4: chef-client

chef-client

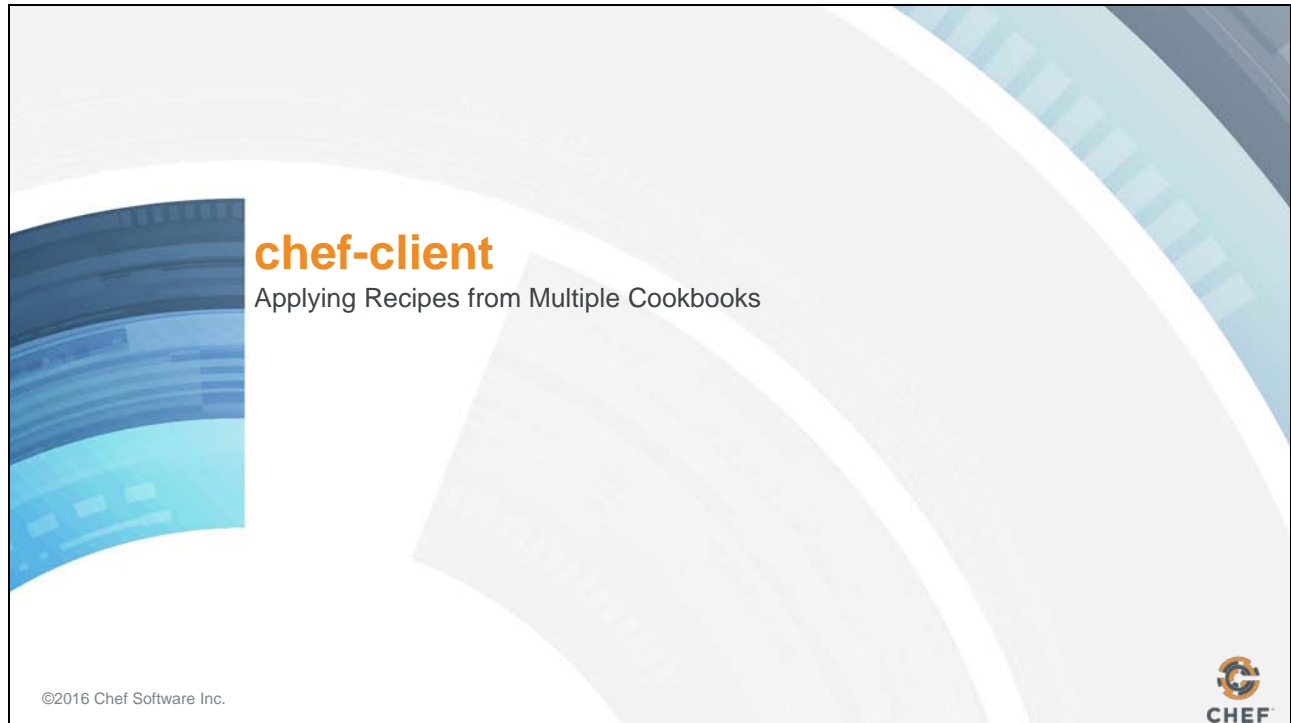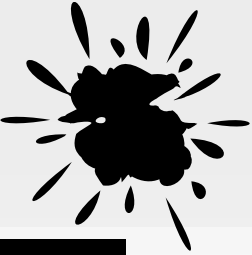Applying Recipes from Multiple Cookbooks

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Slide 2

chef-client

```
$ sudo chef-client --local-mode RECIPE_FILE
```

How would we apply both the workstation's setup recipe and apache's server recipe?

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We have used 'chef-client' to apply recipes but we now face a new problem. How do we use this tool to apply multiple recipes to configure the state of our infrastructure? Combing the recipes seems like it goes against the concept that cookbooks map one-to-one to a piece of software. Running the command twice seems like it would make managing the system difficult to remember.

Slide 3

Objectives

After completing this module, you should be able to use chef-client to:

➤ Locally apply multiple cookbooks' recipes with chef-client.

➤ Include a recipe from within another recipe.

In this module you will learn how to use the 'chef-client' command to apply multiple recipes and include a recipe within another recipe.

Slide 4

CONCEPT

--local-mode

chef-client's default mode attempts to contact a
Chef Server and ask it for the recipes to run for the
given node.

We are overriding that behavior to have it work in a
local mode.

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chef-client has a number of flags that can be passed to it to configure how it works. Up
to this point we have been using the '--local-mode' flag to ensure 'chef-client' does not
query the Chef Server it wants to communicate with by default.

Slide 5

Another flag we can use is '--run-list' or '-r' to specify a list of recipes we want to apply to the system. We call this list of recipes a run list.

This ordered list specifies the recipes in a different way. We are no longer interested in the filepath to the particular recipe file. We instead specify that we want a recipe and then within the square brackets we specify the name of the cookbook and then finally the name of the recipe.

"recipe[COOKBOOK::RECIPE]"

COOKBOOK means the name of the Cookbook.
RECIPE means the name of the Recipe without the Ruby file extension.

Slide 6

Demo: Using 'chef-client' to Locally Apply Recipes

```
$ sudo chef-client --local-mode -r "recipe[workstation::setup]"
```

Applying the following recipes locally:

The 'setup' recipe from the 'workstation' cookbook

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Here is an example of using 'chef-client' to locally apply a run list of recipes. In this case we are applying one recipe and that is the setup recipe within our workstation cookbook.

We are using the abbreviated '-r' to represent the longer flag '--run-list'.

Instructor Note: These commands if executed by a learner at this point will not work. These are being displayed solely as demonstration.

Slide 7

Demo: Using 'chef-client' to Locally Apply Recipes

```
$ sudo chef-client --local-mode -r "recipe[apache::server]"
```

Applying the following recipes locally:

   The 'server' recipe from the 'apache' cookbook

Here is an example of using 'chef-client' to locally apply the server recipe within our apache cookbook.

We are using the abbreviated '-r' to represent the longer flag '--run-list'.

Slide 8

Demo: Using 'chef-client' to Locally Apply Recipes

```
$ sudo chef-client --local-mode \
  -r "recipe[workstation::setup],recipe[apache::server]"
```

Applying the following recipes locally:

- The 'setup' recipe from the 'workstation' cookbook
- The 'server' recipe from the 'apache' cookbook

Here is an example of using 'chef-client' to locally apply two recipes -- the setup recipe from the workstation cookbook and the server recipe within our apache cookbook.

Instructor Note: The command given here includes the backslash '\'. That allows you to specify multiple lines within a terminal. Because of the character limitation of slides it is included to make the command more clear to the learner.

Instructor Note: It is important to note that when specifying a run list, recipes defined within it that are separated with a comma should NOT have a space after the comma or it will create an error.

Slide 9

Applying a Run List

Using a run list will allow us to specify things more 'logically' instead of with paths.

Objective:

❑ Individually apply the apache cookbook's server recipe and workstation cookbook's setup recipe

❑ Apply both the apache cookbook's server recipe and workstation cookbook's setup recipe

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Together let's explore applying run lists with the chef-client command. First two recipes independently and then we will try both together at the same time.

GL: Return Home First

```
$ cd ~
```

Before you start applying cookbooks through 'chef-client', make sure you are in your home directory. This is important because 'chef-client' looks for cookbooks in the 'cookbooks' directory.

Slide 11

GL: Apply the Cookbook Recipe Locally

```
$ sudo chef-client --local-mode -r "recipe[apache::server]"

[2016-09-15T14:54:45+00:00] WARN: No config file found or specified on command
line, using command line options.
Starting Chef Client, version 12.3.0
resolving cookbooks for run list: ["apache::server"]
Synchronizing Cookbooks:
  - apache
Compiling Cookbooks...
Converging 4 resources
Recipe: apache::server
  * yum_package[httpd] action install (up to date)
  * file[/var/www/html/index.html] action create (up to date)
  * service[httpd] action enable (up to date)
```

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From our current working directory, which at the moment is the home directory, the 'chef-client' command will look for a directory named 'cookbooks'. Within that 'cookbooks' directory it will find the cookbook named 'apache'. Within the 'apache' cookbook it will look for the 'server' recipe.

Run this command, from the home directory, and ensure that you see the recipe being applied as it had before except this time the output will display a populated run list and a cookbook that has been synchronized.

Instructor Note: The WARN messages were omitted from this output so you can see the converging resources.

Slide 12

GL: Apply the Cookbook Recipe Locally

```
$ sudo chef-client --local-mode -r "recipe[workstation::setup]"
```

```
[2016-09-15T15:15:26+00:00] WARN: No config file found or specified on command
line, using command line options.
Starting Chef Client, version 12.3.0
resolving cookbooks for run list: ["workstation::setup"]
Synchronizing Cookbooks:
  - workstation (0.1.0)
Compiling Cookbooks...
Converging 4 resources
Recipe: workstation::setup
  * yum_package[cowsay] action install (up to date)
  * yum_package[tree] action install (up to date)
  * yum_package[git] action install (up to date)
  * file[/etc/motd] action create (up to date)
```

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Try applying the workstation cookbook's recipe named 'setup'.

Slide 13

Applying a Run List

Using a run list will allow us to specify things more 'logically' instead of with paths.

Objective:

- ✓ Individually apply the apache cookbook's server recipe and workstation cookbook's setup recipe
- ❏ Apply both the apache cookbook's server recipe and workstation cookbook's setup recipe

Now we see one recipe at a time being applied. Let's try two at a time.

Slide 14

GL: Apply Both Recipes Locally

```
$ sudo chef-client --local-mode \
  -r "recipe[apache::server],recipe[workstation::setup]"
```

```
[2016-09-15T15:17:27+00:00] WARN: No config file found or specified on
command line, using command line options.
Starting Chef Client, version 12.3.0
resolving cookbooks for run list: ["apache::server","workstation::setup"]
Synchronizing Cookbooks:
  - apache
  - workstation
Compiling Cookbooks...


Running handlers:
[2016-09-15T15:17:30+00:00] ERROR: Running exception handlers
```

Try applying both recipes from both cookbooks again at one time.

Instructor Note: It is important to note that when specifying a run list, recipes defined within it that are separated with a comma should NOT have a space after the comma or it will create an error.

Slide 15

Applying a Run List

Using a run list will allow us to specify things more 'logically' instead of with paths.

Objective:

- ✓ Individually apply the apache cookbook's server recipe and workstation cookbook's setup recipe
- ✓ Apply both the apache cookbook's server recipe and workstation cookbook's setup recipe

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Applying two at a time demonstrates for us that if we need to apply more than one recipe at a time, with a single command, it can be done.

Slide 16

A Succinct Run List

The cookbook only has one recipe that we care about. Could we set that up as the default?

Objective:

❑ Load the workstation cookbook's setup recipe in the default recipe
❑ Apply the workstation cookbook's default recipe
❑ Commit the changes

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Actually, we didn't tell you everything about specifying the run list for the `chef-client` command.

When defining a recipe in the run list you may omit the name of the recipe, and only use the cookbook name, when that recipe's name is 'default'.

Slide 17

Similar to how resources have default actions and default attributes Chef uses the concept of providing sane defaults. This makes our faster when we understand the concepts.

A cookbook doesn't have to have a default recipe but most every cookbook has one. It's called default because when you think of a cookbook it is the recipe that defines the most common configuration policy.

When you think about the two cookbooks that we created -- the apache cookbook with the server recipe and the workstation cookbook with the setup recipe -- it seems like those recipes would be good default recipes for their respective cookbooks.

Slide 18

include_recipe

A recipe can include one (or more) recipes located in cookbooks by using the include_recipe method. When a recipe is included, the resources found in that recipe will be inserted (in the same exact order) at the point where the include_recipe keyword is located.

https://docs.chef.io/recipes.html#include-recipes

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A simple solution would be to rename the setup recipe to the default recipe. However, a better practice would instead leave our recipes as they are and have the default recipe include the recipes with a method called `include_recipe`

This allows us to maintain all the current policies within its own recipe file and that way we can more easily switch our cookbooks default behavior, which can be useful when new requirements surface.

Slide 19

Demo: Including a Recipe

```
include_recipe 'workstation::setup'
```

Include the 'setup' recipe from the 'workstation' cookbook in this recipe

In this example we are including the 'workstation' cookbook's 'setup' recipe.

Demo: Including a Recipe

```
include_recipe 'apache::server'
```

Include the 'server' recipe from the 'apache' cookbook in this recipe

In this example, we are including the 'apache' cookbook's 'server' recipe.

Slide 21

GL: The Default Recipe Includes the Setup Recipe

`~/cookbooks/workstation/recipes/default.rb`

```
#
# Cookbook Name:: workstation
# Recipe:: default
#
# Copyright (c) 2016 The Authors, All Rights Reserved.

include_recipe 'workstation::setup'
```

We are interested in having the default recipe for our workstation cookbook run the contents of the setup recipe.

Within the default recipe, define the `include_recipe` method and provide one parameter, which is the name of our recipe as it appears within a run list: cookbook_name::recipe_name.

Slide 22

A Succinct Run List

The cookbook only has one recipe that we care about. Could we set that up as the default?

Objective:

✓ Load the workstation cookbook's setup recipe in the default recipe
❑ Apply the workstation cookbook's default recipe
❑ Commit the changes

Now when the default recipe is applied it will include the setup recipe. Lets put that to the tst by applying the recipe with 'chef-client'.

Slide 23

GL: Apply the Cookbook's Default Recipe

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

 WARN: No config file found or specified on command line, using command line
options.
Starting Chef Client, version 12.3.0
resolving cookbooks for run list: ["workstation"]
Synchronizing Cookbooks:
  - workstation
Compiling Cookbooks...
Converging 4 resources

Running handlers:
Running handlers complete
Chef Client finished, 0/4 resources updated in 3.300489827 seconds
```

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Use 'chef-client' to locally apply the cookbook named workstation. This will load your workstation cookbook's default recipe, which in turn loads the workstation cookbook's setup recipe.

Slide 24

A Succinct Run List

The cookbook only has one recipe that we care about. Could we set that up as the default?
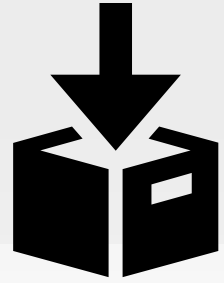
Objective:

- ✓ Load the workstation cookbook's setup recipe in the default recipe
- ✓ Apply the workstation cookbook's default recipe
- ❑ Commit the changes

We made a change to the cookbook. We were able to verify that it applied correctly. Now would be a good time to commit the changes we have made to version control.

Slide 25

COMMIT

GL: Commit Your Work

$ cd cookbooks/workstation
$ git add .
$ git commit -m "Update default recipe to include setup recipe"

CHEF

Slide 26

A Succinct Run List

The cookbook only has one recipe that we care about. Could we set that up as the default?

Objective:

- ✓ Load the workstation cookbook's setup recipe in the default recipe
- ✓ Apply the workstation cookbook's default recipe
- ✓ Commit the changes

Right now specifying the workstation's setup recipe as the default recipe works. In the future we may find that we need to specify a different one as the default.

Slide 27

GL: Return Home

```
$ cd ~
```

Before we begin the next exercise to do similar work for the apache cookbook, return back to the home directory.

Slide 28

Lab: Update the apache Cookbook

- ❑ Update the "apache" cookbook's "default" recipe to:

  Include the 'server' recipe from the 'apache' cookbook

- ❑ Run chef-client and locally apply the run_list: "recipe[apache]"

- ❑ Commit the changes with version control

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In this lab you will update the apache cookbook's default recipe to include the apache cookbook's recipe named server.

Instructor Note: Allow 5 minutes to complete this exercise.

Slide 29

Lab: The Default Recipe Includes the Apache Recipe

`~/cookbooks/apache/recipes/default.rb`

```
#
# Cookbook Name:: apache
# Recipe:: default
#
# Copyright (c) 2016 The Authors, All Rights Reserved.

include_recipe 'apache::server'

```

We are interested in having the default recipe for our apache cookbook run the contents of the server recipe.

Within the default recipe, define the `include_recipe` method and provide one parameter, which is the name of our recipe as it appears within a run list: cookbook_name::recipe_name.

Slide 30

Lab: Applying the apache Default Recipe

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

```
[2016-09-15T15:23:18+00:00] WARN: No config file found or specified on command
line, using command line options.
Starting Chef Client, version 12.3.0
resolving cookbooks for run list: ["apache"]
Synchronizing Cookbooks:
  - apache
Compiling Cookbooks...
Converging 0 resources

Running handlers:
Running handlers complete
Chef Client finished, 0/0 resources updated in 3.310768509 seconds
```

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Use 'chef-client' to locally apply the cookbook named apache. This will load your apache cookbook's default recipe, which in turn loads the apache cookbook's server recipe.

Slide 31

COMMIT

Lab: Commit Your Work
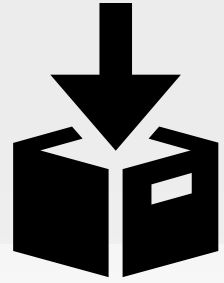
```
$ cd cookbooks/apache
$ git add .
$ git commit -m "Update default recipe to include server recipe"
```

Slide 32

Lab: Update the apache Cookbook

✓ Update the "apache" cookbook's "default" recipe to:

Include the 'server' recipe from the 'apache' cookbook

✓ Run chef-client and locally apply the run_list: "recipe[apache]"

✓ Commit the changes with version control

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Wonderful. Now the apache cookbook's default recipe includes the server recipe. You were able to verify that by applying chef-client with the abbreviated run list. Finally it was a good time to commit the changes that you made.

Slide 33

Discussion

Why would you want to apply more than one recipe at a time?

What are the benefits and drawbacks of using "include_recipe" within a recipe?

Do default values make it easier or harder to learn?

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Answer these questions.

Instructor Note: With large groups I often find it better to have individuals turn to the individuals around them, form groups of whatever size they feel comfortable, and have them take turns asking and answering the questions. When all the groups are done I then open the discussion up to the entire group allowing each group or individuals to share their answers.

Slide 34

What questions can we help you answer?

Generally or specifically about chef-client, local mode, run lists, and include_recipe.

Slide 35