# Install and Configure Chef Workstation, Chef Server, and a Chef Node

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# **Description**

This lab guide provides step-by-step instructions for setting up a Chef ecosystem, including the installation and configuration of Chef Workstation, Chef Server, and a Chef Node. Chef is a powerful tool for automating system configurations, infrastructure management, and application deployments. By the end of this guide, you will have a functional Chef environment ready for configuration management tasks.

#### **Problem Statement**

Automating configuration management across multiple servers can be challenging without the right tools. Chef provides a streamlined way to define infrastructure as code, making server management efficient, consistent, and scalable. In this lab, we will:

- Install Chef Workstation to manage our Chef configurations.
- Configure Chef Server as the central repository for all Chef configurations.
- Set up Chef Node, which will be managed by Chef Server.

# **Prerequisites**

- 64 bit operating system
- CPU Virtualization enabled

In order to virtualize a 64 bit operating system, one must also be running a 64 bit operating system. Most importantly, the CPU itself must support hardware virtualization extensions and this must be enabled in the

BIOS/EFI. Most modern processors support virtualization extensions in the form of VT-x (Intel) or AMD-V (AMD).

# **Implementation Steps**

#### Step-1: Install Chocolatey, Virtual Box and Vagrant

#### 1. Install Chocolatey

• To install Chocolatey, run the following command from the command line or from PowerShell:

```
Set-ExecutionPolicy Bypass -Scope Process -Force;
[System.Net.ServicePointManager]::SecurityProtocol =
[System.Net.ServicePointManager]::SecurityProtocol -bor 3072; iex ((New-Object
System.Net.WebClient).DownloadString('https://community.chocolatey.org/install.ps1'))
```

```
PS - Extraction fooling Bypass - Scope Process - Force; [System.Net.ServicePointHanager]::SecurityProtocol * [System.Net.ServicePointHanager]::SecurityProtocol * Process Proc
```

Verify the installation by running the following command in cmd

```
choco --version
```

```
C:\Users\Administrator>choco --version
2.3.0
C:\Users\Administrator>_
```

#### 2. Install Virtual Box

- VirtualBox is a hypervisor that lets you run virtual machines on your local workstation.
- To install Virtual Box, run the following command from the command line or from PowerShell:

choco install virtualbox

```
Installing the following packages:
By installing, you accept licenses for the packages.
Oy installing, you decept interests on the paraget.

Downloading package from source 'https://community.chocolatey.org/api/v2/'

Progress: Downloading chocolatey-compatibility.extension 1.0.0... 100%
chocolatey-compatibility.extension package files install completed. Performing other installation steps.
 Installed/updated chocolatey-compatibility extensions.
Downloading package from source 'https://community.chocolatey.org/api/v2/'
Progress: Downloading chocolatey-core.extension 1.4.0... 100%
chocolatey-core.extension v1.4.0 [Approved] chocolatey-core.extension package files install completed. Performing other installation steps. Installed/updated chocolatey-core extensions.
Deployed to 'C:\ProgramData\chocolatey\extensions\chocolatey-core'
Downloading package from source 'https://community.chocolatey.org/api/v2/'
Progress: Downloading chocolatey-windowsupdate.extension 1.0.5... 100%
chocolatey-windowsupdate.extension package files install completed. Performing other installation steps.
Installed/updated chocolatey-windowsupdate extensions.
Downloading package from source 'https://community.chocolatey.org/api/v2/'
Progress: Downloading KB2919442 1.0.20160915... 100%
KB2919442 v1.0.20160915 [Approved]
KB2919442 package files install completed. Performing other installation steps.
 he package KB2919442 wants to run 'ChocolateyInstall.ps1'.
Hote: If you don't run this script, the installation will fail.
Hote: To confirm automatically next time, use '-y' or consider:
Thoco feature enable -n allowGlobalConfirmation
Do you want to run the script?([Y]es/[A]ll - yes to all/[N]o/[P]rint): yes
Skipping installation because this hotfix only applies to Windows 8.1 and Windows Server 2012 R2.
                            location of installe
Downloading package from source 'https://community.chocolatey.org/api/v2/'
Progress: Downloading KB2919355 1.0.20160915... 100%
KB2919355 package files install completed. Performing other installation steps.
```

Verify the installation by running the following command in cmd

```
virtualbox --version
```

### 2. Install Vagrant

- Vagrant manages hypervisors such as VirtualBox and makes it easy to distribute pre-packaged virtual machines, known as "boxes".
- To install Vagrant, run the following command from the command line or from PowerShell:

```
choco install Vagrant
```

```
PS C:\Users\Administrator> choco install vagrant
Chocolatey v2.3.0
Installing the following packages:
vagrant
By installing, you accept licenses for the packages.
Downloading package from source 'https://community.chocolatey.org/api/v2/'
Progress: Downloading vagrant 2.4.2... 100%

vagrant v2.4.2 [Approved]

vagrant package files install completed. Performing other installation steps.
The package vagrant wants to run 'chocolateyinstall.psi'.
Note: If you don't run this script, the installation will fail.
Note: If you don't run this script, the installation will fail.
Note: To confirm automatically next time, use 'vy' or consider:
choco feature enable -n allowGlobalConfirmation
Do you want to run the script?([Y]es/[A]]1 - yes to all/[N]o/[P]rint): yes
Downloading vagrant 64 bit
from 'https://releases.hashicorp.com/vagrant/2.4.2/vagrant_2.4.2_windows_amd64.msi'
Progress: 100% - Completed download of C:\Users\Administrator\AppData\Local\Temp\chocolatey\vagrant\2.4.2\wagrant_2.4.2_windows_amd64.msi (250.51 HB).
Download of vagrant_2.4.2_windows_amd64.msi (250.51 HB) completed.
Hashes match.
Installing vagrant...
vagrant has been installed.
Updating installed plugins...
```

Verify the installation by running the following command in cmd

```
vagrant --version
```

```
C:\Users\Administrator>vagrant --version
Vagrant 2.4.2
C:\Users\Administrator>_
```

#### **Step-2: Install Chef workstation**

• To install Chef Workstation, run the following command from the command line or from PowerShell:

```
choco install chef-workstation
```

```
PS C:\Users\Administrator> choco install chef-workstation
Chocolatey v2.3.0
Installing the following packages:
chef-workstation
By installing, you accept licenses for the packages.
Downloading package from source 'https://community.chocolatey.org/api/v2/'
Progress: Downloading chef-workstation 24.8.1068... 100%

chef-workstation v24.8.1068 [Approved]
chef-workstation package files install completed. Performing other installation steps.
The package chef-workstation wants to run 'chocolateyinstall.ps1'.
Note: If you don't run this script, the installation will fail.
Note: To confirm automatically next time, use '-y' or consider:
choco feature enable -n allowGlobalConfirmation
Do you want to run the script?([Y]es/[A]11 - yes to all/[N]o/[P]rint): yes
```

- This package includes Chef Infra Client, Chef InSpec, Test Kitchen, Cookstyle, and a variety of useful tools for the Chef ecosystem.
- Verify the installation by running the following command in cmd

```
chef --version
```

```
C:\Users\Administrator>chef --version

Chef Workstation version: 24.8.1068

Chef Infra Client version: 18.5.0

Chef InSpec version: 5.22.55

Chef CLI version: 5.6.14

Chef Habitat version: 1.6.1041

Test Kitchen version: 3.6.0

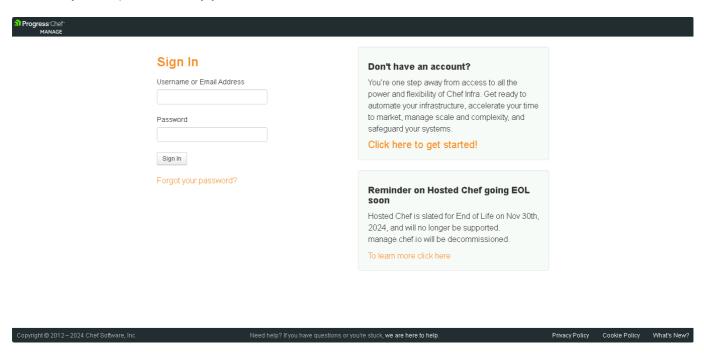
Cookstyle version: 7.32.8

C:\Users\Administrator>_
```

## Step-3: Create an organization for server setup

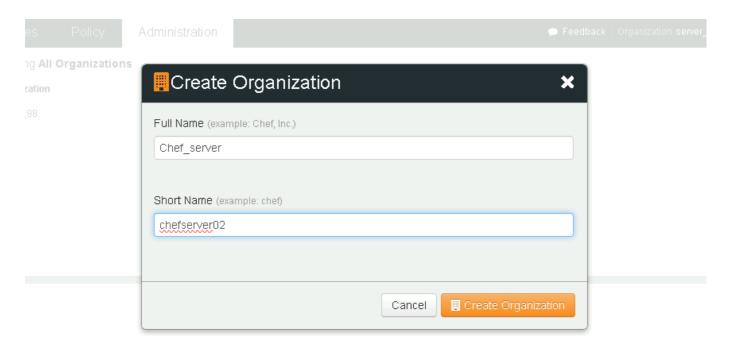
#### 1. Sign Up for Manage Chef

- Go to Manage Chef in your web browser.
- Click Sign Up or Get Started.
- Enter your email address and follow the on-screen instructions to complete the sign-up process. You may be required to verify your email address.



#### 2. Log in and Create an Organization

- Once signed up, log in to Manage Chef.
- After logging in, navigate to the Organizations section.
- Click on **Create Organization**.
- Provide the required details:
  - Organization Name: Choose a name for your organization.
  - Short Name: Enter a short, unique identifier for the organization.
- Complete any additional steps to confirm and create the organization.

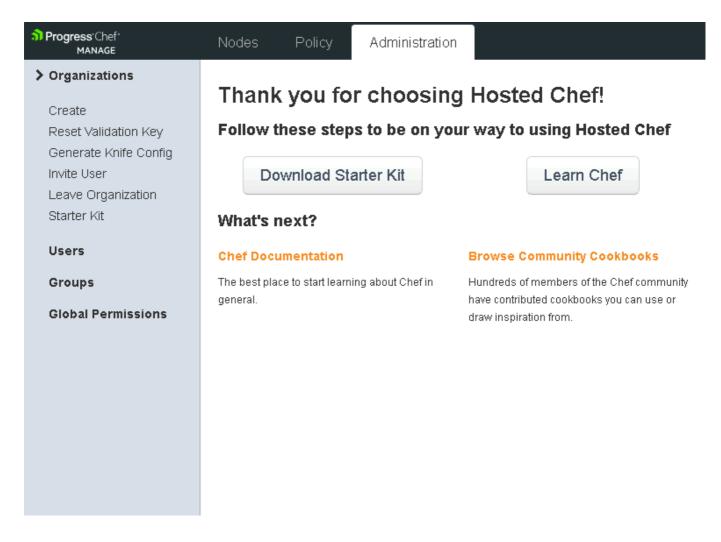


Please select an Organization

#### 3. Download the Starter Kit

- After creating the organization, navigate to the **Starter Kit** section (usually under your organization settings).
- Click **Download Starter Kit**. The kit includes essential configuration files for Chef, like knife.rb, which you'll need to manage nodes.
- Follow any on-screen prompts to confirm the download.
- Extract the files

The starter kit should now be downloaded to your system, and you can proceed with configuring Chef on your workstation using the kit files.



## **Step-4: Generate your Cookbook**

• cd to chef-start\chef-repo\cookbooks and open command promt

#### 1. Creating a Cookbook

- In order to keep our example as simple as possible let's create a chef-infra cookbook to automate the installation and management of the Git distributed version control tool.
- run the following command to generate a cookbook

chef generate cookbook git\_cookbook

```
C:\Users\Administrator>chef generate cookbook git_cookbook
            Chef License Acceptance
Before you can continue, 3 product licenses
must be accepted. View the license at
https://www.chef.io/end-user-license-agreement/
Licenses that need accepting:
  * Chef Workstation
 * Chef Infra Client
 * Chef InSpec
Do you accept the 3 product licenses (yes/no)?
Persisting 3 product licenses...
 3 product licenses persisted.
Generating cookbook git_cookbook
 Ensuring correct cookbook content
 Committing cookbook files to git
Your cookbook is ready. Type `cd git_cookbook` to enter it.
There are several commands you can run to get started locally developing and testing your cookbook.
why not start by writing an InSpec test? Tests for the default recipe are stored at:
test/integration/default/default_test.rb
If you'd prefer to dive right in, the default recipe can be found at:
recipes/default.rb
C:\Users\Administrator>_
```

#### 2. Configure kitchen.yam File for Node Configuration

- The kitchen.yml file is the main configuration file for **Test Kitchen**. It defines how to set up, run, and destroy instances for testing infrastructure code, primarily used for Chef cookbooks.
- cd to chef-start\chef-repo\cookbooks\git\_cookbook
- Edit the kitchen.yml file

```
driver:
  name: vagrant

provisioner:
  name: chef_infra

verifier:
  name: inspec

platforms:
  - name: ubuntu-20.04

suites:
  - name: default
  verifier:
```

```
inspec_tests:
           - test/integration/default
       attributes:
🧐 kitchen - Notepad
File Edit Format View Help
driver:
 name: vagrant
provisioner:
  name: chef_infra
verifier:
  name: inspec
platforms:
  - name: ubuntu-20.04
suites:
  - name: default
    verifier:
      inspec_tests:
        - test/integration/default
    attributes:
```

Run the following command to verify the kitchen list

```
kitchen list
```

```
C:\Users\Administrator\git_cookbook>kitchen list
Instance Driver Provisioner Verifier Transport Last Action Last Error
default-ubuntu-2004 Vagrant ChefInfra Inspec Ssh <Not Created> <None>
C:\Users\Administrator\git_cookbook>_
```

- Configure virtual machine boot timeout
  - cd to C:\Users\Administrator.vagrant.d\boxes\bento-VAGRANTSLASH-ubuntu-20.04\202407.23.0\amd64\virtualbox
  - Add config.vm.boot\_timeout = 600 to the Vagrantfile



#### **Step-5: Create your Node**

A Test Kitchen **Instance** is a combination of a **Suite** and a **Platform** as laid out in your kitchen.yml file. Test Kitchen has auto-named our only instance by combining the **Suite** name ("default") and the **Platform** name ("ubuntu-20.04") into a form that is safe for DNS and hostname records, namely "default-ubuntu-2004".

Let's spin this **Instance** up to see what happens. We're going to be explicit and ask kitchen to only create the **default-ubuntu-2004** instance:

```
kitchen create default-ubuntu-2004
```

#### 1. Setup Node

Run the following command to login to your Node

kitchen login

```
C:\Users\Administrator\git_cookbook>kitchen login
Welcome to Ubuntu 20.04.6 LTS (GNU/Linux 5.4.0-189-generic x86_64)

* Documentation: https://help.ubuntu.com

* Management: https://landscape.canonical.com

* Support: https://landscape.canonical.com

* Support: https://ubuntu.com/pro

System information as of Fri 08 Nov 2024 06:18:05 AM UTC

System load: 0.06 Processes: 150

Usage of /: 11.6% of 30.34GB Users logged in: 0

Memory usage: 10% IPv4 address for eth0: 10.0.2.15

Swap usage: 0%

This system is built by the Bento project by Chef Software
More information can be found at https://github.com/chef/bento

Use of this system is acceptance of the OS vendor EULA and License Agreements.

Last login: Fri Nov 8 06:10:44 2024 from 10.0.2.2

vagrant@default-ubuntu-2004:~$ _____
```

• Run the following command to open the sudoers file safely

```
sudo visudo
```

```
vagrant@default-ubuntu-2004:∼$ sudo visudo_
```

Add the following at the end of sudoers file and ctrl+x to safely exit the file

```
vagrant ALL=(ALL) NOPASSWD:ALL
```

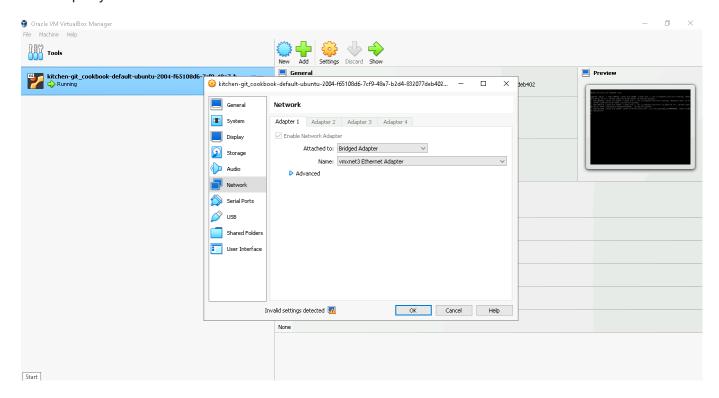
```
This file MUST be edited with the 'visudo' command as root.

# Please consider adding local content in /etc/sudoers.d/ instead of
# directly modifying this file.
# See the man page for details on how to write a sudoers file.
# Defaults env_reset
Defaults exempt_group-sudo
Defaults mail_badpass
Defaults secure_path="/usr/local/sbin:/usr/local/bin:/usr/sbin:/usr/bin:/shap/bin"
# Host alias specification
# User alias specification
# User alias specification
# User privilege specification
# User privilege specification
# User privilege specification
# User of the admin group may gain root privileges
% admin ALL=(ALL) ALL
# Members of the admin group sudo to execute any command
% Sudo ALL=(ALL:ALL) ALL
# Allow members of group sudo to execute any command
% Sudo ALL=(ALL:ALL) ALL
# See sudoers(5) for more information on "#include" directives:
# includedir /etc/sudoers.d

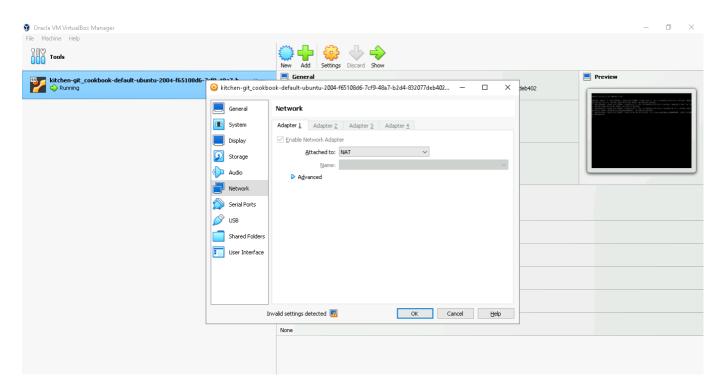
wagrant ALL=(ALL) NOPASSWD:ALL
```

## **Step-6: Change the Network Settings**

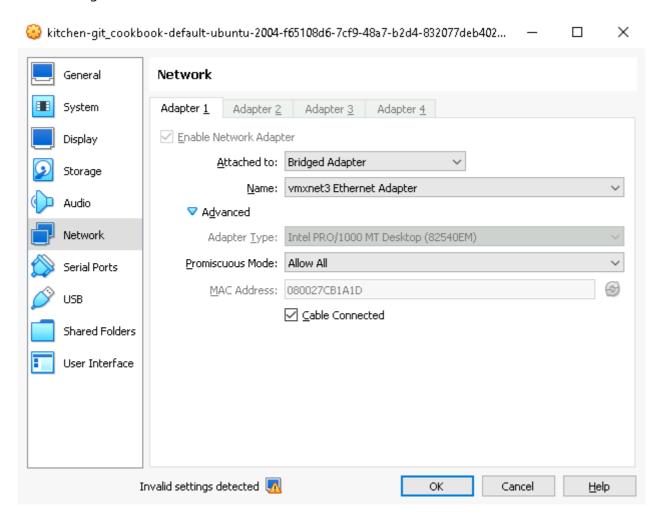
Open your Virtual box and click on Network



• Change the Network settings from Attached to:NAT to Attached to:Bridged Adapter

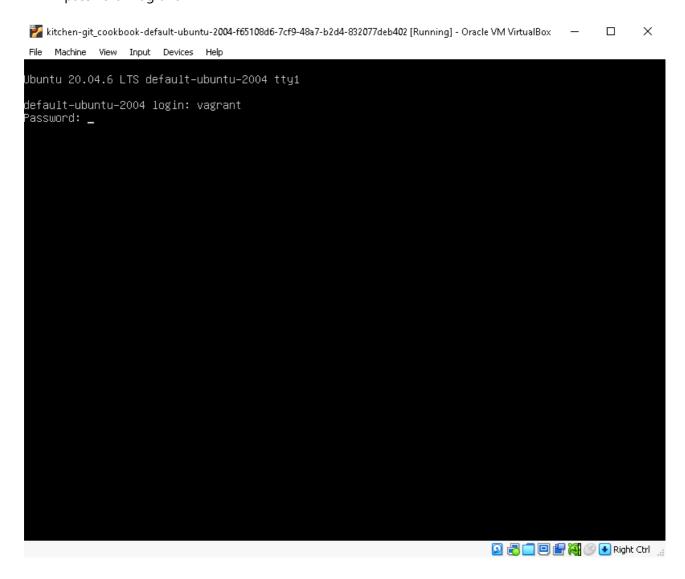


• Change the Promiscuous Mode: Allow All and click on ok



- Reboot your Node by stopping the system in virtual box and starting it again
- Once the system is Running, click on Show and login to your system with the following credetials
  - o username- vagrant

o password-vagrant



Run the following command to install net-tools

```
sudo apt install net-tools
```

```
Reading package lists... Done
Building dependency tree
Reading state information... Done
The following NEW packages will be installed:
    net-tools
0 upgraded, 1 newly installed, 0 to remove and 0 not upgraded.
Need to get 196 kB of archives.
After this operation, 864 kB of additional disk space will be used.
Get:1 http://us.archive.ubuntu.com/ubuntu focal/main amd64 net-tools amd64 1.60+git20180626.aebd88e-1ubuntu1 [196 kB]
Fetched 196 kB in 75 (27.7 kB/s)
Selecting previously unselected package net-tools.
(Reading database ... 41439 files and directories currently installed.)
Preparing to unpack .../net-tools 1.60+git20180626.aebd88e-1ubuntu1 ...
Setting up net-tools (1.60+git20180626.aebd88e-1ubuntu1) ...
Setting up net-tools (1.60+git20180626.aebd88e-1ubuntu1) ...
Processing triggers for man-db (2.9.1-1) ...
vagrant@default-ubuntu-2004:x$ ■
```

• Check the ipconfig of your Node and Note down the etho2 ip: inet

```
ip a
 🗾 kitchen-git_cookbook-default-ubuntu-2004-f65108d6-7cf9-48a7-b2d4-832077deb402 [Running] - Oracle VM VirtualBox
                                                                                                       X
    Machine View Input Devices
 agrant@default–ubuntu–2004:~$ ip a
1: lo: <LOOPBACK,UP,LOWER_UP> mtu 65536 qdisc noqueue state UNKNOWN group default qlen 1000
    link/loopback 00:00:00:00:00:00 brd 00:00:00:00:00
    inet 127.0.0.1/8 scope host lo
       valid_lft forever preferred_lft forever
inet6 ::1/128 scope host
valid_lft forever preferred_lft forever
2: eth0: <BROADCAST,MULTICAST,UP,LOWER_UP> mtu 1500 qdisc fq_codel state UP group default qlen 1000
    link/ether 08:00:27:cb:1a:1d brd ff:ff:ff:ff:ff:ff
    inet 172.19.4.155/16 brd 172.19.255.255 scope global dynamic eth0
       valid_lft 86110sec preferred_lft 86110sec
    inet6 fe80::a00:27ff:fecb:1a1d/64 scope link
       valid_lft forever preferred_lft forever
vagrant@default–ubuntu–2004:~$ _
```

#### **Step-7: Connect Server to your Node**

Run the following command to connect server to your node

Note: Replace the ip address in the command with your respective ip address

```
knife bootstrap 172.19.4.155 -U vagrant -P vagrant -- sudo -N chef-node
```

```
C:\Users\Administrator\Downloads\chef-starter\chef-repo\cookbooks>knife bootstrap 172.19.4.155 -U vagrant -P vagrant --sudo -N chef-node
INFO: Using configuration from C:\Users\Administrator\Downloads\chef-starter\chef-repo\chef\Config.rb
Connecting to 172.19.4.155 using ssh
The authenticity of host '172.19.4.155 using ssh
(reporting to 172.19.4.155 using ssh
(reporting to 172.19.4.155 using ssh
(reating new client for chef-node
Creating new client for chef-node
Creating new node for chef-node
Creating ne
```

- Verify your node
  - 1. Go to Manage Chef in your web browser.
  - 2. Click on your **Organization**.
  - 3. Click n Nodes.



## References

- Official Chef Documentation: https://docs.chef.io/
- Setting Up Chef Server: https://docs.chef.io/server/
- Working with Chef Workstation: https://docs.chef.io/workstation/
- Chef Infra Client Overview: https://docs.chef.io/chef\_client\_overview/