

## Resource Configuration

The configuration file `resources.conf` is used to describe computing resources. When you start DRM4G, `resources.conf` file is copied under `~/drm4g/etc` directory by default if it does not exist or under whatever directory specified with **DRM4G\_DIR**. The file can be edited directly or by executing the `drm4g resource edit` command.

### Configuration format

The configuration resource file consists of sections, each led by a `[section]` header, followed by `key = value` entries. Lines beginning with `#` are ignored. Permitted sections are `[DEFAULT]` and `[resource_name]`.

### DEFAULT section

The DEFAULT section provides default values for all other resource sections.

### Resource section

Each resource section has to begin with the line `[resource_name]` followed by `key = value` entries.

Make sure that each `[resource_name]` is unique. The DRM4G doesn't recognize duplicates but it won't warn you about it.

The name of a resource cannot include the **colon character** `:`. The DRM4G won't be able to send jobs to a resource with that character in its name.

### Configuration keys common to all resources:

- `enable`: true or false in order to enable or disable a resource.
- `communicator` or authentication type :
  - `local`: The resource will be accessed directly.
  - `ssh`: The resource will be accessed through ssh's protocol via Paramiko's API.
  - `op_ssh`: The resource will be accessed through OpenSSH's CLI.
- `username`: Name of the user that will be used to log on to the front-end.
- `frontend`: Hostname or ip address of either the cluster or grid user interface you'll be connected to. The syntax is `"host:port"` and by default the port used is 22.
- `private_key`: Path to the identity file needed to log on to the front-end.
- `public_key`: Path to the public identity file needed to log on to the front-end.
  - **OPTIONAL**: by default the `private_key`'s value will be taken, to which `.pub` will be added)
- `scratch`: Directory used to store temporary files for jobs during their execution, by default, it is `$HOME/.drm4g/jobs`
- `lrms` or Local Resource Management System :
  - `pbs`: TORQUE/PBS cluster.
  - `sge`: Grid Engine cluster.
  - `loadleveler`: LoadLeveler cluster.
  - `lsf`: LSF cluster.
  - `fork`: SHELL.
  - `cream`: CREAM Compute Elements (CE).
  - `slurm`: SLURM cluster.
  - `slurm_res`: [?RES\(Red Española de Supercomputación\)](#) resources.
  - `fedcloud`: [?EGI Federated Cloud](#) resources.

Note that for `communicator` you have two options when it comes to accessing a resource through the ssh protocol. If you don't know which one you prefer use `ssh`.

### Keys for HPC resources:

- `queue`: Queue available on the resource. If there are several queues, you have to use a `,` as follows `"queue = short,medium,long"`.
- `max_jobs_in_queue`: Max number of jobs in the queue.
- `max_jobs_running`: Max number of running jobs in the queue.

- `parallel_env`: It defines the parallel environments available for Grid Engine cluster.
- `project`: It specifies the project variable and is for TORQUE/PBS, Grid Engine and LSF clusters.

#### Keys for grid resources:

- `vo`: Virtual Organization (VO) name.
- `host_filter`: A host list for the VO. Each host is separated by a ",". Here is an example: "`host_filter = prod-ce-01.pd.infn.it, creamce2.gina.sara.nl`".
- `bdi`: It indicates the BDII host to be used. The syntax is "`bdi:port`". If you do not specify this variable, the `LCG_GFAL_INFOSYS` environment variable defined on the grid user interface will be used by default.
- `myproxy_server`: Server to store grid credentials. If you do not specify this variable, the `MYPROXY_SERVER` environment variable defined on the grid user interface will be used by default.

#### Keys for cloud resources:

- `vm_communicator`: or authentication type for the created Virtual Machines (VMs) :
- `ssh`: The resource will be accessed through ssh's protocol via Paramiko's API.
  - `op_ssh`: The resource will be accessed through OpenSSH's CLI.
- `vm_user`: Name of the user that will be used to log on to the creates VMs.
- `vm_config`: Specifies which VM contextualisation file the user will be using, if none is specified "`cloud_config.conf`" will be used by default.
- **OPTIONAL**: Even if this is given by the user, the `vm_user` and `private_key` still need to be defined in the configuration file.
- `myproxy_server`: Server to store cloud credentials. If you do not specify this variable, the `MYPROXY_SERVER` environment variable defined on the grid user interface will be used by default.
- `instances`: It indicates how many VMs you wish to create with the specified configuration.
  - `volume`: It's possible to create some extra storage and add it to the VM. With this you can specify how many extra GBs of storage you want.
  - `max_jobs_in_queue`: Max number of jobs in the VM.
  - `max_jobs_running`: Max number of running jobs in the VM.

The values of the next configuration keys can be customized at your discretion. A new cloud configuration file has been added to the DRM4G called "`cloudsetup.json`" for this reason. This resource keys reference the information saved in this cloud configuration file.

- `cloud_provider`: Name that describes the site from which the image, that will be used to create the VM, will be acquired.
- `virtual_image`: It indicates which one of the system images available you will be using.
- `flavour`: It indicates the hardware template for the VM.

Where and how to get the correct values for your cloud configuration file as well as a more in depth explanation of some of these configuration keys can be found in the section [How to configure an EGI FedCloud VM](#).

A few extra things to take into consideration:

- If no `vm_user` is specified, `drm4g_admin` will be used by default.
- If no `vm_communicator` is specified, the one in `communicator` will be used, but if it's set to `local`, the DRM4G will set it to `ssh`.
- For the moment, the `lrms` for all created VMs will be `fork`.  
The private key used to access the VM will be the same as the one used to access the machine that will create it.
  - So even if you're going to use your local machine to create the VM, you'll have to specify a `private_key`.

#### Examples

By default, DRM4G is going to use the local machine as fork lrms:

```
[localmachine]
enable          = true
communicator    = local
frontend        = localhost
lrms            = fork
max_jobs_running = 1
```

TORQUE/PBS cluster, accessed through ssh protocol:

```
[meteo]
enable          = true
communicator    = ssh
username        = user
frontend        = mar.meteo.unican.es
private_key     = ~/.ssh/id_rsa
lrms            = pbs
queue           = short, medium, long
max_jobs_running = 2, 10, 20
max_jobs_in_queue = 6, 20, 40
```

SGE cluster, accessed through ssh protocol:

```
[blizzard]
enable          = true
communicator    = op_ssh
username        = user
frontend        = blizzard.meteo.unican.es
private_key     = ~/.ssh/id_rsa
parallel_env    = mpi
lrms            = sge
queue           = long
max_jobs_running = 20
max_jobs_in_queue = 40
```

ESR virtual organization, accessed through a grid user interface:

```
[esrVO]
enable          = true
communicator    = local
username        = user
frontend        = ui.meteo.unican.es
lrms            = cream
vo              = esr
bdii            = bdii.grid.sara.nl:2170
myproxy_server  = px.grid.sara.nl
```

FedCloud virtual organization:

```
[cesnet_metacloud]
enable          = true
communicator    = ssh
username        = user
vm_communicator = op_ssh
vm_user         = drm4g_admin
frontend        = ui.meteo.unican.es
private_key     = ~/.ssh/id_rsa
lrms            = fedcloud
max_jobs_running = 2
max_jobs_in_queue = 4
cloud_provider  = EGI FedCloud - CESNET-METACLOUD
myproxy_server  = myproxy1.egee.cesnet.cz
flavour         = Small
virtual_image   = Ubuntu-14.04
instances       = 1
volume          = 0
```