Infrastructure Automation: Real Examples

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We live in an automated world

infrastructure automation is robotics for IT

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Infrastructure as Code

Know the intent and implementation of your system

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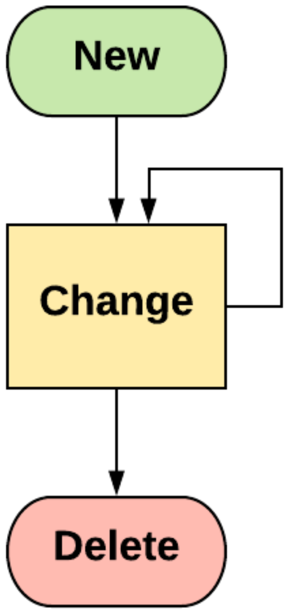
Automation is more than provisioning

- Managing changes
- Cleanup and deletion



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Why not automation?

- Additional point of failure
- Too clever for its own good
- Code as a liability
- Sometimes additional costs

These are all risks we currently manage within IT

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Many tools to choose from

including

- Ansible
- Docker
- Lambda
- CloudFormation

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Examples

↳ github.com/bioteam/infrastructure-automation

Ansible

Configure your server

webserver.yml

```yaml
---
- hosts: localhost
  tasks:
    - name: install nginx
      package: name=nginx state=present

    - name: set to run on boot
      service: name=nginx enabled=yes state=started
```

database.yml

```yaml
---
- hosts: localhost
  tasks:
    - name: install postgresql
      package: name=postgresql state=present

    - name: update config file
      lineinfile:
        path: /etc/postgresql/9.6/main/postgresql.conf
        regexp: '^synchronous_commit ='
        line: 'synchronous_commit = {{ pg_sync|default("on") }}'
      register: postgres_config

    - name: set to run on boot
      service: name=postgresql enabled=yes state=started

    - name: restart service
      service: name=postgresql state=restarted
      when: postgres_config.changed
```

```
ansible-playbook database.yml
```

Get Started

↳ `pip install ansible`

↳ github.com/ansible/ansible-examples

↳ docs.ansible.com/ansible/latest/user_guide/playbooks_intro.htm

Docker

Applications in Containers

Dockerfile

```
FROM node

RUN git clone https://github.com/hakimel/reveal.js.git && \
    cd reveal.js && npm install

EXPOSE 8000
WORKDIR /reveal.js
CMD ["npm", "start"]
```

```
docker build -t my-image .
```

docker-compose.yml

```yaml
---
version: '3'
services:
  mediawiki:
    image: mediawiki
    restart: always
    ports: ['8080:80']
    links: ['database']
    volumes:
      - /var/www/html/images
#     - ./LocalSettings.php:/var/www/html/LocalSettings.php
  database:
    image: mariadb
    restart: always
    environment:
      MYSQL_DATABASE: my_wiki
      MYSQL_USER: wikiuser
      MYSQL_PASSWORD: example
      MYSQL_RANDOM_ROOT_PASSWORD: 'yes'
```

```
docker-compose up
```

Get Started

↳ www.docker.com/products/docker-desktop

↳ docs.docker.com/compose/gettingstarted/

Lambda

Event-driven automation

autotag.py

```python
import boto3
ec2 = boto3.client('ec2')

def lambda_handler(event, context):
    principal_type = event['detail']['userIdentity']['type']
    if principal_type == 'IAMUser':
        username = event['detail']['userIdentity']['userName']
    else:
        username = event['detail']['userIdentity']['principalId']

    response = event['detail']['responseElements']
    instance_ids = [i['instanceId']
                    for i in response['instancesSet']['items']]

    ec2.create_tags(Resources=instance_ids,
                    Tags=[{"Key": "Owner", "Value": username}])
```

```
demo-autotag.sh
```

Other ideas

- Manage DNS entries
- Integrate with a CMDB
- Automate application rollout
- Automatic health checks for critical applications
- Data pipelines and ETL

Get Started

↳ docs.aws.amazon.com/AmazonCloudWatch/latest/events/CloudWatch-Events-Tutorials.html

CloudFormation

AWS infrastructure templates

bucket.yml

```yaml
---
AWSTemplateFormatVersion: "2010-09-09"
Parameters:
  BucketName:
    Type: String
    Default: my-awesome-bucket

Resources:
  StaticBucket:
    Type: "AWS::S3::Bucket"
    Properties:
      BucketName: !Ref BucketName
```

whatismyip.yml

```yaml
AWSTemplateFormatVersion: "2010-09-09"
Transform: "AWS::Serverless-2016-10-31"
Resources:
  WhatIsMyIP:
    Type: "AWS::Serverless::Function"
    Properties:
      Handler: index.handler
      Runtime: python3.7
      InlineCode: |
        import json
        def handler(event, context):
          body = {'ip': event['requestContext']['identity']['sourceIp']}
          return {'statusCode': '200', 'body': json.dumps(body)}
      Events:
        Web:
          Type: Api
          Properties:
            Path: /
            Method: get
```

```
aws cloudformation create-stack

--stack-name whatismyip --template-body file://whatismyip.yml
--capabilities CAPABILITY_AUTO_EXPAND CAPABILITY_IAM
```

Get Started

↳ docs.aws.amazon.com/AWSCloudFormation/latest/UserGuide/gettingstarted.templatebasics.html

↳ aws.amazon.com/serverless/sam

Thanks!

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