

2: Chef Resources



Slide 2

Objectives

After completing this module, you should be able to:

- Use Chef to install packages on your virtual workstation
- Use the chef-apply command
- Create a basic Chef recipe file
- Define Chef Resources

In this module you will learn how to install packages on a virtual workstation, use the 'chef-apply' command, create a basic Chef recipe file and define Chef Resources.

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DOCS
Resources

A resource is a statement of configuration policy.

It describes the desired state of an element of your infrastructure and the steps needed to bring that item to the desired state.

<https://docs.chef.io/resources.html>

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First, let's look at Chef's documentation about resources. Visit the docs page on resources and read the first three paragraphs.

Afterwards, let us look at a few examples of resources.

Instructor Note: This may sound unusual to ask people to read the documentation site but it is important that they learn to refer to the documentation. This page is an important reference page.

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Example: powershell_script

```
powershell_script 'Install IIS' do
  code 'add-windowsfeature Web-Server'
  action :run
end
```

The powershell_script named 'Install IIS' is run with the code 'add-windowsfeature Web-Server'.

https://docs.chef.io/resource_powershell_script.html

Here is an example of the powershell_script resource. The powershell_script named 'Install IIS' is run with the code 'add-windowsfeature Web-Server'

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Example: service

```
service 'w3svc' do
  action [ :enable, :start ]
end
```

The service named 'w3svc' is enabled (start on reboot) and started.

https://docs.chef.io/resource_service.html

In this example, the service named 'w3svc' is enabled and started.

Service resources are often defined with two actions. The action method can only take one parameter so to provide two actions you need to specify the two actions within an Array.

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Example: file

```
file 'c:\inetpub\wwwroot\Default.htm' do
  content 'Hello, world!'
  rights :read, 'Everyone'
end
```

The file 'c:\inetpub\wwwroot\Default.htm' with the content 'Hello, world!' and grants 'read' rights for 'Everyone'.

https://docs.chef.io/resource_file.html

In this example, the file named 'c:\inetpub\wwwroot\Default.htm' with the content 'Hello, world!' and has allowed Everyone rights to read the file.

The default action for the file resource is to create the file.

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Example: file

```
file '/etc/php.ini.default' do
  action :delete
end
```

The file name '/etc/php.ini.default' is deleted.

https://docs.chef.io/resource_file.html

In this example, the file named '/etc/php.ini.default' is deleted.

Instructor Note: A resource's default action is based on the principle of least surprise. So they are often creative actions towards the system. This is why the file resource specified here has the action specified. It is not the default action.

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Using the `-e` Execute Option



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


```
Usage: chef-apply [RECIPE_FILE] [-e RECIPE_TEXT] [-s]
```

<code>--[no-]color</code>	Use colored output, defaults to enabled
<code>-e, --execute RECIPE_TEXT</code>	Execute resources supplied in a string
<code>-j JSON_ATTRIBS,</code> <code>--json-attributes</code>	Load attributes from a JSON file or URL
<code>-l, --log_level LEVEL</code> <code>fatal)</code>	Set the log level (debug, info, warn, error,
<code>--minimal-ohai</code> <code>need ...</code>	Only run the bare minimum ohai plugins chef
<code>-s, --stdin</code>	Execute resources read from STDIN
<code>-v, --version</code>	Show chef version
<code>-W, --why-run</code>	Enable whyrun mode
<code>-h, --help</code>	Show this message

Let's take a look at the `chef-apply` command. The `chef-apply` command is installed in the Chef Development Kit. It is a command that allows you to apply recipe files, recipe text as a string on the command line (`-e` flag), or even accept input from the STDIN (`-s` flag).

Editors are software and software is delivered to our system through packages. So it seems like you could use the package resource to install our preferred editor.

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Group Exercise: Hello, World?

I heard Chef is written in Ruby. If that's the case its required that we write a quick "Hello, world!" application.

Objective:

- ❑ Create a recipe file that defines the policy that creates a file with the contents of 'Hello, world!'.

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Chef is written in Ruby. Ruby is a programming language and it is required that the first program you write in a programming language is 'Hello World'.

So let's walk through creating a recipe file that creates a file named 'hello.txt' with the contents 'Hello, world!'.

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GE: Create and Open a Recipe File



```
$ atom hello.rb
```

Using your editor open the file named 'hello.rb'. 'hello.rb' is a recipe file. It has the extension '.rb' because it is a ruby file.

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GE: Create a Recipe File Named hello.rb

```
~\hello.rb
```

```
file 'hello.txt' do
  content 'Hello, world!'
end
```

The file named 'hello.txt' is created with the content 'Hello, world!'

<https://docs.chef.io/resources.html>

- Add the resource definition displayed above. We are defining a resource with the type called 'file' and named 'hello.txt'. We also are stating what the contents of that file should contain 'Hello, world!'.

- Save the file and return to the command prompt.

Instructor Note: The default action is to create the file.

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GE: Apply a Recipe File



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

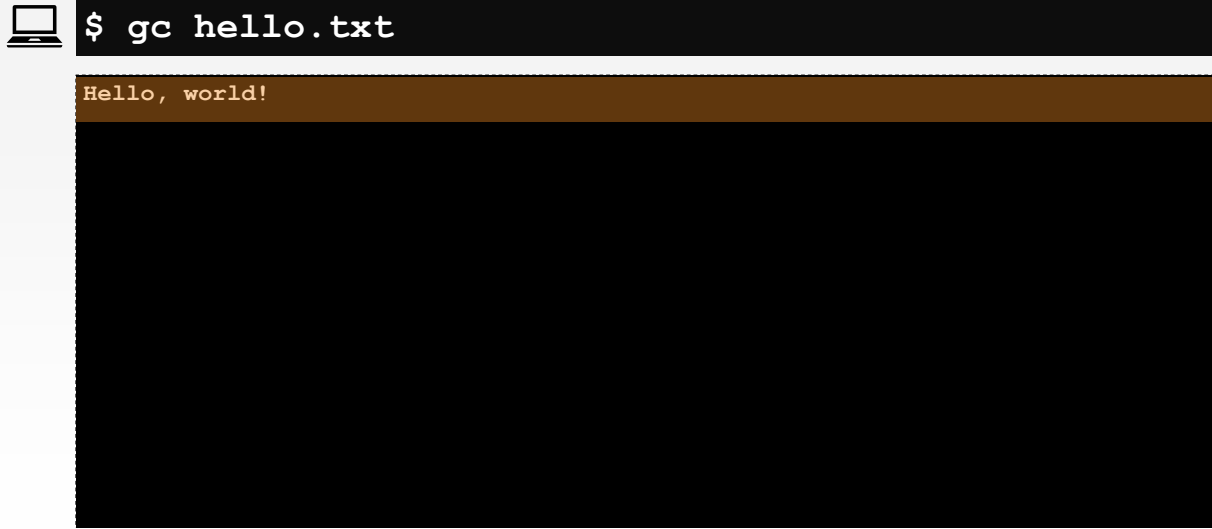
```
Recipe: (chef-apply cookbook)::(chef-apply recipe)
* file[hello.txt] action create
- create new file hello.txt
- update content in file hello.txt from none to 315f5b
--- hello.txt      2015-12-22 18:19:53.000000000 +0000
+++ ./hello.txt20151222-1688-5znmku 2015-12-22 18:19:53.000000000 +0000
@@ -1 +1,2 @@
+Hello, world!
```

Type the specified command to apply the recipe file. You should see that a file named 'hello.txt' was created and the contents updated to include your 'Hello, world!' text.


The output that shows the contents of the file have been modified is being displayed in a format similar to a git diff (<http://stackoverflow.com/questions/2529441/how-to-read-the-output-from-git-diff>).

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GE: What Does hello.txt Say?



A terminal window with a dark background. The prompt is a laptop icon. The command entered is `$ gc hello.txt`. The output is `Hello, world!` on the next line. The rest of the terminal is empty.

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Let's look at the contents of the 'hello.txt' file to prove that it was created and the contents of file is what we wrote in the recipe. The result of the command should show you the contents 'Hello, world!'.

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GE: Test and Repair

What would happen if you ran the command again?

What happens when I run the command again?

Again, before you run the command -- think about it. What are your expectations now from the last time you ran it? What will the output look like?

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GE: Test and Repair

What would happen if the file were removed?

And, of course, what would happen if the file was removed?

At this point you hopefully you are starting to understand the concept of test and repair.

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Lab: Test and Repair

What would happen if the file contents were modified?

- ☐ Modify the contents of 'hello.txt' with your text editor
- ☐ Run the chef-apply command again

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- Modify the contents of 'hello.txt'. Save the file with the new contents.
- Then think about what will happen if you applied this recipe file again.
- Then use `chef-apply` to apply the recipe file again.

Instructor Note: Allow 5 minutes to complete this exercise.

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Test and Repair

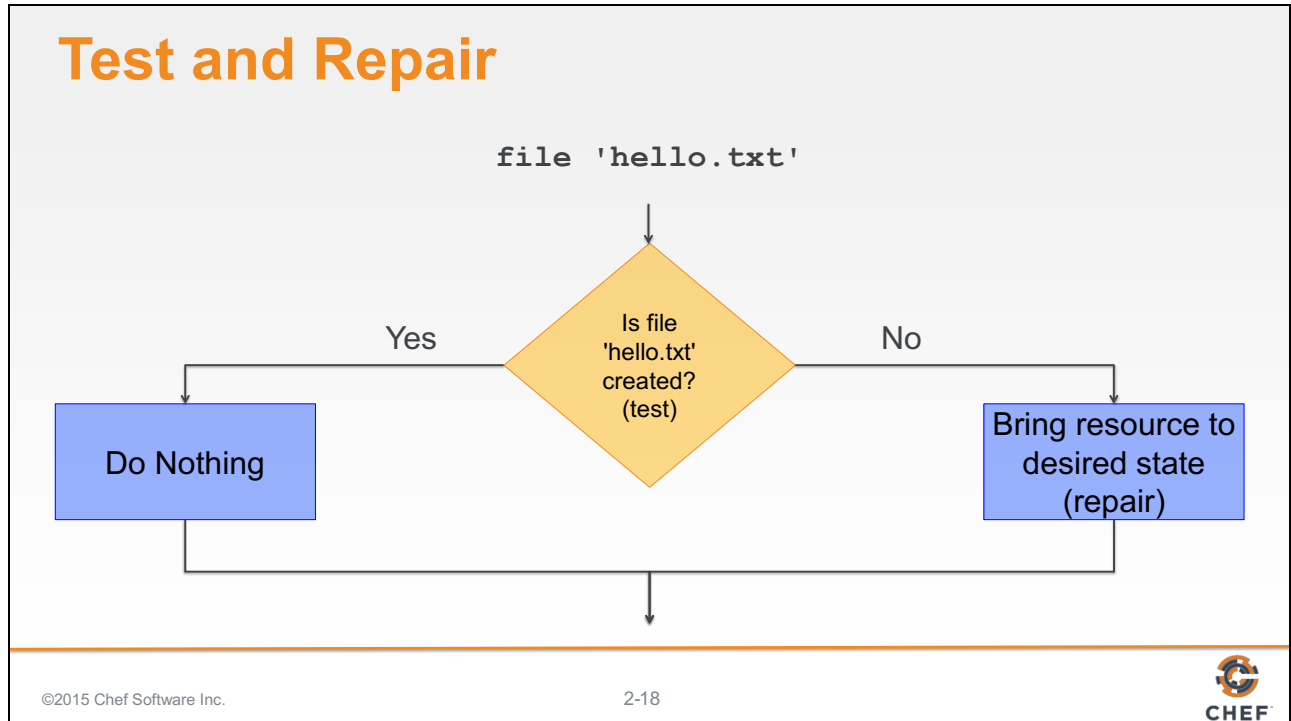
`chef-apply` takes action only when it needs to. Think of it as test and repair.

Chef looks at the current state of each resource and takes action only when that resource is out of policy.

Hopefully it is clear from running the `chef-apply` command a few times that the resource we defined only takes action when it needs to take action.

We call this test and repair. Test and repair means the resource first tested the system before it takes action.

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If the file is already created and not modified, then the resource does not need to take action.

If the file is not created, then the resource **NEEDS** to take action to create the file.
If the file is not in the desired state, then the resource **NEEDS** to take action to modify the file.

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CONCEPT

Resource Definition

```
file 'hello.txt' do
  content 'Hello, world!'
end
```

The **TYPE** named **NAME** should be **ACTION**'d with **ATTRIBUTES**



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Let's take a moment and talk about the structure of a resource definition. We'll break down the resource that we defined in our recipe file.

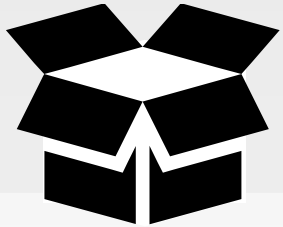
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CONCEPT

Resource Definition


```
file 'hello.txt' do
  content 'Hello, world!'
end
```

The **TYPE** named **NAME** should be **ACTION**'d with **ATTRIBUTES**



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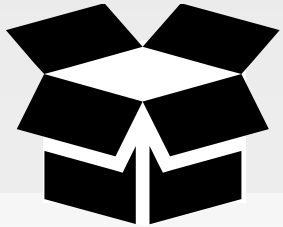


The first element of the resource definition is the resource type. In this instance the type is 'file'. Earlier we used 'package'. We showed you an example of 'service'.

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CONCEPT

Resource Definition




```
file 'hello.txt' do
  content 'Hello, world!'
end
```

The **TYPE** named **NAME** should be **ACTION'd** with **ATTRIBUTES**

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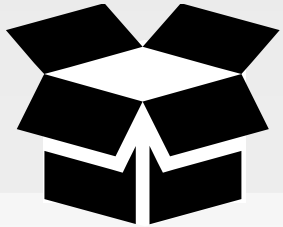
The second element is the name of the resource. This is also the first parameter being passed to the resource.

In this instance the resource name is also the relative file path to the file we want created. We could have specified a fully-qualified file path to ensure the file was written to the exact same location and not dependent on our current working directory.

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CONCEPT

Resource Definition



```
file 'hello.txt' do  
  content 'Hello, world!'  
end
```

The **TYPE** named **NAME** should be **ACTION**'d with **ATTRIBUTES**



The ``do`` and ``end`` keywords here define the beginning of a ruby block. The ruby block and all the contents of it are the second attributes to our resource.

The contents of this block contains attributes (and other things) that help describe the state of the resource. In this instance, the content attribute here specifies the contents of the file.

Attributes are laid out with the name of the attributes followed by a space and then the value for the attribute.

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CONCEPT

Resource Definition

```
file 'hello.txt' do
  content 'Hello, world!'
end
```

?

The **TYPE** named **NAME** should be **ACTION**'d with **ATTRIBUTES**



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The interesting part is that there is no action defined. And if you think back to the previous examples that we showed you, not all of the resources have defined actions.

So what action is the resource taking? How do you know?

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Lab: The `file` Resource

Read <https://docs.chef.io/resources.html>

Discover the `file` resource's:

- default action
- **rights** attribute

Update the `file` policy in "hello.rb" to:

The file named 'hello.txt' is created with 'read' rights for 'Everyone'.

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Find that information in the documentation for the file resource?

- Read through the file Resource documentation.
- Find the list of actions and find the default one.
- Find the list of attributes and find the 'rights' attribute and read a little about it.

The reason for doing this is that we want you to update the file resource in the the recipe file and add the action and add 'read' rights for Everyone.

Instructor Note: Allow 10 minutes to complete this exercise.

Lab: The Updated file Resource

~\hello.rb

```
file 'hello.txt' do
  content 'Hello, world!'
  rights :read, 'Everyone'
  action :create
end
```

This sets the file's rights to allow 'Everyone' access.

The default action is to create (not necessary to define it).

The file resources default action is to create the file. So if that is the policy we want our system to adhere to then we don't need to specify it. It doesn't hurt if you do, but you will often find when it comes to default values for actions we tend to save ourselves the keystrokes and forgo expressing them.

A file resource's rights attribute supports many different rights values. We want to grant Everyone read access. This will allow users that belong to the 'Everyone' group to read the contents of this file.

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Questions

What questions can we answer for you?



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Lab: Goodbye Recipe

Create a recipe file named "goodbye.rb" that defines the policy:

- ❑ The file named 'hello.txt' is deleted.

Use chef-apply to apply the recipe file named "goodbye.rb"

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Now that you've practiced:

- Creating a recipe file
- Creating a file with the file resource

Create a recipe that defines the following resource as its policy. When you are done defining the policy apply the policy to the system.

Instructor Note: Allow 10 minutes to complete this exercise.

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Lab: The Updated file Resource

 ~\goodbye.rb

```
file 'hello.txt' do
  action :delete
end
```

The file resources default action is to create the file. So if we want to remove a file we need to explicitly define the action.

The following policy will delete the 'hello.txt' file when applied.

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Lab: Apply a Recipe File



```
$ chef-apply goodbye.rb
```

```
Recipe: (chef-apply cookbook)::(chef-apply recipe)
* file[hello.txt] action delete
  - delete file hello.txt
```

Type the specified command to apply the recipe file. You should see that a file named 'hello.txt' was deleted.

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Lab: Test that the File was Deleted




```
$ Test-Path hello.txt
```

```
False
```

To test that file was removed from the file system successfully we can run the following command.

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Disable Limited User Account

Managing files is nice but what about Registry keys?

Objective:

- ❑ Create a recipe that disables Limited User Account.

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Managing files is useful but when managing Windows systems we are often more concerned with managing the keys within the registry.

To help setup our system to be more user 'friendly' we want to disable some of the User Access Control (UAC) features that are initially enabled on a Windows system.

GE: Disable the Limited User Account

~\disable-uac.rb

```
system_policies = 'HKLM\Software\Microsoft\Windows\CurrentVersion\Policies\System'

registry_key system_policies do
  values [{
    :name => 'EnableLUA',
    :type => :dword,
    :data => 0
  }]
end
```

Here we are using a new resource named 'registry_key' that takes the name of a registry key. We then provide to the values attribute the values we want to set/insert in the registry. Here we are setting the EnableLUA key to have a dword value of 0. This will make it so that Windows will no longer notify the user when programs try to make changes to the computer. See the following documentation for more information: <https://technet.microsoft.com/en-us/library/ff715520.aspx>.

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GE: Disable the Limited User Account

~\disable-uac.rb

```
system_policies = 'HKLM\Software\Microsoft\Windows\CurrentVersion\Policies\System'

registry_key system_policies do
  values [{
    :name => 'EnableLUA',
    :type => :dword,
    :data => 0
  }]
end
```

Here we are defining a variable named 'system_policies'. With Ruby you can define variables instantly whenever you need them. Here we define this variable to store our registry key in case we need to use the same registry key to set more values.

Instructor Note: The lab that follows this group exercise will use the same registry key so the learner will need to use the variable. The use of the variable here also makes the column length smaller so that the font size on the slide can remain at a reasonable size without the content breaking across multiple lines.

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GE: Apply a Recipe File



```
$ chef-apply disable-uac.rb
```

```
Recipe: (chef-apply cookbook)::(chef-apply recipe)
*
registry_key[HKLM\SOFTWARE\Microsoft\Windows\CurrentVersion\Policies\System]
action create
  - set value {:name=>"EnableLUA", :type=>:dword, :data=>0}
```

Type the specified command to apply the recipe file. This should make a change to the registry key and alert you that you need to restart Windows to disable UAC.

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Lab: Disable Consent Prompt

Update the recipe file named "disable-uac.rb" to also define:

- ❑ The registry_key named
'HKLM\SOFTWARE\Microsoft\Windows\CurrentVersion\Policies\System' has the values:
[{ :name => 'ConsentPromptBehaviorAdmin', :type => :dword, :data => 0 }]

Use chef-apply to apply the recipe file named "disable-uac.rb"

Changing the previous registry key only disables some of UAC. To finish the work return to the recipe file that you created and add another registry resource with the following values.

Instructor Note: Allow 10 minutes to complete this exercise.

GE: Disable the Limited User Account

~\disable-uac.rb

```
system_policies = 'HKLM\Software\Microsoft\Windows\CurrentVersion\Policies\System'

registry_key system_policies do
  # ... ENABLE LUA VALUES (NOT SHOWN HERE TO CONSERVE SPACE)
end

registry_key system_policies do
  values [{
    :name => 'ConsentPromptBehaviorAdmin',
    :type => :dword,
    :data => 0
  }]
end
```

This is the final recipe that contains the two registry keys. This new registry key uses the same variable that we defined before and sets a different values to disable the consent prompt.

Instructor Note: The previous registry key resource is represented here with a comment to allow more space for the new registry key being added.

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Lab: Apply a Recipe File




```
$ chef-apply disable-uac.rb
```

```
Recipe: (chef-apply cookbook)::(chef-apply recipe)
  * registry_key[HKLM\SOFTWARE\Microsoft\Windows\CurrentVersion\Policies\System] action...
  * registry_key[HKLM\SOFTWARE\Microsoft\Windows\CurrentVersion\Policies\System] action...
    - set value {:name=>"ConsentPromptBehaviorAdmin", :type=>:dword, :data=>0}
```


Type the specified command to apply the recipe file. The first registry key should report that it is up-to-date. The second registry key will be updated to disable the consent prompt.

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Let's Talk About Resources

Capture your answers because we're going to talk about them as a group.


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Let's finish this Resources module with a discussion.

Write down or type out a few words for each of these questions. Talk about your answers with each other.

Remember that the answer "I don't know! That's why I'm here!" is a great answer.

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Discussion

What is a resource?

What are some other possible examples of resources?

How did the example resources we wrote describe the desired state of an element of our infrastructure?

What does it mean for a resource to be a statement of configuration policy?


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Answer these four questions:

- What is a resource?
- What are some other possible examples of resources?
- How did the examples resources we wrote describe the desired state of an element of our infrastructure?
- What does it mean for a resource to be a statement of configuration policy?

With your answers, turn to another person and alternate asking each other asking these questions and sharing your answers.


Slide 40



Q&A

What questions can we answer for you?

- chef-apply
- Resources
- Resource - default actions and default attributes
- Test and Repair

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What questions can we answer for you?

About anything or specifically about:

- ``chef-apply``
- resources
- a resources default action and default attributes
- Test and Repair

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