LHC COMPUTING GRID

LCG BDII MANUAL INSTALLATION AND CONFIGURATION

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Abstract: *LCG BDII Manual Installation Guide*

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ABSTRACT

Manual steps for the installation and configuration of a LCG BDII Node based on a standard (non CERN-like) 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/BDII-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 BDII software you need:

- a working Linux Redhat7.3 on the BDII (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 BDII machine

- references to software packages to be installed (see below)

2. BDII SOFTWARE INSTALLATION

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

- BDII package

- Other software which a group may rely on

Two different methods are supported for BDII software installation

- Centrally managed BDII installation using the Debian *apt-get* tool

- Manual BDII 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. BDII INSTALLATION USING *apt-get*

in order to install your BDII using *apt-get* please refer to the following document:

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

2.2. BDII 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/BDII-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:

BDII.pdf: this guide

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

BDII_manual_install_forced_rpm: plain full list of those rpms needed to install the BDII 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

BDII_manual_install_wget: a shell script which downloads, from the LCG mirror site at CERN, the rpms included into the list *BDII_manual_install_rpm*

BDII_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 *BDII_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 **BDII_tools.tar.gz**. So they can be easily downloaded and used on target machines.

The provided *BDII_manual_install_rpm* includes:

- all the packages which are needed in order to have a production BDII.

- all the general purpose objects (i.e. shared libraries or common applications) which the BDII 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 **BDII_tools.tar.gz**.

- extract the archived files.

  > gunzip BDII_tools.tar.gz
  > tar xvf BDII_tools.tar

- give execution permissions and run the script *BDII_manual_install_wget*, which will then fetch all the rpms required into the subdirectories *BDII_INSTALL* and *BDII_INSTALL_FORCED*

  > cd BDII_tools
  > chmod u+x BDII_manual_install_wget
  > ./BDII_manual_install_wget

Install the downloaded rpms

- In the directory **BDII_INSTALL**, where the rpms listed in *BDII_manual_install_rpm* have been downloaded, run the command

  ```
  > rpm -Uvh "*.rpm"
  ```

- In the directory **BDII_INSTALL_FORCED** where the rpms listed in *BDII_manual_install_forced_rpm* have been downloaded, run the command

  ```
  > rpm -Uvh --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 *BDII_manual_install_rpm* list.

Should you prefer to do an upgrade of the BDII 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 BDII 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.

2.3. INSTALLING THE CERTIFICATION AUTHORITY RPMS

As the list and structure of Certification Authorities (CA) accepted by the LCG project can change independently of the middleware releases, the rpm list related to the CAs certificates and URLs has been decoupled from the standard LCG release procedure. You should consult the page

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

in order to ascertain what the version number of the latest set of CA rpms is. At time of writing it is 1.6, so the full set of rpms can be downloaded with the following command;

```
> wget -l1 -nd -r http://grid-deployment.web.cern.ch/grid-deployment/download/RpmDir/security/index_r1.6.html
```

These rpms should then be installed in the usual way;

```
> rpm -Uvh *.rpm
```

Changes and updates to these settings will be announced on the LCG-Rollout mailing list.

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. POOL ACCOUNTS

The group "edginfo" and the user "edginfo" should be created as shown

```
> groupadd -g 999 edginfo
> useradd  -M -u 999 -g 999 -d /opt/edg/var edginfo
```

5. BDII SPECIFIC CONFIGURATION

5.1. GENERAL

Procede through the following steps as shown, to insure the correct ownership/permissions are set.

WARNING: Should any of the following steps be overlooked, the corresponding servers might not run properly!!!

```
> mkdir -p /opt/lcg/var/bdii/

> mkdir -p /opt/lcg/var/bdii/LDAP-read

> mkdir -p /opt/lcg/var/bdii/LDAP-write
```

In */opt/lcg/var/bdii/*

```
> chown -R edginfo:edginfo LDAP-read

> chown -R edginfo:edginfo LDAP-write
```

5.2. LCG-BDII.CONF

In the directory

/opt/lcg/var/bdii/

create and edit accordingly the file

lcg-bdii.conf

In particular the url of lcg2-bdii-update.conf (e.g. *http://grid-deployment.web.cern.ch/grid-deployment/gis/lcg2-bdii-update.conf*) should be entered. The template of the file is reported below:

```
BDII_PORT_READ=2170
BDII_PORT_WRITE=2171
BDII_USER=edginfo
BDII_BIND=mds-vo-name=local,o=grid
```

```
BDII_FILTER='*'
BDII_TIMEOUT=30
BDII_AUTO_UPDATE=yes
BDII_TEMP=/opt/lcg/var/bdii/tmp
BDII_UPDATE_CONFIG_FILE=/opt/lcg/var/bdii/lcg-bdii-update.conf
BDII_HTTP_URL=<URL_OF_BDII-UPDATE.CONF_FILE>

SLAPD=/opt/openldap/libexec/slapd
SLAPADD=/opt/openldap/sbin/slapadd
LDAP_CONF_READ=/opt/lcg/etc/lcg-bdii-read-slapd.conf
LDAP_CONF_WRITE=/opt/lcg/etc/lcg-bdii-write-slapd.conf
LDAP_DB_READ=/opt/lcg/var/bdii/LDAP-read
LDAP_DB_WRITE=/opt/lcg/var/bdii/LDAP-write
PID_FILE_READ=/opt/lcg/var/bdii/slapd-read.pid
PID_FILE_WRITE=/opt/lcg/var/bdii/slapd-write.pid
```

WARNING!!!: NO EMPTY SPACES ARE ALLOWED AT THE END OF THE LINES. SHOULD THERE BE ANY AN ERROR WILL OCCUR WHEN UPDATING THE BDII INFORMATION AND AS A RESULT NO INFORMATION WILL BE PUBLISHED.

6.   SERVERS AND SCRIPTS START UP

6.1.   LCG-BDII-UPDATE

```
> /opt/lcg/libexec/lcg-bdii-update /opt/lcg/var/bdii/lcg-bdii.conf
```

The script generates the file

lcg-bdii-update.conf

in */opt/lcg/var/bdii/*

and will update it regularly once the cronjob in the crontab is specified (see below). The file containes all the relevant information about the LDAP urls.

6.2.   LCG-BDII SYSTEM STARTUP SCRIPT

```
> /etc/init.d/lcg-bdii start
```

7. CRON TABLE CONFIGURATION

The following lines should be added to the crontab:

```
PATH=/sbin:/bin:/usr/sbin:/usr/bin

*/2 * * * * /opt/lcg/libexec/lcg-bdii-update /opt/lcg/var/bdii/lcg-bdii.conf > /dev/null 2>&1
```

8. 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.

8.1. SOFTWARE INSTALLATION

The list "BDII_manual_install_rpm", which has been described in 2., contains the latest version of the BDII-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

BDII_upgrade_rpm

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

BDII_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 to update the rpms within the directory *BDII_UPGRADE*, by issuing the command

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

A further list of rpms is provided, namely

BDII_upgrade_forced_rpm

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

The same "wget" file

BDII_upgrade_wget

---

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

BDII_UPGRADE_FORCED

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

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

Finally the list of rpms *BDII_remove_rpm*

is provided which contains those packages which need to be removed; this is particularly likely to be necessary with CA-related rpms.
The rpm command to remove the listed rpms is

> *rpm -e 'cat BDII_remove_rpm'*

8.2. INSTALLING THE UP-TO-DATE CERTIFICATION AUTHORITY RPMS

As the list and structure of Certification Authorities (CA) accepted by the LCG project can change independently of the middleware releases, the rpm list related to the CAs certificates and URLs has been decoupled from the standard LCG release procedure. You should consult the page

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

in order to ascertain what the version number of the latest set of CA rpms is. At time of writing it is 1.6, so the full set of rpms can be downloaded with the following command;

```
> wget -l1 -nd -r http://grid-deployment.web.cern.ch/grid-deployment/download/RpmDir/security/index_r1.6.html
```

These rpms should then be installed in the usual way;

```
> rpm -Uvh *.rpm
```

Changes and updates to these settings will be announced on the LCG-Rollout mailing list.

8.3. UPGRADE CONFIGURATION

No configuration change is needed to upgrade your BDII from the previous tag to the current one.

CHANGE HISTORY

Table 1: Change History

version	date	description
v1.3.1	16/Mar/2004	2.2 Installation procedure updated
v1.4.0	01/Apr/2004	2: cvs references changed
v1.5.0	3/Aug/04	2.,8.: rpms dealing with CAs no more included in rpm lists.
v1.6.0	20/Aug/04	BDII_FILTER added to lcg-bdii.conf