

LHC COMPUTING GRID

LCG - STORAGE ELEMENT MANUAL INSTALLATION AND CONFIGURATION

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- [2] A. Retico and A. Usai. Lcg grid-mapfile handling on lcg nodes, 2004. http://www.cern.ch/grid-deployment/gis/release-docs/GMF-index.html
- [3] A. Retico and A. Usai. Lcg wn manual software installation and configuration, 2004. http://www.cern.ch/grid-deployment/gis/release-docs/WN-index.html



ABSTRACT

Manual steps for the installation and configuration of a LCG SE Node based on a standard (non CERNlike) Red Hat 7.3 installation

Link to this document: This document is available on the *Grid Deployment* web site

http://www.cern.ch/grid-deployment/gis/release-docs/SE-index.html

There you need to select the version tag before downloading the corresponding version of the guide. Oter documents labeled with "cvs:", in the *References*, are maintained in txt version into the LCG cvs repository.

They can be downloaded via web by browsing the LCG Deployment home page

http://www.cern.ch/grid-deployment/

following then the CVS Deployment link on the left side of the page.



1. PREREQUISITES FOR INSTALLATION

In order to install the SE software you need:

- a working Linux Redhat7.3 on the Storage Element (This procedure has been tested on a basic RH7.3 and should not differ for more or less equivalent versions of RH. Should it be so please contact us)
- root account on SE machine
- references to software packages to be installed (see below)

Though it is not mandatory, it is strongly recommended to create, during Red Hat installation, a separate ext3 partition for the storage space resource. The configuration steps listed below, when needed, identify this storage space with the mount point:

/storage



2. STORAGE ELEMENT SOFTWARE INSTALLATION

In order to have a running SE the following software must be installed

- SE package
- Other software which a group may rely on

Two different methods are supported for SE software installation

- Centrally managed SE installation using the Debian apt-get tool
- Manual SE installation using the Red Hat *rpm* tool.

The first method is simple and straightforward. Node-specific meta-packages define and hide the list of rpms to be installed. Dependencies among rpms, in particular, are easily managed by the *apt-get* tool. This may help if on your site you are running a customized version of Red Hat and you prefer not to solve dependencies manually.

On the other side, the installation using *apt-get* gives to site administrators poor control on installation and on the way the dependencies are solved.

The second method gives full control to site administrators for the installation, because it is based on an explicitly declared set of rpms to be installed on top of Red Hat 7.3 On the other hand, the installation procedure is slower and needs each unmanaged dependency to be manually solved.

2.1. SE INSTALLATION USING apt-get

in order to install your Storage Element using apt-get please refer to the following document:

http://www.cern.ch/grid-deployment/gis/aptDB/

2.2. SE INSTALLATION USING rpm

All the tools needed for LCG releases are available on the Grid Deployment web site

http://www.cern.ch/grid-deployment/gis/release-docs/SE-index.html

You can start browsing by selecting the relevant version tag. Once selected your tag, you will be moved to a page where you can find:

SE.pdf: this guide

SE_manual_install_rpm: plain full list of those rpms needed to install the SE software on top of a plain RH7.3 installation, whose dependencies are already dealt with.



- **SE_manual_install_forced_rpm:** plain full list of those rpms needed to install the SE software on top of a plain RH7.3 installation, and whose dependencies are NOT dealt with, therefore requiring a forced installation. If this list is not present or void it means that no rpm needs to be forced
- **SE_manual_install_wget:** a shell script which downloads, from the LCG mirror site at CERN, the rpms included into the list *SE_manual_install_rpm*
- **SE_manual_install_extra_rpm:** a short list of rpms which RH7.3 does not install by default, but which have been turned out to be required in order to have the SE software installed. This list is provided just for reference, since the rpms from this list are already included into the list *SE_manual_install_rpm*

If any file of the mentioned list is not in the repository it means that it is not applicable within the installation of the current tag. So each further reference to it in this guide can be simply ignored.

All the above mentioned files are grouped in the archive file **SE_tools.tar.gz**. So they can be easily downloaded and used on target machines.

The provided *SE_manual_install_rpm* includes:

- all the packages which are needed in order to have a production Storage Element.
- all the general purpose objects (i.e. shared libraries or common applications) which the SE installation needs in order to run and which are not included in the standard operative system. The composition of this group of rpms may vary depending on what is considered "basic OS" at each site, and so it cannot be easily defined in a static way. Given the previous considerations, this part of the provided list may be not exhaustive.

A possible way to use the provided tools is decribed in the next sections

Download rpms from the repository in a local directory

- log in as *root* into the node to be installed and copy there the file **SE_tools.tar.gz**.
- extract the archived files.

> gunzip SE_tools.tar.gz > tar xvf SE_tools.tar

• give execution permissions and run the script *SE_manual_install_wget*, which will then fetch all the rpms required into the subdirectories *SE_INSTALL* and *SE_INSTALL_FORCED*

> cd SE_tools
> chmod u+x SE_manual_install_wget
> ./SE_manual_install_wget



Install the downloaded rpms

- In the directory **SE_INSTALL**, where the rpms listed in *SE_manual_install_rpm* have been down-loaded, run the command
 - > rpm -ivh "*.rpm"
- In the directory **SE_INSTALL_FORCED** where the rpms listed in *SE_manual_install_forced_rpm* have been downloaded, run the command

> rpm -ivh --nodeps "*.rpm"

Due to possible missing rpms this operation might yield some missing dependencies which have to be analyzed and solved by adding/removing rpms to/from the *SE_manual_install_rpm* list.

Should you prefer to do an upgrade of the SE software already installed at your site instead of a new installation, the necessary steps are listed in the upgrade procedure usually reported in the last section of the SE installation guide.

This procedure, when available, refers to changes occurring between the current version and the previous one. This also means that the procedure is not applicable if the software at your site is more than two tags old.



3. NTP CLIENT INSTALLATION & CONFIGURATION

A general requirement for the LCG nodes is that they should be synchronized. This requirement may be fulfilled in several ways. If your nodes run under AFS most likely they are already synchronized. Otherwise, you can use the NTP protocol with a time server.

Instructions and examples for a NTP client configuration are provided in this section. If you are not planning to use a time server on your machine you can just skip it.

3.1. NTP SOFTWARE INSTALLATION

In order to install the NTP client, you need the following rpms to be installed:

- ntp
- libcap
- libcap-devel

The following versions of the above said rpms have been proven to work on our OS configuration (the list includes the corresponding links to download sites):

• ntp-4.1.1-1

http://grid-deployment.web.cern.ch/grid-deployment/download/RpmDir/release/ntp-4.1.1-1.i386.rpm

• libcap-devel-1.10-8

http://grid-deployment.web.cern.ch/grid-deployment/download/RpmDir/release/libcap-devel-1.10-8.i386.rpm

• libcap-1.10-8

http://grid-deployment.web.cern.ch/grid-deployment/download/RpmDir/release/libcap-1.10-8.i386.rpm

A complete example of NTP rpms download and installation has been provided in 3.3..

3.2. NTP CONFIGURATION

• Configure the file */etc/ntp.conf* by adding the lines dealing with your time server configuration such as, for instance:

```
restrict <time_server_IP_address> mask 255.255.255.255 nomodify notrap noquery
server <time_server_name>
```

Additional time servers can be added for better performance results. For each server, the hostname and IP address are required. Then, for each time-server you are using, add a couple of lines similar to the ones shown above into the file */etc/ntp.conf*.

• Edit the file */etc/ntp/step-tickers* adding a list of your time server(s) hostname(s), as in the following example:



```
137.138.16.69
137.138.17.69
```

• If you are running a kernel firewall, you will have to allow inbound communication on the NTP port. If you are using ipchains, you can do this by adding the following to */etc/sysconfig/ipchains*

```
-A input -s <NTP-serverIP-1> -d 0/0 123 -p udp -j ACCEPT
-A input -s <NTP-serverIP-2> -d 0/0 123 -p udp -j ACCEPT
```

Remember that ipchains rules are parsed in order, so ensure that there are no matching REJECT lines preceding those that you add. You can then reload the firewall

```
> /etc/init.d/ipchains restart
```

- Activate the ntpd service with the following commands:
 - > ntpdate <your ntp server name>
 - > service ntpd start
 - > chkconfig ntpd on

A complete example of NTP configuration has been provided in 3.3.

3.3. EXAMPLE OF NTP CLIENT INSTALLATION AND CONFIGURATION

This section reports a complete example of NTP server configuration done in the CERN context.

• install NTP

> wget http://grid-deployment.web.cern.ch/grid-deployment/download/RpmDir/release/ntp-4.1.1-1.i386.rpm

- > wget http://grid-deployment.web.cern.ch/grid-deployment/download/RpmDir/release/libcap-devel-1.10-8.i386.rpm > wget http://grid-deployment.web.cern.ch/grid-deployment/download/RpmDir/release/libcap-1.10-8.i386.rpm
- > rpm -ivh libcap-1.10-8.i386.rpm libcap-devel-1.10-8.i386.rpm ntp-4.1.1-1.i386.rpm
- Configure the file */etc/ntp.conf*:

the lines

```
restrict 137.138.16.69 mask 255.255.255.255 nomodify notrap noquery server 137.138.16.69 restrict 137.138.17.69 mask 255.255.255.255 nomodify notrap noquery server 137.138.17.69
```

have been added to the file /etc/ntp.conf



• Edit the file */etc/ntp/step-tickers*:

the lines

137.138.16.69 137.138.17.69

have been added to the file /etc/ntp/step-tickers

• Edit /etc/sysconfig/ipchains adding

-A input -s 137.138.16.69 -d 0/0 123 -p udp -j ACCEPT -A input -s 137.138.17.69 -d 0/0 123 -p udp -j ACCEPT

then reload the firewall

- > /etc/init.d/ipchains restart
- Activate the ntpd server
 - > ntpdate ip-time-1.cern.ch
 - > service ntpd start
 - > chkconfig ntpd on
- You can check ntpd's status by running the following command

> ntpq -p



4. LCG COMMON CONFIGURATION

4.1. SET-UP HOST CERTIFICATES

CE, SE, PROXY, RB nodes require the host certificate/key files before you start their installation. Contact your national Certification Authority (CA) to understand how to obtain a host certificate if you do not have one already. Instruction to obtain a CE list can be found in

instruction to obtain a CE list can be found in

http://markusw.home.cern.ch/markusw/lcg2CAlist.html

From the CA list so obtained you should choose a CA close to you.

Once you have obtained a valid certificate, i.e. a file

hostcert.pem

containing the machine public key and a file

hostkey.pem

containing the machine private key, make sure to place the two files into the directory

/etc/grid-security

with the following permissions

> chmod 400 /etc/grid-security/hostkey.pem

> chmod 644 /etc/grid-security/hostcert.pem

It is IMPORTANT that permissions be set as shown, as otherwise certification errors will occur

4.2. CONFIGURE DYNAMIC LINKER RUN-TIME BINDINGS

• If not already present, append the following lines to the file /etc/ld.so.conf

```
/opt/gcc-3.2.2/lib
/opt/globus/lib
/opt/edg/lib
/usr/local/lib
```

• Run the command:

```
> /sbin/ldconfig -v
```

(this command produces a huge amount of output)



4.3. CREATE TOP-LEVEL EDG CONFIGURATION FILE

This file is parsed by EDG daemons to locate the EDG root directory and various other global properties.

Create and edit the file */etc/sysconfig/edg* as follows:

```
# Root directory for EDG software. (mandatory)
# Usual value: /opt/edg
EDG_LOCATION=/opt/edg
# Directory for machine-specific files.
# Usual value: $EDG LOCATION/var
EDG_LOCATION_VAR=/opt/edg/var
# World writable directory for temporary files. (mandatory)
# Usual value: /tmp
EDG_TMP=/tmp
# The directory containing trusted certificates and CRLs (CERTDIR).
# Usual value: /etc/grid-security/certificates
# Host certificate (X509_USER_CERT) for services which don't have their own.
# Usual value: /etc/grid-security/hostcert.pem
X509_USER_CERT=/etc/grid-security/hostcert.pem
# Host key (X509_USER_KEY) for services which don't have their own.
# Usual value: /etc/grid-security/hostkey.pem
X509_USER_KEY=/etc/grid-security/hostkey.pem
# Location of the grid mapfile (GRIDMAP).
# Usual value: /etc/grid-security/grid-mapfile
GRIDMAP=/etc/grid-security/grid-mapfile
# Location of the grid map directory for pooled accounts (GRIDMAPDIR).
# Usual value: /etc/grid-security/gridmapdir
GRIDMAPDIR=/etc/grid-security/gridmapdir/
```



4.4. CREATE TOP-LEVEL GLOBUS CONFIGURATION FILE

Create and edit the file /etc/sysconfig/globus as follows:

GLOBUS_LOCATION=/opt/globus GLOBUS_CONFIG=/etc/globus.conf GLOBUS_TCP_PORT_RANGE="20000 25000"

4.5. **GSI** ACCESS CONTROL LIST (GRID-MAPFILE)

The plain text file

/etc/grid-security/grid-mapfile

maps a GSI (Grid Security Infrastructure) Credential to a local user's login name. By a cron job, the information in this file is periodically verified and, if needed, updated by the script

/opt/edg/sbin/edg-mkgridmap

whose configuration file is

/opt/edg/etc/edg-mkgridmap.conf

If this in turn is not properly configured, the relevant information of the authorised users will not be fetched or updated, resulting in the node not working properly.

Instructions on how to edit edg-mkgridmap.conf can be found in [2].



5. POOL ACCOUNTS CREATION FOR SE

Pool accounts are used to map Virtual Organizations to physical user on LCG nodes. Namely they have to be created on WN, CE, SE and RB node.

Configuration steps listed in chapter 5.1. are valid on all the nodes above said. Specific configuration steps and/or constraints to be applied to a specific node type will be described in a following node-specific section.

User accounts for LCG may be handled in two ways within the PBS system; however in general (e.g. with LSF and Condor) just the first method can be used.

The two methods are outlined below:

- 1. Method1: creating users (and groups) with their own home directory
- 2. Method2: creating users (and groups) which share (by mounting) the /home directory of the CE machine

The first method is to be preferred for performance and scalability reasons.

5.1. LCG GROUPS AND USERS IDS

Pool accounts with the following characteristics have to be created on the SE.

Pool group names

The following groups have to be created:

alice atlas cms lhcb dteam

The following is a production example

> groupadd -g 2688 dteam > groupadd -g 1307 atlas > groupadd -g 1470 lhcb > groupadd -g 1399 cms > groupadd -g 1395 alice



Pool user names

The following users should be created (with also a corresponding home directory in "/home"):

• Users of group alice:

alice001 ... alice050

• Users of group atlas:

atlas001 ... atlas050

• Users of group cms:

```
cms001
...
cms050
```

• Users of group lhcb:

lhcb001 ... lhcb050

• Users of group dteam:

dteam001 ... dteam050

The following is an example for creation of users with their own home directory



```
> useradd -c "mapped user for group ID 2688" -u 18118 -g 2688 dteam001
> ...
> ...
> useradd -c "mapped user for group ID 2688" -u 18774 -g 2688 dteam050
> useradd -c "mapped user for group ID 1307" -u 10761 -g 1307 atlas001
> ...
> ...
> useradd -c "mapped user for group ID 1307" -u 18543 -g 1307 atlas050
> useradd -c "mapped user for group ID 1470" -u 12238 -g 1470 lhcb001
> ...
> ...
> useradd -c "mapped user for group ID 1470" -u 18417 -g 1470 lhcb050
> useradd -c "mapped user for group ID 1399" -u 11410 -g 1399 cms001
> ...
> ...
> useradd -c "mapped user for group ID 1399" -u 18672 -g 1399 cms050
> useradd -c "mapped user for group ID 1395" -u 10417 -g 1395 alice001
> ...
> ...
> useradd -c "mapped user for group ID 1395" -u 18055 -g 1395 alice050
```

5.2. GLOBUS "GRIDMAPDIR" PATCH

- Create the directory /etc/grid-security/gridmapdir
 - > mkdir /etc/grid-security/gridmapdir
- For every Pool user name defined in 5.1., create a corresponding empty file with the same name, e.g.

```
> touch /etc/grid-security/gridmapdir/atlas001
....
> touch /etc/grid-security/gridmapdir/dteam050
```

WARNING: Be careful not to create any other files than the pool user ones. Namely, the "sgm" users used by the experiment software management system DO NOT need to be associated to files in the */etc/grid-security/gridmapdir* directory.

• Edit the crontab

```
> crontab -e
```



adding the line

0 5 * * * /opt/edg/sbin/lcg-expiregridmapdir.pl -v 1>>/var/log/lcg-expiregridmapdir.log 2>&1

5.3. POOL ACCOUNTS CREATION ON SE

User and Group Creation

Create groups and users as they have been defined in 5.. The group IDs can be chosen without any particular constraint, the only one being, of course, that the same group IDs be used when creating the corresponding users.

A suitable algorithm for user creation on Storage Element follows:

```
for each group defined in 5.1.1.
    create the group on the SE
for each user defined in 5.1.2.
    create the user on the SE with the proper group ID
```

An implementation example follows, which uses two scripts provided in 5.4., in order to get the group and user lists from another node (e.g. another SE or a CE) used for reference. Using the following method the user and group IDs on the SE to be installed will match with those in use on the node taken as reference.

As already said, this is not a requirement and, should this implementation conflict with local policies, any customized implementation of the above algorithm is admitted.

• Create a file *VO_names.cfg*

atlas			
alice			
cms			
lhcb			
dteam			
EOF			

• Launch on the reference node the script *CE_createUGlists.sh* (see 5.4.) feeding it with the file *VO_names.cfg*

> ./CE_createUGlists.sh VO_names.cfg

CE_LCG_groups.lst: lists the Unix groups to be created on WN, with corresponding group IDs.

CE_LCG_users.lst: lists the Unix users to be created on WN with corresponding user and group IDs



- Launch on the SE you are installing the script *createPoolAccounts.sh* (see 5.4.)
 - > ./createPoolAccounts.sh CE_LCG_groups.lst CE_LCG_users.lst NOT_SHARED

It will produce two shell script:

createGroups: command lines to create groups **createUsers:** command lines to create users

- Check the produced shell script for possible errors
 - > less createGroups
 - > less createUsers
- Execute the two shell scripts on the SE
 - > chmod u+x createGroups createUsers
 - > ./createGroups
 - > ./createUsers

NFS and firewall (just for Method2)

If you are creating pool accounts according to Method2 (home directories to be shared with WN), and you are using firewalls at your site, you should be sure yourself that the firewall on your WN machines allow the NFS mounting of part of the CE filesystem (see the configuration of Pool Accounts in [3])

5.4. EXAMPLE SCRIPTS FOR USER AND GROUP HANDLING

VO_config

atlas			
alice			
cms			
lhcb			
dteam			
EOF			

CE_createUGlists.sh

!/bin/sh ####################################	
File: CE_createUGlists.sh	
Author: LCG Deployment Team	
Version: 1.2	
Date: 2004/02/18	
Description:	
The script queries the /etc/passwd and /etc/group files of a LCG CE node and creates the two lists of groups and users to	
be created in the WN (or any other LCG node wich you want to have its	
The list descriptions follow:	
1) "CE_LCG_groups.lst" lists the Unix groups to be created.	



```
#
               Its records have the format
           <group Id>:<group name>
2) "CE_LCG_users.lst" lists the Unix users to be created.
Its records have the format
#
#
#
         <use relation have the format
<user Id>:<user Name>:<group Id>
This script queries the /etc/passwd and /etc/group files
and fetches the lines matching the VOs listed in the VO file taken
by the script as input
#
#
#
#
# Syntax::
           ./CE_createUGLists.sh <VO file>
±
# Launch Example:
           ./CE_createUGLists.sh VO_config
# program information
PROGRAM="CE createUGLists.sh"
VERSION="1.2"
SYNTAX="./${PROGRAM} <VO file>"
LAUNCH="./${PROGRAM} VO_config"
if [ $# == 0 ]; then
          echo "Sorry, missing parameters"
          echo "Please make sure to run the script feeding in the VO file"
         echo "Syntax: ${SYNTAX}"
echo "Launch Example: ${LAUNCH}"
          echo
          exit
fi
PASSWD_FILE="/etc/passwd"
GROUP_FILE= "/etc/group"
USER_LIST_FILE="CE_LCG_users.lst"
GROUP_LIST_FILE="CE_LCG_groups.lst"
cat /dev/null > $USER_LIST_FILE
cat /dev/null > $GROUP_LIST_FILE
count=0
while read line; do
    arrayV0[$count]=$line
    (( count++ ))
done < $1
for i in 0 1 2 3 4 ;do
    grep "${arrayVO[$i]}" ${PASSWD_FILE} | awk -F":" '
{print $3 ":" $1 ":" $4}' >> ${USER_LIST_FILE}
    grep "${arrayVO[$i]}" ${GROUP_FILE}| awk -F":" '
    {print $3 ":" $1 }' >> ${GROUP_LIST_FILE}
done
cat <<EOF
DONE
Please find the ouput lists in:
./${GROUP_LIST_FILE} #: record of groups to be created
./${USER_LIST_FILE} #: record of users to be created
EOF
#EOF
```

createPoolAccounts.sh



```
#!/bin/sh
*********************
# File: createPoolAccounts.sh
# Author: LCG Deployment Team
# Version: 1.2
# Date: 2004/03/02
# Description:
         This script is feeded by two files generated by the script
        CE_createUGlists and output two shell scripts to be manually launched in order to
#
        create the desired users and groups
#
        the specification for input files follows:
#
        1) <CE_GroupFile> lists the Unix groups to be created.
            Its records must be in the format
           <group Id>:<group name>
        2) <CE UserFile> lists the Unix users to be created.
#
            Its records nust be in the format
#
           <user Id>:<user Name>:<group Id>
        3) <share_flag>:
            SHARED: home directories have to be shared with CE
            NOT_SHARED; home directorier are not shared with CE
        The output files are:
         createGroups: command lines to create groups
         createUsers: command lines to create users
# Syntax:
        ./createPoolAccounts.sh <CE GroupFile> <CE UserFile> <SHARED NOT SHARED>
#
# Launch Command:
         ./createPoolAccounts.sh CE_LCG_groups.lst CE_LCG_users.lst NOT_SHARED
********************
# program information
PROGRAM="createPoolAccounts.sh"
VERSION="1.2"
VERSION= 1.2
SYNTAX=:\${PROGRAM} <CE_GroupFile> <CE_UserFile> <SHARED|NOT_SHARED>"
LAUNCH="./${PROGRAM} CE_LCG_groups.lst CE_LCG_users.lst NOT_SHARED"
CREATE_GROUPS_FILE=createGroups
CREATE_USERS_FILE=createUsers
echo "${PROGRAM} v${VERSION}"
if test $# -eq 3; then
if [ ! -f ${1} ]; then
        echo "ERROR: file ${1} does not exist"
        exit
    else
        RET_CODE='awk -F":" '{ if (NF != 2) {print "-1"; exit} } ' ${1}'
        if [ ! ${RET_CODE} == '' ]; then
            echo "ERROR: file ${1} is not correctly formatted"
            exit
              fi
    fi
    if [ ! -f ${2} ]; then
        echo "ERROR: file ${2} does not exist"
        exit
    else
        \label{eq:RET_CODE=`awk -F":" '{ if (NF != 3) {print "-1"; exit} } ' ${2}`
        if [ ! ${RET_CODE} == '' ]; then
    echo "ERROR: file ${2} is not correctly formatted"
            exit
              fi
    fi
    if [ ${3} != "SHARED" ] && [ ${3} != "NOT_SHARED" ] ; then
echo "ERROR: unknown value ${3} for share_flag <SHARED|NOT_SHARED>"
        exit
    else
```

if [\${3} = "SHARED"]; then



```
HUMEPLAG="-M"
else
HUMEPLAG="-M"
else
fi
fi

else
echo "Sorry, Missing parameters"
echo "Syntax: ${(SUNTAX)*
echo "Launch Example: ${LAUNCH}*
exit
fi
awk -F*:: '{print "groupadd -g "$1* "$2}', ${1} > ${(CREATE_GROUPS_FILE}
exk -F*: * vhome${HOMEPLAG}' [print "useradd -c \"mapped user for group ID *$3*\* -u *$1* *home* -g *$3* *$2}, ${2} > ${CREATE_USERS_FILE}
chmod u+x ${CREATE_USERS_FILE}
chad u+x ${CREATE_USERS_FILE
```



6. STORAGE DIRECTORIES CREATION

• Create the storage resource directory

The parent storage directory to which all the configuration steps refer is */storage*. If it has not been already created as a separate partition (see 1.), create it

> mkdir /storage

• Create a storage sub-directory for each VO

```
> mkdir /storage/alice
> chown :alice /storage/alice
> chmod g+rwx /storage/alice
> mkdir /storage/atlas
> chown :atlas /storage/atlas
> chmod g+rwx /storage/atlas
> mkdir /storage/cms
> chown :cms /storage/cms
> chown :cms /storage/cms
> chmod g+rwx /storage/cms
> mkdir /storage/lhcb
> chown :lhcb /storage/lhcb
> chmod g+rwx /storage/lhcb
> mkdir /storage/dteam
> chown :dteam /storage/dteam
> chmod g+rwx /storage/dteam
```



7. GRIS CONFIGURATION

7.1. CREATE GROUP AND USER edginfo

Create both the user and group *edginfo* on the CE. The user home directory should be */opt/edg/var*

```
> groupadd -g 999 edginfo
> useradd -c "EDG Info user" -u 999 -g 999 -d /opt/edg/var edginfo
```

(the proposed choice of group ID and user ID is not mandatory)

7.2. CREATE GLOBUS CONFIGURATION FILE

Create and edit the file /etc/globus.conf as follows:

```
[common]
GLOBUS_LOCATION=/opt/globus
globus_flavor_name=gcc32dbg
x509_user_cert=/etc/grid-security/hostcert.pem
x509_user_key=/etc/grid-security/hostkey.pem
gridmap=/etc/grid-security/grid-mapfile
gridmapdir=/etc/grid-security/gridmapdir/
[mds]
globus_flavor_name=gcc32dbgpthr
user=edginfo
[mds/gris/provider/edg]
[mds/gris/registration/site]
regname=<vour-site-name>
reghn=<CE-hostname>
[gridftp]
log=/var/log/globus-gridftp.log
[gatekeeper]
default_jobmanager=fork
job_manager_path=$GLOBUS_LOCATION/libexec
jobmanagers="fork "
[gatekeeper/fork]
type=fork
job_manager=globus-job-manager
```

The meaning of the configurable parameters, reported in the template among angle brakets "<...>", is:

your-site-name: Name of your site within the Information System (as it is defined in */etc.globus.conf* on the CE Installation Guide [1])

If you have doubts on how to configure the file above and you have a reference site, please ask them for indications. Otherwise, send a message to the "LCG-ROLLOUT@cclrclsv.RL.AC.UK" mailing list.

A production example of configuration for */etc/globus.conf* file follows:



[mds/gris/provider/edg]

[mds/gris/registration/site]
regname=cerntestlcg2
reghn=adc0029.cern.ch

[gridftp] log=/var/log/globus-gridftp.log

[gatekeeper] default_jobmanager=fork job_manager_path=\$GLOBUS_LOCATION/libexec

jobmanagers="fork "

[gatekeeper/fork] type=fork job_manager=globus-job-manager

7.3. CREATE DIRECTORIES

create the directories:

/opt/edg/var/info/

> mkdir /opt/edg/var/info

7.4. LCG INFO PROVIDER STATIC CONFIGURATION

• Create the file

/opt/lcg/var/lcg-info-generic.conf

WARNING: be careful not to use blank spaces at the end of each line. The layout is:

```
ldif_file=/opt/lcg/var/lcg-info-static.ldif
generic_script=/opt/lcg/libexec/lcg-info-generic
wrapper_script=/opt/lcg/libexec/lcg-info-wrapper
template=/opt/lcg/etc/GlueSE.template
template=/opt/lcg/etc/GlueService.template
```



dynamic_script=/opt/lcg/libexec/lcg-info-dynamic-classic <SE-hostname> <V01-name>:<V01-storage-area> <V02-name>:<V02-storage-area> ...

GlueSEUniqueID: <SE-hostname> GlueSEName: <your-site-name>:disk GlueSEPort: 2811 GlueInformationServiceURL: ldap://<SE-hostname>:2135/Mds-Vo-name=local,o=grid GlueSLUniqueID: <SE-hostname> GlueSLName: <your-site-name> GlueSLArchitectureType: disk GlueSAPolicyFileLifeTime: permanent GlueSAPolicyMaxFileSize: 2000000 GlueSAPolicyMinFileSize: 00 GlueSAPolicyMaxData: 00 GlueSAPolicyMaxNumFiles: 00 GlueSAPolicyMaxPinDuration: 10 dn: GlueSEUniqueID=<SE-hostname>,Mds-vo-name=local,o=grid GlueForeignKey: GlueSLUniqueID=<SE-hostname> dn: GlueSLUniqueID=<SE-hostname>,Mds-vo-name=local.o=grid GlueForeignKey: GlueSEUniqueID=<SE-hostname dn: GlueSEAccessProtocolType=rfio,GlueSEUniqueID=<SE-hostname>,Mds-Vo-name=local,o=grid GlueChunkKey: GlueSEUniqueID=<SE-hostname> GlueSEAccessProtocolPort: 5001 dn: GlueSEAccessProtocolType=gsiftp,GlueSEUniqueID=<SE-hostname>,Mds-Vo-name=local,o=grid GlueChunkKey: GlueSEUniqueID=<SE-hostname> GlueSEAccessProtocolPort: 2811 dn: GlueSARoot=alice:alice,GlueSEUniqueID=<SE-hostname>,Mds-Vo-name=local,o=grid GlueChunkKey: GlueSEUniqueID=<SE-hostname> GlueSAAccessControlBaseRule: alice dn: GlueSARoot=<VO1-name>:<VO1-group-name>,GlueSEUniqueID=<SE-hostname>,Mds-Vo-name=local,o=grid GlueChunkKey: GlueSEUniqueID=<SE-hostname> GlueSAAccessControlBaseRule: <VO1-group-name> dn: GlueSARoot=<VO2-name>:<VO2-group-name>,GlueSEUniqueID=<SE-hostname>,Mds-Vo-name=local,o=grid
GlueChunkKey: GlueSEUniqueID=<SE-hostname> GlueSAAccessControlBaseRule: <VO2-groupname>

• Configure appropriately the variables:

<SE-hostname> : hostname of the Storage Element

<your-site-name> : Name of your site within the Information System (as it is defined in */etc.globus.conf* on the CE Installation Guide [1])

<VOn-name> : Name of the n-th supported VOs

<VOn-group-name> : Group name Name of the n-th supported VOs as it is defined in 5.1.1.

<VOn-storage-area> : VO Private storage area as defined in 6.

A production example of the file */opt/lcg/var/lcg-info-generic.conf* follows:

ldif_file=/opt/lcg/var/lcg-info-static.ldif generic_script=/opt/lcg/libexec/lcg-info-generic wrapper_script=/opt/lcg/libexec/lcg-info-wrapper template=/opt/lcg/etc/GlueSE.template



template=/opt/lcg/etc/GlueService.template

dynamic_script=/opt/lcg/libexec/lcg-info-dynamic-classic adc0033.cern.ch alice:/storage/alice atlas:/storage/atlas dteam:/storage/dteam

GlueSEUniqueID: adc0033.cern.ch GlueSEName: CERN-TEST-LCG2:disk GlueSEPort: 2811 GlueInformationServiceURL: ldap://adc0033.cern.ch:2135/Mds-Vo-name=local,o=grid GlueSLName: CERN-TEST-LCG2 GlueSLArchitectureType: disk GlueSAPolicyFileLifeTime: permanent GlueSAPolicyMaxFileSize: 2000000 GlueSAPolicyMaxFileSize: 00 GlueSAPolicyMaxData: 00 GlueSAPolicyMaxPinBuration: 10

dn: GlueSEUniqueID=adc0033.cern.ch,Mds-vo-name=local,o=grid GlueForeignKey: GlueSLUniqueID=adc0033.cern.ch

dn: GlueSLUniqueID=adc0033.cern.ch,Mds-vo-name=local,o=grid GlueForeignKey: GlueSEUniqueID=adc0033.cern.ch

dn: GlueSEAccessProtocolType=rfio,GlueSEUniqueID=adc0033.cern.ch,Mds-Vo-name=local,o=grid GlueChunkKey: GlueSEUniqueID=adc0033.cern.ch GlueSEAccessProtocolPort: 5001

dn: GlueSEAccessProtocolType=gsiftp,GlueSEUniqueID=adc0033.cern.ch,Mds-Vo-name=local,o=grid GlueChunkKey: GlueSEUniqueID=adc0033.cern.ch GlueSEAccessProtocolPort: 2811

dn: GlueSARoot=alice:alice,GlueSEUniqueID=adc0033.cern.ch,Mds-Vo-name=local,o=grid GlueChunkKey: GlueSEUniqueID=adc0033.cern.ch GlueSARccessControlBaseRule: alice

dn: GlueSARoot=atlas:atlas,GlueSEUniqueID=adc0033.cern.ch,Mds-Vo-name=local,o=grid GlueChunkKey: GlueSEUniqueID=adc0033.cern.ch GlueSAAccessControlBaseRule: atlas

dn: GlueSARoot=cms:cms,GlueSEUniqueID=adc0033.cern.ch,Mds-Vo-name=local,o=grid GlueChunkKey: GlueSEUniqueID=adc0033.cern.ch GlueSAAccessControlBaseRule: cms

dn: GlueSARoot=dteam:dteam,GlueSEUniqueID=adc0033.cern.ch,Mds-Vo-name=local,o=grid GlueChunkKey: GlueSEUniqueID=adc0033.cern.ch GlueSAAccessControlBaseRule: dteam

• Run the script

> /opt/lcg/sbin/lcg-info-generic-config /opt/lcg/var/lcg-info-generic.conf /opt/lcg/etc/GlueSE.template

7.5. EDG INFO PROVIDER CONFIGURATION

Create the file

/opt/edg/var/info/info-provider.conf

with the following content:

```
EDG_LOCATION=/opt/edg
GRID_INFO_USER=
REP_MET_PRESENT=no
REP_LOC_PRESENT=no
REP_OPT_PRESENT=no
SE_PRESENT=yes
```



7.6. LAUNCH INFO PROVIDER INITIALIZATION SCRIPT

- Define GLOBUS_LOCATION environment variable (if needed)
 - > export GLOBUS_LOCATION=/opt/globus
- Launch the setup script
 - > /opt/edg/sbin/edg-info-provider-setup

7.7. LAUNCH GLOBUS INIZIALIZATION SCRIPT

> /opt/globus/sbin/globus-initialization.sh

This Globus script is meant to be launched on the whole series of LCG1 nodes, as a general configuration step. So that it may perform some configuration actions which are not specifically related to a CE. Because of this it can yield warning messages as well as some error ones. Other typical error messages you can get on a CE are due to the fact that the configuration script will try and perform configuration steps for every kind of GRAM reporter, and of course it will cause errors since it may look up for a GRAM reporter that you are currently not using. An example of warning messages to be considered "normal" in a CE configuration using PBS has been produced in Appendix 1.

Since the script produces a huge output, in order to check it, it is recommended to re-direct the standard output in a log file, using, for instance, the command

> /opt/globus/sbin/globus-initialization.sh > globus-init.log 2>&1

7.8. START THE INFORMATION SERVICE

- > /sbin/chkconfig globus-mds on
- > service globus-mds start

7.9. TEST THE GRIS AND GIIS

Run the following *ldap* queries:

> ldapsearch -h <SE-Hostname> -p 2135 -b "mds-vo-name=local,o=grid" -x

The output should show both the static values you configured in 7.4. (e.g *GlueSAPolicyMaxFileSize*) and dynamic values (e.g. *GlueSAStateUsedSpace*)



8. "RFIO" AND "GLOBUS GRIDFTP" SERVICES

8.1. CONFIGURE PORTS FOR RFIO DAEMON

Append to the file /etc/services the following lines

rfio 5001/tcp rfio 5001/udp

8.2. START THE GLOBUS GRIDFTP SERVER

Run the following commands

```
> /sbin/chkconfig globus-gridftp on
> service globus-gridftp start
```

8.3. FIREWALL CONFIGURATION

If you are using a firewall consider that the following tcp/udp ports need to be opened:

• rfio

udp 5001 tcp 5001

• globus-gridftp

tcp 2811

For example, if you are using ipchains for firewall configuration, you could open the listed ports to your subnet.

To do so, add, before the first REJECT line, the lines

```
-A input -p udp -s <your-subnet>/<type> -d 0/0 5001 -j ACCEPT
-A input -p tcp -s <your-subnet>/<type> -d 0/0 5001 -j ACCEPT
-A input -p tcp -s <your-subnet>/<type> -d 0/0 2811 -j ACCEPT
```



into the file

/etc/sysconfig/ipchains

where <your-subnet> is your subnet address, as configured in the parameter *NETWORK* in the script

/etc/sysconfig/network-scripts/ifcfg-eth0

and<type> is a value which depends on the class of your network, with the following correspondence table.

netmask	type	Subnet
255.0.0.0	8	Class A
255.255.0.0	16	Class B
255.255.255.0	24	Class C
255.255.255.255	32	Point-to-point

After this, the ipchains service has to be restarted:

> service ipchains restart



9. FABRIC MONITORING BY GRIDICE

The CE, SE, and RB LCG nodes produce data for the GridICE monitoring system. The data are then sent to a collector server node which will then be queried by the LCG central GridICE monitoring service. If you are running agents you should also run a GridICE collector server to collect information from your agents.

In the default LCG-2 configuration the SE node runs the GridICE collector node. In Section 9.1. you can find the configuration of agents while section 9.2. deals with the configuration details for the GridICE collector server.

If you are doing a defaul LCG-2 configuration you should apply section 9.2. just to the SE.

Before going forward with configuration, please assure the following RPMs to be installed (they should have been distributed with the node RPMs).

edg-fabricMonitoring edt_sensor

9.1. SET-UP OF GRIDICE AGENTS

In order to enable GridICE agent on a LCG node:

- Create and configure the file /opt/edg/var/etc/edg-fmon-agent.conf as follows:

```
# Sensor file for edg-fmonagent
MSA
       Transport
              TIDP
                     Server <GridICE-collector-hostname>
                     Port 12409
                     FilterMetrics KeepOnly
                           11001
                            11011
                            11021
                            11101
                            11202
                            11013
                            11022
                            11031
                            11201
                            10100
                            10101
                            10102
                            10103
                            10104
                            10105
       Sensors
              edtproc
                     CommandLine /opt/edt/monitoring/bin/GLUEsensorLinuxProc
                     MetricClasses
edt.uptime
                            edt.cpu
                            edt.memory
                            edt disk
                            edt.network
LCG-GIS-MI-SE
                           LCG - Storage Element Manual Installation and Configuration
```



	edt.ctxint edt.swap edt.processes edt.sockets edt.cpuinfo edt.os edt.alive edt.regfiles
sen	sorl CommandLine \$(EDG_LOCATION)/libexec/edg-fmon-sensor-systemCheck MetricClasses executeScript
Metrics	
110	MetricClass edt.uptime
110	MetricClass edt cou
110	
111	MetricClass edt.memory)1
11.2	MetricClass edt.disk
112	MetricClass edt.network
	Parameters interface eth0
110	13 MetricClass edt stvint
110	22
110	MetricClass edt.swap 31
110	MetricClass edt.processes
112	MetricClass edt.sockets
101)0 MetricClass edt couinfo
101)1
101	MetricClass edt.os)2
101	MetricClass edt.alive
101	MetricClass edt.regfiles
101)4 MetricClass executeScript
	Parameters
101	command /opt/edt/monitoring/bin/CheckDaemon.plcig /opt/edt/monitoring/etc/gridice-role.cig
	MetricClass executeScript Parameters
	command /opt/edt/monitoring/bin/PoolDir.pl
Samples	

Sa

s verylowfreg Timing 3600 0 Metrics 10100 lowfreq Timing 1800 0 Metrics proc0 Timing 30 0 Metrics procl Timing 60 0 Metrics 11011 11021 11101 11202 11013 11022 11031 proc2 Timing 300 0 Metrics



10105 proc3 Timing 120 0 Metrics 10104

WARNING: be very careful not to use \langle SPACE \rangle characters to indent lines in this configuration file. Use \langle TAB \rangle (or nothing) instead. The edg-fmon-agent does not allow spaces at the beginning of a row in the configuration file.

The parameter <GridICE-collector-hostname> is the complete hostname of the node that runs the GridICE collector server and publishes the data on the information system. The collector node will have to run a plain GRIS for this.

The information is sent to the collector node via UDP (port 12409)

If you already have a GridICE collector node at your site use that, else set up one as described in section 9.1..

- start the GridICE agent

> chkconfig edg-fmon-agent on

> service edg-fmon-agent start

9.2. SET-UP OF A GRIDICE COLLECTOR SERVER

The Fabric Monitoring server can be installed on every node running a plain GRIS (e.g. Computing Element, Storage Element)

Fabric Monitoring server configuration

- Create (if needed) the directory

/opt/edg/var/etc

> mkdir /opt/edg/var/etc

- Create and edit as follows the file

/opt/edg/var/etc/edg-fmon-server.conf

```
SERVER_SPOOLDIR=/var/fmonServer
SERVER_PORT=12409
MR_SOAP_PORT=12411
```

- Start the Fabric Monitoring server

```
> chkconfig edg-fmon-server on
```

```
> service edg-fmon-server start
```



Start the GridICE Information service

- > chkconfig gridice-mds on
- > service gridice-mds start

Configure extra info in the standard GRIS

- Edit the file /etc/globus.conf and insert the line

[mds/gris/provider/gridice]

between the line

[mds/gris/provider/edg]

and the line

[mds/gris/registration/site]

- Re-start the standard MDS
- > service globus-mds restart

Set up Cron Table

The repository is cleaned daily : data is kept for last 5 days only

- Add the service to the crontab

```
> crontab -e
```

This will allow the editing of the crontable with the default editor, after which the following line has to be added:

43 1 * * * /opt/edg/sbin/edg-fmon-cleanspool &> /dev/null



10. EXPERIMENT SOFTWARE MANAGER CONFIGURATION

There is no real need to have Experiment Software Manager accounts on the SE. The only problem is the way the grid-mapfile is automatically generated. The ESM could be mapped to any account belonging to the VO group. However, if such account does not exist, than the ESM cannot perform any operation on the SE.

So, eventhough the only real requirement is to have the ESM certificate subject mapped to any account belonging to that VO, because of the way the *grid-mapfile* is generated, for each Virtual Organization supported by the site, a special account to handle the VO software has to be created.

The mapping of SGM users to the LCG VOs follows:

VO name	SGM user
alice	alicesgm
atlas	atlassgm
cms	cmssgm
lhcb	lhcbsgm
dteam	dteamsgm

The following lines are an example for user creation

```
> useradd -c "SGM user for dteam" -u 18946 -g 2688 dteamsgm
> useradd -c "SGM user for atlas" -u 18943 -g 1307 atlassgm
> useradd -c "SGM user for lhcb" -u 18945 -g 1470 lhcbsgm
> useradd -c "SGM user for cms" -u 18944 -g 1399 cmssgm
> useradd -c "SGM user for alice" -u 18941 -g 1395 alicesgm
```

WARNING: If you have used the example scripts produced in 5.4. in order to create Pool Accounts using a CE as reference machine, the "sgm" users might have already been created on your node. In addition the following sub-directories have to be created:

/opt/edg/var/info/alice

/opt/edg/var/info/atlas

/opt/edg/var/info/cms

/opt/edg/var/info/lhcb

/opt/edg/var/info/dteam

```
> mkdir /opt/edg/var/info/alice
> mkdir /opt/edg/var/info/atlas
```



- > mkdir /opt/edg/var/info/cms
- > mkdir /opt/edg/var/info/lhcb
- > mkdir /opt/edg/var/info/dteam



11. CRON TABLE CONFIGURATION

Edit the crontab to add scheduled services

```
> crontab -e
```

This will allow the editing of the crontable with the default editor, after which the following lines have to be added:

```
PATH=/sbin:/bin:/usr/sbin:/usr/bin
32 1,7,13,19 * * * /opt/edg/sbin/edg-mkgridmap --output=/etc/grid-security/grid-mapfile --safe
56 3,9,15,21 * * * /opt/edg/etc/cron/edg-fetch-crl-cron >> /var/log/edg-fetch-crl-cron.log 2>&1
```

If needed, an automatic rotation of the log file can be obtained editing the file */etc/logrotate.d/edg-fetch* (create it if it is needed)

An example of configuration of the file /*etc/logrotate.d/edg-fetch* for a monthly log rotation follows:

```
/var/log/edg-fetch-crl-cron.log {
    compress
    monthly
    rotate 12
    missingok
    ifempty
    create
}
```



12. UPGRADE FROM THE PREVIOUS VERSION

This procedure is meant to help site administrators upgrade the node without starting an installation "from scratch", whenever possible.

The aim is to define those "delta" steps dealing both with installation and configuration phases. It is worthy of reminding that here "delta" refers to two contiguous software tags, the latter of which is the current one. Therefore, the procedure is not applicable to software versions more than two tags old.

WARNING: As a requirement for a successful upgrade, all the active servers which might be affected by the upgrade should be stopped.

The servers should be restarted once the installation and configuration described in the following sub paragraphs have been successfully done.

12.1. SOFTWARE INSTALLATION

The list "SE_manual_install_rpm", which has been described in 2., contains the latest version of the SE-related rpms to be installed. If the *rpm -i* command were launched as described in that section, a large number of conflicts would be issued because most of the packages would be reported to be already installed, some of which with the same version number, some others with an older one.

The easiest way to handle this situation is to download those rpms which should update the ones already installed on the node as well as any new ones.

The list of these rpms is contained in the file

SE_upgrade_rpm

whereas the list with the complete command lines for the download is contained in the file

SE_upgrade_wget

WARNING: This script will create a directory tree where the rpms are downloaded and needs to be launched once only.

After downloading the rpms, the first thing to do is uninstall any obsolete packages; this is particularly likely to be necessary with CA-related rpms. For coherence and security reasons, therefore, you should download from CVS the list of obsoleted rpms provided with the current release, in the file

SE_remove_rpm

The rpm command to remove the listed rpms is

```
> rpm -e 'cat SE_remove_rpm'
```

Next, within the directory SE_UPGRADE, the command

```
> rpm -U --oldpackage "*.rpm"
```



should be launched.

Finally a further list of rpms is provided, namely

SE_upgrade_forced_rpm

containing those new rpms whose dependecies are not dealt with, therefore requiring the installation to be "forced". The same "wget" file

SE_upgrade_wget

takes also care to download the rpms of this final list in the directory

SE_UPGRADE_FORCED

The rpms listed in this directory should be installed with the command

> rpm -Uvh --force --nodeps "*.rpm"

12.2. UPGRADE CONFIGURATION

- If you have the "edguser" user and group defined you can remove it.
- Edit the file */opt/lcg/var/lcg-info-generic.conf* to reflect the changes described in 7.4.. WARNING: in more than a row of the mentioned file, the symbol "=" has been replaced by the simbol ":".

Please check the document change history in order to apply configuration fixes possibly occurring between the document version released with the latest tag and the current one.

WARNING: Due to a known bug the script /opt/globus/sbin/globus-initialization.sh might issue the following output:

```
ERROR: Setup package not found. Looking for:
      name=globus_common_setup,setup_name=, and
setup version=
ERROR: Setup package not found. Looking for:
name=globus_mds_common_setup,setup_name=, and
setup version=
ERROR: Setup package not found. Looking for:
      name=globus_mds_gris_setup,setup_name=, and
setup version=
ERROR: Setup package not found. Looking for:
      name=globus_gatekeeper_setup,setup_name=, and
setup version=
ERROR: Setup package not found. Looking for:
      name=globus_gram_job_manager_setup,setup_name=, and
setup version=
ERROR: Setup package not found. Looking for:
      name=globus_gram_reporter_setup_fork,setup_name=, and
setup version=
ERROR: Setup package not found. Looking for:
      name=globus_gram_reporter_setup_pbs,setup_name=, and
setup version=
```



ERROR: Setup package not found. Looking for: name=globus_gram_reporter_setup_condor,setup_name=, and setup version= ERROR: Setup package not found. Looking for: name=globus_gram_reporter_setup_lsf,setup_name=, and setup version= ERROR: Setup package not found. Looking for: name=globus_gram_job_manager_setup_fork,setup_name=, and setup version= ERROR: Setup package not found. Looking for: name=globus_gram_job_manager_setup_pbs,setup_name=, and setup version= ERROR: Setup package not found. Looking for: name=globus_gram_job_manager_setup_condor,setup_name=, and setup version= ERROR: Setup package not found. Looking for: name=globus_gram_job_manager_setup_condor,setup_name=, and setup version= ERROR: Setup package not found. Looking for: name=globus_gram_job_manager_setup_lsf,setup_name=, and setup version= loading cache ./config.cache creating grid-cert-request-config creating grid-security-config

this behaviour is not known to be fatal for the application.



APPENDIX 1: EXAMPLE OF GLOBUS INITIALIZATION OUTPUT

The following output produced by the script *globus-initialization.sh* can be considered *normal* on a Computing Element and it does not indicate any harmful issue:

creating globus-sh-tools-vars.sh creating globus-script-initializer creating Globus::Core::Paths checking globus-hostname Done Creating... /opt/globus/etc/grid-info.conf Done Creating.. /opt/globus/sbin/SXXgris /opt/globus/libexec/grid-info-script-initializer /opt/globus/libexec/grid-info-mds-core /opt/globus/libexec/grid-info-common /opt/globus/libexec/grid-info-cpu* /opt/globus/libexec/grid-info-fs* /opt/globus/libexec/grid-info-mem /opt/globus/libexec/grid-info-net* /opt/globus/libexec/grid-info-platform* /opt/globus/libexe/grid-info-os* /opt/globus/etc/grid-info-resource-ldif.conf /opt/globus/etc/grid-info-resource-register.conf /opt/globus/etc/grid-info-resource.schema /opt/globus/etc/grid.gridftpperf.schema /opt/globus/etc/gridftp-resource.conf /opt/globus/etc/gridftp-perf-info /opt/globus/etc/grid-info-slapd.conf /opt/globus/etc/grid-info-site-giis.conf /opt/globus/etc/grid-info-site-policy.conf /opt/globus/etc/grid-info-server-env.conf /opt/globus/etc/grid-info-deployment-comments.conf Done Creating gatekeeper configuration file ... Done Creating grid services directory... Done Creating state file directory. Done Reading gatekeeper configuration file... Determining system information... Creating job manager configuration file... Done Setting up fork gram reporter in MDS Done Setting up pbs gram reporter in MDS configure: error: Cannot locate qstat Error locating pbs commands, aborting! loading cache /dev/null checking for gstat... no Setting up condor gram reporter in MDS _ _ _ _ _ configure: error: Cannot locate condor_q Error locating condor commands, aborting! loading cache /dev/null checking for condor_q... no Setting up lsf gram reporter in MDS configure: error: Cannot locate lsload Error locating LSF commands, aborting! loading cache /dev/null checking for lsload... no configure: warning: Cannot locate mpirun loading cache ./config.cache loading cache ./config.cache checking for mpirun... no updating cache ./config.cache creating ./config.status creating fork.pm configure: warning: Cannot locate mpirun configure: error: Cannot locate qdel Error locating PBS commands, aborting! loading cache /dev/null checking for mpirun... no



checking for qdel... no configure: error: Cannot locate condor_submit Error locating condor commands, aborting! loading cache /dev/null checking for condor_submit... no configure: warning: Cannot locate mpirun configure: error: Cannot locate bsub Error locating LSF commands, aborting! loading cache /dev/null checking for mpirun... no checking for mpirun... no loading cache ./config.cache creating ./config.status creating grid-cert-request-config creating grid-security-config



CHANGE HISTORY

version	date	description
v1.0.0	06/Apr/04	First Release
v1.1.0	27/Apr/04	 9: section inserted dealing with GridICE agent configuration.Upgrade section changed accordingly. Numbering changed consequently. 10: Section inserted dealing with Experiment Software Mangement tool (SGM) configuration. Upgrade section changed accordingly. Numbering shifted up consequently.
v2.0.0	24/Jun/04	Document re-styling Section "Edg User creation" removed (not needed on SE) Section "Experiment Software Manager Configuration" removed (not needed on SE)
v2.1.0	12/Jul/04	10.: Section "Experiment Software Manager Configuration" re- inserted. Numbering shifted up consequently.
v2.2.0	12/Jul/04	12.2.: changes to be don in file <i>/opt/lcg/var/lcg-info-generic.conf</i> added to the list of instructions for node upgrade .

Table 1: Change History