

Azure DevOps Container Pipelines Demystified

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Introduction

- **Who am I?**

- Cloud/DevOps Architect at Solliance
- Background in C# programming
- Messing around with CI/CD pipelines for ~10 years

- **What to cover**

- What are we even trying to do?
- How do we do it?
- A couple of troubleshooting tips

Kubernetes Deployments 101

- **Kubernetes**

- Container orchestration platform
- Manages container fleets at scale
- YAML deployment configurations

- **Container Image**

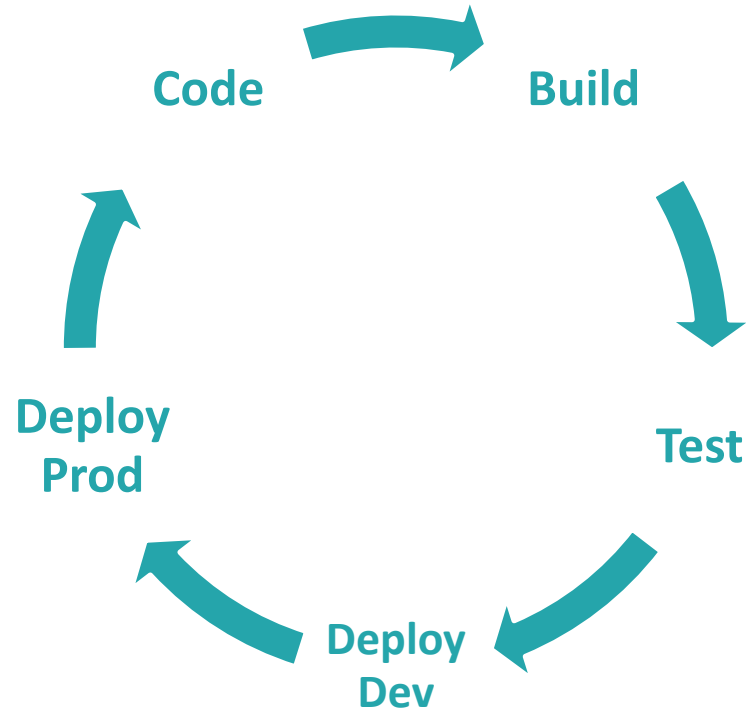
- An application packaging format

- **Helm Chart**

- Templating and deployment engine for Kubernetes*

Kubernetes Deployments 101

- **Build Application Code**
- **Package into Docker Image**
- **Create template for deployment**
- **Run deployment in several environments**

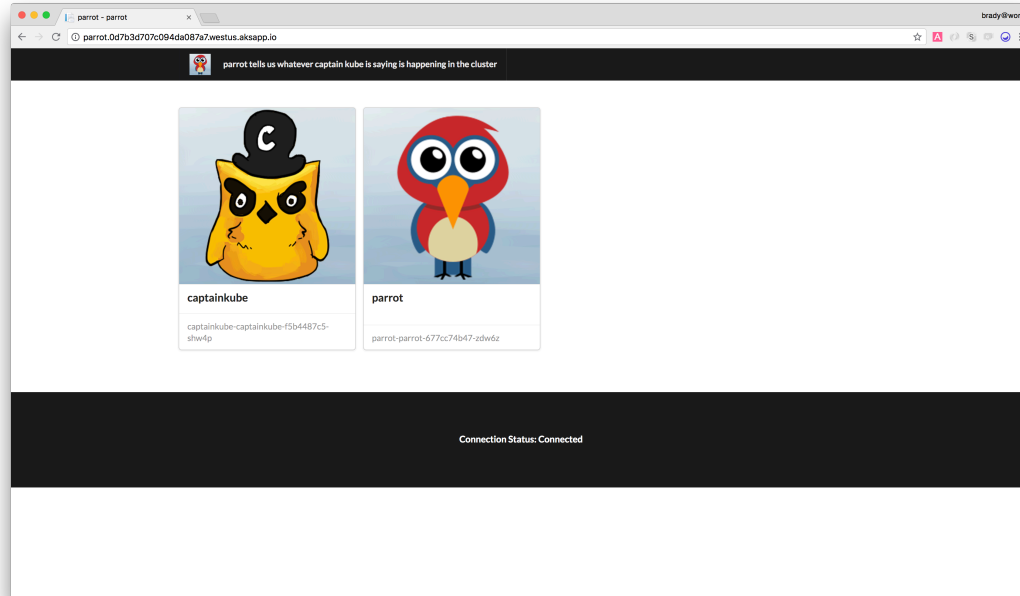


Why

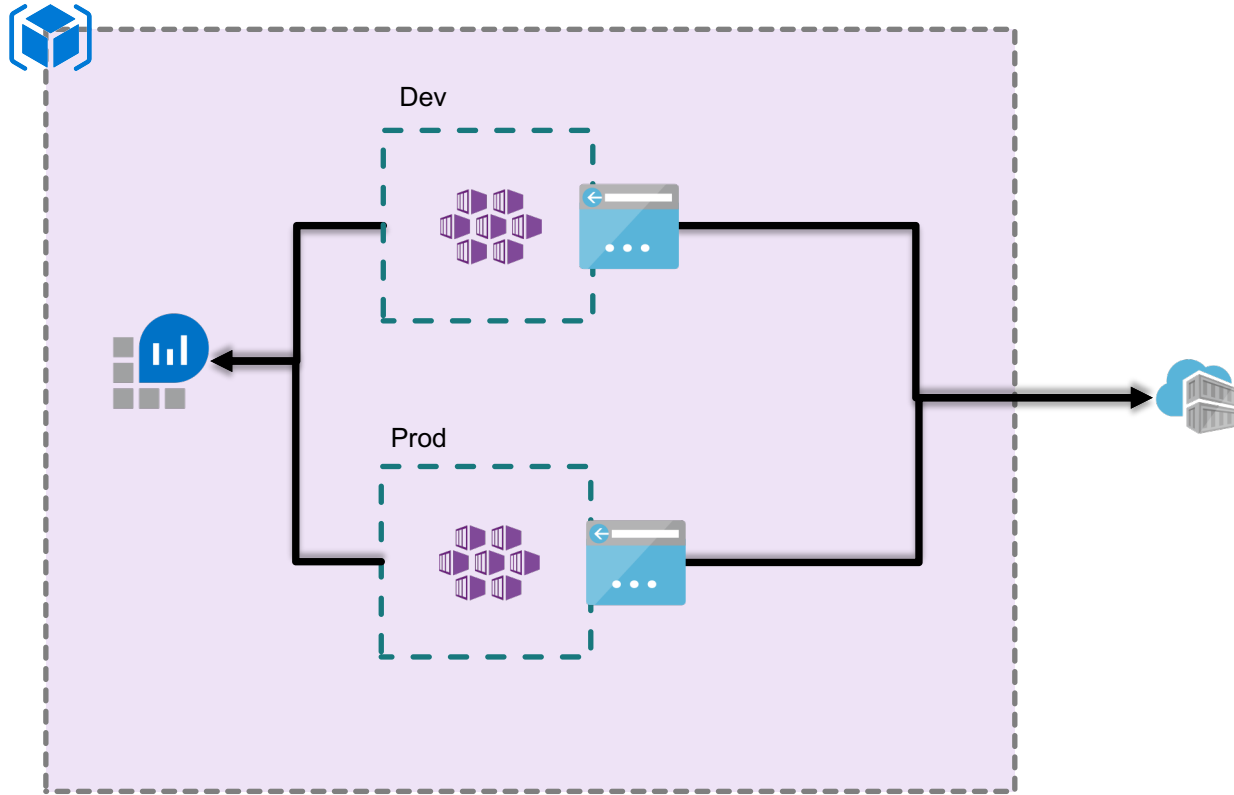
- ❑ Deployment Pipelines exist to build trust in the artifacts they manage
- ❑ Each step in the process should help increase overall trust
 - ❑ Code that compiles is good
 - ❑ Code that passes its unit tests is better
 - ❑ Code that includes no known vulnerabilities is even better
 - ❑ And so on...
- ❑ For many teams, full CI/CD is "too scary"
- ❑ This just means that the CI/CD pipeline isn't doing enough to generate trust

Parrot

- A Kubernetes demo app, with some customization
- <https://github.com/Azure/phippyandfriends>



Required Infrastructure



Pipeline Planning

- **Define the purpose of your environments**
 - Development
 - Production
- **What artifacts do you need?**
 - Docker Image
 - Helm Chart Package



Azure DevOps Build Image Stage

- **Build Stages**
 - create artifacts**
 - First artifact to build: Container Image**
- **Steps**
 - **Clone Code**
 - **Load cached NuGet packages**
 - **Specify the .Net Core SDK**
 - **Run unit tests**
 - **Publish the Application**
 - **Build the Docker Image**
 - **Scan the Docker Image**
 - **Push the Docker Image**

Demo: Build Image Stage

Azure DevOps Build Helm Stage

- **Build Stages**
 - create artifacts**
 - Next artifact to build: Helm**
- **Steps**
 - **Checkout**
 - **Initialize Helm**
 - **Package Helm Chart**
 - **Push Helm Chart**

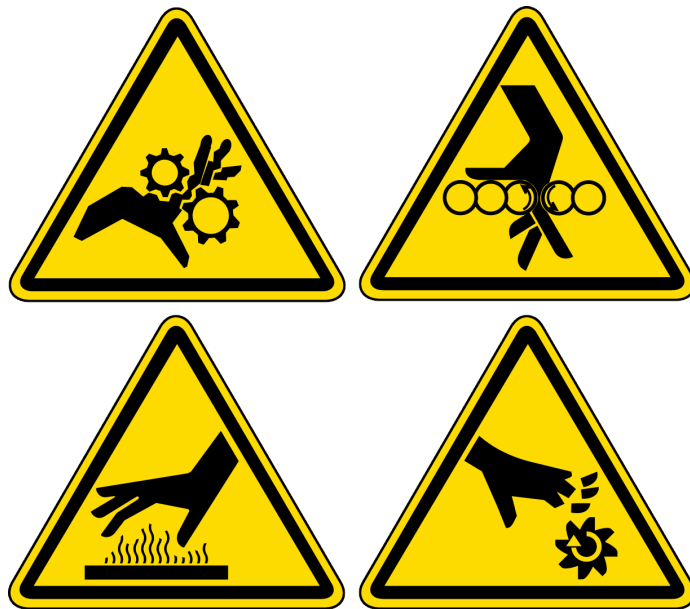
Demo: Build Helm Stage

Azure DevOps Deploy Stage

- **Deploy stages**
consume/deploy build artifacts
 - **Kubernetes deploy stage**
consumes the helm chart
 - **Kubernetes itself**
consumes the Docker Image
- **Steps**
 - **Disable Checkout**
 - **Install Helm**
 - **Initialize Helm**
 - **Add ACR to Helm Repository List**
 - **Deploy Helm Chart**

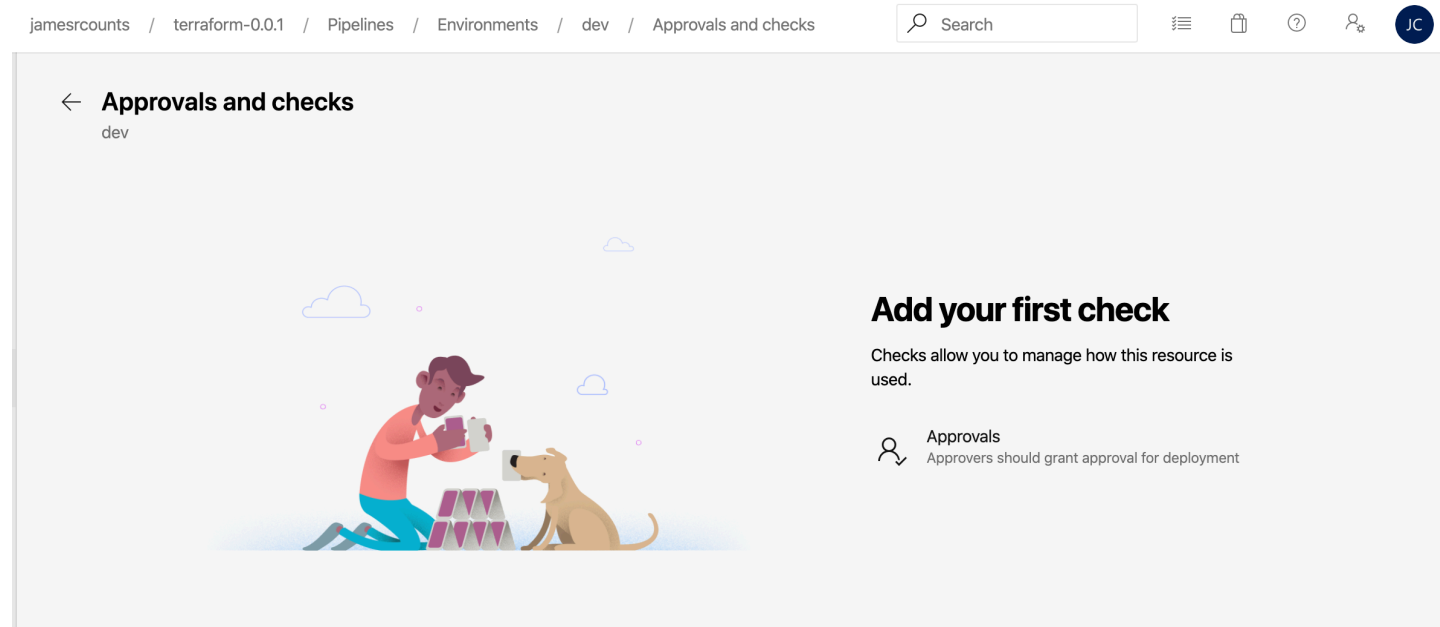
Configure Environment to Support Approvals

- **Some environments don't need them**
 - Like the development environment
 - Some might, like the production environment
- **It comes down to how well you trust your pipeline**
 - Feature Flags
 - Unit Tests
 - Static analysis



Configure Environment to Support Approvals

- **Manual Approval Checks Force Deployment to Pause**



Demo: Kubernetes Deploy Stage

Troubleshooting

■ Check your RBAC settings

Agent job

Pool: [Hosted Ubuntu 1604](#) · Agent: Hosted Agent

- ✓ Initialize job · succeeded
- ✓ Initialize Agent · succeeded
- ✓ Pre-job: helm init · succeeded
- ✓ Pre-job: helm upgrade · succeeded
- ✓ Install Helm 2.11.0 · succeeded

✗ helm init · 1 error

5m 1s

✗ Error: tiller was not found. polling deadline exceeded

Settings

```
52  ✓  ...  --task: HelmDeploy@0
53  ...  displayName: 'Initialize Helm'
54  ✓  ...  inputs:
55  ...  ...  connectionType: 'Azure Resource Manager'
56  ...  ...  azureSubscription: 'AzureMSDN'
57  ...  ...  azureResourceGroup: 'container-pipelines-demo'
58  ...  ...  kubernetesCluster: 'dev-container-demo'
59  ...  ...  useClusterAdmin: true
60  ...  ...  command: 'init'
61  ...  ...  arguments: '--service-account tiller --force-upgrade'
62
```

Troubleshooting

■ Upgrade Failed

✓	Pre-job: helm init · succeeded	2s
✓	Pre-job: helm upgrade · succeeded	<1s
✓	Install Helm 2.11.0 · succeeded	3s
✓	helm init · succeeded	3s
✓	az acr helm repo add · succeeded	17s
✗	helm upgrade · 1 error	3s
✗ Error: UPGRADE FAILED: "azdo" has no deployed releases		
✓	Post-job: helm upgrade · succeeded	<1s
✓	Post-job: helm init · succeeded	<1s

■ Add to pipeline

```
$ helm del --purge azdo
```

- **Blog:** <http://jamesrcounts.com/2019/11/18/azdo-container-pipelines.html>
- **Code:** <https://github.com/jamesrcounts/phippyandfriends>

Please use EventsXD to fill out a session evaluation.

Thank you!