



# CROSSGRID INSTALLATION GUIDE

## WP3.2 POSTPROCESSING

### WP 3.2

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#### Abstract:

This document provides an installation guide for GMDAT component, developed within the CrossGrid project. It contains RPM lists and configuration guides for RedHat Linux systems, and also more detailed description of installation from source code.

**Delivery Slip**

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## 2. ABOUT THE SOFTWARE

GMDAT is a lightweight monitoring system working on 24h/day basis, designed to provide to scheduler data about grid status at a given moment, and try to predict its future state. There are three main parts of the tool: sensors, installed on each computer in the grid; central database gathering summary information from the clusters; and the data analysis module for preparation of the predictions of the future grid status. Sensors are built on top of Ganglia monitoring system, and the central database uses RRD format and SOAP interface to provide data to the scheduler. The data analysis module utilizes Kalman filter algorithm to predict behavior of the grid.

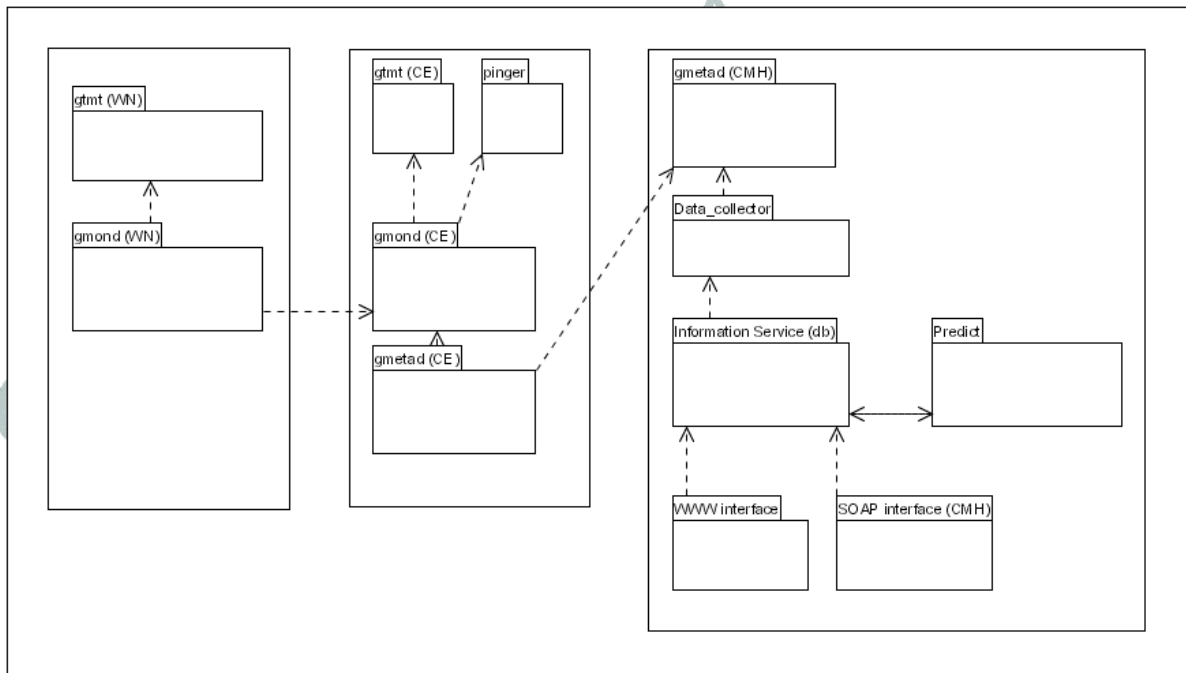
### 2.1. SOFTWARE COMPONENTS

GMDAT sensors come in two flavours: WN and CE. WN package is to be installed on Worker Nodes and Storage Elements, and contains two parts: gmond (part of the Ganglia monitoring system, used for CPU and memory usage measurements, and communication with gmeta on CE), and gtmt (used for measurement of network bandwidth usage). CE is to be installed on Computing Elements, and contains the same components as WN package, plus pinger (measurement of available bandwidth to the other clusters, and round-trip times over external links), and gmeta (collecting of aggregate information, exporting it to the Central Monitoring Host).

Central Monitoring Host contains gmeta component for collecting the information from sensors, RRD database for keeping the historical information, data collector component for filling the database, predict module for generation of the forecasts, and two interfaces: graphical (WWW) for the end users, and SOAP for the scheduler and other consumers (UNIDAL).

Additionally there is client package, to be installed on Resource Broker and other consumer services, for downloading the data via SOAP interface; and the client library providing C++ interface to the system.

Detailed diagram of GMDAT system components is presented below:



### 2.2. DEPENDENCIES

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|                              |                                                                                                            |
|------------------------------|------------------------------------------------------------------------------------------------------------|
| cg-wp3.2-gmdat-sensor-WN     | ganglia-monitor-core-gmond >= 2.5.3-1                                                                      |
| cg-wp3.2-gmdat-sensor-CE     | ganglia-monitor-core-gmetad >= 2.5.3-1<br>ganglia-monitor-core-gmond >= 2.5.3-1<br>bing-1.1.3-2<br>rrdtool |
| cg-wp3.2-gmdat-client-libs   | Expat                                                                                                      |
| cg-wp3.2-gmdat-sensor-client | Expat                                                                                                      |

### **3. INSTALLATION IN THE CROSSGRID TESTBED**

The CrossGrid testbeds are managed by the LCFG deployment support tool. This tool allows an automatic installation of the software on all required nodes.

#### **3.1. RPM LISTS FOR LCFG**

Worker Node:

`cg-wp3.2-gmdat-sensor-WN-1.7-1`

Computing Element:

`cg-wp3.2-gmdat-sensor-CE-1.7-1`

Storage Element:

`cg-wp3.2-gmdat-sensor-WN-1.7-1`

Resource Broker:

`cg-wp3.2-gmdat-client-libs-1.8-1`

`cg-wp3.2-gmdat-sensor-client-1.8-1`

Central Monitoring Host:

- not yet packaged, probably will be integrated with BDII

Build Machine:

`cg-wp3.2-gmdat-client-libs-1.8-1`

#### **3.2. PROFILE MODIFICATIONS FOR LCFG**

N/A

#### **3.3. MANUAL POST INSTALLATION STEPS**

If the central monitoring host is different from the default one, it should be added to the option `trusted_hosts` in `/etc/gmetad.conf`

## **4. MANUAL INSTALLATION**

Installation of RPMs is sufficient in most cases. If the central monitoring host is different from the default one, it should be added to the option

```
trusted_hosts  
in /etc/gmetad.conf
```

### **4.1. DOWNLOAD**

RPMS can be downloaded from FZK repository:

<https://savannah.fzk.de/distribution/crossgrid/autobuilt/i386-rh7.3-gcc3.2.2/wp3/RPMS/>

Bing, ganglia and rrdtool packages can be downloaded from:

<https://savannah.fzk.de/distribution/crossgrid/releases/allfiles/7.3/external/>

Expat is a component of standard RedHat distribution.

### **4.2. INSTALLATION FROM RPM**

Worker Node:

```
cg-wp3.2-gmdat-sensor-WN-1.7-1
```

Computing Element:

```
cg-wp3.2-gmdat-sensor-CE-1.7-1
```

Storage Element:

```
cg-wp3.2-gmdat-sensor-WN-1.7-1
```

Resource Broker:

```
cg-wp3.2-gmdat-client-libs-1.8-1
```

```
cg-wp3.2-gmdat-sensor-client-1.8-1
```

Central Monitoring Host:

- not yet packaged, probably will be integrated with BDII

Build Machine:

```
cg-wp3.2-gmdat-client-libs-1.8-1
```

### **4.3. INSTALLATION FROM SOURCE**

To get the newest copy of the sources one should execute the following commands:

```
export CVSROOT=anoncvs@gridportal.fzk.de:/cvs/crossgrid
```

```
export CVS_RSH=ssh
```

```
cvs checkout crossgrid/wp3/wp3_3-moninfr/wp3_3_4-postproc
```

Then to build and install the sensors in the default CrossGrid location:

```
cd crossgrid/wp3/wp3_3-moninfr/wp3_3_4-postproc/gmdat
```

```
make
```

```
make install
```

To install in different location please use prefix=/your/location.

Then it is necessary to execute:



```
/opt/cg/sbin/ganglia_cg_setup_WN.sh and  
/opt/cg/sbin/setup_gmetrics_WN.sh
```

on WNs and SEs, and

```
/opt/cg/sbin/ganglia_cg_setup_CE.sh and  
/opt/cg/sbin/setup_gmetrics_CE.sh
```

on CEs.

To install the client machine you need to add the following line to `/etc/crontab`:

```
0-59/15 * * * * root /opt/cg/bin/gmdat_update_db
```

To build the RPMS:

```
make -i dist
```

```
make rpm
```

For building and installing the sensors nothing is needed except perl and gmake.

To build the C++ client library you need to:

```
cd ../gmdat-client-lib
```

```
make
```

```
make install
```

For building and installing client libraries gcc, expat and sciew packages are needed.

## **4.4. CONFIGURATION**

### **4.4.1. List of configuration files**

`gmdat-sensors-WN`:

```
/opt/cg/etc/ip_classes – contains IP ranges for Crossgrid clusters
```

```
/etc/gmond.conf – contains multicast port number used by gmond in GMDAT (4743)
```

`gmdat-sensors-CE`:

```
/opt/cg/etc/ip_classes – contains IP ranges for Crossgrid clusters
```

```
/etc/gmond.conf – contains multicast port number used by gmond in GMDAT (4743)
```

```
/opt/cg/etc/pinger_hosts.cf – contains names of CEs in Crossgrid
```

```
/etc/gmetad.conf – gmeta config, contains IP of Central Monitoring Host allowed to contact Gmeta.
```

`gmdat-sensors-client`

```
/opt/cg/etc/clusters.cf – clusters for which the information should be downloaded
```

```
/opt/cg/etc/metrics.cf – metric names which should be downloaded
```

### **4.4.2. Editing the configuration files**

Normally there is no need to modify anything in standard CrossGrid configuration. Non-standard Central Monitoring Host can be added to `/etc/gmetad.conf` if needed (option `trusted_hosts`) on CE.

### **4.4.3. Startup scripts**

Ganglia components are started by:

```
/etc/rc.d/init.d/gmond
```

```
/etc/rc.d/init.d/gmetad
```

GMDAT periodically checks its metrics and configuration through crontab entry:

```
0-59/5 * * * * root /opt/cg/bin/run_gmetrics
```

#### **4.4.4. Other requirements**

##### **4.4.4.1. Environment**

N/A

##### **4.4.4.2. Users**

N/A

##### **4.4.4.3. Ports**

Multicast UDP on port 4743 is needed inside the cluster

TCP port 8649 is needed inside the cluster

TCP port 8651 is needed for inbound connections from Central Monitoring Host on CE

##### **4.4.4.4. Certificates**

N/A

##### **4.4.4.5. Folders**

N/A

## **5. RUNNING AND TESTING**

Command

```
telnet localhost 8651
```

issued on CE should return monitoring information in XML format. On specific WN one should issue:

```
telnet localhost 8649
```

to get the output for this machine.

Also, `netstat -apn --inet` should show UDP multicast interface 239.2.11.71 listening on port 4743. Administrator should make sure if multicast traffic within cluster is enabled (i.e. not blocked by a firewall and properly routed).

If the software is not listening on the given ports, one should check:

```
service gmond status on CE and WN
```

and

```
service gmetad status on CE
```

also the entry

```
0-59/5 * * * * root /opt/cg/bin/run_gmetrics
```

should be present in `/etc/crontab` on each machine

### **5.1. LOG FILES**

N/A

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