CSSE6400

Brae Webb

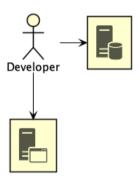
March 21, 2022

How did we get here?

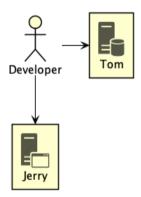
Pre-2000

The Iron Age

Iron Age



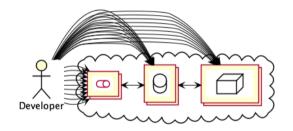
Iron Age



Introducing...

The Cloud Age

The Cloud Age



When faced with complexity

Automate it!

Server Config Config Management

Server Config Config Management Application Config Config Files

Server Config Config Management
Application Config Config Files
Provisioning Infrastructure Code

Server Config Config Management
Application Config Config Files
Provisioning Infrastructure Code
Building Continuous Integration

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Deployment Continuous Deployment

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Server Config Config Management

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Testing Automated Tests
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Specifications Behaviour Driven Development

Definition 1. Infrastructure Code

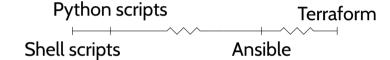
Code that provisions infrastructure resources.

Definition 2. Infrastructure Code

Code that provisions infrastructure resources.

Definition 3. Infrastructure Resources

Compute resources, networking resources, and storage resources.



```
#!/bin/bash

SG=$(aws ec2 create-security-group ...)

aws ec2 authorize-security-group-ingress --group-id "$SG"
```

INST=\$(aws ec2 run-instances --security-group-ids "\$SG" \

--instance-type t2.micro)

8

```
import boto3
   def create instance():
       ec2_client = boto3.client("ec2", region_name="us-east-1")
       response = ec2.create_security_group(...)
       security_group_id = response['GroupId']
      data = ec2.authorize_security_group_ingress(...)
8
       instance = ec2 client.run instances(
1.0
          SecurityGroups=[security_group_id],
11
          InstanceType="t2.micro",
12
13
           . . .
```

14

```
resource "aws instance" "hextris-server" {
       instance_type = "t2.micro"
       security_groups = [aws_security_group.hextris-server.name]
       . . .
   resource "aws_security_group" "hextris-server" {
       ingress {
          from_port = 80
          to_port = 80
10
11
           . . .
12
13
       . . .
14
```

Question

Notice anything different?

The main difference

Imperative vs. Declaritive

• Provisions and manages *infrastructure resources*.

- Provisions and manages infrastructure resources.
- Only one part of the movement to automate the complexities of development.

- Provisions and manages infrastructure resources.
- Only one part of the movement to <u>automate</u> the complexities of development.
- Ranges from simple shell scripts up to...?

- Provisions and manages infrastructure resources.
- Only one part of the movement to *automate* the complexities of development.
- Ranges from simple shell scripts up to...?
- Tendancy to be declaritive.

Typo?

Infrastructure Code \neq Infrastructure αs Code

Definition 4. Infrastructure as Code

Following the same *good coding practices* to manage Infrastructure Code as standard code.

Warning! Infrastructure as Code still *early* and quite *bad*. Question

What are *coding practices*?

Everything as code

```
#!/bin/bash

./download-dependencies

./build-resources
```

cp -r output/* artifacts/

```
#!/bin/bash

./download-dependencies

./build-resources

cp -r output/* artifacts/
```

```
$ cp: directory artifacts does not exist
```

```
resource "aws_instance" "hextris-server" {
   instance_type = "t2.micro"
   security_groups = ["sg-6400"]
...
```

```
resource "aws instance" "hextris-server" {
       instance_type = "t2.micro"
       security_groups = [aws_security_group.hextris-server.name]
       . . .
   resource "aws_security_group" "hextris-server" {
       ingress {
          from_port = 80
          to_port = 80
10
11
           . . .
12
13
       . . .
14
```

Version control

Benefits

- 1. Reproducable.
- 2. Restorable.
- 3. Accountable.

Automation

Re-use Code

Testing