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Driving DevOps Transformation in Enterprises

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acts_as_enterprisey

start up

enterprises

enterprises and monolith software

DevOps

Drive securely and fast

A culture clash

Developers goal: release customer features

Operators goal: keep the lights on

Never change a running system?

Development and Operations teams (should) own a business goal

DevOps requires organizational changes

Two Pizza Teams at Amazon

Decentralization

Autonomy

Accountability

Ownership

DevOps

DevOps pillars

Informational silos

Accept failures

Frequent and small changes

Automation, tooling

Monitoring

DevOps pillars

Informational silos

Accept failures

Frequent and small changes

Automation, tooling

Monitoring

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DevOps: Automation and Tooling

Automation and Tooling in the cloud

Public clouds make infrastructure behave like software

No need for complicated capacity planning

Services make applications scale

Failover and Scaling in minutes

Infrastructure as code

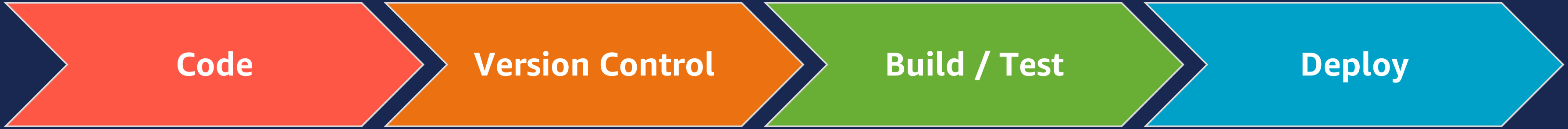
AWS CloudFormation

- Infrastructure as code for AWS Services
- Similar to Terraform but AWS optimized
- Templates in YAML or JSON

Amazon EC2 · Amazon VPC · AWS Lambda · Amazon S3 · Amazon DynamoDB · Amazon CloudFront · Elastic Load Balancing · Amazon CloudWatch

AWS Elastic Beanstalk · Amazon ECS · Elastic Load Balancing · Amazon RDS · Amazon Redshift · Amazon VPC

Infrastructure as Code workflow



Code

Version Control

Build / Test

Deploy

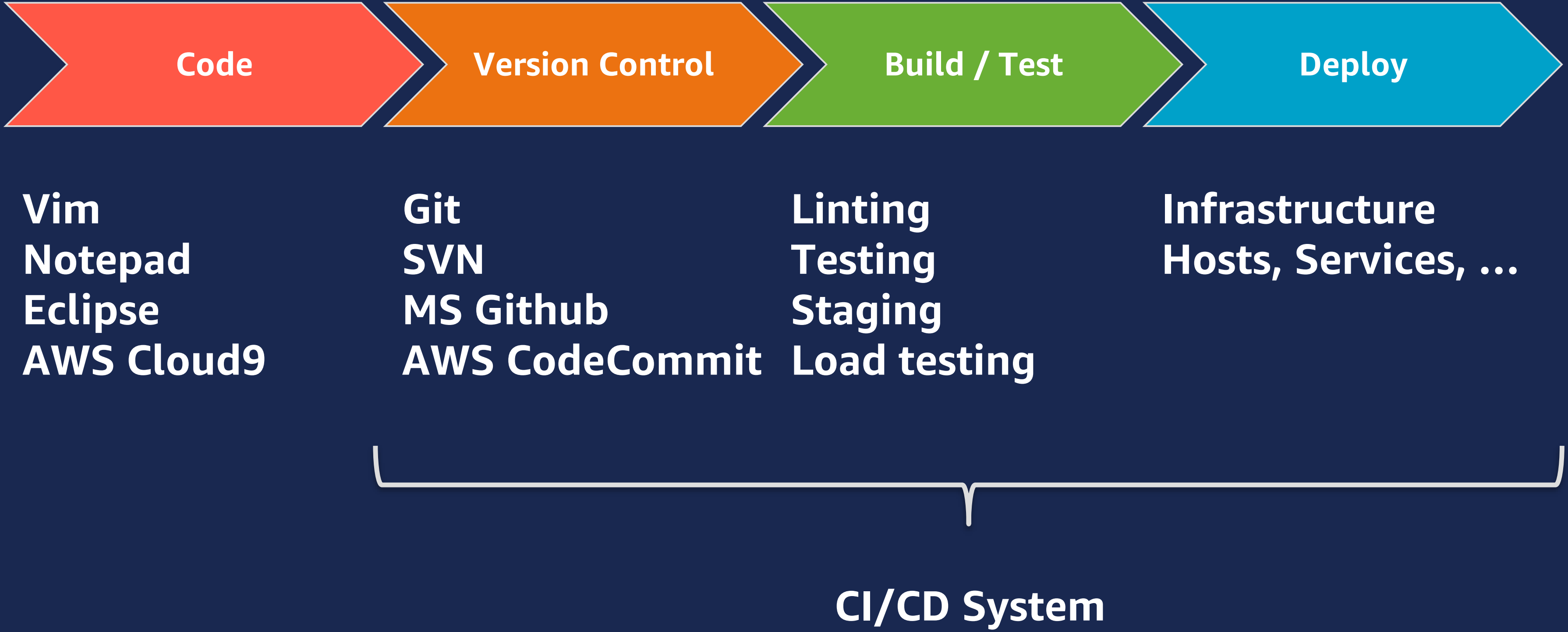
Vim
Notepad
Eclipse
AWS Cloud9

Git
SVN
MS Github
AWS CodeCommit

Linting
Testing
Staging
Load testing

Infrastructure
Hosts, Services, …

Infrastructure as Code workflow



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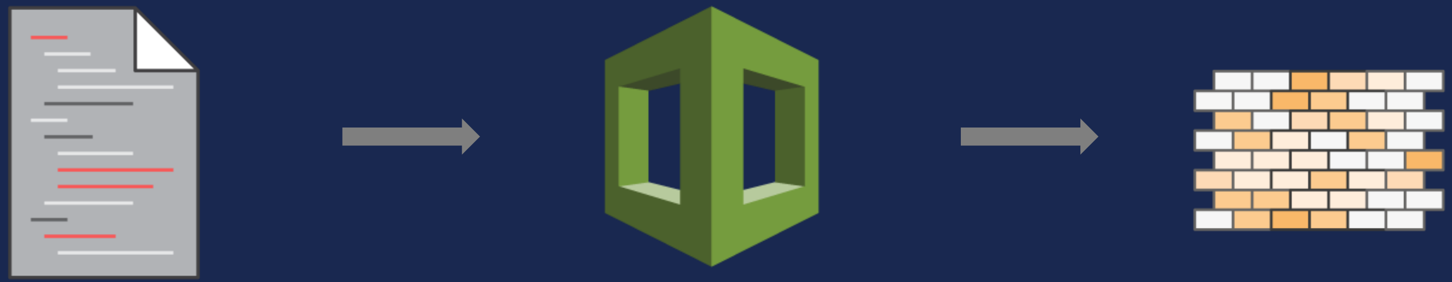
CI/CD System

CloudFormation concepts and technology



Template

JSON/YAML formatted file

Parameter definition

Resource creation

Configuration actions

CloudFormation

Framework

Stack creation

Stack updates

Error detection and rollback

Stack

Configured AWS resources

Service event aware

Customizable

Bootstrapping Servers

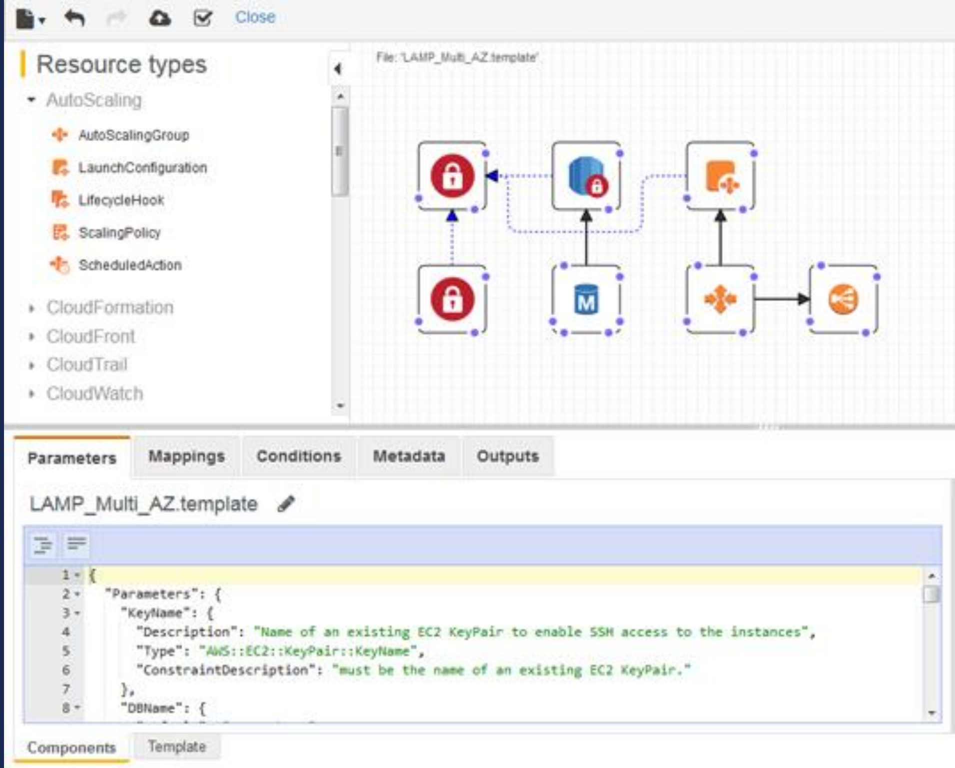
```
"Resources" : {
  "Ec2Instance" : {
    "Type" : "AWS::EC2::Instance",
    "Properties" : {
      "KeyName" : { "Ref" : "KeyName" },
      "SecurityGroups" : [ { "Ref" : "InstanceSecurityGroup" } ],
      "ImageId" : "ami-79fd7eee"
    }
  }
```

Bootstrapping Servers with Userdata

```
"Resources" : {
    "Ec2Instance" : {
      "Type" : "AWS::EC2::Instance",
      "Properties" : {
        "KeyName" : { "Ref" : "KeyName" },
        "SecurityGroups" : [ { "Ref" : "InstanceSecurityGroup" } ],
        "ImageId" : { "Fn::FindInMap" : [ "RegionMap", { "Ref" : "AWS::Region" }, "AMI" ]},
        "UserData" : { "Fn::Base64" : { "Fn::Join" : ["",[
          "#!/bin/bash -ex","\n",
          "curl -o- https://raw.githubusercontent.com/creationix/nvm/v0.33.8/install.sh | bash",
          "curl --silent --location https://rpm.nodesource.com/setup_6.x | bash -”,”\n”
          "yum -y install nodejs",”\n”
          "npm i -g pm2@2.4.3",”\n”
          "curl 'https://gist.githubusercontent.com/example/5c035301e13037e52cd689205b08c121/raw
          "pm2 start /home/ec2-user/hello-world-server.js -i 0 --name 'node-app'","\n"
         ]]}}
      }
    }
```

Visualizing with CloudFormation templates

- AWS CloudFormation Designer
- Visualize template resources
- Modify template with drag-drop
- Customize sample templates

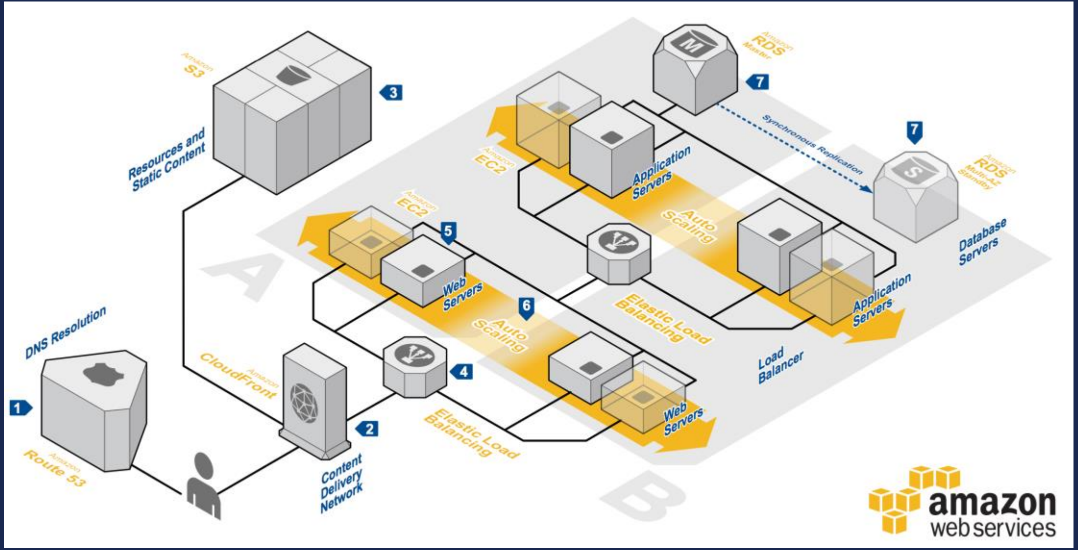


LAMP_Multi_AZ.template

```
{
  "Parameters": {
    "KeyName": {
      "Description": "Name of an existing EC2 KeyPair to enable SSH access to the instances",
      "Type": "AWS::EC2::KeyPair::KeyName",
      "ConstraintDescription": "must be the name of an existing EC2 KeyPair."
    },
    "DBName": {
```

CloudFormation

Templated infrastructure
Versioned
Tested (Linting + TaskCat)
Repeatable + Saleable
Managed decencies
Updates your environment



Configuration Management

Manages lifecycle after EC2 provisioning

Transforms a server into an App, Web, Database, … Server

Abstraction

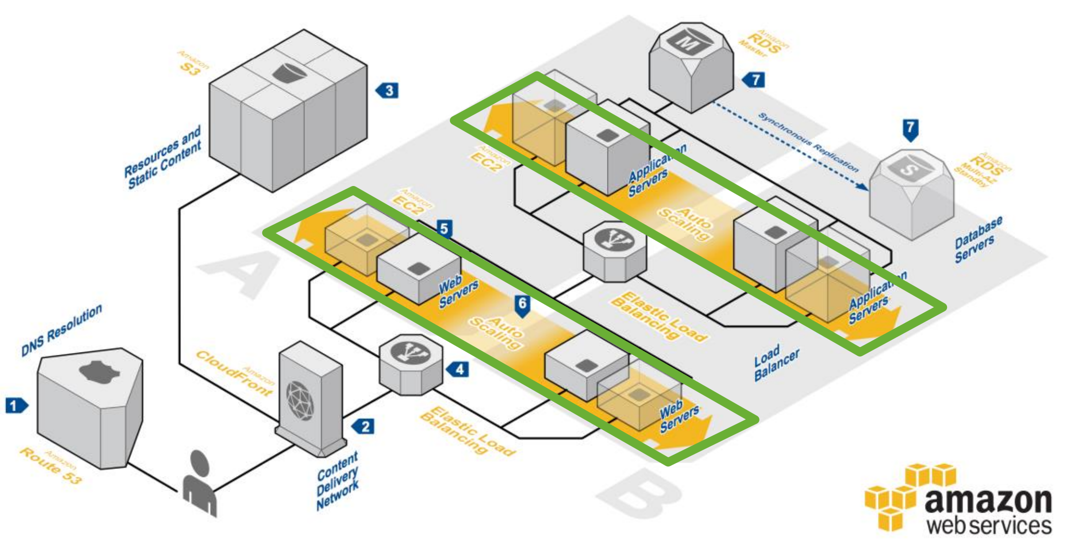
Portability

Patches, updates

New software

Configurations updates

Managing access



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Configuration Management

- Managing changes on hosts
- Run commands across all hosts
- Monitoring and Insights for all running resources
- Enforcing Compliance and Policies

Files

Packages

Configuration

Keys

Every single bit on the instance

Configuration Management

Puppet, Chef

DSL for host configuration

Abstraction for resources (packages, files, secrets)

Scriptable, it’s Ruby code

Community with configuration for everything

CHEF™

puppet

DSL (installing NGinX)

Chef

```
include_recipe "apt"
package "nginx" do
  action :install
end
service "nginx" do
  action [ :enable, :start ]
end
cookbook_file "/www/index.html" do
  source "index.html"
  mode "0644"
end
```

Puppet

```
class nginx {
  package { "nginx":
    ensure => installed,
  }
  service { "nginx":
    ensure => running,
    require => Package["nginx"],
  }
  file { "/www/index.html":
    source =>
"puppet:///modules/n/index.html",
    notify => Service["nginx"],
  }
}
```

AWS OpsWorks

OpsWorks Stacks

- Manage any application with Chef

OpsWorks for Chef Automate and Puppet Enterprise

- Managed Chef Automate or Puppet Enterprise
- Server in your Account, full root access
- Undifferentiated Chef/Puppet experience
- Support through AWS
- Pay as you go, free tier of 10 nodes

OpsWorks for Chef Automate / Puppet Enterprise

Maintenance by OpsWorks

- Continuous Health Checks
- Automated and manual backups
- Restoration and Recreation
- Weekly security patches of the server
- Automatic upgrades

OpsWorks for Chef Automate / Puppet Enterprise

Integrated unattended Node provisioning

IAM for permission handling (Authorization)

Userdata for ASG, CFN, EC2, Terraform, and more

StarterKit to get started quickly

AWS CloudFormation + Configuration Management

1. AWS CloudFormation

    Setting up all AWS Services

    Creating all EC2 instances

2. Configuration Management (AWS OpsWorks)

    Configuring EC2 instances and on-premises

    Auto configure new instances

    Integrated with ASGs

    Monitoring and reverting drift of instances

Monitoring your state

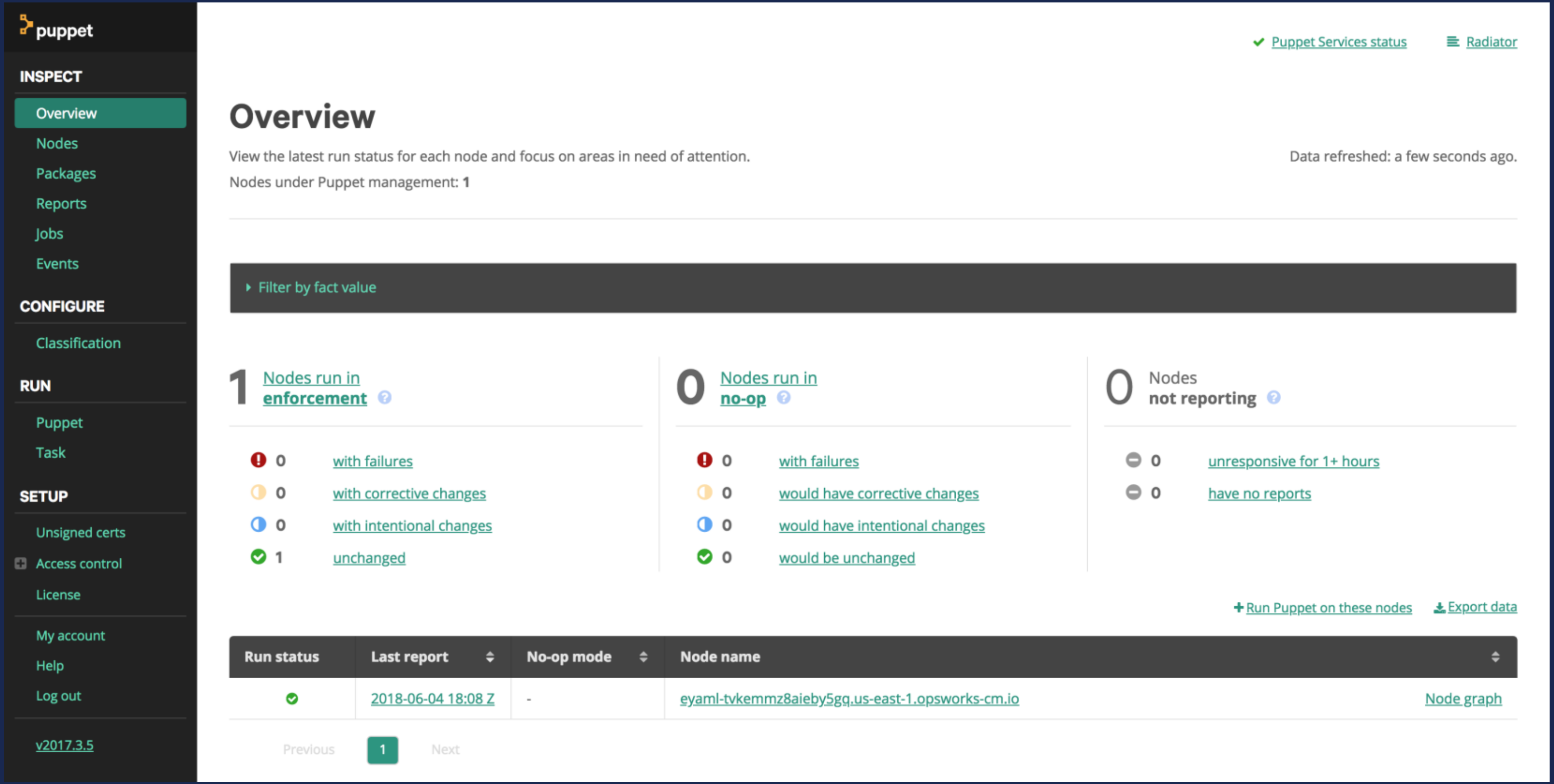
AWS OpsWorks for Chef Automate and Puppet Enterprise

Deep insights into node converges

Detecting Drift (while re-enforcing policy)

Continuous Compliance with InSpec and Chef Automate

Puppet Enterprise



Overview

View the latest run status for each node and focus on areas in need of attention.

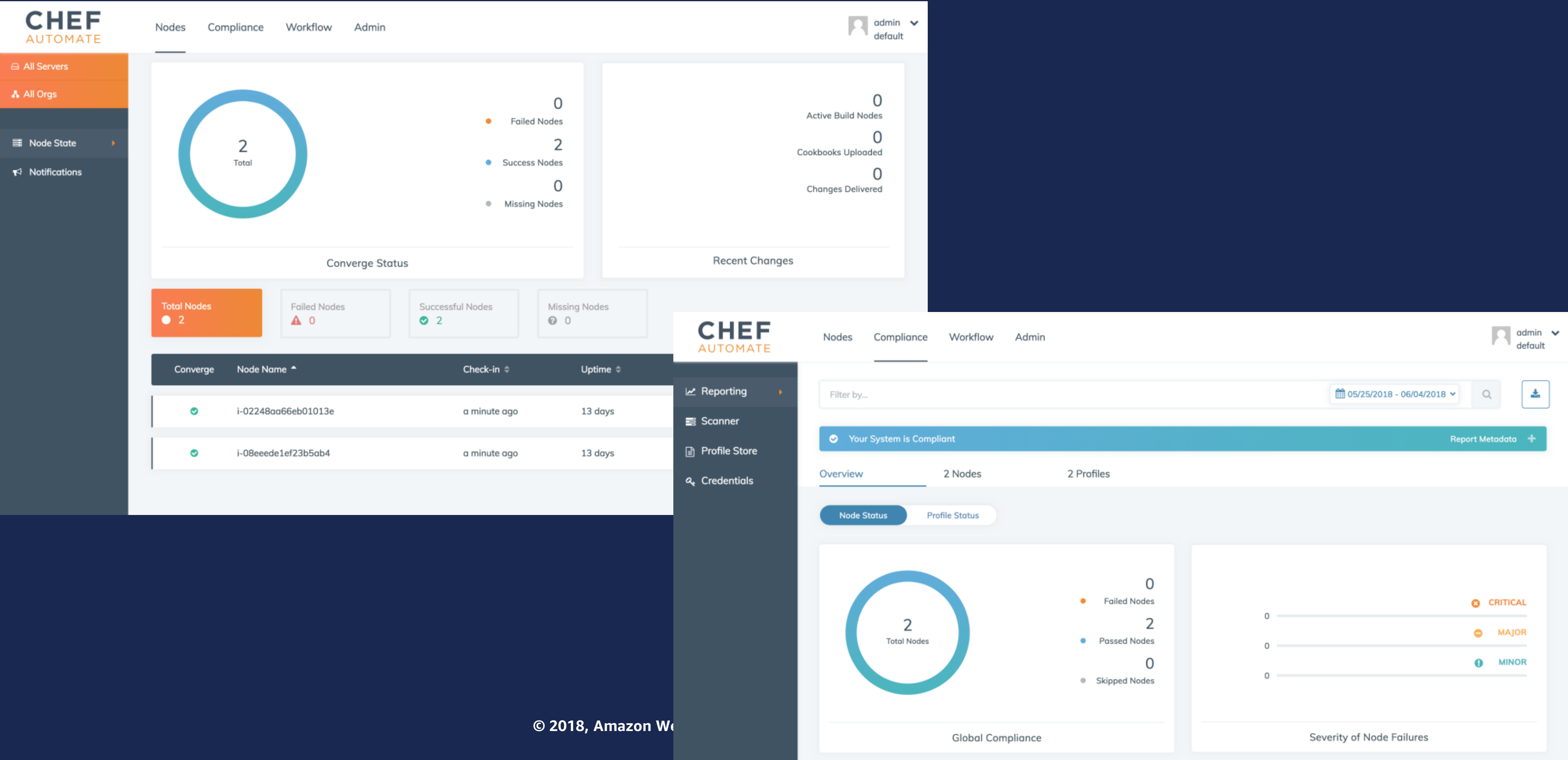
Data refreshed: a few seconds ago.

Nodes under Puppet management: **1**

1 Nodes run in **enforcement**	0 Nodes run in **no-op**	0 Nodes **not reporting**
0 with failures	0 with failures	0 unresponsive for 1+ hours
0 with corrective changes	0 would have corrective changes	0 have no reports
0 with intentional changes	0 would have intentional changes	
1 unchanged	0 would be unchanged	

Run status	Last report	No-op mode	Node name	
✓	2018-06-04 18:08 Z	-	eyaml-tvkemmz8aieby5gq.us-east-1.opsworks-cm.io	Node graph

Chef Automate



2 Total

0 Failed Nodes

2 Success Nodes

0 Missing Nodes

Converge Status

0 Active Build Nodes

0 Cookbooks Uploaded

0 Changes Delivered

Recent Changes

Total Nodes ● 2

Failed Nodes 0

Successful Nodes 2

Missing Nodes 0

Converge	Node Name	Check-in	Uptime
✓	i-02248aa66eb01013e	a minute ago	13 days
✓	i-08eeede1ef23b5ab4	a minute ago	13 days

Your System is Compliant

Report Metadata +

Overview | 2 Nodes | 2 Profiles

Node Status | Profile Status

2 Total Nodes

0 Failed Nodes

2 Passed Nodes

0 Skipped Nodes

Global Compliance

0	CRITICAL
0	MAJOR
0	MINOR

Severity of Node Failures

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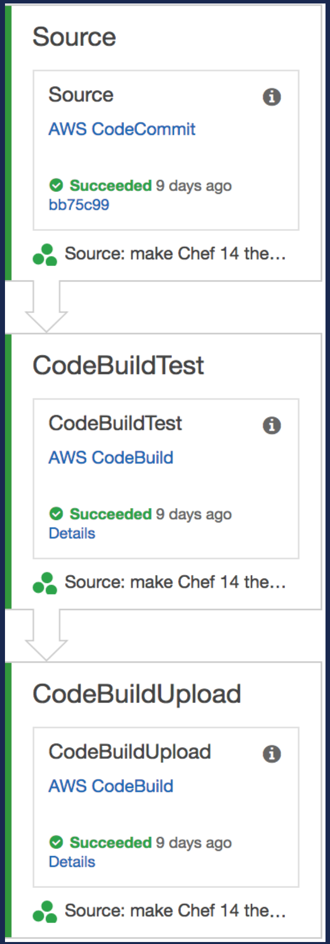
Continuous Infrastructure Development

AWS CodePipeline and CodeBuild

- Fully managed continuous delivery service
- Model and monitor your release process
- Builds, tests, and deploys triggered by a code change



Step

Source

Source

AWS CodeCommit

✓ Succeeded 9 days ago

bb75c99

Source: make Chef 14 the...

CodeBuildTest

CodeBuildTest

AWS CodeBuild

✓ Succeeded 9 days ago

Details

Source: make Chef 14 the...

CodeBuildUpload

CodeBuildUpload

AWS CodeBuild

✓ Succeeded 9 days ago

Details

Source: make Chef 14 the...

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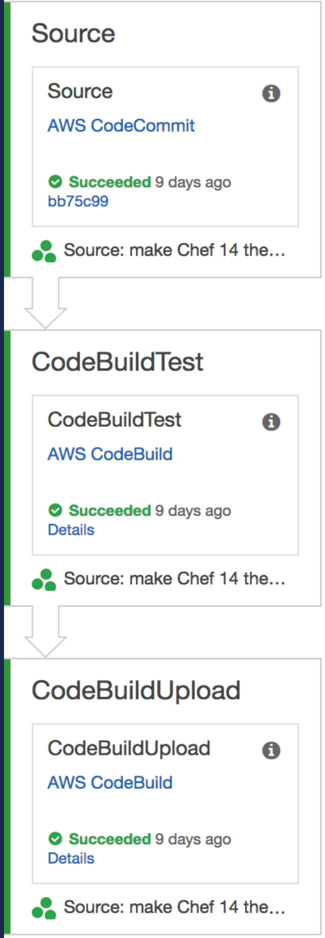
Transition→



Source

Source

AWS CodeCommit

✓ Succeeded 9 days ago

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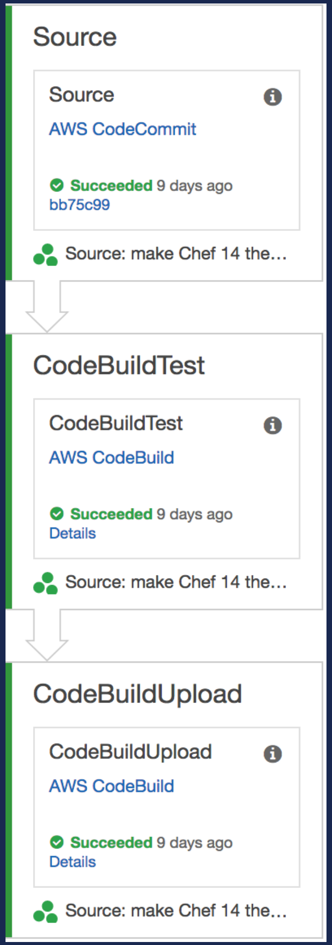

Action

Source

Source
AWS CodeCommit
Succeeded 9 days ago
bb75c99
Source: make Chef 14 the...

CodeBuildTest

CodeBuildTest
AWS CodeBuild
Succeeded 9 days ago
Details
Source: make Chef 14 the...

CodeBuildUpload

CodeBuildUpload
AWS CodeBuild
Succeeded 9 days ago
Details
Source: make Chef 14 the...

Continuous Infrastructure Delivery

Desired State in code

Lint and test the infrastructure before release

Rollout gradually to production

Replicate environments and regions

Applying DevOps

Make engineering running for a shared goal

Change the system frequently in small iterations

Automate everything that is effort, time-consuming, toil

Treat your infrastructure like software

- Versioning, testing, continuous delivery

Failure is unavoidable

- monitoring and mitigations strategies are key

Buy Lunch for your Development AND Operations team

Demo: AWS CodePipeline to rollout infrastructure changes

AWS CodeCommit

AWS CodeBuild

AWS CodePipeline

AWS OpsWorks

+

CHEF™

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