Chef and Solaris

Stephen Nelson-Smith
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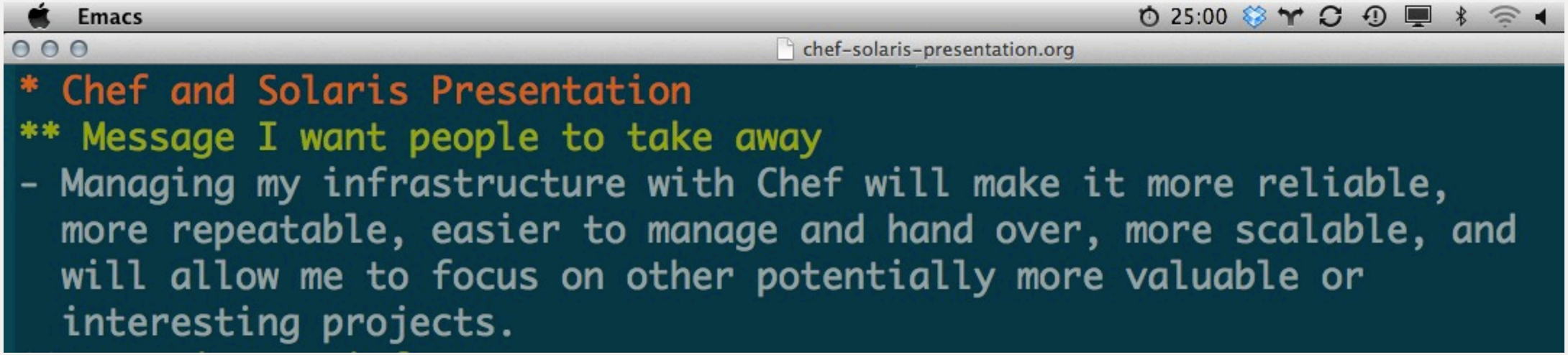
The Message



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The Messanger

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Solaris System Administrator since 1996

Ruby Programmer

Managed Solaris-based internet infrastructures for some of the largest UK and US companies (Diageo, British Gas, Motorola, Novartis)

Founded Atalanta Systems 6 years ago, still Principal Consultant and non-executive director

Joined Opscode March 2012 to enhance Solaris support

Overview of Chef

What is this thing again?

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Applications

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http://www.flickr.com/photos/kky/704056791/

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Infrastructure

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Collection of Resources

- Nodes
- Networking
- Files
- Directories
- Symlinks
- Mounts
- Routes
- Users
- Groups
- Tasks
- Packages
- Software
- Services
- Configurations
- Stuff

http://www.flickr.com/photos/stevekeys/3123167585/

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Acting in concert

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http://www.flickr.com/photos/glowjangles/4081048126/

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To provide a Service

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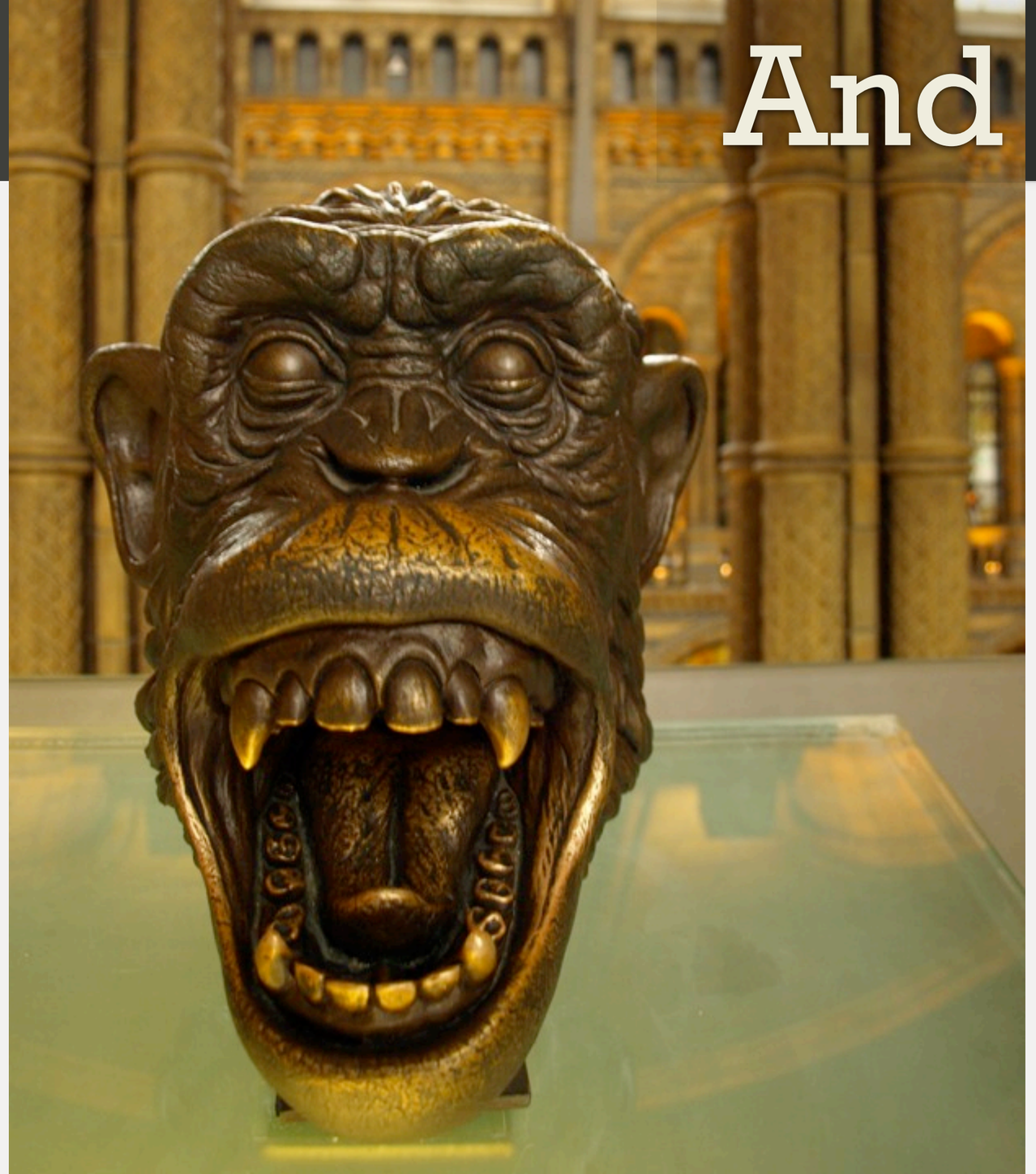
And it *evolves*



http://www.flickr.com/photos/16339684@N00/2681435235/

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See Node

Application

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See Nodes

Application

Application Database

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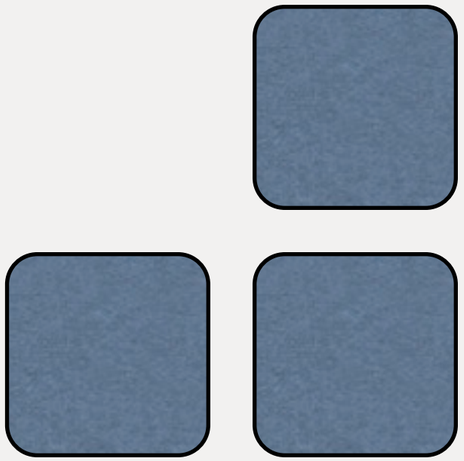
See Nodes Grow



Application

App Databases

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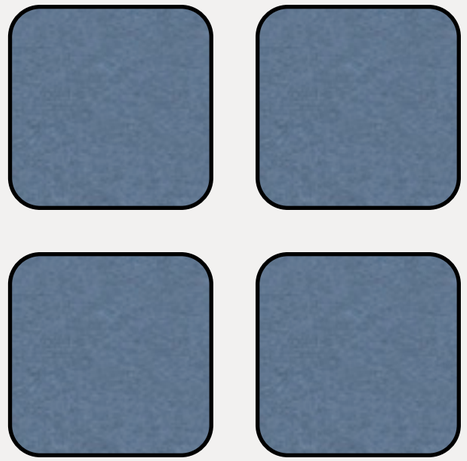
See Nodes Grow



App Servers

App Databases

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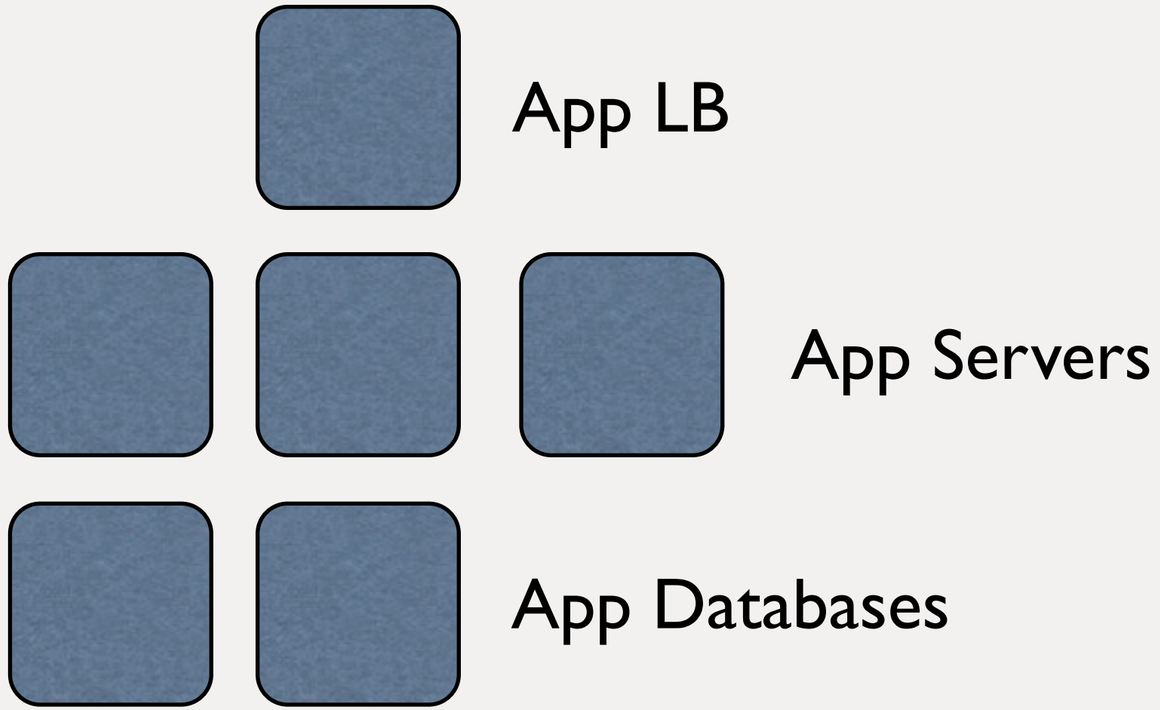
See Nodes Grow



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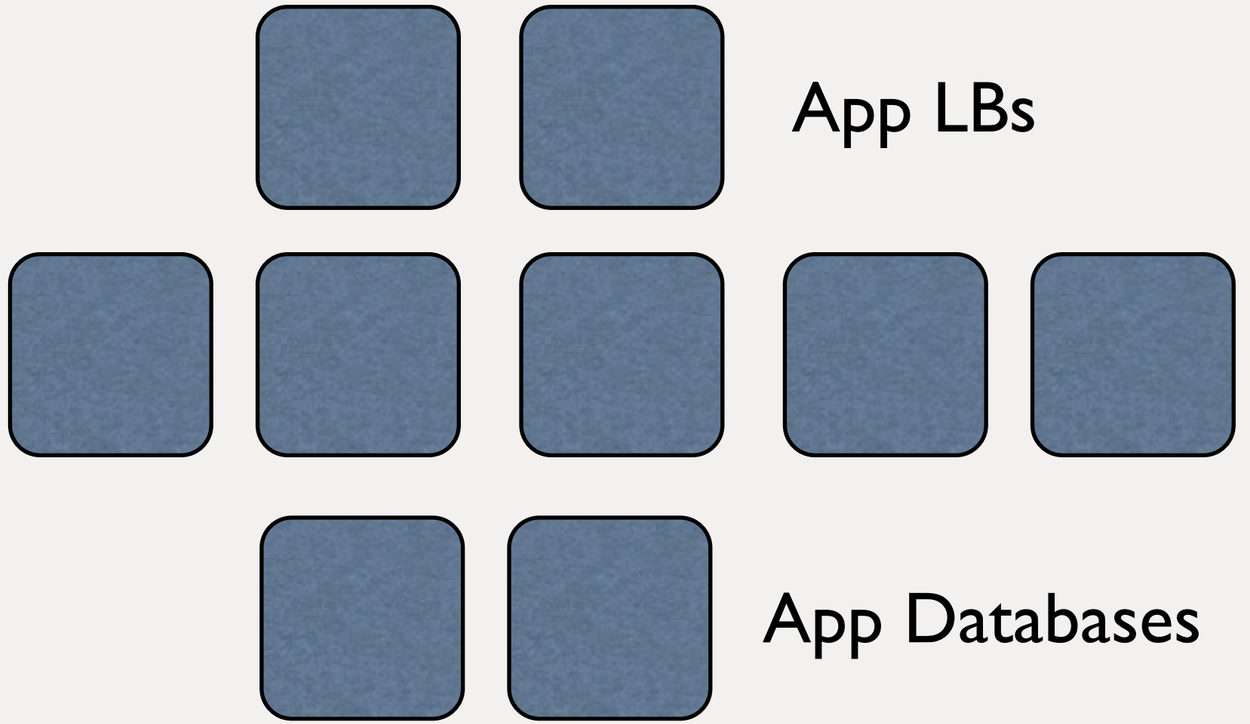
See Nodes Grow



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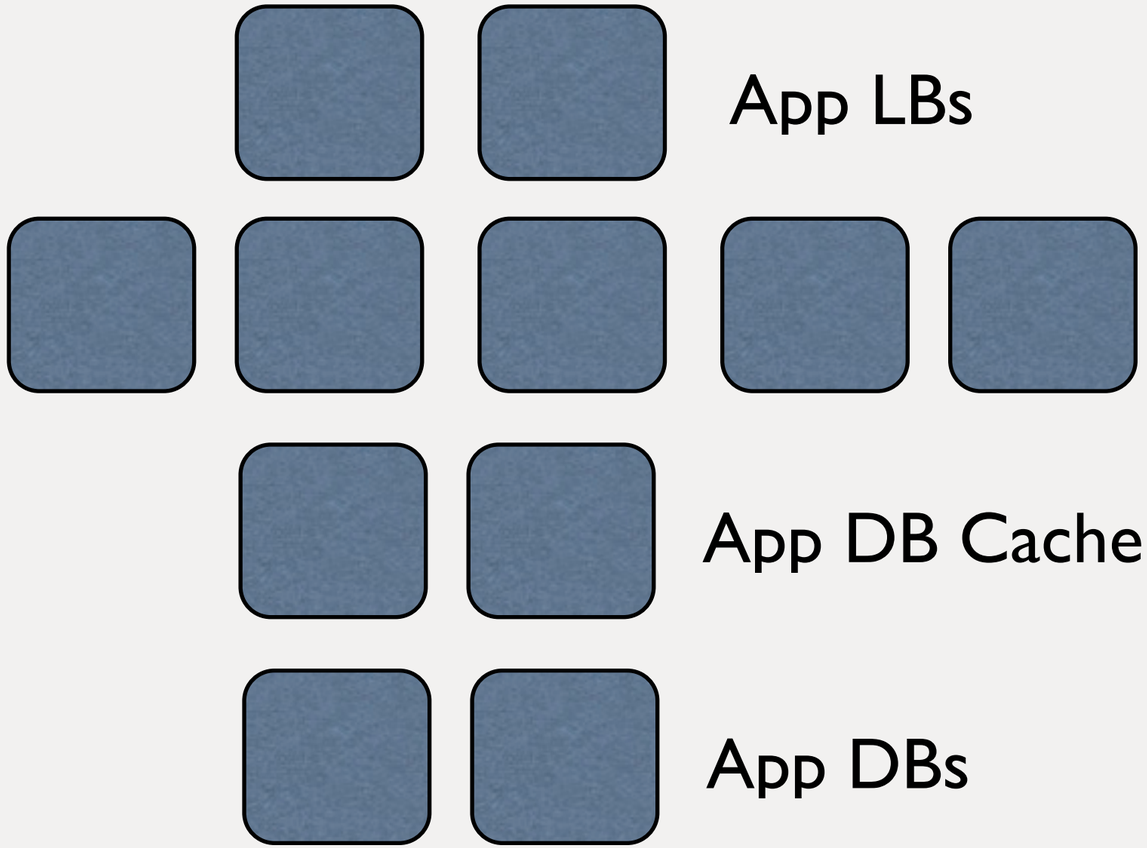
See Nodes Grow



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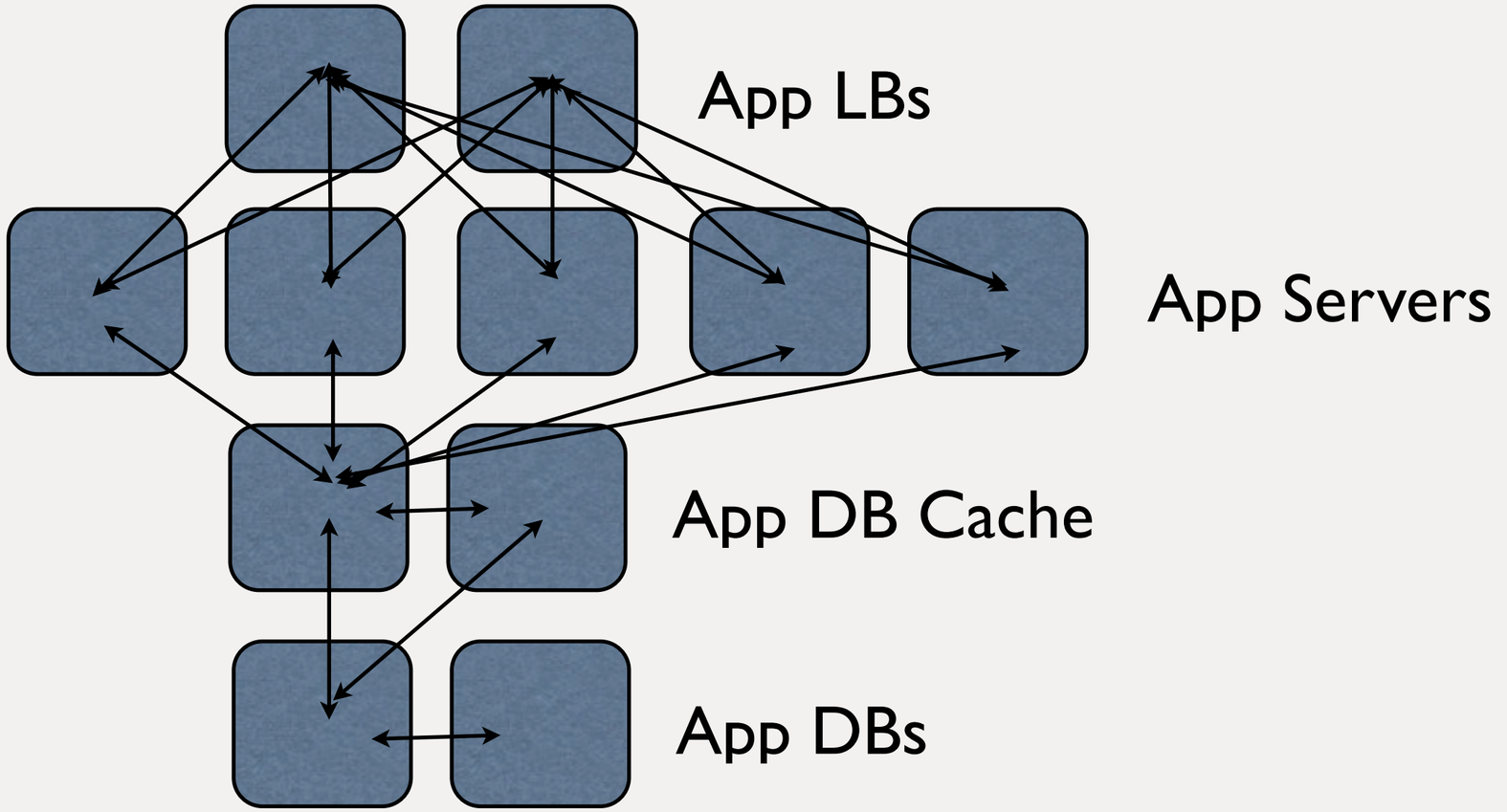
Stitched together with configs



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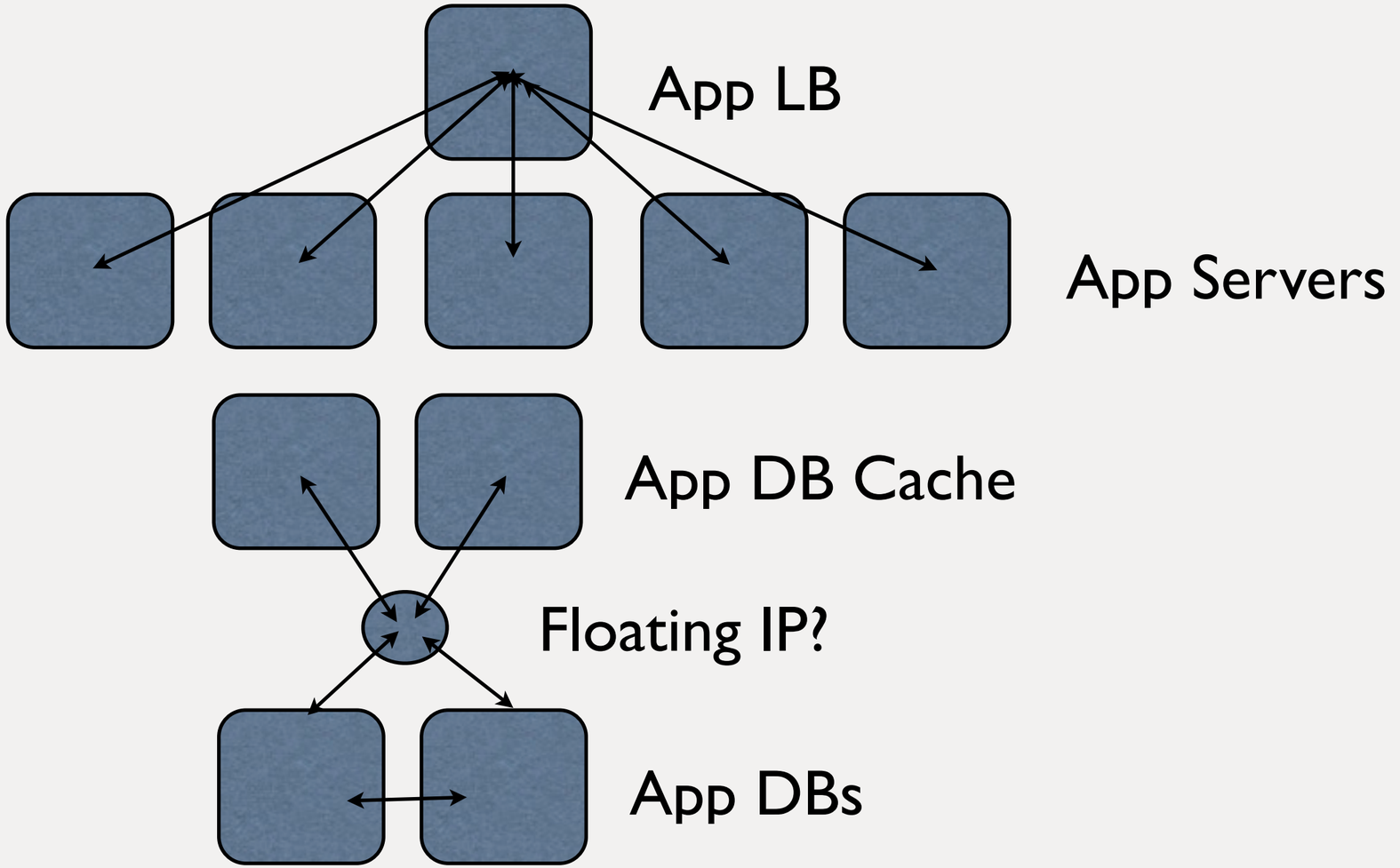
Your Infrastructure is a snow flake



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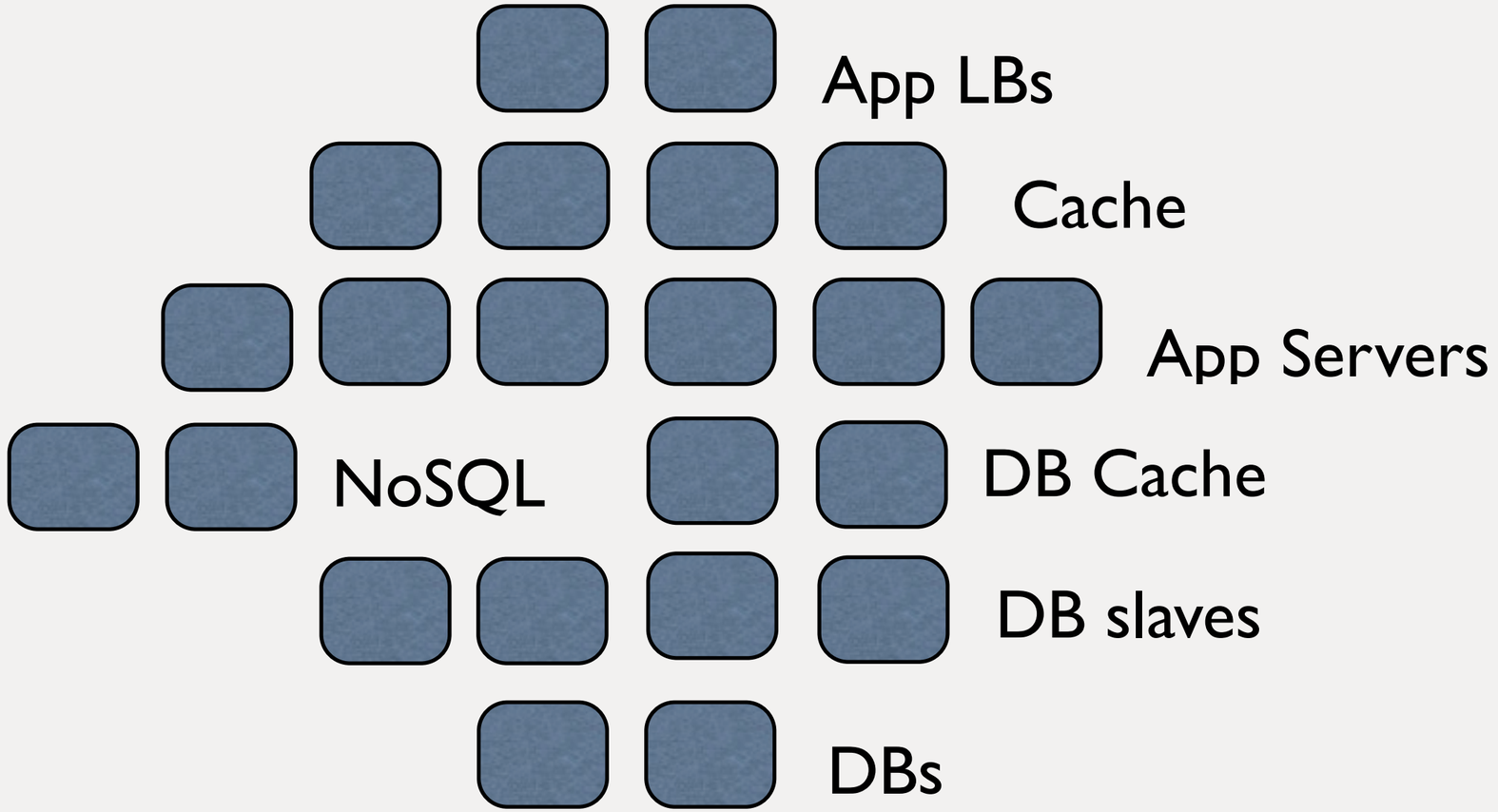
Complexity increases quickly



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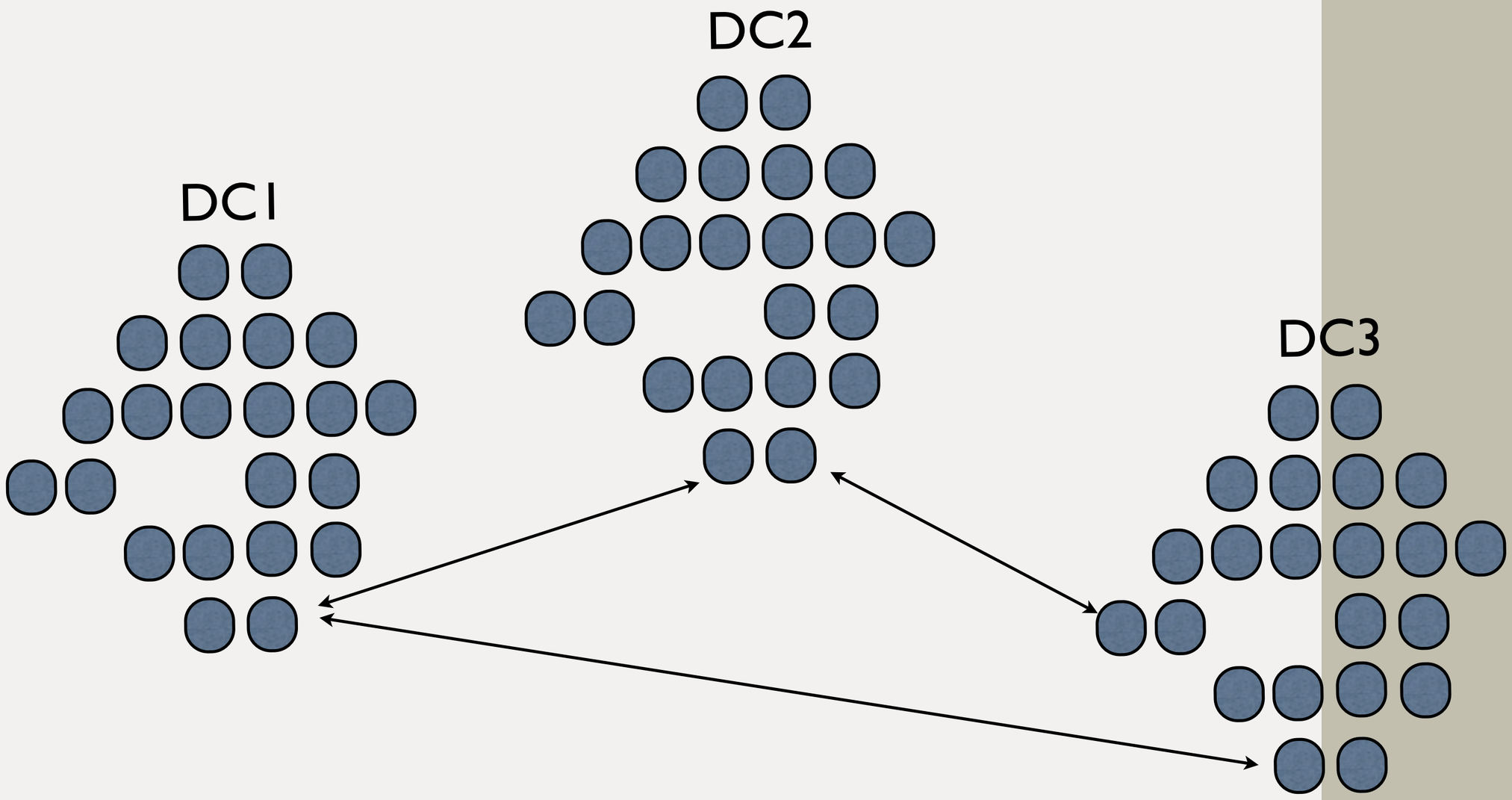
Complexity increases very quickly



http://www.flickr.com/photos/phillipecasablanca/3354734116/

Golden Images are not the answer

- Gold is heavy
- Hard to transport
- Hard to mold
- Easy to lose configuration detail

http://www.flickr.com/photos/garysoup/2977173063/

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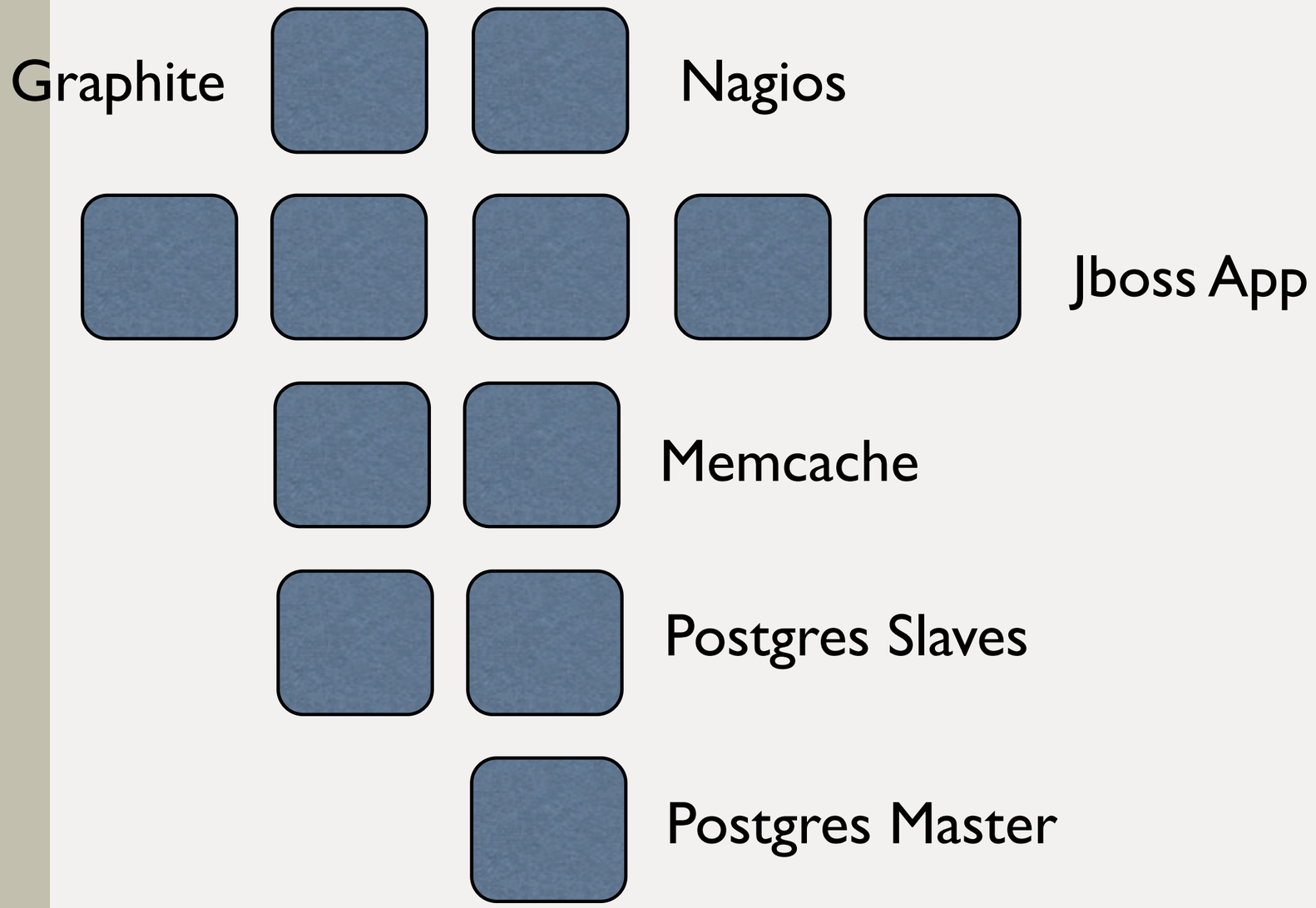
Typical Boring Infrastructure



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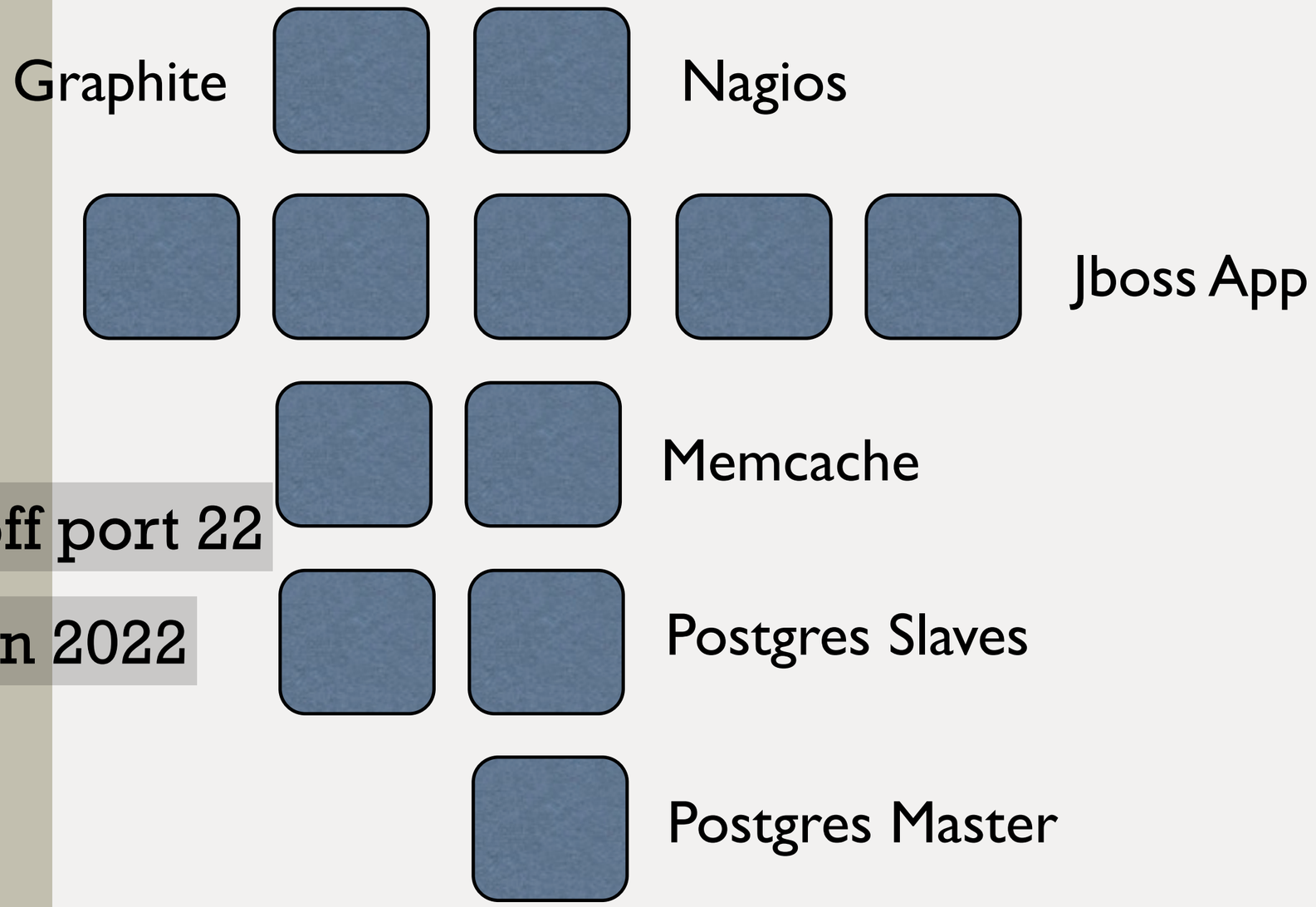
New Compliance Mandate



- Move SSH off port 22
- Lets put it on 2022

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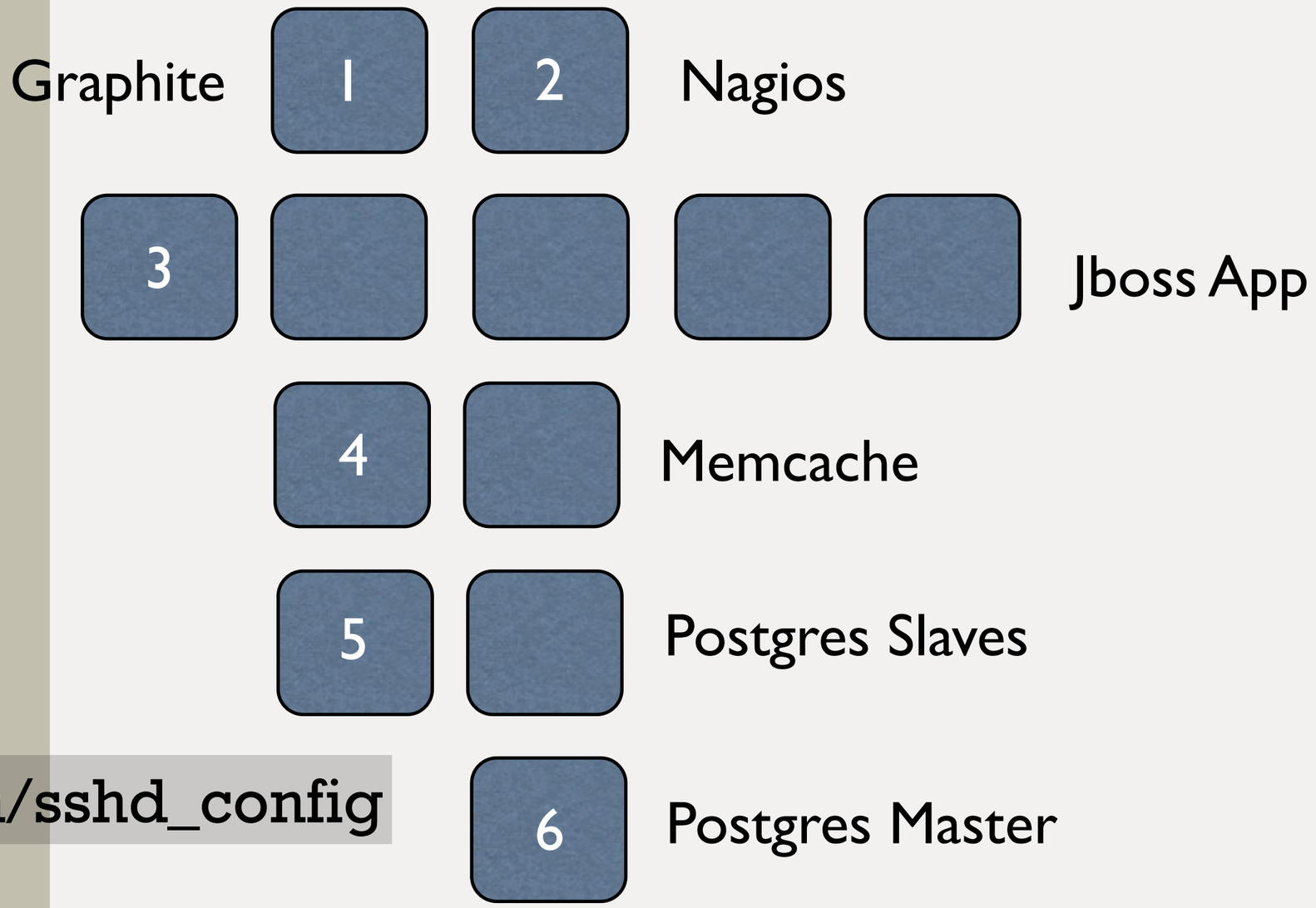
6 Golden Image Updates



- edit /etc/ssh/sshd_config

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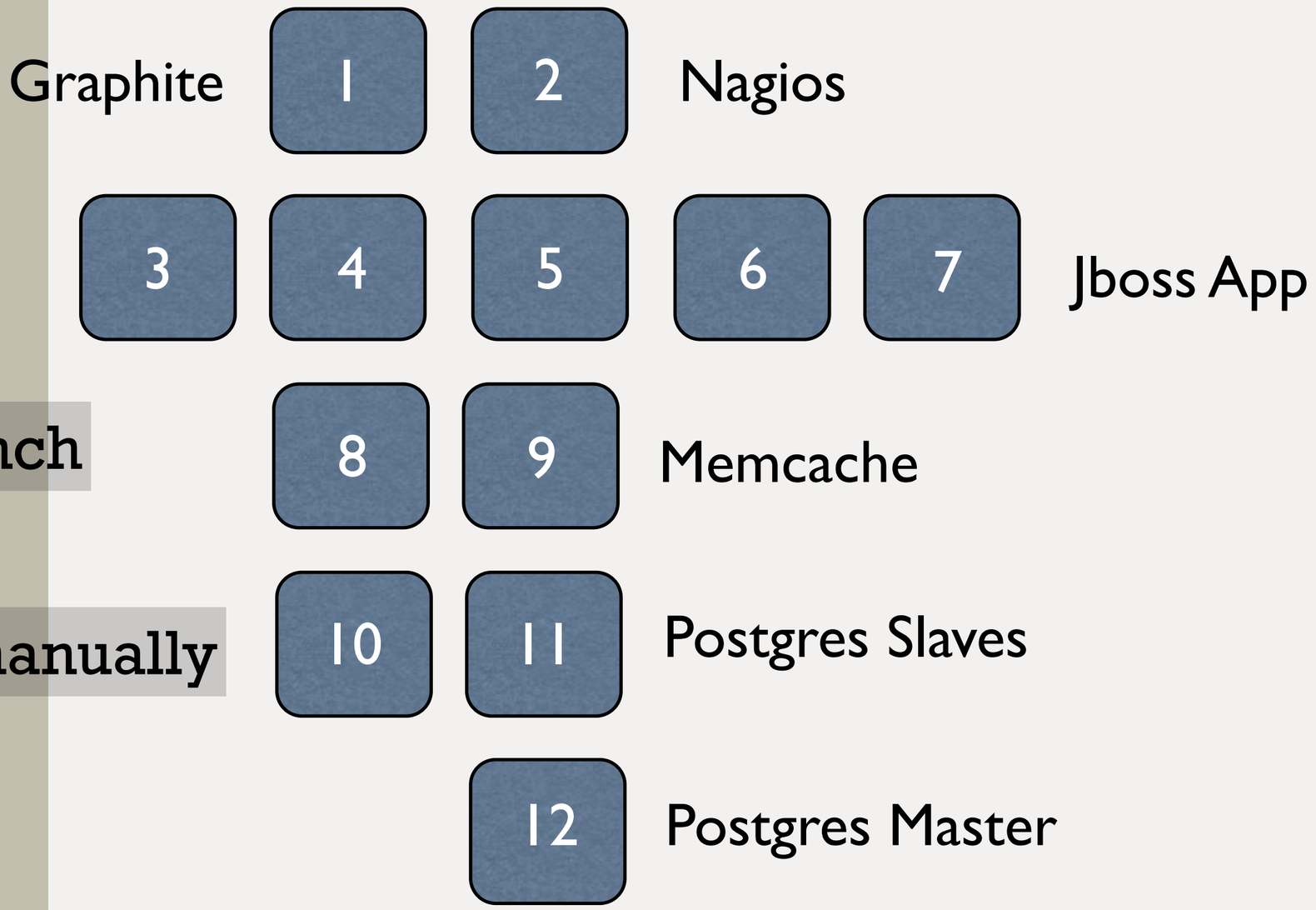
12 Instance Replacements



- Delete, launch
- Repeat
- Typically manually

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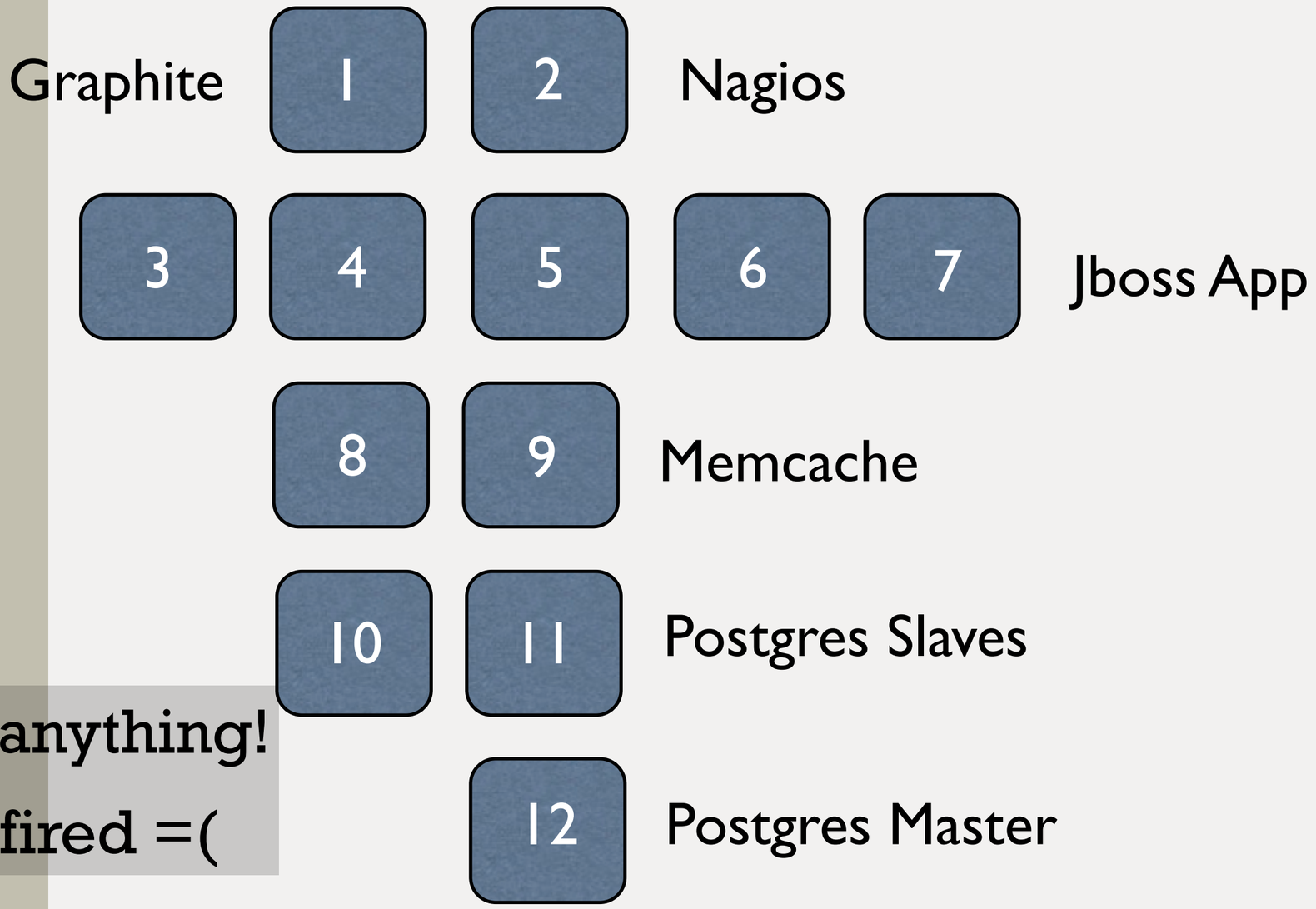
Done in Maintenance Windows



- Don’t break anything!
- Bob just got fired =(

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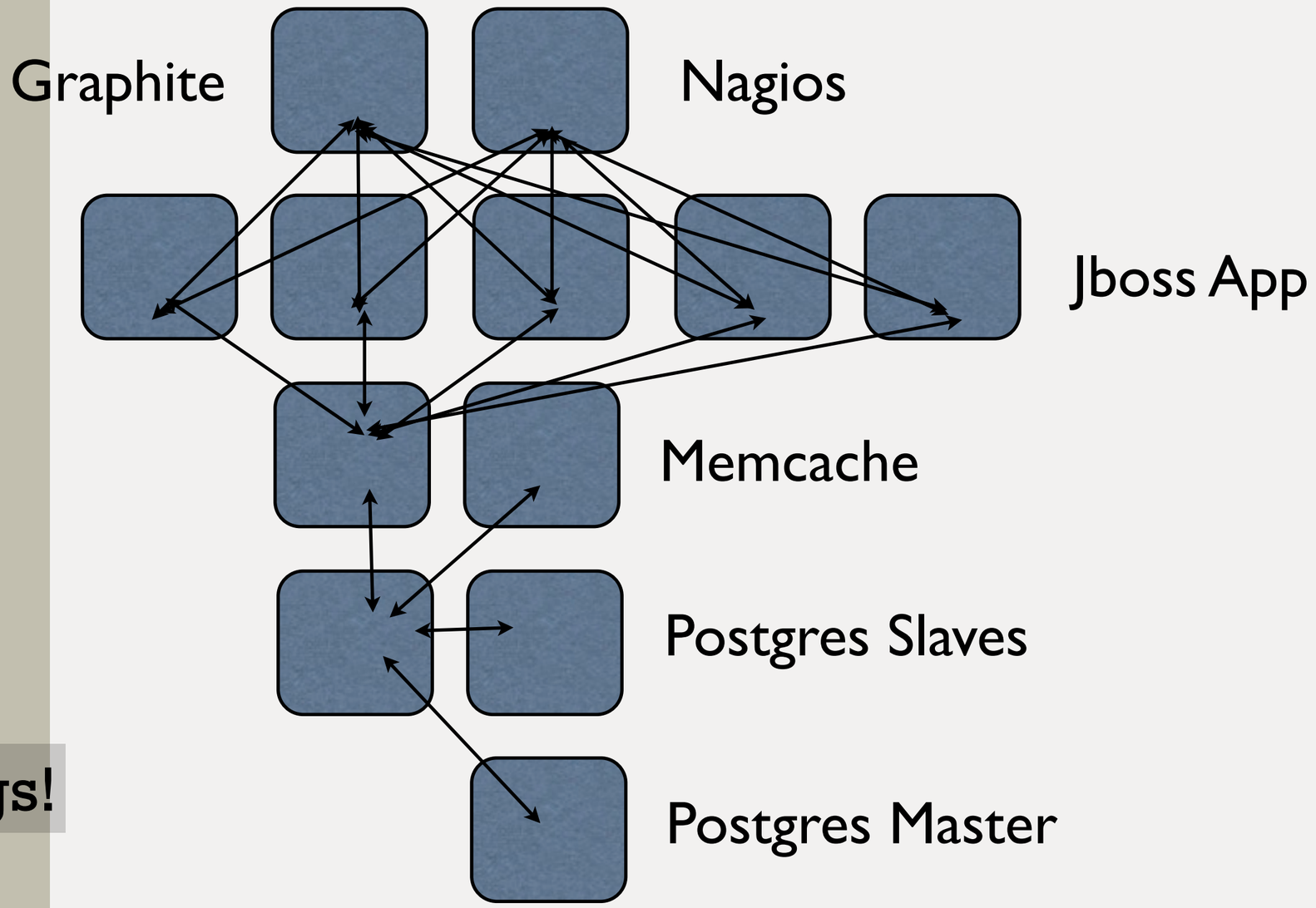
Different IP Addresses?



- Invalid configs!

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Configuration Desperation

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Chef Solves This Problem

chef

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- But you already guessed that, didn't you?

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Programs!

- Generate configurations directly on nodes
- Reduce management complexity
- Version control the programs

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Declarative Interface to Resources

- Define policy
- Say what, not how
- Pull not Push

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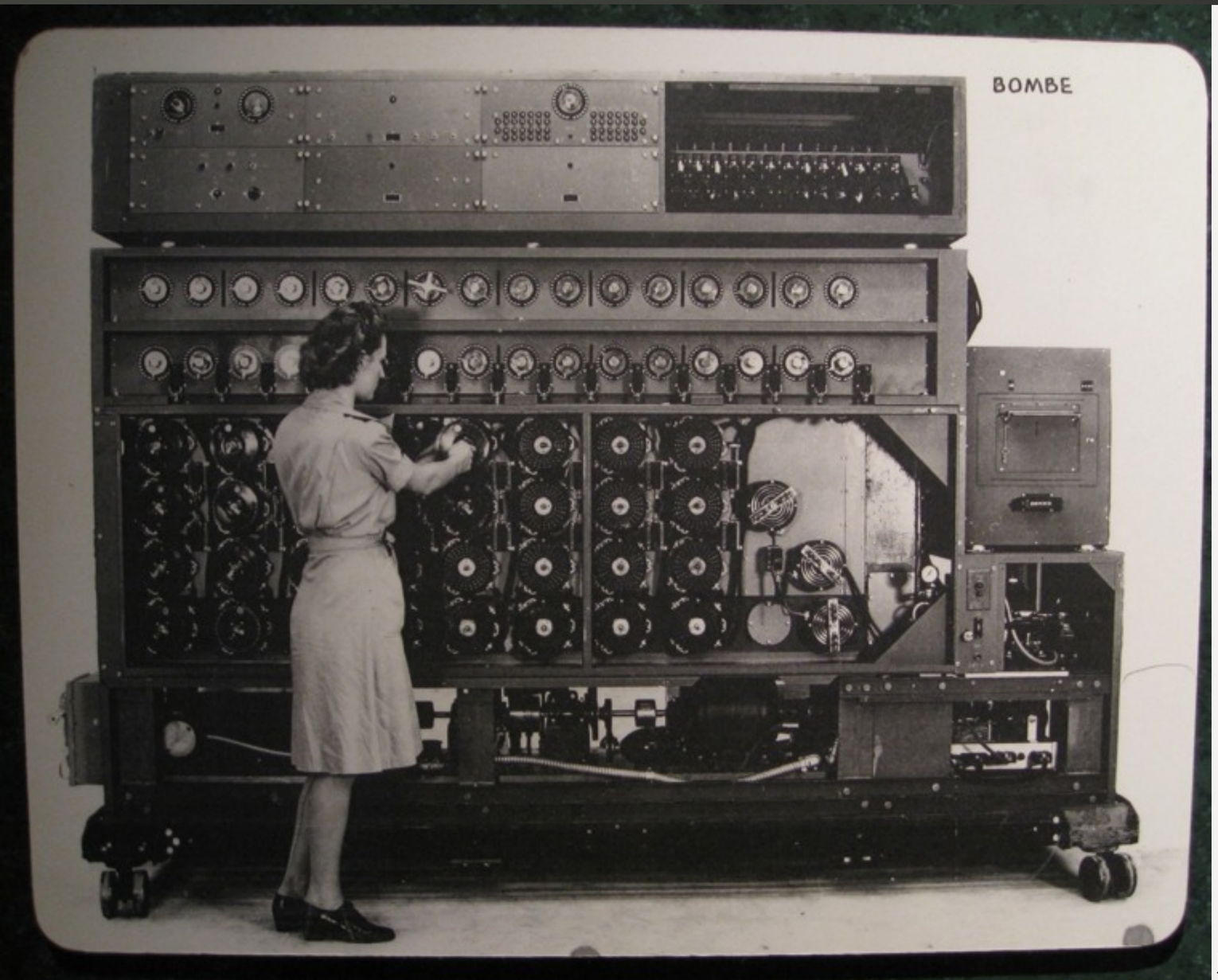
Chef is Infrastructure as Code



- Programmatically provision and configure
- Treat like any other code base
- Reconstruct business from code repository, data backup, and bare metal resources.

http://www.flickr.com/photos/louisb/4555295187/

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That looks like this

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

```
template "/etc/ntpd.conf" do
  source "ntpd.conf.erb"
  owner "root"
  group "root"
  mode 0644
  action :create
  variables(:time_server => “time.example.com”)
  notifies :restart, “service[ntpd]”
end
```

```
service "ntpd" do
  action [:enable,:start]
end
```

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Or this

```
package "net-snmp" do
  action :install
end
```

```
template "/etc/snmpd.conf" do
  source "snmpd.conf.erb"
  owner "root"
  group "root"
  mode 0644
  action :create
  variables(:community_string => “not_public”)
  notifies :restart, “service[snmpd]”
end
```

```
service "snmpd" do
  action [:enable,:start]
end
```

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"
  },
```

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Decide what to declare

```
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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Multiphase Execution

```
size = ((2 * 3) * 4) / 2

99.downto(1) do |i|
  beer_bottle "bottle-#{i}" do
    oz size
    action [ :take_down, :pass_around ]
  end
end
```

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Recipes and Cookbooks

- Recipes are collections of Resources
- Cookbooks contain recipes, templates, files, custom resources, etc
- Code re-use and modularity

http://www.flickr.com/photos/shutterhacks/4474421855/

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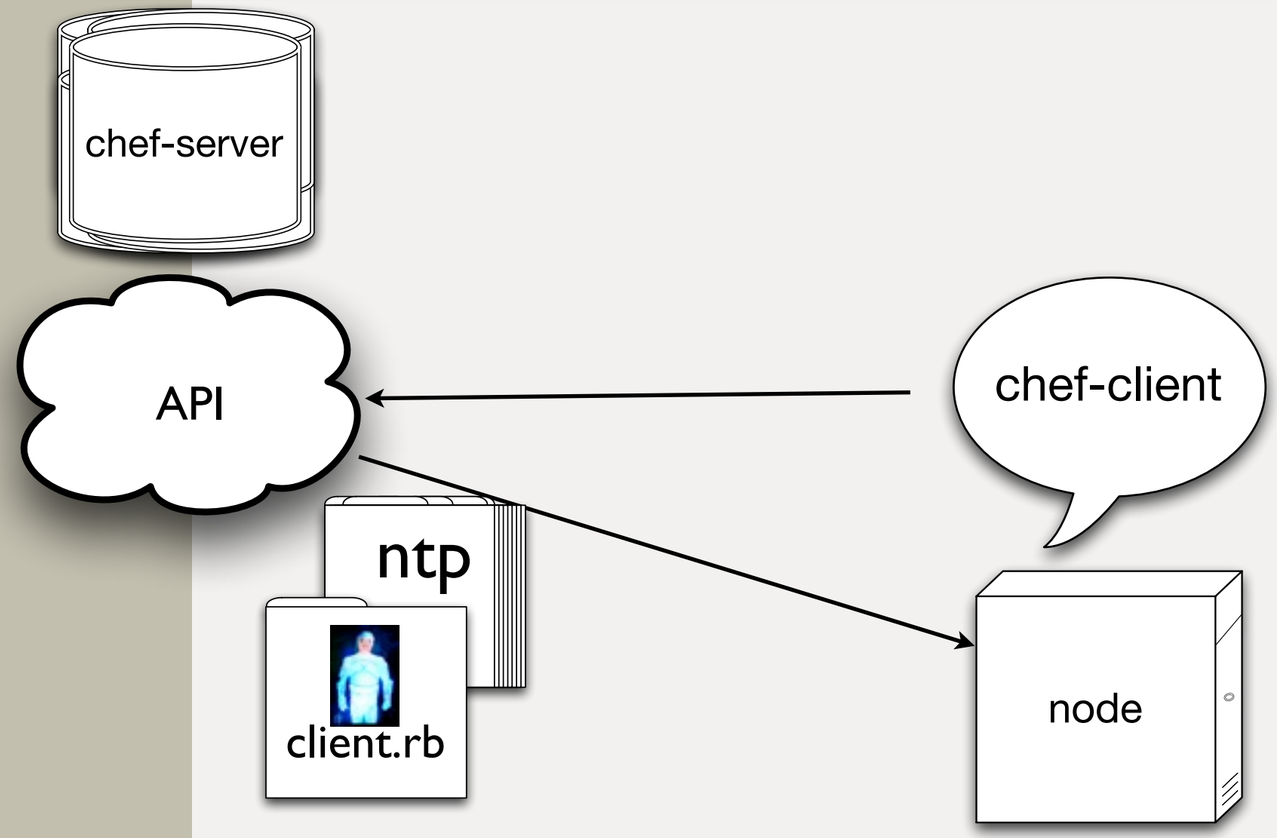
Run Lists



recipe[ntp::client]

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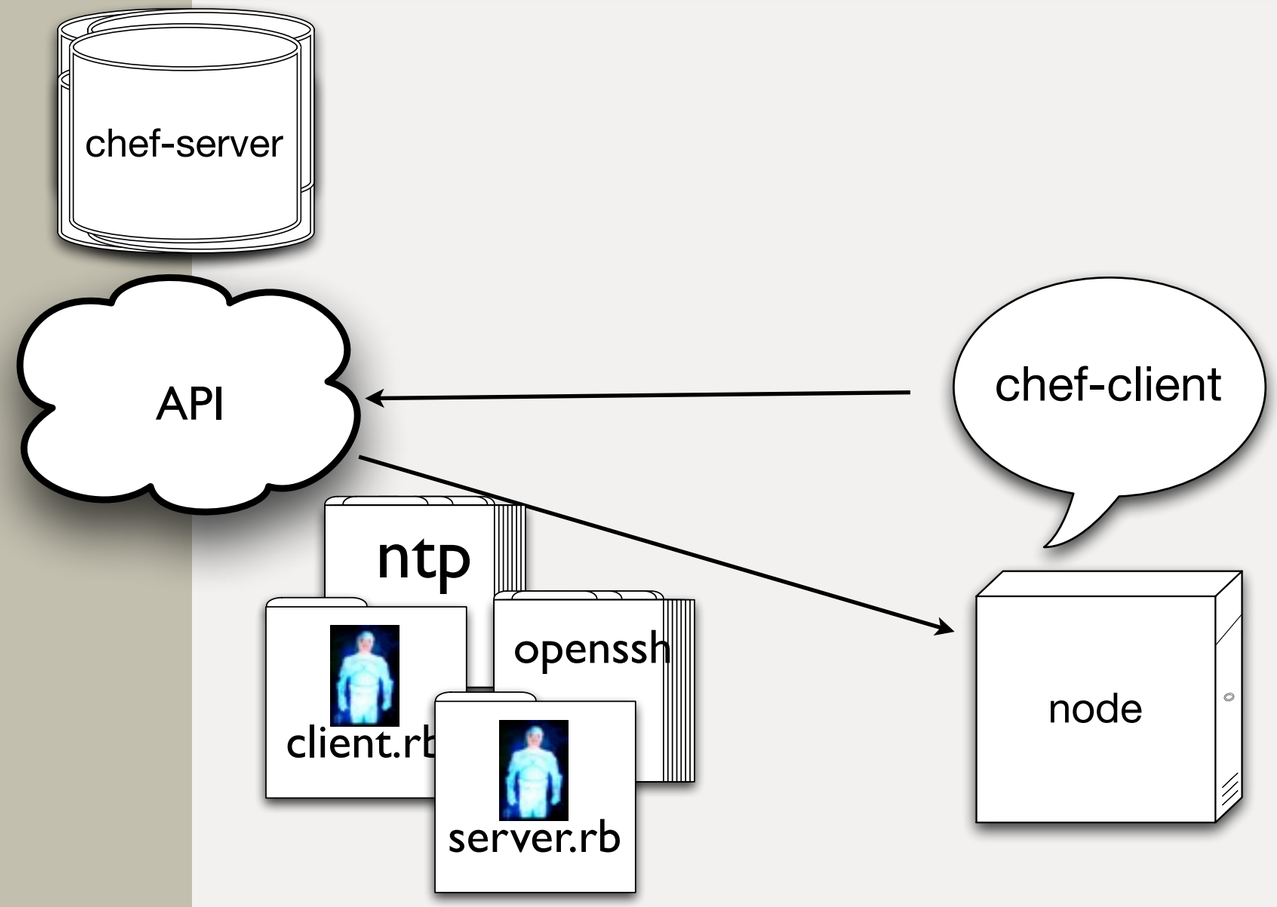
Run Lists



“ntp::client”,
“openssh::server”

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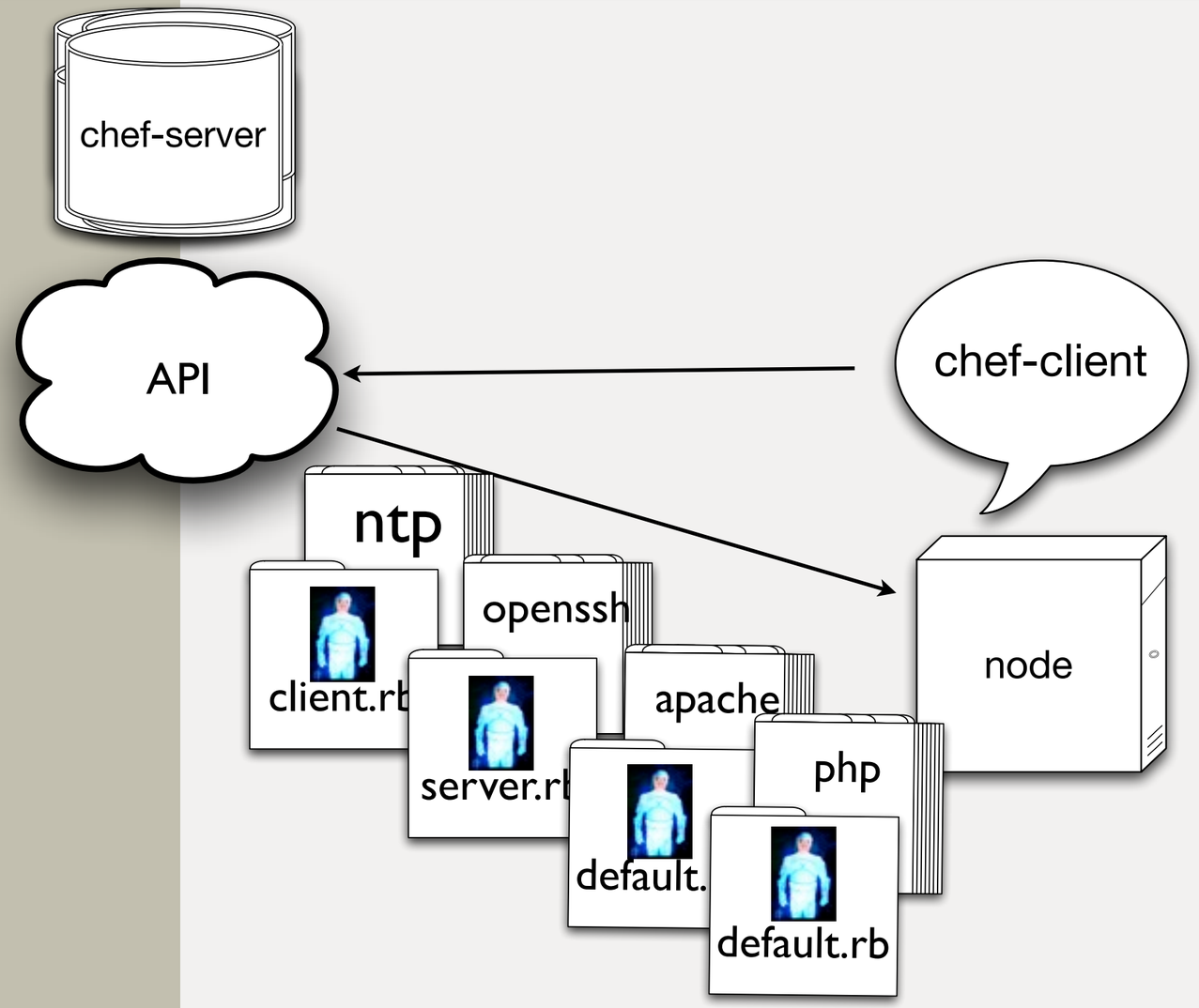
Run Lists



"recipe[ntp::client]",
"recipe[openssh::server]",
"recipe[apache]",
"recipe[php]"

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Roles

```
name "webserver"
description "webserver server"
run_list [
  "role[base]",
  "recipe[nginx::server]"
]
```

```
name "base"
description "base"
run_list [
  "recipe[selinux::disabled]",
  "recipe[etchosts]",
  "recipe[yum::epel]",
  "recipe[debugtools]"
]
```

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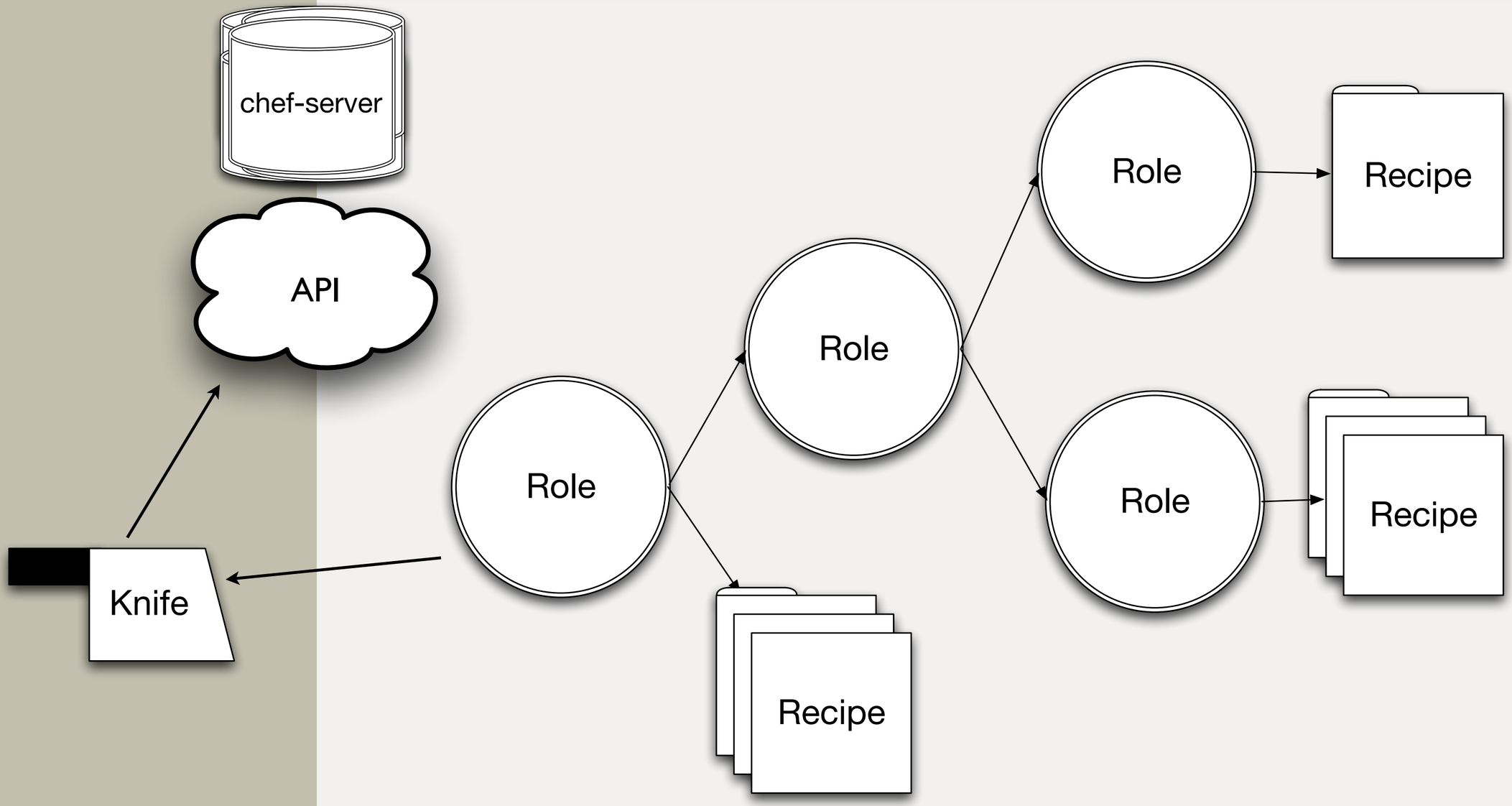
Roles



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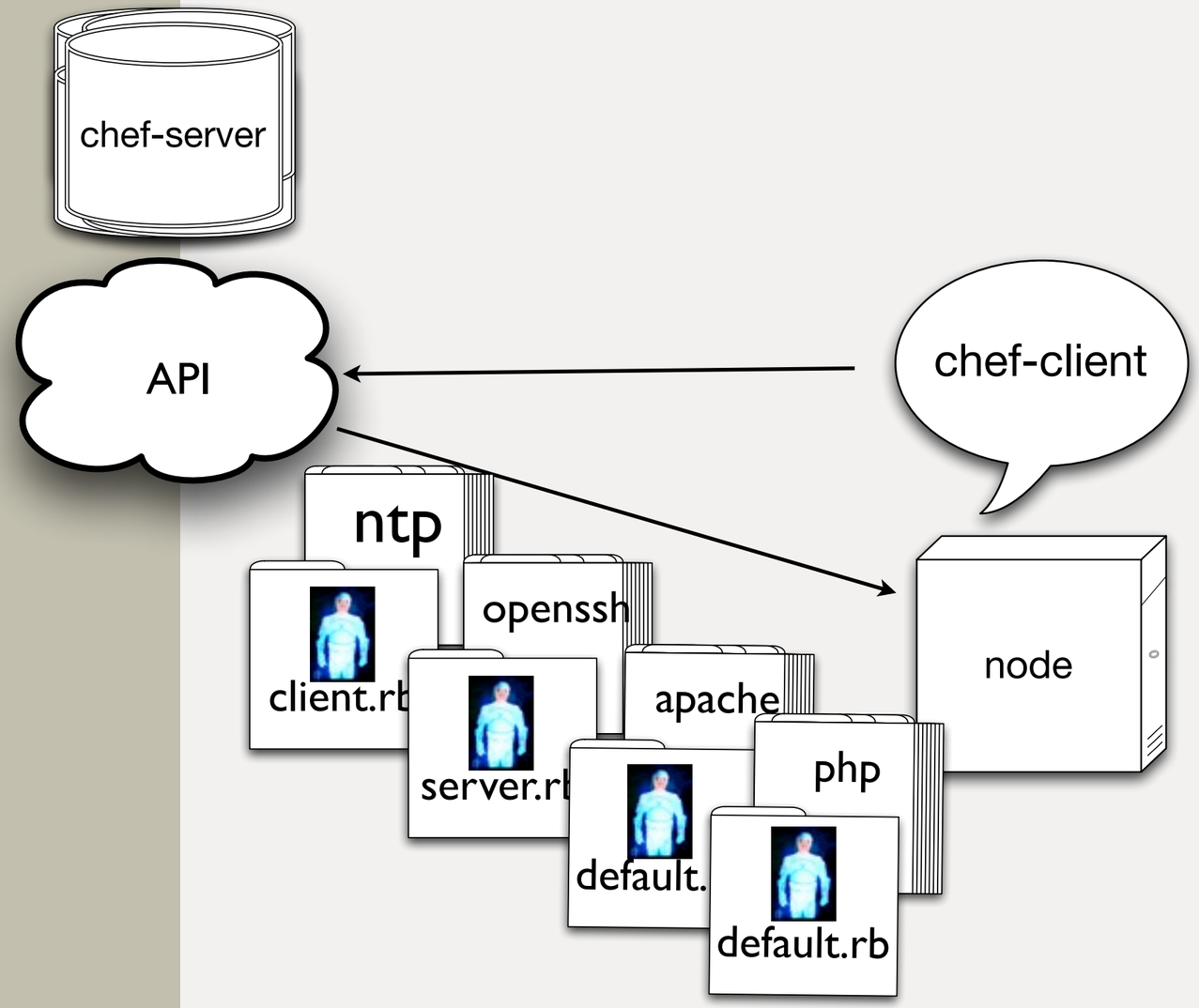
Run Lists



"recipe[ntp::client]",
"recipe[openssh::server]",
"recipe[apache]",
"recipe[php]"

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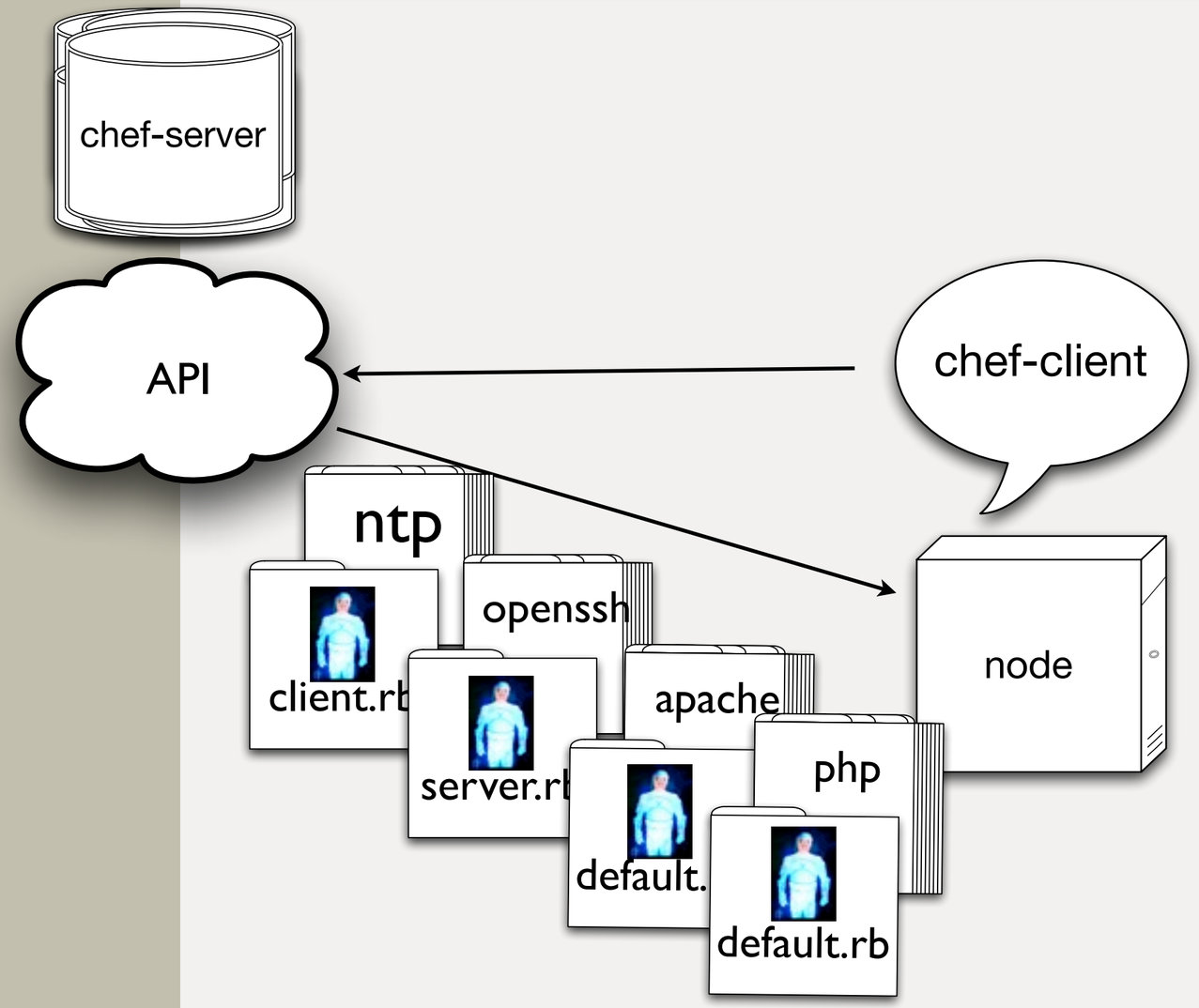
Roles



“role[base]”,
“role[webserver]”

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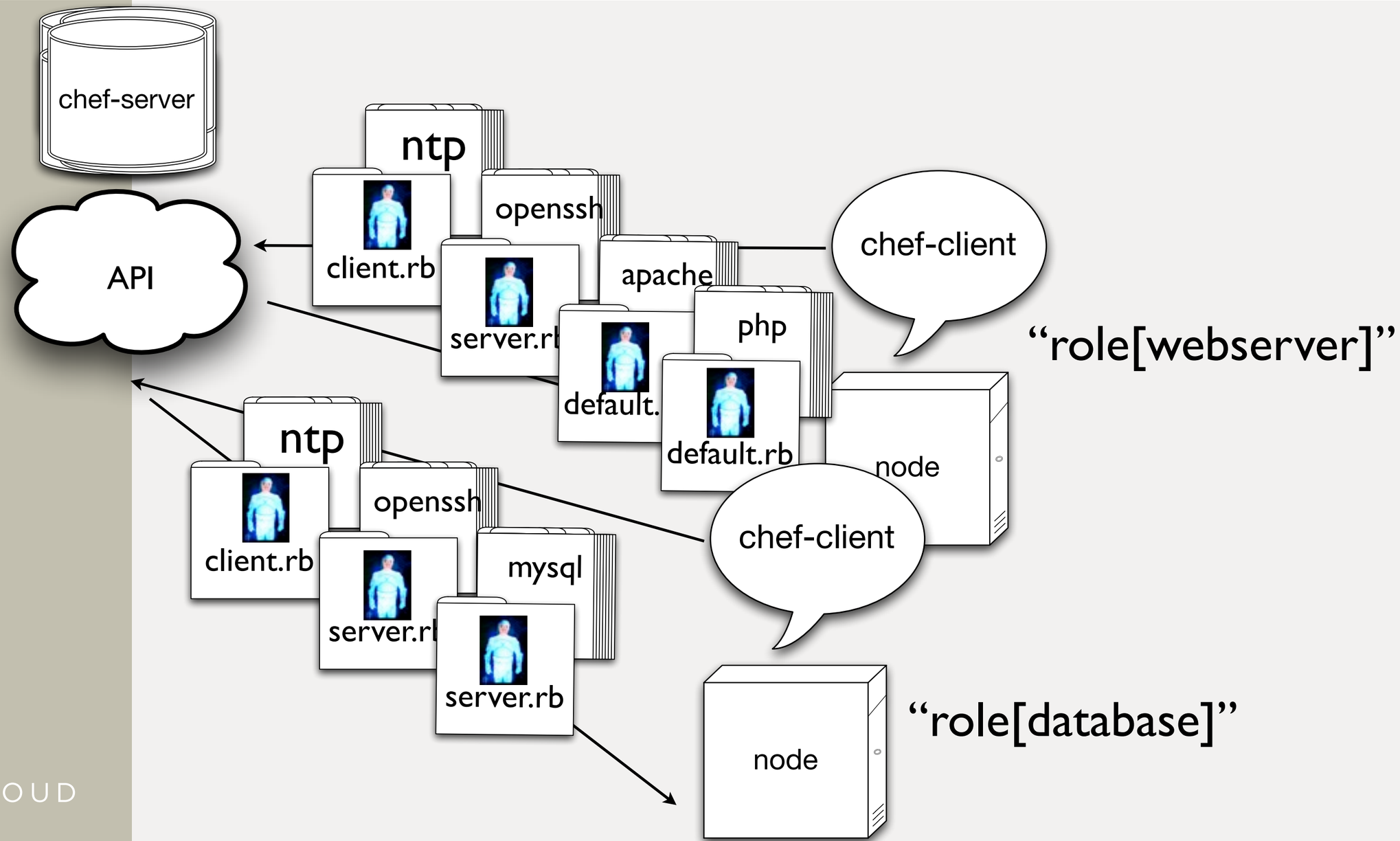
Roles



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Search

- Search for nodes with Roles
- Find configuration data

- IP addresses
- Hostnames
- FQDNs

http://www.flickr.com/photos/kathycsus/2686772625

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Search for nodes

```
pool_members = search("node","role:webserver”)

template "/etc/haproxy/haproxy.cfg" do
  source "haproxy-app_lb.cfg.erb"
  owner "root"
  group "root"
  mode 0644
  variables :pool_members => pool_members.uniq
  notifies :restart, "service[haproxy]"
end
```

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Pass results into Templates

```
# Set up application listeners here.
listen application 0.0.0.0:80
  balance roundrobin
  <% @pool_members.each do |member| -%>
  server <%= member[:hostname] %> <%= member[:ipaddress] %>:> weight 1 maxconn 1 check
  <% end -%>
<% if node["haproxy"]["enable_admin"] -%>
listen admin 0.0.0.0:22002
  mode http
  stats uri /
<% end -%>
```

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munin::server example

```
node.set[:munin][:server] = true
munin_clients = search(:node, "munin_client:true")

cookbook_file "/etc/cron.d/munin" do
  source "munin-cron"
  mode "0644"
  owner "root"
  group "root"
end

template "/etc/munin/munin.conf" do
  source "munin.conf.erb"
  mode 0644
  variables(:munin_clients => munin_clients)
end
```

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munin::client example

```
node.set[:munin][:client] = true
munin_servers = search(:node, "munin_server:true")

unless munin_servers.empty?
  package "munin-node" do
    action :install
  end

  template "/etc/munin/munin-node.conf" do
    source "munin-node.conf.erb"
    mode 0644
    variables :munin_servers => munin_servers
    notifies :restart, "service[munin-node]"
  end

  service "munin-node" do
    supports :restart => true
    action [ :enable, :start ]
  end
end
```

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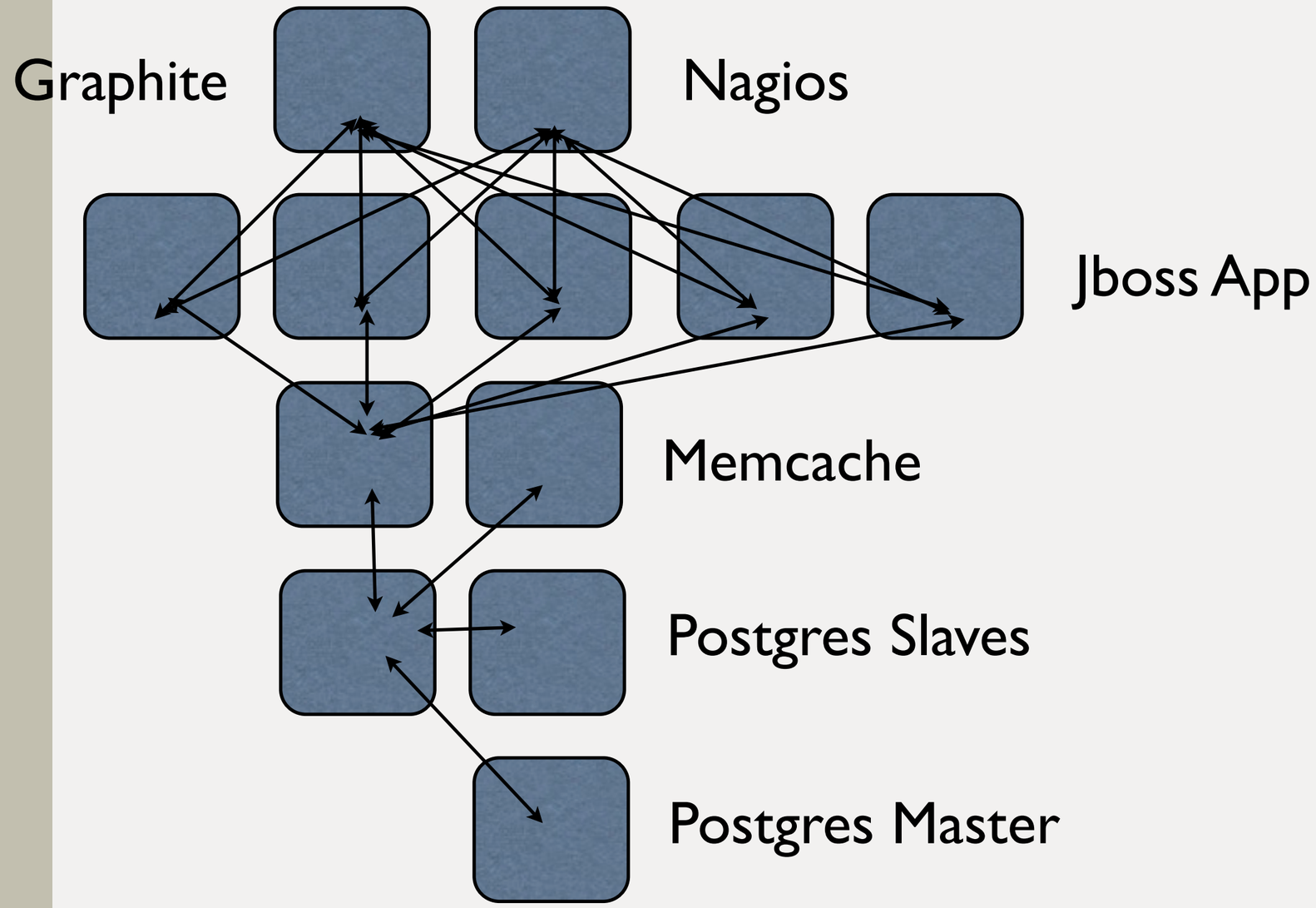
So when this



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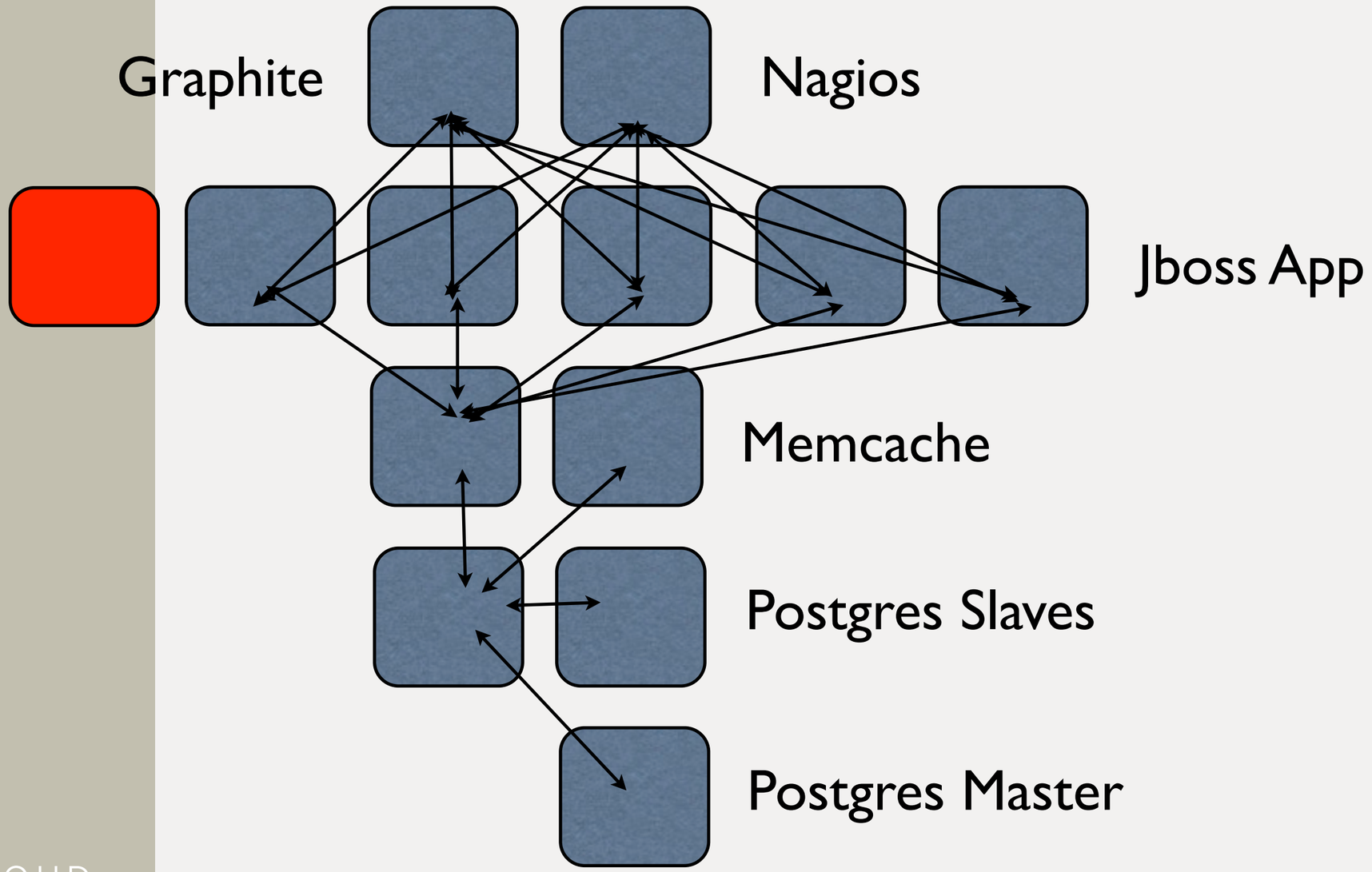
Becomes this



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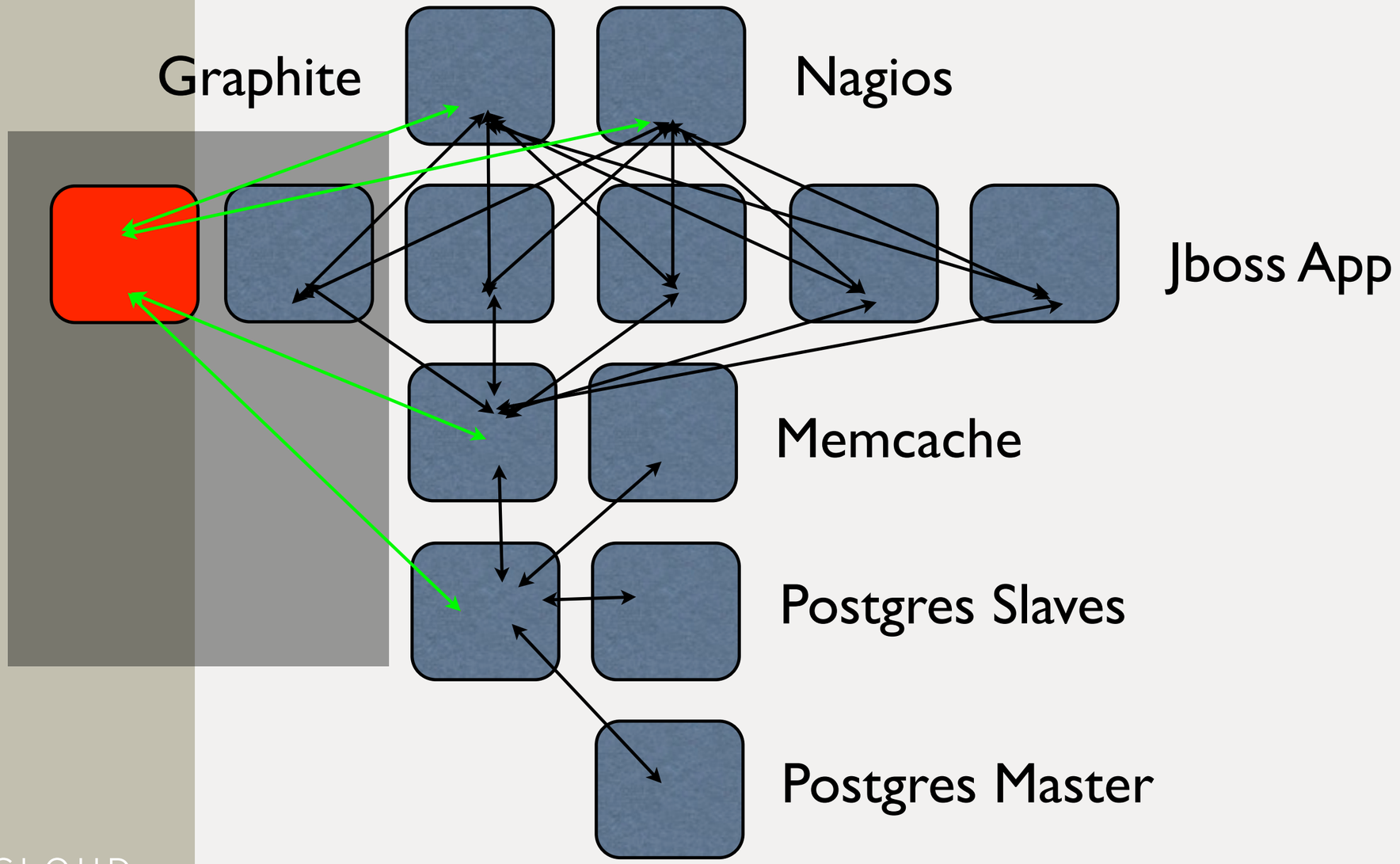
This can happen automatically



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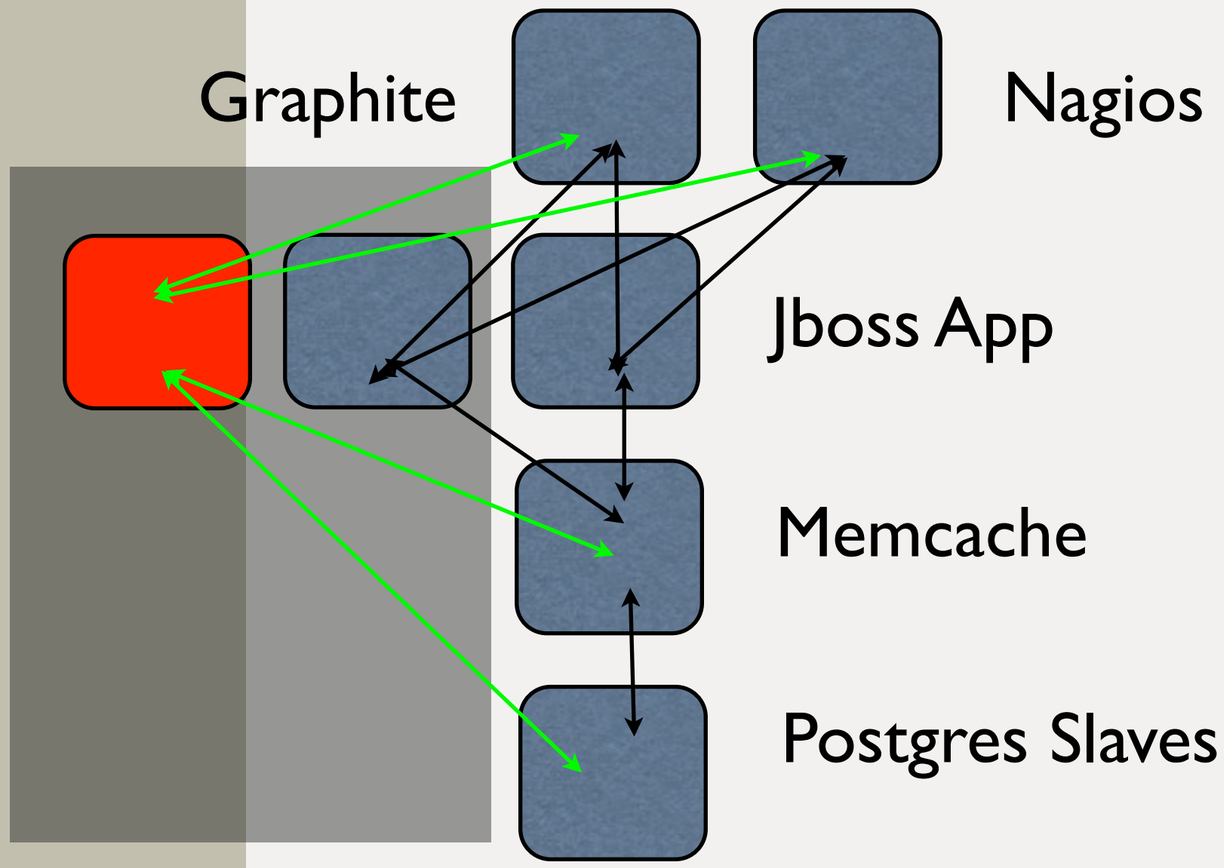
Count the resources



- 12+ resource changes for 1 node addition

- Load balancer config
- Nagios host ping
- Nagios host ssh
- Nagios host HTTP
- Nagios host app health
- Graphite CPU
- Graphite Memory
- Graphite Disk
- Graphite SNMP
- Memcache firewall
- Postgres firewall
- Postgres authZ config

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Questions!

- What is a Node?
- What is a Resource?
- What is a Recipe? How is it different from a Cookbook?
- What is a Run List?
- What is a Role?

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What's this got to do with Solaris?

Opscode Solaris Engineering

Fully Supported

- As of 0.10.8, Solaris 9, 10 and 11 are fully supported
- Also works well with SmartOS, OpenIndiana and OmniOS
- SVR4 packages available for SPARC and Intel
- http://www.opscode.com/chef/install

Improving Support

- Native Resources
  - RBAC
  - SMF
  - IPS
- Lightweight Resources and Providers (LWRP)
  - Zones / Containers
  - ZFS
  - Crossbow
- Cookbooks
- What do you want to see?

Who is using Chef?

- On Solaris:
  - Joyent
  - OmniTi (and clients)
  - Wells Fargo
  - Expeditors International
  - Atalanta Systems (and clients)
  - Others

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Others

> *With Opscode Chef Cookbooks and recipes, we were able to definitively accelerate our time-to-value and time-to-market, which results in operational efficiency and cost savings.*
>
> -Leandro Reox, MercadoLibre

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How do I start?

- http://www.opscode.com/chef/install
- http://wiki.opscode.com
- IRC: freenode.irc.net - #chef #chef-hacking
- Mailing Lists
- Test Driven Infrastructure with Chef (2nd edition out soon)
- Email me: sns@opscode.com

Questions?

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