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# Notes about Installation and Configuration of WN using Torque with MPI support

- These notes are provided by site admins on a best effort base as a contribution to the IGI communities and **MUST not be considered as a substitute of the Official IGI documentation** .
- This document is addressed to site administrators responsible for middleware installation and configuration.
- The goal of this page is to provide some hints and examples on how to install and configure an **EMI WN + MPI** service based on EMI middleware using **TORQUE** as batch system

## References

1. About IGI - Italian Grid infrastructure
2. About IGI Release
3. IGI Official Installation and Configuration guide
4. Generic Installation & Configuration for EMI 1
5. Yaim Guide
6. site-info.def yaim variables
7. MPI yaim variables
8. WN yaim variables
9. TORQUE Yaim variables
10. EMI-WN v.1.0.0
11. gLite-MPI v.1.0.0
12. MPI-Start Installation and Configuration
13. Troubleshooting Guide for Operational Errors on EGI Sites
14. Grid Administration FAQs page

## Service installation

O.S. and Repos [▶](#) O.S. and Repos [▼](#)

### O.S. and Repos

- Starts from a fresh installation of Scientific Linux 5.x (x86\_64).

```
# cat /etc/redhat-release
Scientific Linux SL release 5.7 (Boron)
```

\* Install the additional repositories: EPEL, Certification Authority, UMD

```
# yum install yum-priorities yum-protectbase
# cd /etc/yum.repos.d/
# rpm -ivh http://mirror.switch.ch/ftp/mirror/epel//5/x86_64/epel-release-5-4.noarch.rpm
# wget http://repo-pd.italiangrid.it/mrepo/repos/egi-trustanchors.repo
# rpm -ivh http://repo-pd.italiangrid.it/mrepo/EMI/1/sl5/x86_64/updates/emi-release-1.0.1-1.sl5.n
# wget http://repo-pd.italiangrid.it/mrepo/repos/igi/sl5/x86_64/igi-emi.repo
```

- Be sure that SELINUX is disabled (or permissive). Details on how to disable SELINUX are here :

```
# getenforce
Disabled
```

- Check the repos list (sl-\*.repo are the repos of the O.S. and they should be present by default).

```
# ls /etc/yum.repos.d/
egi-trustanchors.repo
emil-third-party.repo emil-base.repo emil-updates.repo
epel.repo epel-testing.repo igi-emi.repo
sl-contrib.repo sl-fastbugs.repo sl-security.repo sl-testing.repo sl-debuginfo.repo sl.repo sl-sr
```

**IMPORTANT:** remove the dag repository if present

**yum install** [▶](#) **yum install** [▼](#)

## yum install

```
# yum clean all
Loaded plugins: downloadonly, kernel-module, priorities, protect-packages, protectbase, security,
Cleaning up Everything
```

```
# yum install ca-policy-egi-core
# yum install igi-wn_torque_noafs
# yum install glite-mpi
# yum install emi-version
# yum install openmpi openmpi-devel
# yum install mpich2 mpich2-devel
# yum install nfs-utils
```

see here for details

## Service configuration

You have to copy the configuration files in another path, for example root, and set them properly (see later):

```
# ls /opt/glite/yaim/examples/siteinfo/
services  site-info.def

# ls /opt/glite/yaim/examples/siteinfo/services/
glite-mpi  glite-mpi_ce  glite-mpi_sl4-x86  glite-mpi_sl5-x86_64  glite-mpi_wn  glite-vobox  glit

# cp -r /opt/glite/yaim/examples/siteinfo/* .
```

in the services directory, keep and edit only these files:

```
# ls services/
glite-mpi  glite-mpi_ce  glite-mpi_wn
```

**vo.d directory** [▶](#) **vo.d directory** [▼](#)

## vo.d directory

Create the vo.d directory for the VO configuration file (you can decide if keep the VO information in the site.def or putting them in the vo.d directory)

```
# mkdir vo.d
```

here an example for some VOs.

Information about the several VOs are available at the [CENTRAL OPERATIONS PORTAL](#) .

**users and groups configuration** [▶](#) **users and groups configuration** [▼](#)

## users and groups configuration

here an example on how to define pool accounts (ig-users.conf ) and groups (ig-groups.conf ) for several VOs

[site-info.def](#) [site-info.def](#)

### site-info.def

SUGGESTION: use the same site-info.def for CREAM and WNs: for this reason in this example file there are yaim variable used by CREAM, TORQUE or emi-WN.

It is also included the settings of some VOs

For your convenience there is an explanation of each yaim variable. For more details look at [6, 7, 8, 9]

[glite-mpi](#) [glite-mpi](#)

### glite-mpi

in the following example, it is enabled the support for MPICH2 and OPENMPI; moreover the WNs are configured to use shared homes

```
#####
# Mandatory parameters in services/mpi      #
#####

# N.B. this file contains common configuration for CE and WN
# As such, it should be included in your site-info.def to ensure
# that the configuration of the CE and WNs remains in sync.

#-----
# MPI-related configuration:
#-----
# Several MPI implementations (or "flavours") are available.
# If you do NOT want a flavour to be configured, set its variable
# to "no". Otherwise, set it to "yes". If you want to use an
# already installed version of an implementation, set its "_PATH" and
# "_VERSION" variables to match your setup (examples below).
#
# NOTE 1: the CE_RUNTIMEENV will be automatically updated in the file
# functions/config_mpi_ce, so that the CE advertises the MPI implementations
# you choose here - you do NOT have to change it manually in this file.
# It will become something like this:
#
#   CE_RUNTIMEENV="$CE_RUNTIMEENV
#               MPICH
#               MPICH-1.2.7p4
#               MPICH2
#               MPICH2-1.0.4
#               OPENMPI
#               OPENMPI-1.1
#               LAM"
#
# NOTE 2: it is currently NOT possible to configure multiple concurrent
# versions of the same implementations (e.g. MPICH-1.2.3 and MPICH-1.2.7)
# using YAIM. Customize "/opt/glite/yaim/functions/config_mpi_ce" file
# to do so.

#####
# The following example are applicable to default SL 5.3 x86_64 (gLite 3.2 WN)
# Support for MPICH 1 is dropped
MPI_MPICH_ENABLE="no"
```

## NotesAboutInstallationAndConfigurationOfWNTORQUEMPI < SiteAdminCorner < TWiki

```
MPI_MPICH2_ENABLE="yes"
MPI_OPENMPI_ENABLE="yes"
MPI_LAM_ENABLE="no"

#---
# Example for using an already installed version of MPI.
# Just fill in the path to its current installation (e.g. "/usr")
# and which version it is (e.g. "6.5.9").
#---

# DEFAULT Parameters
# The following parameters are correct for a default SL 5.X x86_64 WN
#MPI_MPICH_PATH="/opt/mpich-1.2.7p1/"
#MPI_MPICH_VERSION="1.2.7p1"
MPI_MPICH2_PATH="/usr/lib64/mpich2/"
MPI_MPICH2_VERSION="1.2.1p1"
MPI_OPENMPI_PATH="/usr/lib64/openmpi/1.4-gcc/"
MPI_OPENMPI_VERSION="1.4"
#MPI_LAM_VERSION="7.1.2"

# If you provide mpiexec (http://www.osc.edu/~pw/mpiexec/index.php)
# for MPICH or MPICH2, please state the full path to that file here.
# Otherwise do not set this variable. (Default is to set this to
# the location of mpiexec set by the glite-MPI_WN metapackage.

# Most versions of MPI now distribute their own versions of mpiexec
# However, I had some problems with the MPICH2 version - so use standard mpiexec
MPI_MPICH_MPIEXEC="/usr/bin/mpiexec"
MPI_MPICH2_MPIEXEC="/usr/bin/mpiexec"
MPI_OPENMPI_MPIEXEC="/usr/lib64/openmpi/1.4-gcc/bin/mpiexec"

##### MPI_SHARED_HOME section
# Set this variable to one of the following:
# MPI_SHARED_HOME="no" if a shared directory is not used
# MPI_SHARED_HOME="yes" if the HOME directory area is shared
# MPI_SHARED_HOME="/Path/to/Shared/Location" if a shared area other
# than the HOME directory is used.

# If you do NOT provide a shared home, set MPI_SHARED_HOME to "no" (default).
#MPI_SHARED_HOME=${MPI_SHARED_HOME:-"no"}

# If you do provide a shared home and Grid jobs normally start in that area,
# set MPI_SHARED_HOME to "yes".
MPI_SHARED_HOME="yes"

# If you have a shared area but Grid jobs don't start there, then set
# MPI_SHARED_HOME to the location of this shared area. The permissions
# of this area need to be the same as /tmp (i.e. 1777) so that users
# can create their own subdirectories.
#MPI_SHARED_HOME=/share/cluster/mpi

##### Intra WN authentication
# This variable is normally set to yes when shared homes are not used.
# This allows the wrapper script to copy the job data to the other nodes
#
# If enabling SSH Hostbased Authentication you must ensure that
# the appropriate ssh config files are deployed.
# Affected files are the system ssh_config, sshd_config and ssh_known_hosts.
# The edg-pbs-knownhosts can be use to generate the ssh_known_hosts
#
# If you do NOT have SSH Hostbased Authentication between your WNs,
# set this variable to "no" (default). Otherwise set it to "yes".
#
MPI_SSH_HOST_BASED_AUTH=${MPI_SSH_HOST_BASED_AUTH:-"no"}
```

[glite-mpi\\_ce](#) ▾ [glite-mpi\\_ce](#) ▾

## glite-mpi\_ce

```
# Setup configuration variables that are common to both the CE and WN

if [ -r ${config_dir}/services/glite-mpi ]; then
  source ${config_dir}/services/glite-mpi
fi

# The MPI CE config function can create a submit filter for
# Torque to ensure that CPU allocation is performed correctly.
# Change this variable to "yes" to have YAIM create this filter.
# Warning: if you have an existing torque.cfg it will be modified.
#MPI_SUBMIT_FILTER=${MPI_SUBMIT_FILTER:-"no"}
MPI_SUBMIT_FILTER="yes"
```

[glite-mpi\\_wn](#) ▾ [glite-mpi\\_wn](#) ▾

## glite-mpi\_wn

```
# Setup configuration variables that are common to both the CE and WN
# Most variables are common to CE and WN. It is easier to define
# These in a common file ${config_dir}/services/glite-mpi

if [ -r ${config_dir}/services/glite-mpi ]; then
  source ${config_dir}/services/glite-mpi
fi
```

[munge configuration](#) ▾ [munge configuration](#) ▾

## munge configuration

**IMPORTANT:** The updated EPEL5 build of torque-2.5.7-1 as compared to previous versions enables munge as an inter node authentication method.

- verify that munge is correctly installed:

```
# rpm -qa | grep munge
munge-libs-0.5.8-8.el5
munge-0.5.8-8.el5
```

- On one host (for example the batch server) generate a key by launching:

```
# /usr/sbin/create-munge-key

# ls -ltr /etc/munge/
total 4
-r----- 1 munge munge 1024 Jan 13 14:32 munge.key
```

- Copy the key, /etc/munge/munge.key to every host of your cluster, adjusting the permissions:

```
# chown munge:munge /etc/munge/munge.key
```

- Start the munge daemon on each node:

```
# service munge start
Starting MUNGE: [ OK ]

# chkconfig munge on
```

[software area settings](#) ▾ [software area settings](#) ▾

## software area settings

you have to import the software area from CE (or another host).

- Edit the file /etc/fstab by adding a line like the following:

```
cremino.cnaf.infn.it:/opt/exp_soft/ /opt/exp_soft/ nfs rw,defaults 0 0
```

- check nfs and portmap status

```
# service nfs status
rpc.mountd is stopped
nfsd is stopped

# service portmap status
portmap is stopped

# service portmap start
Starting portmap: [ OK ]

# service nfs start
Starting NFS services: [ OK ]
Starting NFS daemon: [ OK ]
Starting NFS mountd: [ OK ]
Starting RPC idmapd: [ OK ]

# chkconfig nfs on
# chkconfig portmap on
```

- after any modification in /etc/fstab launch

```
mount -a
```

- verify the mount:

```
# df -h
Filesystem      Size  Used Avail Use% Mounted on
/dev/sda3        65G   1.9G   59G   4% /
/dev/sda1        99M   18M   76M  19% /boot
tmpfs            2.0G     0   2.0G   0% /dev/shm
cremino.cnaf.infn.it:/opt/exp_soft/
                65G   4.4G   57G   8% /opt/exp_soft
```

**yaim check**  **yaim check** 

### yaim check

```
# /opt/glite/yaim/bin/yaim -v -s site-info_batch.def -n MPI_WN -n WN_torque_noafs
INFO: Using site configuration file: site-info_batch.def
INFO: Sourcing service specific configuration file: ./services/glite-mpi_wn
INFO:
```

```
#####
```

```
.          /'.-.' )
.   yA,-"-,( ,m, :/ ) .oo.   oo   o   ooo o.   .oo
.   /          .-Y a  a Y-.   8.  .8'   8'8.   8   8b  d'8
.   /          ~ ~ /          8'   .8oo88.   8   8  8'  8
.   (/_          '===='      8   .8'   8.   8   8  Y  8
.   Y,-''-',Yy,-.,/          o8o  o8o   o88o  o8o  o8o   o8o
.   I_))_) I_))_)
```

```
current working directory: /root
```

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```
site-info.def date: Apr 24 09:22 site-info_batch.def
yaim command: -v -s site-info_batch.def -n MPI_WN -n WN_torque_noafs
log file: /opt/glite/yaim/bin/./log/yaimlog
Tue Apr 24 11:53:02 CEST 2012 : /opt/glite/yaim/bin/yaim

Installed YAIM versions:
glite-yaim-clients 5.0.0-1
glite-yaim-core 5.0.2-1
glite-yaim-mpi 1.1.10-10
glite-yaim-torque-client 5.0.0-1
glite-yaim-torque-utils 5.0.0-1

#####
INFO: The default location of the grid-env.(c)sh files will be: /usr/libexec
INFO: Sourcing the utilities in /opt/glite/yaim/functions/utils
INFO: Detecting environment
INFO: Executing function: config_mpi_wn_check
INFO: Executing function: config_ntp_check
INFO: Executing function: config_sysconfig_lcg_check
INFO: Executing function: config_globus_clients_check
INFO: Executing function: config_lcgenv_check
INFO: Executing function: config_users_check
INFO: Executing function: config_sw_dir_check
INFO: Executing function: config_amga_client_check
INFO: Executing function: config_wn_check
INFO: Executing function: config_vomsdir_check
INFO: Executing function: config_vomses_check
INFO: Executing function: config_glite_saga_check
INFO: Executing function: config_add_pool_env_check
INFO: Executing function: config_wn_info_check
INFO: Executing function: config_torque_client_check
INFO: Checking is done.
INFO: All the necessary variables to configure MPI_WN WN_torque_noafs are defined in your conf
INFO: Please, bear in mind that YAIM only guarantees the definition of variables
INFO: controlled in the _check functions.
INFO: YAIM terminated succesfully.
```

**yaim config** ▾ **yaim config** ▾

### yaim config

```
# /opt/glite/yaim/bin/yaim -c -s site-info_batch.def -n MPI_WN -n WN_torque_noafs
INFO: Using site configuration file: site-info_batch.def
INFO: Sourcing service specific configuration file: ./services/glite-mpi_wn
INFO:
#####

.          /'-. ' )
.   yA,-"-,( ,m,:/ ) .oo.   oo   o   ooo o.   .oo
.   /          .-Y a  a Y-.   8. .8'   8'8.   8   8b  d'8
.   /          ~ ~ /          8'   .8oo88.   8   8 8' 8
.   (_/          '===='      8   .8'   8.   8   8 Y 8
.   Y,-''-,Yy,-.,/          o8o o8o   o88o o8o o8o   o8o
.   I_))_) I_))_)

current working directory: /root
site-info.def date: Apr 24 09:22 site-info_batch.def
yaim command: -c -s site-info_batch.def -n MPI_WN -n WN_torque_noafs
log file: /opt/glite/yaim/bin/./log/yaimlog
Tue Apr 24 11:53:15 CEST 2012 : /opt/glite/yaim/bin/yaim

Installed YAIM versions:
glite-yaim-clients 5.0.0-1
glite-yaim-core 5.0.2-1
glite-yaim-mpi 1.1.10-10
glite-yaim-torque-client 5.0.0-1
```

yaim check



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glite-yaim-torque-utils 5.0.0-1

```
#####
INFO: The default location of the grid-env.(c)sh files will be: /usr/libexec
INFO: Sourcing the utilities in /opt/glite/yaim/functions/utils
INFO: Detecting environment
INFO: Executing function: config_mpi_wn_check
INFO: Executing function: config_ntp_check
INFO: Executing function: config_sysconfig_lcg_check
INFO: Executing function: config_globus_clients_check
INFO: Executing function: config_lcgenv_check
INFO: Executing function: config_users_check
INFO: Executing function: config_sw_dir_check
INFO: Executing function: config_amga_client_check
INFO: Executing function: config_wn_check
INFO: Executing function: config_vomsdir_check
INFO: Executing function: config_vomses_check
INFO: Executing function: config_glite_saga_check
INFO: Executing function: config_add_pool_env_check
INFO: Executing function: config_wn_info_check
INFO: Executing function: config_torque_client_check
INFO: Executing function: config_mpi_wn_setenv
INFO: Executing function: config_mpi_wn
INFO: Executing function: config_ldconf
INFO: config_ldconf: function not needed anymore, left empty waiting to be removed
INFO: Executing function: config_ntp_setenv
INFO: Executing function: config_ntp
INFO: Storing old ntp settings in /etc/ntp.conf.yaimold.20120424_115316
INFO: Executing function: config_sysconfig_edg
INFO: Executing function: config_sysconfig_globus
INFO: Executing function: config_sysconfig_lcg
INFO: Executing function: config_crl
INFO: Now updating the CRLs - this may take a few minutes...
Enabling periodic fetch-crl: [ OK ]
INFO: Executing function: config_rfio
INFO: Executing function: config_globus_clients_setenv
INFO: Executing function: config_globus_clients
INFO: Configure the globus service - not needed in EMI
INFO: Executing function: config_lcgenv
INFO: Executing function: config_users
INFO: Executing function: config_sw_dir_setenv
INFO: Executing function: config_sw_dir
INFO: Executing function: config_nfs_sw_dir_client
INFO: Variable $BASE_SW_DIR is not set!
INFO: The directory /opt/exp_soft won't be mounted with NFS!
INFO: Executing function: config_fts_client
INFO: Executing function: config_amga_client_setenv
INFO: Executing function: config_amga_client
INFO: Executing function: config_wn_setenv
INFO: Executing function: config_wn
INFO: Executing function: config_vomsdir_setenv
INFO: Executing function: config_vomsdir
INFO: Executing function: config_vomses
INFO: Executing function: config_glite_saga_setenv
INFO: SAGA configuration is not required
INFO: Executing function: config_glite_saga
INFO: SAGA configuration is not required
INFO: Executing function: config_add_pool_env_setenv
INFO: Executing function: config_add_pool_env
INFO: Executing function: config_wn_info
WARNING: No subcluster has been defined for the WN in the WN_LIST file /root/wn-list.conf
WARNING: YAIM will use the default subcluster id: CE_HOST -> cream-01.cnaf.infn.it
INFO: Executing function: config_torque_client
INFO: starting pbs_mom...
Shutting down TORQUE Mom: pbs_mom already stopped [ OK ]
Starting TORQUE Mom: [ OK ]
INFO: Configuration Complete. [ OK ]
```

INFO: YAIM terminated succesfully.

## Revisions

Date	Comment	By
2012-05-25	installation notes completed	Alessandro Paolini
2012-04-23	First draft	Alessandro Paolini

-- AlessandroPaolini - 2012-04-23

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This topic: SiteAdminCorner > NotesAboutInstallationAndConfigurationOfWNTORQUEMPI

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