

DevOps and AWS

A PERFECT MERGE REQUEST

whoami

- DevOps Engineer Team Lead, Bluesentry IT
- Worked in IT for 11 years, networking, sysadmin, development
- All 5 AWS certifications
- @strongjz



Agenda

- Dev What? Ops who?
- Continuous Integration / Continuous Deployment
- How AWS enables CI/CD
- Demo

Agenda

- Dev What? Ops who?
- Continuous Integration / Continuous Deployment
- How AWS enables CI/CD
- Demo

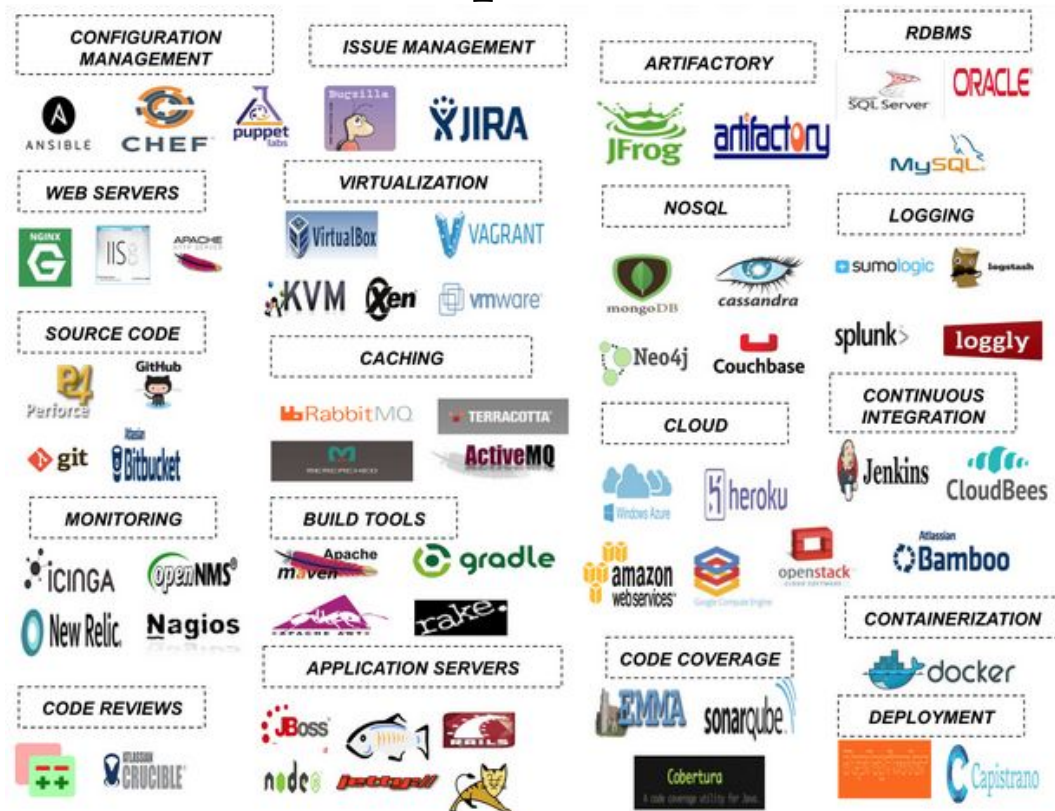
What your CTO thinks DevOps is



What your Project Manager thinks DevOps is

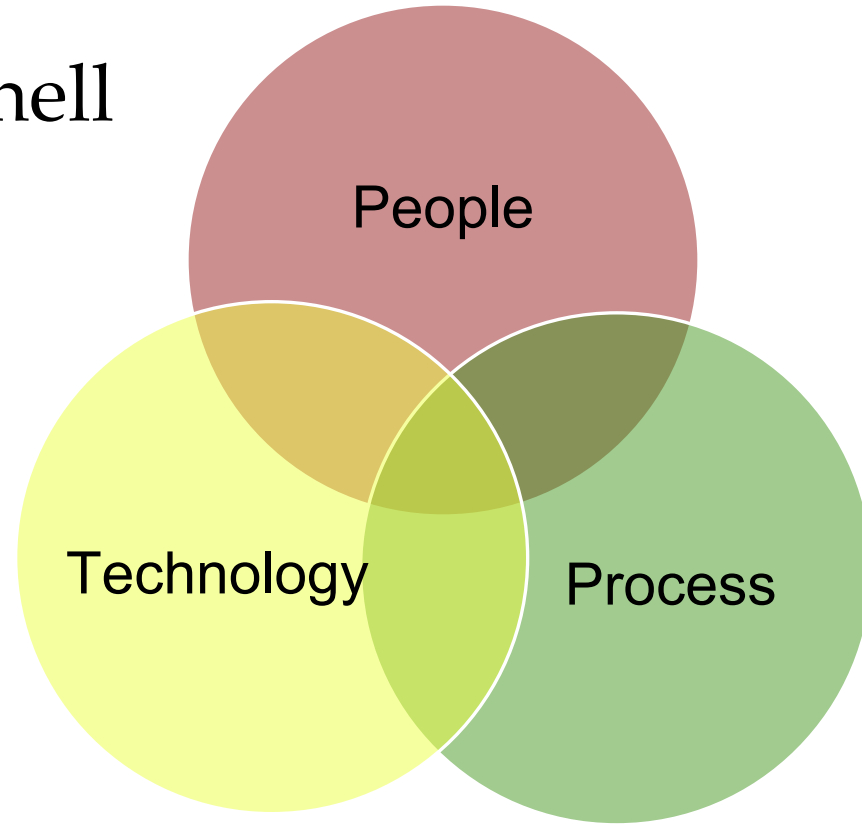


What you think DevOps is

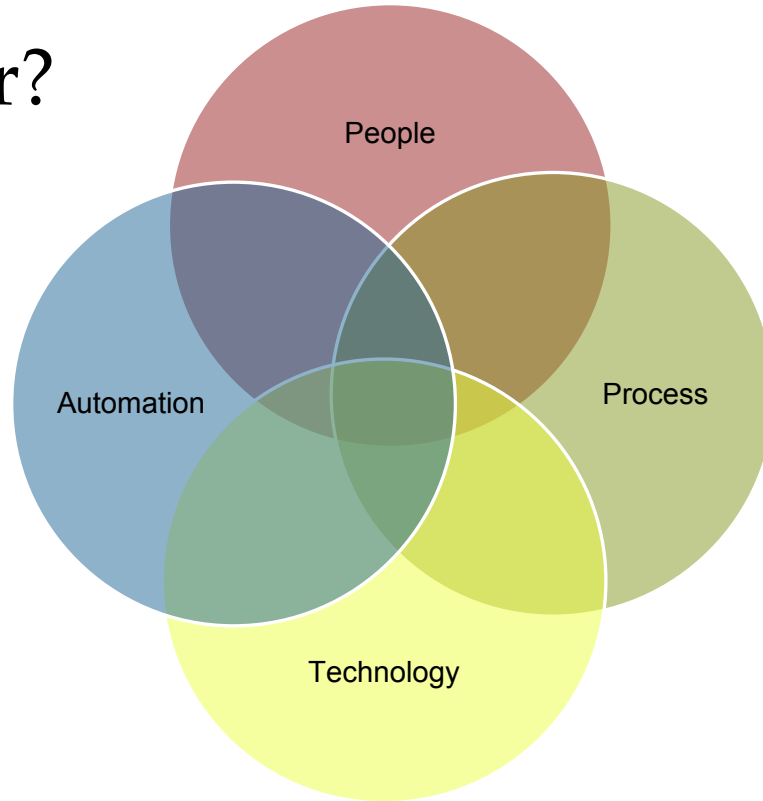


Probably....

IT in a nutshell



A little closer?



What DevOps really is

“DevOps isn’t about automation, just as astronomy isn’t about telescopes.”

- Gene Kim, The DevOps Handbook: How to Create World-Class Agility, Reliability, and Security in Technology Organizations

More so this....

“we’re hearing more lately: something called “DevOps.” Maybe everyone attending this party is a form of DevOps, but I suspect it’s something much more than that. It’s Product Management, Development, IT Operations, and even Information Security all working together and supporting one another.”

— Gene Kim, The Phoenix Project: A Novel About IT, DevOps, and Helping Your Business Win

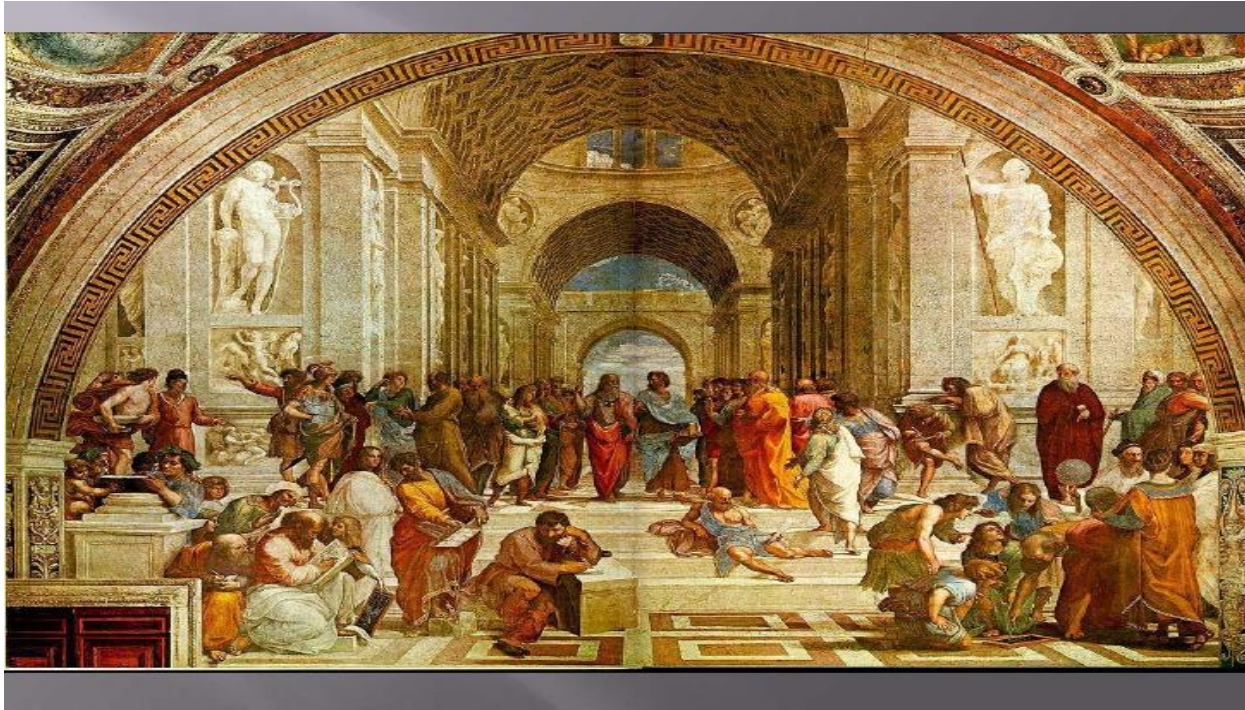
More so this....

“we’re hearing more lately: something called “DevOps.” Maybe everyone attending this party is a form of DevOps, but I suspect it’s something much more than that. **It’s Product Management, Development, IT Operations, and even Information Security all working together and supporting one another.**”

— Gene Kim, The Phoenix Project: A Novel About IT, DevOps, and Helping Your Business Win



Culture?





**ONE DOES NOT SIMPLY
IMPLEMENT**

CONTINUOUS DELIVERY

Agenda

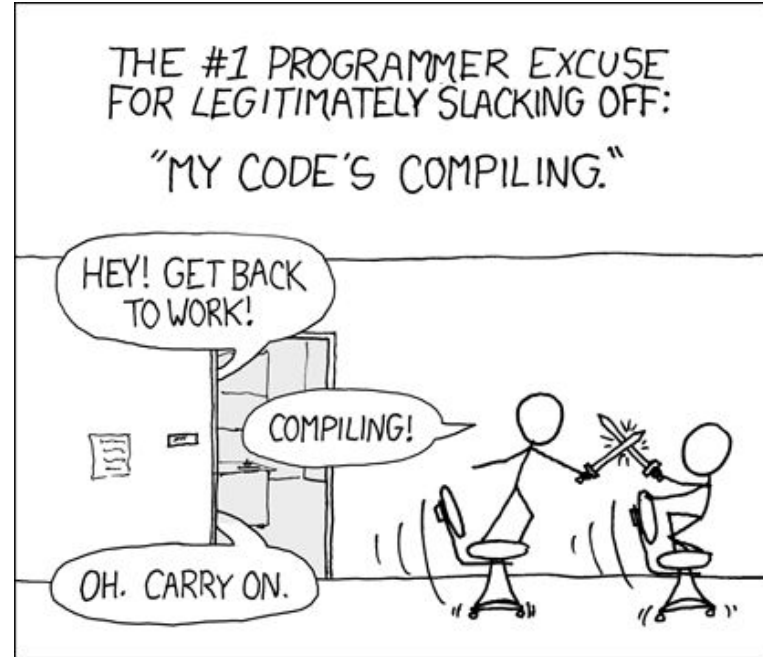
- Dev What? Ops who?
- Continuous Integration / Continuous Deployment
- How AWS enables CI/CD
- Demo

CI/CD

- Continuous – All day, Every day.
- Integration – This is my code, that's your code, Let's get together.
- Deployment – Deploy to ALL the servers! Or not

CI/CD Running Rules

1. Maintain a code repository
2. Automate the build
3. Keep the build fast
4. Make the build self-testing
5. Commit early, commit often
6. Every commit to the mainline gets built
7. Everyone can see the results of the build
8. Automate the deployment and rollback

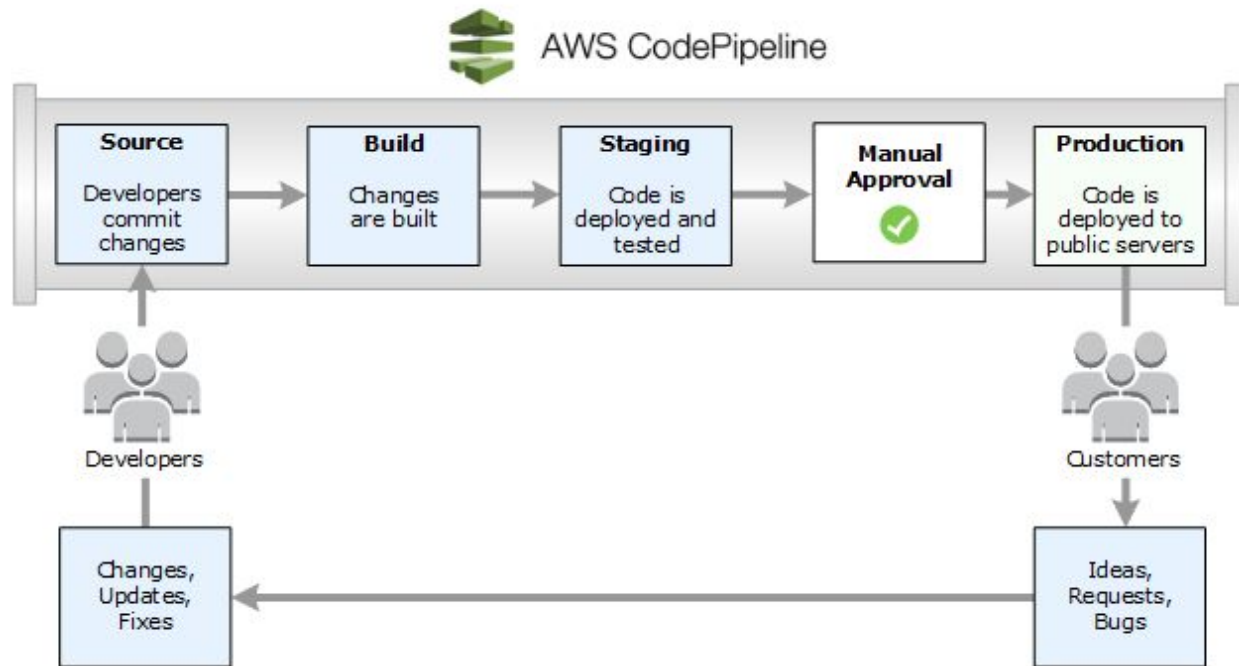


Agenda

- Dev What? Ops who?
- Continuous Integration / Continuous Deployment
- How AWS enables CI/CD
- Demo

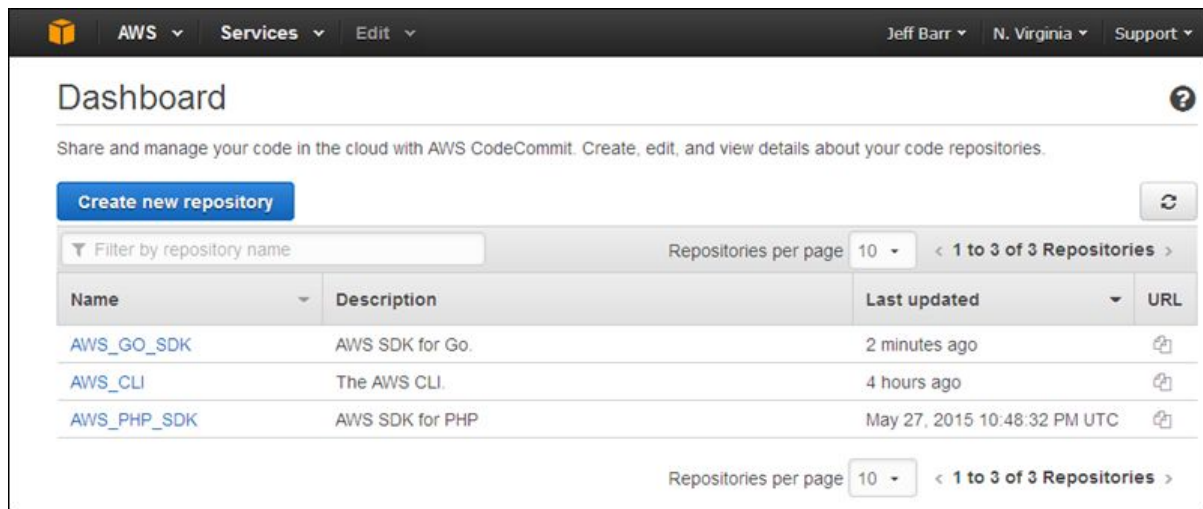
AWS Code*

- Commit
- Build
- Deploy
- Pipeline



AWS CodeCommit

- Encrypted at rest and in transit
- All your favorite git commands work
- Triggers
- “AWS github”



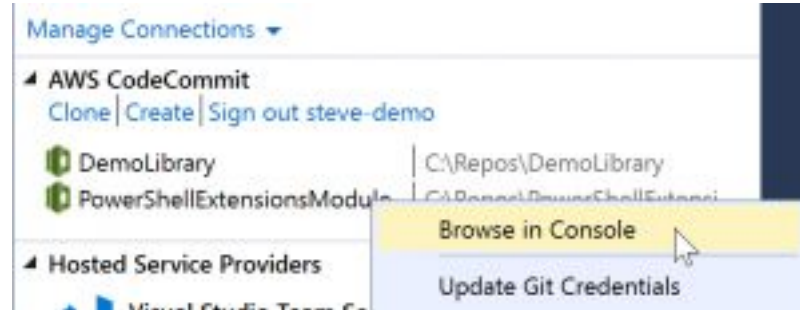
The screenshot shows the AWS CodeCommit Dashboard. At the top, there's a navigation bar with 'AWS', 'Services', and 'Edit' menus, along with user information 'Jeff Barr' and 'N. Virginia'. The main heading is 'Dashboard' with a help icon. Below it, a message says 'Share and manage your code in the cloud with AWS CodeCommit. Create, edit, and view details about your code repositories.' A blue button 'Create new repository' is on the left, and a refresh icon is on the right. A search bar 'Filter by repository name' and a 'Repositories per page' dropdown set to '10' are present. Below this is a table with three repositories:

Name	Description	Last updated	URL
AWS_GO_SDK	AWS SDK for Go.	2 minutes ago	
AWS_CLI	The AWS CLI.	4 hours ago	
AWS_PHP_SDK	AWS SDK for PHP	May 27, 2015 10:48:32 PM UTC	

At the bottom, there's another 'Repositories per page' dropdown set to '10' and a pagination link '< 1 to 3 of 3 Repositories >'.

AWS CodeCommit Integrations

- CodeBuild
- Elastic Beanstalk
- Cloudformation
- CodePipeline
- Key management
- Lambda
- SNS



AWS CodeBuild

- Build Project
- Build Environment
- Build Spec

Build history

Expand to view the build's details.

Stop

Viewing 1 to 10 builds Builds per page 10

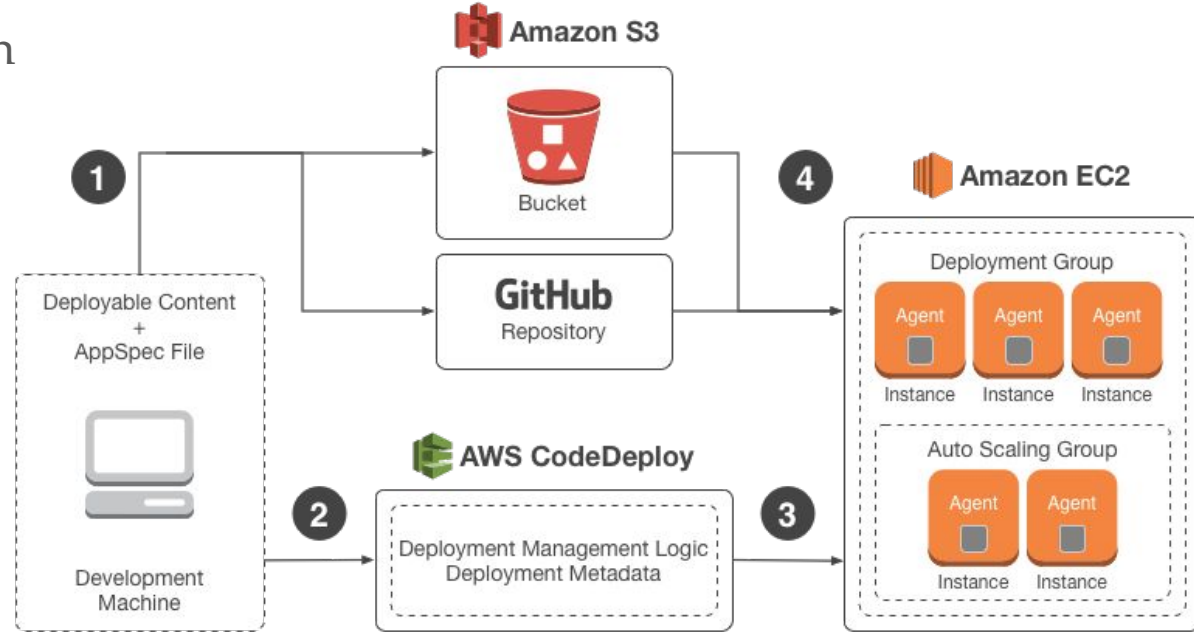
	Project	Build run	Submitter	Status	Duration	Completed
<input type="checkbox"/>	codebuild-demo	codebuild-demo...	CodePipeline-C...	Succeeded	1 min, 13 secs	5 minutes ago
<input type="checkbox"/>	codebuild-demo	codebuild-demo...	CodePipeline-C...	Succeeded	1 min, 49 secs	12 minutes ago
<input type="checkbox"/>	codebuild-demo	codebuild-demo...	root	Succeeded	1 min, 51 secs	Nov 18, 2016 11...
<input type="checkbox"/>	codebuild-demo	codebuild-demo...	root	Failed	1 min, 40 secs	Nov 18, 2016 4:...
<input type="checkbox"/>	codebuild-demo	codebuild-demo...	root	Failed	1 min, 50 secs	Nov 18, 2016 4:...
<input type="checkbox"/>	codebuild-demo	codebuild-demo...	root	Succeeded	1 min, 51 secs	Nov 18, 2016 3:...
<input type="checkbox"/>	codebuild-demo	codebuild-demo...	CodePipeline-C...	Succeeded	1 min, 8 secs	Nov 17, 2016 10...
<input type="checkbox"/>	codebuild-demo	codebuild-demo...	root	Succeeded	1 min, 52 secs	Nov 17, 2016 10...
<input type="checkbox"/>	codebuild-demo	codebuild-demo...	CodePipeline-C...	Failed	47 secs	Nov 17, 2016 10...
<input type="checkbox"/>	codebuild-demo	codebuild-demo...	CodePipeline-C...	Failed	1 min, 5 secs	Nov 17, 2016 10...

AWS CodeDeploy

- Agent based
- Supports Auto Scaling, Elastic Load balancers, CodePipeline
- 2 Levels of deployments. Code deployment then Traffic rerouting

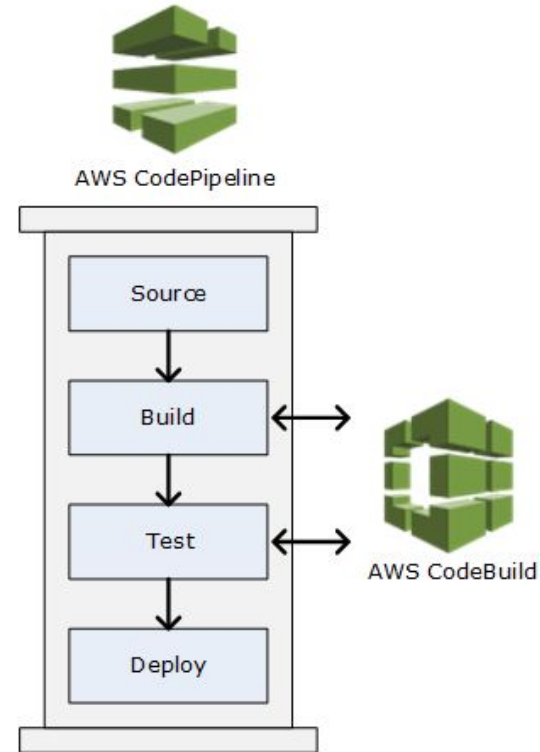
AWS CodeDeploy

- Deployment Configuration
- Applications
- Deployment Group
- Application revisions
- Deployments
- Monitoring all this



AWS CodePipeline

- Revision
- Stages
 - Action
 - Type
 - Transitions
- Deployments

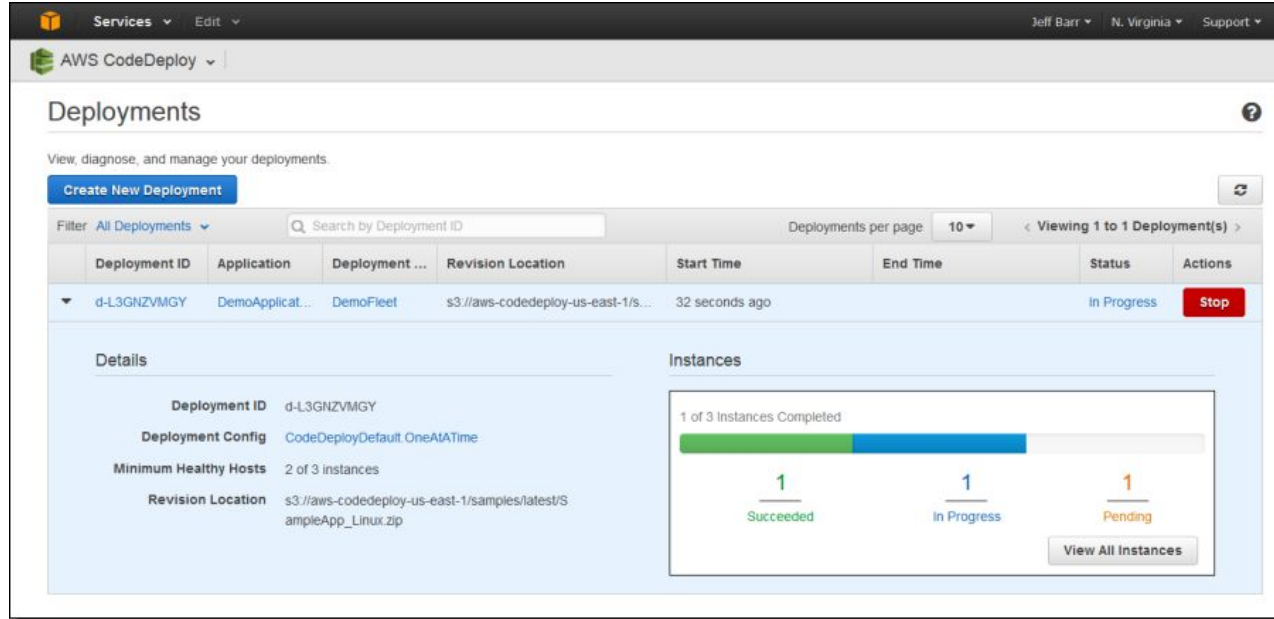


AWS CodePipeline: Actions

- A build action that builds or transforms the items
- A test action that configures and runs automated tests
- A deploy action that deploys items to one or more servers, websites, or repositories
- An invoke action that runs functions
- As well as custom actions

AWS CodePipeline: Deploy

- Code Deploy
- Elastic Beanstalk
- OpsWorks
- Cloudformation



The screenshot displays the AWS CodeDeploy console interface. At the top, the navigation bar includes 'Services' and 'Edit' dropdowns, along with user information 'Jeff Barr' and location 'N. Virginia'. The main header reads 'AWS CodeDeploy'. Below this, the 'Deployments' section is active, with a sub-header 'View, diagnose, and manage your deployments.' and a 'Create New Deployment' button. A filter dropdown is set to 'All Deployments', and a search bar is available. The deployment list shows one deployment with ID 'd-L3GNZVMGY' for 'DemoApplicat...' using 'DemoFleet', located at 's3://aws-codedeploy-us-east-1/s...', started '32 seconds ago', and currently 'In Progress'. A 'Stop' button is visible for this deployment. The 'Details' section on the left lists: Deployment ID 'd-L3GNZVMGY', Deployment Config 'CodeDeployDefault_OneAtATime', Minimum Healthy Hosts '2 of 3 instances', and Revision Location 's3://aws-codedeploy-us-east-1/samples/latest/sampleApp_Linux.zip'. The 'Instances' section on the right shows a progress bar for '1 of 3 Instances Completed'. Below the bar, a summary indicates 1 instance 'Succeeded' (green), 1 instance 'In Progress' (blue), and 1 instance 'Pending' (orange). A 'View All Instances' button is at the bottom right of the instances section.

Deployment ID	Application	Deployment ...	Revision Location	Start Time	End Time	Status	Actions
d-L3GNZVMGY	DemoApplicat...	DemoFleet	s3://aws-codedeploy-us-east-1/s...	32 seconds ago		In Progress	Stop

Details

- Deployment ID: d-L3GNZVMGY
- Deployment Config: CodeDeployDefault_OneAtATime
- Minimum Healthy Hosts: 2 of 3 instances
- Revision Location: s3://aws-codedeploy-us-east-1/samples/latest/sampleApp_Linux.zip

Instances

1 of 3 Instances Completed

1 Succeeded | 1 In Progress | 1 Pending

View All Instances

Agenda

- Dev What? Ops who?
- Continuous Integration / Continuous Deployment
- How AWS enables CI/CD
- Demo

CI/CD Running Rules

- | | |
|--|----------|
| 1. Maintain a code repository | Commit |
| 2. Automate the build | * |
| 3. Keep the build fast | Build |
| 4. Make the build self-testing | Deploy |
| 5. Commit early, commit often | Commit |
| 6. Every commit to the mainline gets built | Pipeline |
| 7. Everyone can see the results of the build | Pipeline |
| 8. Automate the deployment and rollback | Deploy |

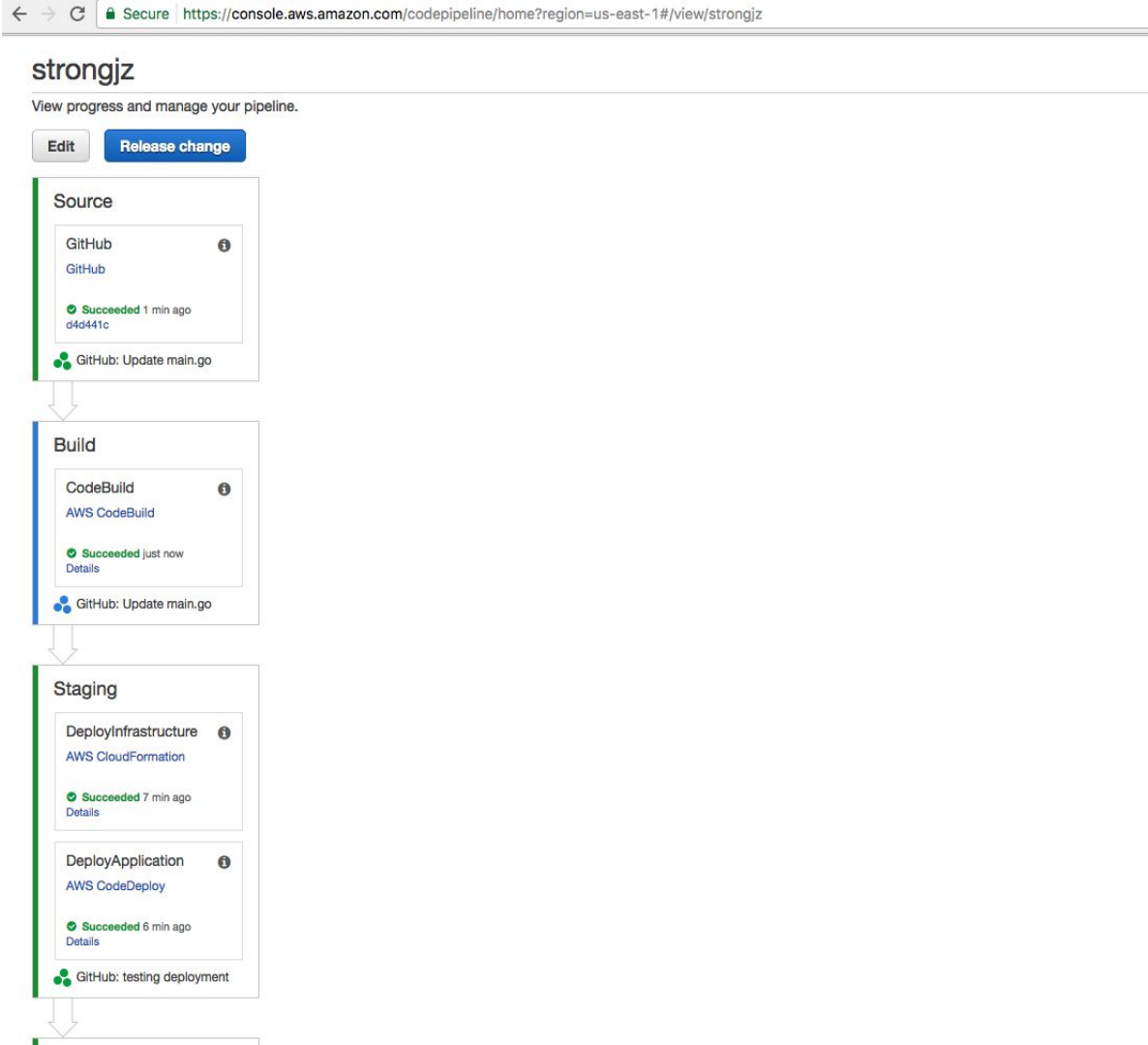
Questions

Resources

- Code Commit - <http://docs.aws.amazon.com/codecommit>
- Code Build - <http://docs.aws.amazon.com/codebuild>
- Code Deploy - <http://docs.aws.amazon.com/codedeploy>
- Code Pipeline - <http://docs.aws.amazon.com/codepipeline>
- Demo - <https://github.com/strongjz/golang-deployment-pipeline>
- Project Phoenix - <https://www.amazon.com/Phoenix-Project-DevOps-Helping-Business/dp/0988262592>

Demo Slides

Code Pipeline



Code Build

Secure <https://console.aws.amazon.com/codebuild/home?region=us-east-1#/projects/strongjz/view>

Services ▾ Resource Groups ▾ ⭐

AWS CodeBuild

- Build projects
- Build history

Build Project: strongjz ?

Back Delete Edit project

Project

Project name strongjz

Description Build project for strongjz

Source provider AWS CodePipeline

Repository

Artifacts upload location

▸ Project details

Build history

Stop Start build ↺

Viewing 1 to 5 builds ▸ Builds per page 10 ▾

		Build run	Submitter	Status	Duration	Completed
<input type="checkbox"/>	▸	strongjz:4c0beb7f-1...	strongjz	Succeeded	32 secs	2 minutes ago
<input type="checkbox"/>	▸	strongjz:ff15ae1f-f10...	strongjz	Succeeded	18 secs	10 minutes ago
<input type="checkbox"/>	▸	strongjz:bc35dc24-a...	strongjz	Succeeded	32 secs	18 minutes ago
<input type="checkbox"/>	▸	strongjz:9d7f60a9-d...	strongjz	Succeeded	40 secs	42 minutes ago
<input type="checkbox"/>	▸	strongjz:ae315641-7...	strongjz	Succeeded	1 min, 7 secs	44 minutes ago

Code Build Logs

← → ↺

Secure

https://console.aws.amazon.com/cloudwatch/home?region=us-east-1#logEventViewer:group=aws/codebuild/strongjz;stream=4c0beb7f-137a-4f76-92a0-e367b278810d

☆

🗨

📦 Services ▾ Resource Groups ▾ ⭐

CloudWatch

Dashboards

Alarms

ALARM 0

INSUFFICIENT 0

OK 1

Billing

Events

Rules

Logs

Metrics

CloudWatch > Log Groups > /aws/codebuild/strongjz > 4c0beb7f-137a-4f76-92a0-e367b278810d



Filter events

Time (UTC +00:00)	Message
2017-05-28	NO OTHER EVENTS FOUND AT THE MOMENT. Retry .
18:33:14	[Container] 2017/05/28 18:33:09 Waiting for agent
18:33:18	[Container] 2017/05/28 18:33:16 Phase is DOWNLOAD_SOURCE
18:33:18	[Container] 2017/05/28 18:33:16 Source is located at /tmp/src586457455/src
18:33:18	[Container] 2017/05/28 18:33:16 YAML location is /tmp/src586457455/src/buildspec.yml
18:33:18	[Container] 2017/05/28 18:33:16 Registering with agent
18:33:18	[Container] 2017/05/28 18:33:16 Phases found in YAML: 3
18:33:18	[Container] 2017/05/28 18:33:16 PRE_BUILD: 2 commands
18:33:18	[Container] 2017/05/28 18:33:16 BUILD: 1 commands
18:33:18	[Container] 2017/05/28 18:33:16 INSTALL: 1 commands
18:33:18	[Container] 2017/05/28 18:33:17 Phase complete: DOWNLOAD_SOURCE Success: true
18:33:18	[Container] 2017/05/28 18:33:17 Phase context status code: Message:
18:33:18	[Container] 2017/05/28 18:33:17 Processing plaintext environment variables
18:33:18	[Container] 2017/05/28 18:33:17 Processing build-level environment variables
18:33:18	[Container] 2017/05/28 18:33:17 ("ARTIFACT_S3_BUCKET":"strongjz-codepipeline","CODEBUILD_RESOLVED_SOURCE_VERSION":"d4d441c61f6cf2c94de393148c5084
18:33:18	[Container] 2017/05/28 18:33:17 ARTIFACT_S3_BUCKET = strongjz-codepipeline
18:33:18	[Container] 2017/05/28 18:33:17 CODEBUILD_RESOLVED_SOURCE_VERSION = d4d441c61f6cf2c94de393148c5084206e3a2731
18:33:18	[Container] 2017/05/28 18:33:17 Processing builtin environment variables
18:33:18	[Container] 2017/05/28 18:33:17 Moving to directory /tmp/src586457455/src
18:33:18	[Container] 2017/05/28 18:33:17 Entering phase INSTALL
18:33:18	[Container] 2017/05/28 18:33:17 Running command go get -u github.com/golang/lint/golint
18:33:22	
18:33:22	[Container] 2017/05/28 18:33:21 Phase complete: INSTALL Success: true
18:33:22	[Container] 2017/05/28 18:33:21 Phase context status code: Message:
18:33:22	[Container] 2017/05/28 18:33:21 Entering phase PRE_BUILD
18:33:22	[Container] 2017/05/28 18:33:21 Running command golint -set_exit_status
18:33:22	
18:33:22	[Container] 2017/05/28 18:33:21 Running command go test
18:33:22	PASS
18:33:22	ok _/tmp/src586457455/src 0.005s
18:33:22	


Code Pipeline Approval


Secure <https://console.aws.amazon.com/codepipeline/home?region=us-east-1#/view/strongjz>

Staging

- DeployInfrastructure 
AWS CloudFormation
✔ Succeeded 1 min ago
[Details](#)
- DeployApplication 
AWS CodeDeploy
✔ Succeeded just now
[Details](#)
- GitHub: Update main.go

Approvals

- ProductionGate 
Manual approval
⚠ Waiting for approval just now
[Review](#)
- GitHub: Update main.go

Approve or reject the revision 

Comments

Summarize the reason for your approval or rejection.

[Cancel](#) [Approve](#) [Reject](#)

Code Deploy

Secure https://console.aws.amazon.com/codedeploy/home?region=us-east-1#/applications/strongjz

Application details: strongjz

Manage your application. Create, edit, or set up triggers for deployment groups. View application revision details.

Deployment groups

View, edit, and redeploy revisions to your deployment groups. View details and set up triggers to receive notifications about deployment group events. [Learn more](#)

Create deployment group

Actions

Filter by deployment group name

Deployment groups per page 10 << View

	Name	Status	Last attempted revision	Last successful revision
<input type="radio"/>	production	✓ Succeeded	May 28, 2017 6:30:25 PM UT	May 28, 2017 6:30:25 PM UT
<input type="radio"/>	staging	✓ Succeeded	May 28, 2017 6:35:36 PM UT	May 28, 2017 6:35:36 PM UT

<< View

Revisions

Code Deploy

Deployment: d-LOCYTK8NM

✔ Deployment Succeeded

Deployment progress

Installing application on your instances

2 of 2 instances updated

✔

▼ Deployment details

Deployment	
Application	strongjz
Deployment group	production
Deployment ID	d-LOCYTK8NM
Initiated by	user
Deployment configuration	CodeDeployDefault.OneAtATime
Minimum healthy hosts	1 of 2 instances

Revision	
Revision location	s3://strongjz-codepipeline/strongjz/B758ed7ed5d15e2cd05e
Revision created	May 28, 2017 6:35:05 PM UTC
Description	Application revision registered by Dep

▼ Instance activity

Filter Status ▾						Instances per page 10	
Instance ID	Start time	End time	Duration	Status	Most recent event		
i-027ba5a6495f9454b	May 28, 2017 6:38:13 PM UTC	May 28, 2017 6:38:22 PM UTC	10 secs	Succeeded	ValidateService		
i-0c8f670b9fc159ce2	May 28, 2017 6:38:01 PM UTC	May 28, 2017 6:38:10 PM UTC	9 secs	Succeeded	ValidateService		

Code Commit Costs

First 5 active users*	Each active user* above the first 5
Free	\$1 per month
Receives: <ul style="list-style-type: none">•Unlimited repositories•50 GB-month of storage•10,000 Git requests/month	Receives: <ul style="list-style-type: none">•Unlimited repositories•10 GB-month of storage per active user•2,000 Git requests/month per active user

•Storage

- \$0.06 per GB-month
- \$0.001 per Git request

Code Build Costs

Compute instance type	Memory (GB)	vCPU	Price per build minute (\$)
build.general1.small	3	2	0.005
build.general1.medium	7	4	0.010
build.general1.large	15	8	0.020

Code Deploy Costs

- For CodeDeploy on EC2: There is no additional charge for code deployments to Amazon EC2 instances through AWS CodeDeploy.

For CodeDeploy On-Premises: You pay \$0.02 per on-premises instance update using AWS CodeDeploy.

Code Pipeline Costs

You pay only for what you use. AWS CodePipeline costs \$1 per active pipeline* per month.

An active pipeline is a pipeline that has existed for more than 30 days and has at least one code change that runs through it during the month. There is no charge for pipelines that have no new code changes running through them during the month. An active pipeline is not prorated for partial months.

You may incur additional charges for storing and accessing your pipeline artifacts in Amazon S3 and for triggering actions from other AWS and third party services that you connect to your pipeline.