Using Policyfiles

YoloVer as a Workflow

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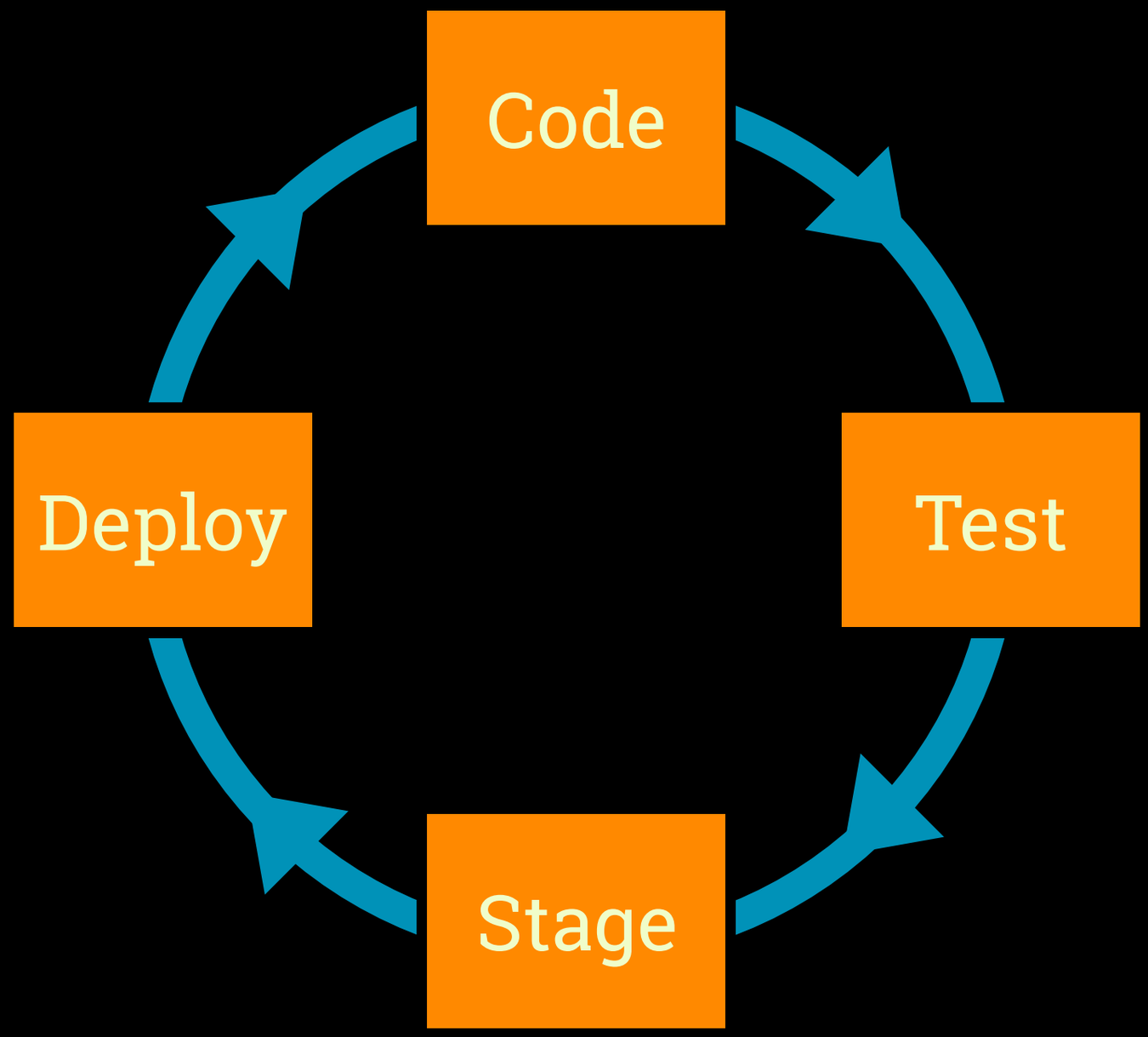
tl;dr

Workflow



New Words

- chef Command – Part of ChefDK, like knife
- Policyfile – Source code for a policy
- Policy Name – Replaces role, web/db/etc
- Policy Group – Replaces env, SN1/2/etc
- Compiled Policy – Snapshot of a policy

Smile for the Camera


```
{
  "revision_id": "288ed244f8db8bff3caf58147e840bbe079f76e0",
  "name": "demo_policy",
  "run_list": ["recipe[demo::default]"],
  "cookbook_locks": {
    "demo": {
      "version": "1.0.0",
      "identifier": "f04cc40faf628253fe7d9566d66a1733fb1afbe9",
      "dotted_decimal_identifier": "67630690.23226298.2550585",
      "source": "cookbooks/demo",
      "cache_key": null,
      "scm_info": null,
      "source_options": {"path": "cookbooks/demo"}
    }
  }
}
```

… And Push It Over There

- `chef install`
- Compile and download
- `chef push`
- Upload to Chef Server

Policyfile.rb

Policyfile.rb

```
name "kafka"

default_source :community

run_list "base", "kafka::server"
```

Run Lola Run

```
run_list "foo"

run_list ["foo", "bar"]

# Same as above
run_list "foo", "bar"
```

Marathon Man

```
named_run_list :deploy, "app::deploy"
```

```
$ chef-client -n deploy

# Doesn't work anymore
$ chef-client -o "recipe[app::deploy]"
```

Alice's Restaurant

```
cookbook "monit"
cookbook "monit", "1.0.0"
cookbook "monit", "~> 1.0"

cookbook "monit", path: "../chef-monit"
cookbook "monit", github: "poise/monit"
cookbook "monit", git: "https://…"
```

The Usual Suspects

```
default_source :community

default_source :supermarket, "http://…"

default_source :chef_server, "http://…"

default_source :chef_repo, "../"
```

Lone Star

```
default_source :… do |s|
  s.preferred_source_for "monit", "…"
end
```

M*A*S*H

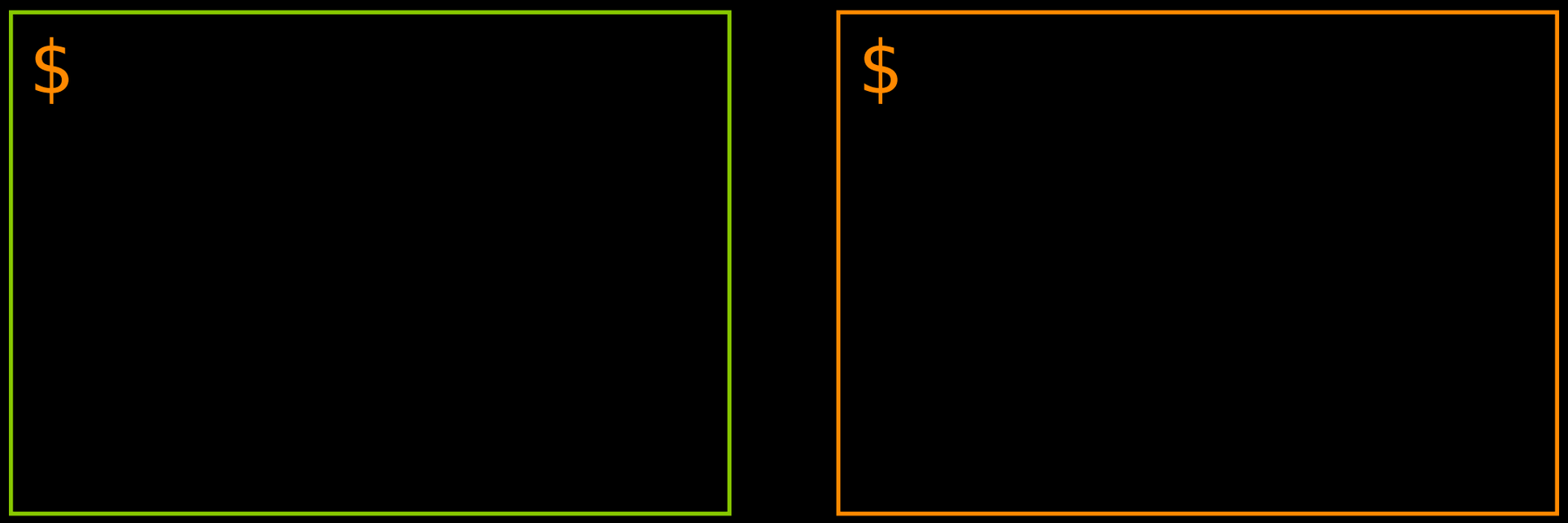
```
default["myapp"]["root"] = "/app"

override["monit"]["port"] = 8080
```

Bleeding Edge

The Talking Stick

- There is only one pipeline
- Multiple releases must be mutex-d

The Talking Stick



S1

S2

S3

The Talking Stick

```
$ chef install
Policy compiled
$ chef push s1
```

```
$
```

S1

S2

S3

The Talking Stick

```
$ chef install
Policy compiled
$ chef push s1
$ chef push s2
```

```
$
```

S1

S2

S3

The Talking Stick

```
$ chef install
Policy compiled
$ chef push s1
$ chef push s2
```

```
$ chef install
Policy compiled
$ chef push s1
$ chef push s2
$ chef push s3
```

The Talking Stick

```
$ chef install
Policy compiled
$ chef push s1
$ chef push s2
$ chef push s3
```

```
$ chef install
Policy compiled
$ chef push s1
$ chef push s2
$ chef push s3
```

S1

S2

S3

The Talking Stick

- For now: make sure no one else is deploying
- Future: Deploy UI may help lock clusters
- Situational awareness is required

Environment Attributes

- default/override in the policy act like role attires
- No specific support for group-level values

Nesting

```
# Policyfile.rb
default["SN1"]["app"]["dbhost"] = "…"
default["SN2"]["app"]["dbhost"] = "…"

# recipes/default.rb
node[node.policy_group]["app"]["dbhost"]
```

Hoisting

```
# Policyfile.rb
default["SN1"]["app"]["dbhost"] = "…"
default["SN2"]["app"]["dbhost"] = "…"

# attributes/default.rb
default.update(default[node.policy_group])
```

Data Bag

```
# attributes/default.rb
item = DataBagItem.load("env",
                        node.policy_group)
default.update(item.raw_data)
```

Base Role

```
# base.rb
default_source :community
run_list "base"
default["key"] = "value"

# Policyfile.rb
instance_eval(IO.read("base.rb"))
name "web"
run_list << "web"
```

Partial Updates

- `chef update` can only regenerate a policy
- Planned for the future
- Use `chef diff` for safety

Danger Zone

- LANA, LANAAAAAAAAAAA
- New, fresh, well-tested
- Growing quickly

Trouble Spots

- Single pipeline
- Group-level attributes
- Shared base configuration
- Partial updates
- Young tooling

Order's Up

Release Process

- Update cookbook version
- Make a git tag
- Maybe push to (internal?) Supermarket
- Push to Chef Server organization
- Update Chef environments in order
- Repeat for each changed cookbook

SemVer FTW!

- Allows looser environment restrictions (~> 1.0)
- Better control for other teams
- More semantic info for UI/tools
- Warm and fuzzy feelings

More Like LameVer

- Mental overhead to establish "compatible"
- Ensure all dependencies are released in order
- Must have linearized x.y.z versions
- No concurrent git branches or pre-releases

I Don't Wanna

YoloVer

- Policyfile(s) linked directly to git
- Use a cookbooks/ folder if desired
- `chef install/update` to take a new snapshot
- `chef push` to deploy to stages

Example Repo

```
$ ls .
cookbooks/ policies/

$ ls cookbooks
bb-kafka/ bb-graphite/ bb-collectd/

$ ls policies/
db.rb frontend.rb
```

policies/db.rb

```
name "db"

default_source :community
default_source :chef_repo, ".."
cookbook "clojure", github: "…/clojure"

run_list "clojure", "git", "bb-kafka"
```

More?

Local development with the policyfile-zero provisioner and Test Kitchen.

replace env cookbook pattern

Mise en Place

Kitchen

- Test Kitchen with policyfile_zero
- Testing policies, not cookbooks
- Use ChefDK or install chef-dk

.kitchen.yml

```
driver:
  name: vagrant

platforms:
- name: ubuntu-14.04
- name: centos-7

suites:
- name: default
- name: other
```

Test Matrix

	ubuntu-14.04	centos-7
default	default-ubuntu-1404	default-centos-7
other	other-ubuntu-1404	other-centos-7

policyfile_zero

```
provisioner:
  name: policyfile_zero
  policyfile: policies/web.rb
```

Named Run Lists

```
suites:
  - name: default
  - name: other
    provisioner_config:
      named_run_list: other
```

Double check this works

Multiple Policies

```
suites:
- name: default
- name: db
  provisioner_config:
    policyfile: policies/db.rb
```

Kitchen Basics

```
$ kitchen converge

$ kitchen converge other

$ kitchen converge default.*

$ kitchen destroy
```

Example

```
driver:
  name: vagrant

provisioner:
  name: policyfile_zero
  policyfile: policies/db.rb

platforms:
- name: centos-7

suites:
- name: default
```

Check platform the monitoring team is using

Remodeling

Role

```
# roles/app.rb
name "app"
run_list [
  "recipe[base]",
  "recipe[app]"
]

default_attributes(
  "app" => {"port" => 8080},
)
```

Role Cookbook

```
# metadata.rb
name "role-app"
depends "base"
depends "app"
```

```
# attributes/default.rb
default["app"]["port"] = 8080

# recipes/default.rb
include_recipe "base"
include_recipe "app"
```

Role Policy

```
# policies/app.rb
name "app"
default_source :community
run_list "base", "app"

default["app"]["port"] = 8080
```

Environment

```
# environments/prod.rb
name "prod"
cookbook_versions({
  "postgresql" => "3.4.20",
})

default_attributes({
  "postgresql" => {
    "dir" => "/data",
  },
})
```

Env Cookbook

```
# metadata.rb
name "env-prod"
depends "role-app"
depends "postgresql", "3.4.20"

# attributes/default.rb
default["postgresql"]["dir"] = "/data"

# recipes/app.rb
include_recipe "role-app"
```

Env Policy

```
# policies/app.rb
name "app"
default_source :community
run_list "base", "app"

cookbook "postgresql", "3.4.20"
default["app"]["port"] = 8080
default["postgresql"]["dir"] = "/data"

# Upload to prod group
$ chef push prod policies/app.rb
```

Env Policy

```
# policies/_prod.rb
cookbook "postgresql", "3.4.20"
default["postgresql"]["dir"] = "/data"
```

```
# policies/app.rb
path = File.expand_path("../_prod.rb",
                        __FILE__)
instance_eval(IO.read(path))
name "app"
# …
```

Wrapper Cookbook

```
# metadata.rb
name "company-postgresql"
depends "postgresql", "3.4.20"
```

```
# recipes/default.rb
include_recipe "postgresql"

# recipes/server.rb
include_recipe "postgresql::server"
```

END OF CURRENTLY WRITTEN SLIDES

Chef Push

Discuss the chef push command and how to use it.

What baseline are we starting from?

A: Name-level familiarity but teaching from scratch.

Household Staff

Jenkins, CI, maybe ChefSpec and InSpec?

Testing Tools

- ChefSpec – Unit testing
- Test Kitchen – Integration testing
- InSpec – Integration/acceptance testing

Unit Testing

- Test a single unit of logic (recipe, resource)
- Mock/stub at unit boundaries
- Ensure isolation between tests
- Move fast and break things

Unit Testing

- Edge cases
- Complex inputs
- Regression checks

Integration Testing

- Test the integration of multiple units
- Check side effects
- Slower, but closer to real life

Integration Testing

- Real world use cases
- Performance tests (sometimes)

ChefSpec

- RSpec 4lyfe
- Really runs Chef
- Provider stubs, `step_into` specific providers
- Stub helpers for data_bags, search, commands

Test Kitchen

- Create a fresh virtual machine
- Install and run Chef
- Run verification tests via InSpec
- Uses Policyfile via policyfile_zero plugin

RSpec

RSpec

```
describe "a thing" do
  it "is a thing" do
    expect(1).to eq 1
  end
end
```

Describe

```
describe MyClass do
  # ...
end

describe "label" do
  # ...
end
```

Context

```
describe "a thing" do
  context "with A" do
    # …
  end
  context "with B" do
    # …
  end
end
```

It

```
it "works" do
  expect(val).to …
end

it { expect(val).to … }
```

All Together

```
describe "addition" do
  context "with 1" do
    it { expect(1+1).to eq 2 }
  end
  context "with 2" do
    it { expect(2+2).to eq 4 }
  end
end
```

Point out that I have no "it" labels here

Running

- Put that in spec/thing_spec.rb
- $ chef exec rspec

Expectations

```
expect(value).to matcher
```

eq Matcher

Point out function-y nature just this once.

```
expect(value).to eq(other)
```

```
expect(1).to eq 1

expect("a").to eq "a"
```

to_not Mode

Quick diversion, not a matcher but a matcher mode

```
expect(1).to_not eq 2

expect("a").to_not eq "b"
```

be Matcher

```
expect(1).to be > 0

expect(-1).to be < 0

expect(0).to be == 0
```

Same as eq matcher

Boolean Matchers

```
expect(nil).to be_nil

expect(true).to be true
expect(false).to be false

expect(1).to be_truthy
expect(nil).to be_falsey
```

String Matchers

```
expect("abc").to include "a"

expect("abc").to match /a.c/

expect("abc").to start_with "a"

expect("abc").to end_with "c"
```

Class Matchers

```
expect("a").to be_a String

expect(1).to be_an Integer
```

Error Matchers

Point out the block here

```
expect { myfunc() }.to raise_error

…to raise_error ArgumentError

…to raise_error /message/
```

Subject

```
describe "a thing" do
  subject { 1 }
  it do
    expect(subject).to eq 1
  end
end
```

Is Expected

```
describe "a thing" do
  subject { 1 }
  it do
    is_expected.to eq 1
  end
end
```

Should (Okay)

```
describe "a thing" do
  subject { 1 }
  it do
    should eq 1
  end
end
```

Should (Not Okay)

```
describe "a thing" do
  subject { 1 }
  it do
    subject.should eq 1
  end
end
```

Let

```
describe "a thing" do
   let(:myval) { 1 }
   it do
      expect(1+myval).to eq 2
   end
end
```

Complex Let

```
describe "a thing" do
  subject { val + 1 }
  context "with 1" do
    let(:val) { 1 }
    it { is_expected.to eq 2 }
  end
  context "with 2" do
    let(:val) { 2 }
    it { is_expected.to eq 3 }
  end
end
```

Before

```
describe "a thing" do
  before do
    puts "BEFORE!"
  end
  it { … }
end
```

Before Timing

```
before(:each) { … }

before(:all) { … }
```

Other Hooks

```
before { … }
```

```
after { … }
```

```
around {|ex| …; ex.run; … }
```

Mention timing works on all of them

Spec Helper

```
# spec/spec_helper.rb
require "…"

RSpec.configure do |config|
  # …
end
```

Spec Helper

```
# spec/thing_spec.rb
require "spec_helper"

describe …
```

Lab?

Mocks

- Helpers for faking out methods
- Avoid "dangerous" call (IO.write, shell_out)
- Call without depending on internals (unit isolation)

Mocks

```
allow(IO).to receive(:read)

expect(IO).to receive(:read)
```

Argument Matchers

```
… receive(:read).with("/foo")

… receive(:read).with(match /foo.*/)
```

Return Value

```
… receive(:read).and_return("lorem")

… receive(:read) {|path| "lorem" }
```

Doubles

```
double()

double(method: "1")

double("label", method: "1")
```

Doubles

```
double(x: 1).x == 1
```

```
fake = double
expect(fake).to receive(:x) { 1 }
```

Default mode is allow

Example

```
describe MyLib do
  let(:node) do
    double(name: "test.example",
           chef_environment: "prod")
  end
  subject { MyLib.myfunc(node) }
  it { is_expected.to eq … }
end
```

Example

```
describe "myfunc" do
  subject { myfunc("foo", "abc") }
  it do
    expect(IO).to receive(:write) \
                  .with("/foo", "abc")
    subject
  end
end
```

Explain expect mock before subject

Example

```
describe "myotherfunc" do
  subject { myotherfunc("bar") }
  before do
    allow(IO).to receive(:read) \
    .with("/bar").and_return("abc")
  end
  it { is_expected.to eq "abc" }
end
```

ChefSpec

ChefSpec

```ruby
# spec/spec_helper.rb
require "chefspec"
require "chefspec/policyfile"
```

```ruby
# Policyfile.rb
name "cookbookname"
run_list name
default_source :community
cookbook name, path: "."
```

Runner

```
subject do
  ChefSpec::SoloRunner.converge("name")
end
```

Basics

```
describe "myrecipe" do
  subject do
    ChefSpec::SoloRunner.converge("myrecipe")
  end

  it { is_expected.to … }
end
```

Matchers

```
…to ACTION_RESOURCE(NAME)
…to install_package("nginx")
…to create_user("myapp")
```

With

```
.with(prop: val, prop: val)

install_package("nginx").with(version: "1.2")
create_user("myapp").with(group: "nogroup")
```

Team Players

How this workflow operates with a team.