Write and Deploy a Basic Chef Recipe to Configure a Web Server

Table of Contents

Description

This guide provides a step-by-step process to write and deploy a simple Chef recipe that installs and configures an Apache web server on a Chef Node. By the end of this lab, you will have a functional Apache server running on a Chef-managed node.

Problem Statement

Setting up and configuring web servers manually on each server can be time-consuming. Chef helps automate this process with recipes that define the configurations for the servers in code. This guide will:

- Create a basic Chef recipe to install Apache.
- Configure Apache to serve a basic web page.
- Deploy the recipe from Chef Server to a Chef Node.

Prerequisites

Software Required

- **Chef Workstation**: To write and test Chef recipes.
- **Chef Server**: To host and distribute Chef configurations.
- **Chef Node**: A target machine where Apache will be installed and configured.

Hardware Requirement

- **Chef Workstation**: 2 GB RAM, 2 CPU cores
- **Chef Server**: 4 GB RAM, 2 CPU cores
- **Chef Node**: 2 GB RAM, 1 CPU core (can be a cloud VM or a local machine)

Implementation Steps

Step-1: Create a Chef Recipe

1. **Navigate to the Cookbooks Directory**:

   ○ From your Chef Workstation terminal, navigate to the `chef-repo/cookbooks` directory:

   ```
   cd ~/chef-repo/cookbooks
   ```

2. **Generate a New Cookbook**:

   ○ Create a new cookbook called `webserver`:

   ```
   chef generate cookbook webserver
   ```

   ```
   C:\Users\Administrator\Downloads\chef-starter\chef-repo\cookbooks>chef generate cookbook webserver
   Generating cookbook webserver
   - Ensuring correct cookbook content
   - Committing cookbook files to git

   Your cookbook is ready. Type `cd webserver` 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\Downloads\chef-starter\chef-repo\cookbooks>
   ```

3. **Navigate to the Cookbook Directory**:

   ○ Move into the `webserver` directory:

   ```
   cd webserver
   ```

   ```
   C:\Users\Administrator\Downloads\chef-starter\chef-repo\cookbooks>cd webserver

   C:\Users\Administrator\Downloads\chef-starter\chef-repo\cookbooks\webserver>
   ```

Step-2: Write the Recipe to Install and Configure Apache

1. **Edit the Default Recipe**:

   ○ Open the `recipes/default.rb` file for editing:

```
notepad recipes/default.rb
```


2. **Add Code to Install Apache and Configure the Home Page**:

- ○ Write a basic recipe to install and start Apache, and serve a simple webpage:

```ruby
# recipes/default.rb

package 'apache2' do
  action :install
end

service 'apache2' do
  action [:enable, :start]
end

file '/var/www/html/index.html' do
  content '<h1>Welcome to Chef-managed Web Server!</h1>'
  action :create
end
```

- ○ This code does the following:

  - ■ Installs the Apache package.
  - ■ Enables and starts the Apache service.
  - ■ Creates a basic HTML page at `/var/www/html/index.html`.

```
# apache_cookbook/recipes/default.rb
package 'apache2' do
  action :install
end

service 'apache2' do
  action [:enable, :start]
end

file '/var/www/html/index.html' do
  content '<h1>Hello, Apache is configured by Chef!</h1>'
  action :create
end
```

3. **Save and Close the File**.

Step-3: Upload the Recipe to Chef Server

1. **Upload the Cookbook to Chef Server**:

   ○ From the `chef-repo` directory, use `knife` to upload the cookbook:

   ```
   knife cookbook upload webserver
   ```

2. **Verify the Cookbook is Uploaded**:

   ○ Check on Chef Server if the `webserver` cookbook appears in the list:

   ```
   knife cookbook list
   ```

```
C:\Users\Administrator\Downloads\chef-starter\chef-repo\cookbooks>knife cookbook list
INFO: Using configuration from C:/Users/Administrator/Downloads/chef-starter/chef-repo/.chef/config.rb
webserver: 0.1.0

C:\Users\Administrator\Downloads\chef-starter\chef-repo\cookbooks>
```

Step-4: Run the Recipe on Chef Node

1. **Assign the Recipe to the Node**:

   ○ Run the following command to add the `webserver` recipe to the node's run-list:

   ```
   knife node run_list add <node_name> 'recipe[webserver]'
   ```

```
C:\Users\Administrator\Downloads\chef-starter\chef-repo\cookbooks>knife node run_list add chef-node "recipe[webserver]"
INFO: Using configuration from C:/Users/Administrator/Downloads/chef-starter/chef-repo/.chef/config.rb
chef-node:
  run_list: recipe[webserver]

C:\Users\Administrator\Downloads\chef-starter\chef-repo\cookbooks>
C:\Users\Administrator\Downloads\chef-starter\chef-repo\cookbooks>_
```

- You can also manually add the `webserver` to the run list by following the below steps

  1. ▪ Go to Manage Chef in your web browser.

  2. Click on settings and edit Run List

Node Name	Platform	FQDN	IP Address	Uptime	Last Check-In	Environment	Actions
chef-node	ubuntu	default-ubuntu-2004.va...	172.19.4.155	17 minutes	2 hours ago	_default	⚙▾

Delete
Manage Tags
Reset Key
Edit Run List
Edit Attributes

  3. Drag and drop `webserver` to the Current Run List

Edit Node Run List ✖

chef-node

▓▓ Available Roles

Current Run List

🗏 Available Recipes

webserver

Cancel   Save Run List

4. Click on Save Run List

2. **Execute the Recipe on the Node**:

   ○ SSH into your Chef Node, and run `chef-client` to apply the recipe:

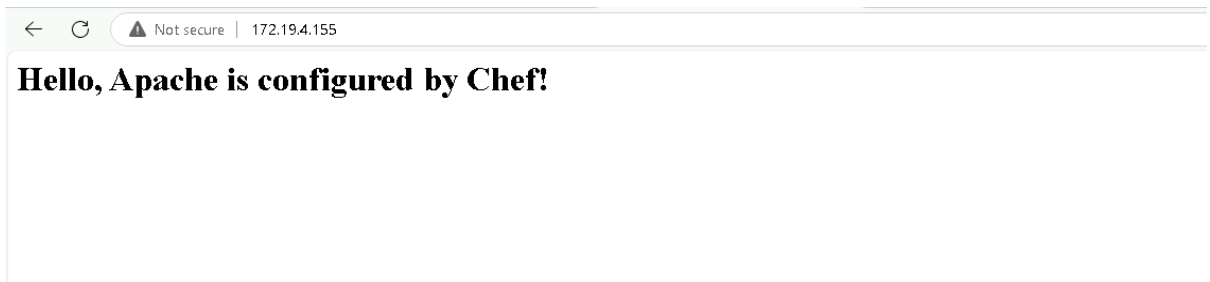   ```
   sudo chef-client
   ```



```
vagrant@default-ubuntu-2004:~$ sudo chef-client
Chef Infra Client, version 18.5.0
Patents: https://www.chef.io/patents
Infra Phase starting
Resolving cookbooks for run list: ["webserver"]
Synchronizing cookbooks:
  - webserver (0.1.0)
Installing cookbook gem dependencies:
Compiling cookbooks...
Loading Chef InSpec profile files:
Loading Chef InSpec input files:
Loading Chef InSpec waiver files:
Converging 3 resources
```

```
    +<h1>Hello, Apache is configured by Chef!</h1>

Running handlers:
Running handlers complete
Infra Phase complete, 2/4 resources updated in 01 minutes 00 seconds
vagrant@default-ubuntu-2004:~$
```

3. **Verify Apache Web Server**:

   ○ Open a web browser and navigate to `http://<node-ip>`. You should see the message:

   ```
   Hello, Apache is configured by Chef!
   ```


References

- Chef Documentation: https://docs.chef.io/
- Managing Cookbooks with Chef: https://docs.chef.io/cookbooks/
- Configuring a Web Server with Chef: https://learn.chef.io/