Ganeti Web Manager Documentation

Release 0.11.2

Oregon State University Open Source Lab

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Contents

Ganeti Web Manager is a Django based web frontend for managing Ganeti virtualization clusters. Since Ganeti only provides a command-line interface, Ganeti Web Manager's goal is to provide a user friendly web interface to Ganeti via Ganeti's *Remote API*. On top of Ganeti it provides a permission system for managing access to clusters and virtual machines, an in browser VNC console, and vm state and resource visualizations. You can see a few screenshots *here*.

If you don't already have a Ganeti cluster setup, these directions can help you get started.

If you are looking for support, please *contact us*.

If you are looking to deploy Ganeti Web Manager for the first time, check out our *Installation* guide.

If you already have a Ganeti Web Manager instance running it might be time to *upgrade*.

Finally, if you would like to report a bug or request a feature, please *file an issue*.

Ganeti Web Manager is licensed under the *GPLv2*. It is currently developed and maintained by the Oregon State University Open Source Lab and a handful of volunteers. If you would like to get involved in development see our *development* guide.

CHAPTER 1

Getting Started

Requirements

Operating system

We officially support Ubuntu 11.10, Ubuntu 12.04 and CentOS 6. Ganeti Web Manager is also known to work on Debian 7 and CentOS 5.

More on *compatibility page*.

Base

- sudo
- git

These dependencies are required to install Ganeti Web Manager via `setup.sh` installation script. Follow up to *installation instructions*.

During installation, if `python` and `python-virtualenv` are not installed, they will be installed.

Other Platforms

For operating systems other than CentOS and Debian, it will be necessary to install several required packages that the script handles, specifically:

- Python
- `python-virtualenv`

Virtualenv is used to manage Ganeti Web Manager's dependencies without touching other software on the system.

When running the `setup.sh` script, pass the `-N` flag to disable installation of these packages.

Databases

All database dependencies are installed **automatically** during `setup.sh` run. All you need is `sudo` priviledge. If you have any issues, please refer to Django database documentation.

If you, for any reason, want to install these database dependencies on your own, here's the list:

MySQL requires `MySQL-python` package installed within virtual environment, which in turn requires `libmysqlclient18` on Ubuntu/Debian and `mysql-libs` on CentOS.

PostgreSQL requires `psycopg2` package installed within virtual environment, which in turn requires `libpq5` on Ubuntu/Debian and `postgresql-libs` on CentOS.

If you're using the `setup.sh` script these database dependencies should be installed for you. But if it runs into errors, these are the dependencies needed.

LDAP

LDAP dependencies can be found on the *LDAP dependencies* page.

VNCAuthProxy

VNCAuthProxy, is used to connect the VNC web frontend to a Ganeti VM's VNC Console. This project is built on twisted and for encryption requires openssl and FFI development headers.

On CentOS, the OpenSSL package is `openssl-devel` and on Ubuntu/Debian its `libssl-dev`. The LibFFI package is `libffi-devel` on CentOS and `libffi-dev` on Ubuntu/Debian.

These packages are necessary to install VNCAuthProxy and should be installed before the setup script is run.

Installation

Warning: Prior to version 0.11, the preferred way of installing Ganeti Web Manager was by using `fabric`. It is **no longer** a default way of installing Ganeti Web Manager. If you have older Ganeti Web Manager, look at *these instructions*.

This instruction covers installation steps for end users. It is not intended for Ganeti Web Manager developers or people installing unstable version. If you want to play with unstable Ganeti Web Manager, please follow *instructions for developers*.

Installing

Installation is now automatic. There is now a shell script detects your operating system, installs required dependencies (even for your database of choice!), creates Python virtual environment and finally installs Ganeti Web Manager with its own dependencies.

1. Make sure that all Ganeti Web Manager's *Requirements* are met. For non-CentOS and non-Debian machines, make sure to see *Other Platforms*.
2. Next you need the latest release of Ganeti Web Manager which is 0.11.2. You can download that here: https://github.com/osuosl/ganeti_webmgr/archive/0.11.2.tar.gz. You can also clone the repo and checkout the latest tag as well:

```
$ git clone https://github.com/osuosl/ganeti_webmgr.git
$ git checkout $VERSION
```

Note: Replace $VERSION with the version you want to deploy, such as 0.11.2

It doesn't actually matter where you put these, it will only be used for installation, which will eventually install the project to another location, which by default is `/opt/ganeti_webmgr`.

1. Once you've got the project, you will use our shell script to install things. First, cd to the Ganeti Web Manager project folder:

```
$ cd ./ganeti_webmgr
```

Next run `./scripts/setup.sh -h` to get help and see all possible usages of our shell script. There are different options for installing to different locations, as well as installing different database dependencies.

2. Now that you've looked at the options, you'll want to actuall install Ganeti Web Manager. By default, it will install to `/opt/ganeti_webmgr` and will not install any database dependencies. To do this install run the following:

```
$ ./scripts/setup.sh
```

If you want to install Ganeti Web Manager with mysql support, which means installing your systems mysql-client libraries, development headers, and the python mysql package run:

```
$ ./scripts/setup.sh -D mysql
```

Note: You will likely need to run this as root as it requires permissions to install packages and create directories in `/opt`.

Warning: For CentOS 6, the EPEL repository must be installed to use `python-virtualenv`. If you do not want to install EPEL, manually install `python-virtualenv` and pass the `-N` flag to `setup.sh`.

VNC AuthProxy startup script

Ganeti Web Manager provides an in-browser VNC console. For more information, see *VNC*. In order to use the VNC console, you must run VNC AuthProxy, which comes with Ganeti Web Manager.

VNC AuthProxy can be set up to start on boot if wanted. To do so, it is necessary to set up an init script to manage the daemon. These vary by platform, so depending on what kind of system you are running Ganeti Web Manager on, there are a few choices.

CentOS and Ubuntu

Important: These scripts were written for CentOS 6.5 and Ubuntu 12.04.

If you are running CentOS, copy the file `scripts/vncauthproxy/init-centos` to `/etc/init.d/vncauthproxy` and install the service:

```
$ sudo cp /path/to/gwm/source/scripts/vncauthproxy/init-centos /etc/init.d/vncauthproxy
$ sudo chkconfig --add vncauthproxy
```

Otherwise, if you are running Ubuntu, copy the file `scripts/vncauthproxy/init-ubuntu` to `/etc/init.d/vncauthproxy` and install the service:

```
$ sudo cp /path/to/gwm/scripts/vncauthproxy/init-ubuntu /etc/init.d/vncauthproxy
$ sudo update-rc.d vncauthproxy defaults
```

The `vncauthproxy` service is installed and can be started:

```
$ sudo service vncauthproxy start
```

systemd

For systems running `systemd`, a basic systemd script is provided. It has been tested on Debian 8.

Copy the file `scripts/vncauthproxy/init-systemd` to `/lib/systemd/system/vncauthproxy.service` and enable the service:

```
$ sudo cp /path/to/gwm/scripts/vncauthproxy/init-systemd /lib/systemd/system/vncauthproxy.service
$ sudo systemctl enable vncauthproxy
```

The script supports variables for PIDFILE, LOGFILE, PORT, and INTERFACE, which can be set in '/etc/defaults/vncauthproxy'.

To set the location of the `twistd` daemon to somewhere other than `/opt/ganeti_webmgr/bin/twistd`, it is at this time necessary to modify the service file directly.

Minimum Configuration

There are defaults for most settings, however, **there are no defaults set for database settings.** Make sure to set these or you will run into problems with the rest of the installation.

See *configuration page* for documentation on configuring Ganeti Web Manager.

Initializing

Because your Ganeti Web Manager instance lives within virtual environment, you must activate the virtual environment in order to access GWM:

```
$ source /opt/ganeti_webmgr/bin/activate
```

Now all the programs installed to that virtual environment are available for you (until you issue `deactivate` or close your terminal session).

We'll be using the `django-admin.py` tool to run commands to administer our app from this point forward. You might be familiar with `manage.py`, which is essentially what `django-admin.py` is. However, we need to tell `django-admin.py` what settings to use, in order for it to work. To do this run the following command:

```
$ export DJANGO_SETTINGS_MODULE="ganeti_webmgr.ganeti_web.settings"
```

You only need to run this once each time you activate the virtual environment, or if you prefer, each time you run `django-admin.py` you can provided the `--settings` argument:

```
$ django-admin.py $CMD --settings "ganeti_webmgr.ganeti_web.settings"
```

Note: Replace $CMD with the command you actually need to run. Also note that the `--settings` flag must come after the $CMD being run.

Install Javascript dependencies

Ganeti Web Manager uses `bower` to manage its dependencies. This allows them to be easily ugpraded, as well as not requiring keeping them inside the repository. To install the dependencies, use `django-admin`'s bower command:

```
$ django-admin.py bower install
```

The dependencies might take a minute to download and install.

Initialize database

- MySQL or SQLite: create new tables and migrate all applications using South:

```
$ django-admin.py syncdb --migrate
```

- PostgreSQL: only fresh installation supports PostgreSQL, because there are no migrations for this database within Ganeti Web Manager prior to **version 0.11**:

```
$ django-admin.py syncdb --all
$ django-admin.py migrate --fake
```

Update Cache

Prior to **version 0.11** when migrations were run, we would automatically update the cache of RAPI data in the Database, however running this during migrations was prone to a lot of errors, so it is now its own command. Run the following to update the cache:

```
$ django-admin.py refreshcache
```

New in version 0.11.

Search indexes

Build them with:

```
$ django-admin.py rebuild_index
```

Note: Running `django-admin.py update_index` on a regular basis ensures that the search indexes stay up-to-date when models change in Ganeti Web Manager.

Next Steps

Congratulations! Ganeti Web Manager is now installed and initialized. Next, you'll want to look into *Configuring* and *Deployment Intro*, if you are going to be setting up a production instance.

Otherwise, if you just want to play around with Ganeti Web Manager, or are *developing*, take a look at the *Development Server*.

Configuring

After you *installed* your Ganeti Web Manager instance with *setup script* it's time for some configuration.

Configuration of Ganeti Web Manager can be defined with YAML, a human-readable markup language. Ganeti Web Manager also supports configuration through `settings.py`.

Ganeti Web Manager supports `settings.py` for those that do not wish to use YAML; however, YAML configuration is preferred. The YAML configuration method makes it much easier to store settings outside of the project's repository, which makes managing settings with a configuration management tool easier and safer.

The YAML configuration file is always named `config.yml`. You can customize the location Ganeti Web Manager looks for this file by setting the `GWM_CONFIG_DIR` environmental variable. The current default is `/opt/ganeti_webmgr/config`.

By default you will need to put your yaml config in `/opt/ganeti_webmgr/config/config.yml`. If you want to customize the location you can set `GWM_CONFIG_DIR` like so:

```
$ export GWM_CONFIG_DIR='/etc/ganeti_webmgr'
```

This will cause Ganeti Web Manager to look for your config file at `/etc/ganeti_webmgr/config.yml`.

When both `config.yml` and `settings.py` are present, any settings stored in `settings.py` take precedence.

Note: A quick note about settings. Any setting value which contains an – or `:`, or any other character used by yaml, must be wrapped in quotes.

Example: `localhost:8000` becomes `"localhost:8000"`.

Creating configuration files

To get started configuring Ganeti Web Manager with YAML, copy the `config.yml.dist` to `config.yml` in the directory where you want your settings:

```
$ cp /path/to/gwm/ganeti_webmgr/ganeti_web/settings/config.yml.dist /opt/ganeti_webmgr/config/config
```

Alternatively, to configure Ganeti Web Manager with the standard Django `settings.py`, copy `settings.py.dist` to `settings.py` in the same directory it is in:

```
$ cp /path/to/gwm/ganeti_webmgr/ganeti_web/settings/settings.py.dist \
    /path/to/gwm/ganeti_webmgr/ganeti_web/settings/settings.py
```

LDAP configuration

To configure Ganeti Web Manager to use LDAP, see the *LDAP* documentation.

Databases

Ganeti Web Manager supports PostgreSQL, MySQL, Oracle, and SQLite databases. The type of database and other configuration options must be defined in either `settings.py` or `config.yml`. **These settings are not set by default** like most other settings in Ganeti Web Manager. Be sure to actually configure your database settings.

Configuring SQLite in `config.yml`:

```
DATABASES:
    default:
        ENGINE: django.db.backends.sqlite3
        NAME: /opt/ganeti_webmgr/ganeti.db
        USER:      # Not used with sqlite3.
        PASSWORD:  # Not used with sqlite3.
        HOST:      # Set to empty string for localhost.
                   # Not used with sqlite3.
```

```
        PORT:      # Set to empty string for default.
                         #Not used with sqlite3.
```

Configuring SQLite in `settings.py`:

```
DATABASES = {
    'default': {
        'ENGINE': 'django.db.backends.sqlite3',
        'NAME': '/opt/ganeti_webmgr/ganeti.db',
        'USER': '',      # Not used with sqlite3.
        'PASSWORD': '',  # Not used with sqlite3.
        'HOST': '',      # Set to empty string for localhost.
                         # Not used with sqlite3.
        'PORT': '',      # Set to empty string for default.
                         #Not used with sqlite3.
    }
}
```

For PostgreSQL, Oracle, and MySQL, replace `.sqlite` in the engine field with `.postgresql_psycopg2`, `.oracle`, or `.mysql` respectively:

```
# config.yml
DATABASES:
    default:
        ENGINE: django.db.backends.mysql
        NAME: database_name
        USER: database_user
        PASSWORD: database_password
        HOST: db.example.com
        PORT: # leave blank for default port
```

Secret Keys

By default Ganeti Web Manager creates a `SECRET_KEY` and a `WEB_MGR_API_KEY` for you the first time you run a command using `django-admin.py`, and puts this key into a file located at `/opt/ganeti_webmgr/.secrets/SECRET_KEY.txt`. This is to make initial setup easier, and less hassle for you. This key is used for protection against CSRF attacks as well as encrypting your Ganeti cluster password in the database. Once set, you should avoid changing this if possible.

If you want to have better control of this setting you can set the `SECRET_KEY` setting in `config.yml` like so:

```
SECRET_KEY: ANW61553mYBKJft6pYPLf1JbTeHKLutU
```

Please do not use this value, but instead generate something random yourself. You do **not** want to share this, or make it publicly accessible. This can be used to avoid protections Ganeti Web Manager has implemented for you.

If you are using the *SSH Keys* feature to add keys to VMs with Ganeti Web Manager, you will also need to set the `WEB_MGR_API_KEY` setting in `config.yml` or keep the value created for you in `/opt/ganeti_webmgr/.secrets/WEB_MGR_API_KEY.txt`. This is the same value you will use when running the `sshkeys.py` or `sshkeys.sh` scripts. Similarly, it should be something impossible to guess, much like the `SECRET_KEY` setting:

```
WEB_MGR_API_KEY: 3SqmsCnNiuDY9lAVIh3Tx3RIJfql6sIc
```

Again, do not use the value above. If anyone gains access to this key, **and** you are using the sshkeys feature, it will allow them to add arbitrary ssh keys to your Virtual Machines.

Note: We have not included these settings in the example `config.yml` at the bottom of this page for security

reasons. We do not want anyone copying the values we've used in our examples for security prone settings such as this. If you wish to set these yourself, you will need to manually add them to `config.yml`.

Time zone and locale

Ganeti Web Manager supports time zones, translations and localizations for currency, time, etc. To find the correct time zone for your locale, visit the List of time zones. For language codes, see List of language codes. Not every language is supported by Ganeti Web Manager.

Date and datetime format follows the Django date format. For instance, `d/m/Y` will result in dates formatted with two-digit days, months, and four- digit years.

A standard configuration might look something like this:

```
TIME_ZONE: America/Los_Angeles
DATE_FORMAT: d/m/Y
DATETIME_FORMAT: "d/m/Y H:i"

LANGUAGE_CODE: "en-US"

# Enable i18n (translations) and l10n (locales, currency, times).
USE_I18N: True

# If you set this to False, Django will not format dates, numbers and
# calendars according to the current locale
USE_L10N: True
```

Registration and e-mails

To set up Ganeti Web Manager to send registration emails, you'll need access to an SMTP server. You can configure the SMTP host, port, and email address:

```
EMAIL_HOST: localhost
EMAIL_PORT: 25
DEFAULT_FROM_EMAIL: noreply@example.org
```

For more complicated email setups, refer to the Django email documentation.

Allowing open registration means that users can create their own new accounts in Ganeti Web Manager. The users will then have the number of days set in `ACCOUNT_ACTIVATION_DAYS` to activate their account:

```
ALLOW_OPEN_REGISTRATION: True
ACCOUNT_ACTIVATION_DAYS: 7
```

More details can be found in the *Open Registration* documentation.

Site root and static files

The site root, static root, and static url must also be set when configuring Ganeti Web Manager.

The `SITE_ROOT` is the subdirectory on the website: `http://example.com/<SITE_ROOT>`. The current default is empty.

The `STATIC_ROOT` is the directory on the filesystem that Ganeti Web Manager's static files will be placed when you run `django-admin.py collectstatic`. The current default is `/opt/ganeti_webmgr/collected_static`.

STATIC_URL is the full url where Ganeti Web Manager will look when trying to obtain static files. The default for this is currently /static which means it will try looking at the same domain it is hosted on. For example if your hostname is *www.yourwebsite.com* it will look for them at www.yourwebsite.com/static.

A standard configuration, putting Ganeti Web Manager at the root of the domain, might look like this:

```
SITE_ROOT: /web_admin
STATIC_ROOT: /opt/ganeti_webmgr/collected_static
STATIC_URL: www.yourwebsite.com/static
```

Haystack Search Settings

Haystack is Ganeti Web Manager's way of performing search indexing. It currently has one setting which you need to worry about.

HAYSTACK_WHOOSH_PATH is the path to a location on the filesystem which Ganeti Web Manager will store the search index files. This location needs to be readable and writable by whatever user is running Ganeti Web Manager. Example users might be the apache or nginx user, or whatever user you've set the Ganeti Web Manager process to run as.

The default path for this setting is /opt/ganeti_webmgr/whoosh_index.

An example of this setting might be:

```
HAYSTACK_WHOOSH_PATH: /opt/ganeti_webmgr/whoosh_index
```

More details can be found in the search documentation.

Sentry

Ganeti Web Manager can log server errors to Sentry, an online exception tracker. To enable tracking, copy the raven.py.dist settings file to raven.py and set the dsn value. If you are using hosted Sentry, you can get the dsn value by logging into your Sentry account and copying it directly from their documentation.

Other settings

ITEMS_PER_PAGE is a setting allowing you to globally limit or extend the number of items on a page listing things. This this currently defaults to 15 items per page, so your pages will have up to 15 VMs, clusters and node's listed on a single page. You might adjust this to a lower value if you find that loading a large number on a single page slows things down.

```
ITEMS_PER_PAGE: 20
```

Set VNC_PROXY to the hostname:port pair of your VNCAuthProxy server. The VNC AuthProxy does not need to run on the same server as Ganeti Web Manager.

```
VNC_PROXY: "localhost:8888"
```

LAZY_CACHE_REFRESH (milliseconds) is the fallback cache timer that is checked when the object is instantiated. It defaults to 600000ms, or ten minutes.

```
LAZY_CACHE_REFRESH: 600000
```

RAPI_CONNECT_TIMEOUT is how long Ganeti Web Manager will wait in seconds before timing out when requesting data from the ganeti cluster.

```
RAPI_CONNECT_TIMEOUT: 10
```

Sample configuration

An annotated sample YAML configuration file is shown below:

```
# config.yml

# Django settings for ganeti_webmgr project.

##### Database Configuration #####
DATABASES:
    default:
        ENGINE: django.db.backends.sqlite3
                    # django.db.backends.sqlite3
                    # django.db.backends.postgresql
                    # django.db.backends.mysql
                    # django.db.backends.oracle
                    # django.db.backends.postgresql_psycopg2

        # Or path to database file if using sqlite3.
        NAME: /opt/ganeti_webmgr/ganeti.db
        USER:      # Not used with sqlite3.
        PASSWORD:  # Not used with sqlite3.
        HOST:      # Not used with sqlite3.
        PORT:      # Set to empty string for default.
                       #Not used with sqlite3.
##### End Database Configuration #####

# Site name and domain referenced by some modules to provide links back to
#  the site.
SITE_NAME: Ganeti Web Manager
SITE_DOMAIN: "localhost:8000"

# http://en.wikipedia.org/wiki/List_of_tz_zones_by_name
TIME_ZONE: America/Los_Angeles
DATE_FORMAT: d/m/Y
DATETIME_FORMAT: "d/m/Y H:i"

# Language code for this installation. All choices can be found here:
# http://www.i18nguy.com/unicode/language-identifiers.html
LANGUAGE_CODE: "en_US"
##### End Locale Configuration #####

# Enable i18n (translations) and l10n (locales, currency, times).
# You really have no good reason to disable these unless you are only
# going to be using GWM in English.
USE_I18N: True

# If you set this to False, Django will not format dates, numbers and
# calendars according to the current locale
USE_L10N: True

# prefix used for the site.  ie. http://myhost.com/<SITE_ROOT>
# for the django standalone server this should be
# for apache this is the url the site is mapped to, probably /tracker
SITE_ROOT: ""
```

```
# Absolute path to the directory that holds media.
# Example: /home/media/media.lawrence.com/
STATIC_ROOT: /opt/ganeti_webmgr/collected_static

# URL that handles the media served from STATIC_ROOT.
# XXX contrary to django docs, do not use a trailing slash.  It makes urls
# using this url easier to read.  ie.  {{STATIC_URL}}/images/foo.png
STATIC_URL: /static

##### Registration Settings #####
ACCOUNT_ACTIVATION_DAYS: 7

# Email settings for registration
EMAIL_HOST: localhost
EMAIL_PORT: 25
DEFAULT_FROM_EMAIL: noreply@example.org

# Whether users should be able to create their own accounts.
# False if accounts can only be created by admins.
ALLOW_OPEN_REGISTRATION: True
##### End Registration Settings #####

####### Haystack Search Index settings #######
HAYSTACK_WHOOSH_PATH: /opt/ganeti_webmgr/whoosh_index
####### End Haystack Search Index settings #######


# GWM Specifics

# The maximum number of items on a single list page
ITEMS_PER_PAGE: 15

# Ganeti Cached Cluster Objects Timeouts
#    LAZY_CACHE_REFRESH (milliseconds) is the fallback cache timer that is
#    checked when the object is instantiated. It defaults to 600000ms, or ten
#    minutes.
LAZY_CACHE_REFRESH: 600000

# VNC Proxy. This will use a proxy to create local ports that are forwarded to
# the virtual machines.  It allows you to control access to the VNC servers.
#
# Expected values:
#   String syntax: HOST:CONTROL_PORT, for example: localhost:8888. If
#   localhost is used then the proxy will only be accessible to clients and
#   browsers on localhost. Production servers should use a publicly accessible
#   hostname or IP
#
# Firewall Rules:
#   Control Port: 8888, must be open between Ganeti Web Manager and Proxy
#   Internal Ports: 12000+ must be open between the Proxy and Ganeti Nodes
#   External Ports: default is 7000-8000, must be open between Proxy and Client
#   Flash Policy Server: 843, must open between Proxy and Clients
VNC_PROXY: "localhost:8888"

# This is how long gwm will wait before timing out when requesting data from the
# ganeti cluster.
RAPI_CONNECT_TIMEOUT: 10
```

Importing a Cluster

1. Log in as an admin user.
2. Navigate *Clusters -> Add Cluster*
3. Fill out properties and click *save*

When the Cluster is imported into Ganeti Web Manager it will automatically synchronize. Virtual Machine objects will be created to match what is found on the Ganeti Cluster. *Permission Tags* will also be parsed to automatically add permissions for virtual machines.

A cluster can be added with only its hostname and port, but a username and password for the cluster are required if you want to make changes to it. Clusters added without a valid username and password appear in *Cluster Read Only Mode* where you can only change aspects of the cluster that are local to Ganeti Web Manager's database.

If you're logged in as a cluster admin or superuser you can edit properties of a cluster by using the "edit" button on the cluster detail page.

Warning: If a cluster is in *Cluster Read Only Mode*, there will be errors if you try to modify virtual machines or create new ones.

Synchronizing Clusters

Ganeti Web Manager stores some information about clusters in its database. Cluster and virtual machine information will *refresh automatically*, but the list of virtual machines must be synchronized manually. This can be done by via the orphans view

1. Main Menu -> Orphans

Clusters are synchronized when the orphans view is visited.

Adding Virtual Machines

To add a virtual machine, select "Create VM" in the toolbar. Only fields with multiple options will be selectable. For example, if you are unable to change the cluster to which a VM gets added, it means that there is only one valid option and cluster is a mandatory field.

- If the user creating the VM has permissions to do so, the owner will be that user. If the user does not have create permissions but is a member of a group that can create VMs, ownership defaults to that group.
- Cluster can be chosen from those that the the user creating the VM has access to.
- The Hypervisor will generally be dictated by the cluster that you choose.
- The instance name must be a fully qualified domain name (FQDN). (e.g. hostname.example.org)
- If you uncheck "Start up after creation", you can start the VM manually on its virtual machine detail page. (click Virtual Machines in the sidebar, then the VM's name)
- DNS name check: if checked, sends the name you selected for the VM to the resolver (e.g. in DNS or /etc/hosts, depending on your setup). Since the name check is used to compute the IP address this also enables/disables IP checks (e.g. if the IP is pingable). Uncheck if using dynamic DNS.
- Disk Template chooses a layout template from these options:
  - plain - Disk devices will be logical volumes (e.g. LVM)
  - drbd - Disk devices will be DRBD (version8.x) on top of LVM volumes

        * If drbd is selected, a primary and secondary node will need to be chosen unless automatic allocation has been selection. DRBD will allow the virtual machine to use live migration and failover in case one of the nodes goes offline.
    - file - Disk devices will be regular files (e.g. qcow2)
    - diskless - This creates a virtual machine with no disks. Its useful for testing only (or other special cases).
- Operating system to install on the virtual machine. Your choices are limited to the images configured on the cluster.

General Parameters:

- Virtual CPUs will be deducted from owner's quota. If the owner field appears blank and is not selectable, the default owner has been chosen.
- Memory is the amount of RAM to give this VM. If no units are given, megabytes is assumed.
- Disk size is the amount of owner's disk quota to allot this VM. If no units are given, megabytes is assumed.
- Disk type determines the way the disks are presented to the virtual machine. Options may vary based on cluster's hypervisor settings.
- More information about NIC Mode, NIC Link, and NIC Type can be found here

Hypervisor parameters:

TODO finish this part

Orphaned Virtual Machines

Permission Tags are parsed by virtual machine objects, but sometimes virtual machines will have no tags. To quickly identify virtual machines with no admin users, use the orphans view

1. Main Menu -> Orphans

Visiting the orphans view will force a synchronization of all clusters and display VirtualMachines that do not have any permissions assigned. You only need to grant permissions directly on virtual machines if you are granting access to non-admin users.

CHAPTER 2

Deployment

Deployment Intro

Ganeti Web Manager supports various methods of deployment. By default Django ships with a simple python web server for development purposes. If you're just trying to get Ganeti Web Manager up and running, or you simply want to contribute to the project then using the *Development Server* is probably your best bet. Otherwise check out *Static Files*. Once you've gotten your static files figured out, move into either deployment with *Apache + mod_wsgi* or *Nginx + uWSGI*.

Development Server

Make sure you've already checked out *Initializing*.

If you are just testing Ganeti Web Manager out, run:

```
$ django-admin.py runserver --insecure
```

Then open a web browser, and navigate to *http://localhost:8000*.

If you want this to be accessable from a machine other than where you ran that command, then run the following:

```
$ django-admin.py runserver 0.0.0.0:8000 --insecure
```

Note: This should only be used to *test*. This should never be used in a *production* environment.

Static Files

Django is not very good at serving static files like CSS and Javascript. This is why we use web servers like Apache or Nginx. So we need to collect all of our static files into a single directory.

To adjust where these static assets get copied to, you can adjust the `STATIC_ROOT` setting in `config.yml`. By default it copies files to `/opt/ganeti_webmgr/collected_static`. To actual do the copy, run the following:

```
$ source /opt/ganeti_webgr/bin/activate
$ django-admin.py collectstatic
```

Once you've done that, you can move on to deploying using your preferred web server.

- *Apache*

- *Nginx*

Apache + mod_wsgi

Overview

Before beginning deploying Ganeti Web Manager using Apache, read the following Django article on deploying Django with apache and mod_wsgi.

If you haven't already, make sure you've set up *Static Files*.

To get Ganeti Web Manager installed there are a few steps.

- Install Apache
- Configure/install `mod_wsgi` and other Apache modules
- Create the Ganeti Web Manager VirtualHost

Configuration

Make sure you have mod_wsgi installed and enabled in Apache before beginning.

Next you want to create a vhost which will contain the Apache settings that will point to our Django app. The following is an example which assumes you have installed Ganeti Web Manager to the default location in `/opt/ganeti_webmgr`, and that your running python 2.6. Replace the locations with where you've actually installed it to, and replace python2.6 with the version of python you're using.

The following is an example Apache configuration for Apache 2.4:

```
<VirtualHost *:80>

    ServerName gwm.example.org

    WSGIDaemonProcess ganeti_webmgr processes=4 threads=1 python-path=/opt/ganeti_webmgr/lib/python2.
    WSGIProcessGroup ganeti_webmgr
    WSGIScriptAlias / /opt/ganeti_webmgr/lib/python2.6/site-packages/ganeti_webmgr/ganeti_web/wsgi.py

    Alias /static/ /opt/ganeti_webmgr/collected_static/

    <Directory /opt/ganeti_webmgr/collected_static>
        Require all granted
    </Directory>

    <Directory /opt/ganeti_webmgr>
        <Files wsgi.py>
            Require all granted
        </Files>
    </Directory>

</VirtualHost>
```

If you're running an older version of Apache, `Require all granted` isn't supported, so you'll need to do the following:

```
<VirtualHost *:80>

    ServerName gwm.example.org

    WSGIDaemonProcess ganeti_webmgr processes=4 threads=1 python-path=/opt/ganeti_webmgr/lib/python2
    WSGIProcessGroup ganeti_webmgr
    WSGIScriptAlias / /opt/ganeti_webmgr/lib/python2.6/site-packages/ganeti_webmgr/ganeti_web/wsgi.py

    Alias /static/ /opt/ganeti_webmgr/collected_static/

    <Directory /opt/ganeti_webmgr/collected_static>
        Order deny,allow
        Allow from all
    </Directory>

    <Directory /opt/ganeti_webmgr>
        <Files wsgi.py>
            Order allow,deny
            Allow from all
        </Files>
    </Directory>

</VirtualHost>
```

WSGIDaemonProcess: `processes` should be set to the number of CPU cores available.

`threads` is fine to be left at 1.

python-path is adding our installation containing Ganeti Web Manager to the pythonpath so it, and all of the dependencies installed can be accessed by mod_wsgi.

More info on this particular directive can be found on the mod_wsgi docs.

WSGIScriptAlias: This is the base URL path that Ganeti Web Manager will be served at. In this case its at / (the root url).

Alias: Defines where to find the static assets (css, js, images) for Ganeti Web Manager. This lets Apache serve the static files instead of having Django do it. You can leave this as is unless you modified the `STATIC_ROOT` setting in your config file.

Nginx + uWSGI

uWSGI

Before you begin, it is adviced you read over the following uWSGI article on setting up Django with uWSGI and Nginx

If you haven't already, make sure you've set up *Static Files*.

Configuration

First you will want to install uWSGI to the virtualenv which is easily done with the following commands:

```
$ source /opt/ganeti_webmgr/bin/activate
$ pip install uwsgi
```

Once uWSGI is installed you should configure Nginx to handle serving our static assets and proxy the rest to uWSGI. This assumes you've already collected static files to the default location. Here is a sample nginx virtual host:

```
upstream gwm {
    # server unix:///path/to/gwm_uwsgi.sock; # for a file socket
    server 127.0.0.1:8001;
}

server {
    listen      80;
    server_name gwm.example.org;

    location /static {
        alias /opt/ganeti_webmgr/collected_static;

    }

    location / {
        uwsgi_pass  gwm;
        include     uwsgi_params;
    }
}
```

Finally you will want to configure uWSGI. Here is a sample uWSGI configuration file that should properly work with GWM:

```
# gwm_uwsgi.ini
[uwsgi]

# GWM's wsgi file
module          = ganeti_webmgr.ganeti_web.wsgi
# the virtualenv (full path)
home            = /opt/ganeti_webmgr

# Configure based on needs
master          = true
processes       = 2
socket          = 127.0.0.1:8001
vacuum          = true
```

To start uwsgi you can run the following command, pointing it at your uwsgi file:

```
$ uwsgi --ini /path/to/gwm_uwsgi.ini
```

CHAPTER 3

Features

Permissions

Permissions may be granted to both clusters and virtual machines. The permissions system is intended to allow users to manage themselves. Any object that can have its permissions edited will have a *Users* tab.

For a high level description of how permissions can be used in various scenarios, read this blog post.

Adding users to objects.

1. navigate to Group, Cluster, or VirtualMachine detail page
2. click *Add New User*
3. select user or group
4. select permissions
5. *save*

Updating permissions

1. navigate to Group, Cluster, or VirtualMachine detail page
2. click *Users* tab
3. click permissions column
4. select permissions and *save*

Deleting permissions

1. navigate to Group, Cluster, or VirtualMachine detail page
2. click *Users* tab
3. click the *delete* icon

Deleting a user will remove all permissions, and other properties associated with the user such as cluster quotas.

Groups

Groups may be created so that permissions can be given out to multiple users at once. This allows permissions structures where you are granting permissions to different organizations. Users may belong to unlimited number of groups. They will inherit the permissions of any group they belong to.

Groups are a persona that user's may act on behalf of. When creating virtual machines, the user must choose whether they are acting on behalf of themselves or a group they are a member of. When acting on behalf of a group, the group's permissions and quota used.

Group Permissions

- **admin** - Grants the ability to see the member list, and edit permissions

Cluster

These permissions can be granted to either a user or a group. A user who is part of a group with a permission does not automatically have that permission individually. For instance, a user who is part of a group that has VM create permission can create a VM, but can only assign ownership to the group, not to themself. To grant permissions on a cluster, click *add user* on the Users tab of the cluster detail page. Cluster permissions can also be added by clicking *Add Cluster* in the Permissions tab of the user detail page.

- **admin** - Grants full access to the cluster. Includes ability to set permissions and quotas, and full access to all virtual machines.
- **create_vm** - Grants ability to create virtual machines on the cluster.
- **tags** - Grants ability to set tags on the cluster.
- **replace disks** - Ability to replace disks of VMs on the cluster.
- **migrate** - Can migrate a VM to another node
- **export** - Can export a virtual machine

Quotas

Quotas restrict the usage of cluster resources by users and groups. Default quotas can be set by editing clusters, if no quota is set unlimited access is allowed. This will affect all users and groups.

The default quota can be overridden on the cluster users page:

1. *Clusters -> Cluster -> Users*
2. click quota value.
3. edit values, and click *save*

Leaving a value empty specifies unlimited access for that resource.

Virtual Machines

To grant a user permissions on a VM, click *Add VirtualMachine* in the Permissions tab of the User detail page. To grant permissions to a user or group, use the *Add User* button on the Users tab of the VM detail page.

- **admin** - Grants full access to the virtual machine, including granting permissions.
- **Modify** - Allows user to modify VM's settings, including reinstallation of OS

- **Remove** - Permission to delete this VM
- **Power** - Permission to start, stop, reboot, and access console
- **Tags** - Can set tags for this VM

Permission Tags

Permissions for virtual machines are also registered as tags on the virtual machine object. This allows the permissions to be viewed and set via the command line tool. Tags will be parsed when creating virtual machines, and will be updated when the object is refreshed (#387). When permissions are granted tags will be set on the virtual machine (#393).

Tags use the pattern: *GANETI_WEB_MANAGER:<permission>:[G|U]:<user_id>*

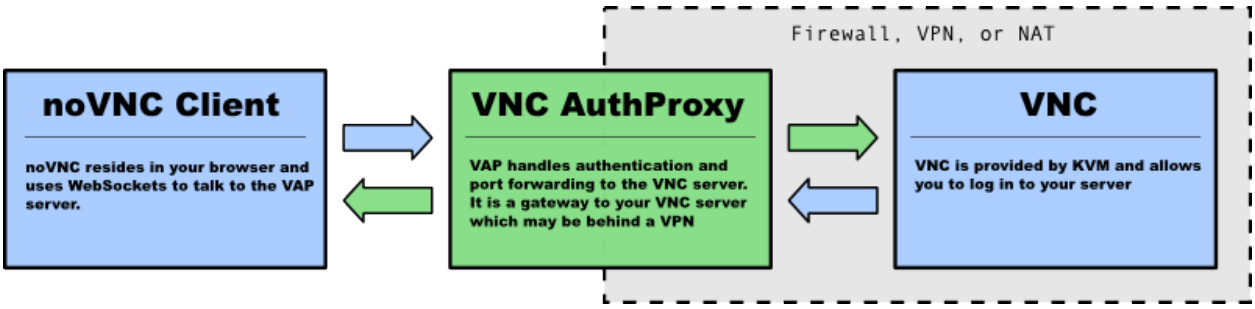
- **GANETI_WEB_MANAGER:admin:U:2** - admin permission for User with id 2
- **GANETI_WEB_MANAGER:admin:G:4** - admin permission for Group with id 4
- **GANETI_WEB_MANAGER:start:U:2** - start permission for User with id 2

Object Log

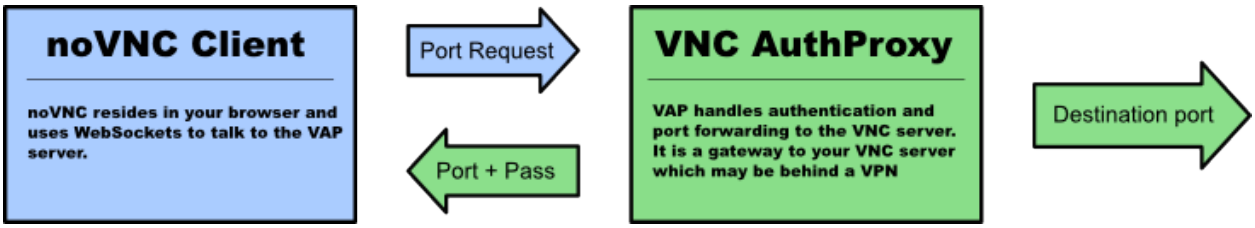
VNC

Ganeti Web Manager provides an in browser console using noVNC, an HTML5 client. noVNC requires WebSockets to function. Support for older browsers is provided through a flash applet that is used transparently in the absence of WebSockets.

VNC AuthProxy



VNC AuthProxy is required for the console tab to function. VNC servers do not speak websockets and our proxy allows your ganeti cluster to sit behind a firewall, VPN, or NAT.



VNC AuthProxy has a control channel that is used to request port forwarding to a specific VNC machine. It will respond with a local port and temporary password that must be used within a short period. This allows a secure connection with the VNC AuthProxy, without compromising the vnc password, and without leaving the port open to anyone with a port scanner.

Configuring VNC AuthProxy

Set the host and port that the proxy uses in `config.yml` with the `VNC_PROXY` setting.

Syntax is `HOST:CONTROL_PORT`, for example: `"localhost:8888"`.

If the host is localhost then the proxy will only be accessible to clients and browsers on the same machine as the proxy. Production servers should use a public hostname or IP.

Note: If using *Vagrant*, you will need to add the VM's FQDN and IP address to your `/etc/hosts` file.

```
# located in your settings file
VNC_PROXY = 'localhost:8888'
```

To set up encryption, find where VNC AuthProxy's working directory. This may depend on how you have set it set up to automatically start; for instance, with `runit`, it automatically sets the working directory to `/etc/sv/vncauthproxy`.

You then should put your HTTPS certificate file in `/path/to/working/dir/keys/vncap.crt` and your HTTPS private key in `/path/to/working/dir/keys/vncap.key`. VNC AuthProxy should then automatically accept encrypted connections.

Starting the Daemon

VNC AuthProxy is now controlled with an init.d script. To install the script, see *VNC AuthProxy startup script*.

Once installed, VNC AuthProxy can be controlled with standard service commands. You can `start`, `stop`, and `restart` the service, and get check if the service is running with `status`:

```
$ sudo service vncauthproxy status
```

If you do not wish to install VNC AuthProxy as a service, it can be manually started when inside the Ganeti Web Manager virtual environment.

```
$ twistd --pidfile=/tmp/proxy.pid -n vncap
```

Starting Flash Policy Server

Browsers that do not support WebSockets natively are supported through the use of a flash applet. Flash applets that make use of sockets must retrieve a policy file from the server they are connecting to. VNC AuthProxy includes a policy server. It must be run separately since it requires a root port. You may want to open port 843 in your firewall for production systems.

Start the policy server with twistd

```
sudo twistd --pidfile=/tmp/policy.pid -n flashpolicy
```

Firewall Rules

The following ports are used by default

- **8888**: Control port used to request vnc forwarding. Should be open between **Ganeti Web Manager** and **Proxy**
- **12000+**: Internal VNC Ports assigned by **Ganeti**. Should be open between **Proxy** and **Ganeti Nodes**.
- **7000-8000**: External VNC Ports assigned by **Proxy**. Should be open between **Proxy** and **Clients/Web Browsers**.
- **843**: Flash policy server. Required to support browsers without native websocket support. Should be open between **Proxy** and **Clients/Web Browsers**.

Debugging Help

Python Path for flash policy server

The following error indicates that your python path is not set or the proxy is not installed:

```
/usr/bin/twistd: Unknown command: flashpolicy
```

Ensure that your virtualenv is active:

```
source venv/bin/activate
```

If not using a virtualenv, then you must manually set the `PYTHONPATH` environment variable as root:

```
export set PYTHONPATH=.
```

SSH Keys

Ganeti Web Manager allows users to store SSH Keys. Each virtual machine has a view that will return SSH keys for users with access.

Configuring User SSH Keys

As an User

1. click your **username** in the menu sidebar
2. use the Add, Edit, and Delete buttons to manage your keys

As an Admin

1. click **Users** in the menu sidebar
2. click the edit button for the user you want to edit
3. use the Add, Edit, and Delete buttons to manage your keys

SSH Keys script

Ganeti Web Manager provides a script that will automatically generate an authorized_keys files

```
$ python util/sshkeys.py [-c CLUSTER [-i INSTANCE]] WEB_MGR_API_KEY URL
```

- **WEB_MGR_API_KEY** is the value set in `config.yml` settings file
- **URL** is a URL pointing to the GWM server
- **CLUSTER** is the identifier of a cluster
- **INSTANCE** is the hostname of an instance

The GWM server URL has some flexibility in how it may be specified; HTTP and HTTPS are supported, as well as custom port numbers. The following are all valid URLs:

- http://example.com/
- https://example.com/
- http://example.com:8080/

CLUSTER and **INSTANCE** are optional. Including them will narrow the list of users to either a **Cluster** or a **VirtualMachine**.

SSH Keys Ganeti hook

If you want your VMs to automatically copy the ssh keys from GWM, then you can use the included ssh keys ganeti hook found in `util/hooks/sshkeys.sh`. Copy that file onto every node in your cluster in the hooks directory for the instance definition you're using (i.e. ganeti-debootstrap). Copy and set the variables in `util/hooks/sshkeys.conf` into the variant config and/or the instance definition config file. Make sure that the hook is executable and all the variables are set include changing the API Key.

LDAP

New in version 0.10.

Ganeti Web Manager supports LDAP authentication through the use of django-auth-ldap and python-ldap. A fabric command has been written to easily handle enabling and disabling LDAP support.

Dependencies

In order to use python-ldap a couple of system level packages need to be installed first.

For a Debian based systems:

- libldap2-dev
- libsasl2-dev

For a Red Hat based systems:

- openldap-devel

Deploying

To deploy Ganeti Web Manager with LDAP

1. Copy `ldap_settings.py.dist` to `ldap_settings.py`.

```
$ cd ganeti_webmgr/ganeti_web/settings
$ cp ldap_settings.py.dist ldap_settings.py
```

2. Change *ldap_settings.py* to fit your LDAP configuration.

```
$ vi ldap_settings.py
```

> **Note:** `ldap_settings.py.dist` has been thoroughly commented so that external documentation shouldn't be needed. If you have specific questions about options or want an overview of the package, please consult the django-auth-ldap documentation.

3. Install the LDAP-specific requirements.

```
$ pip install -r requirements/ldap.txt # in root of repository
```

Disabling

If you would like to later disable LDAP support, all that is required is to remove your ldap_settings file:

```
$ cd ganeti_webmgr/ganeti_web/settings
$ rm ldap_settings.py
```

Note: This will not remove django-auth-ldap and python-ldap, nor the the system specific dependencies. If you want to remove these, use pip and your system's package manager.

Virtual Machine Templates

A new feature of Ganeti Web Manager 0.8 is the ability to create Templates.

Managing Clusters

Ganeti RAPI users and passwords

Before you can start using Ganeti Web Manager you will need to create a user and password on the Ganeti cluster.

Create MD5 hash

Here is an example with a user **jack** and password **abc123**

```
echo -n 'jack:Ganeti Remote API:abc123' | openssl md5
```

Add user to Ganeti cluster

Add the hash to `/var/lib/ganeti/rapi_users` on all the nodes in the cluster and restart ganeti-rapi. Here's an example using above: For ganeti 2.4 and above you need use file /var/lib/ganeti/rapi/users

```
# Hashed password for jack
jack {HA1}54c12257ee9be413f2f3182435514aae write
```

For more information on adding users, please check the Ganeti RAPI documentation

Cluster Read Only Mode

It is possible to add a cluster with only its hostname and port number, and no username and password credentials. This creates a copy of the cluster and its VMs in your local Ganeti Web Manager database without giving you the ability to change the cluster itself.

In Read-Only mode, you CAN:

- Assign ownership of VMs to GWM users from the Orphans page
- Delete VMs from your Ganeti Webmanager database from the Missing VMs page
- Import nodes to your database or delete nodes from it
- Assign permissions to users on the cluster or VM (note that although you can assign VM create permission to a user or group, they cannot actually create a VM in read-only mode)
- Edit the cluster, so that you can go back and add username/password credentials and gain full privileges on it later.
- Delete the record of the cluster from your database (Note: This does not affect the actual cluster)
- Record a default quotas for Virtual CPUs, Disk Space, and Memory
- Change the cluster's slug (the name of the cluster as it appears in the url: <hostname>/cluster/<slug>/<vm>)

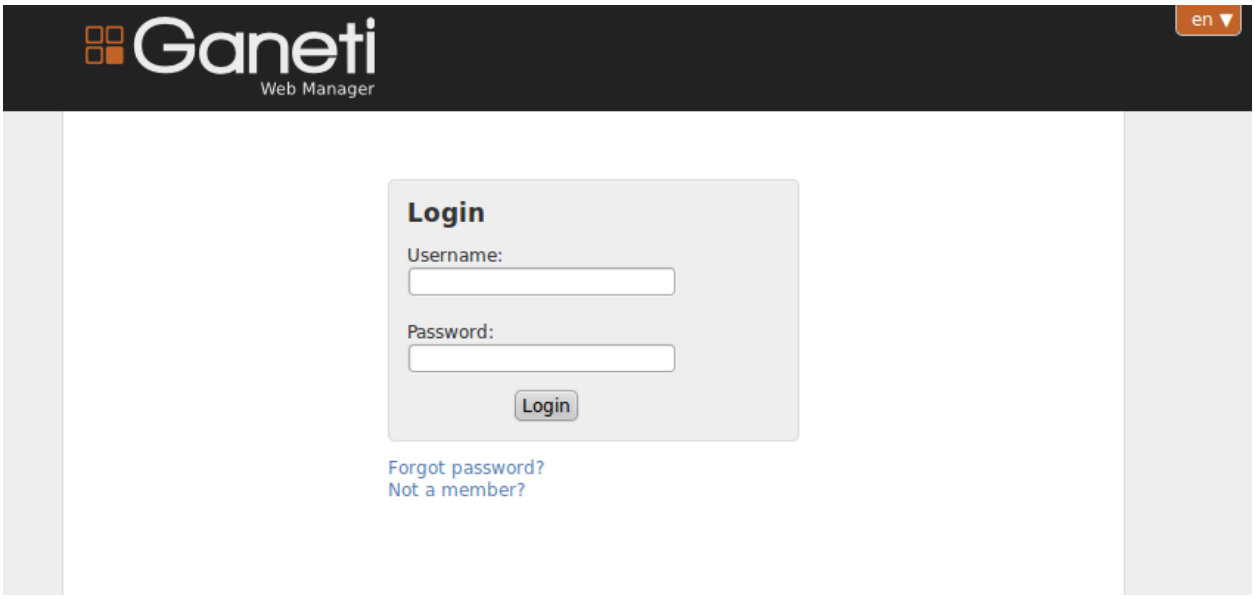
In Read-Only mode, you can NOT:

- Redistribute the cluster's configuration
- Start, stop, or reinstall a VM
- Migrate or change disks
- Access a VM's console
- Create a new VM on the cluster

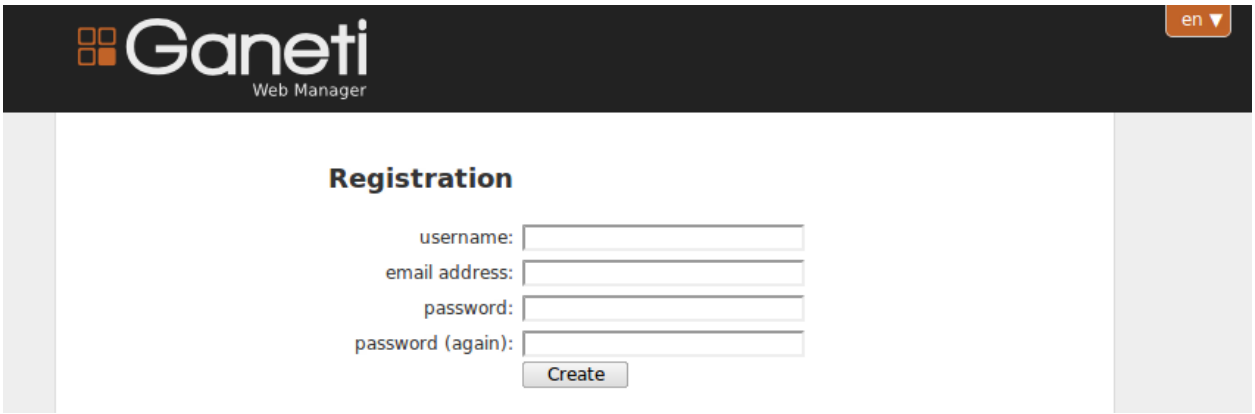
Open Registration

Ganeti Web Manager versions 0.8 and above allow you to choose whether users can create their own accounts, or need to be added by an administrator.

The default setting for registration is open, which means that visitors to your site's login page can follow a link from the login page to create their own accounts.



The "Not a member?" link takes the user to the registration page:



The user is emailed a password and a confirmation link, then has an account on your site. Users can also be added by a site admin by selecting the users link in the admin toolbar, then using the Add User button to reach the user creation form.

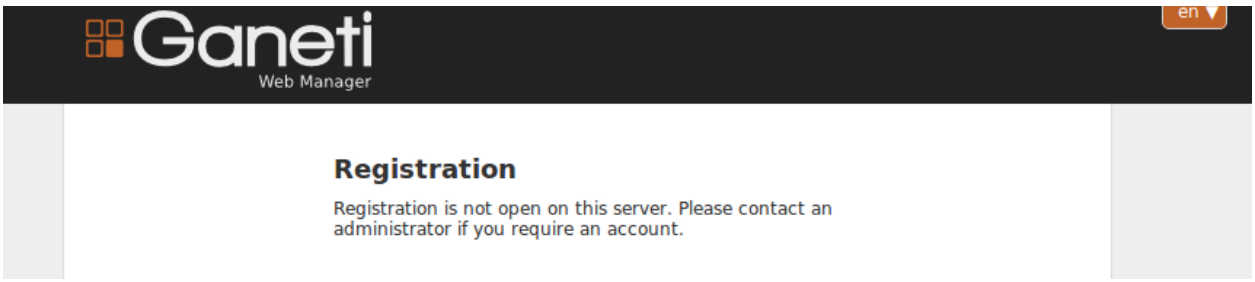
Closing Registration

In some contexts, users should not be able to create their own accounts. To implement this, simply change the `ALLOW_OPEN_REGISTRATION` setting in your `config.yml` file to False:

```
# Whether users should be able to create their own accounts.
# False if accounts can only be created by admins.
ALLOW_OPEN_REGISTRATION = False
```

Result of closed registration

The "Not a member?" link is hidden from users on the login page. If they navigate to the `<SITE_ROOT>/accounts/register` page, they will see this message instead of the account creation form:



Caching

Ganeti Web Manager caches objects for performance reasons.

Why are things cached?

Ganeti is a bottleneck when accessing data. In tests, over 97% of time taken to render a normal page in Ganeti Web Manager is spent waiting for Ganeti to respond to queries. Thus, Ganeti Web Manager caches some of Ganeti's data.

Manual Updates

Sometimes it is necessary to refresh objects manually. To do this, navigate to the detail page for the cluster of the object that needs to be refreshed, and click the "Refresh" button. This will refresh the cluster and all of its objects.

Cached Cluster Objects

Some database-bound objects cache Ganeti data automatically. The functionality for this caching is encapsulated in the `CachedClusterObject` class. Any models which inherit from this class will gain this functionality.

Bypassing the Cache

The cache cannot currently be bypassed reasonably. `CachedClusterObject` uses `__init__()` to do part of its work. An unreasonable, albeit working, technique is to abuse the ORM:

```
values = VirtualMachine.objects.get(id=id)
vm = VirtualMachine()
for k, v in values.items():
    setattr(vm, k, v)
```

RAPI Cache

RAPI clients are cached in memory, and a hash of cluster information is stored in order to locate them quickly. The entire scheme is no longer necessary since RAPI clients are no longer expensive to allocate, and will be removed soon.

Ganetiviz

Graphical Visualization of a ganeti cluster is now possible with the help of **ganetiviz** app in GWM (should be packaged in the next GWM release, version 0.11). Ganetiviz uses the Cytoscape JS library to render network graphs, where ganeti nodes are represented as vertices and failover directions are shown as edges.

The graph is interactive and has the following features:

Features

1. Nodes are represented as circles, which can host a number of primary instances, and mirror data for instances hosted on other secondary nodes.
2. Any node can play the role of both a primary node or a secondary node.
3. When you click on a node, all the instances running on that node are shown.
4. Further, when you click on an instance an edge in the graph connecting 2 nodes is highlighted.
5. The edge points to the secondary node for that particular instance originating at the primary node.
6. Edge thickness between the nodes gives and idea of the total number of failover possibilities existing between two nodes.
7. All the 'running' instances are shown in green and all the **_DOWN* instances are shown in red. Instances "red" in color are not "running" and might require a failover.
8. Additional instance information is shown in the bottom right corner and is fetched on demand on clicking on an instance.
9. Zoom In - Zoom Out using mouse scroll in any region by placing mouse-pointer there first.
10. Long-click & hold the graph at any point and pan it in any direction to shift the whole graph object or Pan by using arrow keys, or use the previous mouse method: longclick-hold-move
11. Select any node ans press the character "s" to see all the secondary instances for a given node.
12. Press the character "c" at any time to clear (actually hide) all the visible instances.
13. Press the character 'r' to reset the whole graph orientation as in the beginning.
14. Most of this important information is available easily pressing character the 'h' ie. help.

Visualizing a cluster via GWM

1. Navigate to Cluster detail page
2. Click the *Visualize* button with an 'eye' on it.
3. ganetiviz - opens up and renders the appropriate cluster.

History

In the initial stages of development I wrote a blog post on Ganetiviz. It might be a little outdated now, but will help understand the ganetiviz evolution.

The ganetiviz-cytoscape project was initially created as a front end component for ganetiviz which was then ported to devganetiviz - a django application that can be run outside GWM and ships with some mock data to get started contributing to GWM in seconds.

Improving ganetiviz

Since ganetiviz is a part of GWM; improving ganetiviz actually means improving GWM. Developing for GWM can sometimes be tedious for front-end contributors who do not want to concern themselves with running a live or virtual ganeti cluster with GWM every time for development purposes.

Ganetiviz has a sister project that makes it possible for anyone to start contributing easily.

1. Front-End code contribution: For any front end contribution you must refer to devganetiviz, a separate django project that comes with batteries included (fixture data, etc), so you do not need to run any physical or virtual server to add front-end features to ganetiviz.
2. For any contribution that changes JSON data avaiable to the front end component. For changing the data returned by GWM to ganetiviz, it is important to run GWM the standard way along with a Virtual or real cluster.

CHAPTER 4

Usage

Upgrading

Note: Please read the instructions fully before starting. The order of operations is important. The upgrade may fail if done out of order.

Warning: This guide is intended for Ganeti Web Manager in versions 0.11 and higher. If you have older installation that you want to upgrade, please read carefully *Deprecated: Upgrading* page.

This guide will walk you through upgrading Ganeti Web Manager. Our upgrade process uses South, a database migration tool that will update your database.

1. Back up the database
2. Make sure newest Ganeti Web Manager is available in OSUOSL repository at http://ftp.osuosl.org/pub/osl/ganeti-webmgr/
3. Run your *setup script* with `-u ./gwm_venv` argument.

Follow the guide for your version.

0.11 and later

Since 0.11, Ganeti Web Manager uses *special setup script* for installing and upgrading.

By using this script (and due to other major changes in Ganeti Web Manager architecture), you now have to use different management script. It gets installed into Ganeti Web Manager's virtual environment as `django-admin.py`. Once you've activated your virtual environment, it will be in your path.

In order to upgrade your database run:

```
$ django-admin.py migrate --delete-ghost-migrations --settings "ganeti_webmgr.ganeti_web.settings"
```

Updated settings

0.11

Settings now have a few ways of configuring, designed to make life easier for those deploying Ganeti Web Manager, especially if your unfamilar with python.

Settings now live in `/opt/ganeti_webmgr/config/config.yml`. You can now use yaml to configure your settings. By default this config file does not exist, so be sure to add your config file there.

An example yaml config file can be found in the configuration documentation, and can also be found in `ganeti_webmgr/ganeti_web/settings/` in a file named `config.yml.dist`.

If you prefer configuration using the typical django `settings.py` file, fear not, that will still work, however it has changed a bit.

You will need to remove any imports of other settings files from it, and you will need to add it to the `ganeti_webmgr/ganeti_web/settings/` folder as `settings.py`. Take a look at `settings.py.dist` in that same folder for an example.

Clusters

Virtual Machines

Nodes

Templates

CHAPTER 5

Contributing

Issues

The issue tracker for Ganeti Web Manager is on Github. All bugs and feature requests for Ganeti Web Manager should be tracked there. Please create an issue for any bug, feature, or translation you wish to contribute or report.

Please follow this guide when filing new issues for Ganeti Web Manager.

Description

When submitting an issue, the description should generally include the following:

- Exactly what the submitter did to encounter the situation
- What the submitter expected to happen
- What actually happened

Depending on the issue, knowing details about the operating system or web browser being used may be helpful.

In addition to these points, bug reports should also include any relevant information with regard to attempted fixes or workarounds as well as any other effects the bug may have on the software. Any patches which resolve or work around bugs are also appreciated, if only to help developers understand the scope of the bug.

Trackers

There are several "trackers" or categories of issues that can be filed.

Bugs

Bugs are well...bugs. Things that are broken. Pieces of the project that don't work as expected.

Features

Features are enhancements to the project that implement a new functionality. They are generally referenced with a phrase like "The ability to...".

Enhancements

Enhancements are updates to existing features. They are not errors encountered in features, but improve the functionality or usability of a feature.

Status

Status reflects where a ticket stands in the filing process.

New This issue is new and we haven't begun work on it, possibly haven't even decided whether we will work on it.

In Progress We are working on this issue.

Won't Fix This is a legitimate issue, but we've decided that it is not something we can or will work on

Duplicate This issue is actually a duplicate of an exisiting issue

Blocked We can't work on this issue until another issue is resolved

Feedback We've worked on this issue, or made some comments on it, and assigned it to someone for their feedback.

Resolved We've completed work on this issue.

Upstream This is actually an issue with some package or library we depend on.

Closed We are done with this issue.

Rejected We don't think this is a legitimate issue, and reject it entirely

Can't Reproduce We believe you, but we can't reproduce the behavior this issue refers to, so we can't do anything with it

Priorities

How important it is for us to get this issue fixed.

- Low
- Normal
- High
- Urgent
- Blocker

Categories

Categories simply describe the general area or topic of an issue, categories may change with time depending on the project's needs.

Difficulty

An estimation of how hard a bug, feature, or enhancement will be and how long it may take.

- Easy
- Medium
- Hard

OSL Development Process

This document describes the general process the OSL uses for developing and maintaining projects.

Issue Triage

When an issue is reported on Github, the core team will triage the issue, assigning it to a release version, rejecting it, or sending it back for more information. This process may take place as part of planning for a new version release, or ad hoc in order to address an important bug in the current release.

Features

Features will be considered only for the next minor or major version release. If the current release cycle has not yet reached the 'feature freeze' deadline, the feature may be considered for the current release; otherwise it should be assigned to a future release.

Enhancements

Enhancements will not be considered for the current version after that version's feature freeze date. Enhancement issues must apply to a current existing feature, if they introduce new basic functionality, they should be reclassified as Features. If they address malfunctioning code or incorrect functionality, they should be reclassified as Bugs.

Bugs

Bugs may be assigned to a release at any time. If they apply to an existing released version, either a new point release must be created, or the bug must be incorporated into the next major or minor release. For example, an urgent fix to the 0.10.1 release should generate a 0.10.2 release to contain the changes. A less urgent fix for 0.10.1 might simply be incorporated into 0.11. In general, we try to collect multiple fixes into any point or minor release.

Workflow

The following workflow should be followed when contributing code.

Assignment

Issues are assigned to developers in several ways:

- direct assignment by the project lead
- volunteer self-assignment

The project lead and core developers may re-assign issues based on time or other considerations.

Branching

The git branching model essentially follows the git-flow model.

When work begins on an issue, a new branch should be created containing the issue type and number.

```
git checkout -b feature/12345
```

This branch should be based on the main branch to which it will apply. For features and enhancements, this should always be develop. For bugs that apply to a specific release, the branch may be taken from that release's branch.

Commit Messages

Commit messages should be informative, they should contain everything another developer might need to know in order to understand your commit. It should contain the problem addressed by the commit and a quick description of the solution.

Commit messages have a header line and a body, the header line should contain a very brief description of the commit, and should be limited to 50 characters. The body should contain a bit more detail on what was changed.

In order to track the commit within our bug tracker, the commit message should also contain a reference to the issue number:

```
refs: #12345
```

An example commit:

```
Short (50 chars or less) summary of changes

refs: #12345

More detailed explanatory text, if necessary.  Wrap it to about 72
characters or so. In some contexts, the first line is treated as the
subject of an email and the rest of the text as the body.  The blank
line separating the summary from the body is critical (unless you omit
the body entirely); some git tools can get confused if you run the
two together.

Further paragraphs come after blank lines.

 - Bullet points are okay, too

 - Typically a hyphen or asterisk is used for the bullet, preceded by a
single space, with blank lines in between, but conventions vary
here

# Please enter the commit message for your changes. Lines starting
# with '#' will be ignored, and an empty message aborts the commit.
# On branch master
# Changes to be committed:
#   (use "git reset HEAD <file>..." to unstage)
#
# modified:   hello.py
#
```

Review

Before being merged into develop or a release branch, all work must be reviewed. Our process is informal. A developer may ask another developer to review their work, or a project lead may assign issues for review. To assign someone to review an issue, the issue should be assigned to the reviewer with the status "needs review".

Code, documentation and internationalization should all be reviewed before being merged.

Code review criteria

- code should be examined for logical or typographical errors
- **code should be examined in the context of the larger application**
  - does the code fit the structure of the application?
  - does the code follow the application's conventions, such as method names, variable namespaces, etc?
  - does the code leverage existing methods, or re-implement things that exist elsewhere?
- code should be audited for standards compliance (i.e. PEP8)
- unit tests should be run in a local dev environment to verify there are no failures
- the features the code effects should be tested by running the application and using those features
- all new code should be accompanied by documentation. Travis CI will check that the PR contains changes to the docs. If you do not believe that new docs are necessary you may argue so in the PR and we may decide to ignore Travis.

Internationalization should be reviewed as code. If the accuracy of translations cannot be confirmed, the code should be reviewed to ensure the correct strings are translated and no errors have been introduced by adding translations to strings.

Documentation review criteria

- documentation should be examined for misspellings, typographical errors and grammar
- **documentation should be examined for formatting consistency**
  - are headers, paragraphs and other elements used consistently with other docs?
  - is the narrative style and organization consistent with other docs?
- documentation should be complete, and where it is not, 'todo' blocks should be included with descriptions of what is still pending
- documentation should be accurate - docs containing instructions should be tested by following those instructions and verifying that the produce the correct result

If the work passes review, the reviewer should add a note to the issue in the tracker, describing what was tested and verifying that the work passed.

If the work does not pass review, the reviewer should add a note in the tracker describing the problem and describing the necessary fixes if known. The reviewer will then re-assign the issue back to the original developer with the status "needs work".

In some cases, work might pass the review, but contain small things that could be cleaned up or done more efficiently. If time constraints or other factors make reassigning for more work undesirable, a detailed note should be added to the issue describing things that could be done to improve the code.

Merging

When work has passed review, the project lead, or a developer assigned by the lead, may merge the work into the appropriate branch.

If the branch has diverged significantly from its parent, the parent should be merged with the branch prior to submitting for review. If this has not been done, the developer responsible for merging into the parent branch may do this, or may assign it back to the original developer. If significant conflicts arise during merging, the issue should be reassigned to the original developer to resolve the conflicts.

Merging should be done with the –no-ff flag to preserve commit history.

After merging the parent branch into the submitted issue, the merging developer will run all tests for the project to ensure no bugs have been introduced by the merge.

When all tests pass, the work will be merged with the parent branch. After merging, the developer doing the merge will run the test suit again.

If all tests pass, the developer will update the issue in the tracker, adding a note that the code was merged and any comments on conflicts resolved. The developer will then change the status of the issue to "resolved".

Github and Pull Requests

If work is done on GitHub or on an external repository rather than the OSL Gitolite instance, the work will be submitted to the core via a Github pull request.

Pull requests will be subject to the same review process outlined above, and should correspond to an issue in the OSL issue tracker. If no such issue exists, it must be created before accepting the pull request. When the pull request is approved, a new branch will be created following the normal naming conventions, and the work pulled into this branch. From this point, the work follows the same workflow as above.

If the original developer does not have or is not willing to create an account on the OSL tracker, and the issue needs to be assigned back for additional work, such assignment may be communicated via email, an issue on the Github issue tracker for the developers' clone. If the developer is not willing to participate in this process, a core developer may be assigned to adopt the work, and the issue will be assigned to that developer for further work.

GWM Release Process

The Ganeti Web Manager release process involves several stages of testing and preparation.

Feature Freeze All of the features to be included in this release are complete - no new feature issues can be created for this release, and all remaining issues should be resolved.

Release Branch When all issues are resolved, a new release branch is created to contain the new release, it will be named for the version, i.e. release/0.10.2. The version number strings in this branch will be updated to the correct version number.

First Test Phase The release branch version of GWM will be tested on the OSL GWM staging server. The deployment and all new features for this version should be tested, and the unit test suite will be run.

Documentation Audit While testing on the staging server, the documentation will be audited to make sure it is up to date and correct for this version. Any issues will be filed as bugs against this version.

First Bug Fix Phase Any code or documentation bugs discovered through testing on the staging server will be addressed during this time, and fixes applied to the release branch. If no bugs are found, we move on to the next phase.

First Release Candidate **(two weeks)** A release canidate tag is created from the release branch, and announced on the mailing list and in IRC. The release candidate is deployed on staging for continued testing. The release candidate will be tested at OSL and by end users for two weeks. Any bugs discovered will be filed against this version.

Second Bug Fix Phase If bugs were found in the release candidate during the two week testing period, fixes should be applied to the release branch as soon as possible. If no bugs were found, the release moves on to the Final Release step.

Second Release Candidate If bugs were fixed in the first release candidate, a new candidate tag is created and is tested for one week. Further release candidates may be created as needed to fix bugs, each release candidate should have a lifetime of one week.

Final Release If no issues were found in the last release candidate after the one or two week testing phase, the release is considered final, a release tag is created. See below for full list of Final Release tasks.

Final Release Tasks

Creating a final release consists of the following tasks.

1. All issues for the release version should be resolved and closed
2. **Build and upload Python `wheels` for all requirements (see building wheels).** Don't forget to build the `psycopg2` and `MySQL-python` wheels!
3. **Bump version in `docs/source/conf.py`, `scripts/setup.sh`, and in** `ganeti_webmgr/constants.py`
4. Create a release tag for this version, e.g. 0.11.2
5. Create a tar file for this release and upload it to Github's Releases.
6. Create a Python package from the tag
7. Announce the new release to the mailing list and IRC channels

GWM Developer Guide

This guide is intended to help you begin writing code and documentation for the Ganeti Web Manager project. Please read the *OSL Development Process* for information on how this project is managed and what we do to review and integrate code into the master repository. Please read the entire guide before beginning work, we will not be able to accept contributions that don't follow these guidelines and standards.

For information on our release cycle and versions, please see *Release Cycle* .

Issue Tracking

The bug tracker for Ganeti Web Manager is on Github, and all bugs and feature requests for Ganeti Web Manager should be tracked there. Please create an issue for any code, documentation or translation you wish to contribute.

Please see *Issues* for details on how to create informative issues.

Dev Environment

Writing and testing code is made much easier by the right tools and a development environment that mirrors a production environment. To begin working with Ganeti Web Manager code, you will need Git, Python 2.6+, and Python VirtualEnv. We also recommend VirtualBox and Vagrant, a scripting front-end to VirtualBox to set up a virtual cluster to test your code with.

Git

If you are unfamiliar with Git, please read the official Git tutorial or this excellent tutorial.

There are many Git GUIs, if you are not comfortable working with Git on the command line. See this list of Git GUI clients for more information.

Virtualenv and Pip

Ganeti Web Manager's install script uses the Python VirtualEnv utility to create a local environment in which to install all of GWM's Python dependencies, and GWM itself runs from within this environment. To run tasks with `manage.py`, or to work with the python console on GWM code, you will need to activate the environment in your shell:

```
source /path/to/gwm/venv/bin/activate
```

Note that the environment will only be active for the terminal in which this command is run.

Pip is used to install packages to the currently active Python environment. If you would like to install python packages for debugging or to add functionality to Ganeti Web Manager, be sure the Ganeti Web Manager virtual environment is active and install packages:

```
pip install packagename
```

If you are adding python packages to add functionality or to support Ganeti Web Manager features you are adding, be sure to add the package to requirements.txt. You can get a list of all python packages installed in your current environment with

```
pip freeze
```

Add your package name to requirements.txt and commit this with the rest of your code. For more information on Pip and package name/version specifications, see (a link to pip docs)

VirtualBox and Vagrant

Virtual machines provide an easy way to deploy a Ganeti cluster to test Ganeti Web Manager with, or for use as a self-contained dev environment that can be shared with other developers. VirtualBox is a free virtualization platform available on Windows, Linux, and MacOS. Vagrant is a scripting front end for VirtualBox that allows easy creation, provisioning, and management of VirtualBox VMs, allowing developers to write and test their code in a uniform environment.

Installation

To install the GWM application for development work, please see *Developer Installation*.

Ganeti Web Manager ships with support for Vagrant. This allows developers to modify and test their code in the same environment and reduce the amount of configuration necessary. See *Vagrant* for details on setting up the virtual machine.

In addition, use of Ganeti Web Manager requires a Ganeti Cluster. For instructions on setting up a test cluster with Vagrant, see test_cluster.

Alternatively, Ganeti Web Manager now comes with a Dockerfile. This allows developers to use Docker to quickly run their code without needing to deal with setup and virtual machines. For now, the included Docker setup does not set up a Ganeti Cluster, for this, Vagrant is still needed.

To use Docker, simply build the included Dockerfile:

```
$ docker build -t="osuosl/ganeti_webmgr:dev" .
```

Then, just create a Docker container from the image:

```
$ docker run -it -p 8000:8000 osuosl/ganeti_webmgr:dev
```

Ganeti Web Manager can now be accessed on `http://localhost:8000`. To change the port that it runs on, the first number in the above command can be changed to the port of choice.

Some developers may prefer to mount their copy of the application as a volume when they run the app. This removes the need to rebuild the Docker image each time the code is changed, and can be done as follows:

```
$ docker run -v /path/to/code/:/opt/ganeti_webmgr -it -p 8000:8000 osuosl/whats_fresh:dev
```

Repository Layout

We loosely follow Git-flow for managing repository. Read about the branching model and why you may wish to use it too.

master Releases only, this is the main public branch.

release/<version> A release branch, the current release branch is tagged and merged into master.

develop Mostly stable development branch. Small changes only. It is acceptable that this branch have bugs, but should remain mostly stable.

feature/<issue number> New features, these will be merged into develop when complete.

bug/<issue number> Bug fixes.

enhancement/<issue number> Enhancements to existing features.

See *Issues* for more information on issue types.

When working on new code, be sure to create a new branch from the appropriate place:

- **develop** - if this is a new feature
- **release/<version>** - if this is a bug fix on an existing release

Code Standards

PEP8

We follow PEP 8, "the guide for python style".

In addition to PEP 8:

- Do not use backslash continuations. If a line must be broken up, use parenthetical continuations instead.

Units

Write modular code. Focus on isolating units of code that can be easily analyzed and tested. For sanity purposes, please avoid mutually recursive objects.

JSON

If you need a JSON library, the import for this code base is "from django.utils import simplejson as json". See #6579 for more information.

Testing

Ideally, tests should be written for all code that is submitted to the project. We recommend writing a test for any new feature before writing the code.

For bugs in features that have existing tests, be sure to run the existing tests on your code before submitting. In some cases a test will need to be updated or modified to test a bug fix, this should be done before writing code to fix the bug.

Tests can be submitted for features separate from the feature code itself, and feature requests that are submitted along with tests will be much more likely to be implemented.

See testing for more information on writing unit tests for Ganeti Web Manager.

See selenium for some ideas on using the Selenium web testing framework to test GWM.

Adding features

When adding a feature to GWM, please remember to include:

Help tips

The gray box with a green title bar that appears on the right side of the page when you focus on a form field is a help tip. To add one for a new field, add it to the file which corresponds to your field's form in the ganeti_web/templates/ganeti/helptips/ directory.

Internationalization

Ganeti Web Manager is designed to support translation to other languages using Django's i18n machinery. If you add text that will be displayed to the user, please remember to format it for translation:

```
{% trans "this text will be displayed in the correct language" %}

{% blocktrans %}
    Here is a some text that will be displayed
    in the correct language but would not
    fit well in a single line
{% endblocktrans %}
```

Django's i18n page has more information about this.

Fixing Bugs

When bugs are fixed, the issue should be updated with a clear description of the nature of the bug, the nature of the fix, and any additional notes that will help future developers understand the fix.

Before working on a bug fix, determine if the faulty code is covered by a unit test. If so, and the test did not reveal the flaw, update the test appropriately. If no test exists, it should be written if possible. The test should be submitted along with the fixed code.

Writing Documentation

Documentation exists as RestructuredText files within the GWM repository, and as in-line comments in the source code itself.

Sphinx

The docs/ directory contains the full tree of documentation in RestructuredText format. To generate the docs locally, make sure you have activated the Ganeti Web Manager virtual environment, and that Sphinx is installed.

```
pip install -r requirements/docs.txt
cd docs
make html
```

HTML documentation will be generated in the build/html directory. For information on generating other formats, see the Sphinx documentation.

The documentation for Ganeti Web Manager is divided into several sections:

- Features: Descriptions of features and their implementation
- User Guide: How to use GWM and its various features
- Development Guide: How to work on the GWM code (this document)
- Info: Various information on the project itself
- Reference: General information referred to in other docs

Usage of features should be documented in the usage/ directory. Each distinct unit of functionality should have a separate file, for instance "create a new virtual machine" should have a single file documenting how to create a new virtual machine. Overview documents, for example "managing virtual machines" will reference or include these sub files.

Implementation and structural details of features should be documented in the features/ directory, one file per distinct feature. This documentation should give an overview of the functionality, rational and implementation of the feature - for example, documenting how the "add virtual machine" view generates a request to the RAPI.

Any changes or enhancements to an existing feature should be documented in the feature's documentation files.

Development documentation should be updated when any changes are made to the development process, standards, or implementation strategies.

In-line Docs

All methods in the source code should be commented with doc strings, including parameters, return values, and general functionality.

Submitting Code

Please read *OSL Development Process* for details on how we triage, review and merge contributed code.

Bower is used to manage javascript dependencies that have previously been stored within GWM as minimized files. For more information on `django-bower`, check out their docs.

To update or add Javascript dependencies, add them to `base.py` and run `manage.py bower install`. This will install the new or updated dependencies to `ganeti_webmgr/bower_components`. Include the added dependencies with the pull request.

Patches

Patches should either be attached to issues, or emailed to the mailing list. If a patch is relevant to an issue, then please attach the patch to the issue to prevent it from getting lost.

Patches must be in git patch format, as generated by git format-patch.

```
git commit
git format-patch HEAD^
```

To create patches for all changes made from the origin's master branch, try:

```
git format-patch origin/master
```

For more information, see the man page for git-format-patch.

Sending emails to the list can be made easier with git send-mail; see the man page for git-send-email for instructions on getting your email system to work with git.

Pull Requests

If there are multiple patches comprising a series which should be applied all at once, git pull requests are fine. Send a rationale for the pull request, along with a git pull URL and branch name, to the mailing list.

Git Write Access

Contributors in good standing who have contributed significant patches and who have shown a long-term commitment to the project may be given write access to our repository. Such contributors must follow our *OSL Development Process*, including participating in code review and planning.

Submitting Documentation

Documentation is just as much a part of the project as code, and as such you can contribute documentation just as outlined above for code. See *Writing Documentation* for details on the documentation tree.

If you are not comfortable with git, patches or pull requests, you may submit documentation via a text file sent to the mailing list or attached to an issue. We recommend creating an issue, as this helps us keep track of contributions, but the mailing list is an excellent place to solicit feedback on your work.

Submitting Translations

Translations should be submitted via patches, a pull request, or by attaching a .po file to an issue. We recommend cloning the git repository and using django-admin.py makemessages to find all the available strings for translation. If you find strings in the UI that are not available for translation, patches to fix this condition are much appreciated. As with all contributions, we recommend creating a new issue on our issue tracker for your work.

For details on how to write translation strings and how to make use of them, please see Django's i18n page

Developer Installation

Make sure you have virtualenv installed, you will want it to keep all of your dependencies isolated, in addition, we use virtualenv for our end user installation as well.

Requirements

- Python >= 2.6
- your compiler of choice
- `python-dev` for compilation of some of Ganeti Web Manager dependencies
- `virtualenvwrapper` (**really recommended**)
- or `python-environment` if you can't (or don't want to) install above wrapper
- `libpq-dev` (Ubuntu/Debian) or `postgresql-devel` (CentOS) if you want to use PostgreSQL
- `libmysqlclient-dev` (Ubuntu/Debian) or `mysql-devel` (CentOS) if you want to use MySQL

Guide

Virtual environment

Start with creating appropriate virtual environment:

```
$ mkvirtualenv gwm
```

This command will work only if you installed `virtualenvwrapper`. We recommend to use it, because it creates virtual environments in `$HOME/.virtualenvs`, which makes your project directory free of any `bin`, `include`, `lib`, `local` or `share` directories.

Alternatively, if you do not have `mkvirtualenv` you can manually create a virtual environment in `$HOME/.virtualenvs`:

```
$ virtualenv ~/.virtualenvs/gwm
$ source ~/.virtualenvs/gwm/bin/activate
```

Take a look at *Virtual environment* page to get better understanding of how virtual enviroments and `virtualenvwrapper` work.

Development package

Clone Ganeti Web Manager repository:

```
(gwm)$ git clone https://github.com/osuosl/ganeti_webmgr
```

You can also fork on GitHub.

Make sure to switch to `develop` branch, as it's the main branch where development happens:

```
(gwm)$ cd ganeti_webmgr
(gwm)$ git checkout develop
```

Now it's time to install Ganeti Web Manager as a development package. This means even though Ganeti Web Manager gets installed as a Python package (and appears on `pip list`, and is importable from everywhere in virtual environment), you can still work on it from the directory you cloned it to. No need to go into virtualenv's `lib/python2.x/site-packages/ganeti-webmgr` directory.

```
(gwm)$ python setup.py develop
```

This installs Ganeti Web Manager dependencies as well, and in some cases requires compilation.

Databases

Database drivers / interfaces aren't listed explicitly in Ganeti Web Manager requirements file, so you have to install them manually.

Make sure you have your dependencies for DBs met.

To install support for **MySQL**:

```
(gwm)$ pip install mysql-python
```

To install support for **PostgreSQL**:

```
(gwm)$ pip install psycopg2
```

To install support for **SQLite**: you don't have to do anything. It's included in Python.

Configuration

Copy `settings.py.dist` to `settings.py` within `ganeti_webmgr/ganeti_webmgr/ganeti_web/settings` directory.

Edit configuration files in `ganeti_webmgr/ganeti_webmgr/ganeti_web/settings` directory:

`base.py` Base settings, might not need to be changed.

`settings.py` Look there for options you might want to change. This file exists there especially for you. When developing, it is necessary to set `testing=TRUE` in order to run the testing suite.

> **Warning:** Remember to configure `settings.py`, not `settings.py.dist`!

Management

It's still done via `manage.py` script, though the script is now hidden deeper in directories structure:

```
/path/to/ganeti_webmgr/ganeti_webmgr/manage.py
```

Vagrant

Vagrant is a tool to help automate the creation and deployment of virtual machines for development purposes. It reduces the amount of effort to make sure multiple developers are using the same set of tools to reduce complaints of "but it worked on my machine".

Vagrant home page

Ganeti Web Manager comes with a Vagrantfile and uses Chef to automate the deployment process within Vagrant.

What you get

- In `/home/vagrant/ganeti_webmgr` you will have your project mounted. All changes made to files in your project folder either in Vagrant, or on the host will be seen on both systems.
- You will have a Django Superuser created with the following credentials (these can be changed in the `Vagrantfile`):

username: admin

password: password

- A MySQL Database and User pre-configured for Ganeti Web Manager

All of these values can be changed by overriding the Chef attributes in the `Vagrantfile`.

Use

Using Vagrant to deploy Ganeti Web Manager is simple. You will need Vagrant version **1.5.4** or greater and two vagrant plugins, *vagrant-berkshelf* and *vagrant-omnibus*. For compatability versions, we require *vagrant-berkshelf* with a version greater than or equal to 2.0.

Installing Vagrant is easy, you can install it to your system by downloading the appropriate package, and running it.

To install the vagrant-berkshelf and vagrant-omnibus plugins run the following command in your terminal:

```
vagrant plugin install vagrant-omnibus
vagrant plugin install vagrant-berkshelf --plugin-version '>= 2.0.1'
```

Once you have the plugins installed you can use the following commands to start the Virtual Machine (this may take a while):

```
vagrant up
```

After it finishes and your back to your prompt, if you do not see any output after:

```
[default] Installing Chef 11.x.x Omnibus Package...
```

Then you need to run the following command to have it reprovision the VM:

```
vagrant provision
```

After provisioning, your Virtual Machine will have Ganeti Web Manager installed and running with the Apache web server. However, so that you can modify the source code, you'll need to run the *Development Server*.

You can get to the VM by using the `vagrant ssh` command. To run Ganeti Web Manager you need to source your *virtualenv* and start the development server:

```
source /opt/ganeti_webmgr/bin/activate
cd ~/ganeti_webmgr
python ganeti_webmgr/manage.py runserver 0.0.0.0:8000
```

From there you can visit Ganeti Web Manager at (by default) 33.33.33.100:8000 in your web browser.

Note: The reason we runserver on 0.0.0.0 is because by default it runs on 127.0.0.1 which is only accessible from the VM.

More details on vagrant can be found at http://docs.vagrantup.com/v2/

Configuration

Configuration of the deployment with Vagrant is done using Chef. For documentation on the available attributes for configuring the deployment visit the cookbook's github here: https://github.com/osuosl-cookbooks/ganeti_webmgr

CHAPTER 6

Project Information

Compatibility

Ganeti Web Manager is compatible with the following:

Ganeti Supported versions: **2.4.x–2.6.0**.

Any newer software should work, but its features may not be implemented in Ganeti Web Manager.

> **Warning:** Earlier versions are unsupported; they may occasionally work, but should not be relied upon.

Browsers Mozilla Firefox >= 3.x, current Google Chrome/Google Chromium.

Other contemporary browsers may also work, but are not supported.

The web-based VNC console requires browser support of WebSockets and HTML5.

Databases SQLite, MySQL.

New in version 0.10: PostgreSQL has limited support

Operating Systems Ubuntu 11.10, Ubuntu 12.04, CentOS 6.

Known to work on Debian 7 and CentOS 5.

Debian 6 should work, provided that pip and virtualenv are the latest version.

Changelog

v0.11.0

Notable Changes:

- Ganeti Web Manager is now a Python package
- New installation script!
- Refactoring and new internal application structure
- Reworked configuration, with config.yml

Other:

- Added notes field to virtual machines

- The VM Wizard now has a summary page
- Updated VNCAuthProxy
- Updated documentation

v0.10.2

Notable Changes:

- Assigning owners to a VM has been changed slightly.
  - Must have admin/create_vm permissions to be an owner
  - Groups can be owners
  - Superusers can assign owner to anyone
  - Owner assignment dropdown is now sorted by name (finally)
- Users without perms on any clusters now get a 403 error if they try to go to the VM Creation page. Before they would get to the page but have no clusters to choose from.
- The 5th step of the VM Wizard composing of HVParams is now properly submitting the data to the RAPI
- Refresh button now refreshes data for nodes and vms instead of just the cluster from the RAPI.
- Hostnames are now stored in the database using all lowercase
- More validation on data retrieved from the RAPI
- Updated sshkeys scripts to be more redundant
- Fixed missing CSRF token on password reset page
- VM List pages should be consistent between the global VM list and the cluster VM lists

v0.10.1

Notable Changes:

- Cluster defaults are now used for all steps in VM Wizard. Previously NIC settings and Disk size had no defaults.
- Pinned Versions of dependencies

Other:

- Fixed bug for KVM where kernel path was required, now optional. (KVM only)
- Fixed exception when owner of a VM was a group
- During VM Creation the form now properly raises a validation error if primary node is the same as the secondary node

v0.10

Notable Changes:

- Ganeti 2.6 Support
- VM Wizard
- Job List - Cluster

- LDAP Support
- Manual Refresh Button
- Notice on Read-Only Clusters
- Sharedfile Disk Template Added

Other:

- Docs now ship with product
- Fabfile cleaned up and simplified

v0.9.2

- Pinned requirements at Django 1.4. Project not reviewed for Django 1.5 compatibility.

v0.9.1

- New Error list page
- Pagination links now correctly show up on the Virtual Machines page
- Migrate button disabled for non-drbd VMs on VM detail page
- VM template fields correctly set NIC and DNS defaults for new VM
- Fix network devices not copied back to new VM page, when deployment fails
- Account password reset form fixed
- Error messages on VMs clearable again

v0.9

Notable changes:

- Django 1.4
- Ganeti 2.5 support
- Pip 1.0+ support
- Remove PyCurl dependency
- Immediate Shutdown button
- Improved installation process and documentation
- Improved RAPI functionality

Other:

- Simplified layout infrastructure
- Fix CSRF Token errors
- Transaction middleware
- Check VM hostnames for illegal characters
- New Help Tips

- Many back-end fixes to improve standards compliance and Django best practices
- Many user interface fixes and improvements

v0.8.1

Bugfix release.

Bugs fixed:

- CsrfResponseMiddleware removed from settings.py.dist

v0.8

Notable Changes:

- VM Templates
- Multiple Disks and Nics for VM Creation
- 'No Install' option for VM Creation
- CDROM2 Image Path for KVM
- User auto-complete for all username fields
- Rework and stabilisation of Jobs
- User registration is now optional
- CPU info added to node list and detail pages
- Ability to replace disks for a VM on DRBD clusters

Other:

- Cached AJAX calls
- Unified json package use (django.utils.simplejson)
- Reduced name collisions with directory reorganizing
- Cache refresh migration moved to post_migrate hook
- Unified use of CSRF tokens

v0.7.2

- Fixed HAYSTACK_SITECONF default setting
- Updated README to include virtualenv for mod_wsgi script

v0.7.1

- Updated Fabric dependency: Django Object Permissions 1.4.1
- Overview: Used resources was not displaying clusters when used did not permissions

v0.7

Notable Changes:

- Xen Support
- Internationalization Support (only greek translations.)
- Fabric & Virtual Environment deployment.
- **Improved Navigation:**
  - Search
  - Contextual links added to more pages
  - Breadcrumbs available on most pages
- Object log upgraded to 0.6 includes scalability improvements
- **Object permissions upgraded to 1.4**
  - speed improvements
  - contextual links added to generic views
  - user/group selection widget added for permission editor.
- noVNC updated to latest head, includes better support for future revisions
- Node Evacuation now works properly
- VirtualMachine owner can now be edited
- **Periodic Cache updater**
  - now syncronizes Nodes
  - now runs using twistd
- Nodes can now be imported through the user interface
- Various UI fixes
- Various optimizations to views to improve load times.

v0.6.2

- fixing packaging issue with object log

v0.6.1

- updating object log to 0.5.1

v0.6

Notable Changes:

- Nodes are now cached in the database:
- Node detail views are now available, including some admin methods
- VirtualMachines may now be edited, renamed, and migrated.

- Errors while creating virtual machines are now handled better, and can be recovered from
- Django Object Log is now providing logs for all objects tracked by GWM
- Admins can now add ssh keys for other users
- Virtual machine detail page has had its layout updated to be more readable and add more
- fixed bugs preventing syncdb working with postgresql

v0.5

Notable Changes:

- **Status Dashboard is now the front page for GWM**
  - lists cluster status for admins.
  - lists summary of virtual machines status for users.
  - lists resource usage for the user and groups.
  - error list including job failures and ganeti errors.
- Integrated NoVNC, an HTML5 + WebSockets VNC viewer
- Super users can now view resource usage and permissions for users and groups.
- Virtual machine lists are now paginated for quicker loading
- Ram and CPU quota is now based off running virtual machines
- Improved layout
- Virtual Machines list now properly works for cluster admins

v0.4

Initial Release

- Caching system
- **Permissions system:**
  - user & group management
  - per cluster/vm permissions
- basic VM management: Create, Delete, Start, Stop, Reboot
- ssh key feed
- basic quota system
- Import tools

History

Design

Next

1.0

Celery

Contact Information

Here are a couple of ways to get in touch with us.

Note: Before asking a support related question, please make sure it has not already been answered by searching the mailing list archive and current issues.

- IRC - Join our IRC channel `#ganeti-webmgr` on Freenode
- Mailing List - Send an email to the mailing list
- Twitter - Tweet us!

Screenshots

Here's a few screenshots of Ganeti Web Manager:

Status Dashboard

Viewing virtual machines in a cluster

Creating a new Virtual Machine

Virtual Machine Console

Virtual Machine Detail Page

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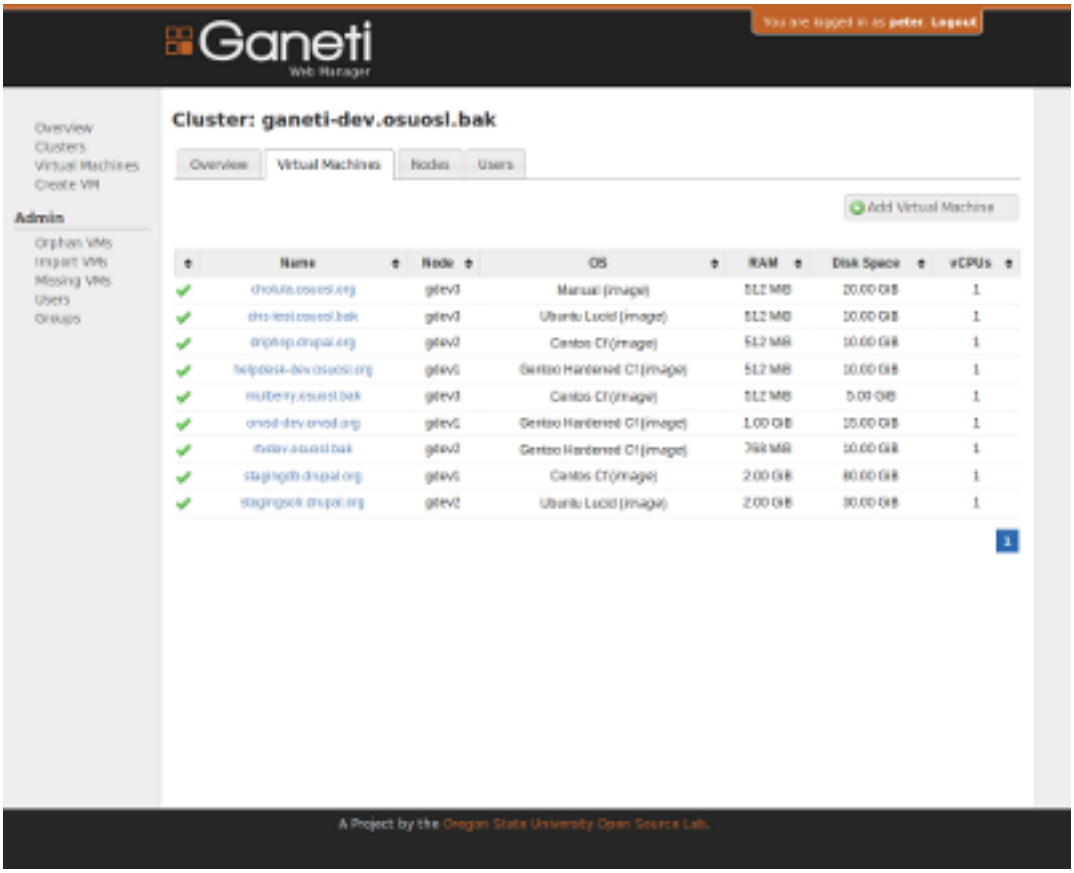


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Ganeti
Web Manager
You are logged in as peter. Logout
Overview
Clusters
Virtual Machines
Create VM
Admin
Orphan VMs
Import VMs
Missing VMs
Users
Groups
New Virtual Machine
Owner
Cluster
Instance Name
Start up after creation
DNS Name Check
Disk Template
Primary Node
Operating System
General Parameters
Virtual CPUs
Memory
Disk Size
Disk Type
NIC Mode
NIC Link
NIC Type
Hypervisor Parameters
Kernel Path
Root Path
Enable Serial Console
Boot Device
CD-ROM Image Path
Create
Disk Template
Disk layout template for the virtual machine on the cluster node.
The available choices are:
plain - Disk devices will be logical volumes (e.g. LVM)
drbd - Disk devices will be DRBD (version 8.x) on top of LVM volumes
file - Disk devices will be regular files (e.g. qcow2)
diskless - This creates a virtual machine with no disks. Its useful for testing only (or other special cases).
If drbd is selected, then a primary and secondary node will need to be chosen unless automatic allocation has been selection. DRBD will allow the virtual machine to use live migration and failover in case one of the nodes goes offline.
A Project by the Oregon State University Open Source Lab.


```
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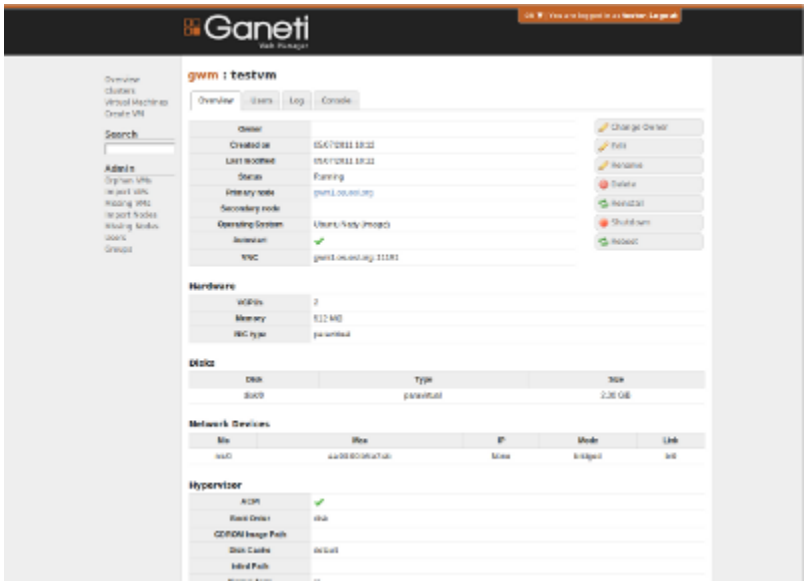
Ganeti
Web Manager
ganeti-test : gimager.osuosl.bak
Overview
Users
Console
Encrypt
Disconnect
Shutdown
Reboot
Ctrl-Alt-Delete
Examples
Install Ubuntu 10.10
A Project by the Oregon State University Open Source Lab.


Ganeti
gwm : testvm
Overview
Users
Log
Console
Hardware
Disks
Network Devices
Hypervisor

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FAQ

Here are some frequently asked questions, and their answers. If your question isn't answered here, ask on the Freenode IRC network in channel `#ganeti-webmgr` or on the GWM Google Group.

List of questions

I added a virtual machine using the `gnt-instance` command-line tool, and I don't see it in GWM!

Use the "Import VM" page (linked from the admin sidebar) to add those virtual machines to GWM.

How do I limit the resources available to a user?

Change the user's quota on the cluster. Default quotas for virtual CPUs, disk space, and memory can be set when adding the cluster. After adding a user to the cluster, their quota will be listed in the "Users" tab of the cluster detail page. Their quota will be listed if it was set from default, or shown as an infinity sign

if there is no existing quota. Click on the user's quota to add or edit the amounts of disk space, memory, and CPUs available to that user.

What does "Autostart" do?

When the "Autostart" mark on a virtual machine's detail page is a green check mark, it means that the virtual machine will be automatically started if the node reboots. Otherwise, if the mark is a red cross, the virtual machine will only start when a user manually starts it.

I get the error "Whoosh_index not writable for current user/group"

When running GWM through Apache, it is required that the apache user (or www-data) and group can write to the whoosh_index directory.

```
chown apache:apache whoosh_index/
```

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Included Projects

Release Tarballs include noVNC by Joel Martin.

Search function uses Haystack by Daniel Lindsley.

Haystack search uses Whoosh by Matt Chaput.

Icons are from Silk set by Mark James.

MonkeyPatcher is used from testtools, written by Jonathan M. Lange and the testtool authors. It is seperately licensed under the MIT License.

The testtools authors are:

- Canonical Ltd
- Twisted Matrix Labs
- Jonathan Lange
- Robert Collins
- Andrew Bennetts
- Benjamin Peterson
- Jamu Kakar
- James Westby
- Martin [gz]
- Michael Hudson-Doyle
- Aaron Bentley
- Christian Kampka
- Gavin Panella
- Martin Pool

and are collectively referred to as "testtools developers".

Internally Created Add-Ons

Django Object Permissions

Django Object Log

Twisted VNCAuthProxy

Release Cycle

Ganeti Web Manager has a feature-based, calendar-influenced release cycle. We aim to release a new minor version roughly twice a year, when new features and bug fixes justify it.

Versions

Ganeti Web Manager uses Major.Minor.Point release numbering. Major versions will incorporate major changes to the application and do not gaurantee backwards compatibility with previous major version databases. Minor versions may incorporate significant changes, but must maintain a consistent upgrade path from previous minor versions. Our Major version is currently 0, as we have not yet released version 1.0.0, the current 0.x series will become 1.0.

Our feature target for 1.0 is near complete feature parity with the ganeti RAPI, after which the 1.x series will be considered stable and no further major structural changes will be integrated. We will then begin work on the 2.0.0 development version, which will incorporate major refactoring of the codebase to separate the UI from the core and communications with the RAPI.

References

Working With The RAPI

There are several places to view documentation detailing how to interface with the python RAPI, though none of them are comprehensive.

The following is a list of five different sources where information relating to the RAPI can be found.

1. The Ganeti RAPI PyDocs
2. The Ganeti RAPI HTML Docs
3. The gnt-instance man-page
4. The rapi client code contained in the upstream ganeti project
5. The rapi-tests which are also contained in the upstream ganeti project

RAPI in a Python Shell

Start up a python shell using the `manage.py` django script.

```
$ ./ganeti_webmgr/manage.py shell
```

In the python shell import `client.py` from `util`.

```
>>> from util import client
```

Assign a variable to the rapi client and pass in the name of the cluster as a string to the GanetiRapiClient object.

```
>>> rapi = client.GanetiRapiClient('my.test.cluster')
```

- Note - For R/W access to the cluster you need to pass in 'username' and 'password' as kwargs to the GanetiRapiClient object. Replace USERNAME and PASSWORD with the correct cluster R/W credentials

```
    >>> rapi = client.GanetiRapiClient('my.test.cluster', username='USERNAME', password='PASSWORD')
```

- Optional - Setup PrettyPrinter to prettify the output of RAPI functions that return dictionaries.

```
    >>> import pprint
    >>> pp = pprint.PrettyPrinter(indent=4).pprint
```

  Now you are able to prettify output like this:

```
    >>> pp(rapi.GetInfo())
```

- RAPI commands can now be accessed as functions of the rapi variable.

```
    >>> rapi.GetInstance('my.test.instance')
```

REST API

Development of the RESTful API for GWM started as a Google Summer of Code 2011 project. The developer, Bojan Suzic, can be reached at bojan.suzic@gmail.com. The mentor for this project is Peter Krenesky.

The current version of the page describes its status as of ~end August 2011. Currently it supports a fair amount of the underlying functionality.

Additionally, this page is intented as a development resource and documentation source for the project.

The project code can be reached at https://github.com/bsu/GWM2. The additional code (changes in other related modules) can be found at the following locations:

- https://github.com/bsu/django_obj_perm
- https://github.com/bsu/django_obj_log.

Users and developers are encouraged to try this addon and send their suggestions/bug reports/improvements either directly to the author, using the GWM mailing list or issue tracker. Please put the line ****[REST-API]**** in the subject if you are sending email message.

REST API for GWM can now be considered as a beta software. For the further development the following is proposed:

Roadmap:

- completion of unit tests
- relocate parts of endpoints which may contain long answers - that variables should be accessed separately (such as object logs)
- further refinement of the code and documentation
- work on further integration (like cloud driver)

The **users/developers/visitors are advised to test** the code and **submit the comments/notices/wishes**. Comments can be submitted either directly to the author, here on this wiki or using the Redmine ticket

The version containing significant changes to this version may be expected in **November 2011**.

About this documentation

This documentation covers basic functionality of the REST API. It consists of the subsections, referring to particular endpoints forming the API. As an endpoints referred are application resources exposed as URIs through appropriate hierarchy. Currently, the system exposes the following resources as REST API endpoints: **User**, **Group**, **Virtual Machine**, **Cluster**, **Node**, **Job**. These are accessible in the form of CRUD operations using HTTP protocol.

By default, each API endpoint returns a list of resources.

For example:

```
/api/vm/
```

would return a list of Virtual Machines in the system, while the particular VM resource is accessed through:

```
/api/vm/1/
```

where 1 represents identifier of particular Virtual Machine. This way only that particular resource is returned. Each resource contains fields related to particular instance in the system. The field types and their properties are described further in the documentation, as a part of related subsections.

For each endpoint described is basic scheme of its resource representation. The scheme includes name, type and description of the particular fields, Additional properties described are possibility for the field to be modified and whether the field returned may be excluded from the representation e.g. nullable. The later one might be useful for clients to prevent unexpected behavior.

While **type** field represents basic data types, it should be noted that **related** type points to other resource in the system. For example:

```
...
<cluster>
...
<virtualmachine>
/api/vm/5
</virtualmachine>
</cluster>
...
```

says that particular cluster resource includes virtualmachine resource, described by related URI. Therefore, if necessary, the complete resource referred at that point may be obtained through provided URI.

This documentation trends to provide as much as complete list of resources and their schematic description. However, due to the level of deepness and limitations of the current wiki system, in some cases this representation is simplified and explained in words rather than in tabular form. It should be noted that all these descriptions are already included in the system.

Using:

```
http://somesite.com/api/?format=xml
```

user is able to get the list of resources exposed, while with the help of:

```
http://somesite.com/api/resource/schema/?format=xml
```

the system returns detailed schema of resource representation and field properties in XML format. Therefore, the user is always able to take a look and check detailed description about a resource, if the one provided here in documentation is not detailed and clear enough.

Design principles

This API aims to expose the resources of Ganeti Web Manager, making suitable for integration into other systems or just performing of simple operations on resources. It does not aim to expose all resources and functions contained in the software, but only the set deemed necessary in order to support its business functions. Currently, it means that the most of the functionality present in the web interface is available for usage and manipulation also using this REST API.

Installation

The most of the code of this addon comes under **/api** directory of GWM distribution. Other code changes are done in some of views and dependent modules (like **django_object_log** and **django_object_permissions**). Its inclusion in the GWM is done in **/urls.py** via:

```
urlpatterns = patterns('',
...
    (r'^', include('api.urls')),
...
```

The prerequisite for running RESTful API over Ganeti Web Manager is to have **django-tastypie** installed. The latest active version/commit of **tastypie** should be used in order to support **ApiKeys** based authentication. That means, as of time of writing this documentation, that **tastypie** should be installed manually. Additionally, the following line in **tastypie/authentication.py**:

```
username = request.GET.get('username') or request.POST.get('username')
```

should be changed to:

```
username = request.GET.get('username') or request.POST.get('username')
or request.GET.get('user') or request.POST.get('user')
```

This is the known issue with **tastypie** already reported in its bug system. If not changed, the part **username** in **/api/user/?api_key=xxx&username=xxx** will produce error message during browsing the main user endpoint. This change makes **tastypie** to accept **user** for authentication instead of **username**. Later produces collision with the field of the same name under **User** model class.

The next change related to the installation of the module is inclusion of **'tastypie'** in **INSTALLED_APPS** of **settings.py**. This will produce necessary tables during installation/migration.

Development

The code is prepared as a part of GSoC activities, and therefore by person not being a part of narrowed GWM development team before. As a such, the main principle to be followed is to try not to interfere too much with existing code. It implies further that the resulting code should be considered as an simple to install add-on. The core business logic of the GWM have not been changed or altered. The most changes done on GWM code are of technical nature, trying to make functions/views accessible to REST backend interface additionally. The code has been committed to separate repository. I tried mostly to perform smaller commits in size, in order to make the code and changes easily readable and trackable.

The framework used to introduce RESTful interface is **django-tastypie**. It has been selected after initial research and testing of several popular Python/Django/REST frameworks. The system supports both XML and JSON as input/output serializations.

Authentication and Authorization

The authentication is done using **API keys**. For each user the appropriate API key is generated automatically. The key can be renewed/recreated using **POST** request and appropriate action inside API. The access to the system looks like in the following example:

```
http://localhost:8000/api/?format=xml&api_key=381a5987a611fb1f8c68ffad49d2cd2b9f92db71&user=test
```

Note: **username** initially supported by **tastypie** has been replaced with **user** in the example query above. The changes and reasons are described in the installation section of this document.

Authorization is completely dependent on Django's authorization system. The existing views from the GWM have been used to expose the most of resources available. Those views are already integrated in Django's authorization system. Therefore, this API should not contain critical security flaws or problems and should be easier to maintenance.

REST API endpoints

/api/user

This endpoint exposes data and operations related to the user management. The following table provides the descriptions of the fields:

Explanations for particular list elements Container: ssh_keys

The elements of the list are denoted as **value** nodes, containing paricular ssh key for the user in the form of **string hash**

Example:

```
<ssh_keys type="list">
<object type="hash">
<id type="integer">1</id>
<key>ssh-rsa
A398kuwNzaC1yc2EAAAADAQABAAABAQDI2oqyrleSvAg4CV5A/4ZZ2fTEFAYU1W2i8373zspaJCSO0eHIl+v4fGeIzH7CFokbM98
/E9ucXR4xcxo77sxGSGH8hiS89aUcHmPKyRYlYj5TwqkZopxYTFmeUhkhP9e5YrlTRXMdhMsIXqXAKRujjySycQ45QLqdYOHbfoh
/aq2vvOoyiGo9vaiIfqbtLjqkjwecDGykesw1c9d07vH53myiLLLkAGGk4KudKSWV6ZxK0ap3/olzzJ3HZpk5MAel5ELX6XuT8VmA
xxx@gmail.com
</key>
</object>
<object>
<id type="integer">2</id>
<key>ssh-rsa
7398kuwNzaC1yc2EAAAADAQABAAABAQDI2oqyrleSvAg4CVjskajslajwFAYU1W2i8373zspaJCSO0eHIl+v4fGeIzH7CFokbM98
/E9ucXR4xcxo77sxGSGH8hiS89aUcHmPKyRYlYj5TwqkZopxYTFmeUhkhP9e5YrlTRXMdhMsIXqXAKRujjySycQ45QLqdYOHbfoh
/aq2vvOoyiGo9vaiIfqbtLjqkjwecDGykesw1c9d07vH53myiLLLkAGGk4KudKSWV6ZxK0ap3/olzzJ3HZpk5MAel5ELX6XuT8VmA
yyy@gmail.com
</key>
</object>
</ssh_keys>
```

Containers: user_actions and actions_on_users

This is the list of **objects**, each object consisting of nullable fields denoted as **obj1, obj2, user, action_name**. The both containers share the representation. The difference between these is the fact that first describes actions performed by user, while the second one describes actions performed on user (by administrator, for instance). The both containers provide read only information.

Example:

```
<user_actions type="list">
<object type="hash">
<obj1>/api/vm/3/</obj1>
<timestamp>2011-07-31T15:23:45.533479</timestamp>
<obj2>/api/job/68/</obj2>
<user>/api/user/2/</user>
<action_name>VM_REBOOT</action_name>
</object>
<object type="hash">
<obj1>/api/vm/3/</obj1>
<timestamp>2011-07-31T17:04:02.333061</timestamp>
<user>/api/user/2/</user>
<action_name>EDIT</action_name>
</object>
```

Container used_resources

This list consists of **object** elements, each containing **resource**, **object** and **type**. The field **object** represents related resource for which the system resources consumption is given. The **type** is **string** describing the object type using internal descriptions (like **VirtualMachine** for virtual machine). The **resource** contains subfields **virtual_cpus**, **disk** and **ram**, each of type **integer** and representing actual consumption of the particular system resource in system's default dimension (e.g. MBs for RAM consumption).

Example:

```
<used_resources type="list">
<object type="hash">
<resource type="hash">
<virtual_cpus type="integer">0</virtual_cpus>
<disk type="integer">0</disk>
<ram type="integer">0</ram>
</resource>
<object>/api/vm/3/</object><
type>VirtualMachine</type>
</object>
<object type="hash">
<resource type="hash">
<virtual_cpus type="integer">0</virtual_cpus>
<disk type="integer">0</disk>
<ram type="integer">0</ram></resource>
<object>/api/vm/11/</object>
<type>VirtualMachine</type>
</object>
</used_resources>
```

Container permissions

Permissions contains elements describing particular resource type, each further containing a list of resources. The primary **elements** are described as **Cluster**, **VirtualMachine**, **Group**. Their list member main nodes are described as **object**, containing **object** reference (related resource) for which the permissions are set, and the **permissions** list containing list of **values** as strings, describing permission type in internal format (like **create_vm**).

Example:

```
<permissions type="hash">
<Cluster type="list"/>
<Group type="list"/>
<VirtualMachine type="list">
```

```
<object type="hash">
<object>/api/vm/3/</object>
<permissions type="list">
<value>admin</value>
<value>power</value>
<value>tags</value>
</permissions>
</object>
<object type="hash">
<object>/api/vm/11/</object>
<permissions type="list">
<value>admin</value>
</permissions></object>
</VirtualMachine>
</permissions>
```

Manipulation and operations using POST/PUT/DELETE methods The fields marked as non-readonly (table above) can be subject of further manipulation and operations. **The same applies to the rest of the document - those fields can be automatically updated or deleted by performing analog request.** In order to maintain consistency with REST approach, the **PUT** method is used on currently available resources with purpose to change or update them. On another side, **POST** method is used either to generate new resources, or to perform predefined actions on currently existing resources.

The following example demonstrates changing of users lastname and status in system (disabling its account). Request URI:

```
PUT /api/user/1/?api_key=xxxxx&username=yyyyy
```

Request header:

```
Content-Type: application/json
Accept: application/json
```

Request payload:

```
{"last_name":"New LastName", "is_active":false}
```

Server response:

```
HTTP/1.1 204 NO CONTENT
Date: Sat, 06 Aug 2011 11:18:25 GMT
Server: WSGIServer/0.1 Python/2.7.1+
Vary: Accept-Language, Cookie
Content-Length: 0
Content-Type: text/html; charset=utf-8
Content-Language: en
```

The next example demonstrates generating of new Api key for the user:

Request URI:

```
POST /api/user/2/?api_key=xxxxx&username=yyyyy
```

Request header:

```
Content-Type: application/json
Accept: application/xml
```

Request payload:

```
{"action":"generate_api_key"}
```

Server response:

```
HTTP/1.1 201 CREATED
Date: Sat, 06 Aug 2011 11:21:56 GMT
Server: WSGIServer/0.1 Python/2.7.1+
Vary: Accept-Language, Cookie
Content-Type: text/html; charset=utf-8
Content-Language: en
```

Response body:

```
<?xml version='1.0' encoding='utf-8'?>
<object>
<api_key>de0a57db0ce43d0f3c52f83eaf33387750ac9953</api_key>
<userid>2</userid>
</object>
```

For the API Key manipulation under **/api/user/** endpoint implemented are two POST actions: **generate_api_key**, as demonstrated in the example above, and **clean_api_key**. The former generates a new API key for the user and returns it in the response, while the later one cleans user's API key. This way its access to the system using REST API is disabled, but the standard access using web interface is untouch.

Additionally, two POST actions are implemented for user-group membership manipulation.

/api/group

This endpoint exposes data and operations related to the group management. The following table summarizes supported fields.

Container: actions_on_group

This is the list of **objects**, each object consisting of nullable fields denoted as **obj1, obj2, user, action_name**. This container describes actions performed on the group (by administrator, for instance) in the form of read-only information. Please note that inclusion od **obj1** and **obj2** depends on the action type, e.g. one of these may be omitted.

Example:

```
<actions_on_group type="list">
<object type="hash">
<obj1>/api/group/1/</obj1>
<timestamp>2011-07-29T08:28:24.566903</timestamp>
<user>/api/user/1/</user>
<action_name>CREATE</action_name>
</object>
<object type="hash">
<obj1>/api/cluster/1/</obj1>
<timestamp>2011-07-29T08:28:59.854791</timestamp>
<obj2>/api/group/1/</obj2>
<user>/api/user/1/</user>
<action_name>ADD_USER</action_name>
</object>
</actions_on_group>
```

Field: users

This simple field contains a list of users belonging to the group. The type of the resource is **related**, which means that it points to the URI representing the resource. Example:

```
<users type="list">
<value>/api/user/2/</value>
<value>/api/user/3/</value>
</users>
```

Container used_resources

The syntax used here is the same as used in the <object>User</object> resource. For more information and example, please refer to the user section of this document.

Container permissions

The syntax used here is the same as used in the <object>User</object> resource. For more information and example, please refer to the user section of this document.

Manipulation actions

/api/vm

This endpoint exposes methods for VirtualMachine inspection and manipulation.

Important: as the attributes exposing VM object are related to many other objects and many calls are done on different views, here the somewhat different approach to attribute exposure is used. At the main point **/api/vm/**, which provides a list of virtual machines, only the basic attributes of VM are provided. However, when the particular object is called, sad **/api/vm/3/**, the system returns additional set of its attributes. This is due to need to perform additional calls which introduce network latency. Performing all those calls at once for all virtual machines could produce unnecessary overhead.

Fields exposed (main endpoint):

Fields exposed (additionally, particular object):

Containers: actions_on_vm and permissions

The format and members of those lists are similar to previous mentioned fields, e.g. in **cluster** endpoint. For detailed description, please refer to those.

The field **actions_on_vm** contains object(s) taking part in action, user initiated the action, timestamp and the internal description of the action in form of the string. The field **permissions>** lists users and groups (as related fields) which have any form of permissions on virtual machine.

Operations supported

Operations on VM are accomplished in form of action. Action is initiated using POST request. Example:

```
POST /api/vm/7
{"action":"shutdown"}
```

In this example, user initiates @POST@ request on Virtual Machine described with @id=7@. The action type is described in field @action@ in request header.

After the action is initiated, server sends back response. Example:

Header:

```
HTTP/1.1 200 OK
Date: Wed, 27 Jul 2011 18:39:31 GMT
Server: WSGIServer/0.1 Python/2.7.1+
Vary: Accept-Language, Cookie
```

```
Content-Type: application/json
Content-Language: en
```

Body:

```
{"end_ts": null, "id": "138722", "oplog": [[]], "opresult": [null],
"ops": [{"OP_ID": "OP_INSTANCE_SHUTDOWN", "debug_level": 0, "dry_run":
false, "ignore_offline_nodes": false, "instance_name":
"ooga.osuosl.org", "priority": 0, "timeout": 120}], "opstatus":
["running"], "received_ts": [1311791966, 837045], "start_ts":
[1311791966, 870332], "status": "running", "summary":
["INSTANCE_SHUTDOWN(ooga.osuosl.org)"]}
```

The following actions and parameters are supported:

/api/cluster

This endpoint describes fields and operations available for the Cluster.

Containers: available_ram and available_disk

The first container provides information about status of the RAM in the cluster. Analogously, the second one provides information about disk space in the cluster.

Example:

```
<available_ram type="hash">
<allocated type="integer">1024</allocated>
<total type="integer">2004</total>
<used type="integer">874</used>
<free type="integer">980</free>
</available_ram>
```

Containers: missing_ganeti and missing_db

Here the names of the missing machines are provided in the simple form. The former container describes machines missing in the Ganeti, while the former contains the machines missing in the database.

Example:

```
<missing_db type="list">
<value>3429_test</value>
<value>breakthis.gwm.osuosl.org</value>
<value>brookjon.gwm.osuosl.org</value>
<value>noinstall2.gwm.osuosl.org</value>
</missing_db>
```

Container: quota and default_quota

This container returns the quotas for the user performing request. If the user is not found or do not have a quotas assigned, default quota is returned. If there are no values for the specific quota element, null is returned. Default_quota container is additionally returned for the case that quota for the user if found.

Example:

```
<quota type="hash">
<default type="integer">1</default>
<virtual_cpus type="null"/>
<ram type="null"/>
```

```
<disk type="null"/>
</quota>
```

Container: info

This element provides extensive information related to the cluster. These information are used internally in Ganeti Web Manager to render specific pages. As of level of detail used, the field contained here will not be described but just provided in detail in example.

```
<info type="hash">
<default_iallocator/>
<maintain_node_health type="boolean">False</maintain_node_health>
<hvparams type="hash">
<kvm type="hash">
<nic_type>paravirtual</nic_type>
<use_chroot type="boolean">False</use_chroot>
<migration_port type="integer">8102</migration_port>
<vnc_bind_address>0.0.0.0</vnc_bind_address>
<cdrom2_image_path/>
<usb_mouse/>
<migration_downtime type="integer">30</migration_downtime>
<floppy_image_path/>
<kernel_args>ro</kernel_args>
<cdrom_image_path/>
<boot_order>disk</boot_order>
<vhost_net type="boolean">False</vhost_net>
<disk_cache>default</disk_cache>
<kernel_path/>
<initrd_path/>
<vnc_x509_verify type="boolean">False</vnc_x509_verify>
<vnc_tls type="boolean">False</vnc_tls>
<cdrom_disk_type/>
<use_localtime type="boolean">False</use_localtime>
<security_domain/>
<serial_console type="boolean">False</serial_console>
<kvm_flag/>
<vnc_password_file/>
<migration_bandwidth type="integer">32</migration_bandwidth>
<disk_type>paravirtual</disk_type>
<migration_mode>live</migration_mode>
<security_model>pool</security_model>
<root_path>/dev/vda3</root_path>
<vnc_x509_path/>
<acpi type="boolean">True</acpi>
<mem_path/>
</kvm>
</hvparams>
<default_hypervisor>kvm</default_hypervisor>
<uid_pool type="list">
<objects>
<value type="integer">8001</value>
<value type="integer">8030</value>
</objects>
</uid_pool>
<prealloc_wipe_disks type="boolean">False</prealloc_wipe_disks>
<primary_ip_version type="integer">4</primary_ip_version>
<mtime type="float">1308862451.98</mtime>
<os_hvp type="hash"/>
<osparams type="hash"/>
```

```
<uuid>0b3b2432-a8e1-4c17-a99b-87303841cb95</uuid>
<export_version type="integer">0</export_version>
<hidden_os type="list"/>
<master>gwm1.osuosl.org</master>
<nicparams type="hash">
<default type="hash">
<link>br0</link>
<mode>bridged</mode>
</default>
</nicparams>
<protocol_version type="integer">2040000</protocol_version>
<config_version type="integer">2040000</config_version>
<software_version>2.4.2</software_version>
<tags type="list"/>
<os_api_version type="integer">20</os_api_version>
<candidate_pool_size type="integer">10</candidate_pool_size>
<file_storage_dir>/var/lib/ganeti-storage/file</file_storage_dir>
<blacklisted_os type="list"/>
<enabled_hypervisors type="list">
<value>kvm</value>
</enabled_hypervisors>
<drbd_usermode_helper>/bin/true</drbd_usermode_helper>
<reserved_lvs type="list"/>
<ctime type="float">1292887189.41</ctime>
<name>gwm.osuosl.org</name>
<master_netdev>eth0</master_netdev>
<ndparams type="hash">
<oob_program type="null"/>
</ndparams>
<architecture type="list">
<value>64bit</value>
<value>x86_64</value>
</architecture>
<volume_group_name>ganeti</volume_group_name>
<beparams type="hash">
<default type="hash">
<auto_balance type="boolean">True</auto_balance>
<vcpus type="integer">2</vcpus>
<memory type="integer">512</memory>
</default>
</beparams>
</info>
```

/api/node

In this endpoint exposed are the attributes and operations on the Cluster.

Container: actions_on_node

This container provides the actions done on the node in form of the log. It is similar in the form to the other actions_on_X containers in other endpoints. For more info please take a look there.

Container: primary_list and secondary_list

These containers provide the list of virtual machines existing on the node in primary and secondary node mode. The list is simple and includes object hostname and related link. Example:

```
<primary_list type="list">
<object type="hash">
<hostname>3429</hostname>
<resource>/api/vm/1/</resource>
</object>
<object type="hash">
<hostname>breakthis.gwm.osuosl.org</hostname>
<resource>/api/vm/2/</resource>
</object>
</primary_list>
```

Container: info

This element provides extensive information related to the node. These information are used internally in Ganeti Web Manager to render specific pages. As of level of detail used, the field contained here will be described partially only. It should be noted that the elements in the table may be nullable. The full example output is included after the table.

```
<info type="hash">
<dfree type="integer">30336</dfree>
<cnodes type="integer">1</cnodes>
<serial_no type="integer">1</serial_no>
<dtotal type="integer">60012</dtotal>
<sinst_cnt type="integer">0</sinst_cnt>
<mtime type="null"/>
<pip>140.211.15.61</pip>
<mfree type="integer">1310</mfree>
<sip>140.211.15.61</sip>
<uuid>4a0e9df5-0b59-4643-b156-c133edb035bc</uuid>
<drained type="boolean">False</drained>
<sinst_list type="list"/>
<csockets type="integer">1</csockets>
<role>M</role>
<ctotal type="integer">2</ctotal>
<offline type="boolean">False</offline>
<vm_capable type="boolean">True</vm_capable>
<pinst_cnt type="integer">15</pinst_cnt>
<mtotal type="integer">2004</mtotal>
<tags type="list"/>
<group.uuid>e318906a-40cd-4702-813b-c2185abaf8ec</group.uuid>
<master_capable type="boolean">True</master_capable>
<ctime type="null"/>
<master_candidate type="boolean">True</master_candidate>
<name>gwm1.osuosl.org</name>
<mnode type="integer">730</mnode>
<pinst_list type="list">
<value>3429</value>
<value>noinstall2.gwm.osuosl.org</value>
<value>failed</value>
<value>success</value>
<value>derpers.gwm.osuosl.org</value>
<value>testtest</value
><value>breakthis.gwm.osuosl.org</value>
<value>foobarherpderp.gwm</value>
<value>brookjon.gwm.osuosl.org</value>
<value>orphanme</value>
<value>foobar352</value>
<value>testcdrom2.gwm.osuosl.org</value>
<value>ooga.osuosl.org</value>
<value>diskless3</value>
```

```
<value>noinstall.gwm.osuosl.org</value>
</pinst_list>
</info>
```

/api/job

This endpoint exposes information related to the job execution in the system.

Container: opresult

This field contains a detailed description of error encountered during job execution. The fields included are the following:

Example:

```
<opresult type="hash">
<error_type>OpPrereqError</error_type>
<error_message>The given name (owelwjqe) does not resolve: Name or
service not known</error_message>
<error_family>resolver_error</error_family>
</opresult>
```

Container: ops This field contains information about the job executed. There may be many subfields included, spanned through several levels.

The following excerpts provide two typical example outputs:

```
<pre>
<ops type="list">
<object type="hash">
<hvparams type="hash">
<nic_type>paravirtual</nic_type>
<boot_order>disk</boot_order>
<root_path>/dev/vda3</root_path>
<serial_console type="boolean">False</serial_console>
<cdrom_image_path/>
<disk_type>paravirtual</disk_type>
<kernel_path/>
</hvparams>
<debug_level type="integer">0</debug_level>
<disk_template>plain</disk_template>
<name_check type="boolean">True</name_check>
<osparams type="hash"/>
<src_node type="null"/>
<source_x509_ca type="null"/>
<dry_run type="boolean">False</dry_run>
<pnode>gwm1.osuosl.org</pnode>
<nics type="list">
<object type="hash">
<link>br0</link>
<mode>bridged</mode>
</object>
</nics>
<wait_for_sync type="boolean">True</wait_for_sync>
<priority type="integer">0</priority>
<start type="boolean">True</start>
<ip_check type="boolean">True</ip_check>
<source_shutdown_timeout type="integer">120</source_shutdown_timeout>
<file_storage_dir type="null"/>
```

```
<no_install type="boolean">False</no_install>
<src_path type="null"/>
<snode type="null"/>
<identify_defaults type="boolean">False</identify_defaults>
<OP_ID>OP_INSTANCE_CREATE</OP_ID>
<source_instance_name type="null"/>
<source_handshake type="null"/>
<hypervisor>kvm</hypervisor>
<force_variant type="boolean">False</force_variant>
<disks type="list">
<object type="hash">
<size type="integer">408</size>
</object>
</disks>
<instance_name>owelwjqe</instance_name>
<mode>create</mode>
<iallocator type="null"/>
<file_driver>loop</file_driver>
<os_type>image+debian-squeeze</os_type>
<beparams type="hash">
<vcpus type="integer">2</vcpus>
<memory type="integer">512</memory>
</beparams>
</object>
</ops>
</pre>
```

```
<pre>
<ops type="list">
<object type="hash">
<instance_name>brookjon.gwm.osuosl.org</instance_name>
<ignore_secondaries type="boolean">False</ignore_secondaries>
<dry_run type="boolean">False</dry_run>
<priority type="integer">0</priority>
<debug_level type="integer">0</debug_level>
<OP_ID>OP_INSTANCE_REBOOT</OP_ID>
<reboot_type>hard</reboot_type>
<shutdown_timeout type="integer">120</shutdown_timeout>
</object>
</ops>
</pre>
```

Working With Git

This page holds a list of some helpful git commands. Several of them were borrowed from Mislav's Blog

git remote show origin

Find out what branches are tracked, configured for pull, configured for push, and are 'up to date'.

git fetch

Update local references to remote branches.

git log -p

View each commits changes.

git log -m -S"search text"

Search through commits for commit messages containing the text = “search text”.

git reset –soft HEAD

Accidentally added the wrong file to the index? This command will reset the current head to HEAD and keep your changes.

git reset –hard HEAD

Remove all your changes and reset the current head to HEAD.

git commit –amend

Change the commit message of the most recent commit.

git add (**FILENAME** *or* **DIRECTORY**)

Add a single file or directory to the index. If a directory is specified all files that are new or have been changed under that directory are added.

git commit

Open up the editor specified by git.editor to review changes and add a message. If no message is given, then the commit is aborted. Commit takes effect once the file is written.

git commit -m “COMMIT MESSAGE”

Commit changes with the message “COMMIT MESSAGE”.

git cherry -v BRANCH

Will list the commits that are part of the current branch, and not part of BRANCH

Logos

Versions

Date GWM Object Log Object Permissions Sep 16th, 2010 INIT – – Oct 8th, 2010 – – INIT Nov 16th, 2010 – – 0.9 Nov 23rd, 2010 – – 1.0 Dec 10th, 2010 – – 1.1 Dec 20th, 2010 – – 1.2 Jan 26th, 2011 0.4 – 1.2 Feb 3rd, 2011 0.5 – 1.3 Feb 25th, 2011 0.5 INIT 1.3 Mar 4th, 2011 0.6 0.5 1.3.1 Mar 6th, 2011 0.6 0.5.1 1.3.1 Mar 10th, 2011 0.6.2 0.5.1 1.3.1 Jun 17th, 2011 0.7 0.6 1.4.1 Jun 17th, 2011 0.7.1 0.6 1.4.1 Jun 19th, 2011 0.7.2 0.6

Setup script

As part of Google Summer of Code 2013 work, Ganeti Web Manager gained better internal structure and important feature, which is being a Python package.

This will ensure that future users of Ganeti Web Manager can install it easily with Python tools like `pip`.

What's even more important is that we created an installation script for your convenience.

Note: Take a look at *installation instructions* to see how you should install Ganeti Web Manager.

setup.sh

The `setup.sh` script can be located in the `scripts/` folder at the root of the Ganeti Web Manager project folder.

Workflow

What this script does:

1. Detects operating system (only Ubuntu, Debian and CentOS are supported) and it's architecture.
2. Installs system dependencies (Python, `python-virtualenv`) via user's OS default package manager (`apt` or `yum`) [requires `sudo` priviledge].
3. Creates *virtual environment* in local directory (or in directory specified by user).
4. Installs newest `pip`, `setuptools` and `wheel` Python packages into that virtual environment.
5. Installs Ganeti Web Manager and it's dependencies from OSUOSL servers (http://ftp.osuosl.org/pub/osl/ganeti-webmgr/) into that virtual environment. These packages are provided as `.whl` packages, ie. binary compiled packages. That helps speeding up installation time and requires no compilation on end user's side.

Warning: If you happen to have different operating system from these *supported* by OSUOSL, you should not install `.whl` packages from OSUOSL servers. They're compiled against these specific operating systems and their behavior on other systems / architectures might by unpredictable.

Warning: This script does not auto-configure your installation. You have to manually do this.

Database requirements

Depending on your operating system, different packages are needed for different database servers.

- **MySQL**: `libmysqlclient18` on Ubuntu/Debian, or `mysql-libs` on CentOS
- **PostgreSQL**: `libpq5` on Ubuntu/Debian, or `postgresql-libs` on CentOS

These dependencies are required for `MySQL-python` and `psycopg2` Python packages to work.

The script will get appropriate packages for you, unless you use `-N` flag. For more information, take a look at *Command line arguments*.

Usage

Command line arguments

-d `<install directory>`

Default `/opt/ganeti_webmgr`

Directory for the virtual environment.

-w `<wheels (local/remote) directory location>`

Default `http://ftp.osuosl.org/pub/osl/ganeti-webmgr`

Wheel packages are read from that path. The path can be either local (eg. `./gwm/wheels`) or remote (eg. `http://ftp.osuosl.org/pub/osuosl/wheels`).

This also assumes the directory structure for the wheels package is structured according to how the *Dependencies building script structures files*.

> **Warning:** Don't change it unless you know what you're doing!

-D `<database server>`

Default SQLite

If you provide `postgresql` or `mysql`, the script will try to install system and Python dependencies for selected database, unless `-N` flag is set.

-N

Skip installing system dependencies. You want to use this flag if you either don't trust this script or if you have unsupported operating system.

> **Warning:** When `-N` flag isn't provided, the script will run **sudo** to get user's permission to install some system dependencies.

-p `<http proxy url>`

Default none

If you provide an HTTP proxy URL, pip will use this proxy to install all of the required packages.

-u `<install directory>`

Default `./ganeti_webmgr`

Upgrade existing installation. Point the script to directory being a virtual environment, ie. containing `bin/pip` (which is required in order to upgrade).

-h

Display help.

Examples

Run with default settings:

```
$ ./scripts/setup.sh
```

Install PostgreSQL:

```
$ ./scripts/setup.sh -d ./gwm -D postgresql
```

Skip installing system dependencies:

```
$ ./scripts/setup.sh -N
```

Upgrade existing installation:

```
$ ./scripts/setup.sh -u ./existing_gwm
```

Generate wheels on your own with *building script*:

```
$ ./scripts/build_wheels.sh -e ./venv_whl -w ./wheels
$ ./scripts/setup.sh -d ./ganeti_webmgr -w ./wheels
```

or send wheels to remote location and install from it:

```
$ ./scripts/build_wheels.sh -e ./venv_whl -w ./wheels
$ rsync ./wheels rsync@foo.example.org:/srv/www/wheels
$ ./scripts/setup.sh -d ./ganeti_webmgr -w http://foo.example.org/wheels
```

Directory structure

After installing Ganeti Web Manager via `setup.sh` this is what you get:

```
./ganeti_webmgr
-- bin
-- config
-- include
|   -- ...
-- lib
|   -- ...
-- local
    -- ...
```

Directories `bin`, `include`, `lib` or `local` are *Virtual environment* specific - don't bother about them. The directory `config` on the other hand is important to you: this is where your Ganeti Web Manager configuration resides.

Troubleshooting

Can't run `setup.sh`: permission denied

This script needs to be executable, you can make it by issuing this command:

```
$ chmod +x ./scripts/setup.sh
```

Dependencies building script

Along with the *setup script*, `build_wheels.sh` was created as a script that builds Ganeti Web Manager dependencies, both compiled and not, and packages them as `.whl` archives.

You can find the build script in Ganeti Web Manager's script directory at `./scripts/build_script.sh`

Folder Structure

Wheels are put in subfolders in this pattern:

```
$wheels_dir/{distribution}/{version}/{architecture}/
```

The *Setup script*'s -w flag expects the wheels to be in this folder structure. So using `build_wheels.sh` to create these is required, unless you create the directory structure yourself.

Workflow

What this script does:

1. Detects operating system (only Ubuntu, Debian and CentOS are supported) and it's architecture.
2. **Tries to install necessary dependencies [requires `sudo` priviledge]:**
    - `python`
    - `python-dev`
    - `python-virtualenv`
    - `libpq-dev`, `libmysqlclient-dev` on Ubuntu and Debian
    - `postgresql-devel`, `mysql-devel` on CentOS
    - `git`
3. Removes existing *virtual environment* installation.
4. Creates new virtual environment in the same destination.
5. Upgrades `pip`, `setuptools` and `wheel` (Python packages) in that virtual environment.
6. Installs Ganeti Web Manager into that virtual environment, while creating proper wheel packages.
7. Removes virtual environment.

Warning: Remember to keep wheels output directory and virtual environment apart.

Usage

The only existing dependency you need is `bash`. This script takes care of installing anything additional. However, if you have some troubles with dependencies, take a look at *Can't install or run dependencies*.

To use the script, you simply run it. If you want to build wheels packages for a different version of Ganeti Web Manager, you simply need to `git checkout` the branch or tag that you want to build the wheels packages for.

Directory structure

Directories you'll need:

- `venv` for virtual environment installation,
- `gwm` for Ganeti Web Manager source code,
- `wheels` for wheel packages.

Hint: You can totally customize paths to these directories.

These directories will be created after you run `build_wheels.sh`.

Command line arguments

By specifying additional arguments you can change this script's behavior and some paths it's using.

Note: `build_wheels.sh` will work graciously without any additional arguments!

-e <virtual environment directory>

Default `./venv`

Path where the script should create a temporary Python virtual environment.

-w <wheels output directory>

Default `./wheels`

Path where output wheel packages are stored.

-N

Skip installing system dependencies.

Examples

Default options:: $ ./scripts/build_wheels.sh

Here's another way to do the above, specifiying the locations:

```
$ ./scripts/build_wheels.sh -e ./venv -w ./wheels
```

Build wheels without dependencies (an unsupported OS), and upload the wheels:

```
$ ./scripts/build_wheels.sh -N
$ rsync ./wheels rsync@server:/srv/www/wheels
```

Troubleshooting

Can't install or run dependencies

If you're using operating system different from Ubuntu, Debian or CentOS, you might have troubles installing necessary dependencies.

What this script is looking for:

- `/usr/bin/sudo`
- `/bin/rm`
- `/usr/bin/virtualenv` (usually `python-virtualen` package provides it)
- `/usr/bin/git` (usually `git` package provides it)

Make sure you have these files present in your system and then run the script with `-N` command line argument.

Can't run `build_wheels.sh`: permission denied

This script needs to be executable, you can make it by issuing this command:

```
$ chmod +x build_wheels.sh
```

Virtual environment

A virtual environment is a "space" separated from operating system, where Python packages get installed. This "space" is local, thus prevents Python packages from overwriting your system Python packages.

Imagine having package `xyz` in version `1.2.4` installed system-wide. Now you want to install Ganeti Web Manager, that requires this package in version `1.1`.

You can't keep both packages installed system-wide. Therefore you need to somehow separate packages required by Ganeti Web Manager and your system packages. Virtual environment does exactly this.

Virtual environment structure

Virtual environment (shortly `virtualenv` or `venv`) consists of these directories:

- `bin` - contains executable files and activation scripts
- `include` - contains symlink to `lib/python2.x` directory
- `lib` - Python packages get installed to this directory
- `local` - contains symlinks to `bin`, `include` and `lib` directories
- `share` - contains documents and `man` pages installed along with Python packages

Helpers and tools

Main tool used for creating virtual environments is `python-virtualenv` and it's executable: `virtualenv`.

When you issue `virtualenv name` in your shell, this tool creates structure described above in the `name` directory.

Usually next thing to do when developing (or deploying) a project in Python is to clone a repository **within that virtual environment**. It creates your project files next to virtual environment's directories. And everything becomes a mess.

To help overcome this mess, someone clever wrote `virtualenvwrapper`. This is a set of shell scripts, that:

- create virtual environment in your `$HOME/.virtualenvs` directory
- list virtual environments existing there
- remove specified virtual environment
- quickly switch between existing virtual environments

...and we **highly recommend** using it.

`virtualenvwrapper` commands

`mkvirtualenv name` Creates virtual environment with given *name*.

`lsvirtualenv` List all existing virtual environments.

rmvirtualenv name Remove existing virtual environment with given *name*.

workon name Switch to virtual environment with given *name*.

deactivate When you're within virtual environment, you can leave it by issuing this command.

Command line prompt

By default, after activating specific virtual environment, it's name appears at the beginning of your shell prompt. For example:

```
$ cd ganeti_webmgr
$ workon gwm
(gwm)$ django-admin.py --help
...
(gwm)$ deactivate
$ lsvirtualenv
```

Note: In some guides in this documentation these brackets indicate commands issued from within virtual environment.

About the search system

The search system in Ganeti Web Manager utilizes three main technologies:

- Haystack - A model-based search system for Django
- Whoosh - A pure-Python indexing and searching library
- jQuery UI Autocomplete widget - Displays suggestions to input boxes as the user types

Below, I will discuss the different components of the search system.

Haystack

Haystack is the meat 'n' potatoes of the search system, involved in every aspect. Mainly it does the following:

- Defines the search set in terms of GWM models in **/ganeti_web/search_indexes.py**
- Manages making queries and indexing the search back-end (currently Whoosh).
- Provides search-specific forms and templates (GWM only uses one search result template: **/templates/search/search.html**)

Find out more about defining search indexes with the Haystack SearchIndex API. To find out more about Haystack in general, see its documentation.

Whoosh

Whoosh is a pure-Python indexing and searching library that Haystack uses as a search back-end. The developer actually doesn't need to interact with Whoosh directly.

Of indexing and DB performance

Haystack is currently set to do live indexing. This means that the search index gets updated every time an included model is updated in the database. This means the index will always be up-to-date, but has the potential to severely hamper performance when dealing with a lot of database changes.

Indexing behavior is set when the search set is defined in **ganeti_webmgr/ganeti_web/search_indexes.py**

If database performance starts to become an issue, try using *SearchIndex* instead of *RealTimeSearchIndex*, and run:

```
$ django-admin.py update_index
```

from time-to-time. For more information, please see the Haystack documentation on the subject.

jQuery UI Autocomplete widget

The Autocomplete widget suggests search results in real-time as the user types a query. This is facilitated through two main components:

- jQuery UI Autocomplete widget itself
- An autocomplete Django view **ganeti_web/views/search.py** that supplies Autocomplete with suggestion data to display

Basically, the Autocomplete widget calls the autocomplete view as the user types, and fills a pop-up box underneath the input box with search suggestions. The JavaScript logic can be found in **/static/js/autocomplete_search.js**, and the search view can be found in **ganeti_web/views/search.py**. Both of these files contain details about how the suggestion data is structured, sent, and processed.

CHAPTER 7

Deprecated

Deprecated: Dependencies

Warning: This document is deprecated as of Ganeti Web Manager version 0.11.

Base

Python >= 2.5

Python-dev

```
sudo apt-get install python-dev
```

Note: Python-dev is required because some pip packages need it to build dependencies

Databases

All databases need their required python binding installed in order for Django to connect. Please refer to Django database documentation if you have any issues.

MySQL python-mysql

```
pip install MySQL-python
```

PostgreSQL postgresql_psycopg2

```
pip install psycopg2
```

LDAP

LDAP dependencies can be found on the *Dependencies* page.

Deprecated: Compatibility

Ganeti Web Manager is compatible with the following:

Ganeti 2.4.x–2.6.0.

Earlier versions are unsupported; they may occasionally work, but should not be relied upon.

Browsers Mozilla Firefox >= 3.x, current Google Chrome/Google Chromium.

Other contemporary browsers may also work, but are not supported.

The web-based VNC console requires browser support of WebSockets and HTML5.

Databases SQLite, MySQL.

New in version 0.10: PostgreSQL has limited support

Operating Systems Ubuntu 11.10, Ubuntu 12.04, CentOS 6.

Known to work on Debian 7 and CentOS 5.

Debian 6 should work, provided that pip, virtualenv and fabric are the latest version managed through pip.

Deprecated: Installation

Warning: This document is deprecated as of Ganeti Web Manager version 0.11.

We use *Fabric*, a tool for streamlining administration tasks, to deploy Ganeti Web Manager.

Before installing Ganeti Web Manager, make sure you have all the required *Deprecated: Dependencies* installed.

Installing

1. Download and unpack the latest release, currently this is 0.11.2.
2. Change to the project directory.

```
cd ganeti_webmgr
```

3. Run Fabric to automatically create a python virtual environment and install required dependencies. This may take a few minutes.

```
# Deploy a production environment
fab deploy
```

Changed in version 0.10: *fab prod deploy* is now *fab deploy*. *fab dev deploy* is still the same.

Note: If you would like a more noisy output, adding *v*, as in *fab v deploy*, will provide more verbosity.

4. While in the project root, copy the default settings file **settings.py.dist** to **settings.py**:

```
cp settings.py.dist settings.py
```

Minimum Configuration

Getting Ganeti Web Manager up and running requires a minimum configuration of a database server. If you don't have a database server available, and are fine using SQLite, you can skip this step.

1. Edit **settings.py** and change the database backend to your preferred database along with filling any any relevant details relating to your database setup.

```
'default': {
    # Add 'postgresql_psycopg2', 'postgresql', 'mysql',
    # 'sqlite3' or 'oracle'.
    'ENGINE': 'django.db.backends.',

    # Or path to database file if using sqlite3.
    'NAME': 'ganeti.db',

    # Not used with sqlite3.
    'USER':     '',

    # Not used with sqlite3.
    'PASSWORD': '',

    # Set to empty string for localhost. Not used with sqlite3.
    'HOST':     '',

    # Set to empty string for default. Not used with sqlite3.
    'PORT':     '',
}
```

Initializing

1. Activate the Python Virtualenv:

```
source venv/bin/activate
```

2. Initialize Database:

   Existing Database:

```
# Create new tables and migrate all apps using southdb
./manage.py syncdb --migrate
```

   New Database:

```
./manage.py syncdb --all
./manage.py migrate --fake
```

1. Build the search indexes:

```
./manage.py rebuild_index
```

Note: Running **./manage.py update_index** on a regular basis ensures that the search indexes stay up-to-date when models change in Ganeti Web Manager.

Next Steps

Congradulations! Ganeti Web Manager is now installed and initialized. Next, you'll want to look into *Configuring* and *deployment*, if you are going to be setting up a production instance. Otherwise, if you just want to play around with Ganeti Web Manager, or are *developing*, take a look at *Development Server*.

Deprecated: Upgrading

Warning: This document is deprecated as of Ganeti Web Manager version 0.11.

Note: Please read the instructions fully before starting. The order of operations is important. The upgrade may fail if done out of order.

This guide will walk you through upgrading Ganeti Web Manager. Our upgrade process uses South, a database migration tool that will update your database.

1. Backup the database
2. Download the latest code
3. Save a copy of **settings.py**
4. Deploy code to your existing directory
5. Copy **settings.py** back into the directory

Follow the guide for your version.

Upgrading From Version 0.4

If you are upgrading from version 0.4 you will be required to convert your installation to use South. Version 0.4 did not track the database with South, so South must be informed that your installation is already partially migrated. Read the South documentation for more information about converting apps.

1. Backup your database
2. install python-django-south.
3. Add "south" to the list of **INSTALLED_APPS** inside **settings.py**
4. Make sure you add any new settings to **settings.py** that are listed in *Settings Changes*
5. Synchronize the database with **./manage.py syncdb**

```
$ ./manage.py syncdb

/usr/lib/pymodules/python2.6/registration/models.py:4: DeprecationWarning: the sha module is dep
  import sha
Syncing...
Creating table south_migrationhistory
No fixtures found.

Synced:
 > django.contrib.auth
 > django.contrib.admin
 > django.contrib.contenttypes
 > django.contrib.sessions
 > django.contrib.sites
 > registration
 > logs
 > object_permissions
 > south

Not synced (use migrations):
```

```
 - ganeti
 - logs
(use ./manage.py migrate to migrate these)
```

6. Convert the ganeti app to use South for future migrations.

```
$ ./manage.py migrate ganeti 0001 --fake

/usr/lib/pymodules/python2.6/registration/models.py:4: DeprecationWarning: the sha module is dep
  import sha
 - Soft matched migration 0001 to 0001_version_0_4.
Running migrations for ganeti:
 - Migrating forwards to 0001_version_0_4.
 > ganeti:0001_version_0_4
   (faked)
```

7. Convert the logs app to use South for future migrations.

```
$ ./manage.py migrate logs 0001 --fake

/usr/lib/pymodules/python2.6/registration/models.py:4: DeprecationWarning: the sha module is dep
  import sha
 - Soft matched migration 0001 to 0001_version_0_4.
Running migrations for logs:
 - Migrating forwards to 0001_version_0_4.
 > logs:0001_version_0_4
   (faked)
```

8. Run South migration

```
$ ./manage.py migrate

/usr/lib/pymodules/python2.6/registration/models.py:4: DeprecationWarning: the sha module is dep
  import sha
Running migrations for ganeti:
 - Migrating forwards to 0002_version_0_5.
 > ganeti:0002_version_0_5
 - Loading initial data for ganeti.
No fixtures found.
Running migrations for logs:
- Nothing to migrate.
```

Upgrading from >=0.5

1. **Backup** your database

Pre-0.8

1. Run South migration.

```
$ ./manage.py migrate
```

0.8 till 0.11

1. Delete ghost migrations while running migrations.

```
    $ ./manage.py migrate --delete-ghost-migrations
```

2. Update **settings.py** following the guide below

Settings Changes

The following settings have been added or changed. Please modify **settings.py** with these new values.

Version 0.5

TESTING

```
# XXX - Django sets DEBUG to False when running unittests.  They want to ensure
# that you test as if it were a production environment.  Unfortunately we have
# some models and other settings used only for testing.  We use the TESTING flag
# to enable or disable these items.
#
# If you run the unittests without this set to TRUE, you will get many errors!
TESTING = False
```

ITEMS_PER_PAGE

```
# default items per page
ITEMS_PER_PAGE = 20
```

VNC_PROXY

```
# Enable the VNC proxy.  When enabled this will use the proxy to create local
# ports that are forwarded to the virtual machines.  It allows you to control
# access to the VNC servers.  When disabled, the console tab will connect
# directly to the VNC server running on the virtual machine.
#
# Expected values: False if no proxy, string with proxy host and port otherwise
# String syntax: "HOST:PORT", for example: "localhost:8888"
#
# Note: you will probably have to open more ports in firewall. For proxy's default
# settings, it uses port 8888 for listening for requests and ports 7000..8000
# for serving proxy.
#
# To run proxy (in 'util' directory):
#  $ python vncauthproxy.py --websockets
# If you want to use encryption, then:
#  $ python vncauthproxy.py --websockets --cert=FILE.pem
VNC_PROXY=False
```

Messages Framework

- Add **django.contrib.messages.middleware.MessageMiddleware** to **MIDDLEWARE_CLASSES**
- Add **django.contrib.messages** to **INSTALLED_APPS** after **django.contrib.contenttypes**

Version 0.6

Rename Logs App

The **logs** app has been renamed object_log. Update **INSTALLED_APPS** to reflect this change.

Version 0.7

South

```
# Disable South during unittests.  This is optional, but will likely cause unittests
# to fail if these are not set properly.
SOUTH_TESTS_MIGRATE = False
SKIP_SOUTH_TESTS = True
```

Haystack

```
# haystack search engine config
HAYSTACK_SITECONF = 'search_sites'
HAYSTACK_SEARCH_ENGINE = 'whoosh'
HAYSTACK_WHOOSH_PATH = os.path.join(DOC_ROOT, 'whoosh_index')
```

Version 0.8

Remember that it is absolutely critical to back up your database before making any changes.

User Registration

```
# Whether users should be able to create their own accounts.
# False if accounts can only be created by admins.
ALLOW_OPEN_REGISTRATION = True
```

More documentation for registration can be found at *Open Registration*.

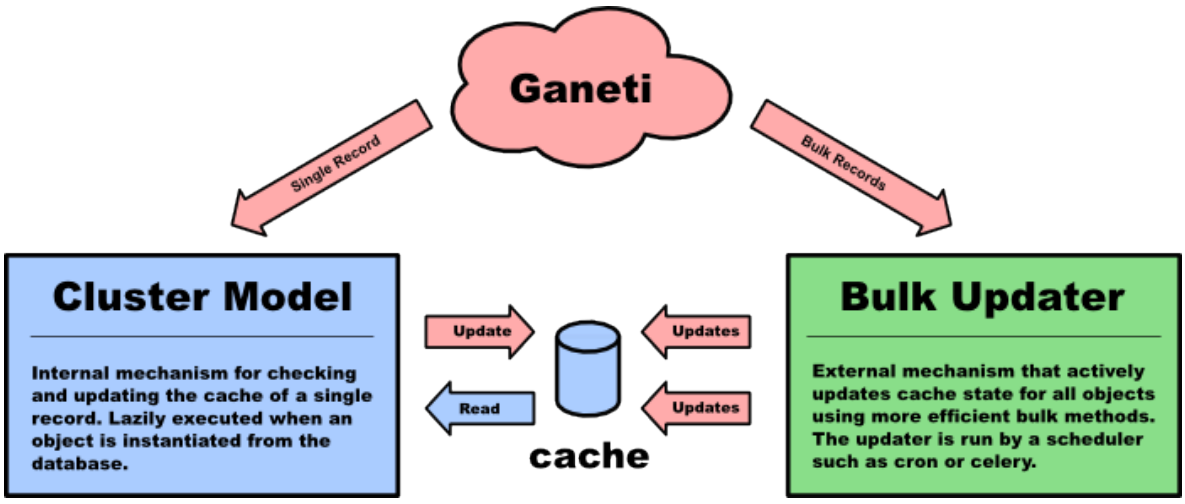
Ganeti Version

Ganeti Web Manager version 0.8

Users have experienced problems with Ganeti version 2.1, because it does not support some of the new RAPI features available in version 0.8 of Ganeti Web Manager. (see Issue #8973). To avoid these problems, use GWM 0.8 with Ganeti version 2.4 or better.

Deprecated: Caching

> **Warning:** This document is deprecated as of Ganeti Web Manager version 0.11.



Ganeti Web Manager uses a cache system that stores information about ganeti clusters in the database. This allows the following:

- Permissions are stored in the database and are associated to the cached objects
- The cached data can be searched and or filtered
- Limits the amount of traffic between the webserver and ganeti cluster.

The cache system is transparent and will load cached data automatically when the object is initialized.

Lazy Cache Refresh

Cached objects will refresh themselves transparently when they are out of date. This happens transparently when objects are queried from the ORM. Lazy cache refreshing is inefficient, it will cause multiple calls to the ganeti RAPI to fetch information. For this reason the lazy refresh mechanism is intended to only be used for testing, and as a backup to ensure that objects will always be refreshed.

CachedClusterObject

The functionality for lazy caching is built into an abstract model, CachedClusterObject. Extending this model will enable caching for the object. It requires that **_refresh()** be implemented with an object specific method for querying fresh info from ganeti. Currently only Cluster and VirtualMachine are cached, but this may extend to Node and Job objects in the future.

parse_persistent_info() can be overridden to parse object specific properties that should be stored in the database. This allows properties to be used as query filters, without requiring the entire object to be loaded.

Bypassing The Cache Refresh

It is not currently possible to bypass the automatic cache refresh in a simple way since it is part of the models ***init***. Currently the only way to bypass the cache is to query the object with a values or values_list query, and copy the values into a new object.

```
values = VirtualMachine.objects.get(id=id)
vm = VirtualMachine()
for k, v in values.items():
    setattr(vm, k , v)
```

RAPI Client Cache

Ganeti remote API clients are also cached. This reduces the number of database calls to retrieve a client capable of connecting to a cluster. This is a deterministic cache based off connection credentials. The keys are a hash of hostname, port, user, and password. This allows changes in settings to be easily detected. Cached objects should store the hash as part of its model and use it to look up existing clients without querying the cluster for the full set of connection credentials.

CHAPTER 8

Indices and tables

- genindex
- modindex
- search

Symbols

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