

|| ALICE Tier-1/Tier-2 Workshop in Seoul ||

Nurion HPC Integration

Hyeonjin Yu

Integrated M.S. and Ph.D student,
Chungbuk National University, South Korea

hyeonjin.yu@cern.ch

2024.04.17(Wed)

INDEX

1. **The Reason for Project**
2. **Project Participants**
3. **Site Architecture**
4. **Site Configuration**
5. **History & Current Status of The Site**
6. **Future Plans**

2. Project Participants

❖ Introduction of institutes participating the project

- The project's goal is to construct a new ALICE grid site with an HPC cluster.
 - HPC resource: Nurion, 5th supercomputer in South Korea (managed by KISTI)

<https://www.ksc.re.kr/eng/resources/nurion>

Overview

Main system

- 8,305 compute nodes
- 132 CPU-only nodes (25.7PFlops total)

Storage

- 12 racks(23.88PB total)
- 3,200 8TB NL-SAS
- 768 1.2TB SSDs

Tape Library

- 4 racks(10PB total)
- 1,700 LTO7 tapes

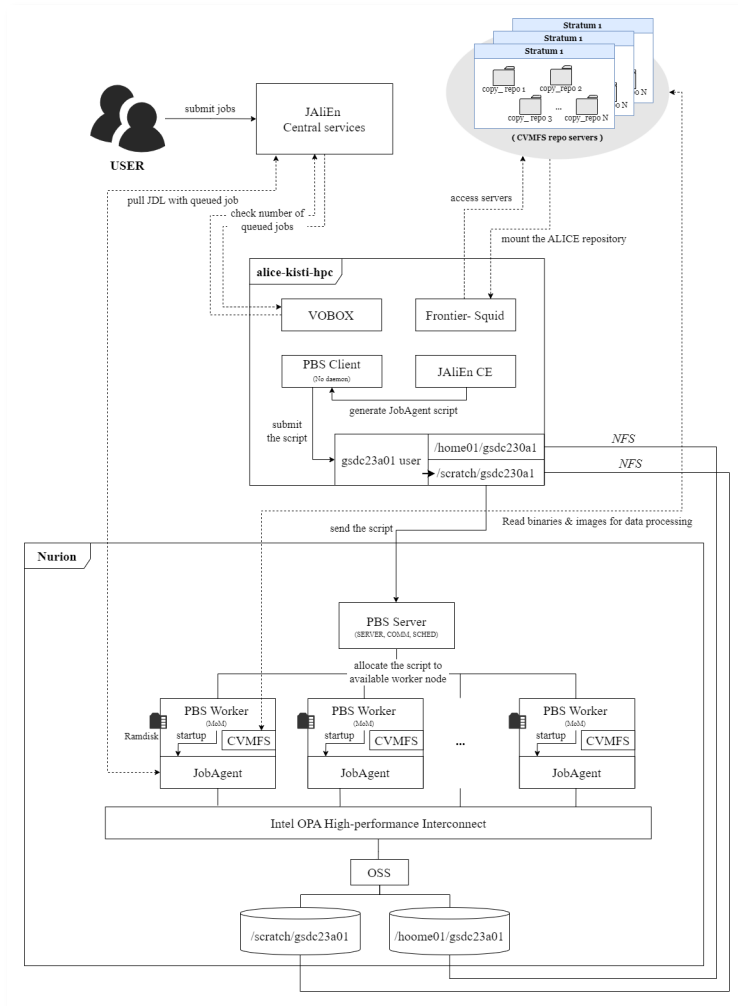
Infrastructure

- Chiller 400RT 4EA
- Free colling 250RT 2EA
- Cooling tower 450RT 4EA
- HVAC 30RT 11EA

- **ALICE** (A Large Ion Collider Experiment)
 - technical support for JAliEn
- **KISTI** (Korea Institute of Science and Technology)
 - Computing resource provider
 - Site environment builder
- **CBNU** (Chungbuk National University)
 - Site environment builder

3. Site Architecture

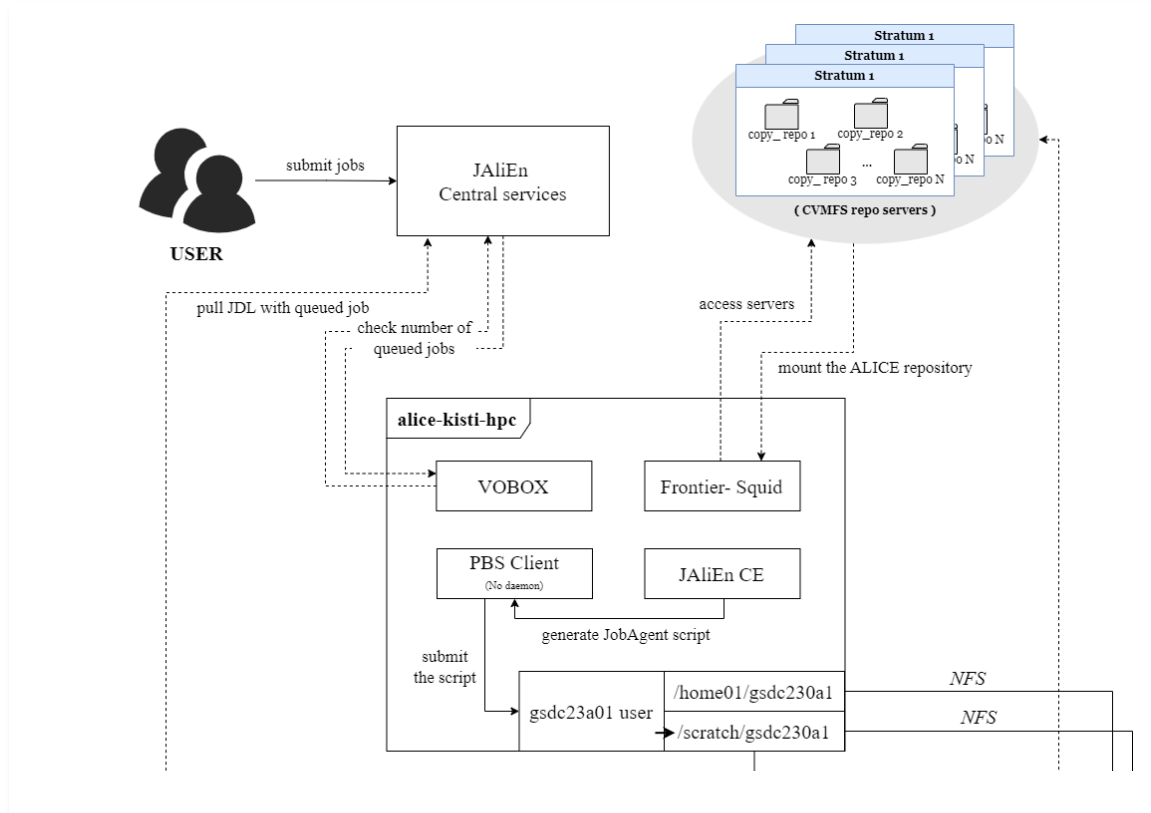
❖ 1) HPC grid site Architecture: ‘KISTI_GSDC_Nurion’



1. Acquire ALICE grid job submissions from authorized users via VOBOX.
2. Create JobAgent script to search for available computational nodes.
3. Transition to the designated job submission user, gsd23a01.
4. Move to the designated submission workspace, /scratch/gsd23a01.
5. Submit a job executing the JobAgent script to the PBS queue by gsdc23a01 on /scratch/gsd23a01.
6. Allocate the job on one of HPC worker nodes by the PBS server.
7. Bring and process ALICE grid jobs for the JobAgent’s lifetime.

3. Site Architecture

❖ 2) VObbox node: 'alice-kisti-hpc'

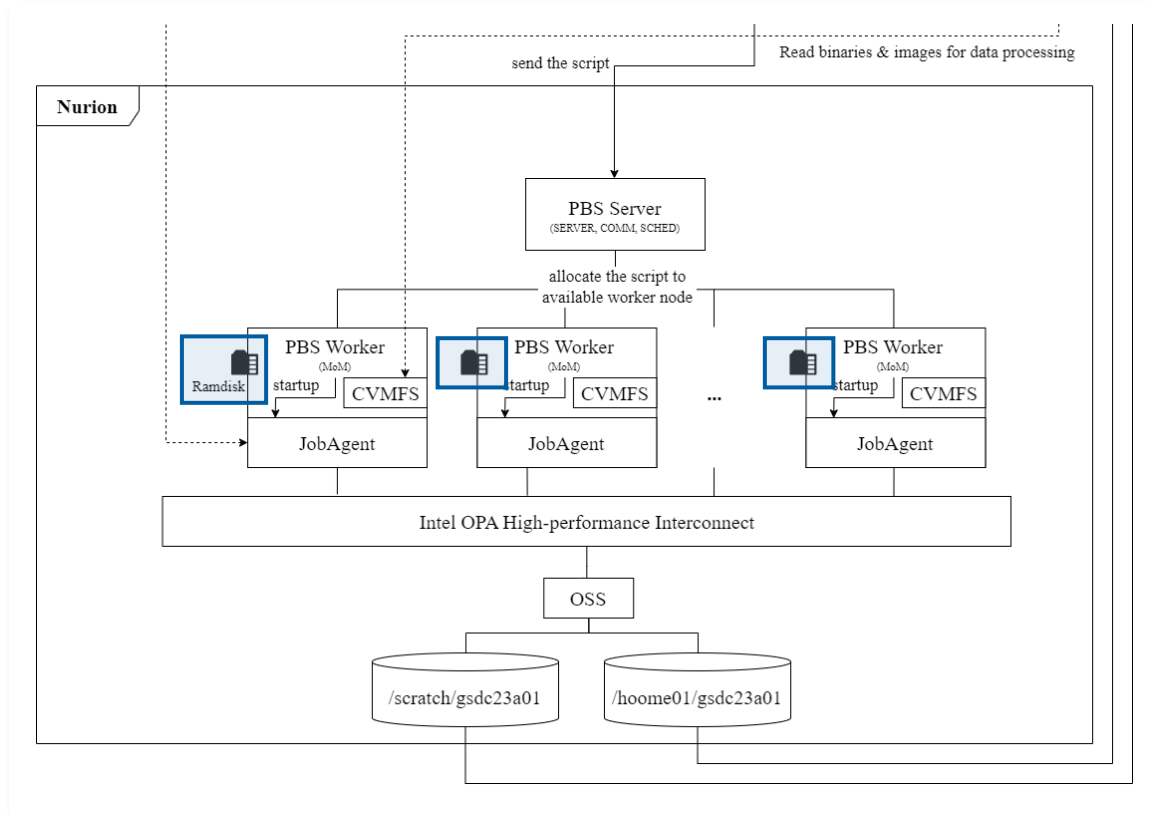


NODE: alice-kisti-hpc

- installed packages
 - vbox
 - cvmfs
 - frontier-squid
 - pbs
- roles
 - authentication
 - proxy server
 - pbs client
- for job submission, it needs:
 - /scratch/gsdc23a01 as a job submission path
 - gsdc23a01 as a job submission user

3. Site Architecture

❖ 3) HPC PBS cluster: 'Nurion'



NODE: PBS server

- installed package
 - pbs
- roles
 - allocating jobs to worker nodes

NODE: PBS worker

- installed packages
 - cvmfs
 - pbs
- roles
 - processing jobs
- why ramdisk used?
 - instead of disks

4. Site Configuration



❖ Overview

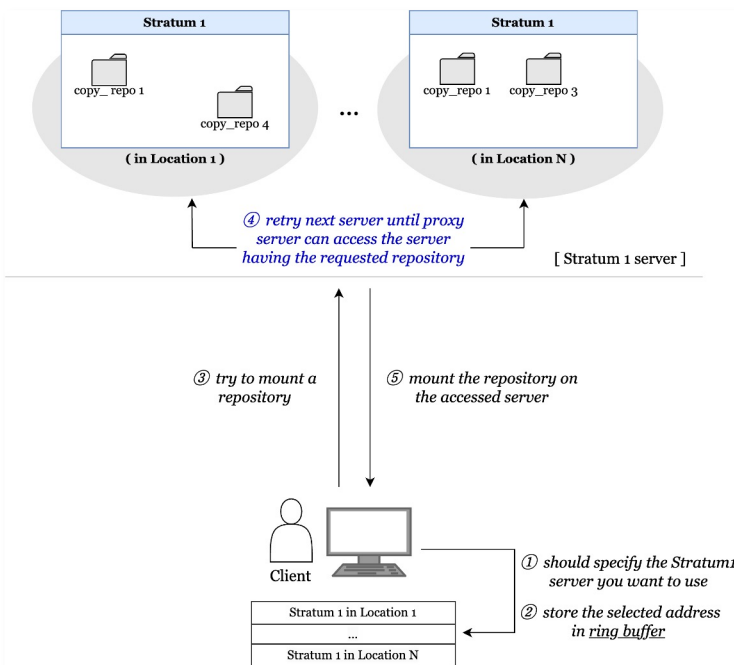
- Introduce Frontier-squid, CVMFS, NFS, PBS and VOBOX.
- Explain their respective roles and how to setup them for this project.

Frontier-squid	<ul style="list-style-type: none">• A proxy server which is utilized for CVMFS.• This proxy contains information about the stratum servers storing CVMFS repositories.
CVMFS	<ul style="list-style-type: none">• A file system which stores various experimental data, packages, software of CERN.• It functions similarly to Github.
NFS	<ul style="list-style-type: none">• A protocol that allows access to file systems on other nodes through a network.• It's used for access a workspace for job submission on HPC node.
PBS	<ul style="list-style-type: none">• A software that optimizes job scheduling and workload management.• It operates similarly to HTCondor.
VOBOX	<ul style="list-style-type: none">• A system to supports ALICE VO services• This system is necessary to grant access to the project environment only for authorized users.

4. Site Configuration

❖ 1) Frontier-squid

- Frontier-squid is a proxy server utilized to mount the ALICE repository necessary for ALICE Grid jobs.
- To configure the proxy server?
 - Add an `http_proxy` environment variable
 - Edit `/etc/squid/customize.sh`



[a 'http_proxy' environment variable]

```
[root@alice-kisti-hpc pbs]# export | grep proxy
declare -x http_proxy="http://alice-kisti-hpc.sdfarm.kr:3128"
[root@alice-kisti-hpc pbs]#
```

[/etc/squid/customize.sh]

```
13 awk --file `dirname $0`/customhelps.awk --source '{
14 uncomment("acl MAJOR_CVMFS")
15 insertline("^# http_access deny !RESTRICT_DEST", "http_access deny !MAJOR_CVMFS")
16 insertline("^acl Safe_ports port 777", "acl CONNECT method CONNECT")
17 setoption("acl NET_LOCAL src", "0.0.0.0/0")
18 setoption("cache_mem", "128 MB")
19 setoptionparameter("cache_dir", 3, "10000")
20 print
21 }'
```

- meaning: when we mount CVMFS repositories, the proxy only connects MAJOR_CVMFS

4. Site Configuration

❖ 1) Frontier-squid

- The path in MAJOR_CVMFS is a list of major WLCG CVMFS stratum1 servers including ALICE repository.
- Through fixing the CVMFS server which squid can connect by 'uncomment' in /etc/squid/customize.sh,
 - We make Frontier-squid only access to MAJOR_CVMFS

[/etc/squid/customize.sh]

```
13 awk --file `dirname $0`/customhelps.awk --source '{
14 uncomment("acl MAJOR_CVMFS")
15 insertline("# http_access deny !RESTRICT_DEST", "http_access deny !MAJOR_CVMFS")
16 insertline("Acl_Safe_ports port 777" "acl CONNECT method CONNECT")
```



[a proxy config file - /etc/squid/squid.conf]

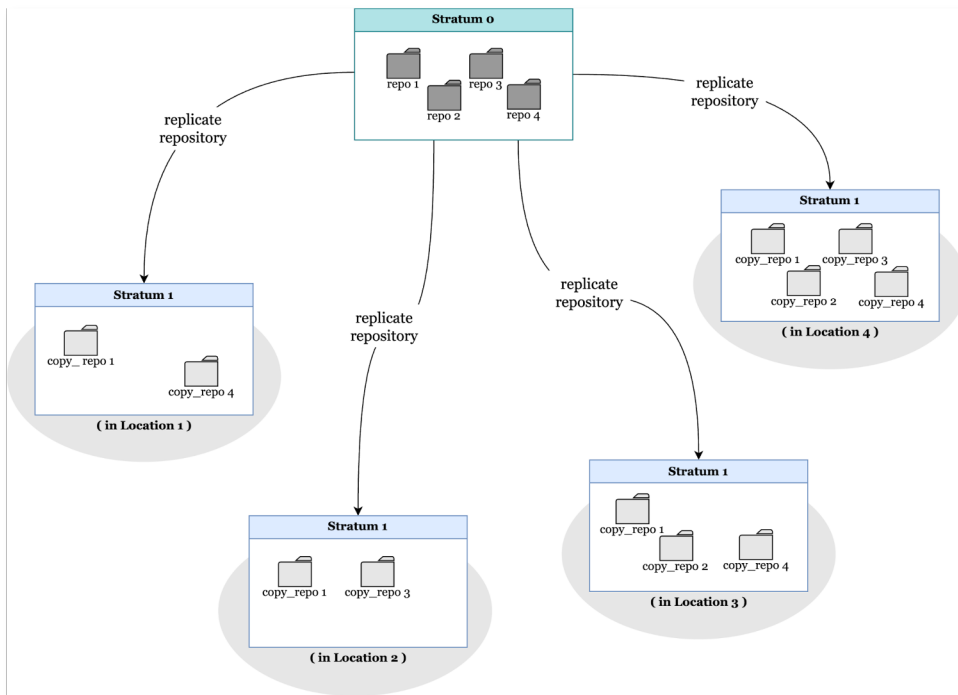
```
# acl CMS_FRONTIER dstdom_regex ^(cmsfrontier.*\.cern\.ch|cms.*frontier\.openhtc\.io)$
# acl ATLAS_FRONTIER dstdom_regex ^(atlas.*frontier.*\.cern\.ch|cc.*\.in2p3\.fr|lcg.*\.gridpp
\.rl\.ac\.uk|(. *frontier.*|tier1nfs)\.triumf\.calatlas.*frontier\.openhtc\.io)$
acl MAJOR_CVMFS dstdom_regex ^((cvmfs-stratum-.*|hepvm)\.cern\.ch|(cernvmfs|cvmfs).*\.gridpp
\.rl\.ac\.uk|cvmfs.*\. (racf|sdcc)\.bn|\.gov|cvmfs.*\.fnal\.gov|(cvmfs01|klei)\.nikhef\.nl|cvmf
s.*\.grid\.sinica\.edu\.tw|cvmfs.*\.lcg\.triumf\.cal|(cvmfs-s1|oasis).*\.opensciencegrid\.org|
cvmfs.*\.ihep\.ac\.cn|hcc-cvmfs\.unl\.edu|(cvmfs-stratum-one\.zeuthen|grid-cvmfs-one)\.desy\.
delcc.*\.in2p3\.fr|.*cvmfs\.openhtc\.io|(cvmfs-s1.*|object-.*\.cloud)\.computecanada\. (calnet
)|sampacs.*\.if\.usp\.br|cvmfs-.*\.hpc\.swin\.edu\.au|cvmfs-stratum-one\.cc\.kek\.jp)$
```

4. Site Configuration

❖ 2) CVMFS

- CVMFS is a file system that stores repositories including packages, experimental data and so on.
- To configure CVMFS, we just need to create and edit `/etc/cvmfs/default.local`.
 - There are some parameters for configuring CVMFS.

[CVMFS Repository servers]



[CVMFS config file - `/etc/cvmfs/default.local`]

```
[root@alice-kisti-hpc ~]# cat /etc/cvmfs/default.local
CVMFS_REPOSITORIES=alice.cern.ch
#CVMFS_CLIENT_PROFILE=single
CVMFS_HTTP_PROXY="http://alice-kisti-hpc.sdfarm.kr:3128"
#CVMFS_HTTP_PROXY="http://alice-t1-squid.sdfarm.kr:3128"
CVMFS_CACHE_BASE="/cache-cvmfs"
CVMFS_QUOTA_LIMIT="17000"
```

- CVMFS_REPOSITORIES - the repository list you want to mount
- CVMFS_HTTP_PROXY - the proxy server list (one or more)
- CVMFS_CACHE_BASE - the location of the cache directory
- CVMFS_QUOTA_LIMIT - the cache size (MB)

4. Site Configuration

❖ 2) CVMFS

- ALICE repository can be mounted simply using the ‘cd’ command, thanks to autofs.
- When we mount repositories, Frontier-squid creates a log file called access.log.
 - TCP-MISS : the repository has not cached before (= it's being mounted for the first time)
 - TCP-HIT : the repository is cached (= it's being mounted for more than one time)

[mounting the alice repository]

```
[root@alice-kisti-hpc ~]# cvmfs_config probe
Probing /cvmfs/alice.cern.ch... OK
[root@alice-kisti-hpc ~]#
[root@alice-kisti-hpc ~]# cd /cvmfs/alice.cern.ch/bin ; ll
total 35
drwxrwxr-x.  2 cvmfs cvmfs   20 Jun  1 20:16 .
drwxr-xr-x. 24 cvmfs cvmfs 4096 Nov 27  2012 ..
-rwxrwxr-x.  1 cvmfs cvmfs  139 Sep 23  2013 alien
-rwxrwxr-x.  1 cvmfs cvmfs  165 Sep 23  2013 aliend
-rwxr-xr-x.  1 cvmfs cvmfs 14404 Jul 11 00:46 alienv
-rwxr-xr-x.  1 cvmfs cvmfs 14347 Jan 10  2023 alienv.safe
[root@alice-kisti-hpc bin]#
[root@alice-kisti-hpc bin]# ./alienv
Unknown distribution release: CentOS 7.9.2009
[root@alice-kisti-hpc bin]#
```

[/var/log/squid/access.log (first mount)]

```
- - [26/Oct/2023:16:44:58.019 +0900] "GET http://cernvmfs.gridp
p.rl.ac.uk/cvmfs/alice.cern.ch/data/f8/7cc7c8734c25af2579c8372861298fa40bdd6dC
HTTP/1.1" 503 4437 TCP_MISS:HIER_DIRECT 0 "-" alice.cern.ch:/%20%28f87cc7c8734
c25af2579c8372861298fa40bdd6d%29" "-" "cvmfs Fuse 2.11.0"
```



[/var/log/squid/access.log (second mount)]

```
- - [26/Oct/2023:16:44:58.216 +0900] "GET http://cvmfs-stratum-
one.cern.ch/cvmfs/alice.cern.ch/data/f8/7cc7c8734c25af2579c8372861298fa40bdd6d
C HTTP/1.1" 200 4625826 TCP_HIT:HIER_NONE 196 "-" alice.cern.ch:/%20%28f87cc7c8
734c25af2579c8372861298fa40bdd6d%29" "-" "cvmfs Fuse 2.11.0"
```

4. Site Configuration

❖ 3) NFS

```
[root@alice-kisti-hpc ~]# mount -t nfs                :/home01/gsd23a01 /home01/gsd23a01
[root@alice-kisti-hpc ~]# mount -t nfs                :/scratch/gsd23a01 /scratch/gsd23a01
```

- NFS is a networking protocol used for sharing /home/gsd23a01 and /scratch/gsd23a01 directories.
- To configure NFS, we edit ldap.conf and sssd.conf
 - LDAP - a Lightweight Directory Access Protocol to search for information over a network
 - SSSD - a System Security Service Daemon for accessing remote directories and authentication services

[/etc/openldap/ldap.conf]

```
SASL_NOCANON on
URI ldaps://
BASE dc=cm,dc=cluster
TLS_REQCERT never
TLS_CACERT /etc/openldap/certs/ca.pem
TLS_CERT /etc/openldap/certs/ldap.pem
TLS_KEY /etc/openldap/certs/ldap.key
```

[/etc/sss/sss.conf]

```
1 [sss]
2 config_file_version = 2
3 domains = LDAP
4 services = nss, pam
5
6 [nss]
7 filter_groups = root
8 filter_users = root
9 reconnection_retries = 3
10 enum_cache_timeout = 600
11 entry_cache_nowait_percentage = 75
12
13 [pam]
14 reconnection_retries = 3
15 offline_credentials_expiration = 2
16 offline_failed_login_attempts = 3
17 offline_failed_login_delay = 5
```

```
19 # A native LDAP domain
20 [domain/LDAP]
21 timeout = 30
22 enumerate = true
23 cache_credentials = TRUE
24 debug_level = 3
25 #ignore_group_members = true
26 id_provider = ldap
27 auth_provider = ldap
28 chpass_provider = ldap
29 ldap_uri = ldaps://
30 ldap_backup_uri = ldaps://
31 ldap_search_base = dc=cm,dc=cluster
32 ldap_user_search_base = dc=cm,dc=cluster
33 ldap_group_search_base = ou=Group,dc=cm,dc=cluster
34 ldap_tls_reqcert = never
35 ldap_tls_cacert = /etc/openldap/certs/ca.pem
36 ldap_tls_cert = /etc/openldap/certs/ldap.pem
37 ldap_tls_key = /etc/openldap/certs/ldap.key
```

4. Site Configuration

❖ 3) NFS

- These files enable only the gsd23a01 user to access to the mounted directories.
- The LDAP server contains gsd23a01 user, and SSSD restricts access the directories to all users except gsd23a01.
 - On root user, it can not access /home/gsd23a01 and /scratch/gsd23a01.
 - On gsd23a01 user, it can access /home/gsd23a01 and /scratch/gsd23a01.

[on root user]

```
[root@alice-kisti-hpc ~]# ll /etc/openldap/certs/
total 76
drwxr-xr-x. 2 root root 116 Oct 6 08:59 .
drwxr-xr-x. 3 root root 81 Oct 12 14:56 ..
-rw-r--r--. 1 root root 1281 Oct 6 08:58 ca.pem
-rw-r--r--. 1 root root 1704 Oct 6 08:59 ldap.key
-rw-r--r--. 1 root root 1383 Oct 6 08:59 ldap.pem
```



```
[root@alice-kisti-hpc ~]# ll /home01/gsd23a01/
ls: cannot open directory /home01/gsd23a01/: Permission denied
[root@alice-kisti-hpc ~]#
[root@alice-kisti-hpc ~]# ll /scratch/gsd23a01/
ls: cannot open directory /scratch/gsd23a01/: Permission denied
```

[on gsd23a01 user]

```
[gsdc23a01@alice-kisti-hpc gsd23a01]$ ll /home01/gsd23a01/certs
total 12
-r--r-----. 1 gsd23a01 in0138 1281 Oct 5 23:04 ca.pem
-r--r-----. 1 gsd23a01 in0138 1704 Oct 5 23:04 ldap.key
-r--r-----. 1 gsd23a01 in0138 1383 Oct 5 23:04 ldap.pem
```



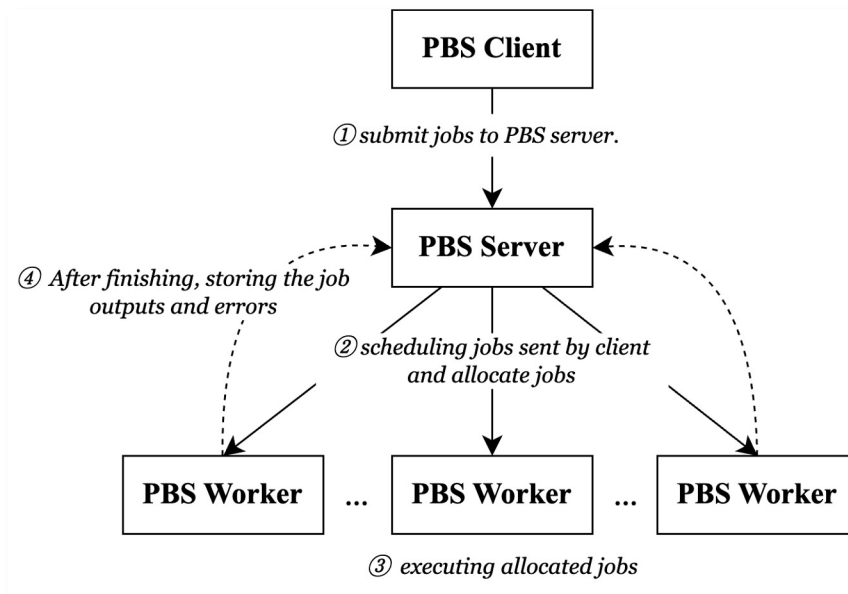
```
[gsdc23a01@alice-kisti-hpc ~]$ ll /home01/gsd23a01
total 56900
drwxr-xr-x. 2 gsd23a01 in0138 4096 Oct 5 23:04 certs
drwxr-xr-x. 2 gsd23a01 in0188 4096 May 18 14:06 job_examples
-rw-r--r--. 1 gsd23a01 in0188 58254308 Sep 26 15:52 pbspro-execution-2020.1.
3.20210315160738-0.el7.x86_64.rpm
[gsdc23a01@alice-kisti-hpc ~]$
[gsdc23a01@alice-kisti-hpc ~]$ ll /scratch/gsd23a01/
-rwxr-x---. 1 gsd23a01 in0188 328 Oct 30 11:34 cvmfs.sh
-rw-r-----. 1 gsd23a01 in0188 81 Oct 19 13:09 test.c
-rwxr-x---. 1 gsd23a01 in0188 8360 Oct 23 14:57 test.exe
```

4. Site Configuration

❖ 4) PBS

- PBS is a distributed workload management system for managing and monitoring your computational workload.
 - The project utilizes all types of pbs nodes: PBS Client, PBS Server, PBS Worker.
- * Our pbs cluster consists of 1 client, 1 server and 2 worker now.*

[Typical architecture of PBS cluster]



- **PBS Client**
 - the interface used by user to interact with the PBS server
 - submitting and monitoring jobs
- **PBS Server**
 - the central node of managing the PBS system
 - managing job scheduling, resources and job execution on the cluster
- **PBS Worker**
 - the nodes that the actual computational work is performed

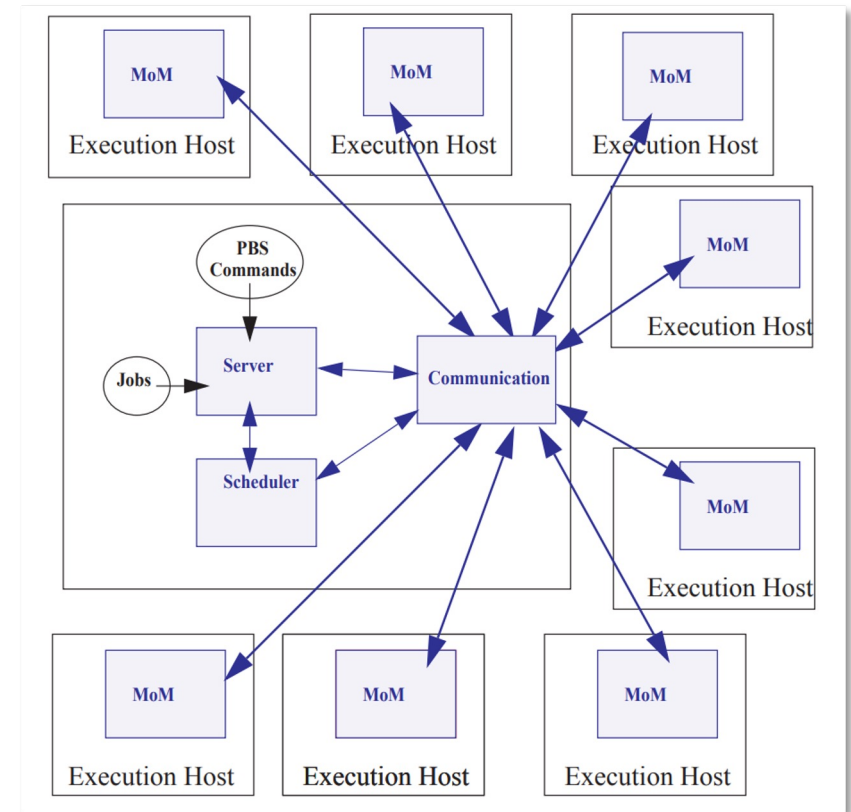
4. Site Configuration

❖ 4) PBS

- There are PBS daemons activated according to necessary role which each node should have.
 - **SERVER:** receives incoming jobs, holds jobs waiting for execution, sends jobs for execution when it's their turn.
 - **SCHED:** implements a policy that you define that controls when each job is run and on which resources
 - **COMM:** handles communication between the other PBS daemons
 - **MOM:** places each job into execution when it receives a copy of the job from the server

```
[gsdcadmin@alice-kisti-hpc ~]$ cat /etc/pbs.conf
PBS_EXEC=/opt/pbs
PBS_HOME=/var/spool/pbs
PBS_SERVER=dm1
PBS_PRIMARY=dm1
PBS_START_SERVER=0
PBS_START_SCHED=0
PBS_START_COMM=0
PBS_START_MOM=0
PBS_CORE_LIMIT=unlimited
PBS_SCP=/bin/scp
```

daemons for PBS Client



<https://help.altair.com/2022.1.0/PBS%20Professional/PBSInstallGuide2022.1.pdf>

4. Site Configuration



❖ 4) PBS - Client node

- Through the client node, we can monitor the status of the PBS server, workers and job queues.
- The cluster consist of 1 server and lots of workers.
 - Currently, we are utilizing 2 worker nodes: node8304, node8305.

[The status of PBS server]

```
[root@alice-kisti-hpc ~]# qstat -B
Server          Max   Tot   Que   Run   Hld   Wat   Trn   Ext Status
-----
pbs             0  9886  2364  1404   73    0    0    2 Scheduling
```

[The status of PBS workers]

```
vnode          state      njobs  run  susp  mem      ncpus  nmics  ngpus  jobs
-----
cpu0001        job-busy   1      1    0    187gb/187gb  0/40   0/0   0/0   13698865.pbs
cpu0002        job-busy   1      1    0    187gb/187gb  0/40   0/0   0/0   13698865.pbs
...
node8302        free       2      2    0    17gb/94gb   4/68   0/0   0/0   13690449.pbs,13690449.pbs
node8303        free       2      2    0    17gb/94gb   4/68   0/0   0/0   13676683.pbs,13676683.pbs
node8304        free       0      0    0    94gb/94gb   68/68   0/0   0/0   --
node8305        free       0      0    0    94gb/94gb   68/68   0/0   0/0   --
```

[The PBS queue list]

```
[gsdc23a01@alice-kisti-hpc ~]$ qstat -q
server: dm1
Queue          Memory CPU Time Walltime Node  Run  Que  Lm  State
-----
all_all        --     --     --     --     0    0    --  E R
skl_all        --     --     --     --     0    0    --  E R
test           --     --     999:00:00 --     0    0    --  E R
kdebug         --     --     48:00:00 --     0    0    --  D S
exclusive      --     --     --     --     0    0    --  E R
rokaf_skl      --     --     --     --     0    0    --  E R
kiost          ?     ?     ?     ?     ?    ?    --  E R
...
kterny         1     2     --     --     1    2    --  E R
alice          --     --     --     --     1    0    --  E R
kioct_knl      0     0     --     --     0    0    --  E R
usc24          --     --     --     --     0    0    --  E R
-----
1035 1005
```


4. Site Configuration

❖ 4) PBS - Worker node

- PBS worker nodes are NURION nodes.
- We test the job submission that mounts ALICE repository and execute the alienv script.
 - This test aims to verify if the worker node is ready to execute ALICE Grid jobs with CVMFES.

[a script of test job]

```
[gsdc23a01@alice-kisti-hpc gsdc23a01]$ cat cvmfs.sh
#!/bin/sh
#PBS -V
#PBS -N cvmfs_debug_job
#PBS -q alice
#PBS -A etc
#PBS -l select=1:ncpus=1:mpiprocs=1:ompthreads=1
#PBS -l walltime=01:00:00

cd $PBS_O_WORKDIR

module purge
module load craype-mic-knl intel/18.0.3

source /cvmfs/alice.cern.ch/etc/login.sh
ALIENV_DEBUG=1 alienv printenv VO_ALICE@AliPhysics::vAN-20231029_02-1
```

[output of the job]

```
[gsdc23a01@alice-kisti-hpc gsdc23a01]$ cat cvmfs_debug_job.o13756203
ALICE=/cvmfs/alice.cern.ch/el7-x86_64/Packages/AlRoot ;export ALICE;ALICE_PHYSICS=/cvmfs/alice.cern.ch/el7-x86_64/Packages/AlPhysics/vAN-20231029_02-1 ;export ALICE_PHYSICS;ALICE_ROOT=/cvmfs/alice.cern.ch/el7-x86_64/Packages/AlRoot/v5-09-59q_02-1 ;export ALICE_ROOT;ALICE_TARGET=linuxx8664gcc ;export ALICE_TARGET;ALICE_TARGET_EXT=linuxx8664gcc ;export ALICE_TARGET_EXT;ALIPHYSICS_RELEASE=vAN-20231029_02-1 ;export ALIPHYSICS_RELEASE;ALIPHYSICS_VERSION=vAN-20231029_02-1 ;export ALIPHYSICS_VERSION;ALIROOT_RELEASE=v5-09-59q_02-1 ;export ALIROOT_RELEASE;ALIROOT_VERSION=v5-09-59q_02-1 ;export ALIROOT_VERSION;BASEDIR=/cvmfs/alice.cern.ch/el7-x86_64/Modules/modulefiles/GEANT4/v11.0.4-37/cvmfs/alice.cern.ch/el7-x86_64/Modules/modulefiles/GEANT4/v11.0.4-37/cvmfs/alice.cern.ch/el7-x86_64/Modules/modulefiles/Vc/1.4.1-105/cvmfs/alice.cern.ch/el7-x86_64/Modules/modulefiles/xjalienfs/1.5.2-7/cvmfs/alice.cern.ch/el7-x86_64/Modules/modulefiles/JAliEn-ROOT/0.7.1-21/cvmfs/alice.cern.ch/el7-x86_64/Modules/modulefiles/AlRoot/v5-09-59q_02-1/cvmfs/alice.cern.ch/el7-x86_64/Modules/modulefiles/RooUnfold/V02-00-01-alice5-134/cvmfs/alice.cern.ch/el7-x86_64/Modules/modulefiles/treelite/8498081-30/cvmfs/alice.cern.ch/el7-x86_64/Modules/modulefiles/KFParticle/v1.1-5-37/cvmfs/alice.cern.ch/el7-x86_64/Modules/modulefiles/jemalloc/v5.1.0-2/cvmfs/alice.cern.ch/el7-x86_64/Modules/modulefiles/AlPhysics/vAN-20231029_02-1 ;export _LMFILES_;[gsdc23a01@alice-kisti-hpc
```



no problem with mounting ALICE repository on worker node

4. Site Configuration

❖ 5) VObox

- VOBOX is a system which supports ALICE VO services, checking whether a user is an authorized VO user.
- To configure VOBOX,
 - Set port and source firewall rules
 - Install `wlcg-vobox` and edit `site-info.def`, `users.conf` and `groups.conf`

[Network setting guide]

Network

The following network connectivity is expected for the VO-Box services:

Port	Access	Service
1093	TCP Incoming from the World	MonALISA FDT server, SE tests
8884	UDP Incoming from your site WN and your site SE nodes	Monitoring info
9930	UDP Incoming from your site SE nodes	XRootD metrics
	ICMP Incoming and Outgoing	Network topology for file placement and access

In the future, these extra services **may** be needed:

Port	Access	Service
8098	TCP Incoming from your site WN	JAIEn/Java Serialized Object stream
8097	TCP Incoming from your site WN	JAIEn/WebSocketS

Protocol	IP Range	Note
IPv4	128.141.0.0/16	
	128.141.25.192/26	<- part of Central Services are here
	128.141.26.0/26	<- part of Central Services are here
	128.142.0.0/16	
	128.142.249.0/24	<- part of Central Services are here
	137.138.0.0/16	<- part of Central Services are here
	188.184.0.0/15	<- part of Central Services are here

	185.249.56.0/22	
	192.65.196.0/23	
	192.91.242.0/24	
	194.12.128.0/18	
IPv6	2001:1458::/32	
	2001:1458:301:54::/64	<- part of Central Services are here
	2001:1459::/32	

<https://jalien.docs.cern.ch/site/vobox/>

4. Site Configuration

❖ 5) VObox

- After installing `wlcg-vobox`, we configure `site-info.def`, `users.conf`, `groups.conf`.
 - `site-info.def` - the main configuration file for defining site information
 - `users.conf` - a file defining the users to be created on the service nodes that need them
 - `groups.conf` - a file defining the user categories that must be accepted by the grid services provided by a site

[site-info.def]

```
[root@alice-kisti-hpc ~]# cat site-info.def
GROUPS_CONF=/opt/glite/yaim/etc/groups.conf
USERS_CONF=/opt/glite/yaim/etc/users.conf

SITE_NAME=KR-KISTI-GSDC-01

VOBOX_HOST=`hostname -f`
WMS_HOST=rocwms01.grid.sinica.edu.tw
PX_HOST=myproxy.cern.ch
BDII_HOST=lcg-bdii.cern.ch

#SE_LIST=alice-t1-se.sdfarm.kr
SE_LIST=my-se.my-domain

#VOS="alice dteam ops"
VOS="alice"

VO_ALICE_SW_DIR=.
VO_ALICE_DEFAULT_SE=my-se.my-domain
VO_ALICE_VOMS_SERVERS="'vomss://voms2.cern.ch:8443/voms/alice?
/alice/' 'vomss://lcg-voms2.cern.ch:8443/voms/alice?/alice/' "
VO_ALICE_VOMSES="'alice lcg-voms2.cern.ch 15000 /DC=ch/DC=cern
/OU=computers/CN=lcg-voms2.cern.ch alice 24' 'alice voms2.cern
.ch 15000 /DC=ch/DC=cern/OU=computers/CN=voms2.cern.ch alice 2
4'"
VO_ALICE_VOMS_CA_DN="'/DC=ch/DC=cern/CN=CERN Grid Certificatio
n Authority' '/DC=ch/DC=cern/CN=CERN Grid Certification Author
ity'"
```

[users.conf]

```
[root@alice-kisti-hpc ~]# tail /opt/glite/yaim/etc/users.conf
14320:ali1_120:14200:alicet1:alice::
14321:ali1_121:14200:alicet1:alice::
14322:ali1_122:14200:alicet1:alice::
14323:ali1_123:14200:alicet1:alice::
14324:ali1_124:14200:alicet1:alice::
14325:ali1_125:14200:alicet1:alice::
14326:ali1_126:14200:alicet1:alice::
14327:ali1_127:14200:alicet1:alice::
14328:ali1_128:14200:alicet1:alice::
100018801:gsdc23a01:1000188:in0188:alice:sgm:
```

[groups.conf]

```
[root@alice-kisti-hpc ~]# cat /opt/glite/yaim/etc/groups.conf
"/alice/ROLE=lcgadmin":::sgm:
"/alice/ROLE=production":::prd:
"/alice/ROLE=pilot":::pilot:
"/alice":::
```

4. Site Configuration

❖ 5) VObox

- When we execute ``/opt/glite/yaim/bin/yaim -c -s site-info.def -n VOBOX > ~/yaim-result.log``, the grid-mapfile is generated based on the three aforementioned files.
 - grid-mapfile is a list of users who can log in the VObox and defines which account is mapped for each users.
 - For the HPC security, we leave only a few map list related to this project.

[grid-mapfile (old ver.)]

```
[root@alice-kisti-hpc ~]# cat /etc/grid-security/grid-mapfile.old  
"/C=BR/O=ANSP/OU=ANSPGrid CA/OU=People/CN=Christian Reckziegel" .ali1_  
"/C=BR/O=ANSP/OU=ANSPGrid CA/OU=People/CN=Fabio Padoa" gsd23a01  
"/C=BR/O=ANSP/OU=ANSPGrid CA/OU=People/CN=Manuela Carneiro Munhoz" .ali1_
```

...

```
"/O=GRID-FR/C=FR/O=CNRS/OU=SUBATECH/CN=Philippe Pillot" .ali1_  
"/O=GRID-FR/C=FR/O=CNRS/OU=SUBATECH/CN=Pierrick Le Corre" gsd23a01  
"/O=GermanGrid/OU=GSI/CN=Jens Wiechula" .ali1_
```



[grid-mapfile (new ver.)]

```
[root@alice-kisti-hpc ~]# cat /etc/grid-security/grid-mapfile  
"/C=KR/O=KISTI/O=KISTI/CN=38191474 Sang Un Ahn" gsd23a01  
"/DC=ch/DC=cern/OU=Organic Units/OU=Users/CN=grigoras/CN=650724/CN=Costin Grigoras" gsd23a01  
"/DC=ch/DC=cern/OU=Organic Units/OU=Users/CN=lbetev/CN=374855/CN=Latchezar Betev" gsd23a01  
"/DC=ch/DC=cern/OU=Organic Units/OU=Users/CN=maarten/CN=410032/CN=Maarten Litmaath" gsd23a01
```

5. History & Current Status of The Site



2023

- 9 • We started construction of the new HPC grid site using Nurion.
- 10
- 11 • We completed the construction of the HPC grid site.
- 12 • CERN started working on JAliEn CE operated on PBS cluster.



2024

- 1 • MonALISA and the JAliEn CE was started.
- 2 • Single-core jobs began to be submitted to the site from CERN.
- 3 • Single core jobs were successfully got started on the HPC site.
- 4 • MonALISA is enable to monitor the job status of the site.
- 5 • The HPC site was shown on the site map.

[Fixed crucial core issues relevant to progress the project]

issue1	<p>Encountering a TCP_DENY(http 403) error during outgoing connection with squid.</p> <ul style="list-style-type: none"> • add 3124/tcp in firewall rules • specify CVMFS stratum servers
issue2	<p>Need to reduce the export list of NFS mounts.</p> <ul style="list-style-type: none"> • restrict access from /scratch to /scratch/gsd23a01 owned by gsd23a01 for enhanced security
issue3	<p>Occurring "(LDAP:'%BE_LDAP')" was terminated by own WATCHDOG" error.</p> <ul style="list-style-type: none"> • add timeout=30 under [domain/LDAP] in /etc/sss/sss.conf
issue4	<p>Encountering 'Invaild Entry' error upon PBS startup.</p> <ul style="list-style-type: none"> • modify \$clienthost in /var/spool/pbs/mom_priv/config
issue5	<p>Deleting jobs apparently when executing the qsub command.</p> <ul style="list-style-type: none"> • add 32768-61000/tcp in firewall rules

5. History & Current Status of The Site

2023

9

- We started construction of the new HPC grid site using Nurion.

10

11

- We completed the construction of the HPC grid site.
- CERN started working on JAliEn CE operated on PBS cluster.



12

2024

1

- MonALISA and the JAliEn CE was started.
- Single-core jobs began to be submitted to the site from CERN.

2

- Single core jobs were successfully got started on the HPC site.

3

- MonALISA is enable to monitor the job status of the site.
- The HPC site was shown on the site map.

4

```
29 public class PBS extends BatchQueue {
30
31     private final HashMap<String, String> environment = new HashMap<>();
32     private TreeSet<String> envFromConfig;
33     private TreeSet<String> envFromHost;
34     pri 165
35     pri 166
36     pri 167
37     pri 168
38     pri 169
39     pri 170
40     pri 171
41     pri 172
42     pri 173
43     pri 174
44     pri 175
45     pri 176
46     pri 177
47     pri 178
48     pri 179
49     pri 180
50     pri 181
51     /* 182
52     * 183
53     * 184
54     */ 185
55     @Su 186
56     pub 187
57     pri 188
58     pri 189
59     pri 190
60     pri 191
61     pri 192
62     pri 193
63     pri 194
64     pri 195
65     pri 196
66     pri 197
67     pri 198
68     pri 199
69     pri 200
70     pri 201
71     pri 202
72     pri 203
73     pri 204
74     pri 205
75     pri 206
76     pri 207
77     pri 208
78     pri 209
79     pri 210
80     pri 211
81     pri 212
82     pri 213
83     pri 214
84     pri 215
85     pri 216
86     pri 217
87     pri 218
88     pri 219
89     pri 220
90     pri 221
91     pri 222
92     pri 223
93     pri 224
94     pri 225
95     pri 226
96     pri 227
97     pri 228
98     pri 229
99     pri 230
100    pri 231
101    pri 232
102    pri 233
103    pri 234
104    pri 235
105    pri 236
106    pri 237
107    pri 238
108    pri 239
109    pri 240
110    pri 241
111    pri 242
112    pri 243
113    pri 244
114    pri 245
115    pri 246
116    pri 247
117    pri 248
118    pri 249
119    pri 250
120    pri 251
121    pri 252
122    pri 253
123    pri 254
124    pri 255
125    pri 256
126    pri 257
127    pri 258
128    pri 259
129    pri 260
130    pri 261
131    pri 262
132    pri 263
133    pri 264
134    pri 265
135    pri 266
136    pri 267
137    pri 268
138    pri 269
139    pri 270
140    pri 271
141    pri 272
142    pri 273
143    pri 274
144    pri 275
145    pri 276
146    pri 277
147    pri 278
148    pri 279
149    pri 280
150    pri 281
151    pri 282
152    pri 283
153    pri 284
154    pri 285
155    pri 286
156    pri 287
157    pri 288
158    pri 289
159    pri 290
160    pri 291
161    pri 292
162    pri 293
163    pri 294
164    pri 295
165    pri 296
166    pri 297
167    pri 298
168    pri 299
169    pri 300
170    pri 301
171    pri 302
172    pri 303
173    pri 304
174    pri 305
175    pri 306
176    pri 307
177    pri 308
178    pri 309
179    pri 310
180    pri 311
181    pri 312
182    pri 313
183    pri 314
184    pri 315
185    pri 316
186    pri 317
187    pri 318
188    pri 319
189    pri 320
190    pri 321
191    pri 322
192    pri 323
193    pri 324
194    pri 325
195    pri 326
196    pri 327
197    pri 328
198    pri 329
199    pri 330
200    pri 331
201    pri 332
202    pri 333
203    pri 334
204    pri 335
205    pri 336
206    pri 337
207    pri 338
208    pri 339
209    pri 340
210    pri 341
211    pri 342
212    pri 343
213    pri 344
214    pri 345
215    pri 346
216    pri 347
217    pri 348
218    pri 349
219    pri 350
220    pri 351
221    pri 352
222    pri 353
223    pri 354
224    pri 355
225    pri 356
226    pri 357
227    pri 358
228    pri 359
229    pri 360
230    pri 361
231    pri 362
232    pri 363
233    pri 364
234    pri 365
235    pri 366
236    pri 367
237    pri 368
238    pri 369
239    pri 370
240    pri 371
241    pri 372
242    pri 373
243    pri 374
244    pri 375
245    pri 376
246    pri 377
247    pri 378
248    pri 379
249    pri 380
250    pri 381
251    pri 382
252    pri 383
253    pri 384
254    pri 385
255    pri 386
256    pri 387
257    pri 388
258    pri 389
259    pri 390
260    pri 391
261    pri 392
262    pri 393
263    pri 394
264    pri 395
265    pri 396
266    pri 397
267    pri 398
268    pri 399
269    pri 400
270    pri 401
271    pri 402
272    pri 403
273    pri 404
274    pri 405
275    pri 406
276    pri 407
277    pri 408
278    pri 409
279    pri 410
280    pri 411
281    pri 412
282    pri 413
283    pri 414
284    pri 415
285    pri 416
286    pri 417
287    pri 418
288    pri 419
289    pri 420
290    pri 421
291    pri 422
292    pri 423
293    pri 424
294    pri 425
295    pri 426
296    pri 427
297    pri 428
298    pri 429
299    pri 430
300    pri 431
301    pri 432
302    pri 433
303    pri 434
304    pri 435
305    pri 436
306    pri 437
307    pri 438
308    pri 439
309    pri 440
310    pri 441
311    pri 442
312    pri 443
313    pri 444
314    pri 445
315    pri 446
316    pri 447
317    pri 448
318    pri 449
319    pri 450
320    pri 451
321    pri 452
322    pri 453
323    pri 454
324    pri 455
325    pri 456
326    pri 457
327    pri 458
328    pri 459
329    pri 460
330    pri 461
331    pri 462
332    pri 463
333    pri 464
334    pri 465
335    pri 466
336    pri 467
337    pri 468
338    pri 469
339    pri 470
340    pri 471
341    pri 472
342    pri 473
343    pri 474
344    pri 475
345    pri 476
346    pri 477
347    pri 478
348    pri 479
349    pri 480
350    pri 481
351    pri 482
352    pri 483
353    pri 484
354    pri 485
355    pri 486
356    pri 487
357    pri 488
358    pri 489
359    pri 490
360    pri 491
361    pri 492
362    pri 493
363    pri 494
364    pri 495
365    pri 496
366    pri 497
367    pri 498
368    pri 499
369    pri 500
370    pri 501
371    pri 502
372    pri 503
373    pri 504
374    pri 505
375    pri 506
376    pri 507
377    pri 508
378    pri 509
379    pri 510
380    pri 511
381    pri 512
382    pri 513
383    pri 514
384    pri 515
385    pri 516
386    pri 517
387    pri 518
388    pri 519
389    pri 520
390    pri 521
391    pri 522
392    pri 523
393    pri 524
394    pri 525
395    pri 526
396    pri 527
397    pri 528
398    pri 529
399    pri 530
400    pri 531
401    pri 532
402    pri 533
403    pri 534
404    pri 535
405    pri 536
406    pri 537
407    pri 538
408    pri 539
409    pri 540
410    pri 541
411    pri 542
412    pri 543
413    pri 544
414    pri 545
415    pri 546
416    pri 547
417    pri 548
418    pri 549
419    pri 550
420    pri 551
421    pri 552
422    pri 553
423    pri 554
424    pri 555
425    pri 556
426    pri 557
427    pri 558
428    pri 559
429    pri 560
430    pri 561
431    pri 562
432    pri 563
433    pri 564
434    pri 565
435    pri 566
436    pri 567
437    pri 568
438    pri 569
439    pri 570
440    pri 571
441    pri 572
442    pri 573
443    pri 574
444    pri 575
445    pri 576
446    pri 577
447    pri 578
448    pri 579
449    pri 580
450    pri 581
451    pri 582
452    pri 583
453    pri 584
454    pri 585
455    pri 586
456    pri 587
457    pri 588
458    pri 589
459    pri 590
460    pri 591
461    pri 592
462    pri 593
463    pri 594
464    pri 595
465    pri 596
466    pri 597
467    pri 598
468    pri 599
469    pri 600
470    pri 601
471    pri 602
472    pri 603
473    pri 604
474    pri 605
475    pri 606
476    pri 607
477    pri 608
478    pri 609
479    pri 610
480    pri 611
481    pri 612
482    pri 613
483    pri 614
484    pri 615
485    pri 616
486    pri 617
487    pri 618
488    pri 619
489    pri 620
490    pri 621
491    pri 622
492    pri 623
493    pri 624
494    pri 625
495    pri 626
496    pri 627
497    pri 628
498    pri 629
499    pri 630
500    pri 631
501    pri 632
502    pri 633
503    pri 634
504    pri 635
505    pri 636
506    pri 637
507    pri 638
508    pri 639
509    pri 640
510    pri 641
511    pri 642
512    pri 643
513    pri 644
514    pri 645
515    pri 646
516    pri 647
517    pri 648
518    pri 649
519    pri 650
520    pri 651
521    pri 652
522    pri 653
523    pri 654
524    pri 655
525    pri 656
526    pri 657
527    pri 658
528    pri 659
529    pri 660
530    pri 661
531    pri 662
532    pri 663
533    pri 664
534    pri 665
535    pri 666
536    pri 667
537    pri 668
538    pri 669
539    pri 670
540    pri 671
541    pri 672
542    pri 673
543    pri 674
544    pri 675
545    pri 676
546    pri 677
547    pri 678
548    pri 679
549    pri 680
550    pri 681
551    pri 682
552    pri 683
553    pri 684
554    pri 685
555    pri 686
556    pri 687
557    pri 688
558    pri 689
559    pri 690
560    pri 691
561    pri 692
562    pri 693
563    pri 694
564    pri 695
565    pri 696
566    pri 697
567    pri 698
568    pri 699
569    pri 700
570    pri 701
571    pri 702
572    pri 703
573    pri 704
574    pri 705
575    pri 706
576    pri 707
577    pri 708
578    pri 709
579    pri 710
580    pri 711
581    pri 712
582    pri 713
583    pri 714
584    pri 715
585    pri 716
586    pri 717
587    pri 718
588    pri 719
589    pri 720
590    pri 721
591    pri 722
592    pri 723
593    pri 724
594    pri 725
595    pri 726
596    pri 727
597    pri 728
598    pri 729
599    pri 730
600    pri 731
601    pri 732
602    pri 733
603    pri 734
604    pri 735
605    pri 736
606    pri 737
607    pri 738
608    pri 739
609    pri 740
610    pri 741
611    pri 742
612    pri 743
613    pri 744
614    pri 745
615    pri 746
616    pri 747
617    pri 748
618    pri 749
619    pri 750
620    pri 751
621    pri 752
622    pri 753
623    pri 754
624    pri 755
625    pri 756
626    pri 757
627    pri 758
628    pri 759
629    pri 760
630    pri 761
631    pri 762
632    pri 763
633    pri 764
634    pri 765
635    pri 766
636    pri 767
637    pri 768
638    pri 769
639    pri 770
640    pri 771
641    pri 772
642    pri 773
643    pri 774
644    pri 775
645    pri 776
646    pri 777
647    pri 778
648    pri 779
649    pri 780
650    pri 781
651    pri 782
652    pri 783
653    pri 784
654    pri 785
655    pri 786
656    pri 787
657    pri 788
658    pri 789
659    pri 790
660    pri 791
661    pri 792
662    pri 793
663    pri 794
664    pri 795
665    pri 796
666    pri 797
667    pri 798
668    pri 799
669    pri 800
670    pri 801
671    pri 802
672    pri 803
673    pri 804
674    pri 805
675    pri 806
676    pri 807
677    pri 808
678    pri 809
679    pri 810
680    pri 811
681    pri 812
682    pri 813
683    pri 814
684    pri 815
685    pri 816
686    pri 817
687    pri 818
688    pri 819
689    pri 820
690    pri 821
691    pri 822
692    pri 823
693    pri 824
694    pri 825
695    pri 826
696    pri 827
697    pri 828
698    pri 829
699    pri 830
700    pri 831
701    pri 832
702    pri 833
703    pri 834
704    pri 835
705    pri 836
706    pri 837
707    pri 838
708    pri 839
709    pri 840
710    pri 841
711    pri 842
712    pri 843
713    pri 844
714    pri 845
715    pri 846
716    pri 847
717    pri 848
718    pri 849
719    pri 850
720    pri 851
721    pri 852
722    pri 853
723    pri 854
724    pri 855
725    pri 856
726    pri 857
727    pri 858
728    pri 859
729    pri 860
730    pri 861
731    pri 862
732    pri 863
733    pri 864
734    pri 865
735    pri 866
736    pri 867
737    pri 868
738    pri 869
739    pri 870
740    pri 871
741    pri 872
742    pri 873
743    pri 874
744    pri 875
745    pri 876
746    pri 877
747    pri 878
748    pri 879
749    pri 880
750    pri 881
751    pri 882
752    pri 883
753    pri 884
754    pri 885
755    pri 886
756    pri 887
757    pri 888
758    pri 889
759    pri 890
760    pri 891
761    pri 892
762    pri 893
763    pri 894
764    pri 895
765    pri 896
766    pri 897
767    pri 898
768    pri 899
769    pri 900
770    pri 901
771    pri 902
772    pri 903
773    pri 904
774    pri 905
775    pri 906
776    pri 907
777    pri 908
778    pri 909
779    pri 910
780    pri 911
781    pri 912
782    pri 913
783    pri 914
784    pri 915
785    pri 916
786    pri 917
787    pri 918
788    pri 919
789    pri 920
790    pri 921
791    pri 922
792    pri 923
793    pri 924
794    pri 925
795    pri 926
796    pri 927
797    pri 928
798    pri 929
799    pri 930
800    pri 931
801    pri 932
802    pri 933
803    pri 934
804    pri 935
805    pri 936
806    pri 937
807    pri 938
808    pri 939
809    pri 940
810    pri 941
811    pri 942
812    pri 943
813    pri 944
814    pri 945
815    pri 946
816    pri 947
817    pri 948
818    pri 949
819    pri 950
820    pri 951
821    pri 952
822    pri 953
823    pri 954
824    pri 955
825    pri 956
826    pri 957
827    pri 958
828    pri 959
829    pri 960
830    pri 961
831    pri 962
832    pri 963
833    pri 964
834    pri 965
835    pri 966
836    pri 967
837    pri 968
838    pri 969
839    pri 970
840    pri 971
841    pri 972
842    pri 973
843    pri 974
844    pri 975
845    pri 976
846    pri 977
847    pri 978
848    pri 979
849    pri 980
850    pri 981
851    pri 982
852    pri 983
853    pri 984
854    pri 985
855    pri 986
856    pri 987
857    pri 988
858    pri 989
859    pri 990
860    pri 991
861    pri 992
862    pri 993
863    pri 994
864    pri 995
865    pri 996
866    pri 997
867    pri 998
868    pri 999
869    pri 1000
870    pri 1001
871    pri 1002
872    pri 1003
873    pri 1004
874    pri 1005
875    pri 1006
876    pri 1007
877    pri 1008
878    pri 1009
879    pri 1010
880    pri 1011
881    pri 1012
882    pri 1013
883    pri 1014
884    pri 1015
885    pri 1016
886    pri 1017
887    pri 1018
888    pri 1019
889    pri 1020
890    pri 1021
891    pri 1022
892    pri 1023
893    pri 1024
894    pri 1025
895    pri 1026
896    pri 1027
897    pri 1028
898    pri 1029
899    pri 1030
900    pri 1031
901    pri 1032
902    pri 1033
903    pri 1034
904    pri 1035
905    pri 1036
906    pri 1037
907    pri 1038
908    pri 1039
909    pri 1040
910    pri 1041
911    pri 1042
912    pri 1043
913    pri 1044
914    pri 1045
915    pri 1046
916    pri 1047
917    pri 1048
918    pri 1049
919    pri 1050
920    pri 1051
921    pri 1052
922    pri 1053
923    pri 1054
924    pri 1055
925    pri 1056
926    pri 1057
927    pri 1058
928    pri 1059
929    pri 1060
930    pri 1061
931    pri 1062
932    pri 1063
933    pri 1064
934    pri 1065
935    pri 1066
936    pri 1067
937    pri 1068
938    pri 1069
939    pri 1070
940    pri 1071
941    pri 1072
942    pri 1073
943    pri 1074
944    pri 1075
945    pri 1076
946    pri 1077
947    pri 1078
948    pri 1079
949    pri 1080
950    pri 1081
951    pri 1082
952    pri 1083
953    pri 1084
954    pri 1085
955    pri 1086
956    pri 1087
957    pri 1088
958    pri 1089
959    pri 1090
960    pri 1091
961    pri 1092
962    pri 1093
963    pri 1094
964    pri 1095
965    pri 1096
966    pri 1097
967    pri 1098
968    pri 1099
969    pri 1100
970    pri 1101
971    pri 1102
972    pri 1103
973    pri 1104
974    pri 1105
975    pri 1106
976    pri 1107
977    pri 1108
978    pri 1109
979    pri 1110
980    pri 1111
981    pri 1112
982    pri 1113
983    pri 1114
984    pri 1115
985    pri 1116
986    pri 1117
987    pri 1118
988    pri 1119
989    pri 1120
990    pri 1121
991    pri 1122
992    pri 1123
993    pri 1124
994    pri 1125
995    pri 1126
996    pri 1127
997    pri 1128
998    pri 1129
999    pri 1130
1000    pri 1131
1001    pri 1132
1002    pri 1133
1003    pri 1134
1004    pri 1135
1005    pri 1136
1006    pri 1137
1007    pri 1138
1008    pri 1139
1009    pri 1140
1010    pri 1141
1011    pri 1142
1012    pri 1143
1013    pri 1144
1014    pri 1145
1015    pri 1146
1016    pri 1147
1017    pri 1148
1018    pri 1149
1019    pri 1150
1020    pri 1151
1021    pri 1152
1022    pri 1153
1023    pri 1154
1024    pri 1155
1025    pri 1156
1026    pri 1157
1027    pri 1158
1028    pri 1159
1029    pri 1160
1030    pri 1161
1031    pri 1162
1032    pri 1163
1033    pri 1164
1034    pri 1165
1035    pri 1166
1036    pri 1167
1037    pri 1168
1038    pri 1169
1039    pri 1170
1040    pri 1171
1041    pri 1172
1042    pri 1173
1043    pri 1174
1044    pri 1175
1045    pri 1176
1046    pri 1177
1047    pri 1178
1048    pri 1179
1049    pri 1180
1050    pri 1181
1051    pri 1182
1052    pri 1183
1053    pri 1184
1054    pri 1185
1055    pri 1186
1056    pri 1187
1057    pri 1188
1058    pri 1189
1059    pri 1190
1060    pri 1191
1061    pri 1192
1062    pri 1193
1063    pri 1194
1064    pri 1195
1065    pri 1196
1066    pri 1197
1067    pri 1198
1068    pri 1199
1069    pri 1200
1070    pri 1201
1071    pri 1202
1072    pri 1203
1073    pri 1204
1074    pri 1205
1075    pri 1206
1076    pri 1207
1077    pri 1208
1078    pri 1209
1079    pri 1210
1080    pri 1211
1081    pri 1212
1082    pri 1213
1083    pri 1214
1084    pri 1215
1085    pri 1216
1086    pri 1217
1087    pri 1218
1088    pri 1219
1089    pri 1220
1090    pri 1221
1091    pri 1222
1092    pri 1223
1093    pri 1224
1094    pri 1225
1095    pri 1226
1096    pri 1227
1097    pri 1228
1098    pri 1229
1099    pri 1230
1100    pri 1231
1101    pri 1232
1102    pri 1233
1103    pri 1234
1104    pri 1235
1105    pri 1236
1106    pri 1237
1107    pri 1238
1108    pri 1239
1109    pri 1240
1110    pri 1241
1111    pri 1242
1112    pri 1243
1113    pri 1244
1114    pri 1245
1115    pri 1246
1116    pri 1247
1117    pri 1248
1118    pri 1249
1119    pri 1250
1120    pri 1251
1121    pri 1252
1122    pri 1253
1123    pri 1254
1124    pri 1255
1125    pri 1256
1126    pri 1257
1127    pri 1258
1128    pri 1259
1129    pri 1260
1130    pri 1261
1131    pri 1262
1132    pri 1263
1133    pri 1264
1134    pri 1265
1135    pri 1266
1136    pri 1267
1137    pri 1268
1138    pri 1269
1139    pri 1270
1140    pri 1271
1141    pri 1272
1142    pri 1273
1143    pri 1274
1144    pri 1275
1145    pri 1276
1146    pri 1277
1147    pri 1278
1148    pri 1279
1149    pri 12
```

5. History & Current Status of The Site



Total 403 lines, released on JALiEn Gitlab

2023

- 9
- 10
- 11
- 12
- 1
- 2
- 3
- 4

```
29 public class PBS extends BatchQueue {
30
31     private final HashMap<String, String> environment = new HashMap<>();
32     private TreeSet<String> envFromConfig;
33     private String host_logdir = "$HOME/ALICE/alien-logs";
34     private String submitCmd = "qsub";
35     private String submitArg = "";
36     private String statusCmd = "qstat";
37     private String statusArg = "";
38     private final String noStageIn = "alien_not_stage_files";
39     private long seq_number = 0;
40     private String preamble = "";
41     private String preambleFile = "preamble.sh";
42     private boolean stageIn = true;
43     private String stageFiles = "true";
44     private final String home;
45     private final String user;
46
47     private int tot_running = 0;
48     private int tot_waiting = 0;
49     private long job_numbers_timestamp = 0;
50
51     /**
52      * @param conf
53      * @param logr
54      */
55     @SuppressWarnings("unchecked")
56     public PBS(final HashMap<String, Object> conf, final Logger logr) {
57         conf = conf;
58         logr = logr;
59
60         logger.info("This VO-Box is " + config.get("ALIEN_CM_AS_LDAP_PROXY") +
61             ", site is " + config.get("site_accountname"));
62
63         host_logdir = (String) config.getOrDefault("host_logdir", host_logdir);
64
65         // Initialize from LDAP
66         submitCmd = readArgFromLdap("ce_submitcmd", submitCmd);
67         submitArg = readArgFromLdap("ce_submitarg", submitArg);
68         statusCmd = readArgFromLdap("ce_statuscmd", statusCmd);
69         statusArg = readArgFromLdap("ce_statusarg", statusArg);
70
71         // deprecated convention: the string "alien_not_stage_files" in the submit args
72         // denotes the job agent startup script must not be staged to the worker node,
73         // because it will be directly available through a shared file system
74         // // a preferred, dedicated environment variable is handled further below
75
76         final Pattern pNoStageIn = Pattern.compile(noStageIn);
77         final Matcher depr = pNoStageIn.matcher(submitArg);
78
79         if (depr.find()) {
80             logger.warning("deprecated use of stage directive in submit args!");
81             logger.warning("please use environment setting instead");
82             submitArg = submitArg.replaceAll(noStageIn, "");
83             stageIn = false;
84         }
85
86         final String ce_env_str = "ce_environment";
87
88         if (config.get(ce_env_str) == null) {
89             final String msg = ce_env_str + " not defined";
90             logger.info(msg);
91             config.put(ce_env_str, new TreeSet<String>());
92         }
93     }
94 }
95
96
```

```
165     if (content != null) {
166         preamble += content;
167         logger.info("preamble loaded from file: " + preambleFile);
168     }
169     else {
170         final String msg = "Error reading " + preambleFile;
171         logger.severe(msg);
172         throw new IllegalArgumentException(msg);
173     }
174 }
175
176 @Override
177 public void submit(final String script) {
178     logger.info("Submit PBS");
179
180     final DateFormat date_format = new SimpleDateFormat("yyyy-MM-dd");
181     final String current_date_str = date_format.format(new Date());
182     final Long timestamp = Long.valueOf(System.currentTimeMillis());
183
184     String short_seq_nr = String.format("%06d", ++seq_number % 1000000L);
185
186     String pbs_script = "#!/bin/sh\n";
187     pbs_script += "#PBS -V\n";
188
189     // Name must be max 10 characters long to fit in "qstat" name column
190
191     final String name = String.format("JA_%s", short_seq_nr);
192     pbs_script += String.format("#PBS -N %s\n", name);
193
194     String out_cmd = "#PBS -o /dev/null\n";
195     String err_cmd = "#PBS -e /dev/null\n";
196
197     final String log_folder_path = String.format("%s/%s",
198         Functions.resolvePathWithEnv(host_logdir, current_date_str),
199         final File log_folder = new File(log_folder_path);
200
201     if (!(log_folder.exists())) {
202         try {
203             log_folder.mkdirs();
204         } catch (final SecurityException e) {
205             logger.severe(String.format("[PBS] Permission denied: %s", log_folder_path));
206             e.printStackTrace();
207         }
208     } catch (final Exception e) {
209         logger.severe(String.format("[PBS] Exception with mkdirs(): %s", log_folder_path));
210         e.printStackTrace();
211     }
212
213     if (!(log_folder.exists())) {
214         final String msg = String.format("[PBS] Couldn't create log folder: %s", log_folder_path);
215         logger.severe(msg);
216         return;
217     }
218
219     final String file_base_name = String.format("%s/jobagent_%d_%s", log_folder_path,
220         Long.valueOf(ProcessHandle.current().pid()), short_seq_nr);
221
222     // allow possibly big stdout and stderr files to be (temporarily) suppressed...
223
224     final File enable_sandbox_file = new File(home + "/enable-sandbox");
225     if (enable_sandbox_file.exists()) {
226
227
228
229
230
231
232
233
234
235
236
237
238
239
240
241
242
243
244
245
246
247
248
249
250
251
252
253
254
255
256
257
258
259
260
261
262
263
264
265
266
267
268
269
270
271
272
273
274
275
276
277
278
279
280
281
282
283
284
285
286
287
288
289
290
291
292
293
294
295
296
297
298
299
300
301
302
303
304
305
306
307
308
309
310
311
312
313
314
315
316
317
318
319
320
321
322
323
324
325
326
327
328
329
330
331
332
333
334
335
336
337
338
339
340
341
342
343
344
345
346
347
348
349
350
351
352
353
354
355
356
357
358
359
360
361
362
363
364
365
366
367
368
369
370
371
372
373
374
375
376
377
378
379
380
381
382
383
384
385
386
387
388
389
390
391
392
393
394
395
396
397
398
399
400
401
402
403
404
405
406
407
408
409
410
411
412
413
414
415
416
417
418
419
420
421
422
423
424
425
426
427
428
429
430
431
432
433
434
435
436
437
438
439
440
441
442
443
444
445
446
447
448
449
450
451
452
453
454
455
456
457
458
459
460
461
462
463
464
465
466
467
468
469
470
471
472
473
474
475
476
477
478
479
480
481
482
483
484
485
486
487
488
489
490
491
492
493
494
495
496
497
498
499
500
501
502
503
504
505
506
507
508
509
510
511
512
513
514
515
516
517
518
519
520
521
522
523
524
525
526
527
528
529
530
531
532
533
534
535
536
537
538
539
540
541
542
543
544
545
546
547
548
549
550
551
552
553
554
555
556
557
558
559
560
561
562
563
564
565
566
567
568
569
570
571
572
573
574
575
576
577
578
579
580
581
582
583
584
585
586
587
588
589
590
591
592
593
594
595
596
597
598
599
600
601
602
603
604
605
606
607
608
609
610
611
612
613
614
615
616
617
618
619
620
621
622
623
624
625
626
627
628
629
630
631
632
633
634
635
636
637
638
639
640
641
642
643
644
645
646
647
648
649
650
651
652
653
654
655
656
657
658
659
660
661
662
663
664
665
666
667
668
669
670
671
672
673
674
675
676
677
678
679
680
681
682
683
684
685
686
687
688
689
690
691
692
693
694
695
696
697
698
699
700
701
702
703
704
705
706
707
708
709
710
711
712
713
714
715
716
717
718
719
720
721
722
723
724
725
726
727
728
729
730
731
732
733
734
735
736
737
738
739
740
741
742
743
744
745
746
747
748
749
750
751
752
753
754
755
756
757
758
759
760
761
762
763
764
765
766
767
768
769
770
771
772
773
774
775
776
777
778
779
780
781
782
783
784
785
786
787
788
789
790
791
792
793
794
795
796
797
798
799
800
801
802
803
804
805
806
807
808
809
810
811
812
813
814
815
816
817
818
819
820
821
822
823
824
825
826
827
828
829
830
831
832
833
834
835
836
837
838
839
840
841
842
843
844
845
846
847
848
849
850
851
852
853
854
855
856
857
858
859
860
861
862
863
864
865
866
867
868
869
870
871
872
873
874
875
876
877
878
879
880
881
882
883
884
885
886
887
888
889
890
891
892
893
894
895
896
897
898
899
900
901
902
903
904
905
906
907
908
909
910
911
912
913
914
915
916
917
918
919
920
921
922
923
924
925
926
927
928
929
930
931
932
933
934
935
936
937
938
939
940
941
942
943
944
945
946
947
948
949
950
951
952
953
954
955
956
957
958
959
960
961
962
963
964
965
966
967
968
969
970
971
972
973
974
975
976
977
978
979
980
981
982
983
984
985
986
987
988
989
990
991
992
993
994
995
996
997
998
999
1000

```

```
316     tot_running = 0;
317     tot_waiting = 0;
318
319     for (final String output_line : output_list) {
320         final String[] line = output_line.trim().split("\\s+");
321
322         for (final String field : line) {
323             if (field.length() != 1) {
324                 continue;
325             }
326
327             if (field.equals("Q")) {
328                 tot_waiting++;
329             } else if (field.equals("R")) {
330                 tot_running++;
331             }
332         }
333     }
334
335     logger.info("Found " + tot_waiting + " idle and " + tot_running + " running jobs");
336
337     job_numbers_timestamp = now;
338     return true;
339 }
340
341 @Override
342 public int getNumberActive() {
343     if (getJobNumbers()) {
344         return -1;
345     }
346
347     return tot_running + tot_waiting;
348 }
349
350 @Override
351 public int getNumberQueued() {
352     if (getJobNumbers()) {
353         return -1;
354     }
355
356     return tot_waiting;
357 }
358
359 @Override
360 public int kill() {
361     logger.info("Kill command not implemented");
362     return 0;
363 }
364
365 @SuppressWarnings("unchecked")
366 private String readArgFromLdap(final String argToRead, final String fallback) {
367     if (config.containsKey(argToRead) || config.get(argToRead) == null) {
368         return fallback;
369     } else if ((config.get(argToRead) instanceof TreeSet)) {
370         final StringBuilder args = new StringBuilder();
371         for (final String arg : (TreeSet<String>) config.get(argToRead)) {
372             args.append(arg).append(' ');
373         }
374         return args.toString();
375     } else {
376         return config.get(argToRead).toString();
377     }
378 }
379
380 }
381
382 }
383
384 }
385
386 }
387
388 }
389
390 }
391
392 }
393
394 }
395
396 }
397
398 }
399
400 }
401
402 }
403
404 }
405
406 }
407
408 }
409
410 }
411
412 }
413
414 }
415
416 }
417
418 }
419
420 }
421
422 }
423
424 }
425
426 }
427
428 }
429
430 }
431
432 }
433
434 }
435
436 }
437
438 }
439
440 }
441
442 }
443
444 }
445
446 }
447
448 }
449
450 }
451
452 }
453
454 }
455
456 }
457
458 }
459
460 }
461
462 }
463
464 }
465
466 }
467
468 }
469
470 }
471
472 }
473
474 }
475
476 }
477
478 }
479
480 }
481
482 }
483
484 }
485
486 }
487
488 }
489
490 }
491
492 }
493
494 }
495
496 }
497
498 }
499
500 }
501
502 }
503
504 }
505
506 }
507
508 }
509
510 }
511
512 }
513
514 }
515
516 }
517
518 }
519
520 }
521
522 }
523
524 }
525
526 }
527
528 }
529
530 }
531
532 }
533
534 }
535
536 }
537
538 }
539
540 }
541
542 }
543
544 }
545
546 }
547
548 }
549
550 }
551
552 }
553
554 }
555
556 }
557
558 }
559
560 }
561
562 }
563
564 }
565
566 }
567
568 }
569
570 }
571
572 }
573
574 }
575
576 }
577
578 }
579
580 }
581
582 }
583
584 }
585
586 }
587
588 }
589
590 }
591
592 }
593
594 }
595
596 }
597
598 }
599
600 }
601
602 }
603
604 }
605
606 }
607
608 }
609
610 }
611
612 }
613
614 }
615
616 }
617
618 }
619
620 }
621
622 }
623
624 }
625
626 }
627
628 }
629
630 }
631
632 }
633
634 }
635
636 }
637
638 }
639
640 }
641
642 }
643
644 }
645
646 }
647
648 }
649
650 }
651
652 }
653
654 }
655
656 }
657
658 }
659
660 }
661
662 }
663
664 }
665
666 }
667
668 }
669
670 }
671
672 }
673
674 }
675
676 }
677
678 }
679
680 }
681
682 }
683
684 }
685
686 }
687
688 }
689
690 }
691
692 }
693
694 }
695
696 }
697
698 }
699
700 }
701
702 }
703
704 }
705
706 }
707
708 }
709
710 }
711
712 }
713
714 }
715
716 }
717
718 }
719
720 }
721
722 }
723
724 }
725
726 }
727
728 }
729
730 }
731
732 }
733
734 }
735
736 }
737
738 }
739
740 }
741
742 }
743
744 }
745
746 }
747
748 }
749
750 }
751
752 }
753
754 }
755
756 }
757
758 }
759
760 }
761
762 }
763
764 }
765
766 }
767
768 }
769
770 }
771
772 }
773
774 }
775
776 }
777
778 }
779
780 }
781
782 }
783
784 }
785
786 }
787
788 }
789
790 }
791
792 }
793
794 }
795
796 }
797
798 }
799
800 }
801
802 }
803
804 }
805
806 }
807
808 }
809
810 }
811
812 }
813
814 }
815
816 }
817
818 }
819
820 }
821
822 }
823
824 }
825
826 }
827
828 }
829
830 }
831
832 }
833
834 }
835
836 }
837
838 }
839
840 }
841
842 }
843
844 }
845
846 }
847
848 }
849
850 }
851
852 }
853
854 }
855
856 }
857
858 }
859
860 }
861
862 }
863
864 }
865
866 }
867
868 }
869
870 }
871
872 }
873
874 }
875
876 }
877
878 }
879
880 }
881
882 }
883
884 }
885
886 }
887
888 }
889
890 }
891
892 }
893
894 }
895
896 }
897
898 }
899
900 }
901
902 }
903
904 }
905
906 }
907
908 }
909
910 }
911
912 }
913
914 }
915
916 }
917
918 }
919
920 }
921
922 }
923
924 }
925
926 }
927
928 }
929
930 }
931
932 }
933
934 }
935
936 }
937
938 }
939
940 }
941
942 }
943
944 }
945
946 }
947
948 }
949
950 }
951
952 }
953
954 }
955
956 }
957
958 }
959
960 }
961
962 }
963
964 }
965
966 }
967
968 }
969
970 }
971
972 }
973
974 }
975
976 }
977
978 }
979
980 }
981
982 }
983
984 }
985
986 }
987
988 }
989
990 }
991
992 }
993
994 }
995
996 }
997
998 }
999
1000

```

<https://gitlab.cern.ch/jalien/jalien/-/blob/2900939b8c27e3db4e294dfab1099a00aba7e6fe/src/main/java/alien/site/batchqueue/PBS.java>

5. History & Current Status of The Site

JALiEn CE's workspace: /scratch/gsdcd23a01/ALICE/alien-logs

Workspace on Apr 10 2024

2023

9

- JobAgent startup script

```
[gsdcd23a01@alice-kisti-hpc 2024-04-10]$ cat jobagent_31162_000010.sh
#!/bin/sh
#PBS -V
#PBS -N JA_000010
#PBS -o /scratch/gsdcd23a01/ALICE/alien-logs/2024-04-10/jobagent_31162_000010.out
#PBS -e /scratch/gsdcd23a01/ALICE/alien-logs/2024-04-10/jobagent_31162_000010.err
#PBS -q alice
#PBS -A etc
#PBS -l select=1:ncpus=1:mpiprocs=1:ompthreads=1
#PBS -l walltime=23:00:00
cd $PBS_O_WORKDIR

module purge
module load craype-mic-knl intel/18.0.3

hostname -f
date
#!/bin/bash
export JALIEN_TOKEN_CERT="-----BEGIN CERTIFICATE-----
...
-----END RSA PRIVATE KEY-----";
export HOME="pwd"
export TMP=$HOME
export TMPDIR=$TMP
export LOGDIR="/scratch/gsdcd23a01/ALICE/alien-logs"
export CACHEDIR="$HOME/ALICE/cache"
export TMPDIR="$HOME/ALICE/tmp"
export cerequisites="other.user!="draining",other.cpuscores>=1"
export RequiredCpusCe=">=1"
export ALIEN_CM_AS_LDAP_PROXY="alice-kisti-hpc.sdfarm.kr:10000"
export site="KISTI_GSDC"
export ALIEN_SITE="KISTI_GSDC"
export CE="ALICE::KISTI_GSDC::Nurion"
export CEhost="alice-kisti-hpc.sdfarm.kr"
export TTL="87000"
export -n _LMFILES_
export APMON_CONFIG="alice-kisti-hpc.sdfarm.kr"
export CPUCores="1"
export partition="PDC08_2,"
export JALIEN_JOBAGENT_CMD="/cmfms/alice.cern.ch/java/JDKs/x86_64/jdk-latest/bin/
java -client -Xms16M -Xmx128M -Djdk.lang.Process.launchMechanism=vfork -XX:UseSe
rialGC -cp /cmfms/alice.cern.ch/el7-x86_64/Packages/JALiEn/1.8.5-1/lib/alien-user
s.jar alien.site.JobRunner"
eval $JALIEN_JOBAGENT_CMD
```

- output and error file of JobAgent startup script

```
[gsdcd23a01@alice-kisti-hpc alien-logs]$ ll 2024-04-10
total 660
-rw-r----- 1 gsdcd23a01 in0188 41999 Apr 10 02:50 jobagent_31162_000001.err
-rw-r----- 1 gsdcd23a01 in0188 262 Apr 10 02:47 jobagent_31162_000001.out
-rw-r----- 1 gsdcd23a01 in0188 4242 Apr 10 02:34 jobagent_31162_000001.sh
-rw-r----- 1 gsdcd23a01 in0188 49900 Apr 10 03:07 jobagent_31162_000002.err
-rw-r----- 1 gsdcd23a01 in0188 262 Apr 10 03:04 jobagent_31162_000002.out
-rw-r----- 1 gsdcd23a01 in0188 4246 Apr 10 02:51 jobagent_31162_000002.sh
-rw-r----- 1 gsdcd23a01 in0188 13950 Apr 10 03:25 jobagent_31162_000003.err
-rw-r----- 1 gsdcd23a01 in0188 262 Apr 10 03:22 jobagent_31162_000003.out
-rw-r----- 1 gsdcd23a01 in0188 4242 Apr 10 03:18 jobagent_31162_000003.sh
-rw-r----- 1 gsdcd23a01 in0188 15220 Apr 10 04:17 jobagent_31162_000004.err
-rw-r----- 1 gsdcd23a01 in0188 262 Apr 10 04:14 jobagent_31162_000004.out
-rw-r----- 1 gsdcd23a01 in0188 4250 Apr 10 04:10 jobagent_31162_000004.sh
-rw-r----- 1 gsdcd23a01 in0188 14918 Apr 10 04:47 jobagent_31162_000005.err
-rw-r----- 1 gsdcd23a01 in0188 262 Apr 10 04:44 jobagent_31162_000005.out
-rw-r----- 1 gsdcd23a01 in0188 4242 Apr 10 04:40 jobagent_31162_000005.sh
-rw-r----- 1 gsdcd23a01 in0188 139608 Apr 10 06:33 jobagent_31162_000006.err
-rw-r----- 1 gsdcd23a01 in0188 1382 Apr 10 06:30 jobagent_31162_000006.out
-rw-r----- 1 gsdcd23a01 in0188 4246 Apr 10 05:03 jobagent_31162_000006.sh
-rw-r----- 1 gsdcd23a01 in0188 106642 Apr 10 07:46 jobagent_31162_000007.err
-rw-r----- 1 gsdcd23a01 in0188 822 Apr 10 07:43 jobagent_31162_000007.out
-rw-r----- 1 gsdcd23a01 in0188 4246 Apr 10 07:02 jobagent_31162_000007.sh
-rw-r----- 1 gsdcd23a01 in0188 13948 Apr 10 08:02 jobagent_31162_000008.err
-rw-r----- 1 gsdcd23a01 in0188 262 Apr 10 07:59 jobagent_31162_000008.out
-rw-r----- 1 gsdcd23a01 in0188 4242 Apr 10 07:51 jobagent_31162_000008.sh
-rw-r----- 1 gsdcd23a01 in0188 107199 Apr 10 08:52 jobagent_31162_000009.err
-rw-r----- 1 gsdcd23a01 in0188 710 Apr 10 08:49 jobagent_31162_000009.out
-rw-r----- 1 gsdcd23a01 in0188 4246 Apr 10 08:13 jobagent_31162_000009.sh
-rw-r----- 1 gsdcd23a01 in0188 15071 Apr 10 09:06 jobagent_31162_000010.err
-rw-r----- 1 gsdcd23a01 in0188 262 Apr 10 09:03 jobagent_31162_000010.out
-rw-r----- 1 gsdcd23a01 in0188 4250 Apr 10 08:58 jobagent_31162_000010.sh
-rw-r----- 1 gsdcd23a01 in0188 4242 Apr 10 09:08 jobagent_31162_000011.sh
```

```
[gsdcd23a01@alice-kisti-hpc alien-logs]$ cat 2024-04-10/jobagent_31162_000001.out
l more
node8305
Wed Apr 10 02:35:38 KST 2024
Connecting to JCentral on alice-jcentral.cern.ch:8098
Connection to JCentral (128.142.249.34:8098) established.
Connecting to JCentral on alice-jcentral.cern.ch:8098
Connection to JCentral (128.142.249.61:8098) established.
```

```
[gsdcd23a01@alice-kisti-hpc 2024-04-10]$ cat jobagent_31162_000001.err
Apr 10, 2024 2:36:08 AM apmon.ApMon initialize
INFO: Initializing destination addresses & ports:
Apr 10, 2024 2:36:09 AM apmon.ApMon arrayInit
INFO: adding destination: 134.75.125.28:8884
Apr 10, 2024 2:36:11 AM apmon.ApMon setJobMonitoring
INFO: Disabling job monitoring...
Apr 10, 2024 2:36:11 AM apmon.ApMon setSysMonitoring
INFO: Disabling system monitoring...
Apr 10, 2024 2:36:11 AM apmon.ApMon setGerMonitoring
INFO: Setting general information monitoring to false
Apr 10, 2024 2:36:12 AM alien.config.ConfigUtils getLocalHostname
INFO: Local hostname resolved as node8305
Apr 10, 2024 2:36:14 AM lia.Monitor.modules.monProcIO initPublishTimer
INFO: [ monProcIO ]Attributes Update thread scheduled
Apr 10, 2024 2:36:14 AM lia.Monitor.modules.monProcStat <init>
INFO: [ monProcStat ] Using : [/proc/stat, /proc/vmstat]
Apr 10, 2024 2:36:14 AM lia.Monitor.modules.monProcLoad initPublishTimer
INFO: [ monProcLoad ] Attributes Update thread scheduled
Apr 10, 2024 2:36:14 AM lia.util.ntp.NTPDateSNTPThread run
INFO: [ NTPDate ] thread started. Waiting for initial sync to finish ...
Apr 10, 2024 2:36:14 AM lia.util.ntp.NTPDateSNTPThread run
INFO: [ NTPDate ] Initial NTP sync finished. Status: OK
Apr 10, 2024 2:36:14 AM apmon.ApMon setJobMonitoring
INFO: Enabling job monitoring, time interval 120 s
Apr 10, 2024 2:36:14 AM apmon.BkThread run
INFO: [Starting background thread...]
Apr 10, 2024 2:36:16 AM alien.user.JAKeyStore loadTrusts
INFO: Loading trusts from ../trusts
Apr 10, 2024 2:36:17 AM alien.user.JAKeyStore loadTrusts
INFO: Found 222 default trusted CAs in classpath
Apr 10, 2024 2:36:18 AM alien.user.JAKeyStore loadTrusts
INFO: Loading trusts from ../trusts
Apr 10, 2024 2:36:18 AM alien.user.JAKeyStore loadTrusts
INFO: Found 222 default trusted CAs in classpath
Apr 10, 2024 2:36:48 AM alien.site.JobAgent <init>
INFO: We have the following DN :C=ch,O=ALiEn2,CN=JobAgent
Apr 10, 2024 2:36:48 AM alien.site.SiteMap getSiteParameters
```

2024

1

2

3

4

```
-----END RSA PRIVATE KEY-----";
export HOME="pwd"
export TMP=$HOME
export TMPDIR=$TMP
export LOGDIR="/scratch/gsdcd23a01/ALICE/alien-logs"
export CACHEDIR="$HOME/ALICE/cache"
export TMPDIR="$HOME/ALICE/tmp"
export cerequisites="other.user!="draining",other.cpuscores>=1"
export RequiredCpusCe=">=1"
export ALIEN_CM_AS_LDAP_PROXY="alice-kisti-hpc.sdfarm.kr:10000"
export site="KISTI_GSDC"
export ALIEN_SITE="KISTI_GSDC"
export CE="ALICE::KISTI_GSDC::Nurion"
export CEhost="alice-kisti-hpc.sdfarm.kr"
export TTL="87000"
export -n _LMFILES_
export APMON_CONFIG="alice-kisti-hpc.sdfarm.kr"
export CPUCores="1"
export partition="PDC08_2,"
export JALIEN_JOBAGENT_CMD="/cmfms/alice.cern.ch/java/JDKs/x86_64/jdk-latest/bin/
java -client -Xms16M -Xmx128M -Djdk.lang.Process.launchMechanism=vfork -XX:UseSe
rialGC -cp /cmfms/alice.cern.ch/el7-x86_64/Packages/JALiEn/1.8.5-1/lib/alien-user
s.jar alien.site.JobRunner"
eval $JALIEN_JOBAGENT_CMD
```


5. History & Current Status of The Site



- 2023
 - 9 • We started construction of the new HPC grid site using Nurion.
 - 10
 - 11 • We completed the construction of the HPC grid site.
 - 12 • CERN started working on JAliEn CE operated on PBS cluster.
- 2024
 - 1 • MonALISA and the JAliEn CE was started.
 - 2 • Single-core jobs began to be submitted to the site from CERN.
 - 3 • Single core jobs were successfully got started on the HPC site.
 - 4 • MonALISA is enable to monitor the job status of the site.
 - 5 • The HPC site was shown on the site map.



[Fixed crucial core issues relevant to start ALICE jobs]

issue1	<p>Unable to contact alice-ldap.cern.ch.</p> <ul style="list-style-type: none"> • Accessing other path not originally configured with OPN prefix. • Need to allow outgoing connectivity toward ALICE central service. <ul style="list-style-type: none"> • add firewall rules about 128.141/16, 128.142/16, 137.138/16, 188.184/15, 2001:1458::/32
issue2	<p>Job queue infinitely in PBS queue.</p> <ul style="list-style-type: none"> • specify memory size under 80G in the job script
issue3	<p>Jobs terminated before reaching wall-time.</p> <ul style="list-style-type: none"> • kill anonymous child processes under processes related to job execution
issue4	<p>JobAgent aborted.</p> <ul style="list-style-type: none"> • update to latest version of JAliEn to replace the older version

5. History & Current Status of The Site



2023

9

- We started construction of the new HPC grid site.

10

- We completed the construction of the HPC grid site.
- CERN started working on JAliEn CE operated on PBS cluster.

11

12

2024

1

- MonALISA and the JAliEn CE was stared.
- Single-core jobs began to be submitted to the site from CERN.

2

- Single core jobs were sucessfully got started on the HPC site.

3

- MonALISA is enable to monitor the job status of the site.
- The HPC site was shown on the site map.

4

[Nurion job log]

```
← → ↻ 🔒 📄 https://alimonitor.cern.ch/jobs/trace.jsp?pid=3032100866 ☆
Trace of subjob 3032100866, masterjob 3032099599

Mar 04 10:43:40 [state ]: Job 3032100866 inserted from aliendb7.cern.ch (5) [Master Job is 3032099599]
Mar 04 10:46:09 [state ]: Job ASSIGNED to: ALICE::KISTL_GSDC::Nurion
Mar 04 10:46:09 [trace ]: This job has requested packages available on the following platforms: [el7-x86_64].
Mar 04 10:46:09 [trace ]: BatchId PBS_JOBID: 14335049.pbs
Mar 04 10:46:09 [trace ]: BatchId PBS_JOBNAME: jobagent_528205
Mar 04 10:46:10 [trace ]: Created workdir: /scratch/gsd23a01/alien-job-3032100866
Mar 04 10:46:10 [trace ]: Running JAliEn JobAgent 1.8.5 on node8305. Builddate: 1708358739000
Mar 04 10:46:11 [trace ]: Job requested 1 CPU cores to run
Mar 04 10:46:11 [trace ]: Local disk space limit: 19500 MB
Mar 04 10:46:11 [trace ]: Virtual memory limit (JDL): 1024000MB
Mar 04 10:46:12 [trace ]: Starting JobWrapper
Mar 04 10:46:12 [trace ]: Job asks for a TTL of 82800 seconds
Mar 04 10:46:12 [trace ]: Support for containers detected. Using ApptainerCVMFS
Mar 04 10:46:13 [trace ]: JobWrapper started
Mar 04 10:46:37 [procmf ]: FRUNTIME | RUNTIME | CPUUSAGE | MEMUSAGE | CPUTIME | RMEM | VMEM | NOCPUS | CPUFAMILY | CPUMHZ | RESOURCEUSAGE | RMEMMAX | VMEMMAX
Mar 04 10:46:38 [proc ]: 00:00:25 25 61.16 0.10 15.46 137.92 137.92 68 6 1400 21.64 137.92 137.92 1000
Mar 04 10:46:41 [trace ]: The following OS has been detected: "CentOS Linux 7 (Core)"
Mar 04 10:46:53 [state ]: Job state transition from ASSIGNED to STARTED
Mar 04 10:46:54 [trace ]: Getting InputFile: /alice/cern.ch/user/a/alihyperloop/bin/run_train5.sh to /workdir/run_train5.sh (14.19 KB)
Mar 04 10:47:25 [trace ]: Getting InputFile: /alice/cern.ch/user/a/alihyperloop/bin/validation.sh to /workdir/validation.sh (3.525 KB)
Mar 04 10:47:46 [trace ]: Getting InputFile: /alice/cern.ch/user/a/alihyperloop/jobs/0033/hy_330825/full_config.json to /workdir/full_config.json (13.72 KB)
Mar 04 10:47:55 [trace ]: Starting execution
Mar 04 10:47:56 [state ]: Job state transition from STARTED to RUNNING
Mar 04 10:52:50 [proc ]: PID: 11307, command: o2-analysis-pid-tof-full, old value: 0.0, new value: 1.6, delta CPU time: 1.6, delta walltime: 5, usage: 32.0%
Mar 04 10:52:50 PID: 11301, command: o2-analysis-lf-lambdakzerobuilder, old value: 0.0, new value: 1.39, delta CPU time: 1.39, delta walltime: 5, usage: 27.8%
Mar 04 10:52:50 PID: 11297, command: o2-analysis-pid-tpc-full, old value: 0.0, new value: 1.38, delta CPU time: 1.38, delta walltime: 5, usage: 27.6%
Mar 04 10:52:50 PID: 11323, command: o2-analysis-lf-cascadebuilder, old value: 0.0, new value: 1.37, delta CPU time: 1.37, delta walltime: 5, usage: 27.4%
Mar 04 10:52:50 PID: 11359, command: o2-analysis-event-selection, old value: 0.0, new value: 1.37, delta CPU time: 1.37, delta walltime: 5, usage: 27.4%
Mar 04 10:56:40 [proc ]: 00:10:26 626 18.93 0.90 118.67 1207.37 1207.37 68 6 1400 166.14 1207.37 1207.37 1000
Mar 04 11:06:42 [proc ]: 00:20:28 1228 40.58 6.20 498.44 3514.80 3514.80 68 6 1400 697.82 3535.05 3535.05 1000
Mar 04 11:16:45 [proc ]: 00:30:30 1830 72.89 7.90 1334.47 3637.04 3637.04 68 6 1400 1868.26 3734.06 3734.06 1000
Mar 04 11:26:44 [proc ]: 00:40:30 2430 92.51 8.90 2248.33 3623.84 3623.84 68 6 1400 3147.66 3769.44 3769.44 1000
Mar 04 11:36:45 [proc ]: 00:50:30 3030 96.35 9.90 2920.35 3757.06 3757.06 68 6 1400 4088.49 3769.44 3769.44 1000
Mar 04 11:46:39 [proc ]: 01:00:28 3625 102.91 10.50 3731.32 3643.39 3643.39 68 6 1400 5223.85 3792.63 3792.63 1000

...

Mar 04 15:46:39 [proc ]: 05:00:25 18025 107.91 9.90 19451.87 3453.50 3453.50 68 6 1400 27232.62 3855.22 3855.22 1000
Mar 04 15:56:42 [proc ]: 05:10:27 18627 107.65 10.00 20053.18 3430.39 3430.39 68 6 1400 28074.45 3855.22 3855.22 1000
Mar 04 16:06:44 [proc ]: 05:20:30 19230 107.41 9.90 20655.57 3453.38 3453.38 68 6 1400 28917.80 3855.22 3855.22 1000
Mar 04 16:16:42 [proc ]: 05:30:28 19828 107.52 10.20 21319.07 3572.76 3572.76 68 6 1400 29846.70 3855.22 3855.22 1000
Mar 04 16:17:17 [proc ]: Execution completed. Time spent: real 19714.82, user 20109.94, sys 978.60,
Mar 04 16:17:19 [trace ]: Starting validation
Mar 04 16:17:23 [proc ]: Execution completed. Time spent: real 2.36, user 0.04, sys 0.20,
Mar 04 16:17:26 [trace ]: Going to uploadOutputFiles(exitStatus=DONE, outputDir=/alice/cern.ch/user/a/alihyperloop/jobs/0033/hy_330825/0126)
Mar 04 16:17:26 [state ]: Job state transition from RUNNING to SAVING
Mar 04 16:17:27 [trace ]: Uploading: metrics_summary.json to /alice/cern.ch/user/a/alihyperloop/jobs/0033/hy_330825/0126
Mar 04 16:17:28 [proc ]: 05:31:14 19874 107.33 0.20 21332.05 233.94 233.94 68 6 1400 29864.87 3855.22 3855.22 1000
Mar 04 16:18:05 [trace ]: /alice/cern.ch/user/a/alihyperloop/jobs/0033/hy_330825/0126/metrics_summary.json: uploaded as requested
Mar 04 16:18:05 [trace ]: Uploading: AnalysisResults.root to /alice/cern.ch/user/a/alihyperloop/jobs/0033/hy_330825/0126
Mar 04 16:18:17 [trace ]: /alice/cern.ch/user/a/alihyperloop/jobs/0033/hy_330825/0126/AnalysisResults.root: uploaded as requested
Mar 04 16:18:18 [trace ]: Registering: metrics_summary.json. Return status: true
Mar 04 16:18:19 [trace ]: Registering: AnalysisResults.root. Return status: true
Mar 04 16:18:19 [state ]: Job state transition from SAVING to DONE
Mar 04 16:18:19 [trace ]: JobWrapper has finished execution
Mar 04 16:18:19 [proc ]: 05:32:06 19926 107.06 0.20 21333.09 235.20 235.20 68 6 1400 29866.33 3855.22 3855.22 1000
Mar 04 16:18:26 [proc ]: 05:32:06 19926 107.06 0.20 21333.09 235.20 235.20 68 6 1400 29866.33 3855.22 3855.22 1000
Mar 04 16:18:27 [trace ]: JobWrapper exit code: 0
Mar 04 16:18:27 [trace ]: Cleaning up after execution...
```

5. History & Current Status of The Site



2023

9

10

11

12

2024

1

2

3

4

the JobAgent log on Apr 10 2024

```
Apr 10, 2024 9:09:41 AM alien.site.JobAgent run JobNumber: 2
INFO: Starting JobAgent 2 in node8305
Apr 10, 2024 9:09:41 AM alien.site.JobAgent run JobNumber: 2
INFO: {Site=KISTI_GSDC, Partition=PDC08_2, containsAVX=1, CE=ALICE::KISTI_GSDC:Nurion, Platform=Linux-x86_64, cpuModelName=Intel(R) Xeon Phi(TM) CPU 7250 @ 1.40GHz, Host=alice-kisti-hpc.sdfarm.kr, RequiredCpusCe=>=1, TTL=87000, alienCm=alice-kisti-hpc.sdfarm.kr:10000, workdir=/scratch/gsdc23a01, NoUsers=[draining], Local host=node8305, WholeNode=false, CGROUPSV2_AVAILABLE=false, Cehost=alice-kisti-hpc.sdfarm.kr, Disk=609248406932, CPUCores=1, CVMS=1}
Apr 10, 2024 9:09:41 AM alien.site.JobAgent run JobNumber: 2
INFO: Resources available: 1 CPU cores and 5949691452 MB of disk space
Apr 10, 2024 9:09:41 AM alien.site.JobAgent updateDynamicParameters JobNumber: 2
INFO: Updating dynamic parameters of jobAgent map
Apr 10, 2024 9:09:41 AM alien.site.JobAgent computeTimeLeft JobNumber: 2
INFO: Still have 86990 seconds to live (1712707781671-1712707771580-10)
Apr 10, 2024 9:09:41 AM alien.site.JobAgent computeTimeLeft JobNumber: 2
INFO: Certificate timeout is 172757
Apr 10, 2024 9:09:41 AM alien.site.JobAgent computeTimeLeft JobNumber: 2
INFO: Still have 86990 seconds to live (1712707781677-1712707771580-10)
Apr 10, 2024 9:09:41 AM alien.site.JobAgent computeTimeLeft JobNumber: 2
INFO: Certificate timeout is 172757
Apr 10, 2024 9:09:41 AM alien.site.JobAgent recomputeDiskSpace JobNumber: 2
INFO: Recombuting disk space of /scratch/gsdc23a01. Starting with a free space of 6238706109775872
Apr 10, 2024 9:09:44 AM alien.site.JobAgent lambda$run$2 JobNumber: 2
INFO: LegacyToken 51RlryUfo9hpl{VrzDRRCa9y930Z:Ibi
Apr 10, 2024 9:09:44 AM alien.site.JobAgent lambda$run$2 JobNumber: 2
INFO: queueId 3051788381
Apr 10, 2024 9:09:44 AM alien.site.JobAgent lambda$run$2 JobNumber: 2
INFO: JDL
[
  User = "aliproduct";

  JobTag = {
    "comment:Pb-Pb, 5.02 TeV - Hijing Monte Carlo production with added GA signals anchored to LHC18q and LHC18r pass3, 3
0-50% cent, updated tag, ALIROOT-8865"
  };

  Packages = {
    "VO_ALICE@AliDPG::prod-202402-02-1",
    "VO_ALICE@AliPhysics::v5-09-54r-01_02-1",
    "VO_ALICE@jemalloc::latest"
  };
}
```

```
Apr 10, 2024 9:09:56 AM alien.site.JobAgent monitorExecution JobNumber: 2
INFO: FRUNTIME | RUNTIME | CPUUSAGE | MEMUSAGE | CPUTIME | RMEM | VMEM | NOCPUS | CPUFA
MILY | CPLMHZ | RESOURCEUSAGE |
RMEMMAX | VMEMMAX
Apr 10, 2024 9:09:57 AM alien.site.JobAgent sendProcessResources JobNumber: 2
INFO: ++++ Sending resources info ++++
Apr 10, 2024 9:09:57 AM alien.site.JobAgent sendProcessResources JobNumber: 2
INFO: 00:00:08 8 172.47 0.10 15.50 147.79 147.79 68 6 1400 21.70 147.79 147.79 1000
Apr 10, 2024 9:10:45 AM alien.site.JobAgent computeTimeLeft JobNumber: 2
OFF: Still have 86926 seconds to live (1712707845811-1712707771580-74)
Apr 10, 2024 9:10:45 AM alien.site.JobAgent computeTimeLeft JobNumber: 2
OFF: Certificate timeout is 172693
Apr 10, 2024 9:12:45 AM alien.site.JobAgent computeTimeLeft JobNumber: 2
OFF: Still have 86806 seconds to live (1712707965811-1712707771580-194)
Apr 10, 2024 9:12:45 AM alien.site.JobAgent computeTimeLeft JobNumber: 2
OFF: Certificate timeout is 172573
Apr 10, 2024 9:14:45 AM alien.site.JobAgent computeTimeLeft JobNumber: 2
OFF: Still have 86686 seconds to live (1712708085811-1712707771580-314)
Apr 10, 2024 9:14:45 AM alien.site.JobAgent computeTimeLeft JobNumber: 2
OFF: Certificate timeout is 172453
Apr 10, 2024 9:16:45 AM alien.site.JobAgent computeTimeLeft JobNumber: 2
OFF: Still have 86566 seconds to live (1712708205811-1712707771580-434)
Apr 10, 2024 9:16:45 AM alien.site.JobAgent computeTimeLeft JobNumber: 2
OFF: Certificate timeout is 172333
Apr 10, 2024 9:18:45 AM alien.site.JobAgent computeTimeLeft JobNumber: 2
OFF: Still have 86446 seconds to live (1712708325811-1712707771580-554)
Apr 10, 2024 9:18:45 AM alien.site.JobAgent computeTimeLeft JobNumber: 2
OFF: Certificate timeout is 172213
Apr 10, 2024 9:19:58 AM alien.site.JobAgent sendProcessResources JobNumber: 2
INFO: ++++ Sending resources info ++++
Apr 10, 2024 9:19:58 AM alien.site.JobAgent sendProcessResources JobNumber: 2
INFO: 00:10:10 610 11.91 0.30 72.63 491.12 491.12 68 6 1400 101.68 516.04 516.04 1000
Apr 10, 2024 9:20:45 AM alien.site.JobAgent computeTimeLeft JobNumber: 2
OFF: Still have 86326 seconds to live (1712708445811-1712707771580-674)
Apr 10, 2024 9:20:45 AM alien.site.JobAgent computeTimeLeft JobNumber: 2
OFF: Certificate timeout is 172093
Apr 10, 2024 9:22:45 AM alien.site.JobAgent computeTimeLeft JobNumber: 2
OFF: Still have 86206 seconds to live (1712708565811-1712707771580-794)
Apr 10, 2024 9:22:45 AM alien.site.JobAgent computeTimeLeft JobNumber: 2
OFF: Certificate timeout is 171973
Apr 10, 2024 9:24:45 AM alien.site.JobAgent computeTimeLeft JobNumber: 2
OFF: Still have 86086 seconds to live (1712708685811-1712707771580-914)
Apr 10, 2024 9:24:45 AM alien.site.JobAgent computeTimeLeft JobNumber: 2
OFF: Certificate timeout is 171853
Apr 10, 2024 9:26:45 AM alien.site.JobAgent computeTimeLeft JobNumber: 2
OFF: Still have 85966 seconds to live (1712708805811-1712707771580-1034)
Apr 10, 2024 9:26:45 AM alien.site.JobAgent computeTimeLeft JobNumber: 2
OFF: Certificate timeout is 171733
```

After starting log record...

- *within 5 seconds:*
JDL contents is printed
- *within 20 seconds:*
first resource usage is recorded
- *every 2 minutes:*
general logs are recorded
- *every 10 minutes:*
resource usage is recorded until the job is finished

5. History & Current Status of The Site



2023

9

- We started construction of the new HPC grid site using Nurion.

10

11

- We completed the construction of the HPC grid site.
- CERN started working on JAliEn CE operated on PBS cluster.

12

2024

1

- MonALISA and the JAliEn CE was started.
- Single-core jobs began to be submitted to the site from CERN.

2

- Single core jobs were successfully got started on the HPC site.

3

- MonALISA is enable to monitor the job status of the site.
- The HPC site was shown on the site map.



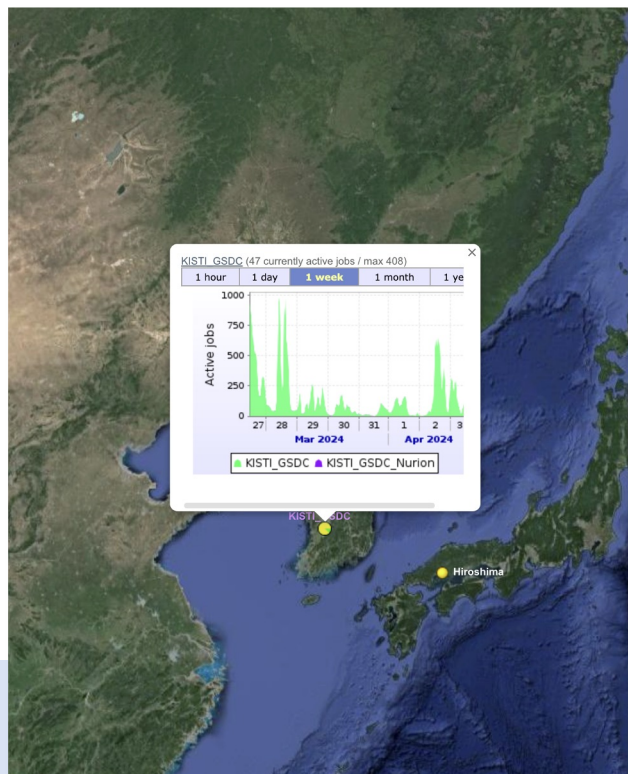
4

5. History & Current Status of The Site

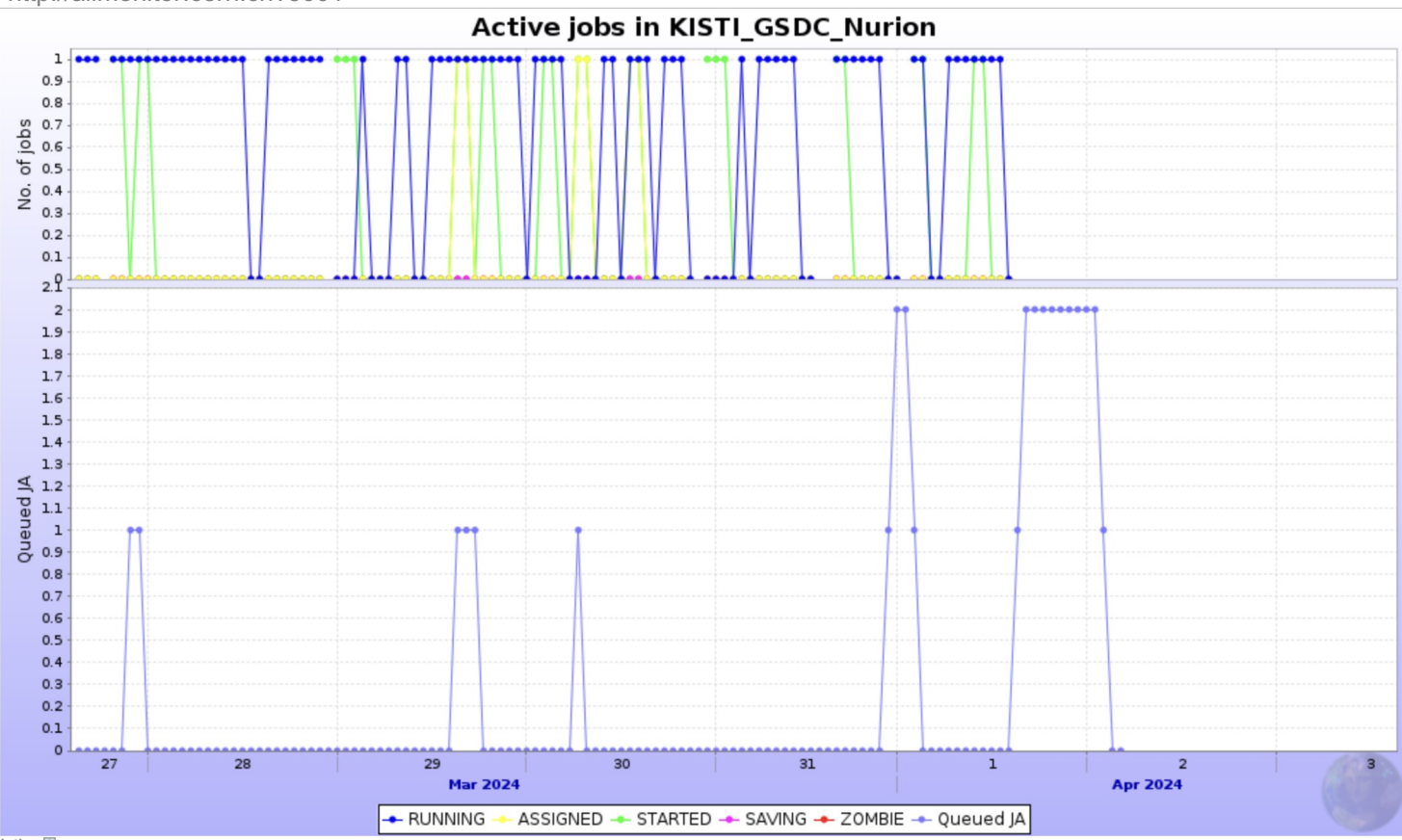
2023

- 9
- 10
- 11
- 12
- 1
- 2
- 3
- 4

<https://alimonitor.cern.ch/map.jsp>



<http://alimonitor.cern.ch?5001>



2024

6. Future Plans



1) If running JAliEn CE is stable for single-core jobs,

- We will conduct submission tests with the following job types:
 - multi-core jobs - utilizing more than 1 core, such as 4/8 cores and so on
 - whole node jobs - allocating all cores of the worker node.

2) Currently only one Nurion node is used for PBS worker node.

- We will assign 10 to 15 additional Nurion worker nodes,
 - The expansion will increase our PBS cluster's capacity to over 640 cores.
 - Each Nurion node has 64 cores.

3) The site will be able to process real ALICE payload in the future,

- We will keep maintaining the JAliEn CE code by:
 - adding some functions which are necessary for the Nurion site.
- For this, having been studying the structure and mechanism of JAliEn.

Thank you!

Hyeonjin Yu

hyeonjin.yu@cern.ch