



OPS CODE

Chef 101

Speaker:

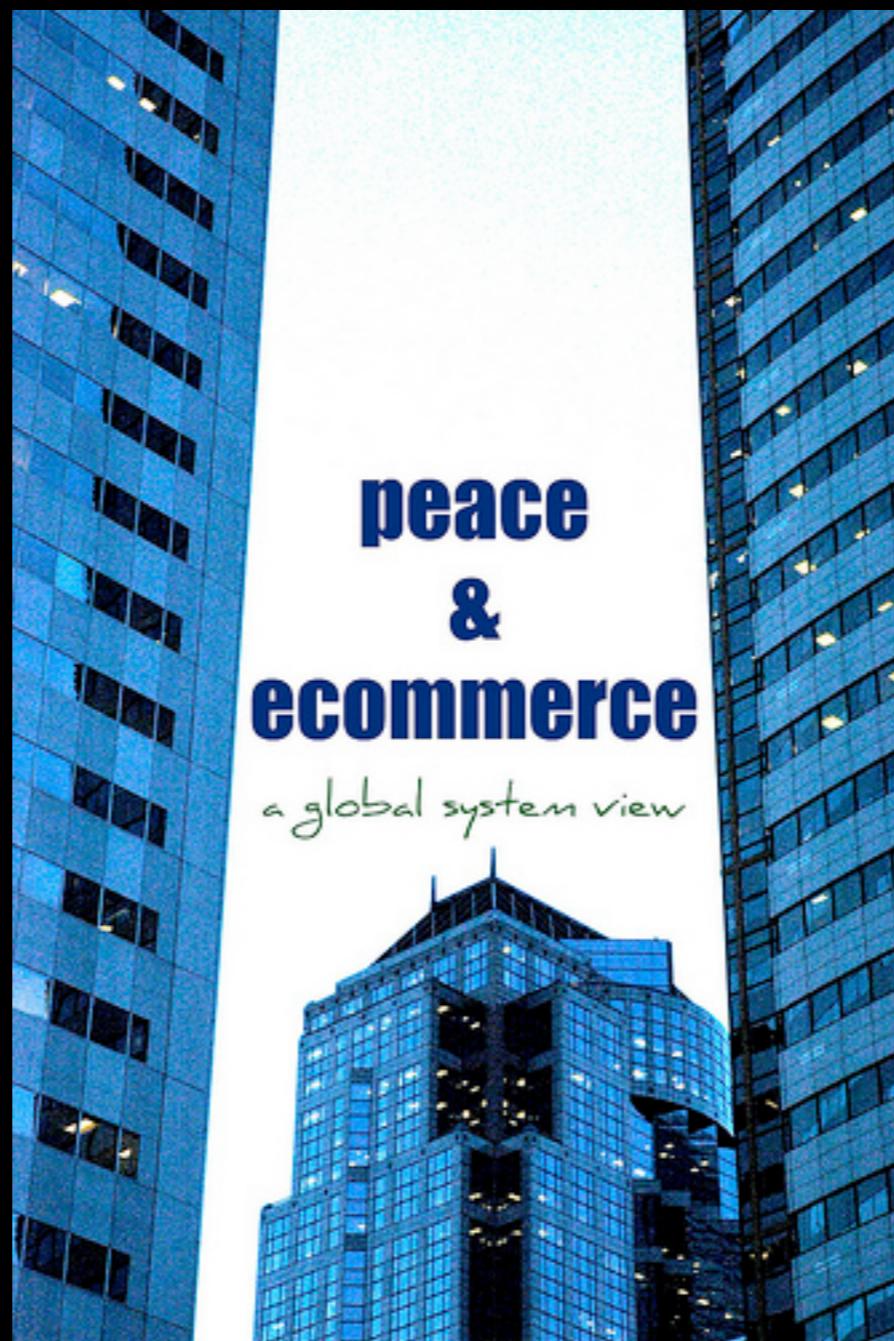
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% whoami

System Administrator Web Operations Training and Support

Infrastructure as Code



<http://www.flickr.com/photos/wonderlane/2306082998/>

Infrastructure as Code is...

A technical
domain revolving
around building
and managing
infrastructure
programmatically



**Enable the reconstruction of
the business from nothing
but a source code
repository, an application
data backup, and bare metal
resources.**

Your Prime Constraint Should Be

The time it
takes to
restore your
application
data



<http://www.flickr.com/photos/visualage/2126833132/sizes/o/>



http://www.brooklynstreetart.com/theBlog/wp-content/uploads/2008/12/swedish_chef_bork-sleeper-cell.jpg

At a High Level...

- A library for configuration management
- A configuration management system
- A systems integration platform
- An API for your entire Infrastructure

Principles

**Idempotent
Reasonability
Sane defaults
Hackability
TMTOWTDI**

A Tour of Chef



Chef Client runs on your systems

They talk to a Chef Server

They can also stand
alone - Chef Solo

We call each system you
configure a **Node**

Nodes have Attributes

```
chef-output.js (/private/tmp) – VIM3
1 {
2   "kernel": { ← Kernel Info
3     "machine": "x86_64",
4     "name": "Darwin",
5     "os": "Darwin",
6     "version": "Darwin Kernel Version 10.3.1: Mon Mar 22 15:13:15 PDT 2010; roo
t:xnu-1504.3.52~1/RELEASE_I386",
7     "release": "10.3.1"
8   },
9   "platform_version": "10.6.3",
10  "fqdn": "latte",
11  "ipaddress": "192.168.0.13", ← My IP Address
12  "platform_build": "10D2094",
13  "domain": null,
14  "os": "darwin",
15  "os_version": "10.3.1",
16  "uptime": "35 days 22 hours 26 minutes 16 seconds",
17  "hostname": "latte", ← My Hostname!
18  "macaddress": "58:b0:35:80:67:76",
19  "uptime_seconds": 3104776,
20  "platform": "mac_os_x"
21 }
```

Attributes are Searchable

```
$ knife search node 'platform:mac_os_x'  
search(:node,'platform:mac_os_x')
```

Nodes have a Run List

What Roles or Recipes to apply
in Order

Nodes have a Run List

```
1 "run_list": [  
2   "role[webserver]",  
3   "role[database_master]",  
4   "role[development]"  
5 ]
```

Nodes have Roles



Roles

Describe what a node should be

```
1 name "webserver"
2 description "Systems that serve HTTP traffic"
3 run_list(
4   "role[base]",
5   "recipe[apache2]",
6   "recipe[apache2::mod_ssl]"
7 )
8
9 default_attributes(
10   "apache2" => {
11     "listen_ports" => [ "80", "443" ]
12   }
13 )
14
15 override_attributes(
16   "apache2" => {
17     "max_children" => "50"
18   }
19 )
```

Roles are Searchable

```
$ knife search role 'max_children:50'  
search(:role,'max_children:50')
```

Roles have a Run List

What Roles or Recipes to apply
in Order

Chef manages Resources on Nodes

A Resource...

- Is of a given **type**.
- Has a **name**.
- Has parameters.
- Takes **actions** to bring the resource to a declared state.

```
20 package "sudo" do
21   version '1.6.8p12'
22   action :install
23 end
```

```
57 service "slapd" do
58   supports [ :restart, :status ]
59   action [:enable, :start]
60 end
```

Is a declarative description of the state you desire a part of your node to be in.

Resources take *action*
through Providers

A Provider...

Knows how to actually perform the actions specified by a resource.

Multiple providers per resource type.

Apt, Yum, Rubygems, Portage, Macports, FreeBSD Ports, etc.

Can be overridden with the **provider** parameter on a resource.

```
33 package "sudo" do
34   provider Chef::Provider::Package::Yum
35   action :install
36 end
```

```
:redhat => {
  :default => {
    :service => Chef::Provider::Service::Redhat,
    :cron => Chef::Provider::Cron,
    :package => Chef::Provider::Package::Yum,
    :mdadm => Chef::Provider::Mdadm
  }
},
```

Resources



Platform



Provider

life

<http://www.flickr.com/photos/acurbelo/2628837104/sizes/o/>

Recipes are lists of Resources

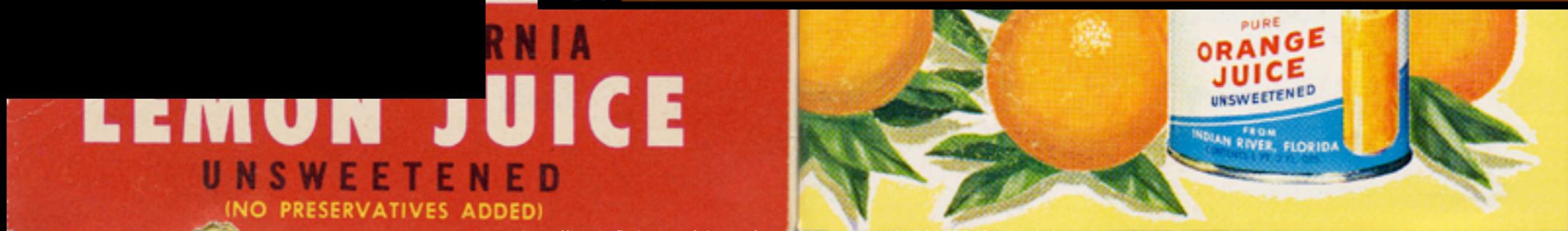
A Recipe...

Applies resources in the order they are specified

- Evaluates resources in the **order** they appear.

```
20 package "sudo" do
21   version '1.6.8p12'
22   action :install
23 end
24
25 template "/etc/sudoers" do
26   source "sudoers.erb"
27   mode 0440
28   owner "root"
29   group "root"
30   variables(
31     :sudoers_groups =>
32       node[:authorization][:sudo][:groups],
33     :sudoers_users =>
34       node[:authorization][:sudo][:users]
35   )
36 end
```

1
2



<http://www.flickr.com/photos/roadsidepictures/2478953342/sizes/o/>

Resource Collection...

- Adds each resource object to the **Resource Collection**

```
38 [  
39  1"package[sudo]",  
40  2"template[/etc/sudoers]"  
41 ]
```

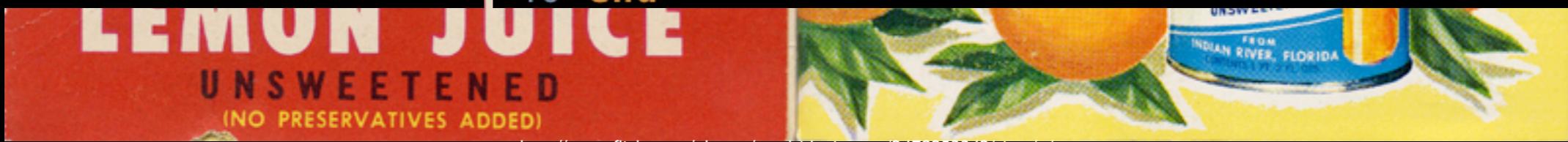
Order Matters

A Recipe...

Applies resources in the order they are specified

- Can **include** other recipes.
- Is just **Ruby**.

```
20 appname = "radiant"
21
22 require "chef-deploy"
23
24 include_recipe "git"
25 include_recipe "sqlite"
26 include_recipe "rails"
27 include_recipe "apache2"
28 include_recipe "apache2::mod_rewrite"
29 include_recipe "apache2::mod_rails"
30
31 gem_package "sqlite3-ruby"
32
33 %w{config log pids sqlite system}.each do |dir|
34   directory "/srv/#{appname}/shared/#{dir}" do
35     recursive true
36     owner "railsdev"
37     group "railsdev"
38     mode "0775"
39   end
40 end
```



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Cookbooks are
packages for Recipes

Cookbooks

**Distributable
Infrastructure as Code
Version control repository**

Common Cookbook Components

Recipes

Assets (files/templates)

Attributes

Metadata

Cookbooks are shareable!

The screenshot shows a search interface with the query 'category:"Databases"'. Below the search bar, the results are displayed for the category 'Cookbooks'. Two cookbooks are listed:

- mysql**:
Rating: ★★★★☆ (1 rating)
Category: Databases
Description: Installs and configures mysql for client or server
Downloads: 578
Followers: 14
Platforms: debian, ubuntu
- database**:
Rating: ★★★★☆ (0 ratings)
Category: Databases
Description: Sets up the database master or slave
Downloads: 19
Followers: 0

Working with Chef

Workflow

Create repository
Download / write cookbooks
Interact with API
Configure systems

Chef Repository

```
git clone git://github.com/opscode/chef-repo.git  
ls chef-repo  
README  
Rakefile  
certificates/  
config/  
cookbooks/  
roles/  
site-cookbooks/
```



OPSCODE

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Search

Advanced Search[+ Add a new cookbook](#)

Browse Categories



Databases



Web Servers



Process Management



Monitoring & Trending



Programming Languages



Package Management



Applications



Networking



Operating Systems & Virtualization



Utilities



Other

Alpha

This site is currently in Alpha.
Please use the feedback
widget to the right to let us
know what you think.

Need Help?

If you have questions, or you're
stuck, we're here to help.

[Get Help ▾](#)

Popular Tags

Ruby db dns logs **opscode**
rails security ssh ubuntu web



Writing recipes

- ▶ **Determine data required about nodes**
- ▶ **Create declarative resources**
- ▶ **Create the needed assets**

Required Data

Application data

- ▶ **Source repository**
- ▶ **Deploy keys**
- ▶ **Roles of application stack servers**
- ▶ **Configurable attributes**

Declarative Resources

Packages

- ▶ `package "apache2"`
- ▶ `gem_package "rails"`

Configuration Files

- ▶ `template "/srv/my_app/shared/database.yml"`
- ▶ `template "/etc/unicorn/my_app.rb"`

Required Assets

cookbooks/my_app:

- ▶ **templates/default/database.yml.erb**
- ▶ **templates/default/unicorn.rb.erb**

API Interaction

Upload cookbooks

Create/assign roles

Manage systems

OSCON 2010

Automated Infrastructure is on the Menu with Chef

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- ▶ [@jtimberman, joshua@opscode.com](mailto:jtimberman@opscode.com)