



Get started with CFEngine
A CFEngine Handbook

CFEngine AS

This short guide explains how to install the software from binary packages and get it running. This procedure is the same for both CFE Community and CFE Nova since the launch CFE Community version 3.2 and CFE Nova version 2.1.

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1 Getting Started with CFEngine

1.1 What does getting started entail?

Choosing your hub. Assumptions about your operating system (working package manager) Start with no initial CFEngine policies.

1.2 Installing CFEngine

CFEngine is designed to be simple to install in its default configuration. The installation process has three phases:

- Unpacking the software.
- Obtaining a license (only for commercial editions).
- Adapting policy.

1.3 Installing the software on a new host

You should start from a blank system. If you wish to install CFE Nova and you have already developed a policy using CFE Community, set aside this policy during the installation process. You will be able to integrate it back later.

In the following, '<edition>' represents either 'community' or 'nova', depending on whether you are installing CFE Community or CFE Nova.

CFEngine is provided in two packages, 'cfengine-<edition>' and 'cfengine-<edition>-expansion'. The main software package (for each operating system) must be installed on every host. The second package (expansion) is only installed on the *hub* or *policy server*. **You should install and set up the hub first.**

The 'cfengine-<edition>' package may be installed on a wide range of supported operating systems, including Linux, Solaris, Windows, etc. The 'cfengine-<edition>-expansion' package currently only supports the following Linux operating systems:

Debian
Ubuntu
Red Hat
SuSE

This means you must have one Linux computer running as your hub. No special software is required on other machines in your network. CFEngine bundles all dependencies in the binary package.

On a new host, installation follows the following procedure. References to package managers assume that additional packages might need to be installed on the policy server, e.g. the Apache Web Server, MySQL database, etc. Remember, root privilege is required for the installation.

1. Verify that the machine's network connection is working and that it can resolve names. On the hub, verify that package managers `yum`, `zypper` or `apt-get` are working (for example by typing `apt-get update`). They will be used to install a web, database and php server (if not already installed). If you are not able to set up a package manager and

repository on the hub, please look in the Frequently Asked Questions below for manual installation.

- Copy the binary packages to the system. On the hub or policy server:

CFE Community

```
cfengine-community-3.xxx. [rpm|deb]
cfengine-community-expansion-3.xxx. [rpm|deb]
```

CFE Nova

```
cfengine-nova-2.xxx. [rpm|deb]
cfengine-nova-expansion-2.xxx. [rpm|deb]
```

On all other machines:

CFE Community

```
cfengine-community-3.xxx. [rpm|deb]
```

CFE Nova

```
cfengine-nova-2.xxx. [rpm|deb]
```

- Unpack the software:

Red Hat family

```
host# rpm -ihv packages
```

SUSE family

```
host# rpm -ihv packages
```

Debian family

```
host# dpkg --install packages
```

- On the hub, a public key has now been created in `‘/var/cfengine/ppkeys/localhost.pub’` as part of the package installation. Users of CFE Community may skip to the next step. CFE Nova users: you should send this public key to CFEngine Support as an attachment in the ticket system (<https://cfengine.com/otrs/customer.pl>), to obtain a license file `‘license.dat’`. *** Save the returned license file to `‘/var/cfengine/masterfiles/license.dat’` on the hub **before continuing** ***. See more details for the software licensing here; <https://cfengine.com/software/Licensing.pdf>
- The remaining steps apply to all hosts, but you should **install the hub or policy server first**. Find the hostname or IP address of the hub (policy server), here we assume `‘123.456.789.123’` is the address.

```
hub # /var/cfengine/bin/cf-agent --bootstrap --policy-server 123.456.789.123
```

Use the same command on all hosts, i.e. *** do not bootstrap the policy server with a localhost address *** If you mistype the address of the hub, we recommend doing the following steps to re-bootstrap.

```
hub # /var/cfengine/bin/cf-agent --bootstrap --policy-server 123.456.789.124
hub # killall cf-execd cf-serverd cf-monoitord cf-hub
hub # rm -rf /var/cfengine/inputs/*
hub # rm -f /var/cfengine/policy_server.dat
hub # /var/cfengine/bin/cf-agent --bootstrap --policy-server 123.456.789.123
```

6. The software should now be running.
7. CFE Nova users: To complete licensing setup, you should make a promise to accept the license terms by editing `/var/cfengine/masterfiles/promises.cf` on the hub (policy server), changing the line `host_licenses_paid => "1";` in `'body common control'` to reflect the correct number of licenses that you have subscribed to.

How to assess success in this procedure (CFE Community and CFE Nova):

1. Look at the process list on the systems with `'ps waux | grep cf'`. You should be able to see `cf-execd` running, and eventually other processes from the CFEngine suite like `cf-monitor` `cf-serverd`. For CFE Nova, you should also eventually see `cf-hub` running on the hub. Note that it may take 5–10 minutes before all the processes get started.
2. Look for files in `'/var/cfengine/inputs'` (Unix) or `'C:\Program Files\Cfengine\inputs'` (Windows). For CFE Nova users the license file will be copied out from the policy server to the clients as part of the normal distribution of policy. Each Unix machine should get a copy of the `'license.dat'` file in `'/var/cfengine/inputs'` (Unix) or `'C:\Program Files\Cfengine\inputs'` (Windows).

How to assess success in this procedure (CFE Nova only):

3. On the hub, the file `'/var/cfengine/promise_knowledge.cf'` should have been created, and should contain data.
4. Finally, try to connect to the web server at port 80 on the hub / policy host. You should see a summary page like the one shown in the figure below. There should be at least 1 host registered, since the hub will pull reports from itself also.



The opening page of the CFEngine Nova Mission Portal.

1.4 What is the default configuration?

Following the above procedure, you should have a fully functional CFEngine on all clients. However, in the default configuration, CFEngine does nothing other than looking after itself, and looking for possible policy updates from `'/var/cfengine/masterfiles'` on the policy server. The policy server is configured to collect data from non-policy server machines and generate reports that are integrated into the knowledge base.

To alter policies, you need to change the files on the policy hub, in the directory `/var/cfengine/masterfiles`. To begin with most of the policy examples are commented out in these files:

```
cdp_inputs/  cfengine.cf          failsafe.cf    knowledge.cf  promises.cf  update.cf
cdp_lib/    cfengine_stdlib.cf  file_change.cf OrionCloud/
```

To change this, you can go to the main file `'promises.cf'`, and include additional pre-made bundles of promises. You should always verify the contents of the bundles you include before activating and deploying to new machines.

Remark: this section will and below have to be modified according to what is included in the PolicyBase. Will the update procedure also be included in Community 3.2?

```
bundle agent main
{
methods:

  any::

    "general" usebundle => def;

#   "jobs" usebundle => system_scheduling;
#   "security" usebundle => change_management;
#   "security" usebundle => security_files;
#   "windows boxes" usebundle => active_directory;

# windows::
#   "windows boxes" usebundle => software_local;
#   "windows boxes" usebundle => app_baseline;
#   "windows boxes" usebundle => win_services;
#   "windows boxes" usebundle => win_registry;
#   "windows boxes" usebundle => win_emergency;

# !windows::
#   "security" usebundle => system_xinetd;
#   "maintenance" usebundle => garbage_collection;
}
```

1.5 Frequently Asked Questions

1.5.1 How do I install the prerequisites for the hub manually?

Here is a list of dependencies for the hub to be checked if The Mission Portal displays nothing;

- Red Hat/CentOS/Fedora

```
httpd, mysql, mysql-server, php, php-bcmath, subversion
```

- SUSE

```
apache2, apache2-mod_php5, apache2-prefork, mysql, php5, subversion
```

- Debian/Ubuntu

```
apache2, mysql-server, php5
```

To install all of these, you might want to use yum on Red Hat/CentOS/Fedora, zypper on SUSE or apt on Debian/Ubuntu.

1.5.2 Why do I get a promise failed with the message Can't stat

`/var/cfengine/master_software_updates/SOME-OS` on some hosts?

There is a built-in promise to automatically upgrade the Nova binaries. By default, the clients will check for an update package every time Nova runs. So if the clients find that there is no source directory to download the files from, the message will be displayed.

To fix the problem, simply create an empty directory mentioned in the message on the hub.

```
hub # mkdir /var/cfengine/master_software_updates/SOME-OS
```

1.5.3 I did bootstrap the hub *before* obtaining a license file, what should I do?

Four steps need to be followed to correct this minor issue.

1. obtain a working license file and copy it to `'/var/cfengine/masterfiles'`

```
hub # cp /tmp/license.dat /var/cfengine/masterfiles
```

2. killall Nova running processes

```
hub # killall cf-execd cf-serverd cf-monitord cf-hub
```

3. wipe out `'/var/cfengine/inputs'`

```
hub # rm -rf /var/cfengine/inputs
```

4. bootstrap the policy hub

```
hub # /var/cfengine/bin/cf-agent --bootstrap --policy-server 123.456.789.123
```

1.5.4 On my hub, I get messages of connection failures to a database. For example, in messages, I can see something like `!! Could not open connection to report database for saving`. What should I do?

This message comes from the `cf-hub` process. It is responsible for pulling reports from hosts that have contacted the hub to get policy updates. When these reports are fetched, they are stored in a local MongoDB database on the hub, and connecting to this database is what is failing.

Probably, the issue is that the database server is not running on your hub. Run the `ps`-command to check this.

```
hub # ps -e | grep mongod
```

```
hub #
```

If the `mongod` process *is* running, it must be misconfigured or in some bad state. Please look at the newest entry in `'/var/log/mongod.log'` to diagnose the problem, and contact CFEngine Technical Support if necessary.

If the `mongod` process *is not* running, please follow the steps below.

- Run `hub # /var/cfengine/bin/cf-twin -Kvf failsafe.cf > /tmp/cfout`
- Check again if the `mongod` is running, if so, the problem is probably fixed now.
- If `mongod` is still not running, please search the output file for lines starting as follows.

```
...
nova> -> Making a one-time restart promise for mongod
...
...
nova> -> Executing '/var/cfengine/bin/mongod....
nova> -> Backgrounding job /var/cfengine/bin/mongod...
nova> -> Completed execution of /var/cfengine/bin/mongod...
...
```

If you don't see the first line above, Nova does not try to start `mongod` — so check if you bootstrapped your hub correctly. If you see all lines, Nova starts `mongod`, but the process just terminates immediately after. If so, continue to the next step.

- Look at the newest entry in `'/var/log/mongod.log'`. It should give you more details of why the `mongod` process refuses to start. The two most common scenarios are described next.
- If `mongod` has been terminated unexpectedly, it might have left a lock-file behind that stops it from starting again. Try deleting `'/var/cfengine/state/mongod.lock'` if it exists.
- If the database is corrupted, you can have `'mongod'` create a new one by moving `'/var/cfengine/state/cf-report.*'` out of the way. There are also tools and documentation for repairing a database at <http://www.mongodb.org/>.

Note that almost all of the `cfreport` database is completely recreated with data collected from clients every six hours, so deleting it is normally acceptable. But CFEngine AS or CFEngine Inc can not be held responsible for data loss in this respect.

1.5.5 How do I upgrade from community version to Nova?

There is no shortcut for this task. We urge you to set aside your current community policy while you install Nova, setup the Nova hub by following this/Nova supplement document, and then integrate your existing policy to the hub manually, in small testable steps.

CFEngine Nova is compatible with the Community Edition of CFEngine 3, but some process files are now managed by CFEngine for user convenience.

1.5.6 Let's say I'd like to deploy Nova on my Debian/Ubuntu network. Describe this step by step?

Here we go:

Debian/Ubuntu Installation Example:

- **Hub(policy-server)**
 1. Verify that the package manager is working (eg. `apt-get update`)
 2. Download the Nova and Nova Supplement package
 3. Unpack the software:


```
hub # dpkg --install cfengine-nova_2.0.1-1_x86_64.deb
hub # dpkg --install cfengine-nova-expansion_2.0.1-1_x86_64.deb
```

4. Send the file: `"/var/cfengine/ppkeys/localhost.pub"` to Cfengine Support (OTRS ticket system)
5. You will receive a license file: `license.dat`
6. Copy the license file to: `"/var/cfengine/masterfiles/license.dat"`
7. Bootstrap the hub:

```
hub # /var/cfengine/bin/cf-agent --bootstrap --policy-server <ip address of the hub>
*** Warning: do not use 127.0.0.1 as the ip address ***
```
8. Open `"/var/cfengine/masterfiles/promises.cf"`, and change `'host_licenses_paid => "<Number of licenses subscribed>"`;

- **Clients**

1. Verify that the package manager is working (eg. `apt-get update`)
2. Download the Nova package
3. Unpack the software:

```
hub # dpkg --install cfengine-nova_2.0.1-1_x86_64.deb
```
4. Bootstrap the Client to the hub:

```
client # /var/cfengine/bin/cf-agent --bootstrap --policy-server <ip address of the hub>
```

To check if the installation went as expected, see "How to assess success in this procedure" section in the `Nova_Supplement` Guide.

