# AWS Meetup: DevOps

**Date:** 4/27/2016

**Presenter:** Aater Suleman

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# About Flux7

**Aater Suleman**
Co-Founder & CEO Flux7
Faculty, University of Texas at Austin

**Flux7: Cloud and DevOps Solutions**
Founded in 2013
Team of 35+
Headquartered in Austin, Texas

## Achievements

**AWS DevOps, Healthcare, and Life Sciences Competencies**

TechTarget's "**Impact Best AWS Consulting Partner**" two years in a row (2015 & 2016)

**Partner Recognition Award by AWS at reInvent 2015**

Customers featured on stage at AWS re:Invent three years in a row

Docker Foundation and authorized consulting partner

150+ happy customers through word of mouth

*"[Flux7] taught us how to do 10x the work in 1/10th the time" - Patrick K, AWS Re:invent'14, CTO's Keynote*

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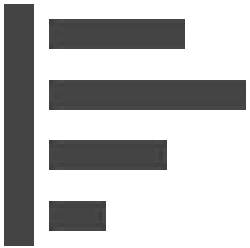
# Quick Poll

## HOW MANY?



- ★ Frontend HTML/JS developers
- ★ Backend developers
- ★ Operations folks
- ★ Business: Managers/executives

## HOW MANY?

- ★ Enterprise ( > 1B in cap )
- ★ Mid-tier
- ★ SMBs

# POP

**Purpose:**

To provide the audience working knowledge and a sample DevOps workflow implemented on AWS

**Outcomes:**

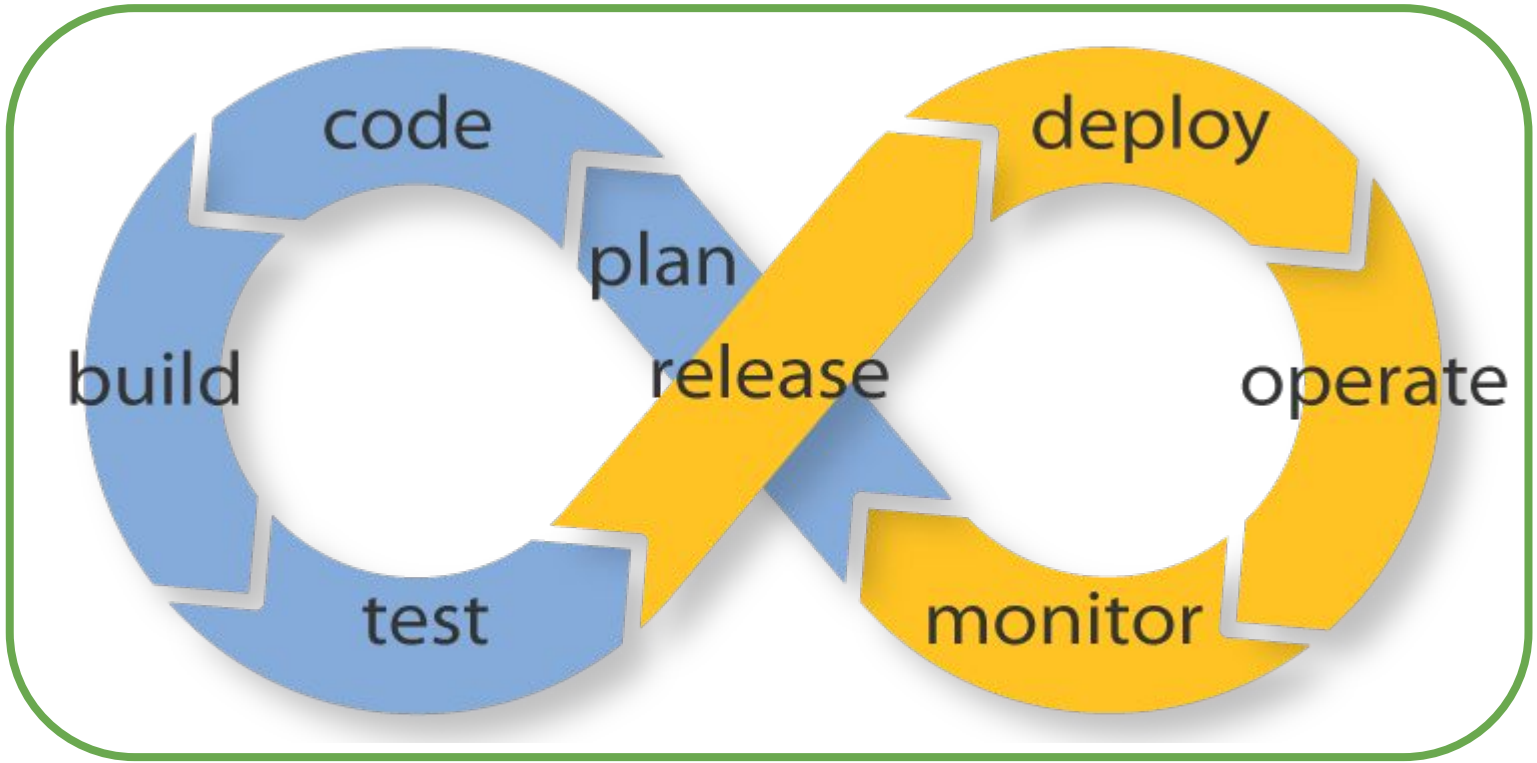
- The audience shall be able to:
  - The role of 4Cs in DevOps
  - A sample use of each C and how everything ties together
- Take home a working DevOps environment

# POP (Continued)

- Cloud → Automated Infrastructure Provisioning
- Config management → Automated software provisioning
- Containers → Building DevOps using containers
- CI/CD → Using the automation to build continuous delivery

# DevOps

# DevOps



# Delivery of Technology

**Delivering technology includes the delivery of:**

Infrastructure


Code

Server Configurations

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Code

Server Configurations

# AWS DevOps 4 Cs - Part 1
## CloudFormation

# Pre-reqs

A laptop with web browser, a text editor, and Wifi


AWS account with PowerUser privileges

# Outcomes

**You will be able to:**

- ☑ Understand the anatomy of CloudFormation
- ☑ Be able to read and modify CloudFormation
- ☑ Deploy a CloudFormation stack
- ☑ Update a CloudFormation stack
- ☑ Access a web app running on the servers behind an ELB

# Agenda

## Present

- ➔ Provide a big picture view of CloudFormation
- ➔ CloudFormation concepts
- ➔ Walkthrough a sample CloudFormation stack

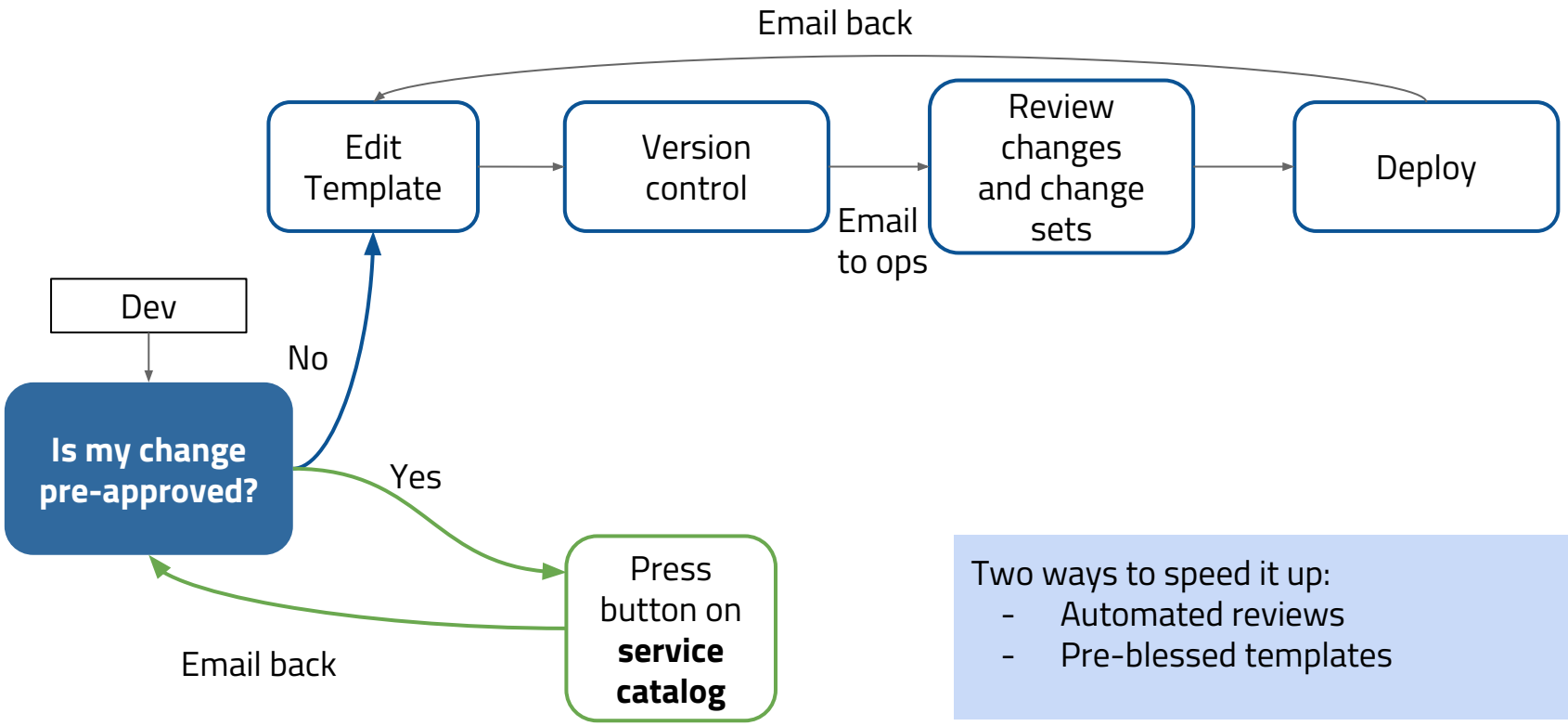
## Hands On

- ➔ Deploy a simple CloudFormaitonStack
- ➔ Deploy a complex Stack
- ➔ Extend a CloudFormation stack

# Infrastructure Delivery

- ➔ Request
- ➔ Review
- ➔ Deployment
- ➔ Delivery
- ➔ Audit Trails

# Infrastructure Delivery in DevOps




Two ways to speed it up:

- Automated reviews
- Pre-blessed templates

# CloudFormation

# CloudFormation

✓ Infrastructure as code

✓ Describe the Resources with a JSON descriptor

```
"WebSg": {
            "Type" : "AWS::EC2::SecurityGroup",
            "Properties" : {
                "GroupDescription" : "Security group attached to the webservers",
                "SecurityGroupIngress" : [
                  { "CidrIp":"10.0.0.0/8", "FromPort":"80",  "ToPort":"80",  "IpProtocol":"
tcp" },
                  { "CidrIp":"10.0.0.0/8", "FromPort":"443", "ToPort":"443", "IpProtocol":"
tcp" },
                  { "SourceSecurityGroupId":{"Ref":"WebElbSg"}, "FromPort":"80",  "ToPort":"
80",  "IpProtocol":"tcp" }
                ],
                "VpcId" : {"Fn::FindInMap":["VpcConfig",{"Ref":"VpcStack"},"Vpc"]}
            }
        },
```

# CloudFormation

Handles ordered creation and deletion of resources

Updates will create new resource before destruction of the old one

Includes automated rollback in failure

Leaves an audit trail of changes applied

# Taxonomy: Nouns

**Template:**

A JSON file containing a description of the architecture

**Stacks:**

Instantiation of a CloudFormation template

**Parameters:**

The input parameters provided when creating a stack

**Resources:**

The resources that make up a stack

**Events:**

The events that take place while a CF operation (e.g., creation, update, deletion, or rollback) is taking place

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# Taxonomy: Verbs

**Create:**
The operation of creating a new CloudFormation stack using a template

**Update:**
The action to update an existing stack by making changes to the template

**Delete:**

The action to delete a CloudFormation stack

**Rollback:**

The actions triggered when a Stack creation or update fails mid-way. Purpose is to undo any changes made by the operation stack

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# Taxonomy: Adjectives

**Created:**

A stack creation operation has successfully completed

**Updated:**

A stack update operation has successfully completed

**Deleted:**

A stack update operation has successfully completed and the stack is no longer listed as a stack on the AWS console

**Corrupted:**

A stack is considered corrupted if the rollback operation fails

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# Anatomy of a template

## Parameters

Declare parameters that the user must specify when they want to create a stack

***Examples***: Name of an instance, number of instances, instance types, etc

## Resources

Declare resources to be created when a stack is created

***Examples***: Instances, ELBs, VPCs, EBS volume, S3 buckets, etc

## Outputs

The outputs to be displayed to the user once the stack creation/update has completed

***Examples***: Endpoint of the ELB

## Attributes

The properties of a parameter, resource, and outputs. Some are defined in the template and others get populated when the stack is created

# Anything else?

- **References**: It is possible to reference one resource when defining the attributes of another resource, e.g., use a reference to the routing table when creating a subnet
- **Conditionals**: It is possible to set a properly based on a conditional, e.g, if a DB snapshot parameter is defined, use it otherwise create a fresh DB
- **Depends On and Signals**: It is possible to enforce order on creation of resources, e.g., that application servers be created *after* the DB has been created
- **Joins**: To help with creating names of resources, you can concatenate two or more strings
- **Mappings:** To match a key with a corresponding set of name values

# Anything else?

- **API Version**: API Version of  CF template you specify in each template
- **Signals**: Mechanism to signal CloudFormation when a particular activity is complete

# Resources

Starter Code:
https://github.com/Flux7Labs/aws-devops-tutorial

# What resources can CF provision?

Nearly all AWS services can be provisioned via templates:

- **Network:** VPC, subnets, routing tables, gateways
- **Infrastructure:** Instances, Load balancers
- **IAM:** User accounts, permissions, groups, and privileges
- **Custom:** It is possible to declare customer resources which can be inside or outside AWS

# How do I:

? **Write a template**
- ◎ Text editor (VS, Eclipse)

? **Catch syntactic errors**
- ◎ CF validate

? **Catch logical errors**
- ◎ ChangeSets

? **Provision**
- ◎ Create stack

? **Access outputs**
- ◎ Review the console

? **Update an existing stack**
- ◎ Update stack

? **Debug errors**
- ◎ Review error logs

# Thank You