

Setting up a Grid environment

Aim of this section

This section will present different methods to install and use the User Interface software needed to access the grid infrastructure discussed in this guide. For each method detailed instructions will be presented and software requirements, if any, will be indicated. Please note that User Interface is providing a "command line interface" access to the GRID and requires therefore some familiarities with a Linux/Unix shell. If you prefer to access the GRID through the EGRID portal please refer to the EGRID portal documentation.

In this section we discuss in details the following methods:

- ◆ how to access the preinstalled/preconfigured egrid-4.egrid.it User Interface
- ◆ how to install and configure the Egrid-ready-UI
- ◆ how to install and configure the EGRID-liveCD

Readers can choose the preferred method and skip over the other sections. For both EGRID Live CD and EGRID Ready UI you need to do some initial configurations.

How to reach and configure the User-Interface egrid-4.egrid.it

This is the simplest way to gain access to the GRID infrastructure. The User Interface is already installed and ready to be used on the egrid-4.egrid.it workstation. Any entitled user of either the EGRID project or EUINDIAGRID project can request an account on this workstation just sending an email to staff@egrid.it providing detailed information.

The workstation is reachable through standard ssh connection:

```
ssh egrid-4.egrid.it

localhost$ ssh egrid-4.egrid.it -l cozzini
Scientific Linux CERN Release 3.0.8 (SL)
cozzini@egrid-4.egrid.it's password:
Last login: Tue Dec 12 14:21:12 2006 from 192.248.18.46

Warning this UI is configured for egrid-TESTBED

If you wish use it for GRIDATS please run
the command:

source /usr/local/bin/gridats.env.sh

If you wish use it for EGRID production please run
the command:

source /usr/local/bin/egrid_prod.env.sh

cozzini@egrid-4:~$
```

Once the user is logged in she/he can switch among different grid infrastructures (namely test-bed gridats / egrid production) by means of the source command as clearly stated in the /etc/motd file prompted at the

login.

Please note however that to have full access to any of the grid infrastructure mentioned user should have the appropriate digital certificates (see later)

How to install and configure the EGRID Ready User Interface

The 'egrid-ready-ui_*.tar.gz' archive contains all the required files for installing the UI on a linux client machine as standard user, i.e. no need to know the root password.

This is a very simple and effective tools for any linux users who wants to access the grid from his/her standard workstation without any dramatic change on it.

The latest version of the package can be downloaded from here: <http://www.egrid.it/download/software/ui/>
Updated documentation about the package is here: <http://www.egrid.it/sw/egrid-ready-ui/>

In the following detailed instructions are provided how to install and test it.

Prerequisites

Make sure the following conditions are satisfied:

- ◆ You must have a Linux host.
- ◆ You should have the EGRID Ready UI software downloaded. If not download the latest tar archive file from EGRID web site [2.1]?
- ◆ The host should have a Fully Qualified Domain Name (FQDN). Both forward ("A") and reverse ("PTR") entries should be registered on the Domain Name server.
- ◆ The systems time and Time Zone should be correct.
- ◆ Make sure the firewall is configured to allow necessary incoming and outgoing packets. [2.5]?

You must have the following packages installed on your system (if not see section 2.1.2 on installing required packages):

Python

version 2.2 or later

tkinter

(Python Tk support)

Java Runtime Environment (JRE)

version 1.4.x or later

LDAP client package

Perl based LDAP packages

Perl-documentation

The install script will issue warnings if any of the above software is not installed.

You need the user certificate (`usercert.pem`) and private key (`userkey.pem`) generated by a Certification Authority (CA) to access the Grid system [2.6]?

Installing Required Packages

You can either use the Package Manager (in some systems this is given as Add/Remove Packages) utility or use the command line. If the Package Manager (or Add/Remove Packages) is used search for the following packages and install them:

```
python2.2 or later python2.2-tk j2re1.4 ldaptor-common libnet-ldap-perl perl-doc
```

If you prefer the command-line use the following commands (in order to perform these you must login in as the root):

Debian GNU/Linux and Ubuntu:

```
root@stroligo:~# apt-get install python2.2 python2.2-tk
```

```
root@stroligo:~# apt-get install j2re1.4
```

```
root@stroligo:~# apt-get install ldaptor-common \  
libnet-ldap-perl perl-doc
```

Ubuntu does not host the JRE on its repositories however you can download and install it from Sun web site (see section 2.1.3 on installing Java).

Mandrake 9.2 and 10:

```
root@stroligo:~# urpmi python tkinter
```

```
root@stroligo:~# apt-get install ldaptor-common libnet-ldap-perl perl-doc
```

The Java Runtime Environment (JRE) unfortunately is available only for Mandrake Cooker but you can download and install the Blackdown JVM.

Fedora Core 1 to 5: You will need to configure your software repositories and then issue the commands:

```
root@stroligo:~# yum install tkinter j2re
```

```
root@stroligo:~# yum install install \  
ldaptor-common libnet-ldap-perl perl-doc
```

RedHat? does not host the JRE on its Fedora Core repositories however you can download and install it from Sun web site (see section 2.1.3 on installing Java).

Installing Java

In order to successfully run the EGRID Ready UI the user need to have Java Runtime Environment (JRE) version 1.4.x installed on his/her computer. Note that EGRID Ready UI works only with Java version 1.4.x but not with 1.5.x. Following is a brief introduction on installing and configuring Java on a UNIX/Linux host.

Note

Note:

Following command will install Java to the directory that you have downloaded the .bin file (typical to your home directory). If you wish to allow other users to use JRE it would be better to move the .bin file to a

directory such as /opt.

Installing JRE on RedHat? Linux and Fedora Core

The RedHat? or Fedora users can download the RPM—in self extracting file from Sun Microsystems web site [2.2]? Detailed installation instructions for Linux can be found in Java 2 Runtime Environment 1.4.2 Installation Notes for Linux [2.3]?.

Step 1

After downloading set the executable privileges as follows:

```
# chmod +x j2re-1_4_"sub_version"linux-i586-rpm.bin
```

Step 2

Execute the binary:

```
# ./j2re-1_4_"sub_version"-linux-i586-rpm.bin
```

Then the RPM file will be created.

Step 3

Run the rpm command to install the packages that comprise the Java 2 SDK:

```
# rpm -Uvh j2re-1_4_"sub_version"-linux-i586.rpm
```

If everything is successful a message saying "Done" will appear. Then continue with section [Configuring JRE](#)

Installing JRE on other Linux Variants

Linux users should download the self–extracting installation file (*j2re-1_4_"sub version"-linux-i586.bin*) from Sun Microsystems web site [2.2]? Detailed installation instructions for Linux can be found in *Java 2 Runtime Environment 1.4.2 Installation Notes for Linux* [2.3]?.

Step 1

After downloading set the executable privileges to the JRE package using the following command:

```
# chmod +x j2re-1_4_"sub_version"linux-i586.bin
```

Step 2

Then execute the file and continue with the installation instructions:

```
# ./j2re-1_4_2_12-linux-i586.bin
```

If everything is successful a message saying "Done" will appear. Continue with section [Configuring JRE](#).

Configuring JRE

After installing JRE, you need to register the Java path variables. This can be done in several ways: 1) just for the current session, 2) for all sessions of the current user, 3) and for all sessions of all users.

The following steps explain how to set up the Java environment variables for all sessions of the current user account.

Step 1

Add the following line to the .bashrc file in your home (~) directory. For safety, backup the file before editing.

```
$ cp .bashrc .bashrc_backup
$ vi .bashrc
```

Add the following lines to the end of the file:

```
export PATH="/path to java directory"/bin:$PATH
```

Then save and exit the text editor.

Step 4

To make these changes effective you need to logout and login again. Or you may use the following command:

```
$ source .bashrc
```

Step 5

You can test whether it has been properly set by checking Java version. Use the following command:

```
$ java -version
java version "1.4.2_12"
```

```
Java(TM) 2 Runtime Environment, Standard Edition (build
1.4.2_12-b03)
```

```
Java HotSpot(TM) Client VM (build 1.4.2_12-b03, mixed mode)
```

Setting the Hostname

In order to use the EGRID Ready UI your computer should have a FQDN. Following set of steps, explain how the current hostname can be changed.

Step 1

Current hostname can be found using hostname command:

```
$ hostname
stroligo
```

Step 2

To set the new hostname do the following (you need to have root privileges):

```
$ su -
Password:
# hostname stroligo.egrid.it
```

Step 3

Now check the hostname again:

```
# hostname
stroligo.egrid.it
```

Step 4

Although the hostname is set sometimes the FQDN may not be set properly. Just be sure, check the FQDN with the following command:

```
# hostname -f
```

If the output from the above command is null or blank or does not contain dots (.), you will need to replace the hostname (e.g., stroligo) in /etc/hostname and /etc/hosts files with the fully-qualified hostname (e.g., stroligo.sissa.it), and repeat the steps above.

Setting the Date and Time Zone

For proper functionality, the system time must be correct. The time zone must be correctly set.

Use the `date` command to check your current time and time zone:

```
# date
Thu Jun 13 09:59:31 LKT 1999
```

Above you see that the year is wrong and time zone is set to Sri Lankan time zone. Let us see how the date, time and time zone can be reconfigured.

The following steps explain how to set the time zone to Europe/Rome and you can use the same procedure to set it to the time zone of your country. In order to perform the following you need root privileges.

Step 1

To change the date use the following command:

```
# date 071310012006
Thu Jul 13 10:01:00 LKT 2006
```

Here the first 2 digits indicate the month, next digits indicate the day of the month, the next 2 digits correspond to the time (in 24 hours notation) and next two digits indicate the number of minutes. Finally last 4 digits indicate the year.

When you press Enter the new date should appear.

Step 2

To set the time zone use the `tzconfig` command. Here's a sample:

```
# tzconfig
Your current time zone is set to Asia/Colombo
Do you want to change that? [n]: y

Please enter the number of the geographic area in
which you live:

1) Africa                7) Australia
2) America               8) Europe
3) US time zones        9) Indian Ocean
4) Canada time zones   10) Pacific Ocean
5) Asia                 11) Use System V style time zones
6) Atlantic Ocean      12) None of the above
```

Upon selecting a geographic area, you will be shown a list of cities which represent the time zone in which they are located. You should choose a city in your time zone:

Number: 8

```
Amsterdam Andorra Athens Belfast Belgrade Berlin Bratislava
Brussels Bucharest Budapest Chisinau Copenhagen Dublin Gibraltar
Helsinki Istanbul Kaliningrad Kiev Lisbon Ljubljana London
Luxembourg Madrid Malta Mariehamn Minsk Monaco Moscow Nicosia Oslo
Paris Prague Riga Rome Samara San_Marino Sarajevo Simferopol
Skopje Sofia Stockholm Tallinn Tirane Tiraspol Uzhgorod Vaduz
Vatican Vienna Vilnius Warsaw Zagreb Zaporozhye Zurich
```

Please enter the name of one of these cities or zones

You just need to type enough letters to resolve ambiguities

Press Enter to view all of them again

Name: [] Rome

Your default time zone is set to 'Europe/Rome'.

Local time is now: Thu Jul 13 10:04:20 CEST 2006.

Universal Time is now: Thu Jul 13 08:04:20 UTC 2006.

Step 4

Again use the date command to check whether the time zone is changed.

```
# date Thu Jul 13 10:04:48 CEST 2006
```

Note: Although time zone is set to CEST (Central European Savings Time) in the above example, in your host it should be set to your actual time zone and time/date should be your exact local time (with a +/- 5 minute allowance).

Installing and Configuring the EGRID Ready UI

The next step is to unpack and install the EGRID Ready UI. If you have not already downloaded the installation packages download the latest tar archive file from EGRID web site [2.1]2.

The EGRID Ready UI is preconfigured to access three Grids, namely:

```
egrid-testbed
    testbed of the EGRID Project
gridats
    Grid of the GRID@Trieste project [2.4]2
production
    production grid of the EGRID Project
```

At the point of installation you can select which configuration to be used. If required, these configurations can be changed later with the `egrid-UI-change-config` command.

Step 1

Use the following command to unpack the archive:

```
# tar -xjf \
    egrid-ready-ui_LATEST.tar.bz2 \
    -C /"path to extract files"
```

This will extract all files to the directory `/"path to extract files"/egrid-ready-ui`. The `"path to extract files"` indicate the directory that you want the EGRID Ready UI files to be extracted.

Step 2

Change your current directory to where the files are extracted:

```
# /"path to install files"/egrid-ready-ui
```

Step 3

Next, run the install script with the Grid configuration that you prefer:

```
# ./install.ui "grid"
```

where "grid" is one of above mentioned configurations supported by the UI. If the script complains about some required software not being found, please check section on installing necessary packages.

If required these configurations can be later be changed using the `egrid-UI-change-config "grid"` command. The `egrid-UI-change-config` command without any parameters will list available list of configurations.

All the examples in this document are based on GRID@Trieste. Therefore replace "grid" with `gridats`. The modified command should be similar to the following:

```
$ ./install.ui "gridats"

WARNING: The EDG User Interface tools need a Python interpreter
version 2.2, while your system has 2.4.1 (#2, Mar 30 2005,
21:51:10) [GCC 3.3.5 (Debian 1:3.3.5-8ubuntu2)]. Please install Python
2.2, or some EDG programs may not function properly.

Configuring crontab to run edg-fetch-crl-cron every 6 hours...done

In order to use the LCG2/EDG User Interface tools, your
environment variables need to be properly set up. If your shell is
sh, bash, or ksh, you just need to add the following 2 lines

# EGRID/LCG2 User Interface
. /usr/egrid-ready-ui/sw/etc/egrid/userenv.sh

to the shell startup files:

/home/dilumb/.bash_profile
/home/dilumb/.bashrc

Do you want me to add the above lines to
'/home/dilumb/.bash_profile'? (Y/n)y

Do you want me to add the above lines to
'/home/dilumb/.bashrc'? (Y/n)y

Configuration changed on disk.

In order to use the new configuration, you must redo:

. /usr/egrid-ready-ui/sw/etc/egrid/unsetenv.sh

and

. /usr/egrid-ready-ui/sw/etc/egrid/userenv.sh

EGRID/LCG-2 UI successfully configured.
```

When the installation script ask you "Do you want me to add the above lines to `/home/dilumb/.bash_profile` and `/home/dilumb/.bashrc` files", say "yes" by typing `y`.

Step 4

You need to logout and login again to make the changes effective.

Testing the installation

After installing the UI you can use the `egrid-host-self-test` command to check that your UI is properly configured. It will perform set of tests and inform you about their success or failure as follows:

```
Initialization. OK
Checking IP address.... OK
Checking that IP address is in public range.... OK
Checking that hostname is fully-qualified.... OK
Checking that time zone matches locale.... OK
Checking that DNS is functional..... OK
Checking forward resolution of this host DNS name.... OK
Checking DNS reverse resolution of this host IP.... OK
Checking connectivity to Internet.... OK
Checking connectivity to Grid services (can take up to 10 minutes time)... OK
```

Now the EGRID Ready UI is setup to communicate with the `gridats` Grid. However in order to access any Grid resources you need to install your user certificates and create a proxy certificate. These will be covered in the section 2.3.

Configuring the EGRID Live-CD as a User Interface

The EGRID Live CD contains a live Knoppix distribution plus all the software you need to run an EGRID User Interface or even an entire site from a CD, with a simplified graphical configuration interface. You can do various experiments with the Live CD and it will not affect any of your files or hardware. If you are done experimenting with the CD, you can easily install those on the actual machine with the use of an easy to use graphical installation program.

Prerequisites

In order to configure a User Interface using the EGRID Live-CD, it is necessary to make sure the following initial conditions are satisfied:

The host should have a Fully Qualified Domain Name (FQDN). Both forward and reverse entries should be registered on the Domain Name server.

The systems time and Time Zone is correct.

Make sure the firewall is configured to allow incoming requests on TCP ports 20000–25000.

You need the user certificates (`userkey.pem` and `usercert.pem` files) generated by the GRID administrator to access the GRID system.

Booting with the EGRID Live-CD

Step 1

Switch on the Computer. Then Insert the EGRID Live-CD into the CD-ROM drive and follow the installation instructions on screen.

Note: By default the EGRID Live CD root account does not have a password. When the machine is booted you will be automatically log in to an account named `knoppix`.

Initial Configurations

Step 1

Open a Shell (i.e. the command prompt) and become super user. Use the following command:

```
$ su -
```

#

Next step is on configuring network. Two methods of configuring the network are supported:

DHCP

Relies on your network administrator correctly configuring the DHCP server with forward and reverse DNS entries.

Manually setting the network parameters

The network parameters should be supplied by your network admin nonetheless.

By default, EGRID Live CD will use the DHCP method; if it fails, follow the instructions given in Step 2 below; otherwise, skip it.

Step 2 (Manual configuration of network)

Configure the network interface with static IP information. You can use the `netcardconfig` command.

```
# netcardconfig
```

Follow the instruction given by the configuration program and provide the necessary inputs. You need to provide the IP address, Subnet mask, Default gateway and IP address of the DNS.

Step 3

Double-check the network configuration with the `ifconfig` command. You should see an output like this:

```
# ifconfig
eth0      Link encap:Ethernet  HWaddr 00:0D:60:66:FC:84
          inet addr:140.105.46.64  Bcast:140.105.46.255  Mask:255.255.255.0
          UP BROADCAST RUNNING MULTICAST  MTU:1500  Metric:1
          RX packets:16898333  errors:0  dropped:0  overruns:0  frame:0
          TX packets:17595515  errors:0  dropped:0  overruns:0  carrier:0
          collisions:0 txqueuelen:1000
          RX bytes:4258203629 (3.9 GiB)  TX bytes:2857136520 (2.6 GiB)

lo        Link encap:Local Loopback
          inet addr:127.0.0.1  Mask:255.0.0.0
          UP LOOPBACK RUNNING  MTU:16436  Metric:1
          RX packets:8960  errors:0  dropped:0  overruns:0  frame:0
          TX packets:8960  errors:0  dropped:0  overruns:0  carrier:0
          collisions:0 txqueuelen:0
          RX bytes:11946545 (11.3 MiB)  TX bytes:11946545 (11.3 MiB)
```

Make sure that the loopback interface (`lo`) is up and running.

Step 4

Check that the internet host name of the system is correctly configured and that it's fully-qualified. Refer to section [Setting the Hostname](#) for instructions.

Step 5

For proper functionality the system time must be correct and the time zone must be correctly set. Refer to section [Setting the Date and Time Zone](#) for instructions.

Configuring Live CD as a User Interface

EGRID Live CD can be configured as a UI, CE, SE or a WN. The `egrid-conf` utility (a graphical tool that allows you to configure the machine) can be used for this purpose. However, the following sections focus only on configuring the EGRID Live CD as a User Interface.

Step 1

As super user (i.e. root) run the `grid-conf` command:

```
# egrid-conf
```

It should open the EDG-SN configuration message box as in figure 2.1. Press `Enter` to continue.

Figure 2.1 – EDG-SN configuration message box

Step 2

Then the *Select Node Type* pane appears with a message saying "Select the Node Type that you want to configure" (figure 2.2). From the list of options select `1 User Interface`.

Then select the `Ok` button which is at the bottom of the pane and press `Enter` to continue.

Figure 2.2 – Select Node Type pane

Step 3

Then the *Select Action* pane appears (figure 2.3). From the list of options select `1 Set configuration parameters`. Then select the `Ok` button which is at the bottom of the pane and press `Enter` to continue.

Figure 2.3 – Select Action pane

Step 4

From the *Configuration Parameters Settings* pane (figure 2.4) select `1 Set the parameters manually` option. Then select the `Ok` button and press `Enter`.

Figure 2.4 – Configuration Parameters Settings pane

Step 5

Then another pane similar to figure 2.5 will appear (it also has the name `Configuration Parameters Settings` pane).

Enter the value for each of the parameters listed in figure 2.5. Select one parameter from the list at a time. A description of each of these parameters and their values are given in Table 2.1. These parameters are valid only for `gridats`.

Note: It is necessary to contact the administrator of your Grid for these parameters. We will be connecting to `gridats` therefore we will use those parameters.

Figure 2.5 – Setting parameter manually

Step 6

After enter all the parameter values double check the inputs. Then select `Ok` and press `Enter`.

Then you will go back to the *Configuration Parameters Settings* pane (figure 2.4). Then select `Back` and press `Enter`.

Then you will go back to *Select Action* pane (figure 2.3).

Step 7

Select `2 Build configuration files` option (figure 2.6) from the *Select Action* pane. Then select `Ok` and press `Enter` to build the configuration files.

Figure 2.6 – Select Action pane – building configuration files

Table 2.1 – Parameters for setting up the user interface for the gridats Grid.

Parameter	Description	Values
CLOSE_SE	The closest SE to this host	egrid-ce-01.egrid.it
CATALOG_TYPE	Type of catalog are you using	lfc
DEF_VO_NAME	Name of the default VO	gridats
BDII_HN	Hostname of the BDII	grid04.grid.elettra.trieste.it
BDII_PORT	The port where the BDII is listening at	2170
MAIN_SE_FQH	Fully qualified hostname of the main SE	egrid-ce-01.egrid.it
REPLICA_SERVER	Fully qualified hostname of the replica server	grid05.grid.elettra.trieste.it
MYPROXY_SERVER	Fully qualified hostname of the MyProxy ₂ server	grid04.grid.elettra.trieste.it
RB_SERVER	Fully qualified hostname of the RB	grid05.grid.elettra.trieste.it

Step 8

Then a confirmation message as in figure 2.7 appears. Select **Yes** and press *Enter* to continue building the configuration files.

When the configuration is complete it will be indicated by a message box as in figure 2.8.

Press *Enter* to continue.

Figure 2.7 – Confirmation message box.

Figure 2.8 – Configuration results message box

Step 9

Then from the *Select Action* pane (figure 2.3) select **7 Exit**. Then select **Ok** and press *Enter* to exist the *Select Action* pane.

Then the *Select Node Type* pane (figure 2.2) appears again. Select option **6 Exit**. Then select **Ok** and press *Enter* to exit the *Select Node Type* pane.

When a conformation message box appears asking whether you really want to exit from the `egrid-conf` select **Exit** and press *Enter*.

Now the EGRID Live CD based system is ready to act as a UI. However in order to access any Grid resources you need to install your user certificates and create a proxy certificate. These will be covered in the next section.