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INFRASTRUCTURE AS CODE
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DevOps, Continuous Delivery, Agile Ops

ThoughtWorks®

Twitter: @kief
Book: http://oreil.ly/1JKIBVe
Site: http://infrastructure-as-code.com

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HOW LONG?

Provision a new server?
Rebuild a public-facing environment?
Change a configuration setting?
Roll out patches across all servers?
RISK
COWBOYS
or
BUREAUCRATS
FASTER IS SAFER

http://bit.ly/2cQQSOk
CHALLENGES

Automation rocks, but ...
SERVER SPRAWL
CONFIGURATION DRIFT

Servers start out identical

But changes accumulate over time
AUTOMATION FEAR CYCLE

I make changes outside my automation tool

My servers are inconsistent

I'm afraid that running my automation tool will break something
INFRASTRUCTURE AS CODE

Applying tools and practices from software engineering to infrastructure management.
PRINCIPLES

All your stuff can be **rebuilt**

All your things are **disposable**

Everything is **consistent**

There is no **end state**
PRACTICES
DEFINE SYSTEMS AS CODE

System design is:
▪ Reusable
▪ Consistent
▪ Visible
▪ Versioned
AUTOMATICALLY TEST CHANGES
DELIVER SMALL CHANGES FREQUENTLY
DESIGN TO ENABLE CHANGE
CONTINUOUSLY SYNCHRONIZE
OR CONTINUOUSLY REBUILD
FOUNDATIONS
Platforms and tools
subnet "app_server_subnet"
cidr_block: 10.0.1.0/24

firewall_rule "app_server_port"
allow:
  port: 8080
  protocol: http
  cidr_blocks: [0.0.0.0/0]

disk_volume "app_server_data"
size: 40

server_instance "app_server"
image: app-server-template
instance_type: medium
disks: app_server_data
subnet: app_server_subnet
firewall_rules: app_server_port
chef_role: app_server
DYNAMIC INFRASTRUCTURE PLATFORMS

Cloud

Virtual

Physical
PROGRAMMABLE
BASIC PIPELINE
Testing and promoting definitions
Deploy application, configuration, and infrastructure
Example: Shared server images
SHARED INFRASTRUCTURE

Example: Global infrastructure stack
GLOBAL STACK

VPC

SubnetA

SubnetB

LB Security Group

Service Security Group

Global stack definition
MULTIPLE PIPELINES

Global stack pipeline

Service stack pipelines
Test the global stack on its own

Apply changes to the global stack in production
SERVICE STACK PIPELINE

Global infrastructure stack

Service stack pipeline
DESIGN PATTERNS
Avoiding monolithic infrastructure
Modularity is helpful for sharing and reusing code
Modularity can actually make change more risky
The scope of a valuable change typically crosses layers.
Infrastructure Stack for the Viewer Service
- Load Balancer VIP
- Firewall Rule
- Web Server Vhost
- App Server Cluster

Infrastructure Stack for the User Service
- Load Balancer VIP
- Firewall Rules
- App Server Cluster
- Database Instance
Design systems so that changes can be made rapidly, frequently, and reliably.
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