

5 Things You Always Wanted to Know About Chef

But Were Afraid to Ask

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- Technical Community Manager
- Co-host Food Fight Show
- @nathenharvey



- Attribute Precedence
- Encrypted Data Bags
- LWRPs
- Report & Error Handlers
- Testing Your Chef Code
- and more if there's time...

Attribute Precedence





- Attribute is a specific detail about a node
 - IP Address
 - Total Memory
 - URL of third-party service



- Attribute data can come from many places
 - Cookbook
 - Recipe
 - Environment
 - Role
 - Data Bag
 - Ohai

```
"hostname": "server-1",
"fqdn": "server-1.example.com",
"domain": "example.com",
"network": {
  "interfaces": {
    "eth0": {
      "type": "eth",
      "number": "0",
      "encapsulation": "Ethernet",
      "addresses": {
        "00:0C:29:43:26:C5": {
          "family": "lladdr"
        },
        "192.168.177.138": {
          "family": "inet",
          "broadcast": "192.168.177.255",
          "netmask": "255.255.255.0"
        },
        "fe80::20c:29ff:fe43:26c5": {
          "family": "inet6",
          "prefixlen": "64",
          "scope": "Link"
        }
      }
    }
  },
}
```

```
"memory": {
  "swap": {
    "cached": "0kB",
    "total": "4128760kB",
    "free": "4128760kB"
  },
  "total": "2055676kB",
  "free": "1646524kB",
  "buffers": "35032kB",
  "cached": "210276kB",
  "active": "125336kB",
  "inactive": "142884kB",
  "dirty": "8kB",
  "writeback": "0kB",
  "anon_pages": "22976kB",
  "mapped": "8416kB",
  "slab": "121512kB",
  "slab_reclaimable": "41148kB",
  "slab_unreclaim": "80364kB",
  "page_tables": "1784kB",
  "nfs_unstable": "0kB",
  "bounce": "0kB",
  "commit_limit": "5156596kB",
  "committed_as": "74980kB",
  "vmalloc_total": "34359738367kB",
  "vmalloc_used": "274512kB",
  "vmalloc_chunk": "34359449936kB"
},
```

```
"block_device": {
  "ram0": {
    "size": "32768",
    "removable": "0"
  },
  "ram1": {
    "size": "32768",
    "removable": "0"
  },
  "ram2": {
    "size": "32768",
    "removable": "0"
  },
}
```

Ohai!



```
    execute "load sysctl" do
      command "/sbin/sysctl -p"
      action :nothing
    end

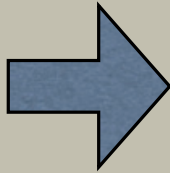
    bytes = node['memory']['total'].split('kB')[0].to_i * 1024 / 3
    pages = node['memory']['total'].split('kB')[0].to_i * 1024 / 3 / 2048

    # adjust shared memory and semaphores
    template "/etc/sysctl.conf" do
      source "sysctl.conf.erb"
      variables(
        :shmmax_in_bytes => bytes,
        :shmall_in_pages => pages
      )
      notifies :run, "execute[load sysctl]", :immediately
    end
```




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Using Ohai Data



```
execute "load sysctl" do
  command "/sbin/sysctl -p"
  action :nothing
end

bytes = node['memory']['total'].split('kB')[0].to_i * 1024 / 3
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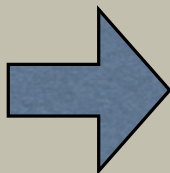
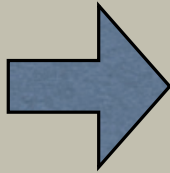
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```

RULE THE CLOUD



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Using Ohai Data



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  )
  notifies :run, "execute[load sysctl]", :immediately
end
```

RULE THE CLOUD

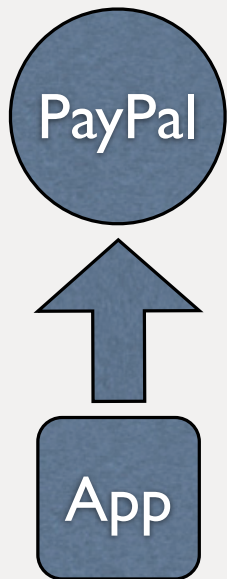


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Environmental Data

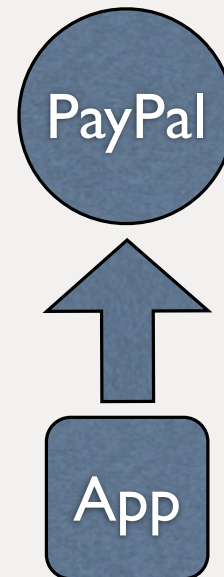
Test

www.sandbox.paypal.com



Production

www.paypal.com



RULE THE CLOUD



```
# File:  environments/production.rb
name "production"
description "Production Environment"
default_attributes "paypal" => {
  "hostname" => "www.paypal.com"
}

# File:  environments/staging.rb
name "staging"
description "Staging Environment"
default_attributes "paypal" => {
  "hostname" => "www.sandbox.paypal.com"
}
```



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Modeling Environmental Data

```
# This file managed by Chef!
```

```
url: https://<%= node['paypal']['hostname'] %>/cgi-bin/webscr
```

RULE THE CLOUD



- Attribute data can come from many places
 - Cookbook
 - Recipe
 - Environment
 - Role
 - Data Bag
 - Ohai

When you combine precedence and merge order, you get the complete picture of node attribute setting

	Attribute Files	Node/Recipe	Environment	Role
Default	1	2	3	4
Force Default	5	6		
Normal	7	8		
Override	9	10	12	11
Force Override	13	14		
Automatic	15			

Encrypted Data Bags





- Variable data stored in JSON
- Stored on and retrieved from the Chef Server
 - (also stored in your source code repository)



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User Data Bag Item

```
{
  "id": "nharvey",
  "groups": [ "sysadmin" ],
  "uid": 2001,
  "shell": "/bin/bash",
  "comment": "Nathen Harvey",
  "nagios": {
    "email": "nathen@opscode.com"
  },
  "ssh_keys" : "ssh-rsa AB3Nza...FVsw== nharvey@opscode"
}
```

RULE THE CLOUD



```
search(:users, "*:*").each do |  
  user_data|  
  
  user user_data['id'] do  
    uid user_data['uid']  
    home user_data['home']  
    shell user_data['shell']  
  end  
  
end
```



- Variable data stored in JSON
- Stored on and retrieved from the Chef Server
 - (also stored in your source code repository)



```
{  
  "id": "database",  
  "username": "awesome_app",  
  "password": "super_sercet1!"  
}
```



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Encrypt the Data

```
$ openssl rand -base64 512 > .chef/encrypted_data_bag_secret
```

```
$ knife data bag create credentials database \  
  --secret-file .chef/encrypted_data_bag_secret
```

RULE THE CLOUD

```
$ knife data bag show credentials database
```

```
id:          database
password:
  cipher:      aes-256-cbc
  encrypted_data: VimII9irDvU7kYNBLiYUVGQYY0RUo9Q2xvairNGbch19aBA/6q/2lbKzHTdo
  mbxB

  iv:          9uBvym60oN5UYF/4A9p40Q==

  version:     1
username:
  cipher:      aes-256-cbc
  encrypted_data: N+GzLZ1nKC3K1BhPXZP8e5s19GHxh0WUIIz/sma9+Jg=

  iv:          Blu9+a2A1CghtFAdEPb1JQ==

  version:     1
```



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Use Encrypted Data in a Recipe

```
creds = Chef::EncryptedDataBagItem.load("credentials", "database")

template "/svr/awesome_app/config/database.yml" do
  variables(
    :username => creds['username'],
    :password => creds['password']
  )
end
```

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LWRPs



- Chef provides a set of **resources** & **providers**



- Declarative specification of policy

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



- Take steps to bring resource in to compliance with policy

```
def action_install
  # If we specified a version, and it's not the current version, move to the
  # specified version
  if !@new_resource.version.nil? && !(target_version_already_installed?)
    install_version = @new_resource.version
    # If it's not installed at all, install it
  elsif @current_resource.version.nil?
    install_version = candidate_version
  else
    Chef::Log.debug("#{@new_resource} is already installed - nothing to do")
    return
  end

  ...
end
```

- Resources
 - Declarative **interface**
- Providers
 - **Implementation**

- Lightweight Resource and Provider
- LWRP
- Custom resource and provider



```
file "/etc/profile.d/myrailsapp.sh" do
  mode "0644"
  content "alias current='cd /svr/myrailsapp/current'"
end

file "/etc/profile.d/h.sh" do
  mode "0644"
  content "alias h='cd ~/'"
end
```



```
magic_shell_alias "current" do
  command "cd /svr/myrailsapp/current"
end

magic_shell_alias "h" do
  command "cd ~/ "
end
```





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Custom Resource

```
actions :add, :remove

default_action :add

attribute :alias_name, :kind_of => String, :name_attribute => true
attribute :command, :kind_of => String, :default => :add
```

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Custom Provider

```
    action :add do
      command_name = new_resource.alias_name.gsub(/ /, "_")
      if !new_resource.command.nil?
        Chef::Log.info("Adding #{command_name}.sh to /etc/profile.d/")
        file_contents = "# This alias was generated by Chef for #{node["fqdn"]}\n"
        file_contents += "alias #{command_name}='#{new_resource.command}'"
        resource = file "/etc/profile.d/#{command_name}.sh" do
          owner "root"
          group "root"
          mode "0755"
          content file_contents
          action :nothing
        end
        resource.run_action(:create)
        new_resource.updated_by_last_action(true) if resource.updated_by_last_action?
      end
    end
  end
```

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- Custom Resource and Provider
 - Interface and Implementation
- Encapsulate common functionality
- http://ckbk.it/magic_shell

Exception & Report Handlers



- Run custom code when chef-client run starts, ends, fails, or succeeds
- Use cases
 - Notify when a chef-client run fails
 - Gather data about chef-client runs



- success? / failed?
- exception
- all_resources
- updated_resources
- elapsed_time
- ...and more!

- Airbrake exceptions
- Campfire handler
- chef-handler-graphite
- Mail report handler
- ...and more

Testing Your Chef Code





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Why test?



Sean Moubry

@ethicalsean



Following

Yep. “Automation that requires rework is the worst thing ever.” —@jschairb #bigrubyconf

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- knife cookbook test



```
$ knife cookbook test website  
checking website  
Running syntax check on website  
Validating ruby files  
Validating templates
```



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Testing Tools

- knife cookbook test
- foodcritic

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- A lint tool for your Opscode Chef cookbooks
- Flag problems in your Chef cookbooks that will cause Chef to blow up when you attempt to converge
- Encourage discussion within the Chef community on the more subjective stuff
 - what does a good cookbook look like?



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Foodcritic

```
$ foodcritic cookbooks/website
```

```
FC006: Mode should be quoted or fully specified when setting file permissions:  
  cookbooks/website/recipes/default.rb:11
```

```
FC008: Generated cookbook metadata needs updating:  
  cookbooks/website/metadata.rb:2
```

```
FC008: Generated cookbook metadata needs updating:  
  cookbooks/website/metadata.rb:3
```

RULE THE CLOUD

- knife cookbook test
- foodcritic
- chefspec



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Chefspec

```
require 'chefspec'

describe 'website::default' do
  chef_run = ChefSpec::ChefRunner.new
  chef_run.converge "website::default"

  it "should install apache package" do
    chef_run.should install_package "apache2"
  end

  it "should create a home page" do
    chef_run.should create_file "/var/www/index.html"
  end
end
```

RULE THE CLOUD



- knife cookbook test
- foodcritic
- chefspec
- Minitest and the Minitest Chef Handler



```
class TestWebsite < MiniTest::Chef::TestCase
  include MiniTest::Chef::Assertions
  include MiniTest::Chef::Context
  include MiniTest::Chef::Resources

  def test_succeed
    assert run_status.success?
  end

  def test_that_the_package_installed
    package("apache2").must_be_installed
  end

  def test_that_the_service_is_running
    service("apache2").must_be_running
  end
end
```



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minitest-handler

```
$ vagrant provision
```

```
[2013-02-01T06:43:34+00:00] INFO: Running report handlers
```

```
Run options: -v --seed 12405
```

```
# Running tests:
```

```
TestWebsite#test_succeed =
```

```
...
```

```
Finished tests in 0.098367s, 60.9959 tests/s, 60.9959 assertions/s.
```

```
6 tests, 6 assertions, 0 failures, 0 errors, 0 skips
```

```
[2013-02-01T06:43:34+00:00] INFO: Report handlers complete
```

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- knife cookbook test
- foodcritic
- chefspec
- Minitest and the Minitest Chef Handler
- why-run



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Why Run

```
$ chef-client --why-run
Starting Chef Client, version 11.4.0
...
Converging 3 resources
  * package[apache2] action install
    - Would install version 2.2.22-1ubuntu1 of package apache2
  * template[/var/www/index.html] action create
    * Parent directory /var/www does not exist.
    * Assuming directory /var/www would have been created
    - Would create template[/var/www/index.html]
  * service[apache2] action start
    - Would start service service[apache2]
  * service[apache2] action enable
    - Would enable service service[apache2]

WARN: In whyrun mode, so NOT performing node save.
Chef Client finished, 4 resources would have been updated
```

RULE THE CLOUD



- Promises, Lies, and Dry-Run Mode
 - <http://bit.ly/guessrun>



- **knife cookbook test** - Verify ruby syntax
- **Foodcritic** - Cookbook linter
- **Chespec** - Unit testing recipes
- **Fauxhai** - Mock all the things
- **Minitest Chef Handler** - post-converge tests
- **Why-run** - Best guess

- **Vagrant** - Local development and testing
- **Test Kitchen** - Cross-platform testing
- **Cucumber Chef** - acceptance & integration testing

Bonus Round





- Using search
- Gradually rolling out cookbook changes
- What's new in Chef 11?
- Global Gotchas!
- Learning Chef
- Chef on Windows
- But I don't know ruby
- Chef vs. ...

Search





- What application servers should be included in my load balancer configuration?
- What host groups should I include in my nagios config?



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Graduating Cookbooks Through Environments





- http://docs.opscode.com/essentials_environments.html
- Pin cookbook versions to specific environments



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Chef 11





- Full API server re-write in Erlang
- Omnibus Chef Server Install
- chef-apply
- partial search
- partials in templates
- Commercial Support



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GLOBAL Gotchas





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GLOBAL Gotchas

- Roles
- Data Bags
- Search

RULE THE CLOUD



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Learning Chef





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Resources

- Hosted Chef
- <http://learnchef.com>
- <http://docs.opscode.com>
- #chef on Freenode IRC

RULE THE CLOUD



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Windows



Chef on Windows?



That's the band Yes

Yes, Chef manages
Windows, too!

RULE THE CLOUD



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Ruby



```
%w{htop dstat strace sysstat gdb tmux tshark}.each do |  
  tool_package|  
    package tool_package  
end
```

```
case platform
when "redhat", "centos", "scientific", "fedora", "suse", "amazon", "oracle"
  default['apache']['package'] = "httpd"
when "debian", "ubuntu"
  default['apache']['package'] = "apache2"
when "arch"
  default['apache']['package'] = "apache"
when "freebsd"
  default['apache']['package'] = "apache22"
end

package node['apache']['package'] do
  action :install
end
```



- http://docs.opscode.com/just_enough_ruby_for_chef.html
- <http://blog.loftninja.org/2011/02/16/the-power-of-chef-and-ruby/>



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Chef vs.





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Mark Imbriaco

@markimbriaco



Following

Pro-tip: Nobody gives a s t about your opinion of Chef vs. Puppet. Seriously. Just f 1g stop it already.

[#usewhatworksforyou](#)

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FAVORITES



11:53 PM - 7 Jul 11



- Using search
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5 or more Things You Always Wanted to Know About Chef

Thank You!

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