

EUROPEAN MIDDLEWARE INITIATIVE

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Table of Contents

Functional Description	3
EMI Middleware clients & libraries present on an EMI UI.....	3
Client Installation & Configuration	5
Installing the Operating System	5
<i>Scientific Linux 5 & 6</i>	<i>6</i>
<i>Node synchronization, NTP installation and configuration.....</i>	<i>6</i>
Installing & Configuring the Middleware	7
<i>The Certification Authority repository</i>	<i>7</i>
<i>The EPEL repository.....</i>	<i>7</i>
<i>Configuring the use of EMI 3 repositories</i>	<i>8</i>
<i>Installation.....</i>	<i>9</i>
<i>Configuration.....</i>	<i>9</i>
User Guides & Troubleshooting Guides references.....	11
Service Reference Card	13

Functional Description

The **emi-ui** is a suite of clients and APIs that users and applications can use to access grid services

The access point to the Grid-Infrastructure is the User Interface (UI). This can be any machine where users have a personal account and where their user certificate is installed. From a UI a user can be authenticated and authorized to use the GRID resources, and can access the functionalities offered by the Information, Workload and Data Management Systems.

EMI Middleware clients & libraries present on an EMI UI

- AMGA:
 - emi.amga.amga-cli
- ARC:
 - nordugrid-arc-client-tools
 - nordugrid-arc-plugins-xrootd
 - nordugrid-arc-plugins-gfal
- CREAM:
 - glite-ce-cream-client-api-c
 - glite-ce-monitor-client-api-c
 - glite-ce-monitor-cli
 - glite-ce-cream-cli
- CERN Grid DataManagement:

- DPM
 - dpm
 - dpm-libs
 - dpm-perl
 - dpm-python
 - dpm-python26 (SL5 only)
- LFC
 - ffc
 - lfc-libs
 - lfc-perl
 - lfc-python
 - lfc-python26 (SL5 only)
- LCGDM common
 - lcgdm-libs
 - lcgdm-devel
- FTS 2
 - fts2-client (EMI 3 only)
- GFAL, LCG_Util
 - gfal
 - gfal-py26 (SL5 only)
 - gfal-python
 - lcg-util
 - lcg-util-lib
 - lcg-util-py26 (SL5 only)
 - lcg-util-python
 - gridftp-ifce
 - srm-ifce
 - is-interface
- GFAL 2.0
 - gfal2-all
 - gfal2-python
 - gfalFS
 - gfal2-doc
 - gfal2-devel
- dCache:
 - dcap
 - dcap-tunnel-gsi
 - dcap-tunnel-telnet
 - dcap-tunnel-krb
 - dcap-tunnel-ssl
 - dcap-libs
 - dcap-devel
 - dcache-srmclient
- lcg-info clients
 - lcg-info
 - lcg-infosites
- GridSite:
 - gridsite-commands
 - gridsite-libs

- L & B:
 - glite-jobid-api-c
 - glite-lb-client
 - glite-lb-client-progs
 - glite-lb-common
 - glite-lbjp-common-gss
 - glite-lbjp-common-trio
- SAGA
 - emi.saga-adapter.context-cpp
 - emi.saga-adapter.isn-cpp
 - emi.saga-adapter.sd-cpp
- STORM
 - storm-srm-client
- UNICORE
 - unicore-hila-emi-es
 - unicore-hila-gridftp
 - unicore-hila-shell
 - unicore-hila-unicore6
 - unicore-ucc
- VOMS:
 - voms
 - voms-clients3
- WMS:
 - glite-wms-brokerinfo-access
 - glite-wms-ui-commands
- Others:
 - emi-version
 - fetch-crl
 - glite-service-discovery-api-c
 - glite-yaim-clients
 - glite-yaim-core
 - lcg-ManageVOTag
 - lcg-tags
 - myproxy

Client Installation & Configuration

General information on installation and configuration can be found at:

- <https://twiki.cern.ch/twiki/bin/view/EMI/GenericInstallationConfigurationEMI3>

You can find some details bellow.

Installing the Operating System

For the moment EMI UIs are fully supported on the **SL5/x86_64** & **SL6/x86_64** platforms with EPEL as repository for external components.

Scientific Linux 5 & 6

For more information on Scientific Linux please check:

<http://www.scientificlinux.org>

All the information to install this operating system can be found at

<https://www.scientificlinux.org/download>

Example of **sl5.repo** file:

```
[core]
name=name=SL 5 base
baseurl=http://linuxsoft.cern.ch/scientific/5x/$basearch/SL
      http://ftp.scientificlinux.org/linux/scientific/5x/$basearch/SL
      http://ftp1.scientificlinux.org/linux/scientific/5x/\$basearch/S
L
      http://ftp2.scientificlinux.org/linux/scientific/5x/\$basearch/S
L
protect=0
```

Example of **sl6.repo** file:

```
[core] name=name=SL 6 base
baseurl=http://linuxsoft.cern.ch/scientific/6x/$basearch/SL
      http://ftp.scientificlinux.org/linux/scientific/6x/$basearch/SL
protect=0
```

Node synchronization, NTP installation and configuration

A general requirement is that the nodes are synchronized. This requirement may be fulfilled in several ways. If your nodes run under AFS they are most likely 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 this section.

Use the latest ntp version available for your system. If you are using APT, an apt-get install ntp will do the work.

- 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 iptables, you can add the following to `/etc/sysconfig/iptables`

```
-A INPUT -s NTP-serverIP-1 -p udp --dport 123 -j ACCEPT
-A INPUT -s NTP-serverIP-2 -p udp --dport 123 -j ACCEPT
```

Remember that, in the provided examples, 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/iptables restart
```

- Activate the ntpd service with the following commands:

```
# ntpdate <your ntp server name>
# service ntpd start
# chkconfig ntpd on
```

- You can check ntpd's status by running the following command
- ```
ntpq -p
```

## Installing & Configuring the Middleware

### The Certification Authority repository

All the details on how to install the CAs can be found in EGI IGTF release pages ([https://wiki.egi.eu/wiki/EGI\\_IGTF\\_Release](https://wiki.egi.eu/wiki/EGI_IGTF_Release)). It contains information about how to configure YUM & APT managers for downloading and installing the trust anchors ("Certification Authorities" or "CAs") that all sites should install.

### The EPEL repository

If not present by default on your nodes, you should enable the EPEL repository (<https://fedoraproject.org/wiki/EPEL>).

EPEL has an 'epel-release' package that includes gpg keys for package signing and repository information. Installing the latest version of epel-release package available on EPEL5 and EPEL6 repositories like:

- [http://download.fedoraproject.org/pub/epel/5/x86\\_64/](http://download.fedoraproject.org/pub/epel/5/x86_64/),

or

- [http://www.nic.funet.fi/pub/mirrors/fedora.redhat.com/pub/epel/6/x86\\_64/](http://www.nic.funet.fi/pub/mirrors/fedora.redhat.com/pub/epel/6/x86_64/)

should allow you to use normal tools, such as yum, to install packages and their dependencies. By default the stable EPEL repo is enabled.

### The middleware (EMI) repositories

All EMI products are distributed from a **single repository** (<http://emisoft.web.cern.ch/emisoft>)

The packages are signed with the EMI gpg key, that can be downloaded from <http://emisoft.web.cern.ch/emisoft/dist/EMI/3/RPM-GPG-KEY-emi>.

Please import the key, as described bellow, **BEFORE** starting!

- for SL5/SL6 save the key under `/etc/pki/rpm-gpg/`

```
rpm --import http://emisoft.web.cern.ch/emisoft/dist/EMI/3/RPM-GPG-KEY-emi
```

The fingerprint of the key is:

```
pub 1024D/DF9E12EF 2011-05-04
 Key fingerprint = AC82 01B1 DD50 6F4D 649E DFFC 27B3 331E
DF9E 12EF
uid Doina Cristina Aiftimiei (EMI Release Manager)
aiftim@pd.infn.it
sub 2048g/C1E57858 2011-05-04
```

### Configuring the use of EMI 3 repositories

- EMI 3 production repositories are available at:
  - <http://emisoft.web.cern.ch/emisoft/dist/EMI/3/>
- YUM configuration files are available at:
  - SL5 - <http://emisoft.web.cern.ch/emisoft/dist/EMI/3/repos/sl5/>
  - SL6 - <http://emisoft.web.cern.ch/emisoft/dist/EMI/3/repos/sl6/>
- Use Case 1: - update EMI repositories on a node with EMI 1 middleware to EMI 3 (SL5/x86\_64):
  - remove first the emi-release package installed on your node:

```
rpm -e emi-release
```
  - install the EMI 3 emi-release package:

```
wget
http://emisoft.web.cern.ch/emisoft/dist/EMI/3/sl5/x86_64/base/emi-release-3.0.0-2.el5.noarch.rpm
yum localinstall emi-release-3.0.0-2.el5.noarch.rpm
```
- Use Case 2: - update EMI repositories on a node with EMI 2 middleware to EMI 3 (SL5/x86\_64):

```
rpm -Uvh
http://emisoft.web.cern.ch/emisoft/dist/EMI/3/sl5/x86_64/base/emi-release-3.0.0-2.el5.noarch.rpm
```
- Use Case 3: - install EMI 3 repositories on a fresh node, without EMI middleware:
  - SL5/x86\_64:

```
wget
http://emisoft.web.cern.ch/emisoft/dist/EMI/3/sl5/x86_64/base/emi-release-3.0.0-2.el5.noarch.rpm (*)
yum localinstall emi-release-3.0.0-2.el5.noarch.rpm
```
  - SL6/x86\_64:

```
wget
http://emisoft.web.cern.ch/emisoft/dist/EMI/3/sl6/x86_64/base/emi-release-3.0.0-2.el6.noarch.rpm (*)
yum localinstall emi-release-3.0.0-2.el6.noarch.rpm
```

(\*) - please add the option "--nogpgcheck" if you didn't download first the key.



These packages will install required dependencies, the EMI public key and ensures the precedence of EMI repositories over EPEL

## Installation

You need to have enabled only the above repositories (Operating System, EPEL, Certification Authority, EMI).

- On SL5/SL6 – to install please run:  
`# yum install emi-ui`

## Configuration

### *General configuration for gLite middleware*

Please see <https://twiki.cern.ch/twiki/bin/view/LCG/YaimGuide400> for more details on how to use YAIM for configuring a UI.

YAIM configuration variables

- **Mandatory general variables** - to be set-up in <your-site-info.def> file
  - BDII\_HOST
  - LB\_HOST
  - PX\_HOST
  - WMS\_HOST
  - USERS\_CONF
  - VOS
  - VO\_<vo-name>\_VOMSES
  - VO\_<vo-name>\_VOMS\_CA\_DN
- **Default general variables:**
  - OUTPUT\_STORAGE – do not modify unless you know what you are doing
    - Known Issue:  
[https://ggus.eu/tech/ticket\\_show.php?ticket=81701](https://ggus.eu/tech/ticket_show.php?ticket=81701)
- **Default service specific:** they can be found in /opt/glite/yaim/defaults/emi-ui.pre and .post:
  - GLITE\_SD\_PLUGIN
    - Service discovery settings to determine the FTS endpoint.
  - GLITE\_SD\_SERVICES\_XML
    - Location of the FTS services.xml cache file

If the installation step was successful one should run the configuration:

```
<path-to-yaim>/yaim -c -s <path_to_file>/site-info.def -n UI
```

### *Specific configuration details for different middleware clients present on a UI*

- AMGA client:
  - [https://twiki.cern.ch/twiki/pub/EMI/AMGA/amga-manual\\_2\\_4\\_0.pdf](https://twiki.cern.ch/twiki/pub/EMI/AMGA/amga-manual_2_4_0.pdf) - Section 2.1, 3.1
- ARC clients:
  - <http://www.nordugrid.org/documents/arc-client-install.html> (arc\* tools)
  - <http://www.nordugrid.org/documents/ng-client-install.html> (ng\* tools)
  - Client Configuration Template: Section "ARC Client Configuration" of <http://www.nordugrid.org/documents/arc-ui.pdf> and section "Configuration" of <http://www.nordugrid.org/documents/ui.pdf>
- CREAM clients:
  - Nothing special, the general configuration using yaim is enough
- dCache-clients:
  - <http://www.dcache.org/manuals/Book-2.2/cookbook/cb-clients-fhs-comments.shtml>
- CERN DataManagement clients
  - <https://svnweb.cern.ch/trac/lcgdm/wiki/Integration/Clients>
- GFAL/lcg\_utils:
  - [https://svnweb.cern.ch/trac/lcgutil/wiki/GFALRelease\\_1\\_14\\_0](https://svnweb.cern.ch/trac/lcgutil/wiki/GFALRelease_1_14_0)
  - [https://svnweb.cern.ch/trac/lcgutil/wiki/lcg\\_util](https://svnweb.cern.ch/trac/lcgutil/wiki/lcg_util)
- GridSite clients:
  - [http://egee.cesnet.cz/cvsweb/SEC/GridSite\\_User.pdf](http://egee.cesnet.cz/cvsweb/SEC/GridSite_User.pdf)
- SAGA clients:
  - <http://hepunix.rl.ac.uk/egee/sa3-uk/sd/sagaC++SD.pdf> - Section 3
  - <http://hepunix.rl.ac.uk/egee/sa3-uk/sd/sagaC++ISN.pdf> - Section 3
- StoRM client:
  - [http://storm.forge.cnaf.infn.it/documentation/client\\_examples](http://storm.forge.cnaf.infn.it/documentation/client_examples)
- UNICORE UCC:
  - "Installation and Configuration" in <http://unicore-dev.zam.kfa-juelich.de/documentation/ucc-6.6.0/ucc-manual.pdf>
- UNICORE HILA:
  - "Configuration section for each backend implementation" <http://unicore-dev.zam.kfa-juelich.de/documentation/hila-2.3.0/hila-grid-api/hila.html>
- VOMS clients:
  - <https://github.com/italiangrid/voms/wiki/VOMS-clients-guide>
- WMS clients:
  - <http://wiki.italiangrid.org/twiki/bin/view/WMS/WMSClientInstallConfig>

## User Guides & Troubleshooting Guides references

- AMGA client
  - [https://twiki.cern.ch/twiki/pub/EMI/AMGA/amga-manual\\_2\\_4\\_0.pdf](https://twiki.cern.ch/twiki/pub/EMI/AMGA/amga-manual_2_4_0.pdf) - Section 4, 5, 6, 7, 14, 15, 16, 17
- ARC client
  - User Guide:
    - <http://www.nordugrid.org/documents/arc-client-install.html#use>
    - <http://www.nordugrid.org/documents/arc-ui.pdf> (arc\* tools), <http://www.nordugrid.org/documents/ui.pdf> (ng\* tools)
  - User Troubleshooting Guide:
    - [http://wiki.nordugrid.org/index.php/Documentation/Troubleshooting\\_Guides/ARC\\_Clients](http://wiki.nordugrid.org/index.php/Documentation/Troubleshooting_Guides/ARC_Clients)
  - Other Documentation:
    - <http://www.nordugrid.org/documents/xrsl.pdf>, [http://wiki.nordugrid.org/index.php/ARC\\_Client\\_Tools\\_Transition](http://wiki.nordugrid.org/index.php/ARC_Client_Tools_Transition)
  - Man Pages/Online Help: man pages available with binary packages
- CREAM client
  - User Troubleshooting Guide:
    - <https://wiki.italiangrid.it/twiki/bin/view/CREAM/TroubleshootingGuide>
  - Man Pages/Online Help:
    - [https://wiki.italiangrid.it/twiki/bin/view/CREAM/UserGuideEMI2#Man\\_pages\\_for\\_CREAM\\_Command\\_Line](https://wiki.italiangrid.it/twiki/bin/view/CREAM/UserGuideEMI2#Man_pages_for_CREAM_Command_Line)
- dCache client
  - User Guide :
    - <http://www.dcache.org/manuals/Book-2.2/cookbook/cb-clients-fhs-comments.shtml>
  - Other documentation:
    - <http://www.dcache.org/manuals/Book-2.2/index-fhs.shtml>
- DPM clients:
  - <https://svnweb.cern.ch/trac/lcgdm/wiki/Dpm/User/Tutorial>
- LFC clients:
  - <https://svnweb.cern.ch/trac/lcgdm/wiki/Lfc/User/Tutorial>
- GFAL/lcg\_utils:
  - <http://www.gridpp.ac.uk/deployment/users/datamanagement/howtolcg.html>
- L&B clients:
  - User Guide:
    - <http://egee.cesnet.cz/cvsweb/LB/LBUG.pdf>
  - User Troubleshooting Guide:
    - <http://egee.cesnet.cz/cvsweb/LB/LBTG.pdf>

- API Documentation:
    - <http://egee.cesnet.cz/cvsweb/LB/LBDG.pdf>
- SAGA clients:
  - User Guides:
    - <http://hepunix.rl.ac.uk/egee/sa3-uk/sd/sagaC++SD.pdf>
    - <http://hepunix.rl.ac.uk/egee/sa3-uk/sd/sagaC++ISN.pdf>
  - Man Pages/Online Help:
    - man saga-sd
    - saga-sd --help
    - man saga-isn
    - saga-isn -help
  - API Documentation:
    - /usr/share/doc/glite-saga-adapters-cpp/html/
  - Other Documentation:
    - <http://hepunix.rl.ac.uk/egee/sa3-uk/sd/>
- StoRM client:
  - [http://storm.forge.cnaf.infn.it/documentation/client\\_examples](http://storm.forge.cnaf.infn.it/documentation/client_examples)
- UNICORE UCC:
  - User Guide:
    - <http://unicore-dev.zam.kfa-juelich.de/documentation/ucc-6.6.0/ucc-manual.pdf>
  - Man Pages/Online Help: available by calling "ucc --help" and "ucc help-auth"
  - User Troubleshooting Guide:
    - "Frequently asked questions" in <http://unicore-dev.zam.kfa-juelich.de/documentation/ucc-6.6.0/ucc-manual.pdf>
- UNICORE HILA
  - User Guide:
    - <http://unicore-dev.zam.kfa-juelich.de/documentation/hila-2.4.0-SNAPSHOT/hila-grid-api/hila.html>
  - Man Pages/Online Help: available by calling 'help' in HiLA Shell
  - API Documentation:
    - <http://unicore-dev.zam.kfa-juelich.de/documentation/hila-2.4.0-SNAPSHOT/hila-grid-api/apidocs/index.html>
- VOMS clients:
  - <https://github.com/italiangrid/voms/wiki/VOMS-clients-guide>
- WMS clients:
  - <http://web.infn.it/gLiteWMS/images/WMS/Docs/wmproxy-guide.pdf>
  - Job Description Language (JDL) documentation:
    - <http://edms.cern.ch/document/590869>
  - Other Documentation:
    - <http://web.infn.it/gLiteWMS/index.php/techdoc/howtosandguides>

## Service Reference Card

- EMI UI reference card - <https://twiki.cern.ch/twiki/bin/view/EMI/EMluiSRC>