

Philly ETE 2012

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The Rise of Configuration Management



We have a problem

Here's a hint



Cabling?



Close...

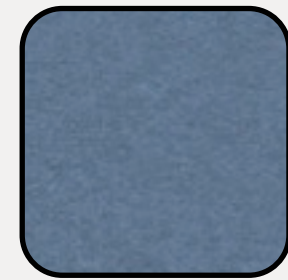
Complexity



Infrastructure

Items of manipulation

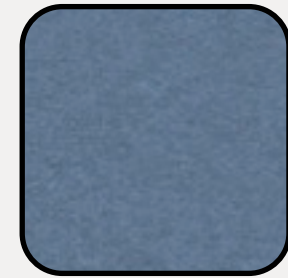
- Nodes
- Networking
- Files
- Directories
- Symlinks
- Mounts
- Routes
- Users
- Groups
- Tasks
- Packages
- Software
- Services
- Ruby Gems
- Python Modules
- Java Artifacts
- Disks
- Volumes
- Filesystems
- Firewall Rules



Application

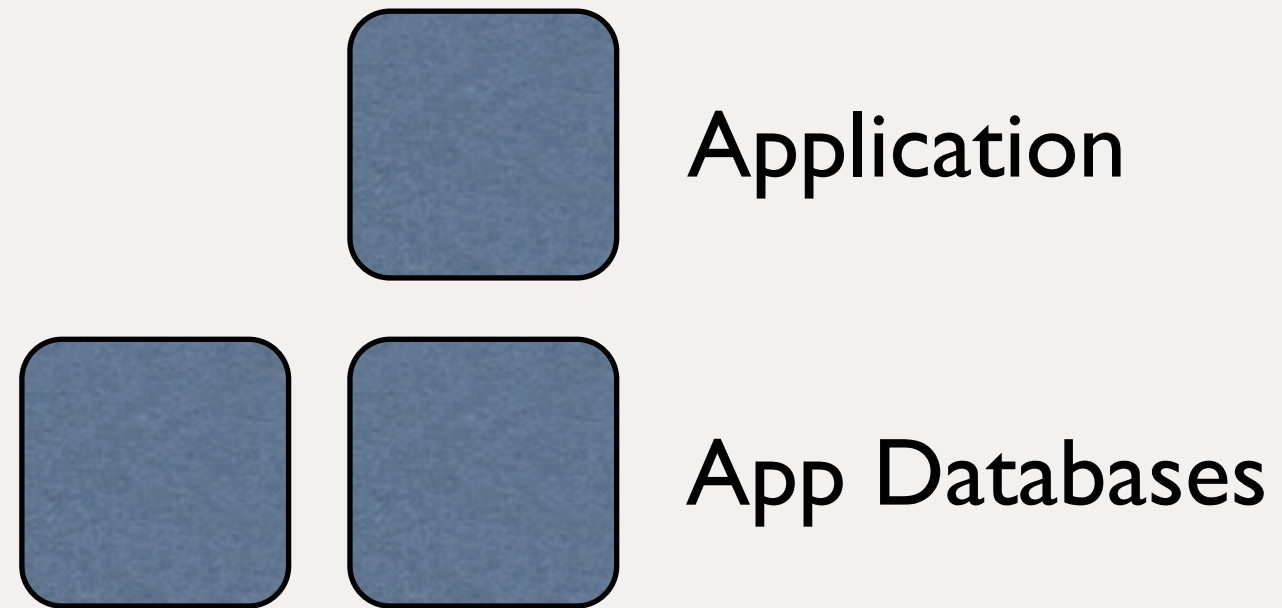


Application

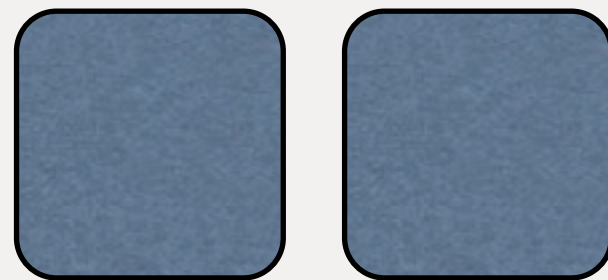


Application Database

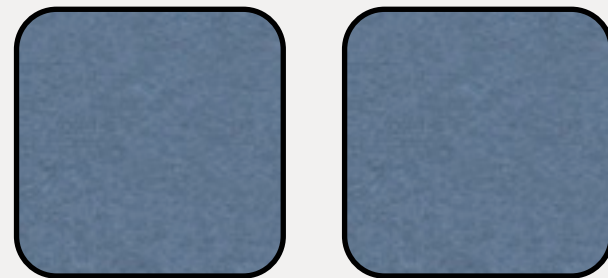
See Nodes Grow



See Nodes Grow



App Servers



App Databases

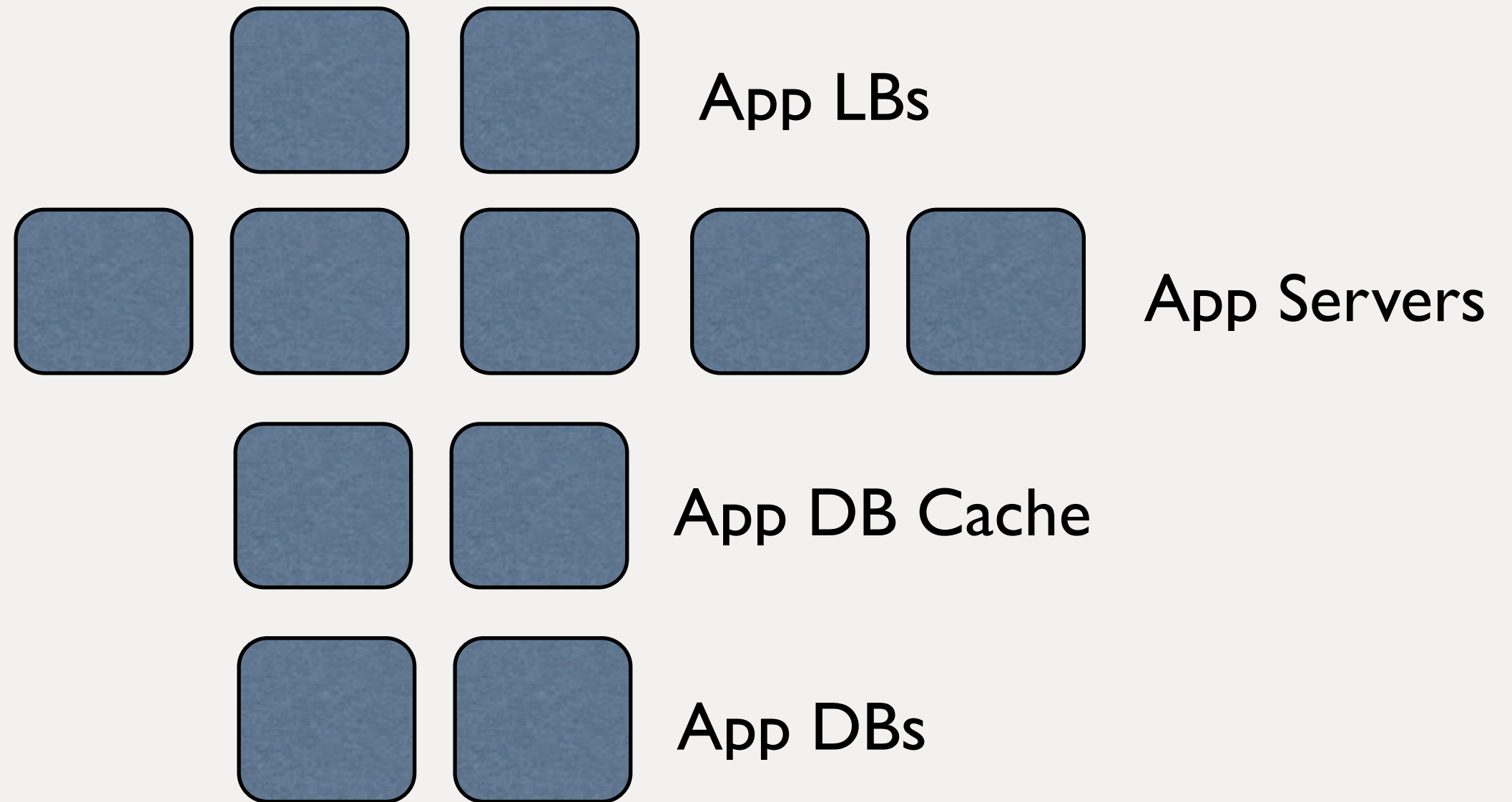
See Nodes Grow



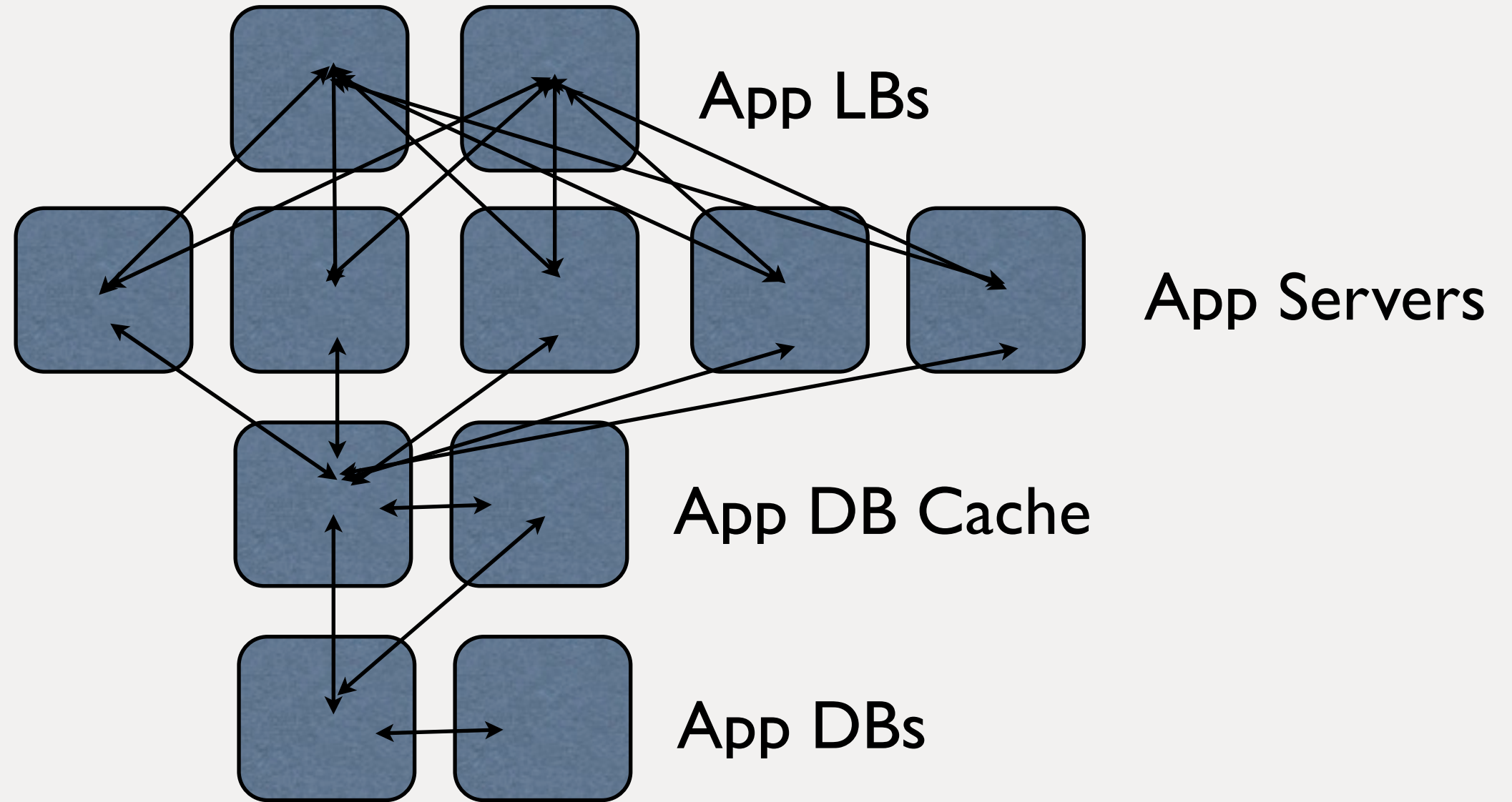
See Nodes Grow



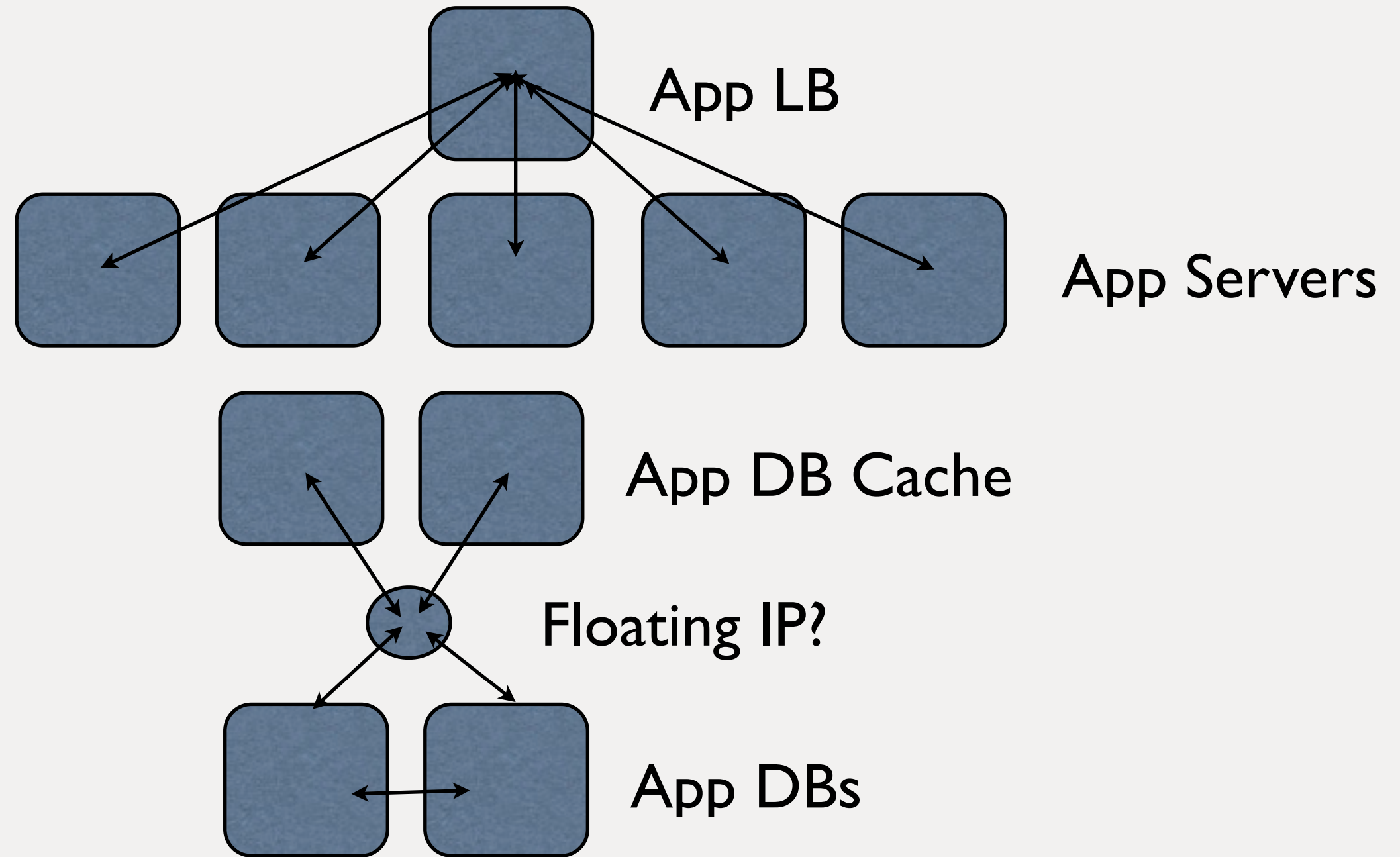
See Nodes Grow



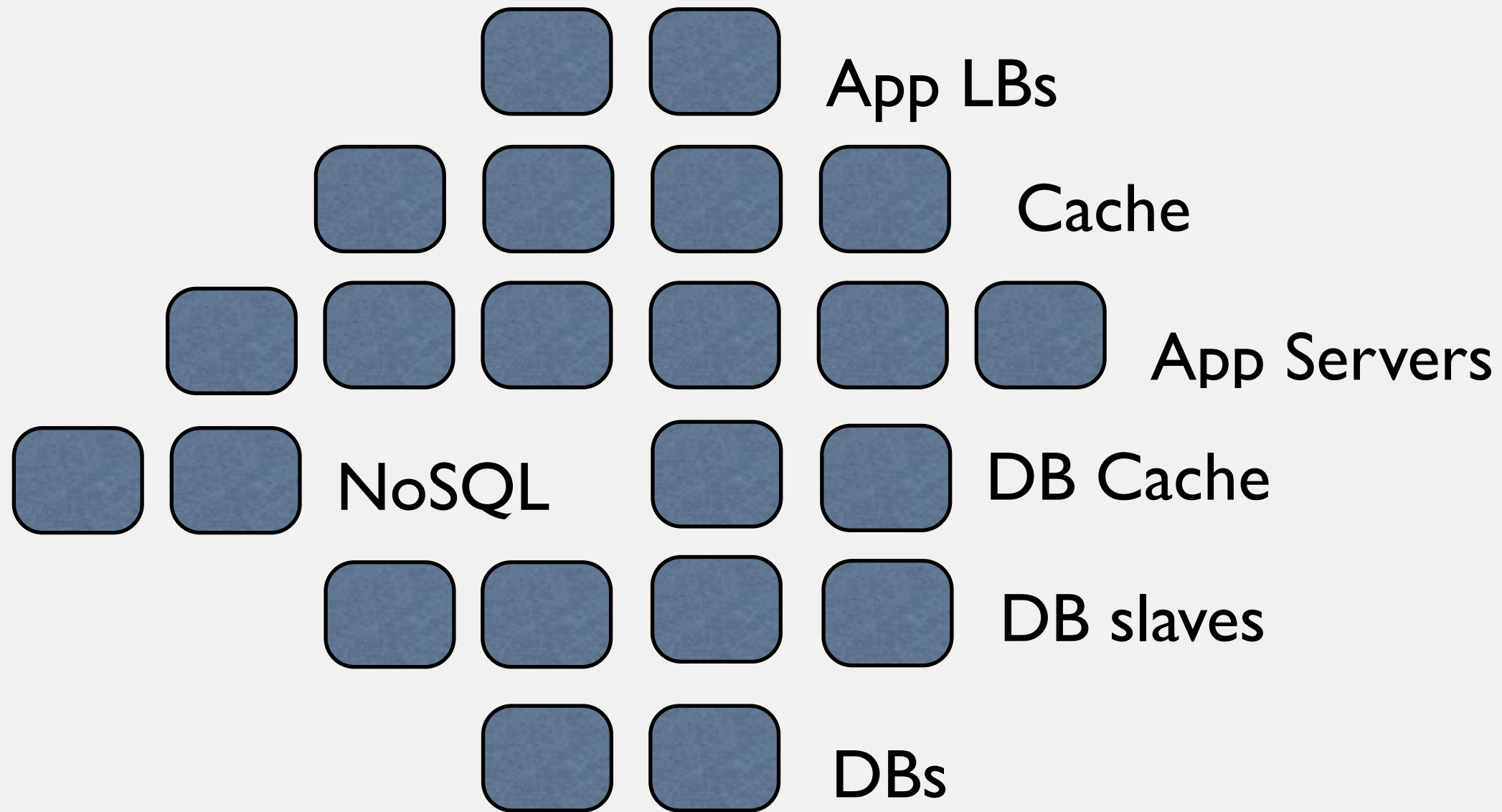
Infrastructures have topology



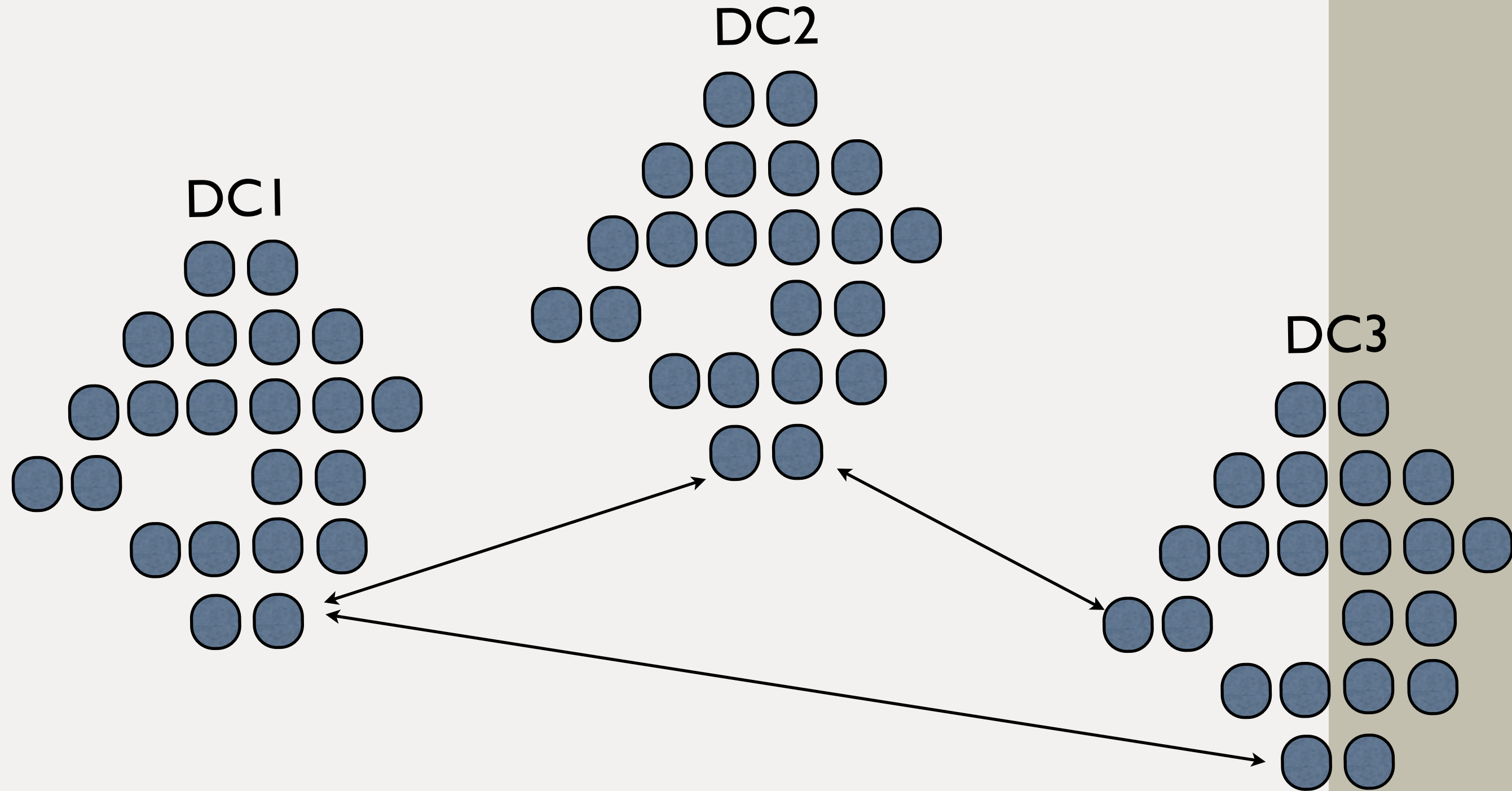
Your Infrastructure is a snow flake



Complexity increases quickly



Complexity increases very quickly



Operations

The buck stops here



<http://www.flickr.com/photos/jerrykeenan/5895872085/>

Thursday, April 12, 12

Sysadmins

WE TOOK THE HOSTAGES,
SECURED THE BUILDING, AND
CUT THE COMMUNICATION
LINES LIKE YOU SAID.



BUT THEN THIS GUY CLIMBED UP
THE VENTILATION DUCTS AND WALKED
ACROSS BROKEN GLASS, KILLING
ANYONE WE SENT TO STOP HIM.



NO, HE IGNORED THEM.
HE JUST RECONNECTED
THE CABLES WE CUT,
MUTTERING SOMETHING
ABOUT "UPTIME".



Availability

Efficiency

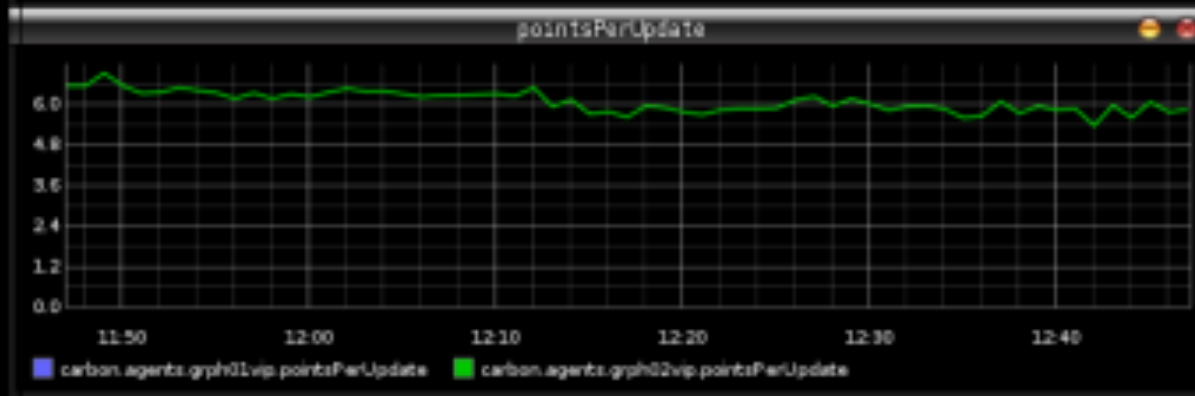
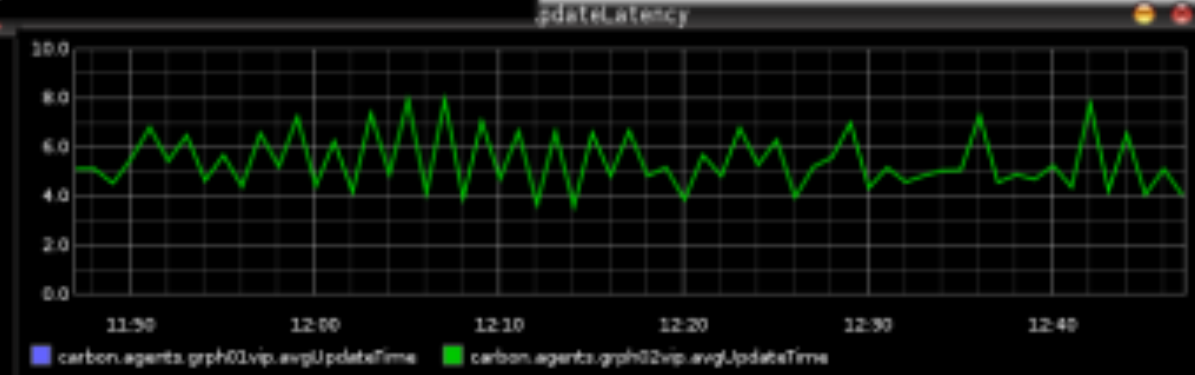
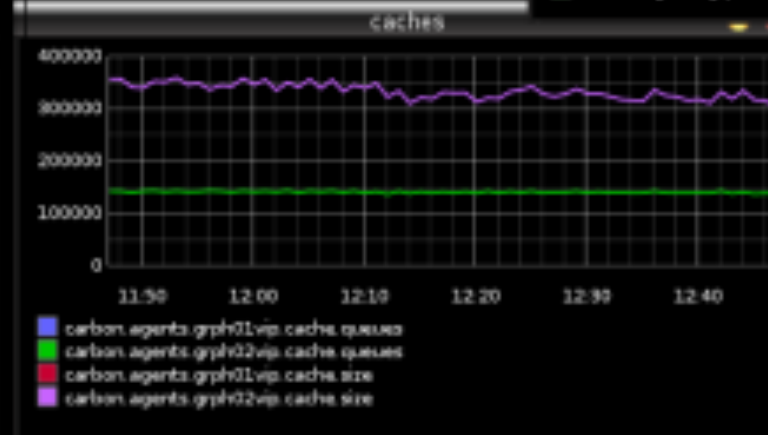
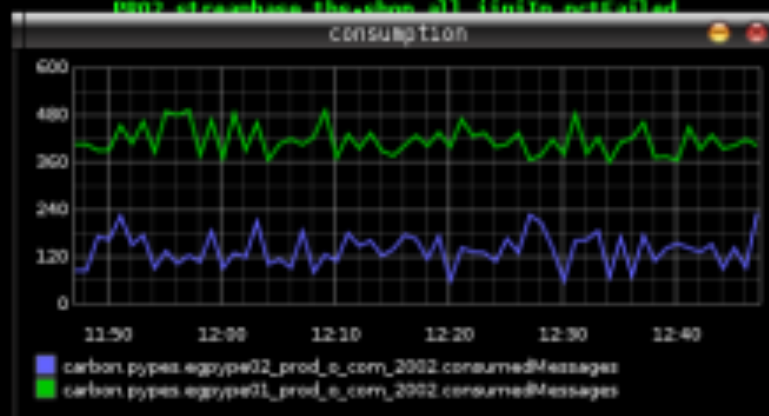
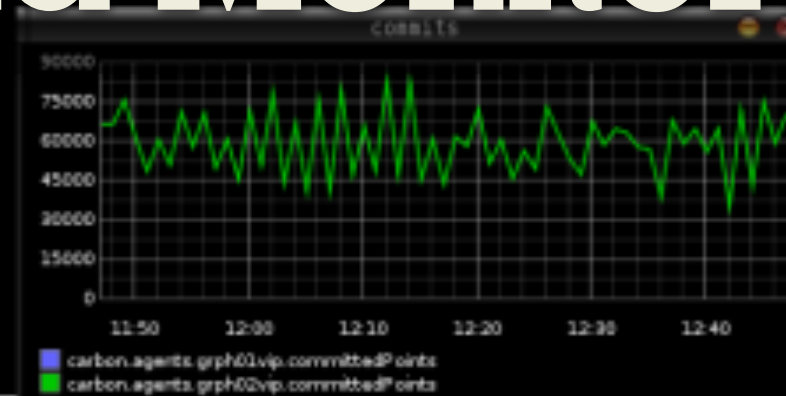
Battling Entropy



<http://www.flickr.com/photos/acidpix/5822011145/>

Metrics and Monitoring

```
graphite>load c3
Loading view c3
graphite>draw PR02.streambase.tbs-shop.all.jiniIn.
PR02.streambase.tbs-shop.all.jiniIn.LocationFinderService.
PR02.streambase.tbs-shop.all.jiniIn.SessionEventService.
PR02.streambase.tbs-shop.all.jiniIn.ShopService.
PR02.streambase.tbs-shop.all.jiniIn.stdevLatency
PR02.streambase.tbs-shop.all.jiniIn.avgLatency
PR02.streambase.tbs-shop.all.jiniIn.count
PR02.streambase.tbs-shop.all.jiniIn.countFailed
PR02.streambase.tbs-shop.all.jiniIn.maxLatency
PR02.streambase.tbs-shop.all.jiniIn.minLatency
PR02.streambase.tbs-shop.all.jiniIn.outFailed
```



Managing Complexity



<http://www.flickr.com/photos/snaks/4062510327/>

ZOMGTHECLOUD



<http://www.flickr.com/photos/gsfcr/6086341900/>

A group of people are sitting on a floor covered in colorful confetti. They are looking at a laptop screen. The scene is dimly lit, and the confetti is scattered all over the floor.

Configuration Management

<http://www.flickr.com/photos/philliecasablanca/3354734116/>

AUTOMATE



ALL THE THINGS!

The Past

Manual Configuration

- Labor intensive
- Error prone
- Hard to reproduce
- Unsustainable

Scripting

- Typically very brittle
- Throw away, one off scripts
- grep sed awk perl
- curl | bash

<http://www.flickr.com/photos/40389360@N00/2428706650/>

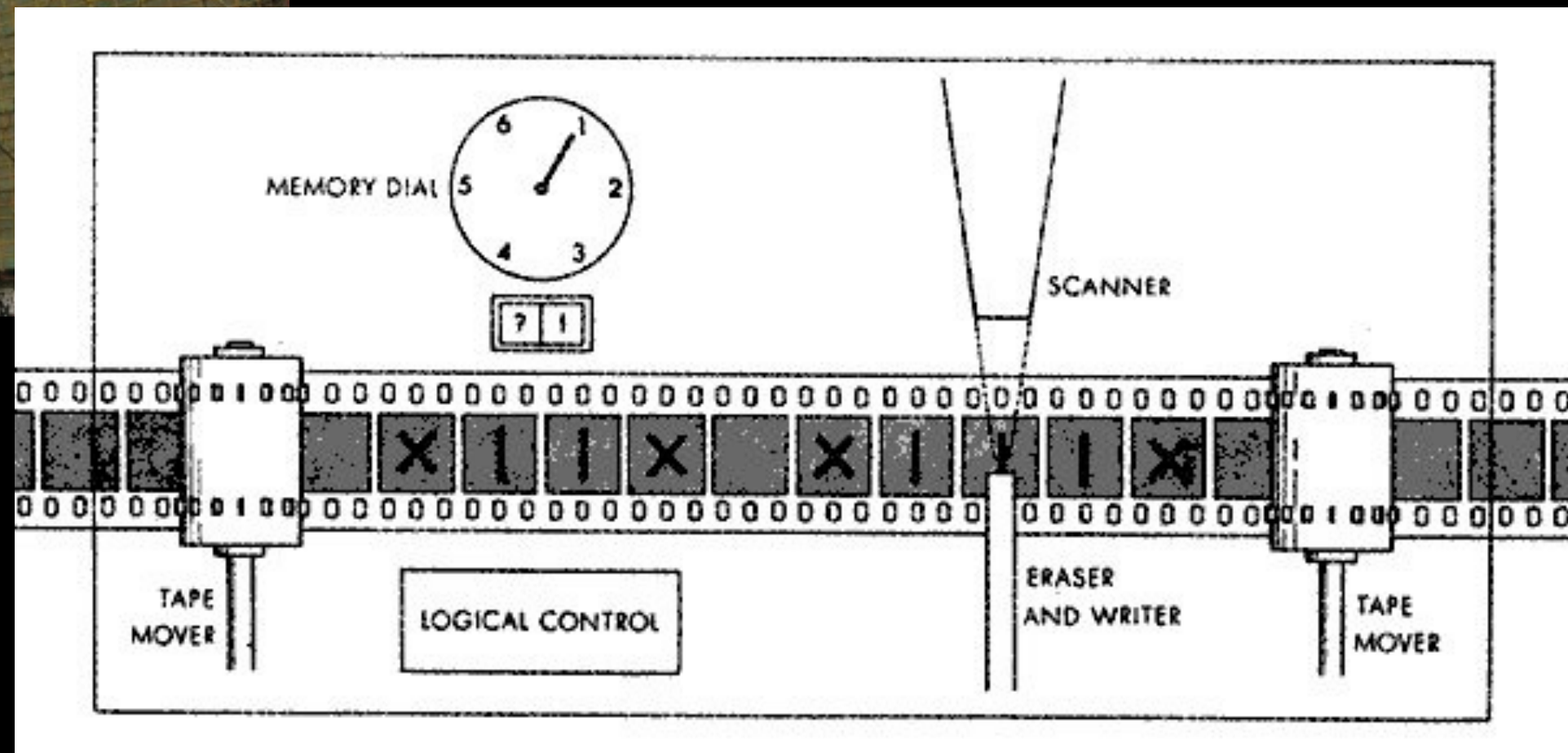
File Distribution



- NFS mounts
- rdist
- scp-on-a-for-loop
- rsync on cron

Execution Management

- Cluster SSH
- Golden Images
- ISConf



This used to be awesome.

```
for i in `cat servers.txt` ;  
do scp ntp.conf root@  
$i:/etc/ntp.conf ; done  
  
for i in `cat servers.txt` ;  
do ssh root@$i /etc/  
init.d/ntp restart ; done  
  
for i in `cat servers.txt` ;  
do ssh root@$i  
chkconfig ntp on ; done
```

- ^ does not scale

A bronze statue of a fisherman in a cap and boots, kneeling and pulling a thick rope. In the foreground, a hand is pulling the rope towards the viewer, creating a sense of tension. The background shows a modern building with glass windows and green trees.

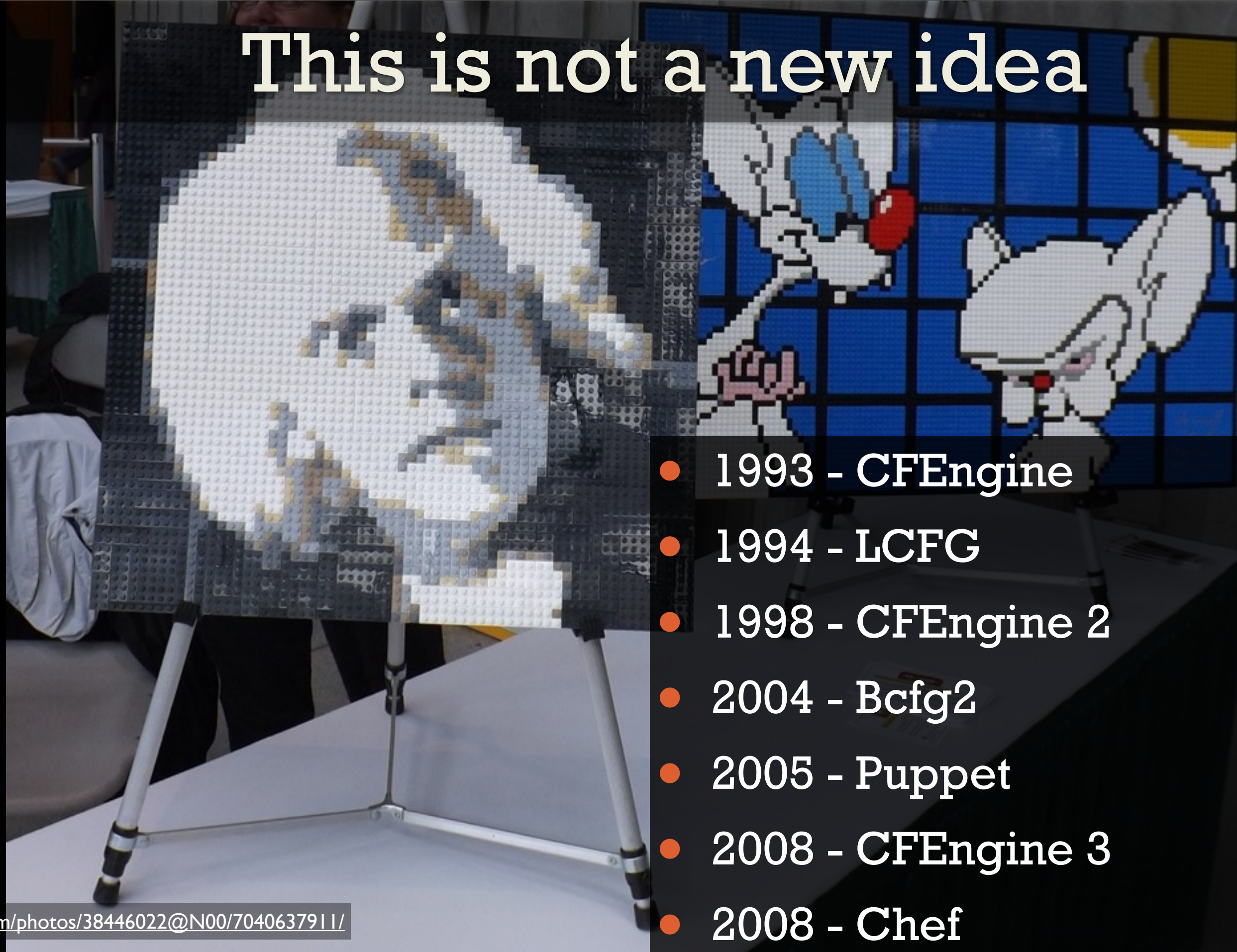
Push vs Pull

Declarative Policy Interface

- Define policy
- Say what, not how
- Executable documentation
- Long History

<http://www.flickr.com/photos/53696718@N07/5367325257/>

This is not a new idea



- 1993 - CFEngine
- 1994 - LCFG
- 1998 - CFEngine 2
- 2004 - Bcfg2
- 2005 - Puppet
- 2008 - CFEngine 3
- 2008 - Chef

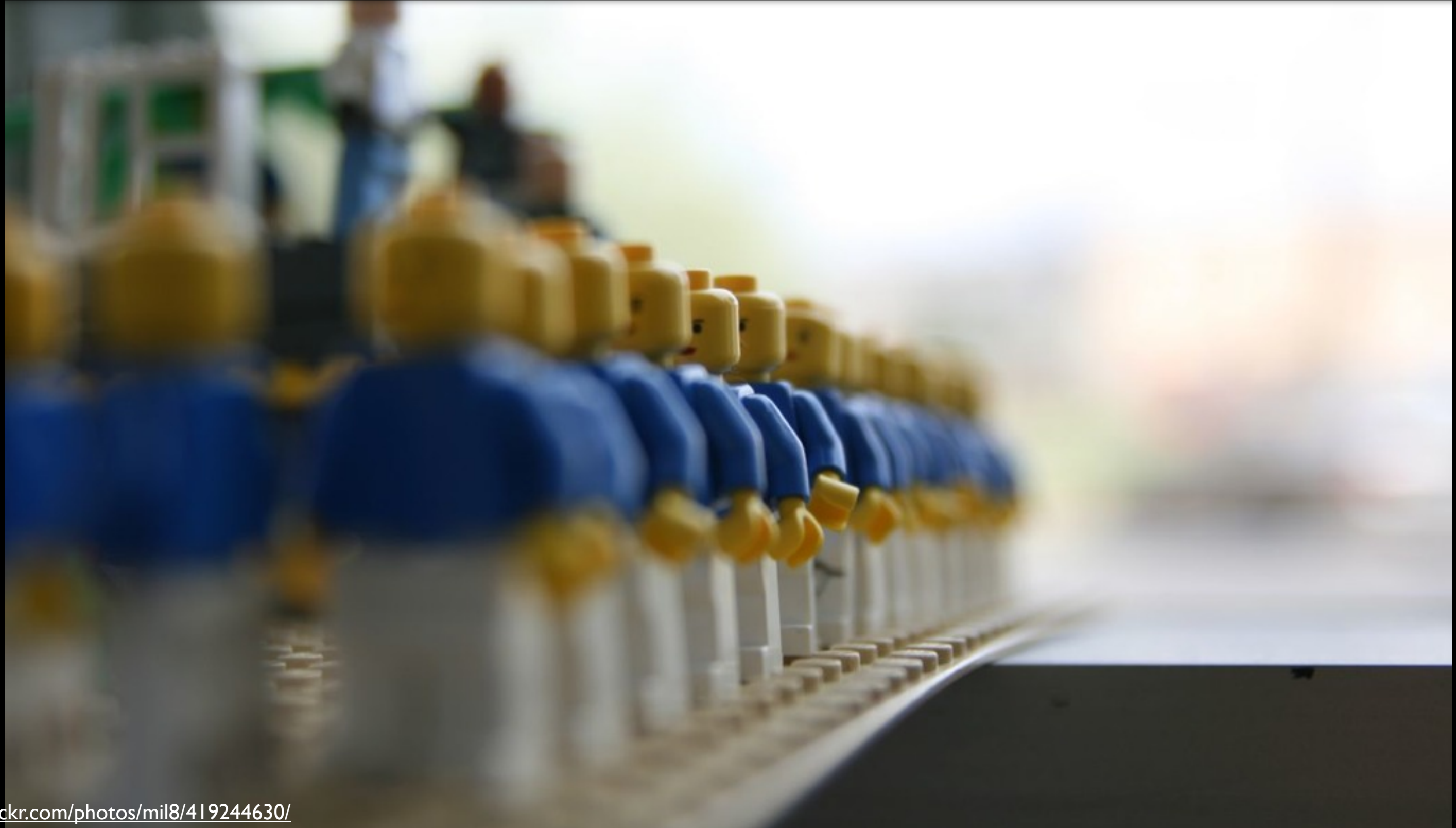
<http://www.flickr.com/photos/38446022@N00/7040637911/>



Convergence

<http://www.flickr.com/photos/dalbera/3009070876>

System of Operators



<http://www.flickr.com/photos/mil8/419244630/>

Loops



Constant Repair



```
file "/etc/shadow" do  
  owner "root"  
  mode "0600"  
end
```



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

template "/etc/ntpd.conf" do
  owner "root"
  mode "0644"
  notifies :restart, "service[ntpd]"
end

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


Larger Constructs



<http://www.flickr.com/photos/63056612@N00/18428735/>

```
template "/etc/ntp.conf" do
  owner "root"
  mode "0644"
  notifies :restart, "service[ntp]"
end

service "ntp" do
  action [:enable, :start]
end

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



```
directory "/var/log" package "java" user "ntp"
service "ntpd" user "httpd" template "pghba.conf"
template "/etc/logrotate.conf" package "python"
link "/usr/bin/java" cron "run-logrotate"
template "/etc/httpd.conf" service "postgresql-server"
service "httpd" package "ntp" package "postgresql"
directory "/srv/mahprogram" cron "dump-mahtables"
package "httpd" deploy "mahcoderepo" user "postgres"
file "/etc/shadow" template "/etc/ntpd.conf"
```

SCIENCE!



http://www.flickr.com/photos/windows_on_the_continuum/5724448340/

The Present



Chneef

A wooden sculpture of a face, possibly a mask or a piece of art. The face is made of light-colored wood and has two large, realistic eyes with detailed irises and pupils. The eyes are mounted on silver-colored metal frames. A large, clear, teardrop-shaped pendant hangs from the mouth area. The sculpture is set against a plain white background.

State of the Art



Internal DSL

<http://www.flickr.com/photos/myklroventine/3190432862/>

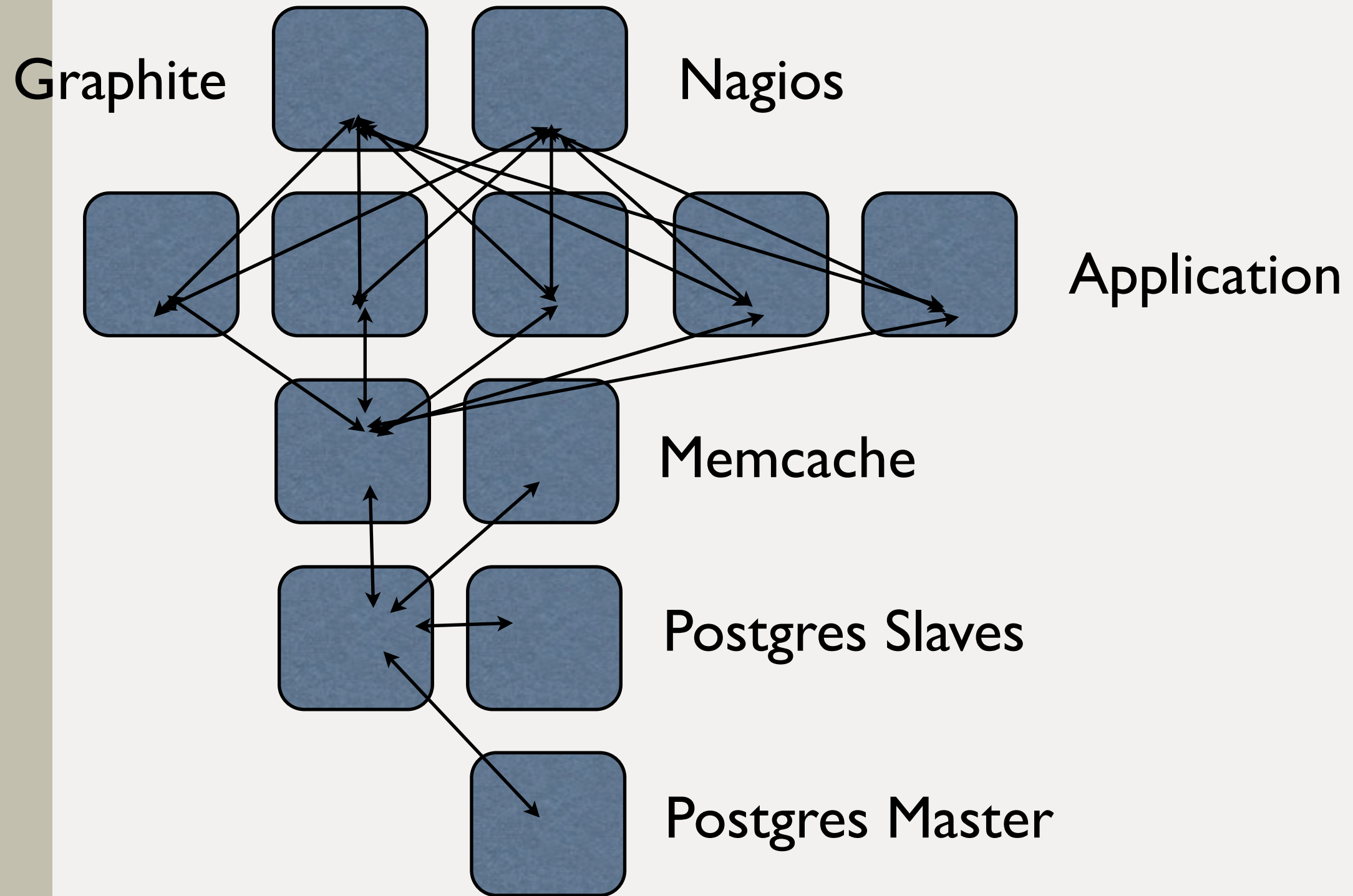
Search

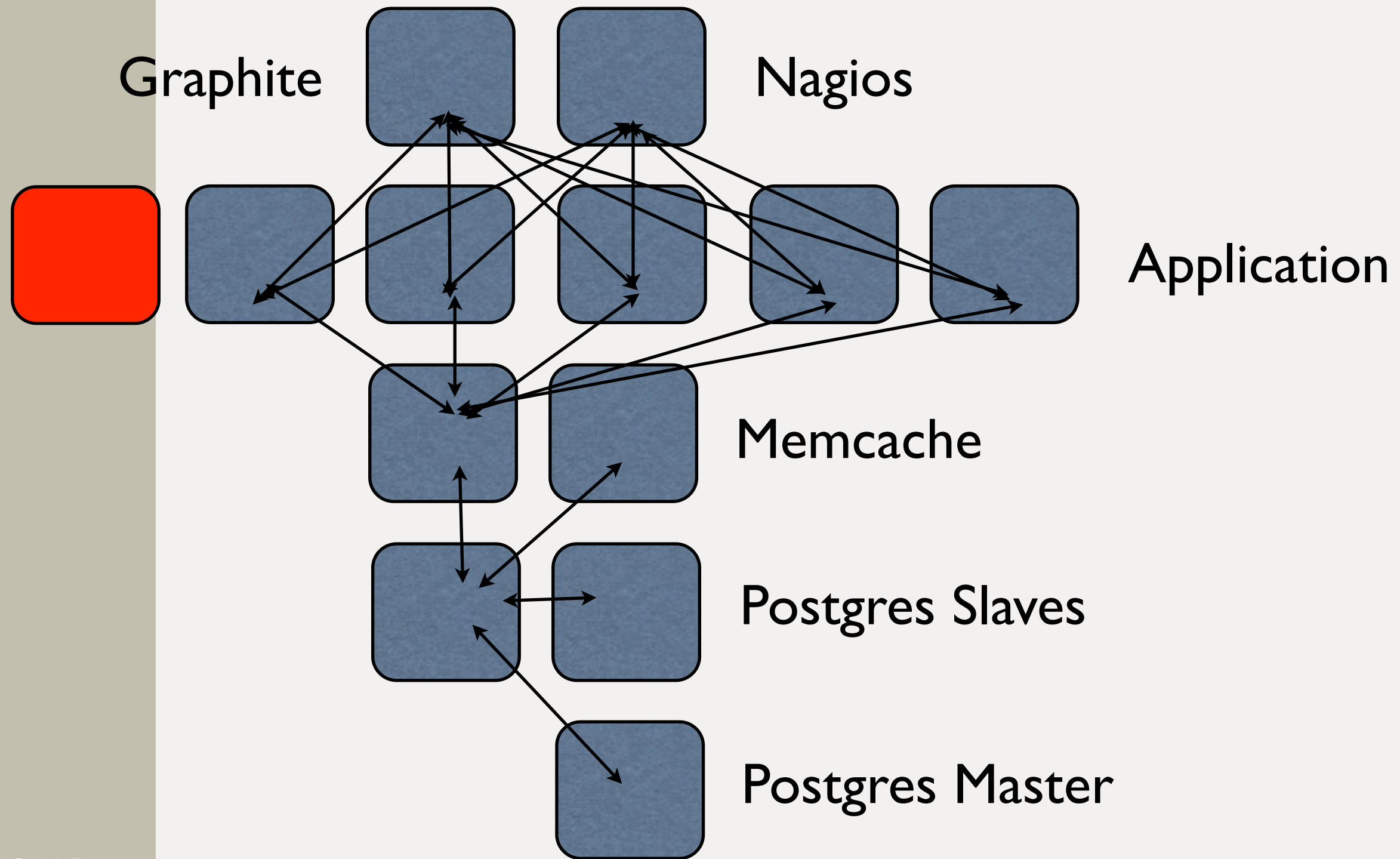


- Search for nodes with Roles
- Find topology data

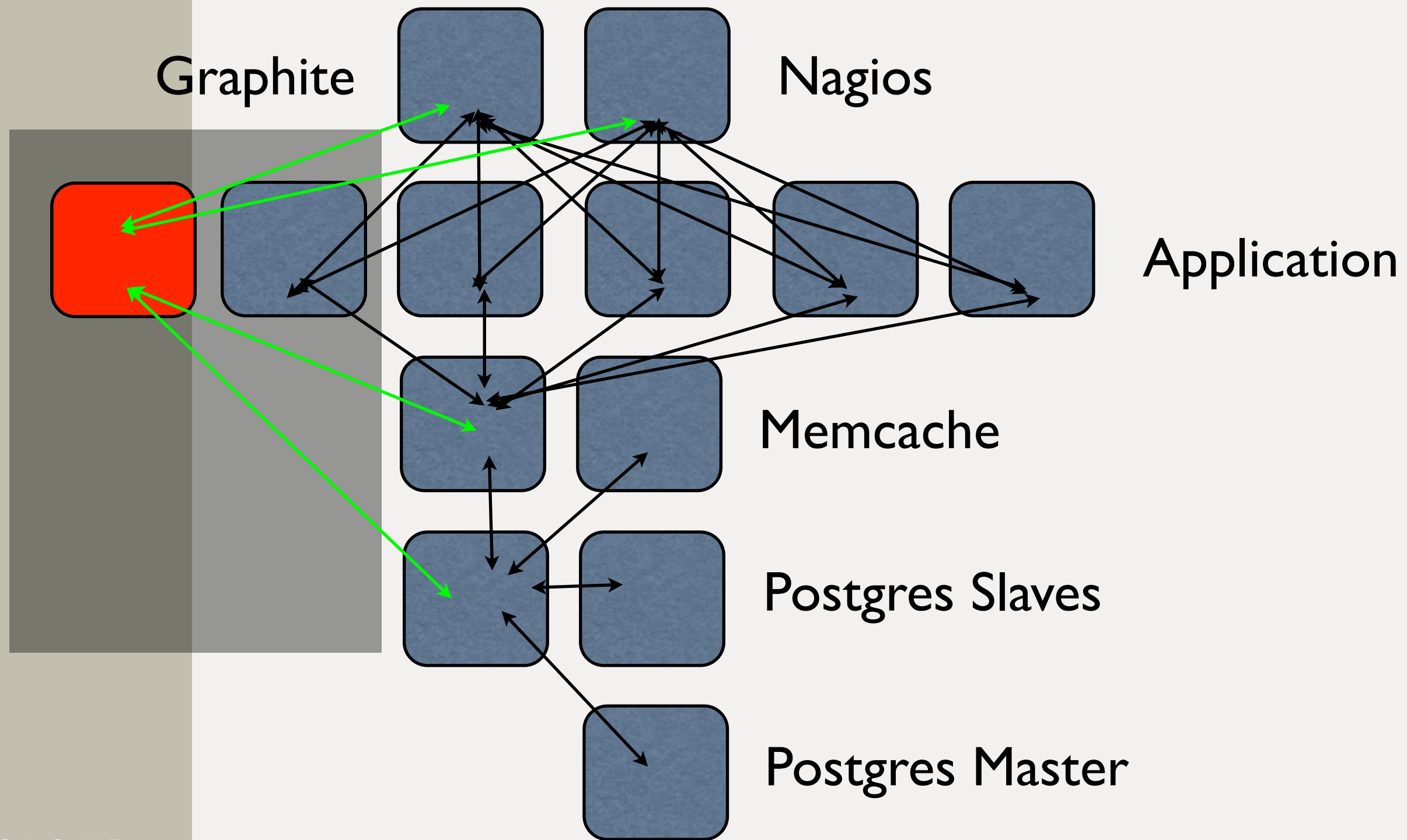
- IP addresses
- Hostnames
- FQDNs

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

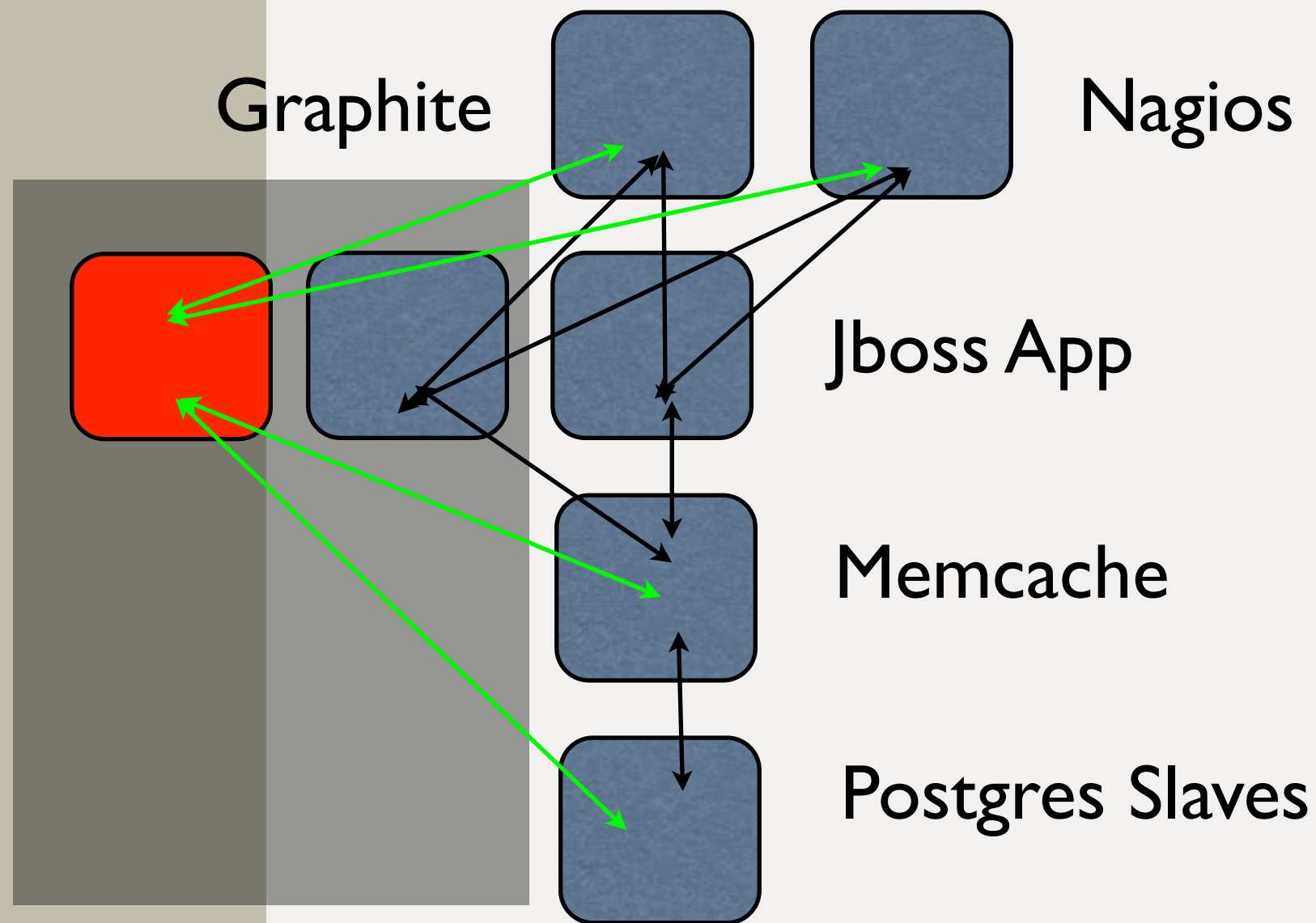




Automatic Integration



Count the resources



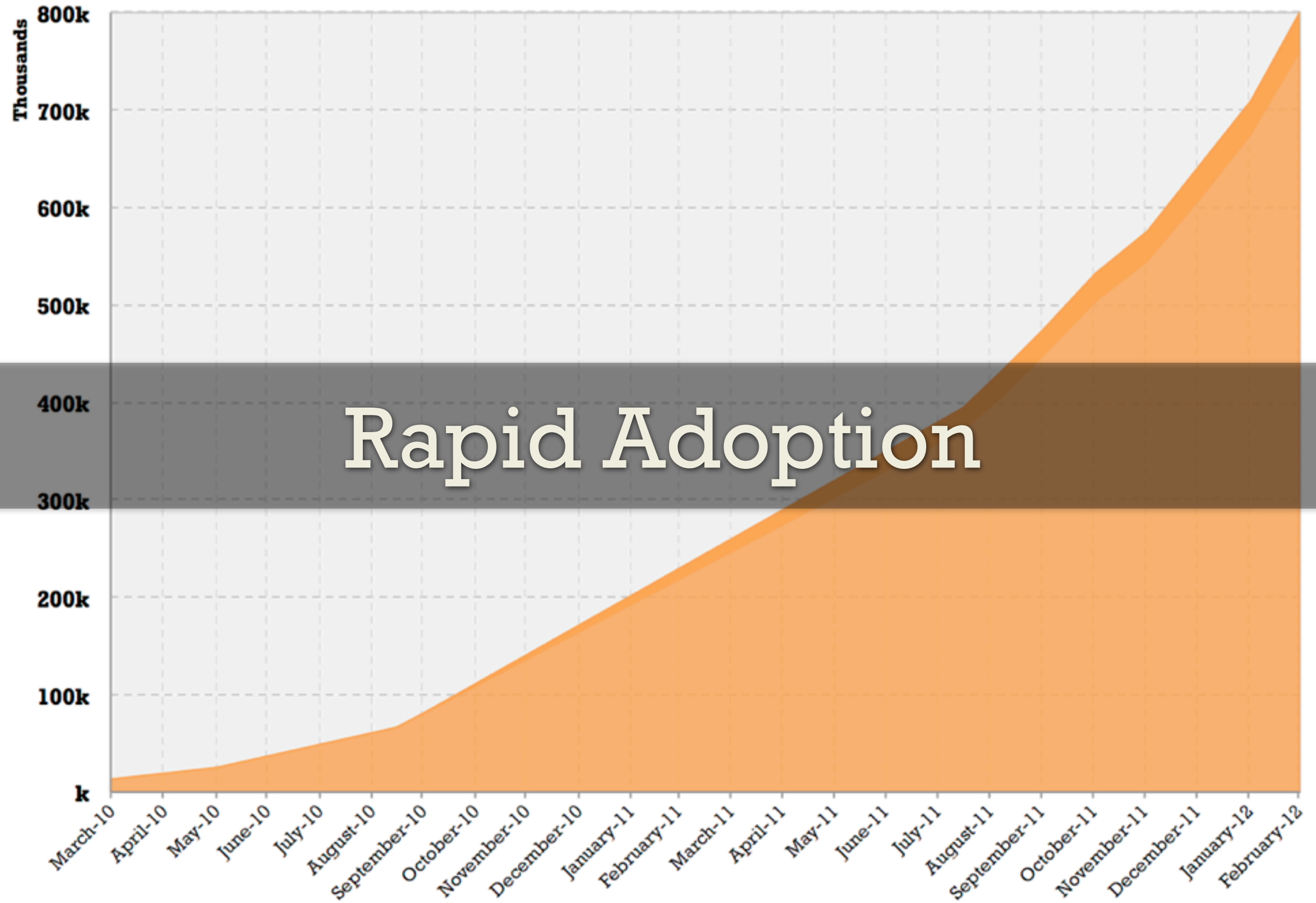
- Load balancer config
- Nagios host ping
- Nagios host ssh
- Nagios host HTTP
- Nagios host app health
- Graphite CPU
- Graphite Memory
- Graphite Disk
- Graphite SNMP
- Memcache firewall
- Postgres firewall
- Postgres authZ config

● 12+ resource changes for 1 node addition



```
{
  "id": "bob",
  "ssh_keys": "ssh-rsa AAAADEADBEEF",
  "groups": "sysadmin",
  "uid": 2001,
  "shell": "\/bin\/bash",
  "comment": "Praise Bob",
  "nagios": {
    "pager": "8005551212@txt.att.net",
    "email": "bob@opscode.com"
  }
}
```


Known Downloads of Opscode Chef



Rapid Adoption



Competition

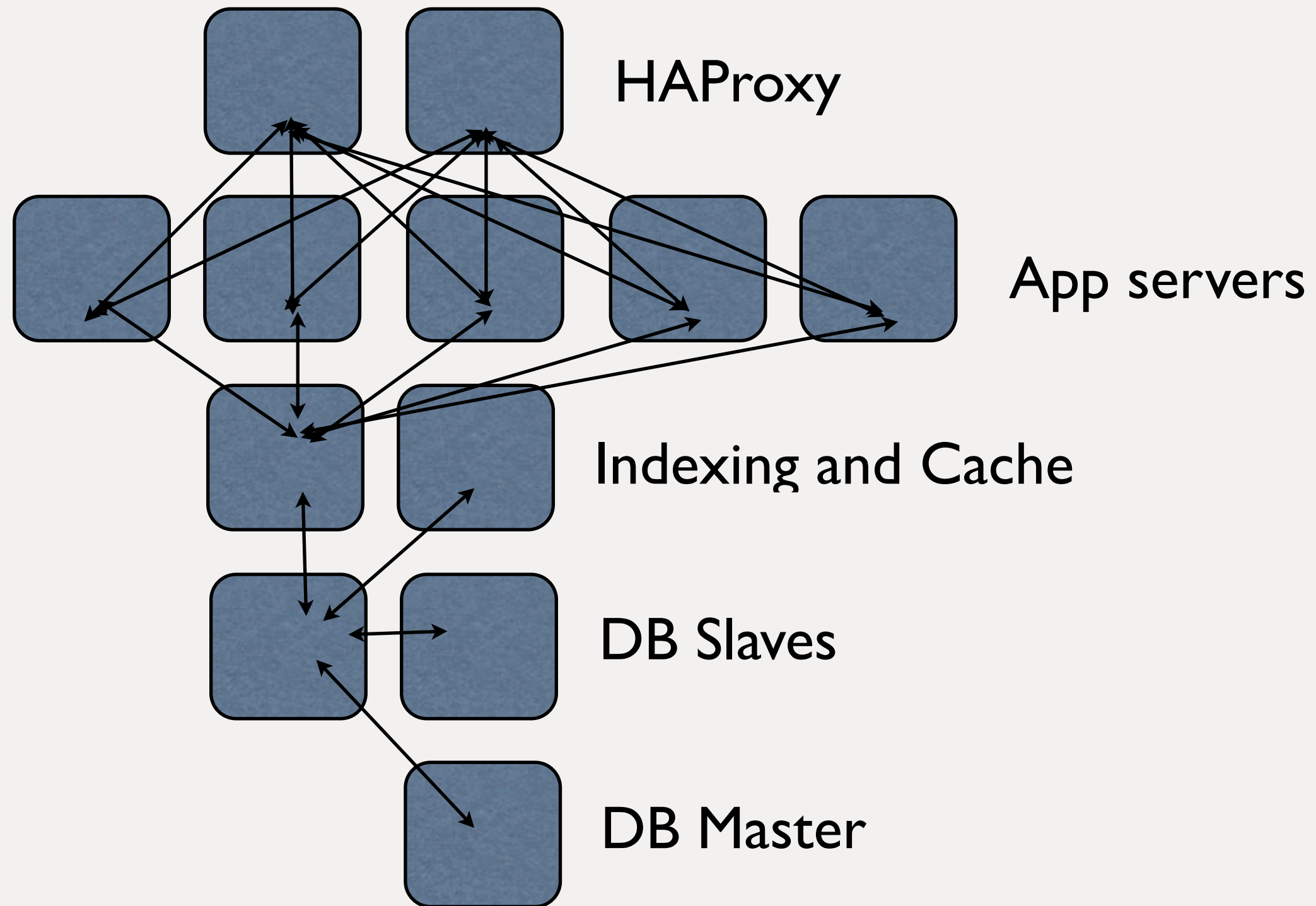


Community



The Future


Convergence Orchestration





Pattern Encoding

<http://www.flickr.com/photos/lrargerich/2787454868/>

A row of white chess pieces of varying sizes is arranged on a wooden surface. From left to right, the pieces are a large king, a medium rook, a medium knight, a small pawn, a very small pawn, and a tiny pawn. The pieces are illuminated from the right, casting soft shadows to the left. A dark horizontal banner is overlaid across the middle of the image, containing the word "Closures" in white, bold, sans-serif font.

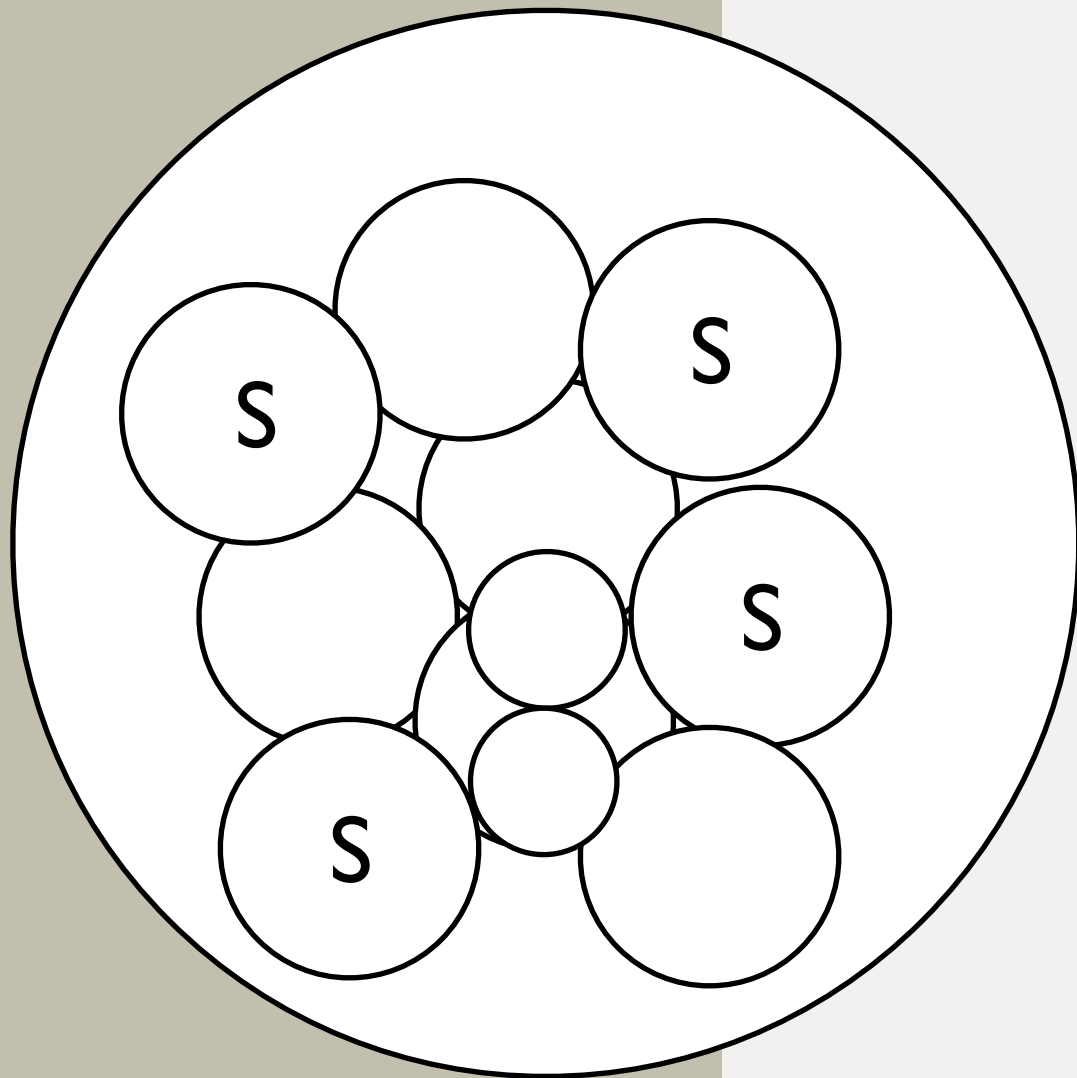
Closures

<http://www.flickr.com/photos/bluedino/392705560/>

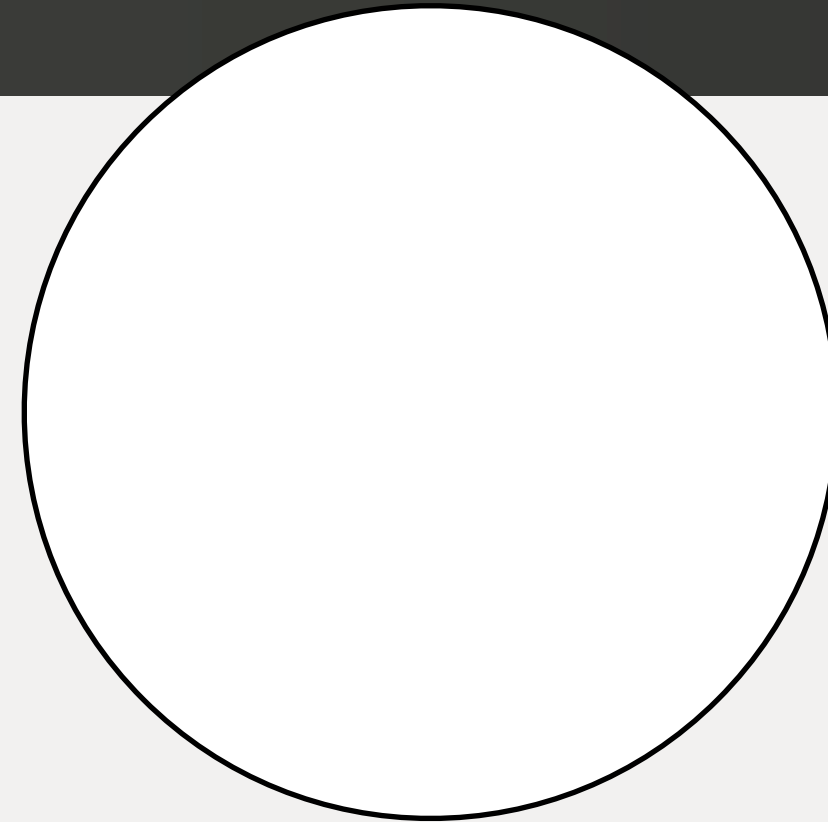


OPSCODE

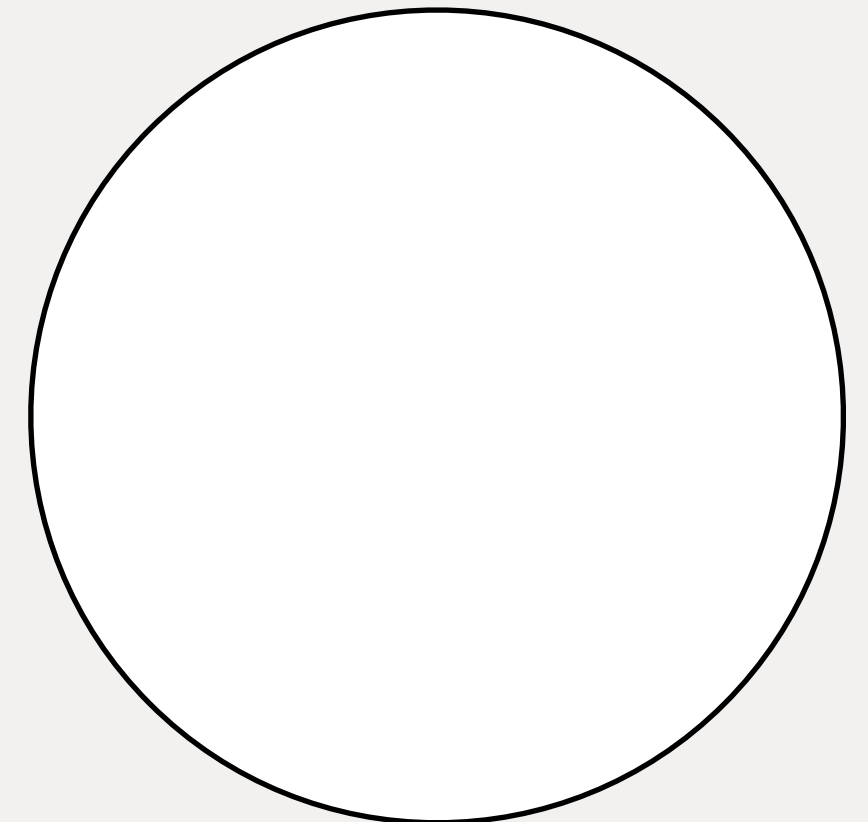
Mah Service



A Service

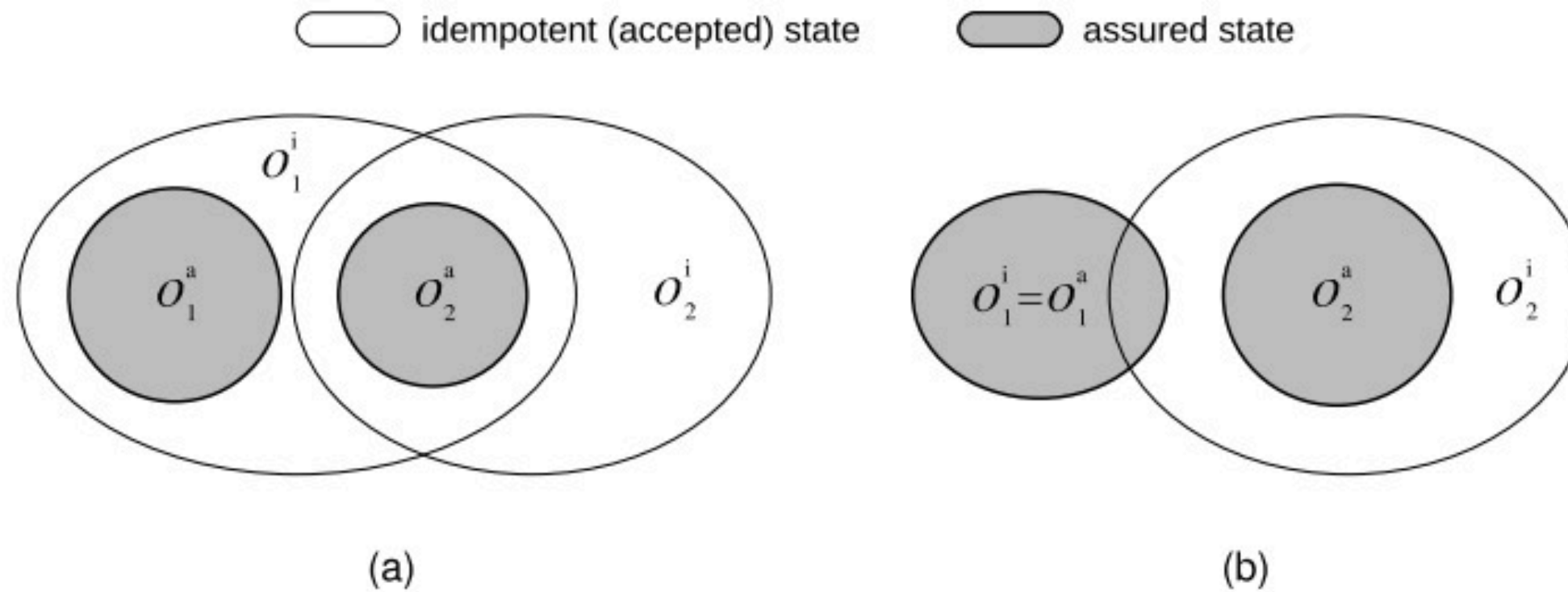


Some Service

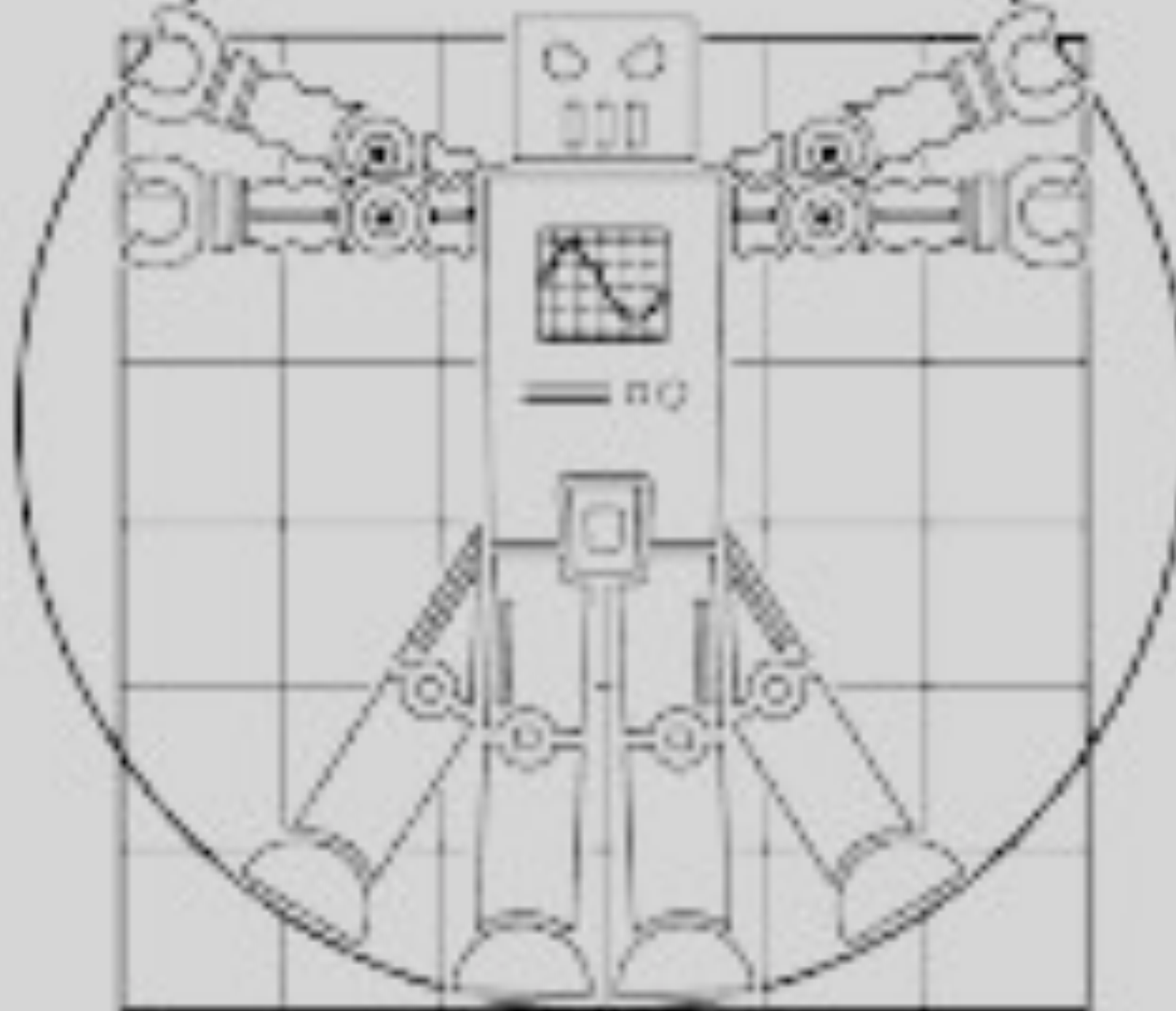


RULE THE CLOUD

Sets of Acceptable States



Change the world





OPSCODE



HELP US!!

RULE THE CLOUD

<http://www.flickr.com/photos/devenlaney/5767271943/>

Thank You!

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