



# FIREWHEEL

## CHEAT SHEET

### EXPERIMENT MANAGEMENT

#### **firewheel mc generate**

Generate a new model component.

#### **firewheel experiment [-r] [...]**

Check if a FIREWHEEL experiment with launch with the provided model components. Use "-r" if an experiment is already running to clear the testbed before starting a new experiment.

#### **firewheel experiment [...] minimega.launch**

Same as above, but adding "minimega.launch" launches the experiment.

#### **firewheel restart**

Cleans up all of the virtual machines and virtual networks started by FIREWHEEL and ensures it is ready for another run.

#### **firewheel restart hard**

Tears down all services, virtual machines, and networking independent of whether FIREWHEEL restarts them or not.

#### **firewheel status**

Informs a user if the testbed is available for use or occupied by an existing experiment.

#### **firewheel vm builder [...] [image]**

**--launch || --modify**

**--network, --memory, --vcpus**

Create a standalone, (potentially) Internet accessible VM useful for fetching dependencies. Use the parameters above to run the VM in launch or modify mode, allow networking, and specify resources.

### EXPERIMENT INFO

#### **firewheel time**

List the time elapsed since experiment start.

#### **firewheel config [get | reset | set]**

Enables command-line access to get and set the FIREWHEEL configuration.

#### **firewheel vm mix**

List the current configuration state of the experiment VMs, grouped by image. This command will automatically update as the experiment configures.

#### **firewheel vm list [...]**

List the current configuration state of each experiment VM. More detailed information can be specified through the examples below. Options can also be mix and matched or combined to narrow down a search, e.g.:

```
firewheel vm list
hostname=agent-0.pro image time
```

#### **[...] time**

List the experiment VM times. When all VMs display ": )", then the experiment has started.

#### **[..] name[=vm\_name]**

List or filter the experiment VM names.

#### **[...] image[=image\_name]**

List or filter the experiment VM images.

#### **[...] hostname[=hostame]**

List or filter the experiment VM hostnames.

#### **[...] vnc**

List or filter the experiment VM VNC ports.

### EXPERIMENT FILE TRANSFER

#### **firewheel experiment [...] control\_network [...]**

Appending the "control\_network" model component to any FIREWHEEL experiment will create a virtual network connecting all VMs and physical hosts. This is useful for accessing VMs through the CLI.

#### **firewheel scp**

Prepend "firewheel" to an scp command to move files between an experiment VM and your host (e.g., `firewheel scp /path/to/file ubuntu@agent-0.pro:/home/`). *NOTE: Requires the experiment was launched with the control\_network.*

#### **firewheel ssh**

Prepend "firewheel" to an ssh command for full SSH capabilities to any experiment VM (e.g., `firewheel ssh ubuntu@agent-0.pro`). *NOTE: Requires the experiment was launched with the control\_network*

#### **firewheel push file [file] [vm\_host] [dst]**

Push a file to a VM using the VM resource handler. This works independent of whether you've added the control\_network. *NOTE: The destination must be a full path.*

#### **firewheel pull file [file] [vm\_host] [dst]**

Pull a file from a VM using the VM resource handler. This works independent of whether you've added the control\_network.

### MISCELLANEOUS

#### **firewheel help [command]**

Run `firewheel help` to get a full list of commands. Prepend this to any command for more specific, detailed command usage.

#### **firewheel list**

Display a list FIREWHEEL helper commands.

#### **firewheel history**

Display FIREWHEEL command history.

#### **firewheel mc list -k name=[mc\_name]**

Verify if a particular model component is installed.

#### **Logs**

Using the following command, you can find the location of the experiment logs for each VM: `echo "$(firewheel config get logging.root_dir)$(firewheel config get logging.vmr_log_dir)".`

### EXAMPLES

#### **Router Tree**

```
firewheel experiment
tests.router_tree:3
control_network minimega.launch
```

Launch an experiment using the router tree tutorial topology with an attached control network.

#### **VM Builder**

```
firewheel vm builder --launch
--network --memory 8192 --vcpus 8
/tmp/ubuntu-22.04-amd64.qcow2
```

Start a standalone VM, without modifying the base image and allow networking, provide 8 GB RAM, and 8 vCPUs.