Creating and Running Containers in Azure

Anthony E. Nocentino
ENTERPRISE ARCHITECT @ CENTINO SYSTEMS
@nocentino www.centinosystems.com

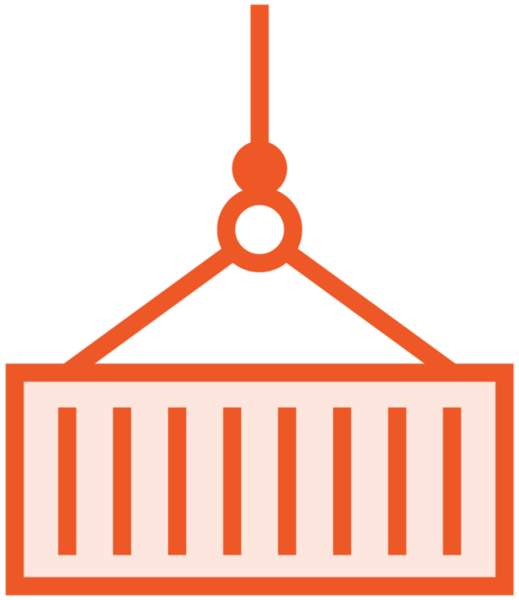
Running Containers in Azure

docker

Azure Container Registry (ACR)

Azure Container Instances (ACI)

Container Fundamentals



Binaries, libraries and other components

Container image - binary application package

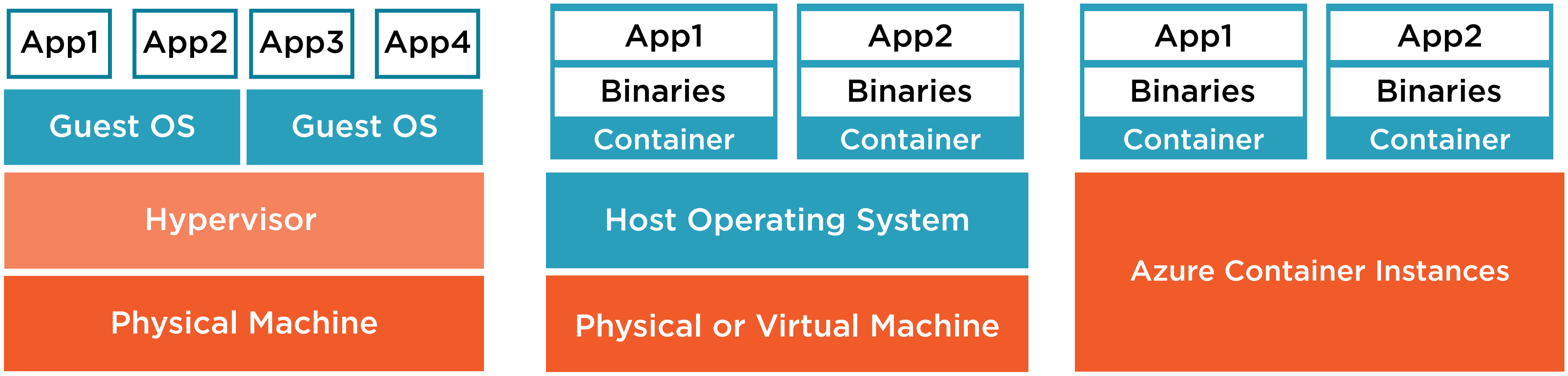
Container - running container image

One app inside the container

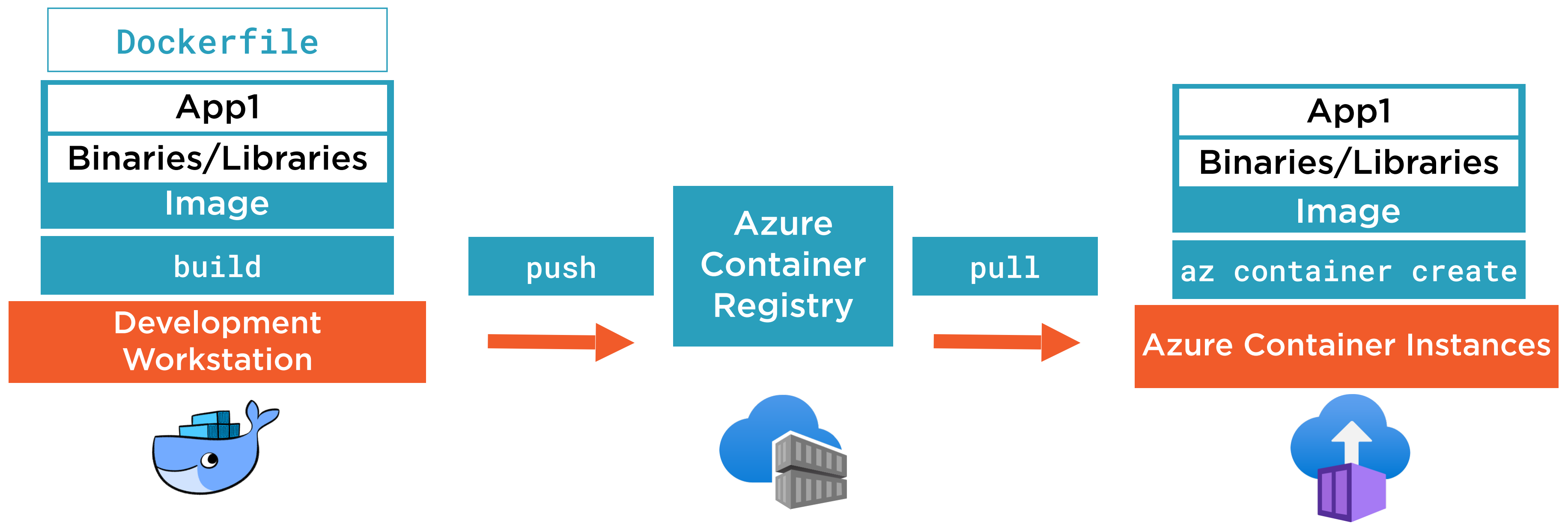
Generally very small and very portable

Container Registries - enables exchanging of container images

Container Fundamentals



Working with Containers in Azure



Example Dockerfile

```
FROM mcr.microsoft.com/dotnet/core/aspnet:3.1

RUN mkdir /app
WORKDIR /app

COPY ./webapp/bin/Release/netcoreapp3.1/publish ./
COPY ./config.sh ./

RUN bash config.sh

EXPOSE 80
ENTRYPOINT ["dotnet", "webapp.dll"]
```

```
docker build -t webappimage:v1 .
```

Demo

Creating a container image using docker

Azure Container Registry (ACR)

Build, store, and manage container images

Key component of building a CI/CD pipeline

ACR Tasks for container image automation

Service tiers

https://docs.microsoft.com/en-us/azure/container-registry/container-registry-skus

ACR Authentication and Security Options

- **Requires authentication for operations**
  - **Azure Active Directory Identities**
    - **Users**
    - **Service Principals**
  - **ACR Admin**
- **Orchestrators, tools and applications should use ‘headless’ authentication**
- `az acr login` **OR** `docker login`
- **Role-based access controls**

https://docs.microsoft.com/en-us/azure/container-registry/container-registry-authentication

ACR Role-Based Authentication

Role/Permission	**Access Resource Manager**	**Create/delete registry**	**Push image**	**Pull image**	**Delete image data**	**Change policies**	**Sign images**
Owner	X	X	X	X	X	X	
Contributor	X	X	X	X	X	X	
Reader	X			X			
AcrPush			X	X			
AcrPull				X			
AcrDelete					X		
AcrImageSigner							X

From: https://docs.microsoft.com/en-us/azure/container-registry/container-registry-roles

Creating and Authenticating to Azure Container Registry

```
ACR_NAME='psdemoacr'  #<---- THIS NEEDS TO BE GLOBALLY unique in Azure

az acr create \
    --resource-group psdemo-rg \
    --name $ACR_NAME \
    --sku Standard

az acr login --name $ACR_NAME
```

Pushing an Image into ACR

```
ACR_NAME='psdemoacr'
ACR_LOGINSERVER=$(az acr show --name $ACR_NAME --query loginServer --output tsv)

#psdemoacr.azurecr.io

docker tag webappimage:v1 $ACR_LOGINSERVER/webappimage:v1

docker push $ACR_LOGINSERVER/webappimage:v1

#Build using ACR Tasks
az acr build --image "webappimage:v1-acr-task" --registry $ACR_NAME .
```

Demo

Creating an Azure Container Registry (ACR)

Pushing an image into ACR

Building an image in ACR using Tasks

Deploying Containers in Azure Container Instances

Serverless container platform

Access application via Internet or on an Azure Virtual Network

Windows and Linux containers

Resource requests for CPU and memory

Use Azure Files for persistent storage

Deployed in Groups

Restart policy - always, on failure and never

Deploying Containers in ACI from Container Registries

Azure Container Registry

Docker Hub or other container registries

Public or private

Login server

Username and password

Creating a Service Principal for ACI to Pull From ACR

```
ACR_NAME='psdemoacr'
ACR_REGISTRY_ID=$(az acr show --name $ACR_NAME --query id --output tsv)

SP_NAME=acr-service-principal
SP_PASSWD=$(az ad sp create-for-rbac \
    --name http://$ACR_NAME-pull \
    --scopes $ACR_REGISTRY_ID \
    --role acrpull \
    --query password \
    --output tsv)

SP_APPID=$(az ad sp list \
    --display-name http://$ACR_NAME-pull \
    --query '[].appId' \
    --output tsv)
```

Running a Container from ACR in ACI

```
ACR_LOGINSERVER=$(az acr show --name $ACR_NAME --query loginServer --output tsv)

az container create \
    --resource-group psdemo-rg \
    --name psdemo-webapp-cli \
    --dns-name-label psdemo-webapp-cli \
    --ports 80 \
    --image $ACR_LOGINSERVER/webappimage:v1 \
    --registry-login-server $ACR_LOGINSERVER \
    --registry-username $SP_APPID \
    --registry-password $SP_PASSWD
```

```
psdemo-webapp-cli.centralus.azurecontainer.io
```

Demo

Deploying containers in Azure Container Instances (ACI)

- Azure Portal
- Azure CLI

Summary

Provision VMs

Configure VMs for remote access

Create ARM templates

Create container images for solutions by using Docker

Publish an image to the Azure Container Registry

Run containers by using Azure Container Instance

Thank You!

@nocentino