Introduction to Chef

Cookbook development workflow

Prerequisites

- Have an ssh client
- Have a good text editor (Atom, Sublime, vim, emacs)

- Git & GitHub Account (Optional)

Introductions

Instructor

- John Martin
- CHEF Solutions Engineer
- 7th year @ SCALE

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Course Objectives & Style

Course Objectives

- After completing this course you will be able to:
  - Automate common infrastructure tasks with Chef
  - Verify your automation code BEFORE it runs in production
  - Describe some of Chef's tools
  - Apply Chef's primitives to solve your problems

Learning Chef

- You bring the domain expertise about your business and problems
- Chef provides a framework for solving those problems
- Our job is to work together to help you express solutions to your problems with Chef

Chef is a Language

- Learning Chef is like learning the basics of a language
  - 80% fluency reached quickly
  - 20% just takes practice
- The best way to ***LEARN*** Chef is to ***USE*** Chef

Training is a discussion

- Lots of hands on labs
- Lots of typing
- Ask questions when they come to you
- Ask for help when you need it
- Help each other
- We will troubleshoot and fix bugs on the spot

Just an Introduction

- Today is just an Introduction to testing your automation code with Chef and it's tools
- We'll cover lots of topics but won't go too deep on any of them
- Any discussion that takes us too far off the path will be captured
  - We will return to these topics as time permits

Agenda

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Agenda

- Overview of Chef
- Resources
- Describing Policies
- A Sandbox for testing
- Verifying node state
- Even faster feedback
- Clean code
- Wrap Up

Breaks!

- We will take breaks as often as we need them
- We will break for lunch

Prerequisites

- Have an ssh client
- Have a good text editor (Atom, Sublime, vim, emacs)

- Git & GitHub Account (Optional)

Overview of Chef

Policy-based Infrastructure as Code

v0.1.3

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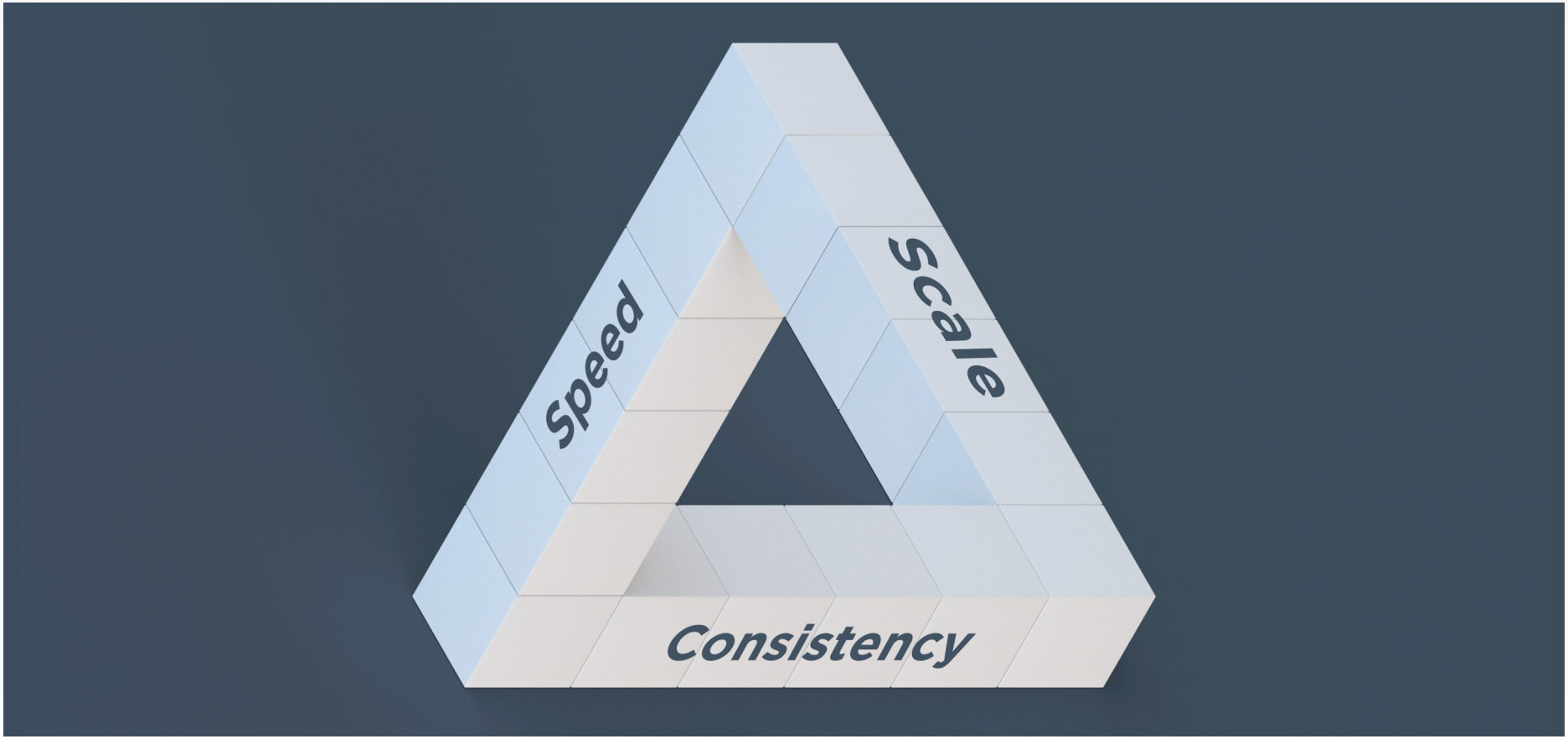
Benefits of Automation



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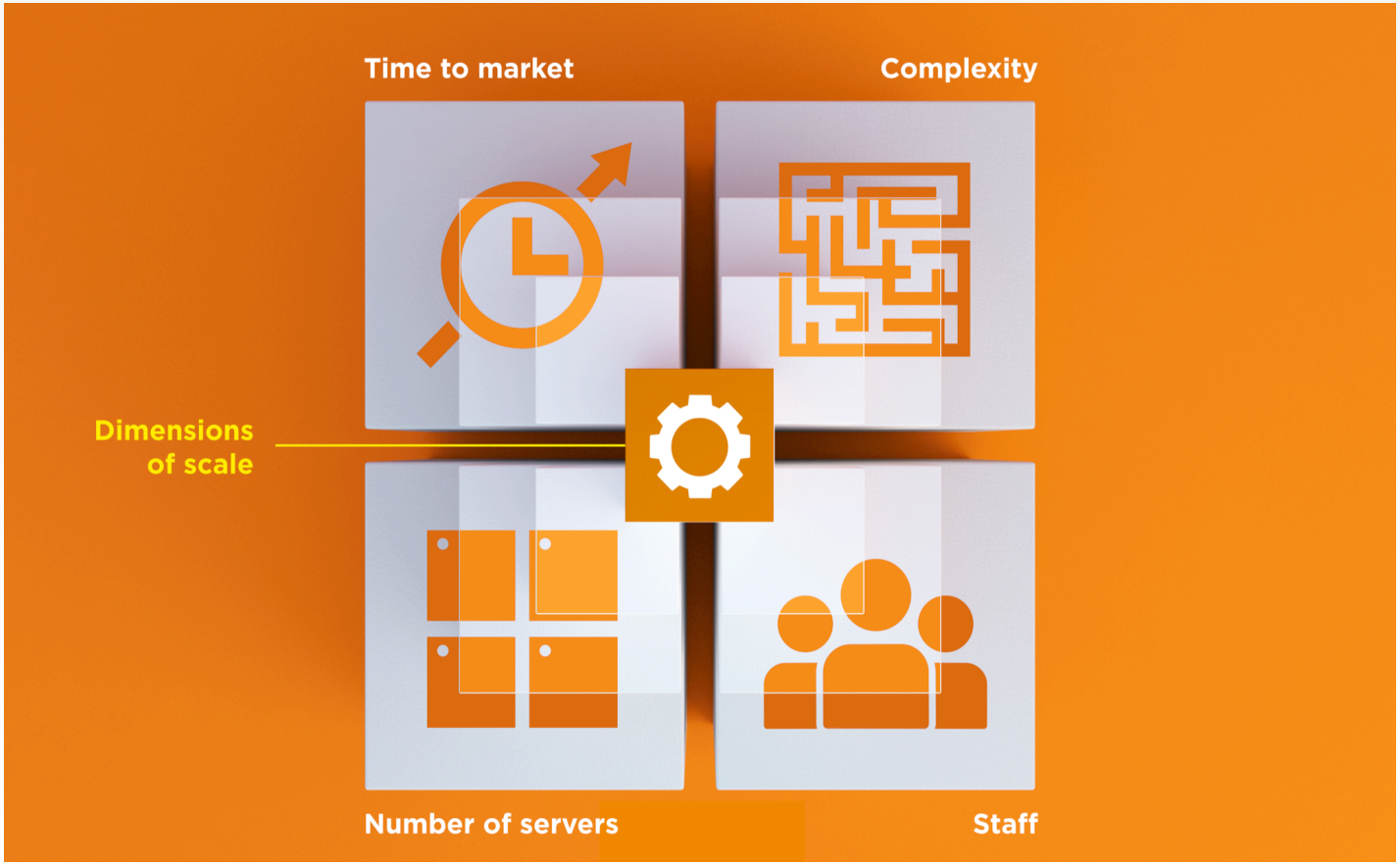
CODE CAN

Dimensions of Scale



Automation Platform

- Creates a dependable view of your entire network's state.
- Can handle complex dependencies among the nodes of your network.
- Is fault tolerant.
- Is secure.
- Can handle multiple platforms
- Can manage cloud resources
- Provides a foundation for innovation

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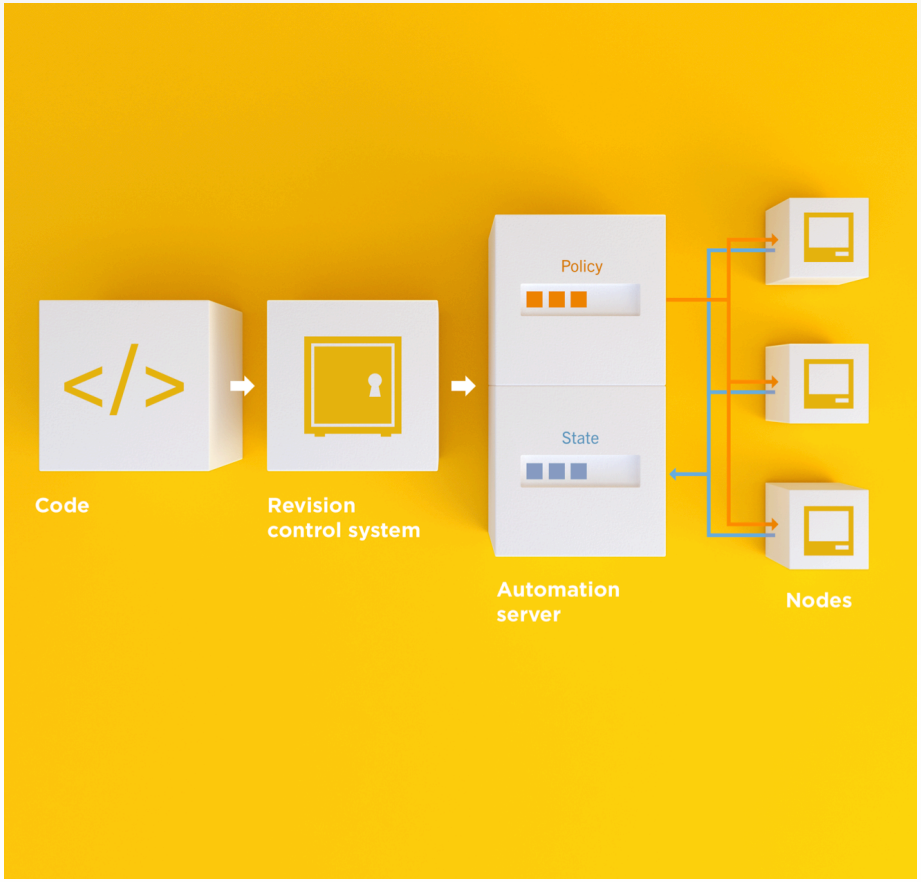
Infrastructure as Code



- Programmatically provision and configure components

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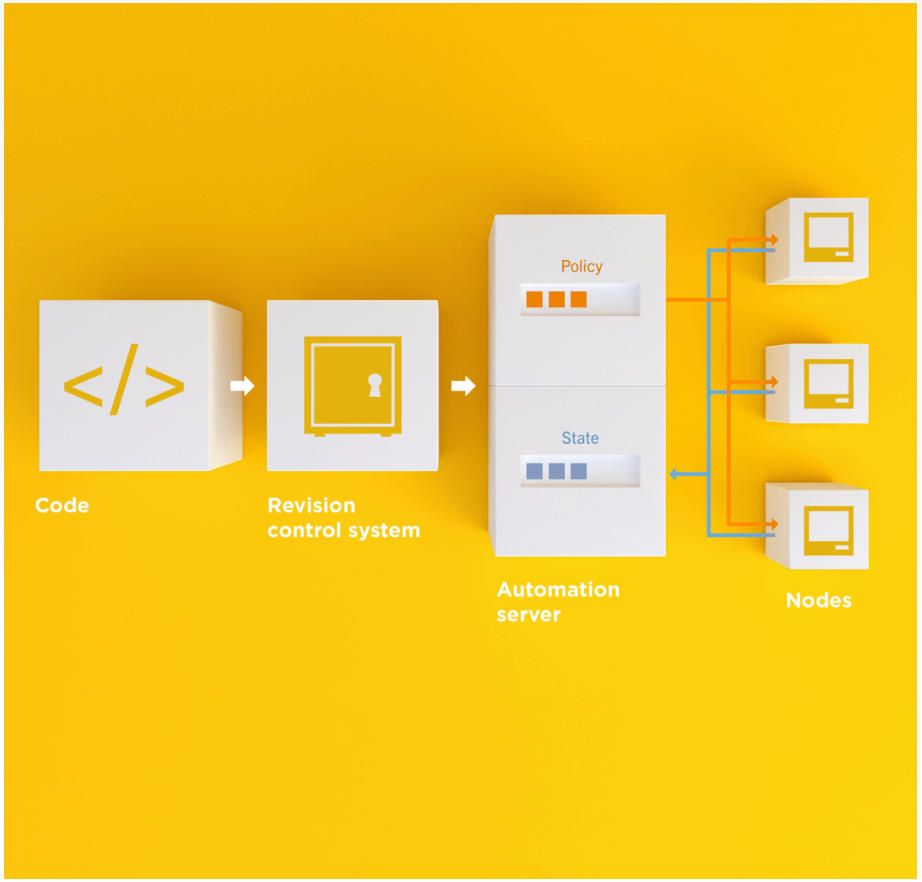
Infrastructure as Code



- Treat like any other code base

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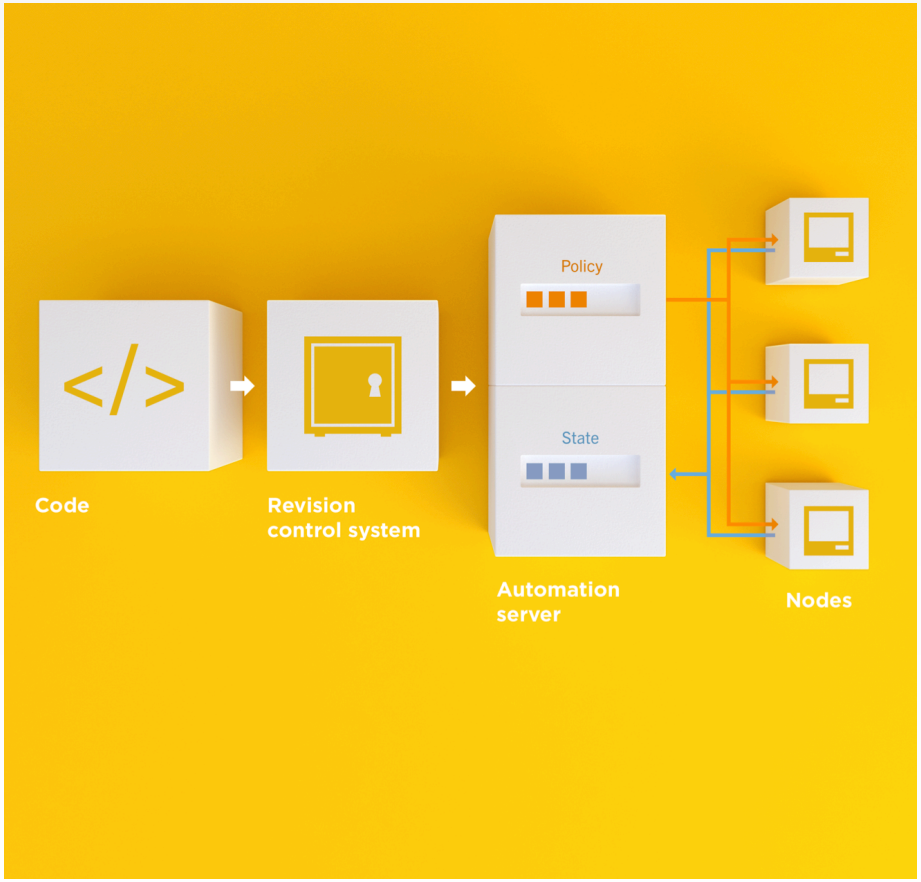
Infrastructure as Code



- Reconstruct business from code repository, data backup, and compute resources

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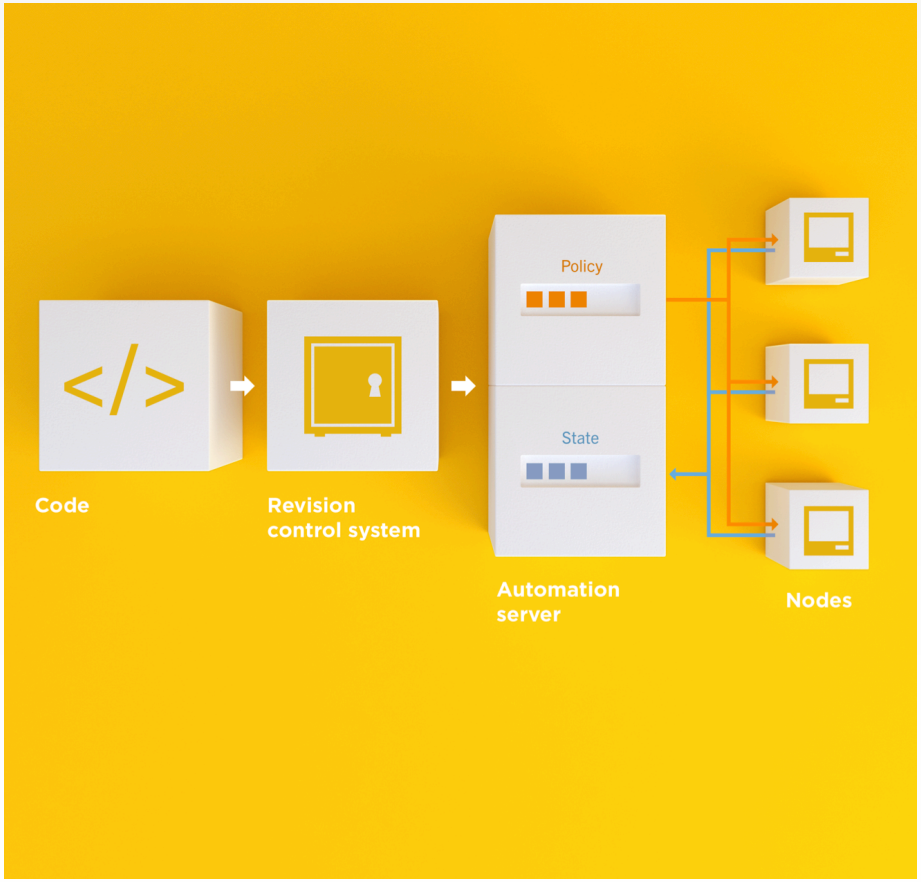
Infrastructure as Code



- Programmatically provision and configure components
- Treat like any other code base
- Reconstruct business from code repository, data backup, and compute resources

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Policy-based

- You capture the policy for your infrastructure in code
- Chef ensures each node in your infrastructure complies with the policy

Policy-based

- Chef provides a domain-specific language (DSL) that allows you to specify policy for your infrastructure
- Policy describes the desired state
- Policies can be statically or dynamically defined

Resources

Fundamental building blocks

Resources

- Piece of the system and its desired state

Resources - Package

Package that should be installed

```
package "mysql-server" do
  action :install
end
```

Resources - Service

Service that should be running and restarted on reboot

```
service "iptables" do
  action [ :start, :enable ]
end
```

Resources - Service

File that should be generated

```
file "/etc/motd" do
  content "Property of Chef Software"
end
```

Resources - Cron

Cron job that should be configured

```
cron "restart webserver" do
  hour '2'
  minute '0'
  command 'service httpd restart'
end
```

Resources - User

User that should be managed

```
user "nginx" do
  comment "Nginx user <nginx@example.com>"
  uid 500
  gid 500
  supports :manage_home => true
end
```

Resources - DSC

DSC resource that should be run

```
dsc_script 'emacs' do
  code <<-EOH
  Environment 'texteditor'
  {
    Name = 'EDITOR'
    Value = 'c:\\emacs\\bin\\emacs.exe'
  }
  EOH
end
```

Resources – Registry Key

Registry key that should be created

```
registry_key "HKEY_LOCAL_MACHINE\
\SOFTWARE\\Microsoft\\Windows\
\CurrentVersion\\Policies\\System"
do
  values [{
    :name => "EnableLUA",
    :type => :dword,
    :data => 0
    }]
  action :create
end
```

Resources

- Piece of the system and its desired state

- http://docs.chef.io/chef/resources.html

Lab 1 – Install a text editor

- **Problem**: Our workstation does not have $EDITOR installed
- **Success Criteria**: You can edit files with $EDITOR

- $EDITOR is your favorite command line text editor: vim, emacs, or nano

Login to your lab machine

```
$ ssh chef@54.164.75.30
```

```
The authenticity of host '54.165.227.226
(54.165.227.226)' can't be established.
RSA key fingerprint is c1:ec:ab:66:fb:22:4a:
8f:c2:c5:9b:26:77:f3:dd:b3.
Are you sure you want to continue connecting
(yes/no)? yes
Warning: Permanently added
'54.165.227.226' (RSA) to the list of known
hosts.
chef@54.165.227.226's password:
```

Welcome to your workstation

- ChefDK version 0.4.0 is installed
  - `chef --version`
- Chef user has passwordless sudo access
  - `sudo cat /etc/shadow`

Is $EDITOR installed?

```
$ which vim
```

```
/usr/bin/which: no vim in (/opt/
chefdk/bin:/home/chef/.chefdk/gem/
ruby/2.1.0/bin:/opt/chefdk/embedded/
bin:/usr/local/bin:/bin:/usr/bin:/
usr/local/sbin:/usr/sbin:/sbin:/
home/chef/bin)
```

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chef-apply

- chef-apply is an executable program that allows you to work with resources
- Is included as part of the ChefDK
- A great way to explore resources
- NOT how you'll eventually use Chef in production

What does chef-apply do?

```
$ chef-apply --help
```

```
Usage: chef-apply [RECIPE_FILE] [-e RECIPE_TEXT] [-s]
        --[no-]color                 Use colored output,
defaults to enabled
    -e, --execute RECIPE_TEXT        Execute resources
supplied in a string
    -l, --log_level LEVEL            Set the log level
(debug, info, warn, error, fatal)
    -s, --stdin                      Execute resources
read from STDIN
    -v, --version                    Show chef version
    -W, --why-run                    Enable whyrun mode
    -h, --help                       Show this message
```

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Install vim

```
$ sudo chef-apply -e "package 'vim'"
```

```
Recipe: (chef-apply cookbook)::(chef-apply recipe)
  * package[vim] action install
    - install version 7.2.411-1.8.el6 of package vim-enhanced
```

Install emacs

```
$ sudo chef-apply -e "package 'emacs'"
```

```
Recipe: (chef-apply cookbook)::(chef-apply recipe)
  * package[emacs] action install
    - install version 23.1-25.el6 of package emacs
```

Install nano

```
$ sudo chef-apply -e "package 'nano'"
```

```
Recipe: (chef-apply cookbook)::(chef-apply
recipe)
  * package[nano] action install
    - install version 2.0.9-7.el6 of package nano
```

Resources

- Describe the desired state
- Do not need to tell Chef how to get there

- What happens if you re-run the chef-apply command?

Install $EDITOR again with chef-apply

```
$ sudo chef-apply -e "package 'vim'"
```

```
Recipe: (chef-apply cookbook)::(chef-apply
recipe)
  * package[vim] action install (up to date)
```

Test and Repair

Resources follow a test and repair model

```
package "vim"
```

Test and Repair

Resources follow a **test** and repair model

```
package "vim"
```

Test Is vim installed?

Test and Repair

Resources follow a **test** and repair model

```
package "vim"
```

Test Is vim installed?

Yes

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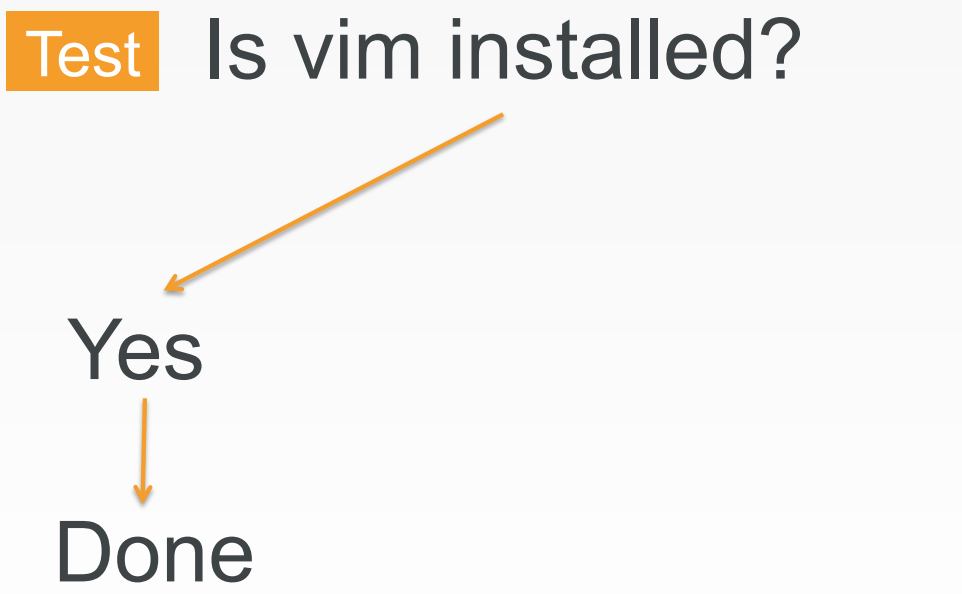
Test and Repair

Resources follow a **test** and repair model

```
package "vim"
```



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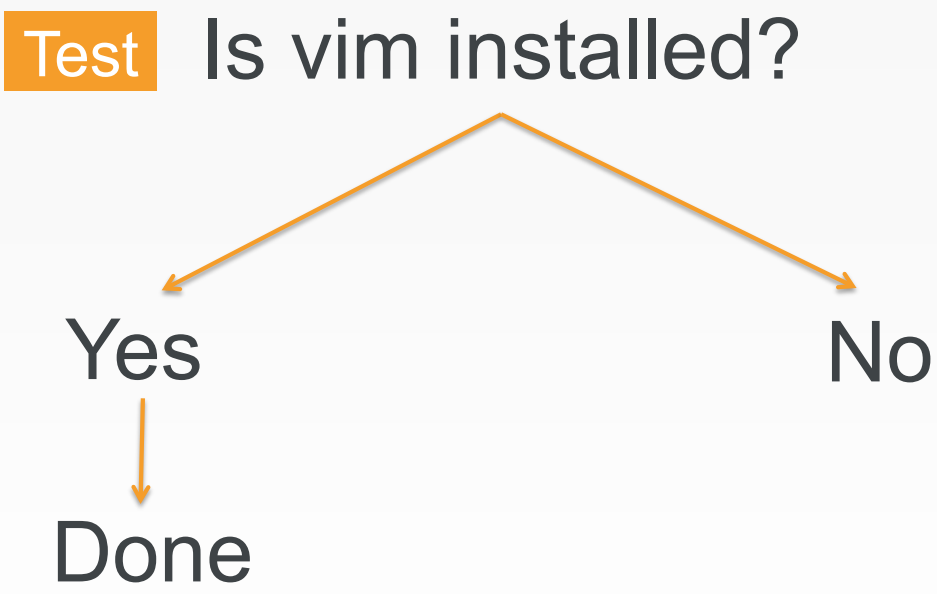
Test and Repair

Resources follow a **test** and repair model

```
package "vim"
```



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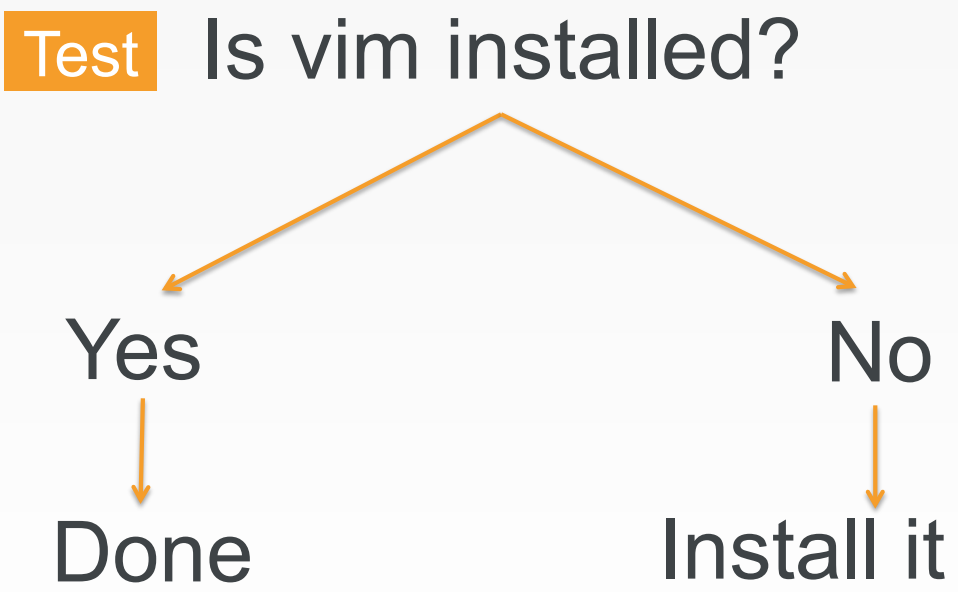
Test and Repair

Resources follow a **test** and repair model

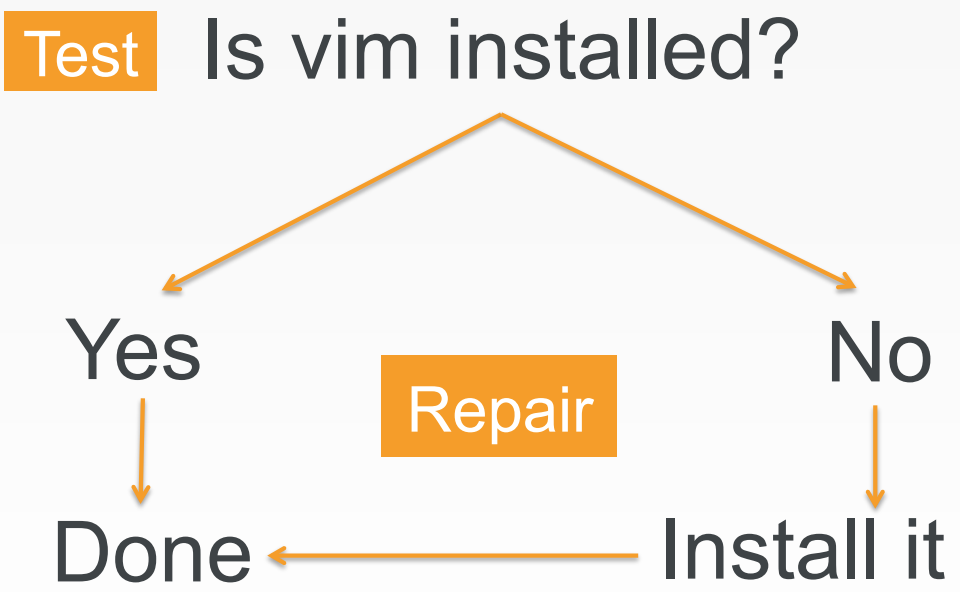
```
package "vim"
```



Test and Repair

Resources follow a **test** and **repair** model

```
package "vim"
```



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Resources – Test and Repair

- Resources follow a test and repair model

- Resource currently in the desired state? (test)
  - Yes – Do nothing
  - No – Bring the resource into the desired state (repair)

Resources

- package
- template
- service
- directory
- user
- group
- dsc_script
- registry_key
- powershell_script
- cron
- mount
- route
- …and more!

Lab 2 – Hello, world!

- **Problem**: Oops, we forgot to start with “hello, world”
- **Success Criteria**: A file with “Hello, world!” content is available in our home directory.

Hello, world!

OPEN IN EDITOR: ~/hello.rb

```
file "hello.txt" do
  action :create
  content "Hello, world!"
  mode "0644"
  owner "chef"
  group "chef"
end
```

SAVE FILE!

CHEF

Apply hello.rb

```
$ sudo chef-apply hello.rb
```

```
Recipe: (chef-apply cookbook)::(chef-apply recipe)
  * file[hello.txt] action create
    - create new file hello.txt
    - update content in file hello.txt from none to 315f5b
    --- hello.txt       2014-12-02 14:00:22.967821184 +0000
    +++ /tmp/.hello.txt20141202-1036-af0vmi     2014-12-02 14:00:22.970821184 +0000
    @@ -1 +1,2 @@
    +Hello, world!
    - change mode from '' to '0644'
    - change owner from '' to 'chef'
    - change group from '' to 'chef'
    - restore selinux security context
```

Read hello.txt

```
$ cat hello.txt
```

```
Hello, world!
```

Chef Resources

Have a type

```
file "hello.txt"
```

Chef Resources

Have a name

- Have a type

```
file "hello.txt"
```

Chef Resources

Include details between keywords **do** and **end**

- Have a name
- Have a type

```
file "hello.txt" do


end
```

Chef Resources

Describe the state of the thing using the keyword `action`

- Include details between keywords **do** and **end**
- Have a name
- Have a type

```
file "hello.txt" do
  action :create
end
```

Chef Resources – In Plain English

The TYPE named NAME should be ACTION'd

```
file "hello.txt" do
  action :create
end
```

Chef Resources – In Plain English

The TYPE named NAME should be ACTION'd

The file named "hello.txt" should be created

```
file "hello.txt" do
  action :create
end
```

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Chef Resources

- Include additional details about the state of the thing (attributes)
- Describe the state of the thing using the keyword `action`
- Include details between keywords `do` and `end`
- Have a name
- Have a type

```
file "hello.txt" do
  action :create
  content "Hello, world!"
  mode "0644"
  owner "chef"
  group "chef"
end
```

Chef Resources – In Plain English

The TYPE named NAME should be ACTION'd with ATTRIBUTES

```
file "hello.txt" do
  action :create
  content "Hello, world!"
  mode "0644"
  owner "chef"
  group "chef"
end
```

Chef Resources – In Plain English

The file named "hello.txt" should be created with content of "Hello, world!", permissions of 0644, owned by the chef user and chef group

```
file "hello.txt" do
  action :create
  content "Hello, world!"
  mode "0644"
  owner "chef"
  group "chef"
end
```

Hello, world!

OPEN IN EDITOR: ~/hello.rb

```
file "hello.txt" do
  content "Hello, world!"
  action :create
  mode "0644"
  owner "chef"
  group "chef"
end
```

SAVE FILE!

CHEF

Re-apply hello.rb

```
$ sudo chef-apply hello.rb
```

```
Recipe: (chef-apply cookbook)::(chef-apply
recipe)
  * file[hello.txt] action create (up to date)
```

Resources – Test and Repair

- Resources follow a test and repair model

- Resource currently in the desired state? (test)
  - Yes – Do nothing
  - No – Bring the resource into the desired state (repair)

What if…?

- Change the content of the file using your favorite text editor?
- Change the ownership of the file?
- Delete the file?

Resources

- package
- template
- service
- directory
- user
- group
- dsc_script
- registry_key
- powershell_script
- cron
- mount
- route

Resources

- What states can a `file` be in?
- What state will a `file` be in if you don't declare an action?
- What state will a `package` be in if you don't declare an action?
- Do you have to indent the attributes of a resource?
- What Chef tool allows us to easily explore resources?

Lab 3 – Manage a file

The file named /etc/motd should have the contents “Property of COMPANY NAME”, permissions of “0644”, and owned by the group and user named root

Lab 3 – Manage a file

The file named /etc/motd should have the contents “Property of COMPANY NAME”, permissions of “0644”, and owned by the group and user named root

Resources

- What questions can I answer for you?

Describing Policies

Recipes and Cookbooks

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Resources > Recipes > Cookbooks

- A resource is a piece of the system and it's desired state
- A recipe is a collection of resources
- A cookbook is a "package" of policy information

Recipe - a collection of resources

```
package "haproxy" do
  action :install
end

template "/etc/haproxy/haproxy.cfg" do
  source "haproxy.cfg.erb"
  owner "root"
  group "root"
  mode "0644"
  notifies :restart, "service[haproxy]"
end

service "haproxy" do
  supports :restart => :true
  action [:enable, :start]
end
```

Recipes – Order Matters

- Resources are applied in order


```
package "haproxy" do
  action :install
end

template "/etc/haproxy/haproxy.cfg" do
  source "haproxy.cfg.erb"
  owner "root"
  group "root"
  mode "0644"
  notifies :restart, "service[haproxy]"
end

service "haproxy" do
  supports :restart => :true
  action [:enable, :start]
end
```

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Recipes – Order Matters

- Resources are applied in order

1st

2nd

```
package "haproxy" do
  action :install
end

template "/etc/haproxy/haproxy.cfg" do
  source "haproxy.cfg.erb"
  owner "root"
  group "root"
  mode "0644"
  notifies :restart, "service[haproxy]"
end

service "haproxy" do
  supports :restart => :true
  action [:enable, :start]
end
```

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Recipes – Order Matters

- Resources are applied in order

1st

2nd

3rd

```
package "haproxy" do
  action :install
end

template "/etc/haproxy/haproxy.cfg" do
  source "haproxy.cfg.erb"
  owner "root"
  group "root"
  mode "0644"
  notifies :restart, "service[haproxy]"
end

service "haproxy" do
  supports :restart => :true
  action [:enable, :start]
end
```

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Cookbook

- A “package” for Chef policies
- Typically map 1:1 to a piece of software or functionality

Cookbooks – Packaged Policies

- Distribution unit
- Versioned
- Re-usable

Abstracting Data from Policy

- Policy – The desired state of the system
- Data – The details that might change

Abstracting Data from Policy

- Policy – Tomcat should be installed
- Data – Version 6

Abstracting Data from Policy

- Policy – A file should exist
- Data – The content of that file

Lab 4 – Manage Data & Policy Separately

- **Problem**: Policy for the state and content of `/etc/motd` are currently intermingled.
- **Success Criteria**: State and content of `/etc/motd` are managed separately.

Message of the day

State – policy that describes the resource

```
file "/etc/motd" do
  content "Property of COMPANY NAME"
  action :create
  mode "0644"
  owner "root"
  group "root"
end
```

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Message of the day

- Content – data that may change independent of policy changes

```
file "/etc/motd" do
  content "Property of COMPANY NAME"
  action :create
  mode "0644"
  owner "root"
  group "root"
end
```

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Version your code

- Managing infrastructure as code means storing that code in a version control system
- Any version control system will do but…
  - Chef community prefers and recommends git
  - Many tools support git by default

How many git repos?

- Once you have more than one cookbook, you may ask yourself this question
- The answer is easy:

How many git repos?

- Once you have more than one cookbook, you may ask yourself this questions
- The answer is easy:
  - It depends!

How many git repos?

- Once you have more than one cookbook, you may ask yourself this questions
- The answer is easy:
  - It depends!

- Two options are common:
  - Monolithic Repository
  - Independent Software Projects

Monolithic Repository

- All of your Chef related source code tracked in one source code repository
- External dependencies are made with built-in vendor branches

Independent Software Projects

- All Chef cookbooks are treated as independent software projects
- External dependencies are
  - fetched as needed
  - treated as artifacts

Lab 4 - Manage Data & Policy Separately

- Install git
- Create a chef-repo
- Create a cookbook

Install git

- The package `git` should be installed
- The file named '`/home/chef/.gitconfig`' should be created.
- It should be owned by the chef user and group.
- It should have the content:

```
[user]\n  name=John Doe\n  email=jdoe@example\n
```

Install git

OPEN IN EDITOR: ~/git.rb

```
package 'git' do
  action :install
end

file '/home/chef/.gitconfig' do
  content "[user]\n  name=John Doe\n  email=jdoe@example\n"
  user 'chef'
  group 'chef'
end
```

SAVE FILE!

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Install git

```
$ sudo chef-apply ~/git.rb
```

```
Recipe: (chef-apply cookbook)::(chef-apply recipe)
  * package[git] action install
    - install version 1.7.1-3.el6_4.1 of package git
  * file[/home/chef/.gitconfig] action create
    - create new file /home/chef/.gitconfig
    - update content in file /home/chef/.gitconfig from none to 259950
    --- /home/chef/.gitconfig   2014-09-24 00:24:13.558127555 +0000
    +++ /tmp/..gitconfig20140924-10180-1ij68vq  2014-09-24 00:24:13.559127555 +0000
    @@ -1 +1,4 @@
    +[user]
    +  name=John Doe
    +  email=jdoe@example.com
    - change owner from '' to 'chef'
    - change group from '' to 'chef'
    - restore selinux security context
```

Lab 4 – Manage Data & Policy Separately

- ✓ Install git?
2. Create a chef-repo
3. Create a cookbook

chef-repo

- Chef cookbooks and other policy files should be stored in a version control system
- Create a directory named `chef-repo`
- Manage that directory as a git repository

chef

- chef is an executable command line tool for
  - generating cookbooks, recipes, and other things that make up your Chef code
  - ensuring RubyGems are downloaded properly for your development environment
  - verifying that all the components are installed and configured correctly
- Included with ChefDK

What can `chef` generate?

```
$ chef generate --help
```

```
Usage: chef generate GENERATOR [options]

Available generators:
  app          Generate an application repo
  cookbook     Generate a single cookbook
  recipe       Generate a new recipe
  attribute    Generate an attributes file
  template     Generate a file template
  file         Generate a cookbook file
  lwrp         Generate a lightweight resource/provider
  repo         Generate a Chef policy repository
```

How do we generate a repo?

```
$ chef generate repo --help
```

```
Usage: chef generate repo NAME [options]
    -C, --copyright COPYRIGHT        Name of the copyright holder - defaults to 'The Authors'
    -m, --email EMAIL                Email address of the author - defaults to 'you@example.com'
    -I, --license LICENSE            all_rights, apache2, mit, gplv2, gplv3 - defaults to all_rights
    -p, --policy-only                Create a repository for policy only, not cookbooks
    -g GENERATOR_COOKBOOK_PATH,      Use GENERATOR_COOKBOOK_PATH for the code_generator cookbook
        --generator-cookbook
```

Go home!

```
$ cd ~
```

Create a chef-repo

```
$ chef generate repo chef-repo
```

```
Compiling Cookbooks...
Recipe: code_generator::repo
  * directory[/home/chef/chef-repo] action create
    - create new directory /home/chef/chef-repo
    - restore selinux security context
  * template[/home/chef/chef-repo/LICENSE] action create
    - create new file /home/chef/chef-repo/LICENSE
    - update content in file /home/chef/chef-repo/LICENSE from none to dbc1af
    (diff output suppressed by config)
    - restore selinux security context
  * cookbook_file[/home/chef/chef-repo/README.md] action create
    - create new file /home/chef/chef-repo/README.md
    - update content in file /home/chef/chef-repo/README.md from none to 767ead
    (diff output suppressed by config)
    - restore selinux security context
  * cookbook_file[/home/chef/chef-repo/Rakefile] action create
```

Commit this chef-repo to git

```
$ cd chef-repo
```

Commit this chef-repo to git

```
$ git init
```

```
Initialized empty Git repository
in /home/chef/chef-repo/.git/
```

Commit this chef-repo to git

```
$ git add .
```

Commit this chef-repo to git

```
$ git commit -m "Initial chef-repo"
```

```
[master (root-commit) 6774a70] Initial chef repo
 11 files changed, 388 insertions(+), 0 deletions(-)
 create mode 100644 .gitignore
 create mode 100644 LICENSE
 create mode 100644 README.md
 create mode 100644 Rakefile
 create mode 100644 certificates/README.md
 create mode 100644 chefignore
 create mode 100644 config/rake.rb
 create mode 100644 cookbooks/README.md
 create mode 100644 data_bags/README.md
 create mode 100644 environments/README.md
 create mode 100644 roles/README.md
```

Lab 4 – Manage Data & Policy Separately

- ✓ Install git?
- ✓ Create a chef-repo
3. Create a cookbook

Create an motd cookbook

```
$ chef generate cookbook --help
```

```
Usage: chef generate cookbook NAME [options]
    -C, --copyright COPYRIGHT        Name of the copyright holder - defaults to 'The Authors'
    -m, --email EMAIL                Email address of the author - defaults to 'you@example.com'
    -I, --license LICENSE            all_rights, apache2, mit, gplv2, gplv3 - defaults to all_rights
    -g GENERATOR_COOKBOOK_PATH,      Use GENERATOR_COOKBOOK_PATH for the code_generator cookbook
        --generator-cookbook
```

Create a motd cookbook

```
$ cd cookbooks
```

Create a cookbook

```
$ chef generate cookbook motd
```

```
Compiling Cookbooks...
Recipe: code_generator::cookbook
  * directory[/home/chef/chef-repo/cookbooks/motd] action create
    - create new directory /home/chef/chef-repo/cookbooks/motd
  * template[/home/chef/chef-repo/cookbooks/motd/metadata.rb] action create_if_missing
    - create new file /home/chef/chef-repo/cookbooks/motd/metadata.rb
    - update content in file /home/chef/chef-repo/cookbooks/motd/metadata.rb from none to 7852c2
    (diff output suppressed by config)
  * template[/home/chef/chef-repo/cookbooks/motd/README.md] action create_if_missing
  ...
```

Commit the initial cookbook

```
$ git add .
```

Commit the initial cookbook

```
$ git commit -m "initial motd cookbook"
```

```
[master (root-commit) af2b629] initial apache
recipe, does nothing
 6 files changed, 144 insertions(+), 0 deletions(-)
 create mode 100644 .kitchen.yml
 create mode 100644 Berksfile
 create mode 100644 README.md
 create mode 100644 chefignore
 create mode 100644 metadata.rb
 create mode 100644 recipes/default.rb
```

Copy your motd.rb

```
$ cat ~/motd.rb >> motd/recipes/default.rb
```

CHEF
CODE CAN

Update the recipe

OPEN IN EDITOR: ~/chef-repo/motd/recipes/default.rb

```
#
# Cookbook Name:: motd
# Recipe:: default
#
# Copyright (c) 2014 The Authors, All Rights Reserved.
file "/etc/motd" do
  content "Property of COMPANY NAME"
  action :create
  mode "0644"
  owner "root"
  group "root"
end
```

SAVE FILE!

CHEF

What resource should we use?

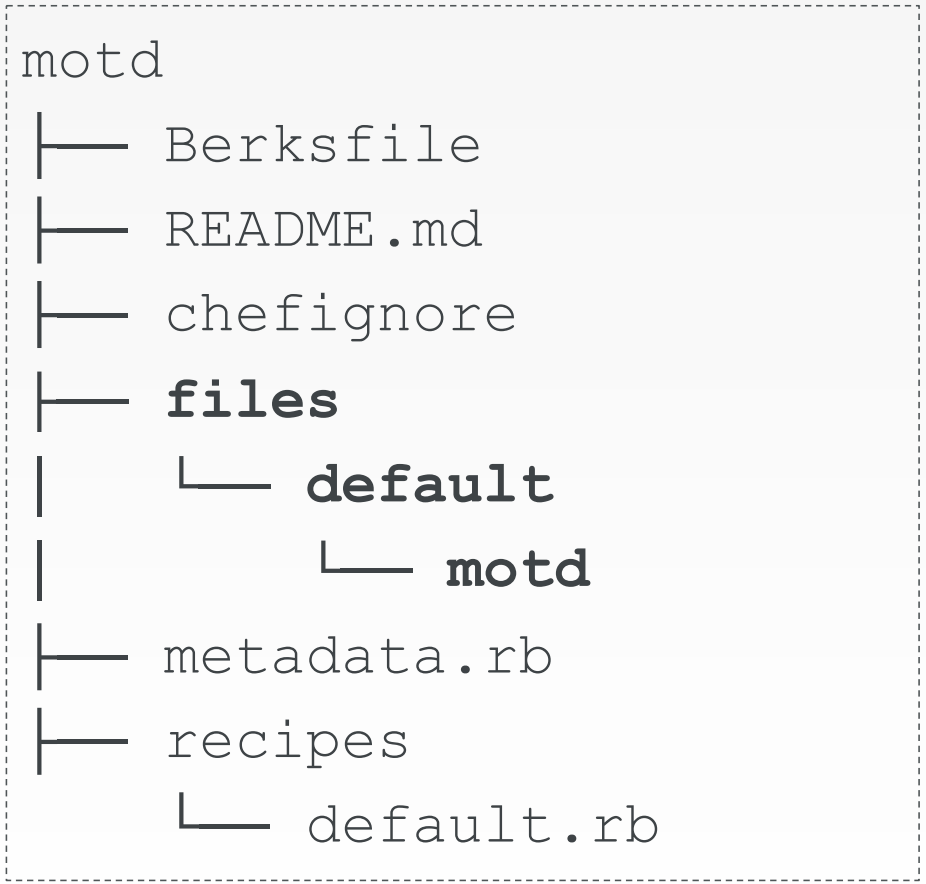
Resources: About Resources | Common Functionality — **Resources:** apt_package | bash | batch | breakpoint | chef_gem | chef_handler | cookbook_file | cron | deploy | directory | dpkg_package | dsc_script | easy_install_package | env | erl_call | execute | file | gem_package | git | group | http_request | ifconfig | link | log | mdadm | mount | ohai | package | powershell_script | registry_key | remote_directory | remote_file | route | rpm_package | ruby_block | script | service | subversion | template | user | yum_package | windows_package — **Single Page:** Resources and Providers

- cookbook_file
- file
- remote_file
- template

CHEF

cookbook_file

A file stored in the cookbook contains the content of the file.



CHEF

file

The content is described inline in the recipe

```
file "/etc/motd" do
  content "Property of COMPANY NAME"
  action :create
  mode "0644"
  owner "root"
  group "root"
end
```

remote_file

The file is stored in a remote location, such as on the web

```
file "/etc/motd" do
  url "http://some.where.com/motd"
  action :create
  mode "0644"
  owner "root"
  group "root"
end
```

template

A template file is stored as part of the cookbook

```
motd
├── Berksfile
├── README.md
├── chefignore
├── metadata.rb
├── recipes
│   └── default.rb
└── templates
    └── default
        └── motd.erb
```

template

A template file is stored as part of the cookbook and rendered to create the file.

motd/templates/default/motd.erb

```
Property of <%= @company_name %>
```

Which resource should we use?

- cookbook_file – static file, within the cookbook
- file – content managed inline
- remote_file – static file, obtained from a URL
- template – dynamic content based on ERB template

Template Resource

- An ERB template stored as part of our cookbook

Update the recipe

OPEN IN EDITOR: ~/chef-repo/motd/recipes/default.rb

```
#
# Cookbook Name:: motd
# Recipe:: default
#
# Copyright (c) 2014 The Authors, All Rights Reserved.
template "/etc/motd" do
  action :create
  source "motd.erb"
  mode "0644"
  owner "root"
  group "root"
end
```

SAVE FILE!

Create the ERB template

```
$ chef generate template --help
```

```
Usage: chef generate template [path/to/cookbook] NAME [options]
    -C, --copyright COPYRIGHT        Name of the copyright holder
- defaults to 'The Authors'
    -m, --email EMAIL                Email address of the author
- defaults to 'you@example.com'
    -I, --license LICENSE            all_rights, apache2, mit,
gplv2, gplv3 - defaults to all_rights
    -s, --source SOURCE_FILE         Copy content from
SOURCE_FILE
    -g GENERATOR_COOKBOOK_PATH,      Use GENERATOR_COOKBOOK_PATH
for the code_generator cookbook
        --generator-cookbook
```

Go to the motd cookbook directory

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

Create the ERB template

```
$ chef generate template . motd -s /etc/motd
```

```
Compiling Cookbooks...
Recipe: code_generator::template
  * directory[././templates/default] action create
    - create new directory ././templates/default
  * file[././templates/default/motd.erb] action create
    - create new file ././templates/default/motd.erb
    - update content in file ././templates/default/
motd.erb from none to 315f5b
    (diff output suppressed by config)
```

Check the template

OPEN IN EDITOR: `~/chef-repo/cookbooks/motd/templates/default/motd.erb`

```
Property of COMPANY NAME
```

SAVE FILE!

CHEF
CODE CAN

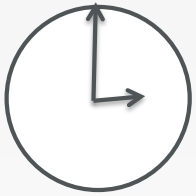
chef-apply

- chef-apply does not understand cookbooks, only resources and recipes
- We cannot use chef-apply to apply the policy stored in our motd cookbook

chef-client

- chef-client is an executable
  - performs all actions required to bring the node into the desired state
  - typically run on a regular basis
    - daemon
    - cron
    - Windows service
- Included with ChefDK

chef-client applying policies

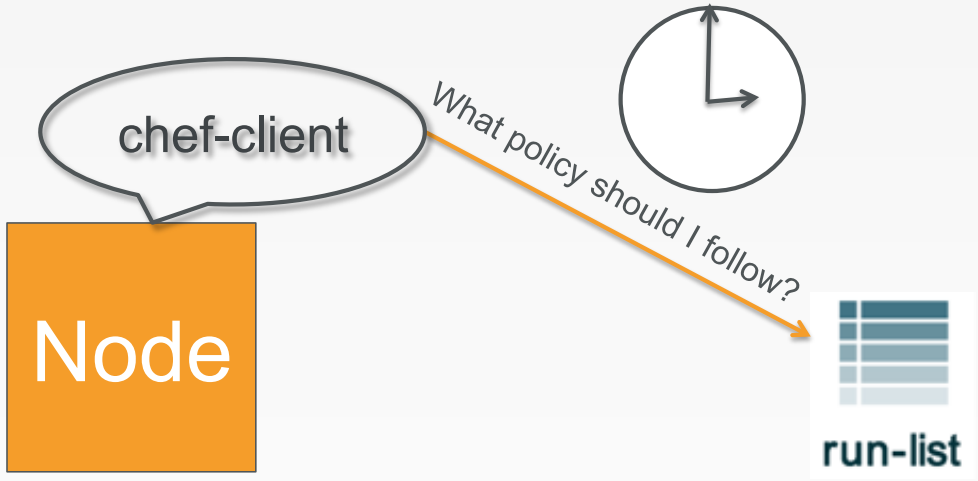


Node

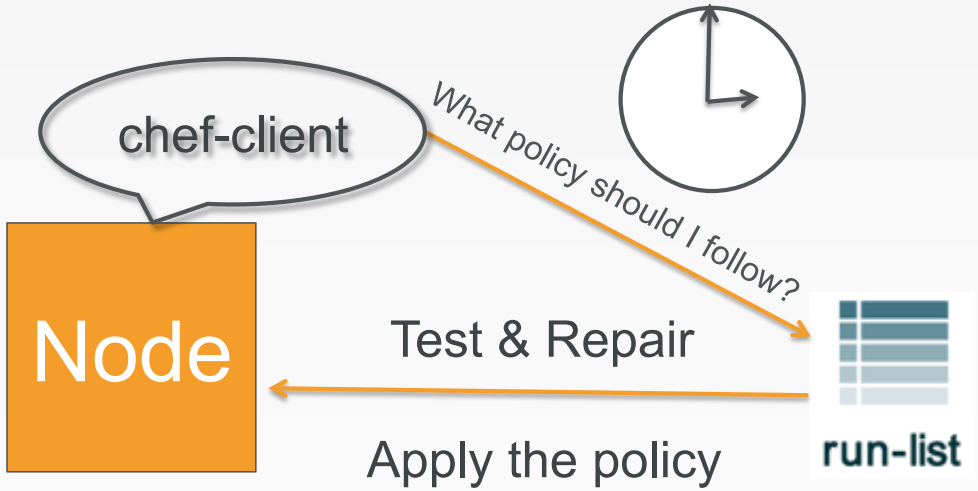
chef-client applying policies

CHEF

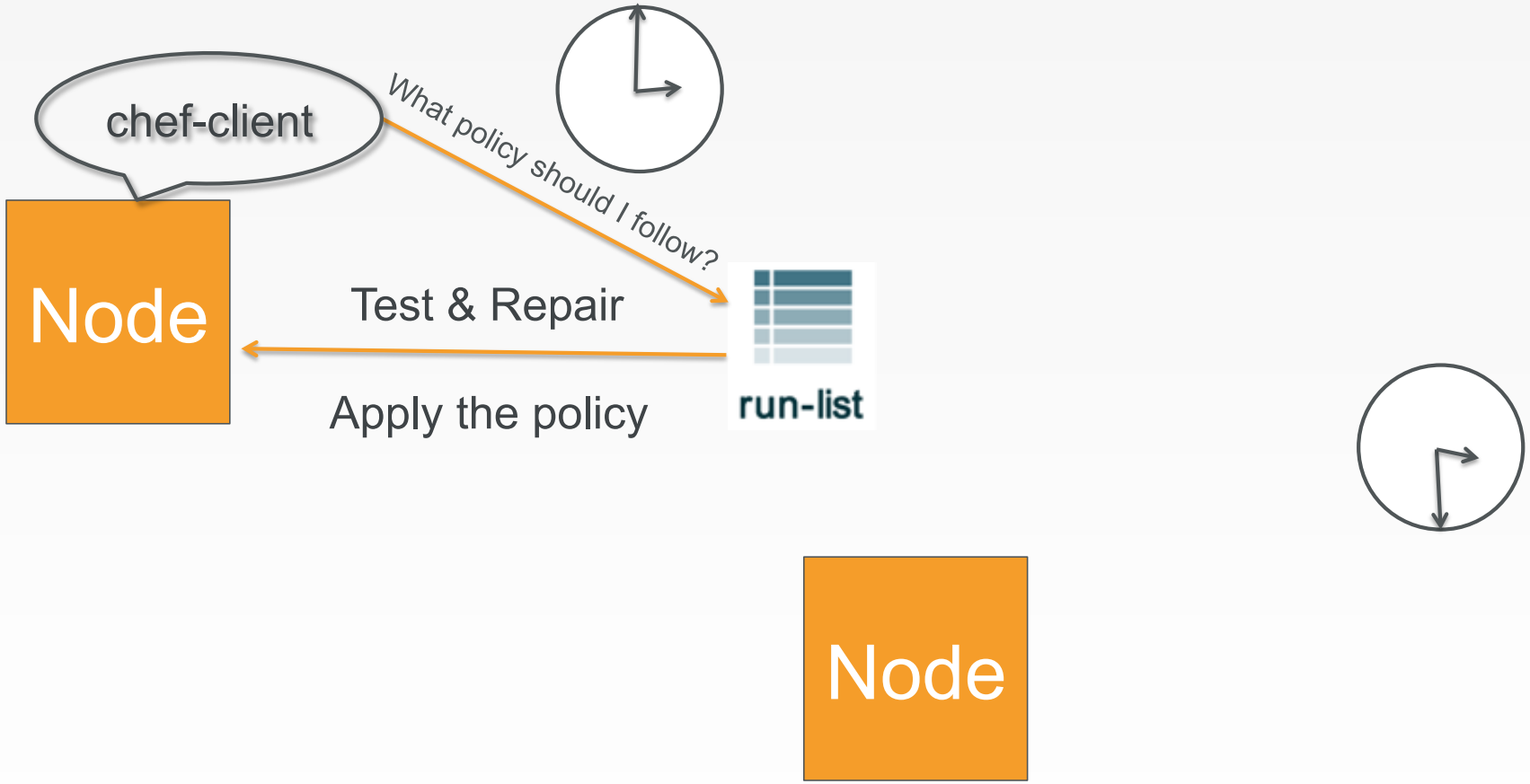
chef-client applying policies



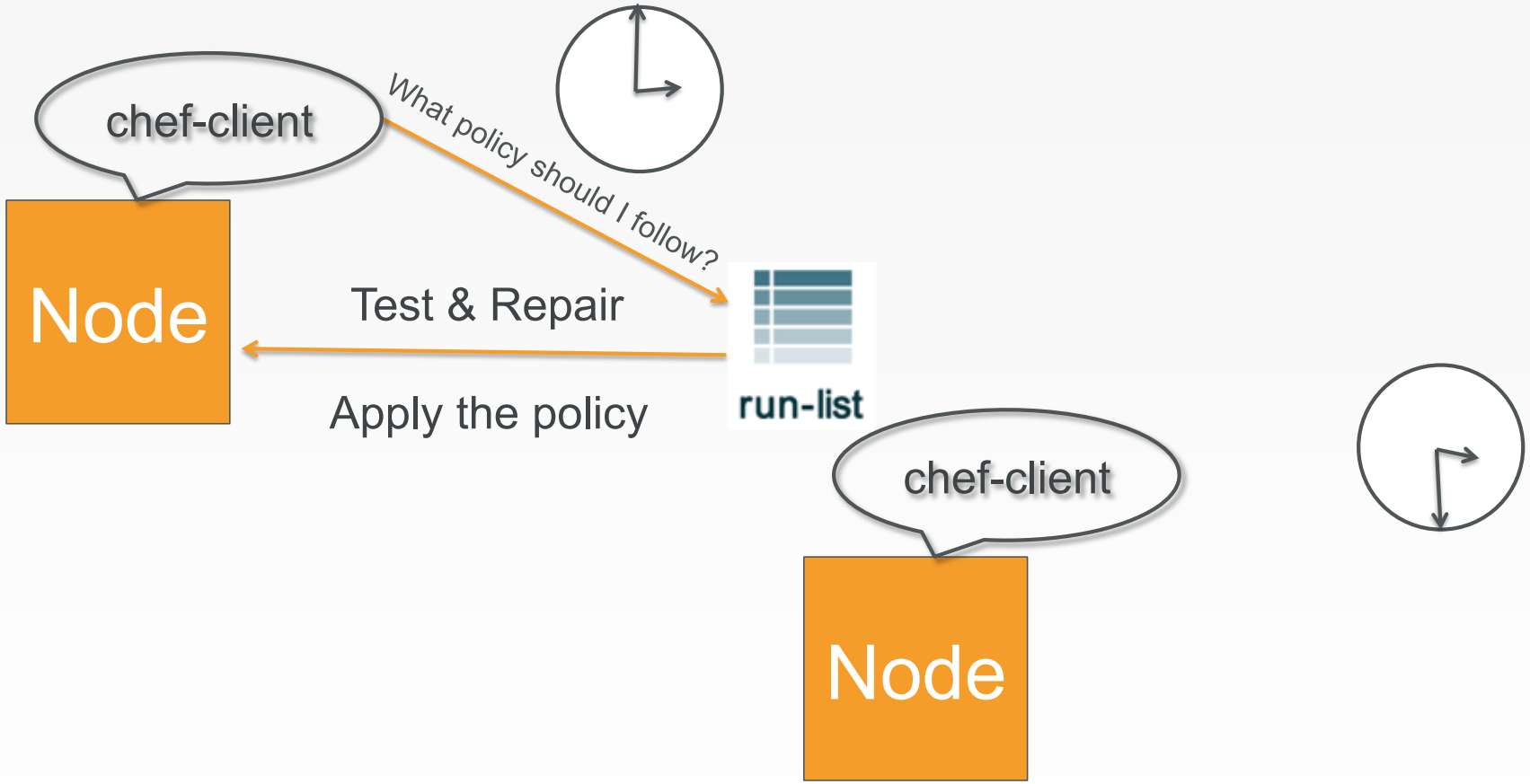
chef-client applying policies



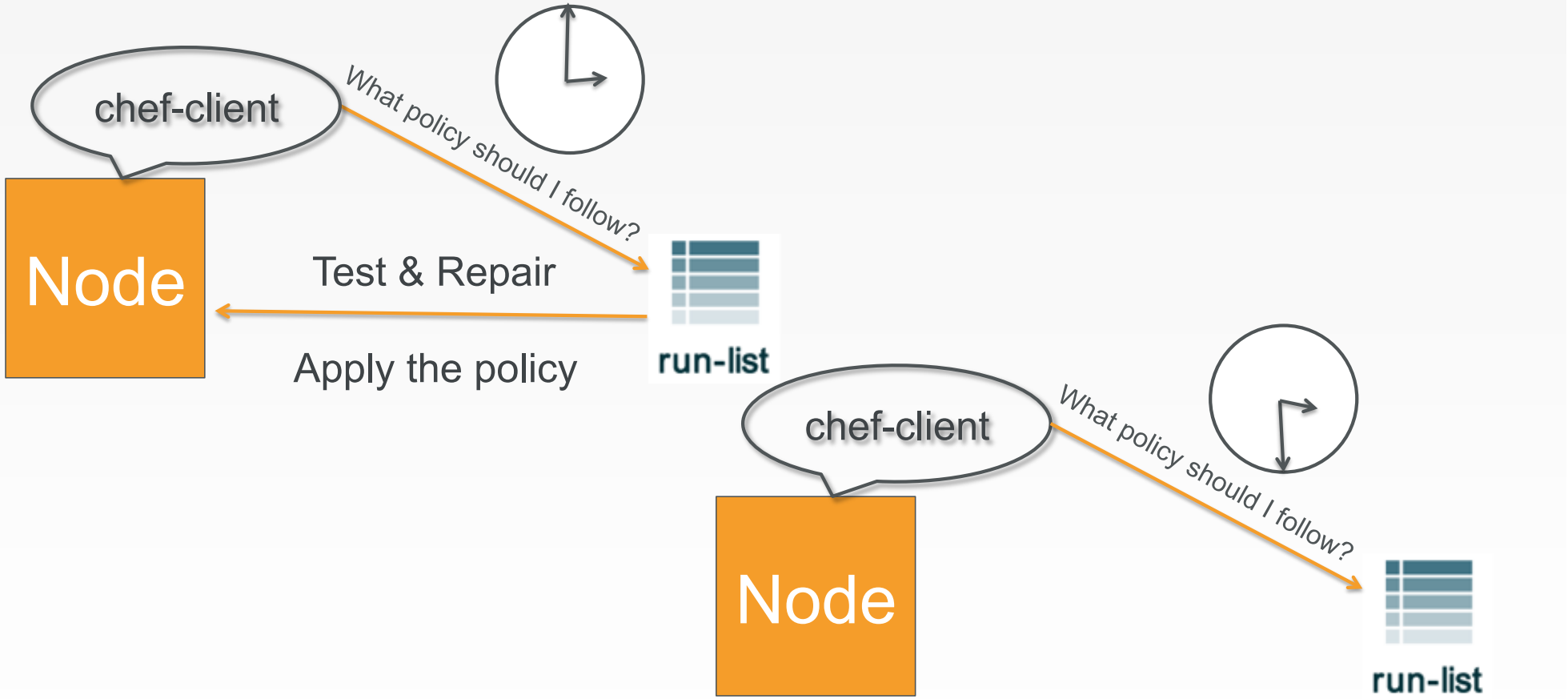
chef-client applying policies repeatedly



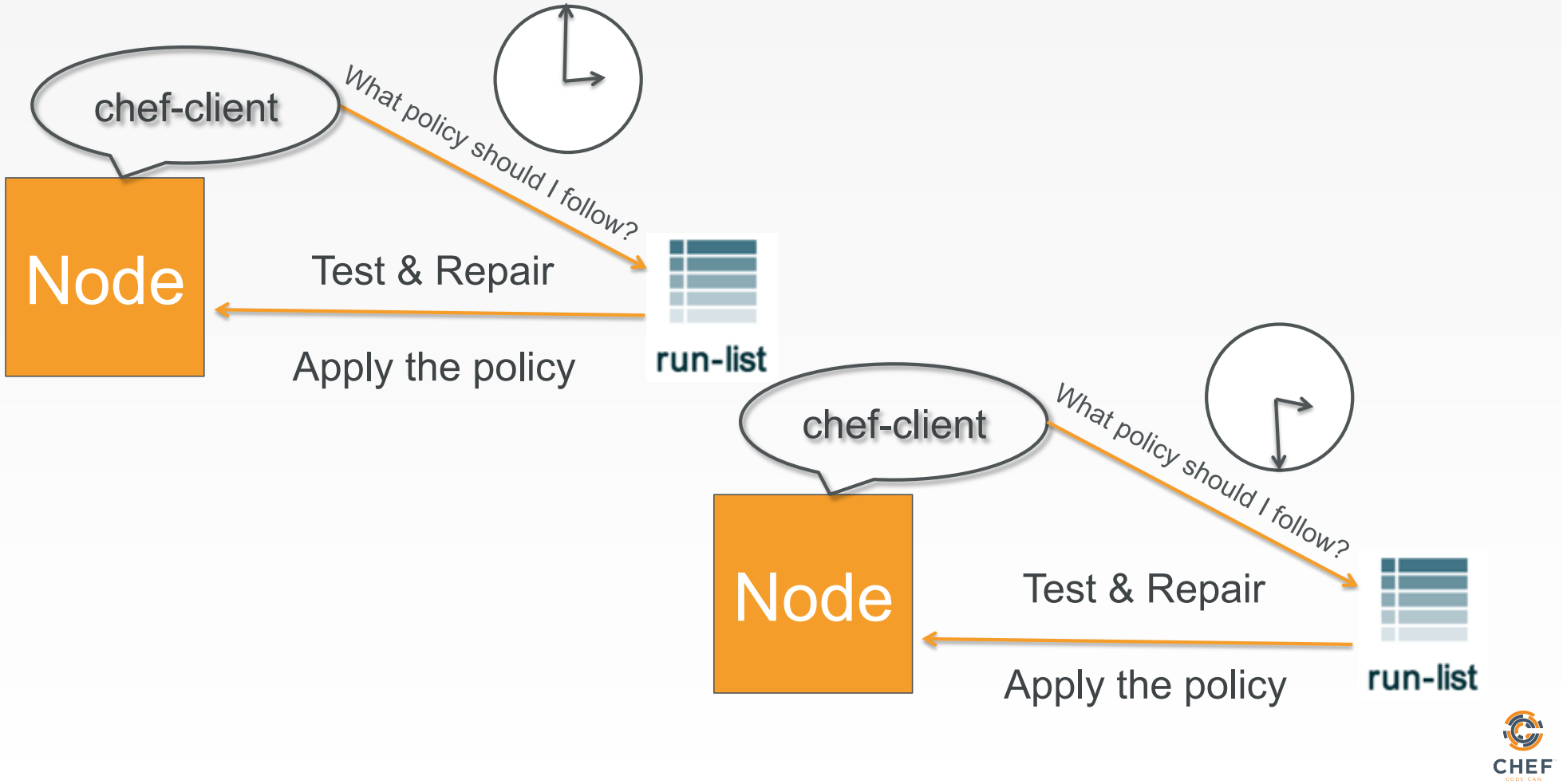
chef-client applying policies repeatedly



chef-client applying policies repeatedly



chef-client applying policies repeatedly



chef-client modes

- In conjunction with a Chef Server
- Local mode (no Chef Server)

chef-client privileges

- Usually run with elevated privileges
  - root
  - sudo
  - Administrator
- Can run as a normal user

Apply our recipe using chef-client

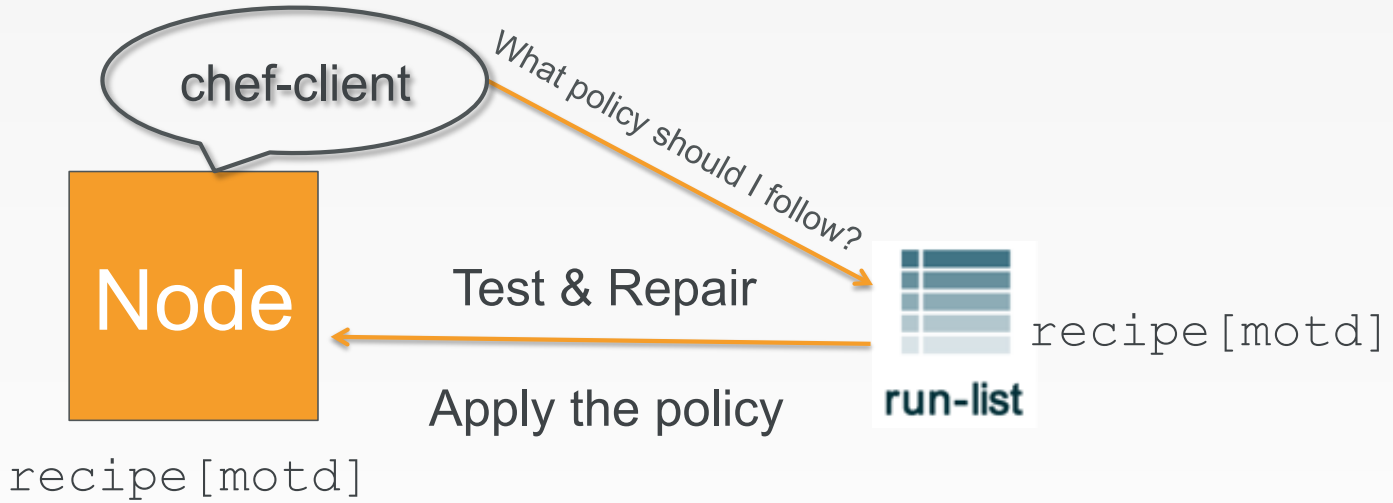
```
$ cd ~/chef-repo
```

Apply our recipe using chef-client

```
$ sudo chef-client --local-mode -r "recipe[motd]"
```

```
[2014-12-02T15:13:21+00:00] WARN: No config file found or specified on command line, using command line
options.
Starting Chef Client, version 11.18.0.rc.1
resolving cookbooks for run list: ["motd"]
Synchronizing Cookbooks:
  - motd
Compiling Cookbooks...
Converging 1 resources
Recipe: motd::default
  * template[/etc/motd] action create
    - update content in file /etc/motd from 4fe2f6 to e989a4
    (no diff)
    - restore selinux security context

Running handlers:
Running handlers complete
Chef Client finished, 1/1 resources updated in 3.346092479 seconds
```

chef-client applying policies



Lab 4 – Manage Data & Policy Separately

- ✓ Install git?
- ✓ Create a chef-repo
- ✓ Create a cookbook

Separating data from policy

- Storing the file's content directly in the recipe feels wrong
- We can manage that content separately using a different resource
  - cookbook_file
  - remote_file
  - template

Template resource

- An ERB template that is used to generate files based on the variables and logic contained within the template.

What if…?

- The contents of motd should be pulled from a file in an s3 bucket?
- The motd file should have variable content?

Lab 5 – Manage ntp

- Create a cookbook that will manage ntp
- Use a template to manage /etc/ntp.conf
- Initially, the file's content needn't change from the defaults

- Packages for ntp on CentOS are
  - ntp
  - ntpdate

Describing Policies

- Describe the relationship between resource, recipes, and cookbooks?
- What types of files might you find in a cookbook?
- Where is the version of a cookbook specified?

Describing Policies

- What questions can I answer for you?

A Sandbox for Testing

Test Kitchen

v0.1.3

CHEF

Our process

- Write policy
- Apply policy
- Verify policy

- Not bad for the simple case, will quickly get untenable

Faster Feedback

- Speed-up the feedback loops with automated testing.
- Have confidence in your changes before you run them in production

The pedantries of testing

- Unit testing
- Integration testing
- Acceptance testing
- Functional testing
- Regression testing
- Smoke testing
- Load testing

Chef Testing

- Did chef-client complete successfully?
- Did the recipe put the node in the desired state?
- Are the resources properly defined?
- Does the code follow our style guide?

Test-driving infrastructure

- We are going to use a relatively simple scenario
- We are going to explore many facets of testing
- We are going to follow a test-first, test-driven model

Our Scenario

- We want a custom home page available on the web.

Lab 6 – Create a Sandbox Environment

- **Problem**: Applying recipes directly to our workstation is akin to making changes directly in production. We should NOT do that!
- **Success Criteria**: We have an isolated environment to verify the success status of a chef-client run

Create an apache cookbook

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

Create an apache cookbook

```
$ chef generate cookbook apache
```

```
Compiling Cookbooks...
Recipe: code_generator::cookbook
  * directory[/home/chef/chef-repo/cookbooks/apache] action create
    - create new directory /home/chef/chef-repo/cookbooks/apache
    - restore selinux security context
  * template[/home/chef/chef-repo/cookbooks/apache/metadata.rb] action create_if_missing
    - create new file /home/chef/chef-repo/cookbooks/apache/metadata.rb
    - update content in file /home/chef/chef-repo/cookbooks/apache/metadata.rb from none to 4c0e2d
    (diff output suppressed by config)
    - restore selinux security context
  * template[/home/chef/chef-repo/cookbooks/apache/README.md] action create_if_missing
    - create new file /home/chef/chef-repo/cookbooks/apache/README.md
    - update content in file /home/chef/chef-repo/cookbooks/apache/README.md from none to 5c3d3a
    (diff output suppressed by config)
    - restore selinux security context
  * cookbook_file[/home/chef/chef-repo/cookbooks/apache/chefignore] action create
 …
```

Create an apache cookbook

```
$ cd apache
```

Create an apache cookbook

```
$ git add .
```

Create an apache cookbook

```
$ git commit -m "initial apache cookbook"
```

Chef client success status

- Requirements to verify chef-client success:
  - A target server running the same OS as production

Chef client success status

- Requirements to verify chef-client success:
  - A target server running the same OS as production
  - A chef-client with access to the cookbook

Test Kitchen

- Test harness to execute code on one or more platforms
- Driver plugins to allow your code to run on various cloud and virtualization providers
- Includes support for many testing frameworks
- Included with ChefDK

Test Matrix

- Two operating systems

ubuntu-12.04
centos-6.4

Test Matrix

- Two operating systems
- One recipe

	default
ubuntu-12.04	apache::default
centos-6.4	apache::default

Test Matrix

- Two operating systems
- Two recipes

	default	ssl
ubuntu-12.04	apache::default	apache::ssl
centos-6.4	apache::default	apache::ssl

Test Matrix

- Three operating systems
- Two recipes

	default	ssl
ubuntu-12.04	apache::default	apache::ssl
centos-6.4	apache::default	apache::ssl
ubuntu-14.04	apache::default	apache::ssl

Configuring the Kitchen

OPEN IN EDITOR: apache/.kitchen.yml

```
---
driver:
  name: vagrant

provisioner:
  name: chef_zero

platforms:
  - name: ubuntu-12.04
  - name: centos-6.4

suites:
  - name: default
    run_list:
      - recipe[apache::default]
    attributes:
```

SAVE FILE!

CHEF

.kitchen.yml

- driver - virtualization or cloud provider

```
---
driver:
  name: vagrant

provisioner:
  name: chef_zero

platforms:
  - name: ubuntu-12.04
  - name: centos-6.4

suites:
  - name: default
    run_list:
      - recipe[apache::default]
    attributes:
```

.kitchen.yml

- provisioner - application to configure the node

```
---
driver:
  name: vagrant

provisioner:
  name: chef_zero

platforms:
  - name: ubuntu-12.04
  - name: centos-6.4

suites:
  - name: default
    run_list:
      - recipe[apache::default]
    attributes:
```

.kitchen.yml

- platforms - target operating systems

```
---
driver:
  name: vagrant

provisioner:
  name: chef_zero

platforms:
  - name: ubuntu-12.04
  - name: centos-6.4

suites:
  - name: default
    run_list:
      - recipe[apache::default]
    attributes:
```

.kitchen.yml

- suites - target configurations

```
---
driver:
  name: vagrant

provisioner:
  name: chef_zero

platforms:
  - name: ubuntu-12.04
  - name: centos-6.4

suites:
  - name: default
    run_list:
      - recipe[apache::default]
    attributes:
```

.kitchen.yml

	default
ubuntu-12.04	apache::default
centos-6.4	apache::default

```
---
driver:
  name: vagrant

provisioner:
  name: chef_zero

platforms:
  - name: ubuntu-12.04
  - name: centos-6.4


suites:
  - name: default
    run_list:
      - recipe[apache::default]
```

.kitchen.yml

	default	ssl
ubuntu-12.04	apache::default	apache::ssl
centos-6.4	apache::default	apache::ssl

```
---
driver:
  name: vagrant

provisioner:
  name: chef_zero

platforms:
  - name: ubuntu-12.04
  - name: centos-6.4

suites:
  - name: default
    run_list:
      - recipe[apache::default]
  - name: ssl
    run_list:
      - recipe[apache::ssl]
```

.kitchen.yml

	default	ssl
ubuntu-12.04	apache::default	apache::ssl
centos-6.4	apache::default	apache::ssl
ubuntu-14.04	apache::default	apache::ssl

```
---
driver:
  name: vagrant

provisioner:
  name: chef_zero

platforms:
  - name: ubuntu-12.04
  - name: centos-6.4
  - name: ubuntu-14.04

suites:
  - name: default
    run_list:
      - recipe[apache::default]
  - name: ssl
    run_list:
      - recipe[apache::ssl]
```

.kitchen.yml

- The configuration file for your Test Kitchen
- driver – virtualization or cloud provider
- provisioner – application to configure the node
- platforms – target operating systems
- suites – target configurations

Update .kitchen.yml

OPEN IN EDITOR: cookbooks/apache/.kitchen.yml

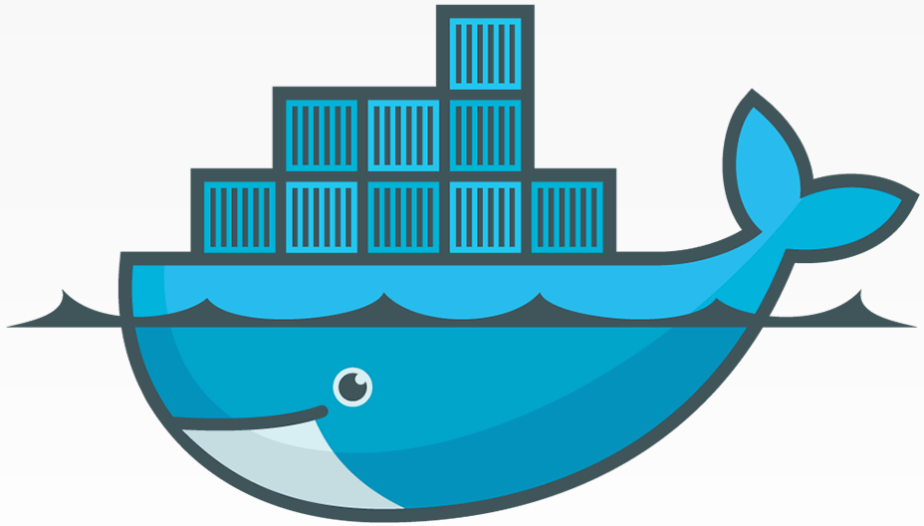
```
---
driver:
  name: docker

provisioner:
  name: chef_zero

platforms:
  - name: centos-6.5

suites:
  - name: default
    run_list:
      - recipe[apache::default]
    attributes:
```

SAVE FILE!

CHEF

Docker

- Portable, lightweight application runtime
- Linux containers
- Installed on the workstation



https://d3oypxn00j2a10.cloudfront.net/0.10.3/img/homepage/docker-whale-home-logo-@2x.png?cf34b4b2b839

Verify docker

```
$ sudo docker images
```

```
REPOSITORY          TAG                 IMAGE ID            CREATED             VIRTUAL SIZE
centos              centos6             70441cac1ed5        6 days ago          215.8 MB
ubuntu              12.04               0b310e6bf058        2 weeks ago         116.1 MB
```

kitchen-docker gem

- A driver that allows Test Kitchen to work with Docker
- Installed on the workstation

- ChefDK includes kitchen-vagrant

Verify kitchen-docker is installed

```
$ gem list kitchen
```

```
*** LOCAL GEMS ***


kitchen-docker (1.5.0)
kitchen-vagrant (0.15.0)
test-kitchen (1.2.1)
```

Move to the apache cookbook directory

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

List the Test Kitchens

```
$ kitchen list
```

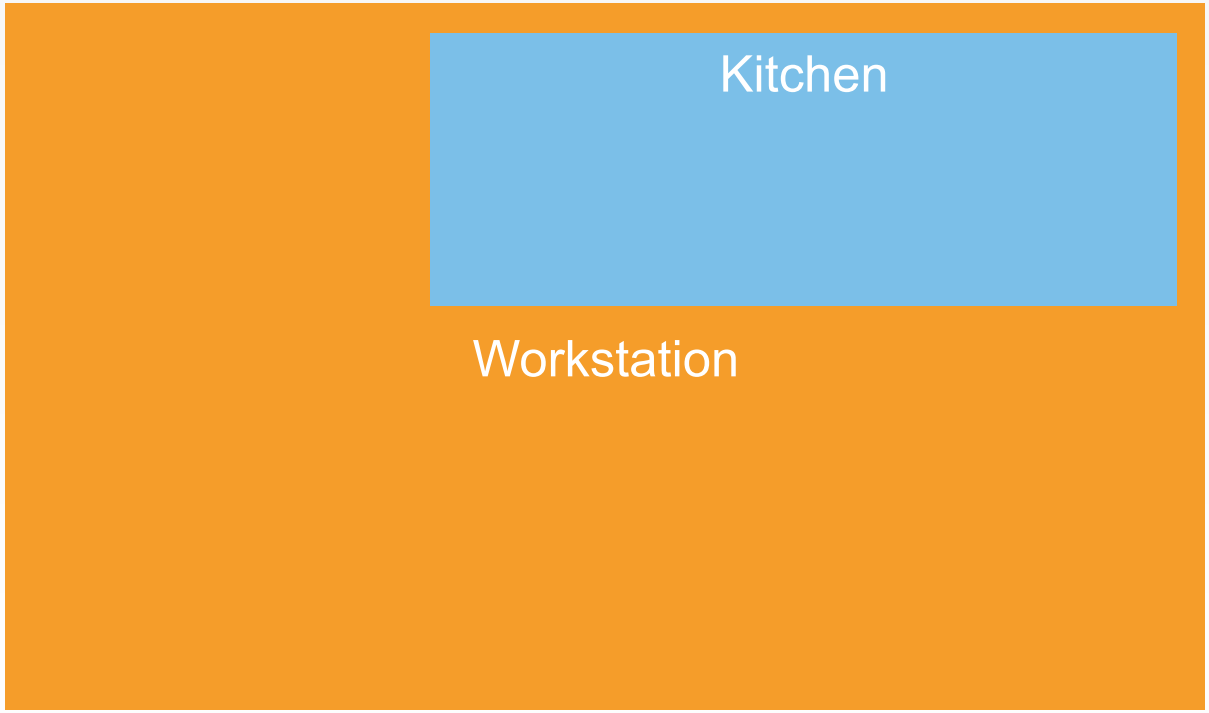
```
Instance             Driver   Provisioner  Last Action
default-centos-65    Docker   ChefZero     <Not Created>
```

Create the kitchen

```
$ kitchen create
```

```
-----> Starting Kitchen (v1.2.1)
-----> Creating <default-centos-64>...
       Step 0 : FROM centos:centos6
        ---> 68eb857ffb51
       Step 1 : RUN yum clean all
        ---> Running in cdf3952a3f18
       Loaded plugins: fastestmirror
       Cleaning repos: base extras libselinux updates
       Cleaning up Everything
        ---> b1cccd25ce55
       Removing intermediate container cdf3952a3f18
       Step 2 : RUN yum install -y sudo openssh-server openssh-clients which curl
        ---> Running in 9db69ace459d
       Loaded plugins: fastestmirror
```

Kitchen created



Login to the kitchen

```
$ kitchen login
```

```
kitchen@localhost's password:
```

Login to the kitchen

```
$ kitchen login
```

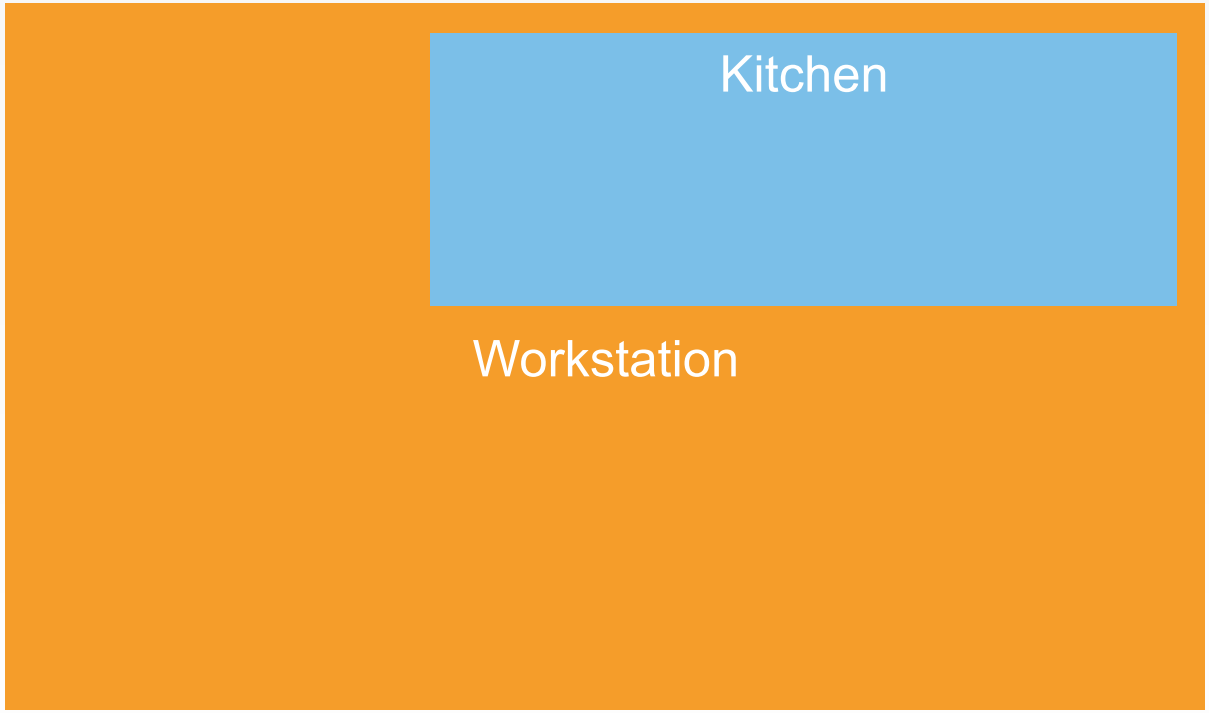
```
kitchen@localhost's password: kitchen
```

Login to the kitchen

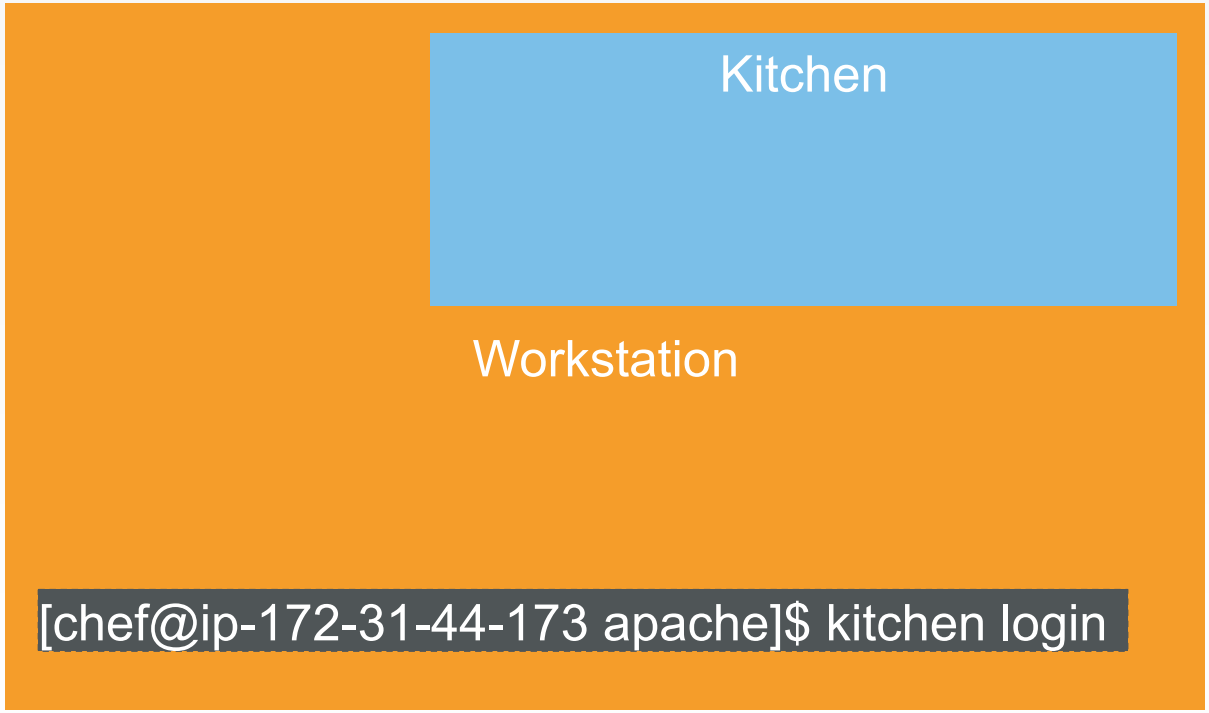
```
$ kitchen login
```

```
kitchen@localhost's password: kitchen
Last login: Wed Sep 24 04:30:29 2014 from 172.17.42.1
```

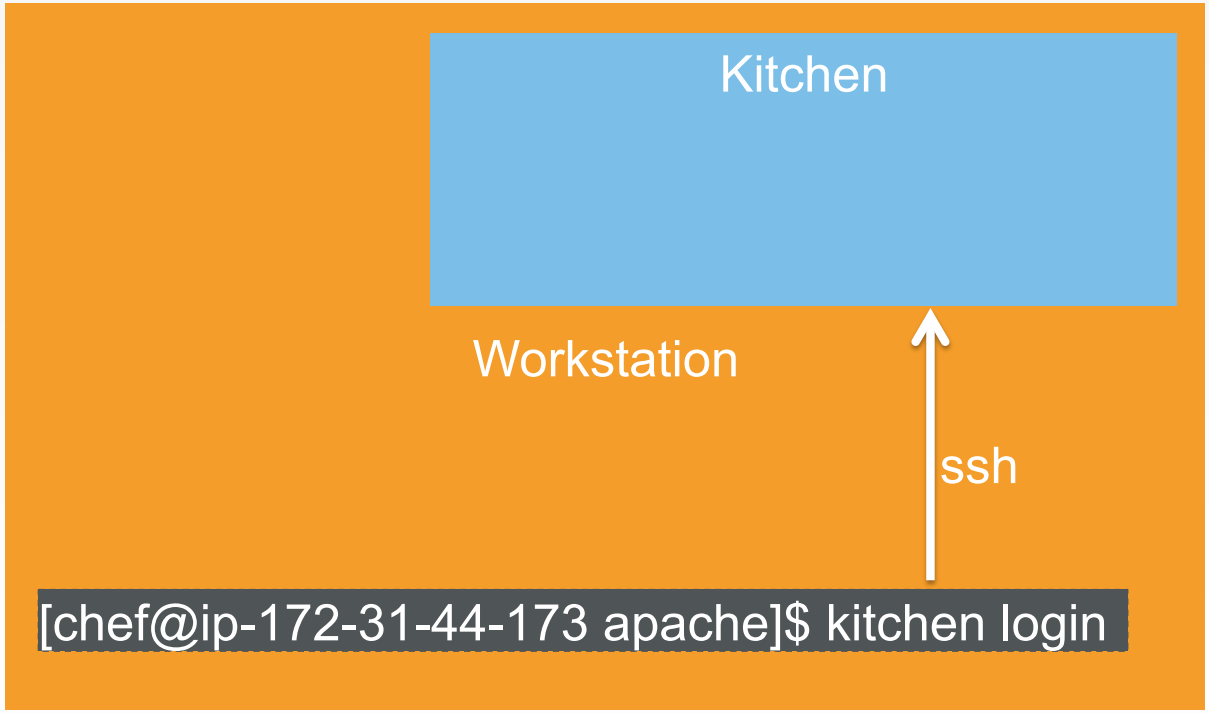
Kitchen login



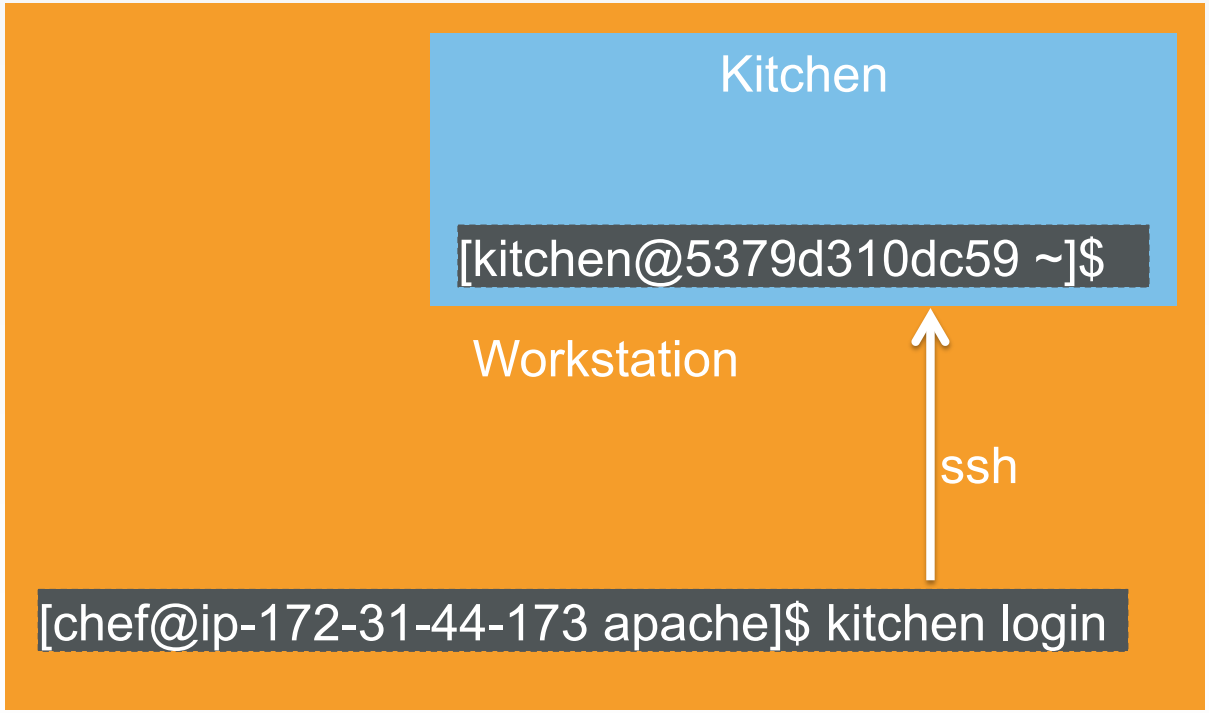
Kitchen login



Kitchen login



Kitchen login



Chef client success status

- Requirements to verify chef-client success:
  - A target server running the same OS as production
  - A chef-client with access to the cookbook

Lab 7 – Apply our policy

- **Problem:** We have not applied our policy to the test environment.
- **Success Criteria:** The default apache recipe will be applied in the test environment

Leave the kitchen

```
$ exit
```

```
logout
Connection to localhost closed.
```

Go to the right place

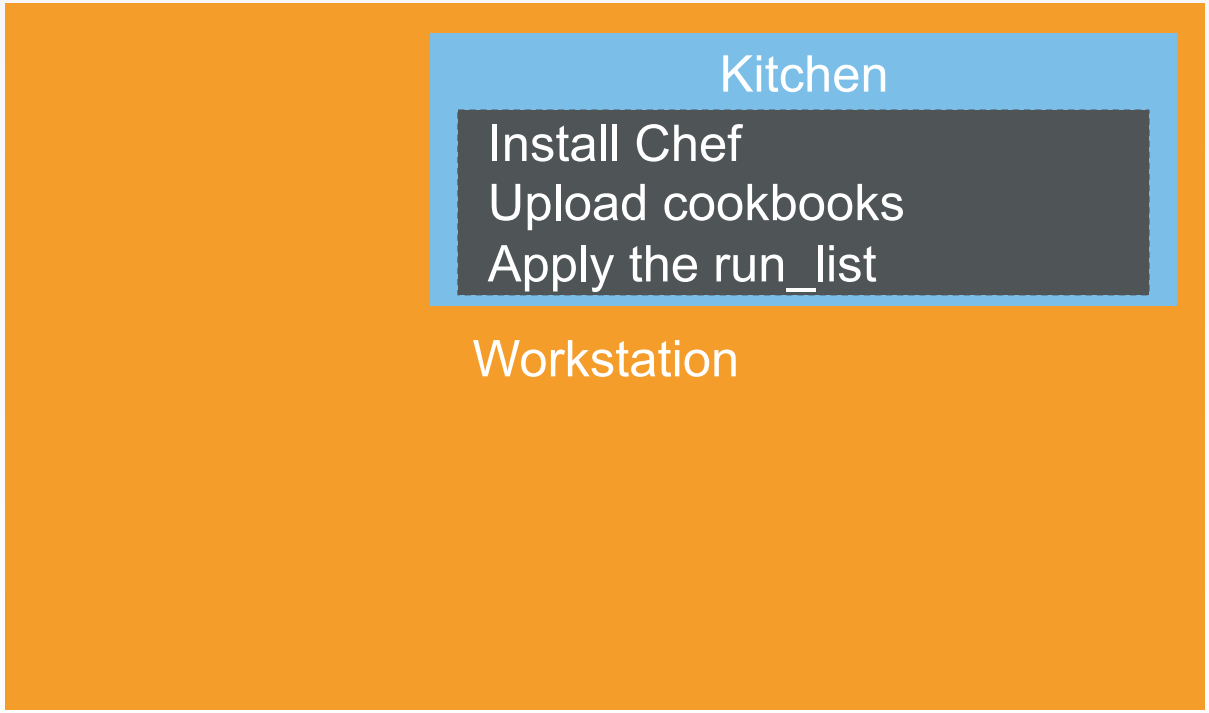
```
$ cd ~/chef-repo/cookbooks/apache
```

Apply our policy

```
$ kitchen converge
```

```
-----> Starting Kitchen (v1.2.1)
-----> Converging <default-centos-64>...
       Preparing files for transfer
       Resolving cookbook dependencies with Berkshelf 3.1.5...
       Removing non-cookbook files before transfer
-----> Installing Chef Omnibus (true)
       downloading https://www.getchef.com/chef/install.sh
         to file /tmp/install.sh
       trying curl...
```

Kitchen converge



Status Check

- **Success Criteria**: We have an isolated environment to verify the success status of a chef-client run
- **Success Criteria**: The default apache recipe will be applied in the test environment

Chef Testing

- Did chef-client complete successfully?
- Did the recipe put the node in the desired state?
- Are the resources properly defined?
- Does the code following our style guide?

Chef Testing

- ✓ Did chef-client complete successfully?
- Did the recipe put the node in the desired state?
- Are the resources properly defined?
- Does the code following our style guide?

Test Kitchen

- What is a driver?
- What is a provisioner?
- What are platforms?
- What are suites?

Kitchen Commands

- kitchen list
- kitchen create
- kitchen converge
- kitchen login

Lab 8 – Create kitchen for motd

- Update Test Kitchen for the motd cookbook
  - Use kitchen-docker driver
  - Only text CentOS
  - Create the Test Kitchen

What if…?

- You wanted to test our recipe on Ubuntu as well as CentOS?
- You wanted to remove the kitchen sandbox?
- Did not have Docker installed?

Test Kitchen

- What questions can I answer for you?

Verifying node state

Serverspec

CHEF

Chef Testing

- ✓ Did chef-client complete successfully?
- Did the recipe put the node in the desired state?
- Are the resources properly defined?
- Does the code following our style guide?

Manually inspect the test node

```
$ kitchen login
```

```
kitchen@localhost's password:
```

Manually inspect the test node

```
$ kitchen login
```

```
kitchen@localhost's password: kitchen
```

Manually inspect the test node

```
$ kitchen login
```

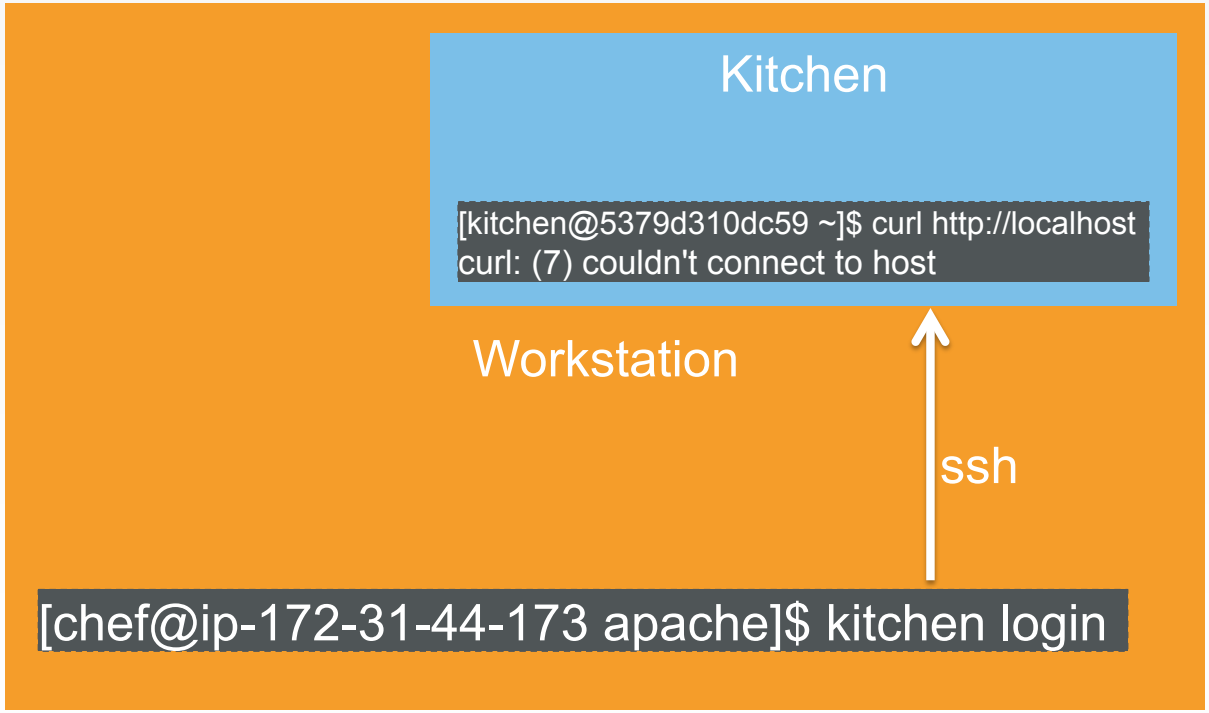
```
kitchen@localhost's password: kitchen
Last login: Wed Sep 24 04:30:29 2014 from 172.17.42.1
```

Manually inspect the test node

```
$ curl http://localhost
```

```
curl: (7) couldn't connect to host
```

Kitchen login



Lab 9 – Verify node state

- **Problem**: Manually verifying the state of the test node is tedious and error-prone.
- **Success Criteria**: The end state of the node is automatically tested.

Serverspec

- Write tests to verify your servers
- Not dependent on Chef
- Defines many resource types
  - package, service, user, etc.
- Works well with Test Kitchen
- http://serverspec.org/

CHEF

Leave the Kitchen

```
$ exit
```

```
logout
Connection to localhost closed.
```

Move to the proper directory

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

Create directory for serverspec tests

```
$ mkdir -p test/integration/default/serverspec
```

Default location for tests

- Test Kitchen will look in the `test/integration` directory for test-related files

Suite subdirectory

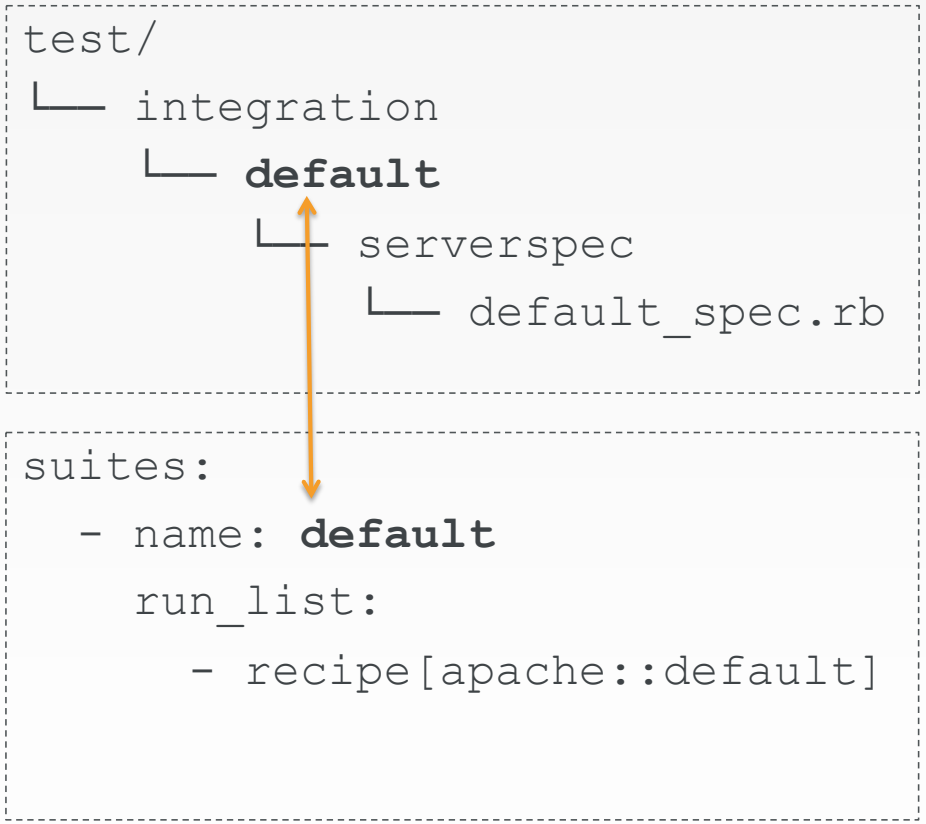
- The next level subdirectory will match the suite name.

```
test/
└── integration
    └── default
        └── serverspec
            └── default_spec.rb
```

```
suites:
  - name: default
    run_list:
      - recipe[apache::default]
```

Suite subdirectory

- The next level subdirectory will match the suite name.



CHEF

Busser subdirectory

- Test Kitchen utilizes **bussers** to manage test plugins.
- We'll be using the serverspec plugin

```
test/
└── integration
    └── default
        └── serverspec
            └── default_spec.rb
```

```
suites:
  - name: default
    run_list:
      - recipe[apache::default]
```

CHEF

Write a Serverspec test

OPEN IN EDITOR: test/integration/default/serverspec/default_spec.rb

```
require 'serverspec'
set :backend, :exec

describe 'apache' do

end
```

SAVE FILE!

CHEF

Generic Expectation Form

```
describe "<subject>" do
  it "<description>" do
    expect(thing).to eq result
  end
end
```

Awesome Expectations

OPEN IN EDITOR: test/integration/default/serverspec/default_spec.rb

```
require 'serverspec'
set :backend, :exec

describe "apache" do
  it "is awesome" do
    expect(true).to eq true
  end
end
```

SAVE FILE!

CHEF

Run the serverspec test

```
$ kitchen verify
```

```
-----> Running serverspec test suite
       /opt/chef/embedded/bin/ruby -I/tmp/busser/suites/serverspec -I/tmp/
busser/gems/gems/rspec-support-3.1.2/lib:/tmp/busser/gems/gems/rspec-
core-3.1.7/lib /opt/chef/embedded/bin/rspec --pattern /tmp/busser/suites/
serverspec/\*\*/\*_spec.rb --color --format documentation --default-path /
tmp/busser/suites/serverspec

       apache
         is awesome

       Finished in 0.02823 seconds (files took 0.99875 seconds to load)
       1 example, 0 failures
       Finished verifying <default-centos-64> (0m5.03s).
```

How would you test our criteria?

- We want a custom home page available on the web.

What is success?

- Package is installed?
- Page is displayed?
- What else?

Verify package is installed

OPEN IN EDITOR: test/integration/default/serverspec/default_spec.rb

```
require 'serverspec'
set :backend, :exec

describe "apache" do
  it "is awesome" do
    expect(true).to eq true
  end

  it "is installed" do
    expect(package("httpd")).to be_installed
  end
end
```

SAVE FILE!

CHEF

Exercise the test

```
$ kitchen verify
```

```
 apache
         is awesome
         is installed (FAILED - 1)

       Failures:

         1) apache is installed
            Failure/Error: expect(package("httpd")).to
be_installed
              expected Package "httpd" to be installed
              /bin/sh -c rpm\ -q\ httpd
              package httpd is not installed
```

Test is failing, make it pass

- Test-driven development involves
  - Write a test to verify something is working
  - Watch the test fail
  - Write just enough code to make the test pass
  - Repeat

Update our cookbook

OPEN IN EDITOR: ~/chef-reop/cookbooks/apache/recipes/default.rb

```
package "httpd"
```

SAVE FILE!

CHEF

Converge the node again

```
$ kitchen converge
```

```
-----> Converging <default-centos-64>...
       Preparing files for transfer
       Resolving cookbook dependencies with Berkshelf 3.1.5...
       Removing non-cookbook files before transfer
       Transfering files to <default-centos-64>
       [2014-11-10T09:20:26+00:00] INFO: Starting chef-zero on host localhost, port 8889
with repository at repository at /tmp/kitchen
         One version per cookbook

       [2014-11-10T09:20:26+00:00] INFO: Forking chef instance to converge...
       Starting Chef Client, version 11.16.4
       [2014-11-10T09:20:27+00:00] INFO: *** Chef 11.16.4 ***
       [2014-11-10T09:20:27+00:00] INFO: Chef-client pid: 571
 ...
```

Exercise the test

```
$ kitchen verify
```

```
 apache
         is awesome
         is installed

       Finished in 0.48165 seconds (files took 1.05
seconds to load)
       2 examples, 0 failures
       Finished verifying <default-centos-64>
(0m5.64s).
-----> Kitchen is finished. (0m11.84s)
```

What else will you test?

- Is the service running?
- Is the port accessible?
- Is the expected content being served?

- Make sure everything works from a fresh kitchen, too!

Time to hack!

https://www.flickr.com/photos/peterpearson/424047087

CHEF

Extend the Serverspec test

OPEN IN EDITOR: test/integration/default/serverspec/default_spec.rb

```
describe 'apache' do
  it "is installed" do
    expect(package 'httpd').to be_installed
  end

  it "is running" do
    expect(service 'httpd').to be_running
  end

  it "is listening on port 80" do
    expect(port 80).to be_listening
  end

  it "displays a custom home page" do
    expect(command("curl localhost").stdout).to match /hello/
  end
end
```

SAVE FILE!

CHEF

Verify the kitchen

```
$ kitchen verify
```

```
apache
        is installed
        is running
        is listening on port 80
        displays a custom home page

      Finished in 0.3968 seconds
      4 examples, 0 failures
      Finished verifying <default-centos-64> (0m4.25s).
```

Kitchen Workflow

- `kitchen create`
- `kitchen converge`
- `kitchen verify`
- `kitchen destroy`

- All at once with `kitchen test`

Chef Testing

- ✓ Did chef-client complete successfully?
- ✓ Did the recipe put the node in the desired state?
- Are the resources properly defined?
- Does the code following our style guide?

Lab 10 – Verify node state in motd

- Add serverspec tests to your motd cookbook

Verifying the node

- What command will show you the current state of your test kitchen suites?
- Can you view your kitchen's custom home page from your laptop's browser? How? Why?
- Is it important to start with a fresh kitchen?

Verifying Node State

- What questions can I answer for you?

Even Faster Feedback

ChefSpec

CHEF

Chef Testing

- ✓ Did chef-client complete successfully?
- ✓ Did the recipe put the node in the desired state?
- Are the resources properly defined?
- Does the code following our style guide?

This is too slow!

- To test our code, we need to spin up a test kitchen, converge a node, execute some tests.
- Our simple test case takes about 2 minutes to fully execute.

Properly configured resources

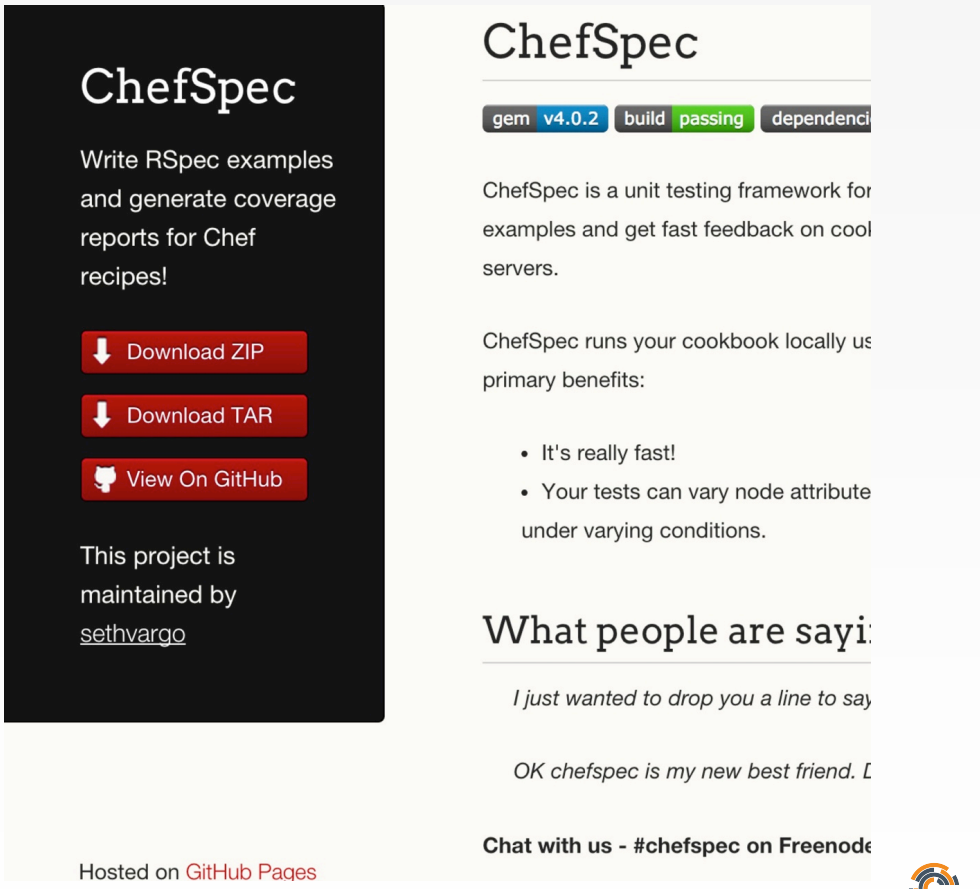
- We need a way to verify that the resources in our recipes are properly configured
- We want to get faster feedback

Lab 9 – Verify the resources

- **Problem**: We should be able to catch errors before we need to converge a node
- **Success Criteria**: Catch a typo prior to converge

ChefSpec

- Test before you converge
- Get feedback on cookbook changes without the need for target servers



http://sethvargo.github.io/chefspec/

Make a directory for our ChefSpec tests

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

Make a directory for our ChefSpec tests

```
$ mkdir -p spec/unit
```

Write a ChefSpec test

OPEN IN EDITOR: spec/unit/default.rb

```
require 'chefspec'

describe 'apache::default' do
  let(:chef_run) do
    ChefSpec::Runner.new.converge(described_recipe)
  end

  it 'installs apache' do
    expect(chef_run).to install_package('httpd')
  end
end
```

SAVE FILE!

CHEF

Run the ChefSpec tests

```
$ rspec spec/unit/*.rb
```

```
.

Finished in 0.00865 seconds (files took 5.5 seconds to load)
1 example, 0 failures
```

Break the cookbook

OPEN IN EDITOR: recipes/default.rb

```
package "http"

service "httpd" do
  action :start
end

template "/var/www/html/index.html" do
  source "index.html.erb"
end
```

SAVE FILE!

CHEF

Run the ChefSpec tests

```
$ rspec spec/unit/*.rb
```

```
F

Failures:

  1) apache::default installs apache
     Failure/Error: expect(chef_run).to install_package('httpd')
       expected "package[httpd]" with action :install to be in Chef run. Other package resources:

         package[http]

     # ./spec/unit/default_spec.rb:9:in `block (2 levels) in <top (required)>'

Finished in 0.00847 seconds (files took 4.85 seconds to load)
1 example, 1 failure

Failed examples:

rspec ./spec/unit/default_spec.rb:8 # apache::default installs apache
```

Fix the cookbook

OPEN IN EDITOR: recipes/default.rb

```
package "httpd"

service "httpd" do
  action :start
end

template "/var/www/html/index.html" do
  source "index.html.erb"
end
```

SAVE FILE!

CHEF

Time to hack!

https://www.flickr.com/photos/peterpearson/424047087

CHEF

Chef Testing

- ✓ Did chef-client complete successfully?
- ✓ Did the recipe put the node in the desired state?
- ✓ Are the resources properly defined?
- Does the code following our style guide?

ChefSpec

- What is the primary difference between ChefSpec and ServerSpec?
- Why use ChefSpec if you already have ServerSpec tests?
- Do passing ChefSpec tests ensure your recipe will work?
- How would you feel about removing some of your ServerSpec tests now that you have ChefSpec in place?

ChefSpec

- What questions can I answer for you?

Clean code

Follow best practices, avoid mistakes

CHEF

Foodcritic

- Check cookbooks for common problems
- Style, correctness, deprecations, etc.
- Included with ChefDK

http://www.foodcritic.io/

Change our recipe

OPEN IN EDITOR: recipes/default.rb

```
package_name = "httpd"

package "#{package_name}"

service "httpd" do
  action :start
end

template "/var/www/html/index.html" do
  source "index.html.erb"
end
```

SAVE FILE!

CHEF

Run Foodcritic

```
$ foodcritic .
```

```
FC002: Avoid string interpolation
where not required: ./recipes/
default.rb:7
```

Chef Testing

- ✓ Did chef-client complete successfully?
- ✓ Did the recipe put the node in the desired state?
- ✓ Are the resources properly defined?
- ✓ Does the code following our style guide?

Foodcritic

- What rules have been deprecated?
- What does Foodcritic return on success?

Foodcritic

- What questions can I answer for you?

Wrap Up

CHEF

Course Objectives

- After completing this course you will be able to:
  - Automate common infrastructure tasks with Chef
  - Verify your automation code BEFORE it runs in production
  - Describe Chef's various tools
  - Apply Chef's primitives to solve your problems

Tool Survey

- chef-apply
- chef
- chef-client in local mode
- Test Kitchen
- Docker
- Serverspec
- ChefSpec
- Foodcritic

Vocabulary

- Resources
- Recipes
- Cookbooks

Resources

- Package
- Service
- File
- Template

But wait…

- …there's more, so much more!
- How much time do we have left? I could go on for days!

Further Resources

- learnchef.com
  - Guided tutorials
  - Chef Fundamental Series
- Upcoming Training
  - chef.io/blog/events/category/training-events/

Chef Fundamentals Q & A Forum

- Chef Fundamentals Google Group Q&A Forum
- http://bit.ly/ChefFundamentalsForum
- Join the group and post questions

A list of URLs

- http://chef.io
- http://docs.chef.io
- http://supermarket.chef.io
- http://youtube.com/getchef
- http://lists.opscode.com
- irc.freenode.net: #chef, #chef-hacking
- Twitter: @chef #getchef, @learnchef #learnchef

Food Fight Show

- foodfightshow.org
- Podcast where DevOps Chefs Do Battle
- Best practices for working with Chef

CHEF

What questions do you have?

- Chef Server
- Roles
- Environments
- Data Bags
- Bootstrapping new nodes
- Open source projects
- Working with IaaS providers
- chef-provisioner
- Search

- Thank You!
- @tekbuddha

What else would you like to work on?

- Make the cookbook work for ubuntu?
- Explore Chef Server
- Learn about other top-level Chef Objects
  - Node
  - Roles
  - Environments
  - Data Bags

Time to hack!

https://www.flickr.com/photos/peterpearson/424047087

CHEF