

# Munin

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## Background

Munin is a server/node pair that graphs, htmlifies and optionally sends out notifications about data it gathers. It's designed to let it be easy to graph new datasources.

## The Node

### munin-node

Munin-node is a perlscript listening to port 4949 using the Net::Server Perl module. It reads all the scripts in /etc/munin/plugins/ (or CONFDIR/plugins/, to be more specific) on startup. The node accepts these commands:

```
nodes
    List available nodes
list [node]
    list available scripts for [node]
config <script>
    output configuration for <script>
fetch <script>
    output script value <script>
version
    Output version string
quit
    disconnect
```

## Scripts

These scripts can be in your language of choice: bash, perl, python, C, or anything else that your system can execute. The scripts can be run in several modes, the important ones being without parameters, and with the "config"-parameter. When run with "config" as parameter, the script should output the configuration of the graph. An example with the "load" graph, which has one field (also called "load"):

```
jo@yes:~$ ./load config
graph_title Load average
graph_args --base 1000 -l 0
graph_vlabel load
graph_scale no
load.label load
load.warning 10
load.critical 120
```

The plugin can output quite a few options:

```
graph_title
    The title of the graph, defaults to the servicename.
create_args
    If set, the arguments will be passed on to rrdcreate.
graph_args
    If set, the arguments will be passed on to rrdgraph.
graph_width
    Sets the width (in pixels) of the graph. Defaults to 400.
graph_height
    Sets the height (in pixels) of the graph. Defaults to 175.
graph_order
    In witch order to draw the fields. Can also include path aliases on the form
    alias=domain;host:graph.datasources. See further down for details.
graph_vlabel
    Y-axis label of the graph.
graph_vtitle
    Y-axis label of the graph. NOTE: Deprecated, use graph_vlabel. If the graph is COUNTER or
    DERIVE based, the variable ${graph_period} can be used to access the current scale (second,
    minute, hour, day).
graph_info
    A description of the graph contents.
graph_total
    If set, summarise all the datasources' values and use the value of graph_total as a label.
graph_scale
    Default on. If set, enables scaling of avg/min/max/cur values.
graph_period
    Default "second". Set to "minute" to scale (almost) all graphs that are COUNTER or DERIVE based,
    to show data per minute instead of per second.
graph_sums
    Creates two additional graphs for services using COUNTER or DERIVE fields. The new graphs show
    values per hour and day. NOTE: This feature requires rrdtool version 1.0.39 or above.
graph
    Set to "yes" or "no". Decides wether to draw the graph. Defaults to "yes".
update
```

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Set to "yes" or "no". Decides whether munin-update should fetch data for the graph. Defaults to "yes".

*host\_name*  
Override which host name this plugin is run for. Ugly – see further down on how to do this in the node configuration files instead, which is more elegant.

*{field}.label*  
REQUIRED. Name of the datasource. You can have many datasources in one graph.

*{field}.cdef*  
RPN-expression. Modify the values before graphing. See the FAQ for examples.

*{field}.draw*  
What to draw from the data source: AREA, LINE1–3. Defaults to LINE2.

*{field}.graph*  
Set to "no" or "yes". Decides whether to graph the data source. Defaults to yes.

*{field}.max*  
Maximum value. If the fetched value is above "max", it will be discarded.

*{field}.min*  
Minimum value. If the fetched value is below "min", it will be discarded.

*{field}.negative*  
Name of field to 'mirror' on the opposite side of zero. See the FAQ for examples.

*{field}.skipdraw*  
Disables drawing of datasource. NOTE: Deprecated – use {field}.graph instead.

*{field}.info*  
A description of the field.

*{field}.type*  
Type of datasource, COUNTER, ABSOLUTE, DERIVE and GAUGE, defaults to GAUGE. Read "man rrdcreate" for more info.

*{field}.line*  
Draw a line (HRULE) associated with the field. Format is <value>[:colour[:label]]. The default colour is the same as the field colour, or red if it's a single-field graph. Default label is unset.

*{field}.warning*  
Used by munin-nagios. Can be a max value or a range separated by colon. E.g. "min:", ":max", "min:max", "max".

*{field}.critical*  
Same as above.

{field} is limited to 19 characters, and the characters [a-zA-Z0-9\_]. The first character cannot be a number.

Without options the script should only give out {name}.value (value):

```
jo@yes:~$ ./load
load.value 0.41
```

All scriptnames containing other characters than alphanumerics, "-", "\_", and ".", or starting with "." will be skipped.

To run a plugin as a specific user and/or group, create a file in the plugin configuration dir (default is CONFDIR/plugin-conf.d/). This file is parsed as munin-node starts up. It can contain the following options:

[<plugin-name>]

The following lines are for plugin-name.

*user* <username|userid>

Run plugin as this user. Only works if munin-node is run as root.

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*group* <groupname/groupid>[, <groupname/groupid>] [...]   
Run plugin as this group. If group is inside paranthesis, don't croak if it's nonexistant. Only works if munin-node is run as root.

*command* <command>   
Run command instad of plugin. "%c" will be expanded to what would otherwise have been run. E.g. "command sudo -u root %c". Nice to avoid running munin-node as root.

*allow* <regex>   
Allow hosts matching regex to run this plugin.

*allow* *tls*   
Allow hosts which use TLS with verified certificates to run this plugin.

*deny* <regex>   
Deny hosts matching regex from running this plugin.

*deny* *tls*   
Deny hosts which use TLS with verified certificates to run this plugin.

*timeout* <seconds>   
Use a timeout of <seconds> seconds instead of the default timeout of 10 seconds, when running this plugin.

*env.<var>* <contents>   
Set the environment variable var to contents before running the plugin.

Example:

```
[exim_mailstats]
group mail

[cps_*]
user root

# Will cause the variable "mysqlopts" to be set inside the plugins
[mysql_*]
env.mysqlopts --user foo --password fii
```

## File locations

According to FHS, this is where you should place the files.

### System package (Debian, RedHat, maybe others)

*CONFDIR*  
/etc/munin/  
*SBINDIR*  
/usr/sbin/  
*LIBDIR*  
/usr/share/munin/  
*STATEDIR*  
/var/run/munin/  
*LOGDIR*  
/var/log/munin/

**Independent install (tarball)**

```

CONFDIR
    /etc/opt/munin/
SBINDIR
    /opt/munin/sbin/
LIBDIR
    /opt/munin/lib/
STATEDIR
    /var/run/munin/
LOGDIR
    /var/log/munin/

```

**The Server**

The server runs a cronjob as the user munin every 5 minutes. The cronjob runs munin-update, munin-limits, munin-graph and munin-html one by one. All scripts creates a lockfile in @@STATEDIR@@. Everytime a script starts, it checks if the pid in the lockfile is alive before starting.

**munin.conf**

This is the configuration-file for all serverscripts.

```

#Configfile for munin
dbdir      /var/lib/munin/
htmldir    /var/www/munin/
logdir     /var/log/munin
rundir     /var/run/munin/

#To send email notifications
contact.email.command mail -s "Notification from Munin" fnord@fnord.com
#To notify nagios
contact.nagios.command /usr/bin/send_nsca -H nagios-server.fnord.com -c /etc/send_nsca.cfg

#
# Edit and uncomment the following to start surveillance
#
#[machine.fnord.com]
# address localhost

```

**Explanation:**

```

dbdir
    Rootdir for alle rrd-files (files go into <dbdir>/<domain>/)
htmldir
    Where the png's and htmlfiles end up
logdir
    Where to put logs
rundir
    Where to put state files
htaccess
    The default htaccessfile

```

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### *tmpldir*

Where the templates reside

### *graph\_strategy*

Set to "cron" to draw the graphs periodically via cron every 5 minutes. Set to "cgi" to draw on-demand. (default cron)

### *cgiurl*

URL to the directory where the CGI scripts (for the time being only one) doing the graphing (if graph\_strategy is "cron"). (default /cgi-bin)

### *cgiurl\_graph*

URL to the CGI script doing the graphing (if graph\_strategy is "cron"). (default \${cgiurl}/munin-cgi-graph)

### *fork*

If set, run updates of several hosts simultaneously. (default yes)

### *max\_processes*

Set max number of simultaneous Munin processes.

### *nsca\**

Nagios options. See separate section. Deprecated, use contacts instead.

### *contact.\**

Set contact information. See separate section.

### *contacts*

Set which contact entries to use ("none" for no contacts). Default is all contact entries existing under "contact" tree.

### *domain\_order*

Change the order of domains. (Default is alphabetically sorted.)

### *local\_address*

Set the local address to be used for connecting to the nodes.

### *[foo.com;machine.dom.ain]*

Add machine.dom.ain to group foo.com.

### *[machine.dom.ain]*

Add machine.dom.ain to group dom.ain. (A short form of [dom.ain;machine.dom.ain].)

To add a new node, just put in a new section and add the address option. Group-level options

### *node\_order*

Changes order of nodes in a group. (Default is alphabetically sorted.)

### *local\_address*

Set the local address to be used for connecting to the nodes in the group.

### *compare*

Generate node comparisons for the nodes in this group.

### *contacts*

Set which contact entries to use for nodes in this group. Default is all contact entries existing under "contact" tree.

## Node-level options

### *address*

## Independent install (tarball)

## Munin

Set the node address

*local\_address*  
Set the local address to be used for connecting to the node.

*port*  
Set node port number (default 4949)

*use\_node\_name*  
Set to "yes" or "y" to force getting all the default plugins from a node. Good for hosts which changes hostname (e.g. laptops).

*use\_default\_name*  
Set to "yes" or "y" to force getting all the default plugins from a node. Good for hosts which changes hostname (e.g. laptops). NOTE: Deprecated. Use *use\_node\_name* instead.

*contacts*  
Set which contact entries to use for this node. Default is all contact entries existing under "contact" tree.

*tls*  
Configure TLS support when communicating with the node. Set to "enabled" to force TLS support, "disabled" to not use it, "paranoid" to force node certificate validation against a local CA file, and "auto" to try to get the most secure level of communication, but accept anything (including no TLS) if the node does not support it. (Default: "auto")

*tls\_private\_key*  
Set path to private key file. (Default "@@CONFDIR@@/munin.pem")

*tls\_certificate*  
Set path to certificate file. (Default "@@CONFDIR@@/munin.pem")

*tls\_pem*  
Set path to pem file (if you have both private key and certificate in the same file). (Default "@@CONFDIR@@/munin.pem")

### Field-level options

*sum*  
Summarise other fields. See the FAQ for how to use this.

*stack*  
Stack other fields. See the FAQ for how to use this.

*+++*  
Check the node configuration (further up) for everything else.

## munin-update

Munin-update reads *munin.conf*, searches for nodes, and connect to the munin-nodes using the *address-field*. When connected it will run the *list-command* to fetch available scripts, then it will run *config* for each script. This configuration will expand in the *datafile* and *rdd-databases* will be created. Already expanded configuration will be skipped. Then *munin-update* runs through it's newly modified configuration file and runs *fetch* on all scripts.

## **munin-graph**

Munin-graph reads `/etc/munin/munin.conf` and graphs all services unless `[service].graph no`. The following options are available in the configuration

|                                    |  |
|------------------------------------|--|
| <code>[service].graph_title</code> | limited to 19 characters   |
| <code>[service].graph_order</code> | The title of the graph   |
| <code>[service].graph_args</code>  | Which order to graph the lines.  |
| <code>[field].label</code>         | Extra arguments to the graph   |
| <code>[field].type</code>          | REQUIRED, the name of the value to be graphed,   |
|                                    | Type of value. COUNTER, GAUGE, defaults to GAUGE. NOTE: When GAUGE is used, only "snapshots" of every 5 minutes are recorded. Peaks in-between updates will not be graphed. When you use COUNTER, the numbers are averaged out over the past 5 minutes, so short peaks will show up as substantially lower than they were. |

## **munin-html**

Munin-html creates the html-pages for the graphs.

Usefull configuration in the server.conf file is:

`node_order [node1] [node2] ....`

In which order the nodes should be listed, defaults to sorted. This is a domain-level option.

`domain_order [domain1] [domain2] ....`

In which order the domains should be listed, defaults to sorted. This is a top-level option.

`category_order_order [category1] [category2] ....`

In which order the categories should be listed, defaults to sorted. This is a node-level option.

`service_order_order [service1] [service2] ....`

In which order the services should be listed, defaults to sorted. This is a node-level option.

## **munin-limits**

Munin-limits is a script to send an alert to a set of contacts. Munin-limits operates with three states -- ok, warning and critical.

### **The quick and easy way**

For most people, the following line will do all the work:

```
contact.email.command mail -s "Munin-notification for ${var:group} :: ${var:host}" your@email.address
```

This entry will use the default `text` entry, which should probably suite most people. If you also use Nagios, try swapping all the `nsca*` parameters for:

```
contact.nagios.command /usr/bin/send_nsca -H your.nagios-host.here -c /etc/send_nsca.cfg
```



## Defining contacts

There are some top-level options available in `munin.conf`:

*contact.<contact>.command <command>*

Define which command to run. Mandatory for each contact. The command can start with "> " (greater than space) to create/empty a file and write to it, or ">> " (greater than greater than space) to append to a file.

*contact.<contact>.text <text>*

Text to pipe into the command. Default is the text in `contact.default.text`, which is hardcoded (but can be overridden). `contact.nagios.text` also has a short hardcoded default suitable for transmission via `nsca` to Nagios.

*contact.<contact>.max\_messages <num>*

Close (and reopen) command after <num> messages.

*contact.<contact>.always\_send <states>*

Always send messages with a state that is mentioned in <states>. This only works for "warning" and "critical" states. <states> is a space delimited list.

*contacts <contact-list>*

A list of the available contacts to use by default. Defaults to all contacts with a command definition. Can be set on every level — top-level, domain-level, node-level and service-level.

## Command and text definitions

When defining the `command` and `text` entries, a number of variables are available for expansion.

*\${var:<variable>}*

For example `${var:graph_title}`. All variables from the plugin are available, as well as the following:

*numofields*

Number of OKs in the service.

*numfoields*

Number of new OKs (which were not OK on the last run) in the service.

*numwfields*

Number of warnings in the service.

*numcfields*

Number of criticals in the service.

*ofields*

Fields in the service with an OK state.

*fofields*

Fields in the service which just went to OK state.

*wfields*

Fields in the service with a state of warning.

*cfields*

Fields in the service with a state of critical.

*fields*

All fields in the service.

*worst*

The worst state of all the fields in the plugin.

*worstid*

0 for ok, 1 for warning, 2 for dcritical.

*wrange*

|   |                                  |
|---|----------------------------------|
|   | The warning range of the field.  |
| <i>crange</i>   | The critical range of the field. |
| <i>host</i>   | The hostname.                    |
| <i>group</i>  | The name of the group/domain.    |
| <i>plugin</i>   | The name of the plugin.          |
| <i>value</i>  | Current value of the field.      |
| <b><code>\${if:[!]&lt;field&gt; &lt;text&gt;}</code></b>  |                                  |
| Include <text> only if <field> is not 0 or a zero length string. Reverse meaning if the "!" is included.  |                                  |
| <b><code>\${loop[&lt;sep&gt;]:&lt;list&gt; &lt;text&gt;}</code></b>   |                                  |
| Print <text> once for each element of the space separated <list>. Separate the <text> additions with the contents of [sep] if it exists (note that the < and > should be included). Example: <code>\${loop&lt;, &gt;:fields \${var:label} is \${var:state}}}</code> . |                                  |

### Limit definitions in the plugin or munin.conf

A contact is only contacted if a value falls outside the .warning or .critical fields in your configuration or plugin scripts. The value for these field can be a single maxvalue or a colonseperated range

```
processes.warning 10:300
processes.critical 5:500
```

A value lower than 10 or higher then 300 will result in a warning to nagios, a value lower than 5 or higher than 500 will result in a critical.

Other usefull ranges:

```
[field].warning :400
```

is equal to:

```
[field].warning 400
```

Only warn if lower than 300:

```
[field].warning 300:
```

When a service contains .critical or .warning it will chech it's status agains the last fetched value. Any change in the state (ok, warning, critical) will cause a notification to be sent.

### munin-nagios

NOTE: As of version 1.1.5, munin-nagios is replaced by munin-limits. Munin-nagios is a optional script to send a passive alert to a nagios-server. For this to work, you need a nagios-nsca server, a working send\_nsca configuration and the following configuration in /etc/munin/munin.conf:

```
nsca                /usr/bin/send_nsca
nsca_config         /etc/nagios/send_nsca.cfg
```

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```
nsca_server [nsca-server]
```

Then add .warning and .critical fields in your configuration or directly into you plugin scripts. The value for these field can be a single maxvalue or a colonseperated range

```
processes.warning 10:300
processes.critical 5:500
```

A value lower than 10 or higher then 300 will result in a warning to nagios, a value lower than 5 or higher than 500 will result in a critical to nagios

Other usefull ranges:

```
[service].warning :400
```

is equal to:

```
[service].warning 400
```

Only warn if lower than 300:

```
[service].warning 300:
```

When a service contains .critical or .warning it will chech it's status agains the last fetched value. If it's ok, a "{service}.ok" file will be created in the \$dbdir/\$domain directory. If the value is not ok. This file will be removed and munin–nagios will update nagios every 5 minutes untill the value is ok and a new ".ok" file will be created.

## File locations

According to [FHS](#), this is where you should place the files.

### System package (Debian, RedHat, maybe others)

```
CONFDIR
    /etc/munin/
SBINDIR
    /usr/sbin/
LIBDIR
    /usr/share/munin/
STATEDIR
    /var/run/munin/
LOGDIR
    /var/log/munin/
DBDIR
    /var/lib/munin/
```

### Independent install (tarball)

```
CONFDIR
    /etc/opt/munin/
SBINDIR
```

File locations

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*/opt/munin/sbin/*  
*LIBDIR*  
*/opt/munin/lib/*  
*STATEDIR*  
*/var/run/munin/*  
*LOGDIR*  
*/var/log/munin/*  
*DBDIR*  
*/var/opt/munin/*