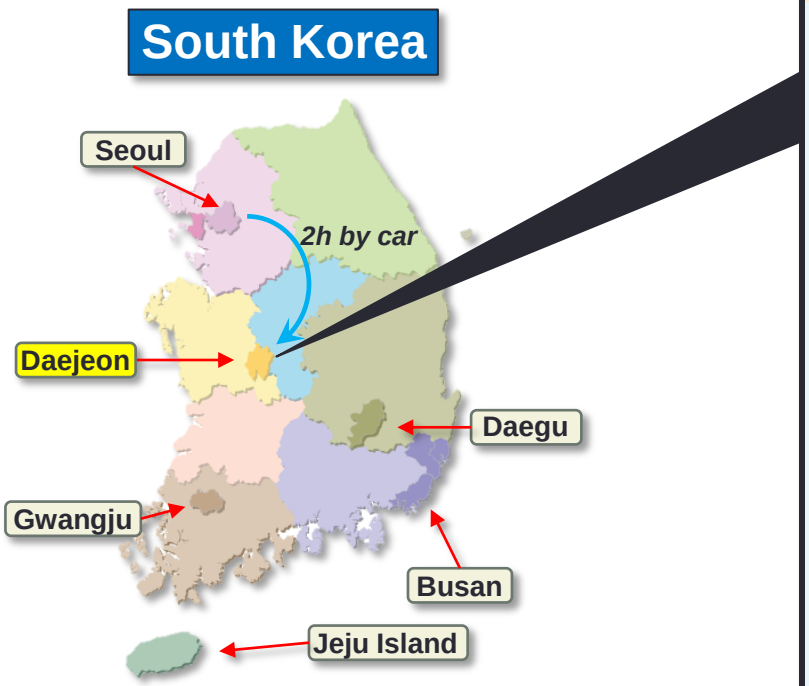
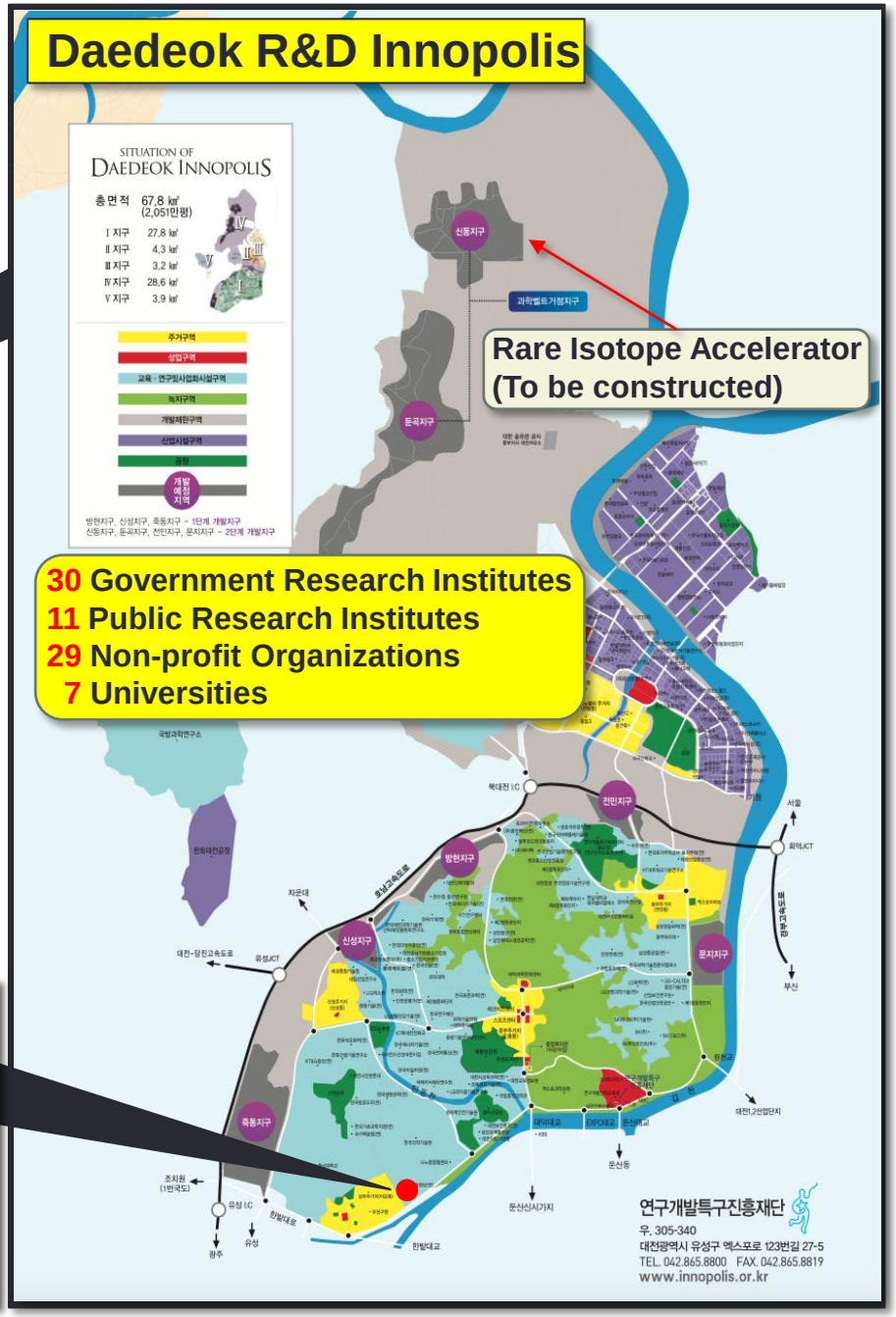
- Tier-1 operations
- GSDC System & Plan

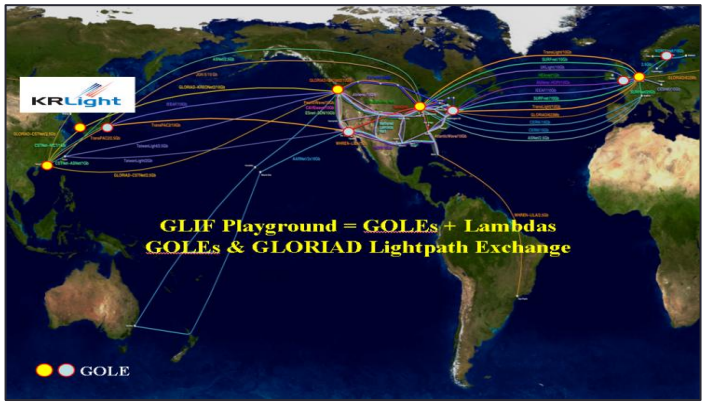
KISTI GSDC OVERVIEW

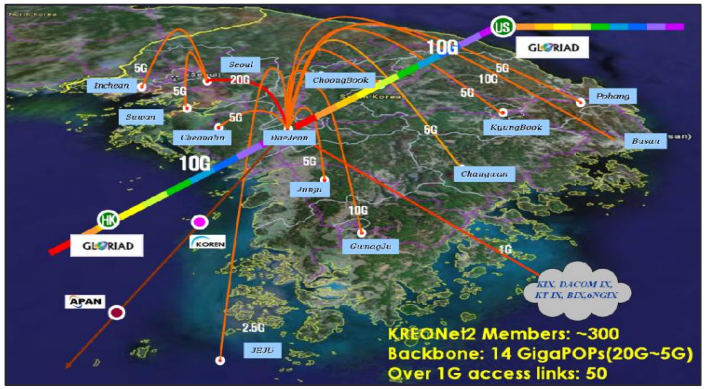
KISTI Location





KISTI GSDC





KISTI (Korea Institute of Science and Technology Information)

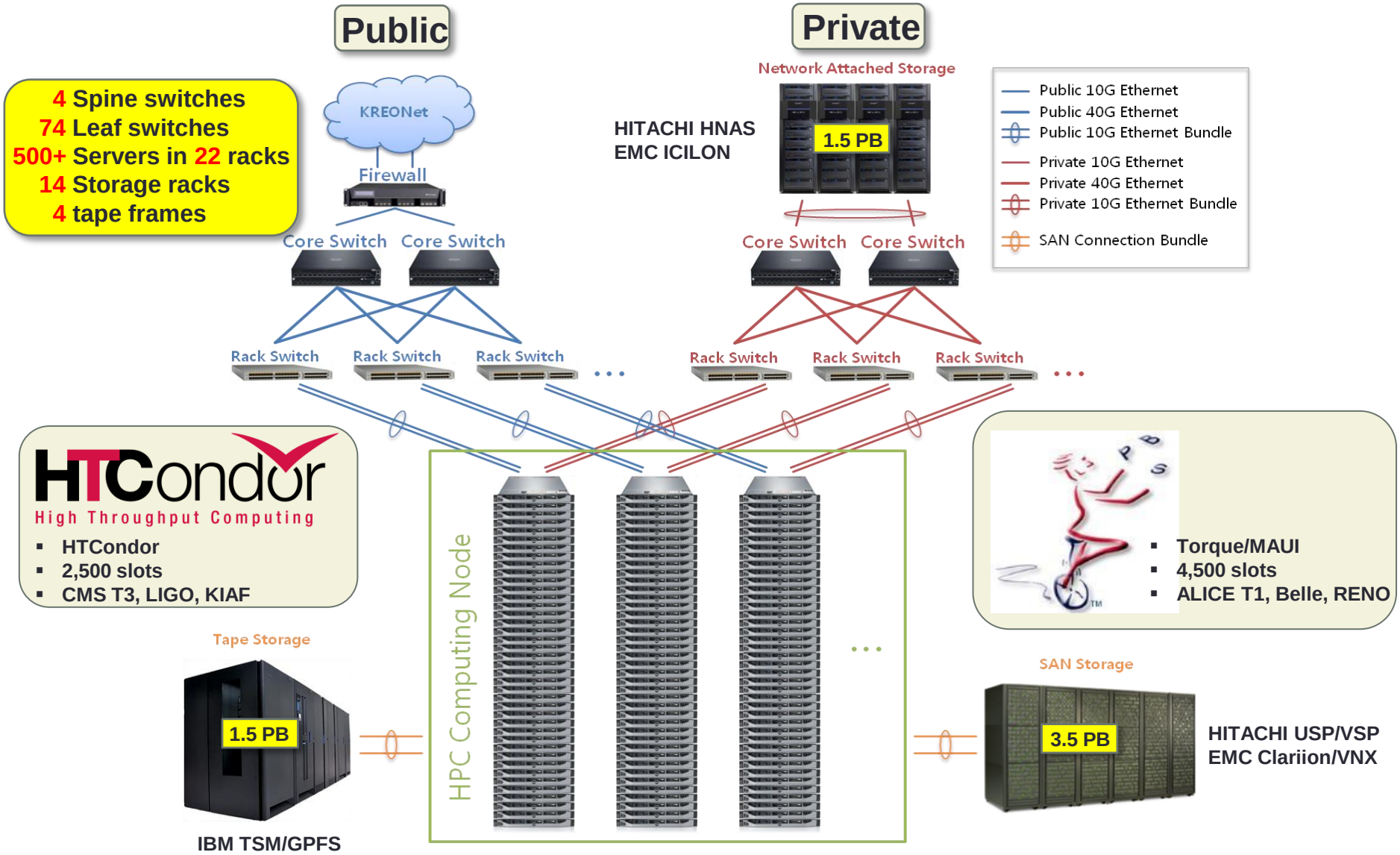
- Government funding research institute for IT founded in 1962
  - 600 people working for National Information Service(distribution & analysis), **Supercomputing and Networking**
- Operating **Supercomputing** and **NREN Infrastructure**
  - Supercomputer: **307.4 TFlops** at peak(14th ranked at Top500 in 2009; 201st now)
  - NREN Infrastructure: KREONet2
    - Domestic: **Seoul ←(100G)→ Daejeon**
    - International: **HK ←(100G)→ Chicago/Seattle**(Member of GLORIAD)

GSDC (Global Science experiment Data hub Center)

- Government funding project to promote research experiment providing computing power and storage
  - HEP: ALICE, CMS, Belle, RENO
  - Others: LIGO, Bioinformatics
- Running **Data-Intensive Computing Facility**
  - 13 staffs: sysadmin, experiment support, external-relation, administration
  - Total 7,900 cores, 6,000 TB disk and 1,500 TB tape storage

History of GSDC

GSDC System Overview



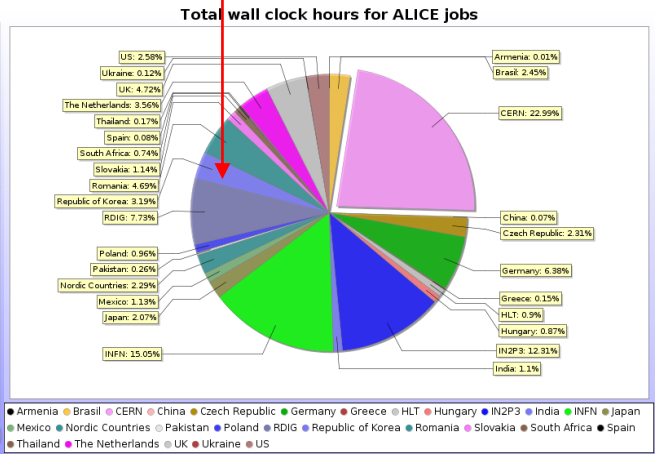
TIER-1 OPERATIONS

Jobs

Stable and smooth running
Participating in HI Reco Run at the end of 2015
261M jobs done for the last 6 months

Maximum 3,402 concurrent jobs = 37 kH06
(84 nodes x 32 (logical) cores + 20 nodes x 40 (logical) cores)

KISTI, 3.19% = 2.6M jobs for the last 6 months



Maximum 1,344 concurrent jobs (84 nodes x 16 cores)
> 5GB memory available per job
For HI Reco Run ~ Feb 2016

ALICE ONLY

Storage

1.465PB ALICE RAW Data Transferred
99% Storage Availability for the last 6 months

1,465 TB Used (Tape)

855.6 TB Used (Disk)

Run2 Data Taking

Tape
Disk

Disk storage elements

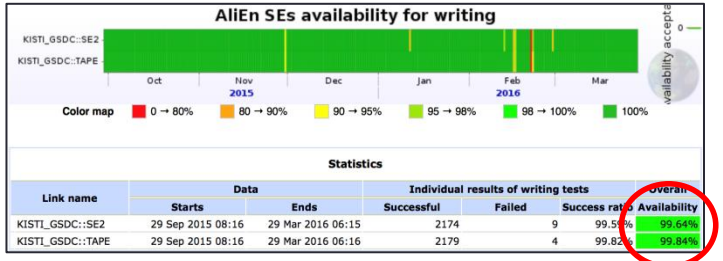
KISTI

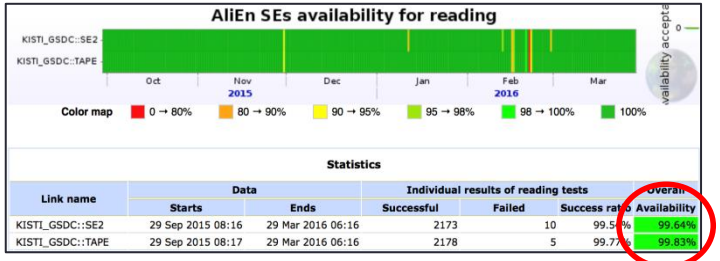
	AliEn SE		Statistics						Xrootd info						Functional tests			Last day tests		Demotion
SE Name	AliEn name	Size	Used	Free	Usage	No. of files	Type	Size	Used	Free	Usage	Version	EOS Version	add	get	Last OK test	Successful	Failed	factor
1. KISTI_GSDC - SE2	ALICE::KISTI_GSDC::SE2	1.446 PB	860.3 TB	620.4 TB	58.1%	24,811,384	FILE	1.446 PB	901.4 TB	579.7 TB	60.86%	v4.3.0				07.04.2016 02:15	12	0	0
Total		1.446 PB	860.3 TB	620.4 TB		24,811,384		1.446 PB	901.4 TB	579.7 TB									

Tape storage elements

KISTI

	AliEn SE		Statistics						Xrootd info					Functional tests			Last day tests		Demotion
SE Name	AliEn name	Size	Used	Free	Usage	No. of files	Type	Size	Used	Free	Usage	Version	EOS Version	add	get	Last OK test	Successful	Failed	factor
1. KISTI_GSDC - TAPE	ALICE::KISTI_GSDC::TAPE	387.2 TB	1.465 PB	-	387.3%	1,362,014	FILE	387.2 TB	352.3 TB	34.89 TB	90.99%	v3.3.4				29.03.2016 06:16	12	0	0
Total		387.2 TB	1.465 PB	0		1,362,014		387.2 TB	352.3 TB	34.89 TB									





400TB Disk buffer for helping fast access to data archived

99% Storage Availability of R/W for last 6 months

ALICE ONLY

Site Availability/Reliability

- **99.8%** Reliable for the last 6 month (from Sep-2015 to Feb-2016)
  - Monthly Target for Reliability of ALICE test: 97%
  - Less than 10 days of yearly downtime

$$Reliability = \frac{T_{UP}}{T_{UP} + (T_{DOWN} - T_{SCHED_DOWN})}$$

$$Availability = \frac{T_{UP}}{T_{UP} + T_{DOWN}}$$

- On track for a stable and reliable site
  - Participating in weekly WLCG operations meetings(1 times (Mon) per week): reporting operation-related issues
  - 24/7 monitoring & maintenance contract
  - 2 persons responsible for on-call

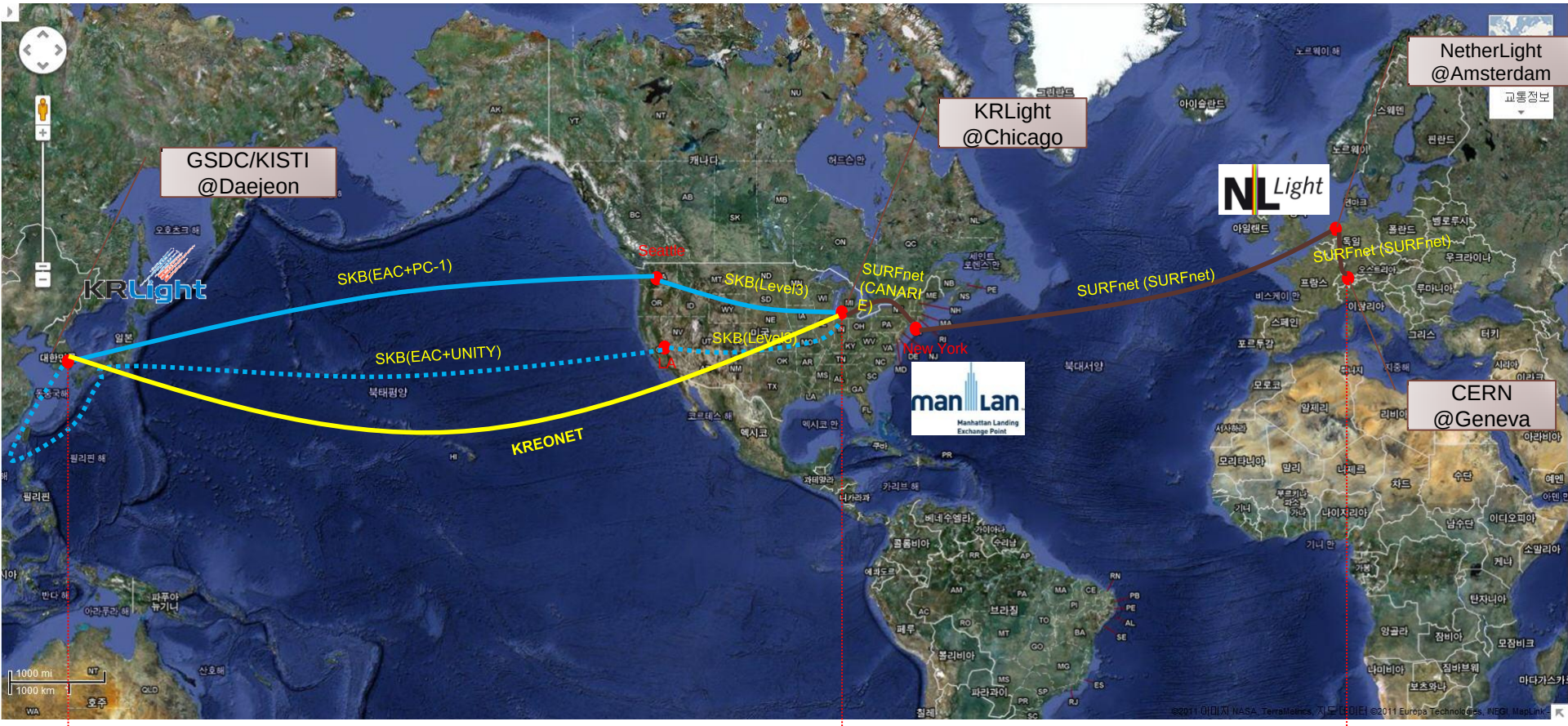
< Monthly Availability/Reliability (%) >

	Sep	Oct	Nov	Dec	Jan	Feb
Reliability	100	100	100	100	100	99
Availability	100	100	100	95	100	99

ALICE ONLY

KISTI-CERN Network (LHCOPN)

10Gbps Upgrade done by 31st April 2015

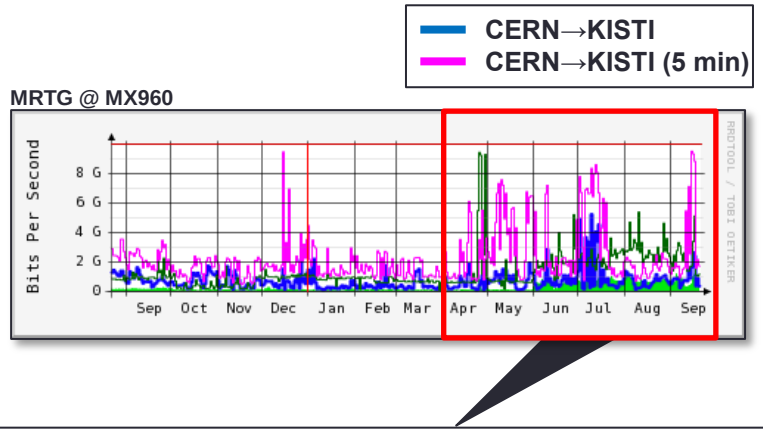


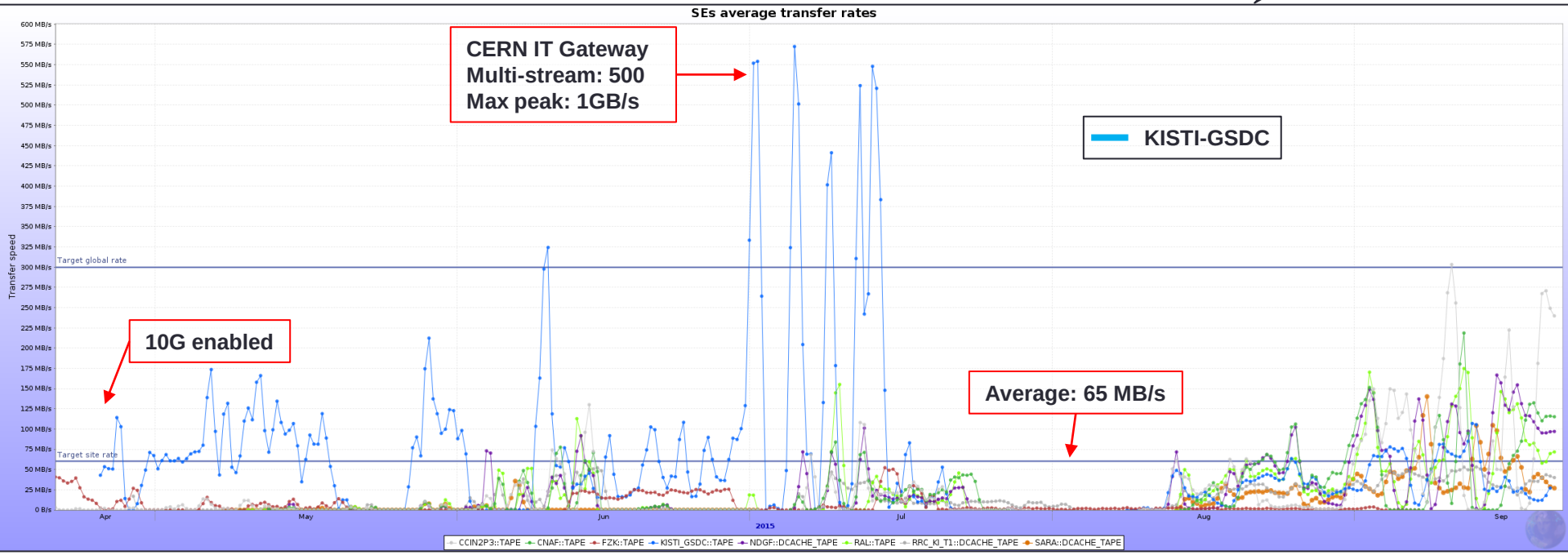
SK Broadband (~'16.8)

SURFnet

Performance

- > 9Gbps peak (~ 1GB/s) observed
  - CERN IT provided a gateway, 500 parallel transfers
    - xrd3cp crashed with Xrootd v3.3.4 (fixed @ v4 or later)
  - Max 1GB/s peak @ alimonitor.cern.ch
  - Confirmed full capacity



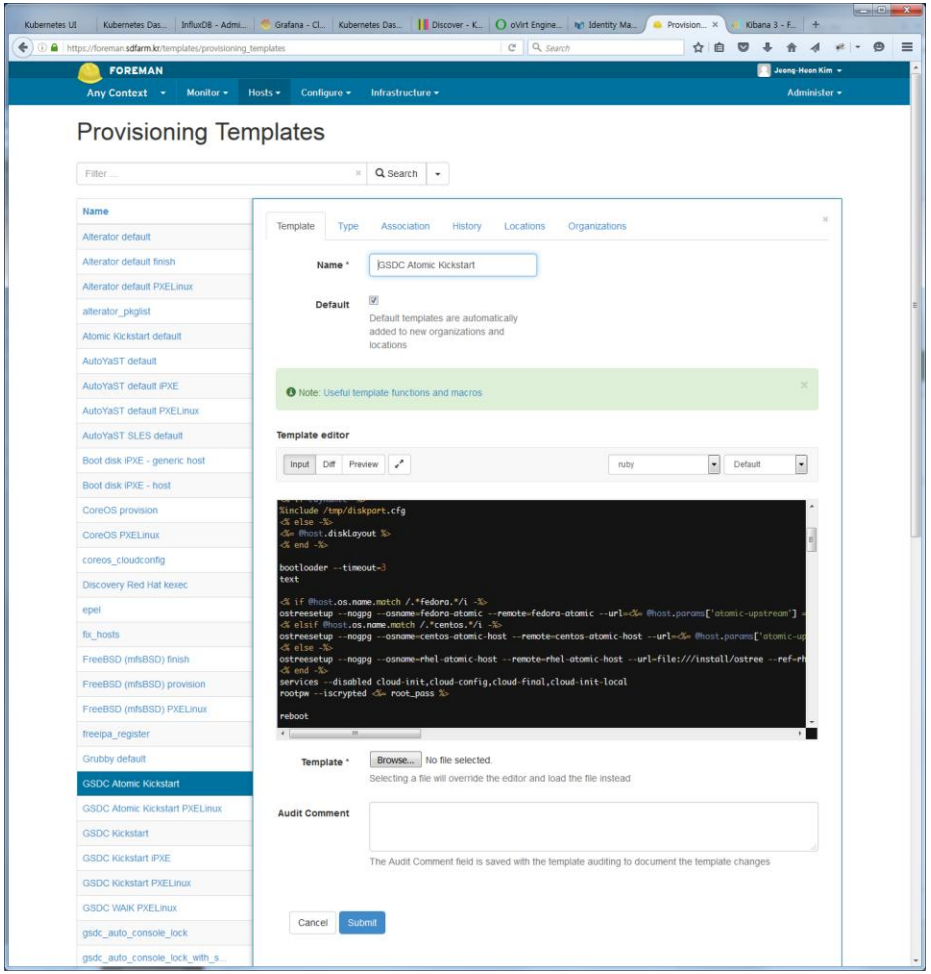


alimonitor.cern.ch

GSDC SYSTEM

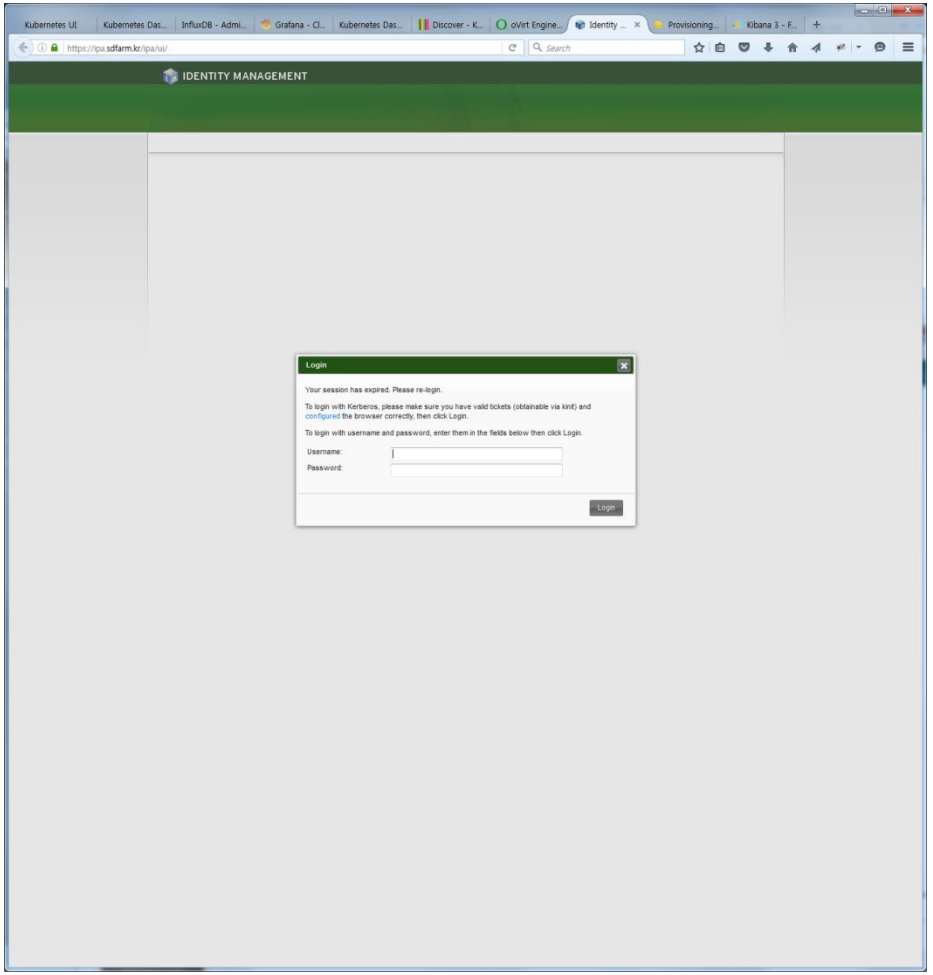
Controlled by Puppet and Foreman

- Profile implemented by the Puppet
- Role defined in the Host Group of Foreman



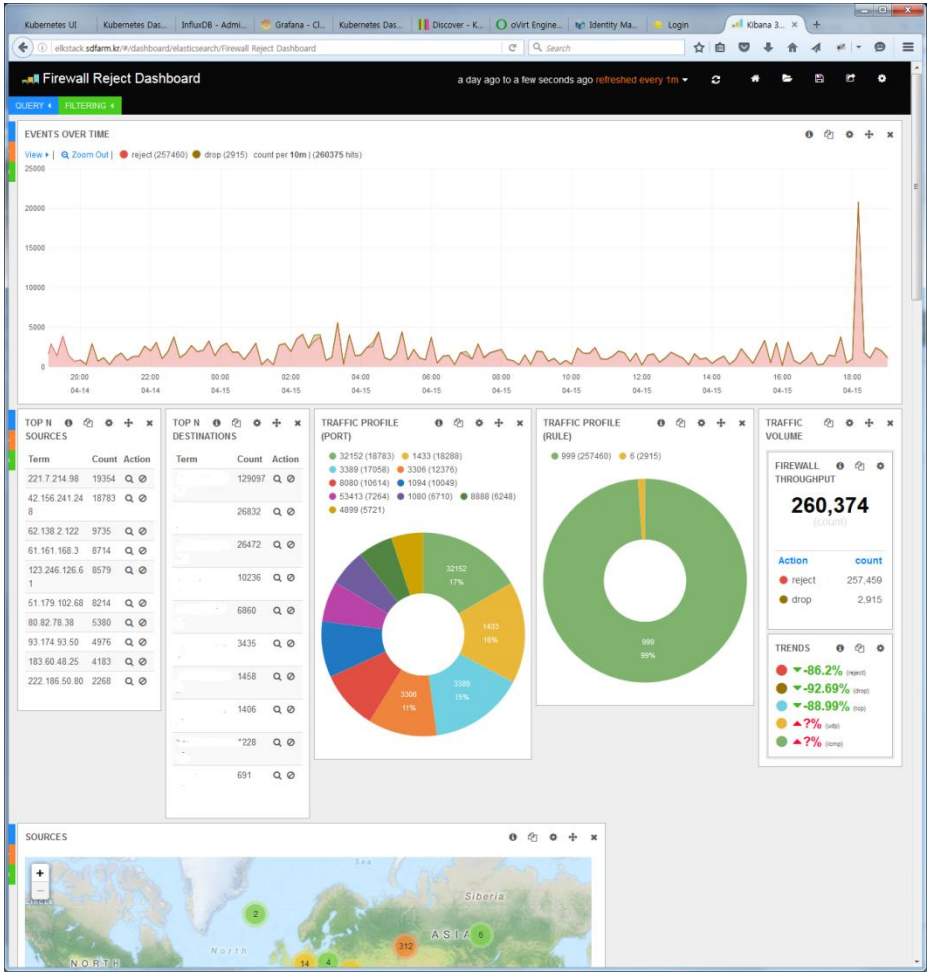
Central Authentication by IPA

- User
- DNS
- Kerberos
- SUDO rule
- Automount
- Host based access control



Log Collecting by ELKStack

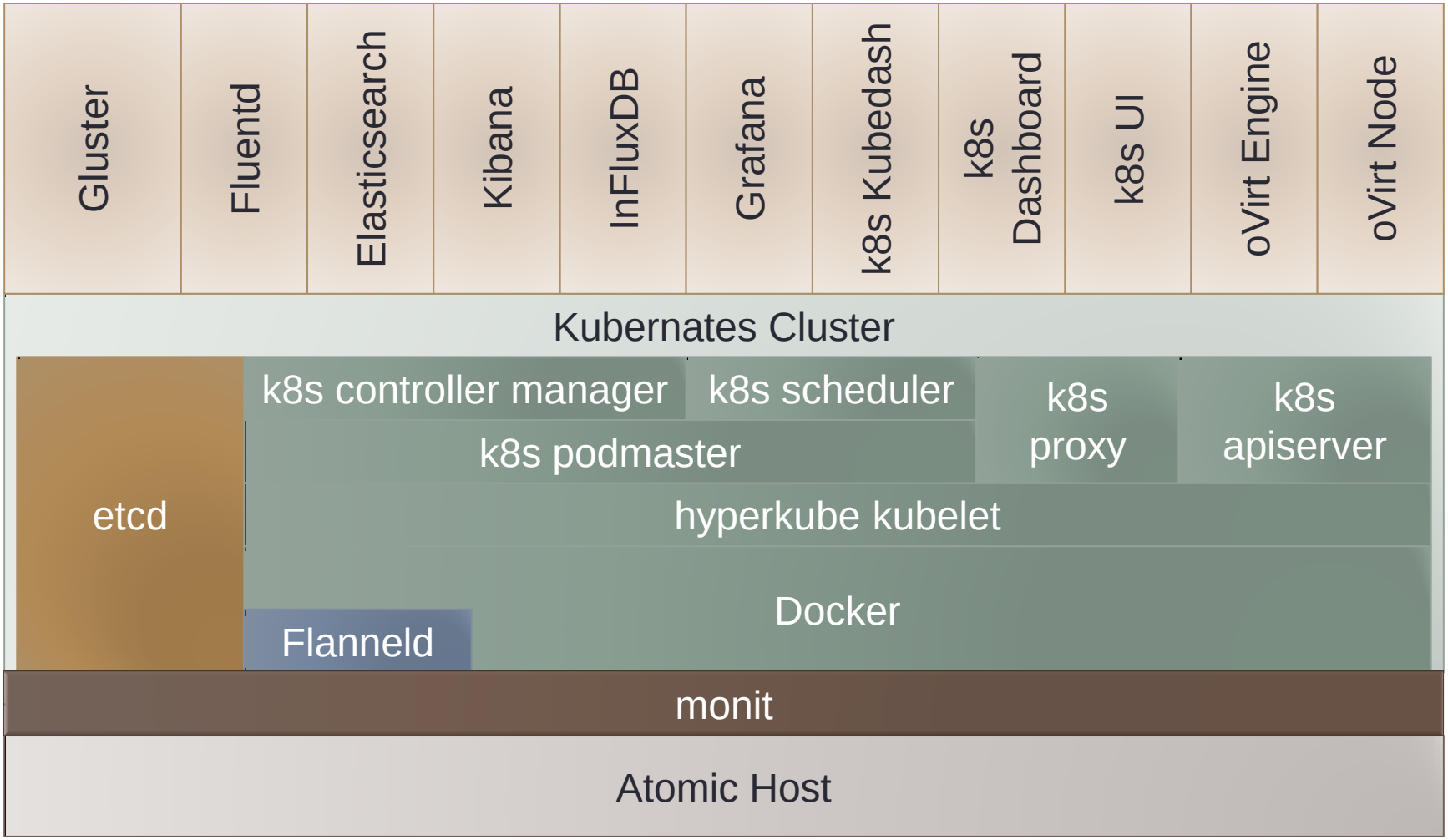
- Messages
- IPTables
- SNMP trap
- Torque job



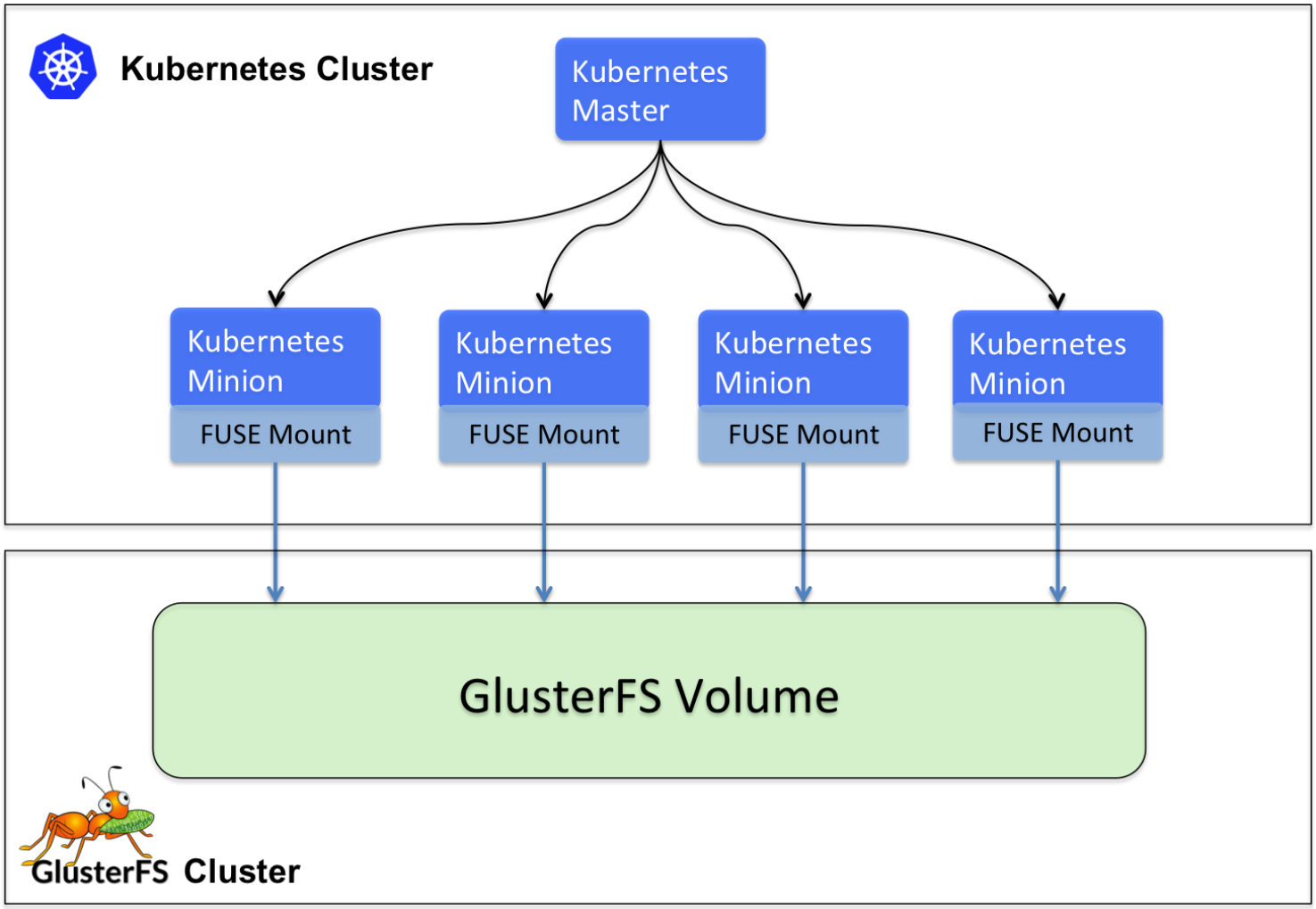
Plan

- Additional resources will be procured
  - ~720 CPU cores
  - ~2 PB disk storage (NAS)
  - ~1.5 PB tape storage
- Linux container based provisioning system will be deployed for supporting several researches

Experimental Setup

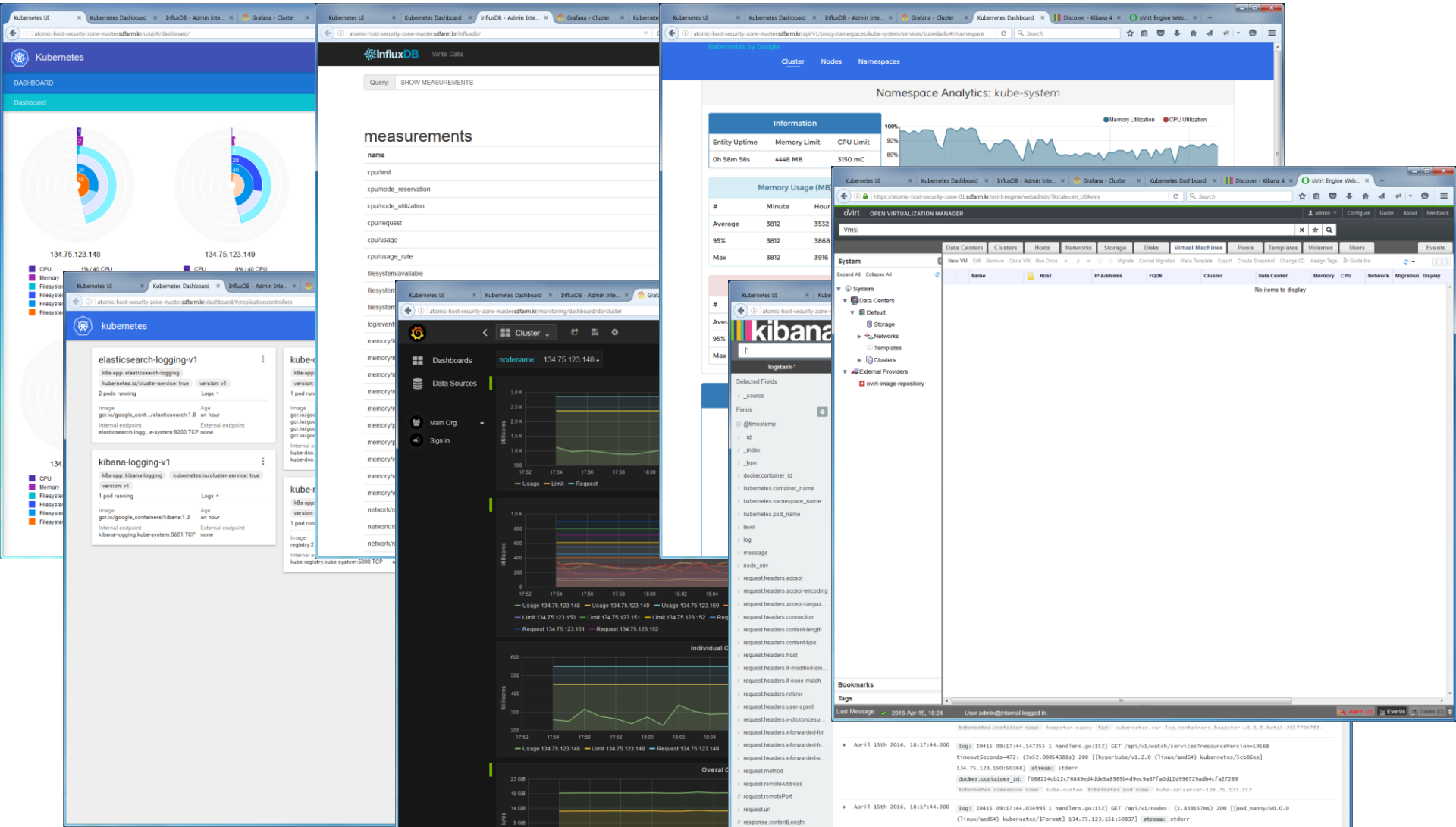


Persistence Data Storage

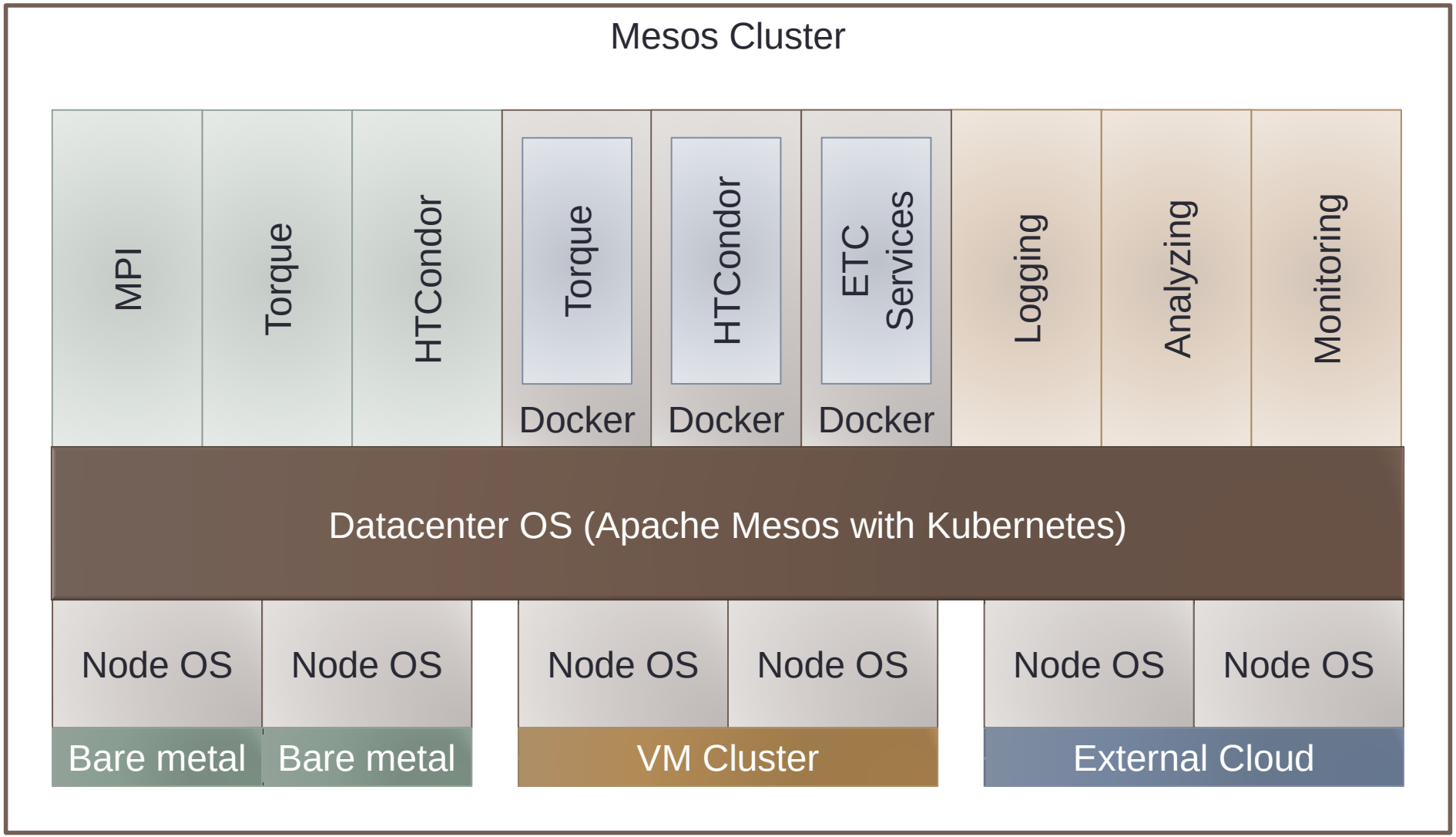


Install Script

Running Screenshot



Master Plan for Container based Provisioning System



감사합니다.

آپ کا شکریہ .

धन्यवाद।

ขอบคุณ

谢谢。

ありがとうございます。

Terima kasih .

Благодаря.

Dank u.

Ευχαριστώ.

Dziękuję.

Grazie.

Vielen Dank.

Dank je.

Merci.

Thank you.