

# **Ganglia Users Guide**

6.2 Edition

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# Preface

This Roll installs and configures the Ganglia<sup>1</sup> cluster monitoring system.

## Notes

1. <http://ganglia.info/>

# Chapter 1. Overview

**Table 1-1. Summary**

Name	ganglia
Version	6.2
Maintained By	Rocks Group
Architecture	i386, x86_64
Compatible with Rocks®	6.2

The ganglia roll has the following requirements of other rolls. Compatability with all known rolls is assured, and all known conflicts are listed. There is no assurance of compatiblity with third-party rolls.

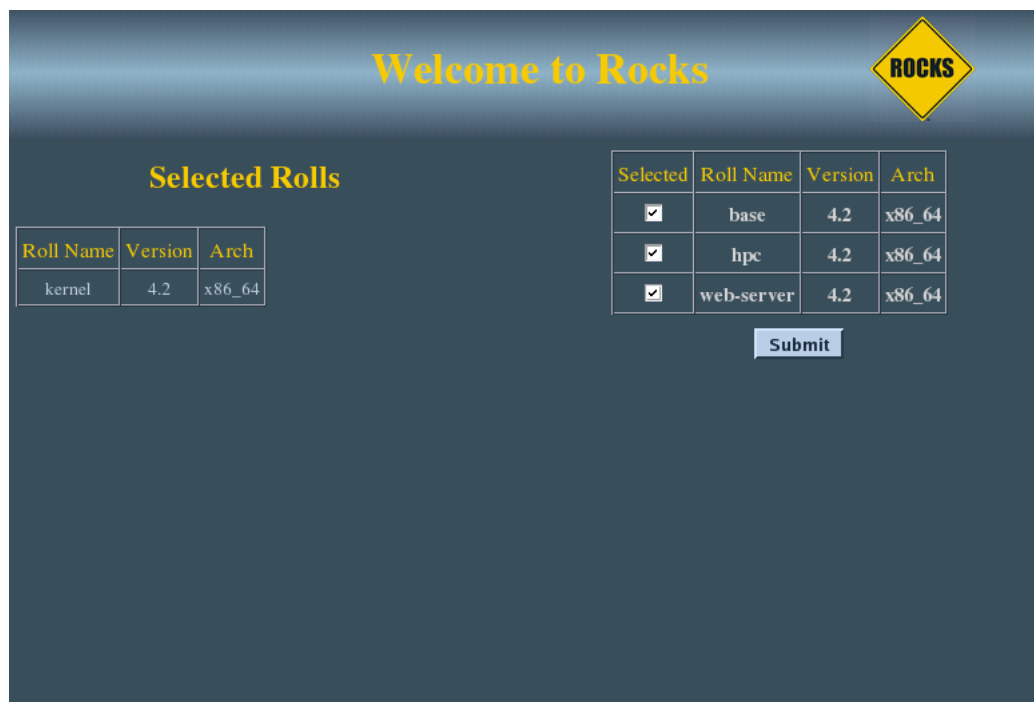
**Table 1-2. Compatibility**

<b>Requires</b>	<b>Conflicts</b>
<b>Base</b>	
<b>Kernel</b>	
<b>OS</b>	
<b>Web Server</b>	

# Chapter 2. Installing

## 2.1. On a New Server

The ganglia roll should be installed during the initial installation of your server (or cluster). This procedure is documented in section 3.2 of the Rocks® usersguide. You should select the ganglia roll from the list of available rolls when you see a screen that is similar to the one below.



## 2.2. On an Existing Server

The Ganglia Roll can be installed on running frontend.

The following procedure will install the roll on the frontend. After the frontend reboots, the roll will be fully configured.

First download the Ganglia Roll ISO from the Rocks web site. Then, as root, execute:

```
# rocks add roll ganglia*iso
# rocks enable roll ganglia
# cd /export/rocks/install
# rocks create distro
# rocks run roll ganglia | bash
```

Then reboot:

```
# init 6
```

To apply ganglia to the compute nodes, you will need to reinstall the compute nodes, e.g.:

```
# rocks set host boot compute action=install  
# rocks run host compute command="reboot"
```



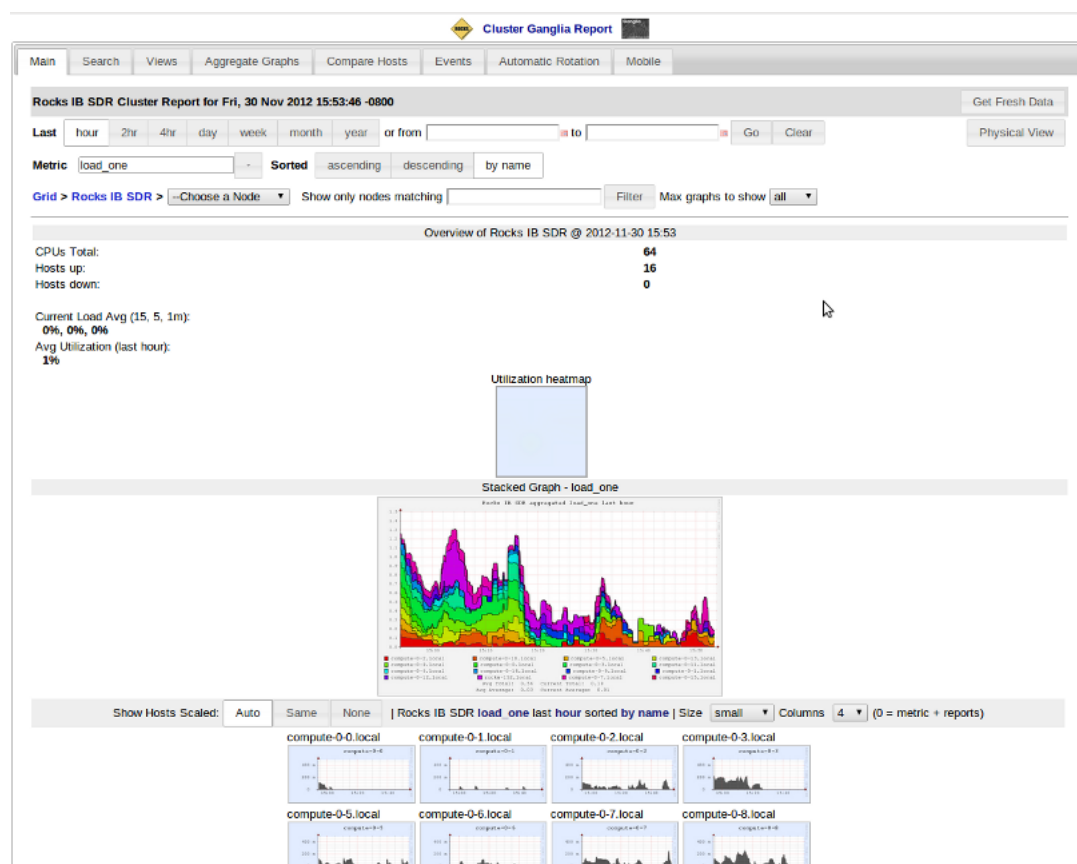
# Chapter 3. Using the Ganglia Roll

## 3.1. Using the Ganglia Roll

### 3.1.1. Cluster Status

You can check the status of your cluster by pointing a browser to `http://YOUR_FRONTEND_NAME/ganglia/` (see the image below for an example). This link provides a graphical interface to live cluster information provided by Ganglia monitors<sup>1</sup> running on each cluster node. The monitors gather values for various metrics such as CPU load, free memory, disk usage, network I/O, operating system version, etc. These metrics are sent through the private cluster network and are used by the frontend node to generate the historical graphs.

In addition to metric parameters, a heartbeat message from each node is collected by the Ganglia monitors. When a number of heartbeats from any node are missed, this web page will declare it "dead". These dead nodes often have problems that require additional attention, and are marked with the Skull-and-Crossbones icon, or a red background.



Ganglia<sup>2</sup> was designed at Berkeley by Matt Massie (`massie@cs.berkeley.edu`) in 2000, and is currently developed by an open source partnership between Berkeley, SDSC, and others. It is distributed through Sourceforge.net and GitHub.com under the GPL software license.

## **Notes**

1. <http://ganglia.info/>
2. <http://ganglia.info/>

# Chapter 4. Customizing the Ganglia Roll

## 4.1. Customizing the Ganglia Web interface

The Ganglia Web interface (at [http://YOUR\\_FRONTEND\\_NAME/ganglia/](http://YOUR_FRONTEND_NAME/ganglia/)) allows extensive customization. This is done by modifying the file `/var/www/html/ganglia/conf.php` on your frontend. The default configuration file contains:

```
<?php

$config['rrdtool'] = "/opt/rocks/bin/rrdtool";

?>
```

If you would like to change the font used in the various graphs, for example, use something like the following instead of the `$config['rrdtool']` line above; "Sans" is the font to use:

```
$config['rrdtool'] = "env RRD_DEFAULT_FONT='Sans' /opt/rocks/bin/rrdtool";
```

You can also set the default metric and prevent certain graphs from appearing; simply add something like the following to somewhere between the `<?php` and `?>` lines:

```
$config['show_stacked_graphs'] = 0;
$config['default_metric'] = 'cpu_report';
```

You can also override the installation defaults supplied in the file `/var/www/html/ganglia/conf_default.php`. For example, if you would like to modify the list of time ranges available, you could add something like the following to `conf.php`:

```
$config['time_ranges'] = array(
    '15min' => 900,
    'hour'   => 3600,
    '2hr'    => 7200,
    '4hr'    => 14400,
    'day'    => 86400,
    '3day'   => 259200,
    'week'   => 604800,
    'month'  => 2419200,
    'year'   => 31449600
);
```

Note that you should *not* modify `conf_default.php` directly!

For further ideas on customizing `conf.php`, please read the default configuration file `/var/www/html/ganglia/conf_default.php`. You should also see the Ganglia Web 2 homepage<sup>1</sup>.

## 4.2. Monitoring Multiple Clusters with Ganglia

Ganglia has the ability to track and present monitoring data from multiple clusters. A collection of monitored clusters is called a *Grid* in Ganglia's nomenclature. This section describes the steps required to setup a multi-cluster monitoring grid.

The essential idea is to instruct the gmetad daemon on one of your frontend nodes to track the second cluster in addition to its own. This procedure can be repeated to monitor a large set clusters from one location.

For this discussion, your two clusters are named "A" and "B". We will choose the frontend on cluster "A" to be the top-level monitor.

1. On "A" frontend, add the line to `/etc/gmetad.conf`:

```
data_source "Cluster B" B.frontend.domain.name
```

Then restart the gmetad server on "A" frontend.

2. On "B" frontend, get the IP address of "A.frontend.domain.name" and edit `/etc/ganglia/gmond.conf` and change the section from:

```
tcp_accept_channel {
  port = 8649
  acl {
    default = "deny"
      access {
        ip = 127.0.0.1
        mask = 32
        action = "allow"
      }
    access {
      ip = 10.0.0.0
      mask = 8
      action = "allow"
    }
  }
}
```

to:

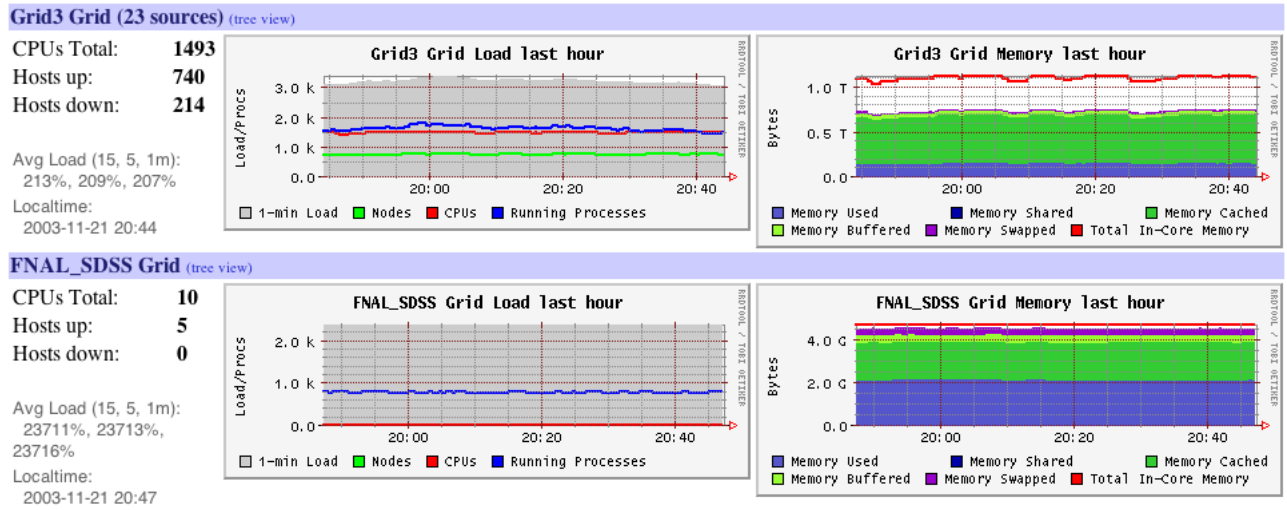
```
tcp_accept_channel {
  port = 8649
  acl {
    default = "deny"
      access {
        ip = 127.0.0.1
        mask = 32
        action = "allow"
      }
    access {
      ip = 10.0.0.0
      mask = 8
      action = "allow"
    }
    access {
      ip = ip-address-of-A.frontend
      mask = 32
      action = "allow"
    }
  }
}
```

```
}
}
```

Then restart gmond server on "B" frontend.

3. Take a look at the Ganglia page on "A". It should include statistics for B, and a summary or "roll-up" view of both clusters.

This screenshot is from the iVDGL Physics Grid3 project. It is a very large grid monitored by Ganglia in a similar manner as specified here.



## Notes

1. <http://sourceforge.net/apps/trac/ganglia/wiki/ganglia-web-2>

# Appendix A. Frequently Asked Questions

**1.** I see IP addresses but not names in my Ganglia graphs. Why is this?

The DNS system in the cluster sometimes causes Ganglia to record bogus node names (usually their IP addresses). To clear this situation, restart the "gmond" and "gmetad" services on the frontend. This action may be useful later, as it will flush any dead nodes from the Ganglia output.

```
# service gmond restart
# service gmetad restart
```

This method is also useful when replacing or renaming nodes in your cluster.

**2.** When looking at the Ganglia page, I don't see graphs, just the error:

```
There was an error collecting ganglia data (127.0.0.1:8652): XML error: not
well-formed (invalid token) at xxx
```

This indicates a parse error in the Ganglia gmond XML output. It is generally caused by non-XML characters (& especially) in the cluster name or cluster owner fields, although any Ganglia field (including node names) with these characters will cause this problem.

We hope future versions of Ganglia will correctly escape all names to make them XML safe. If you have a bad name, edit `/etc/ganglia/gmond.conf` on the frontend node, remove the offending characters, then restart gmond.

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Rocks(r)  
www.rocksclusters.org  
version 6.2 (SideWinder)

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## C.3. rrdtool

RRDTOOL - Round Robin Database Tool  
A tool for fast logging of numerical data graphical display of this data.

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1. <http://cvs.rocksclusters.org>