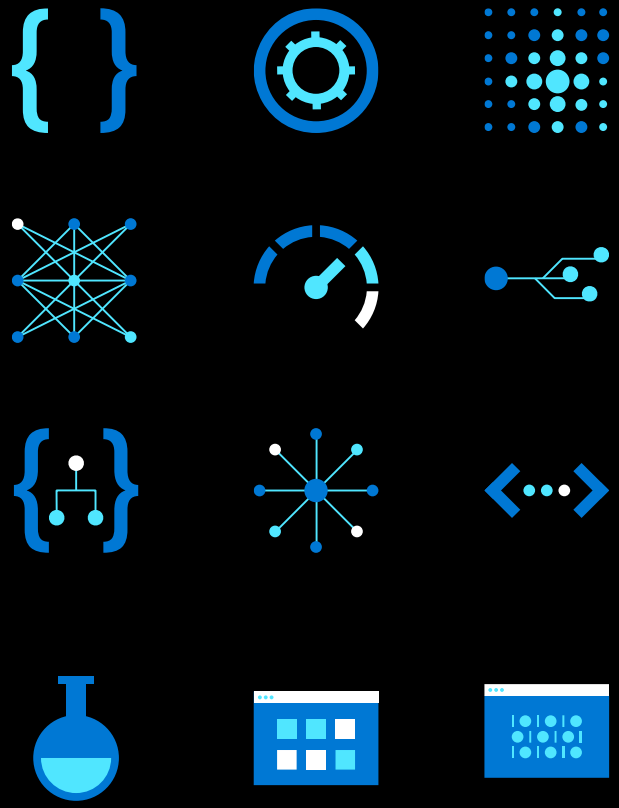
Microsoft Azure

Azure Training Day

Run cloud-native apps with Azure Kubernetes Service



Microsoft

Azure

Optimize operations and monitoring

Part 3 of 4 in the Run cloud-native apps with Azure Kubernetes Service series

MSUSDev@Microsoft.com

Oct, 2019

About us...

Ryan Berry

- Principal Cloud Solution Architect

For questions or help with this series
MSUSDev@Microsoft.com

For the lab guides and sample code
https://github.com/MSUSDEV/Run-Cloud-Native-Apps-With-AKS

Setting the scene

Overview of the workshop

About the workshop content…

About:
This series is the second half of a longer workshop that teaches how to build a proof of concept (POC) that will transform an existing ASP.NET-based Web application (SimplCommerce) to a container-based application. You can register to view the modules from the first half at https://aka.ms/web-app-series You can find all the presentations form the first half at https://github.com/MSUSDEV/Migrating-web-apps-to-Azure

At the end of this workshop, you will have a good understanding of container concepts, Docker architecture and operations, Azure Container Services, Azure Kubernetes Services and Azure DevOps tools.

Target Audience:
The workshop is targeted to Cloud Architects, Cloud Solution designers, developers and IT sysadmins, CIO's, CTO's and anybody else who is interested in learning about Azure, containers, application cloud migration and digital transformation.
Focus of the workshop (40%) is getting hands-on experience, complemented with presentations and whiteboard sessions (if in-person delivery).

Time Estimate:
11 hours (+/- 5 hours presentations, 6 hours of optional hands-on labs for attendees)

Workshop Agenda - Presentations

What we will talk about…

Series 1: https://aka.ms/web-app-series

- Module 1: Digital App Transformation with Azure
- Module 2: Running Azure Infrastructure and execute Lift & Shift Migrations
- Module 3: Performing proper assessments to smooth Azure Migrations
- Module 4: Why and how migrating databases to Azure PaaS
- Module 5: Migrating to Azure App Services – Azure Web Apps (.NET)

Series 2: https://aka.ms/cloud-native-series

- Module 1: Deploying Containers on Azure
- Module 2: Deploying Azure Kubernetes Services
- Module 3: Optimizing Azure Operations and Monitoring YOU ARE HERE
- Module 4: Introduction to Azure DevOps

Workshop Agenda – Hands On Labs

From series 1

- **Module 2: Running Azure Infrastructure and execute Lift & Shift Migrations**
- *Lab 1: Deploy an Azure VM Infrastructure using ARM-Templates*

- **Module 3: Performing proper assessments to smooth Azure Migrations**
- *Lab 2: Using Azure assessment tools*

- **Module 4: Why and how migrating databases to Azure PaaS**
- *Lab 3: Migrating SQL Databases to Azure using Database Migration Assistant*

- **Module 5: Migrating to Azure App Services – Azure Web Apps (.NET)**
- *Lab 4: Publishing application source code to Azure Web Apps using Visual Studio 2019*

Workshop Agenda – Hands On Labs

For this series 2

- **Module 1: Deploying Containers on Azure**
- *Lab 5: Containerizing applications using Docker and running it in Azure Container Instance and Azure WebApp for Containers*

- **Module 2: Deploying Azure Kubernetes Services**
- *Lab 6: Deploying Azure Kubernetes Services and running containerized apps from Azure Container Registry*

- **Module 3: Optimizing Azure Operations and Monitoring YOU ARE HERE**
- *Lab 7: Monitoring and Managing your Azure deployed workloads*

- **Module 4: Introduction to Azure DevOps**
- *Lab 8: Deploying Azure DevOps with CI/CD Pipelines and deploy your applications to Azure WebApps, WebApp for Containers, Azure Container Instance and Azure Kubernetes Services*

Technical Requirements

What you need…

- See appendix slides for lab dependencies and / or alternate path for workshop
- Client workstation running recent Windows, Linux or Mac OS and latest internet browser
- Access to ports 80 (HTTP), 443 (HTTPS) and 3389 (Remote Desktop)
- Full Azure subscription (MSDN, AzurePass, Paid subscription, AE, CSP,…), where you have Owner permissions on subscription level
- Lab consumption estimate: $15-35

Questions and HOL support

For questions or help with this series
MSUSDev@Microsoft.com

For the lab guides and sample code
https://github.com/MSUSDEV/Run-Cloud-Native-Apps-With-AKS

For information about lab dependencies and alternate approach please see the appendix slides at the end of this presentation.

Key Objectives

What you will learn in this section

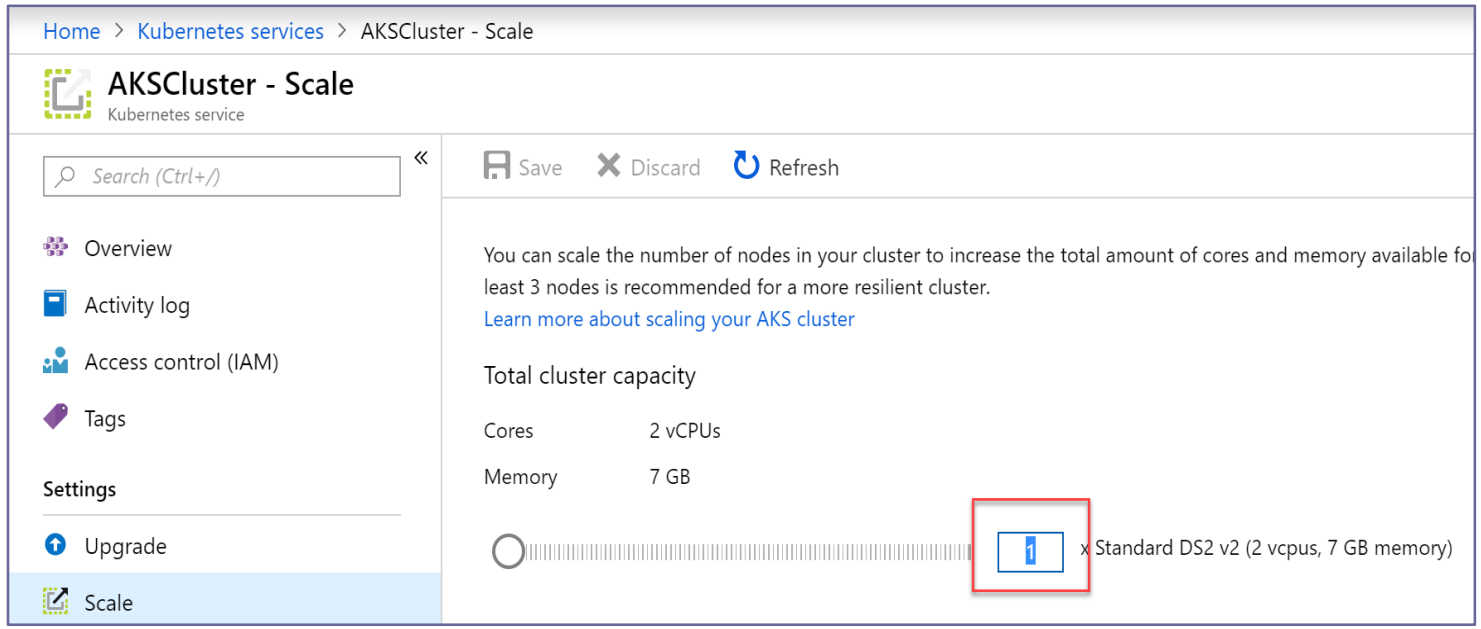
- Enabling Container Scalability in AKS
- Monitoring Azure Kubernetes Services
- Using Kubernetes dashboard with Azure Kubernetes Services

Enabling Container Scalability

AKS Scale

Option 1: Scaling the Nodes

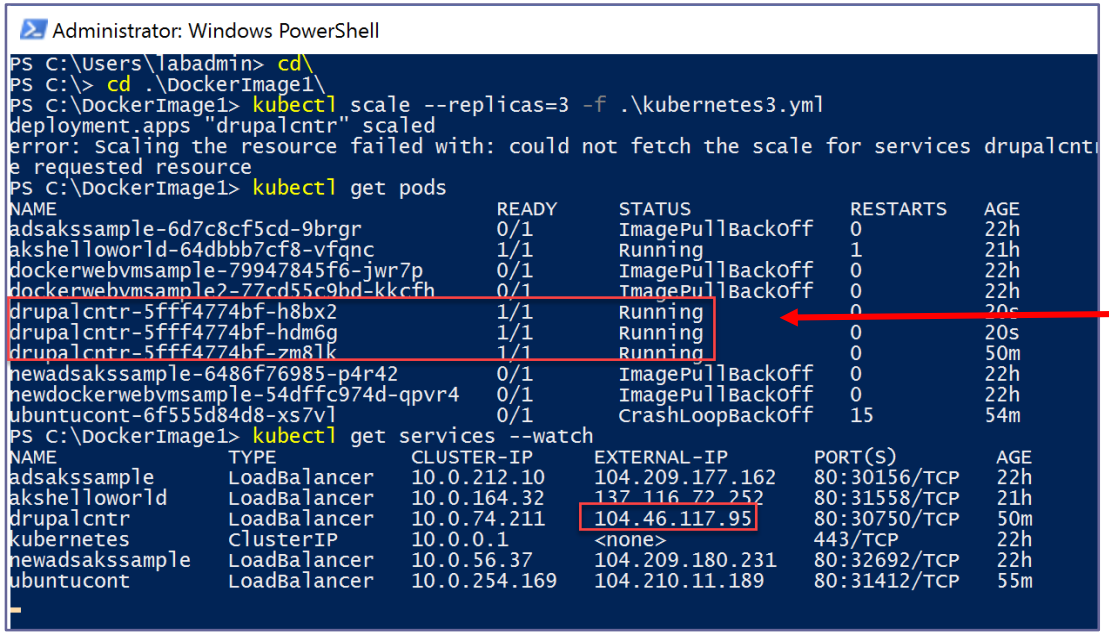
```
Az aks scale --resource-group AKSRG --name AKSCluster --node-count 3
```



AKS Scale

Option 2: Scaling the PODS

```
kubectl scale --replicas=3 -f .\kubernetes3.yml
```



Scaling PODS means you technically deploy multiple instances of your app container

AKS Container AutoScaler

Preview

```
kubectl create -f aks-cluster-autoscaler.yaml

kubectl autoscale deployment azure-vote-front --cpu-
percent=50 --min=3 --max=10
```

AutoScaling checks pending PODS, based on values in the Yaml-file.
Define a min and max value
e.g. Run 3 nodes minimum, with a maximum of 10, when CPU +50%.

```
            memory: 300Mi
        command:
        - ./cluster-autoscaler
        - --v=3
        - --logtostderr=true
        - --cloud-provider=azure
        - --skip-nodes-with-local-storage=false
        - --nodes=1:10:nodepool1
        env:
        - name: ARM_SUBSCRIPTION_ID
          valueFrom:
```

Demo

Scaling Azure Kubernetes Services

Monitoring AKS in Azure

AKS Monitoring

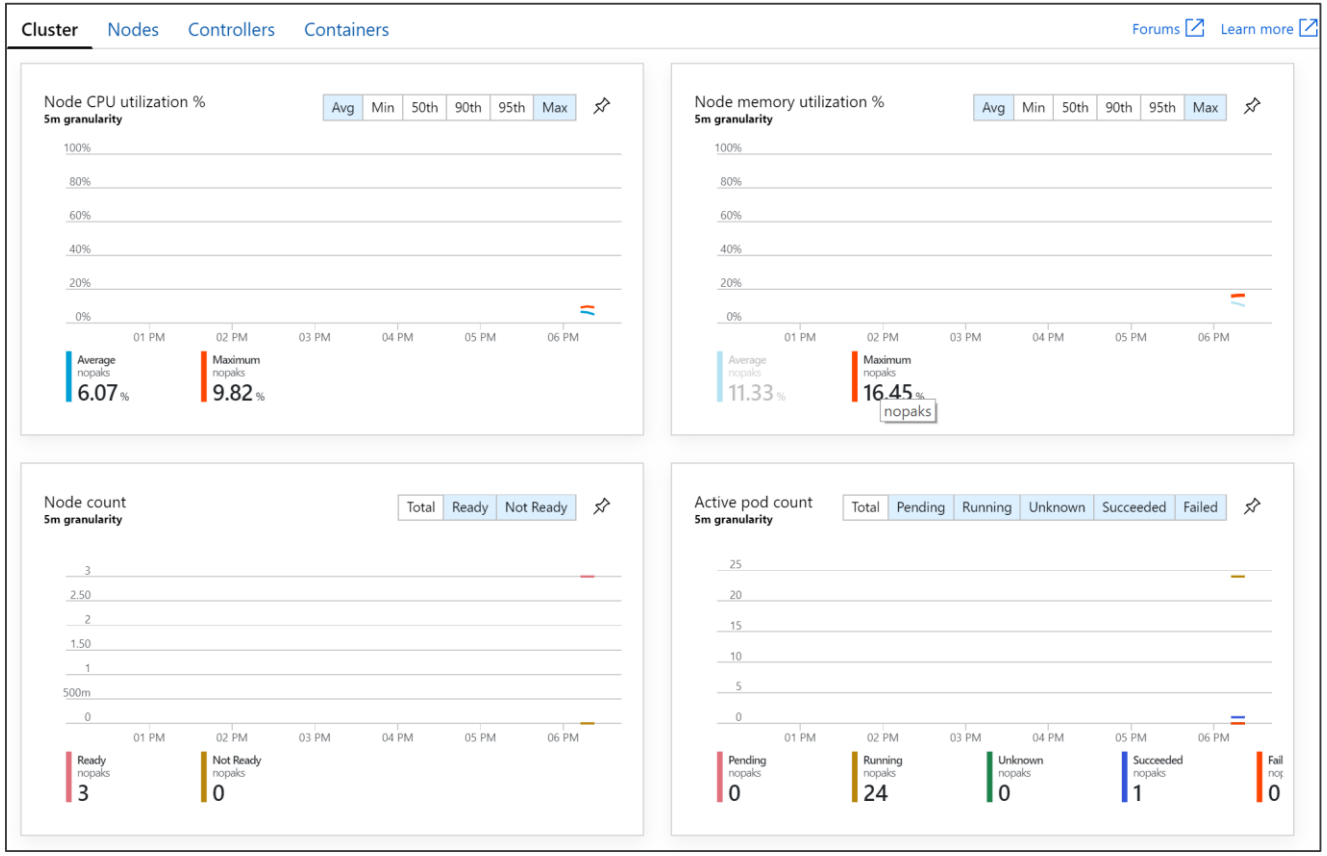
You can't manage what you don't see…

- Identify AKS containers that are running on the node and their average processor and memory utilization.
- Identify where the container resides in a controller or a pod.
- Review the resource utilization of workloads running on the host that are unrelated to the standard processes that support the pod.
- Understand the behavior of the cluster under average and heaviest loads.

AKS Monitoring

Built-in monitoring capabilities of the AKS Cluster, provided by Azure Monitor

- Cluster
- Nodes
- Controllers
- Containers



AKS Monitoring

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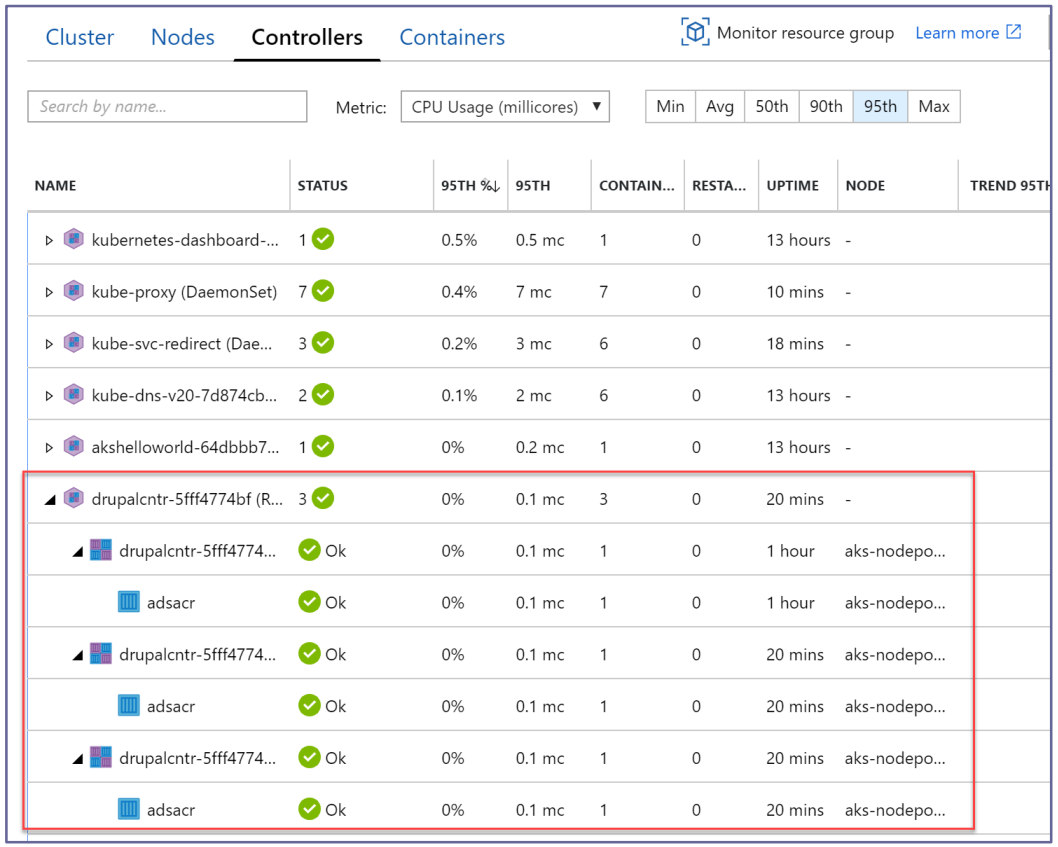
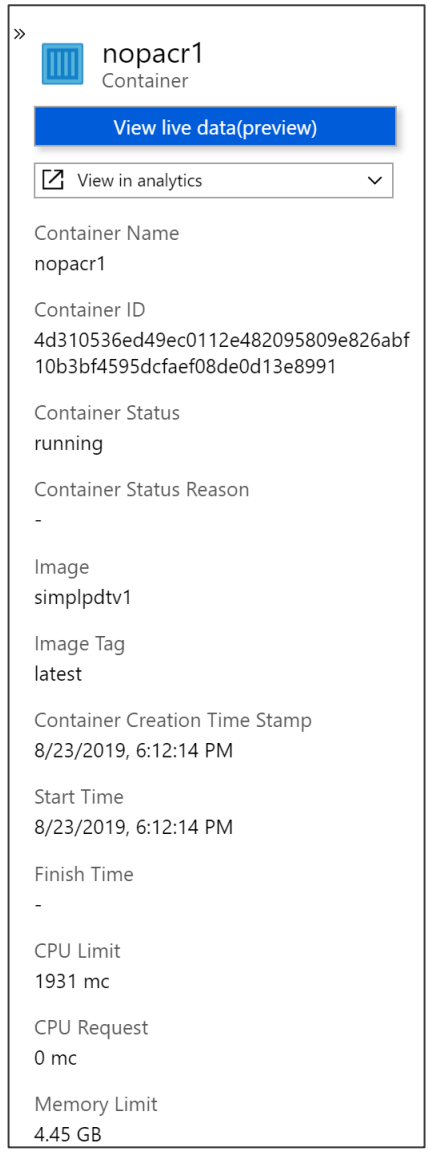
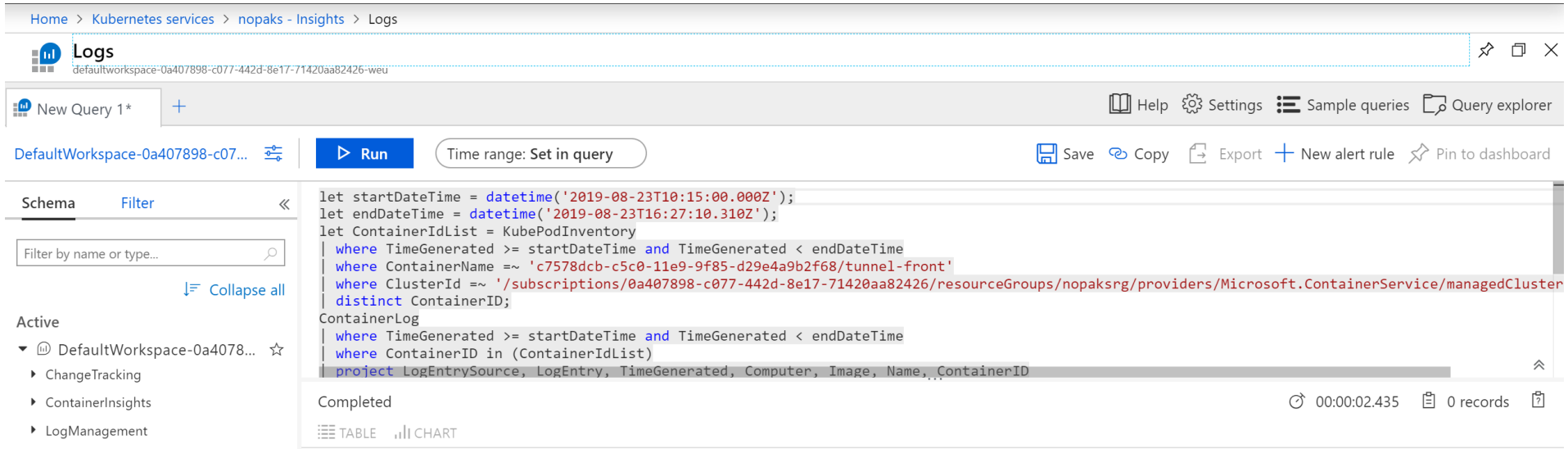




AKS Monitoring – Log Analytics

Run Powerful Queries against the AKS Cluster, provided by Log Analytics

- Cluster
- Nodes
- Controllers
- Containers



Demo

Monitoring AKS in Azure

Using the Kubernetes Dashboard

Kubernetes Dashboard

You can't manage what you don't see…

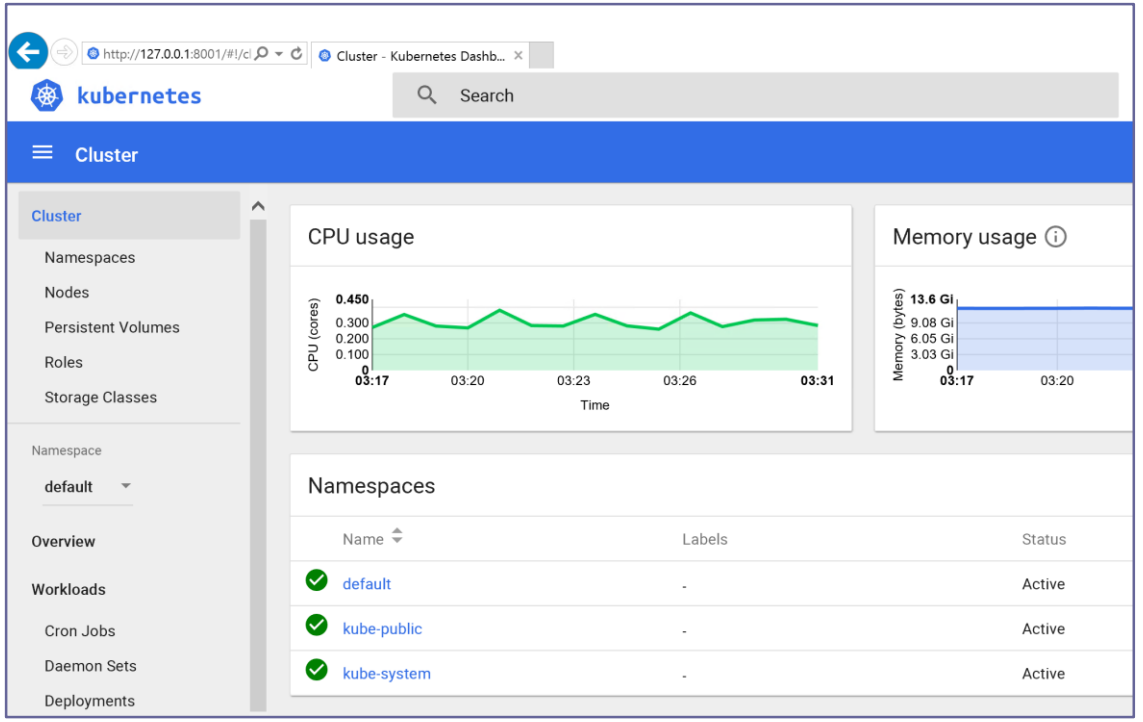
- Kubernetes includes a web dashboard that can be used for basic management operations. This dashboard lets you view basic health status and metrics for your applications, create and deploy services, and edit existing applications.

```
az aks browse --resource-group AKSResourceGroup --name AKSCluster
```

Using the Default Kubernetes Dashboard

You don't have to use the Azure Monitor-based version…

1. Install latest version of the kubectl CLI tool
2. Connect to the AKS Cluster with the correct credentials
3. az aks browse…

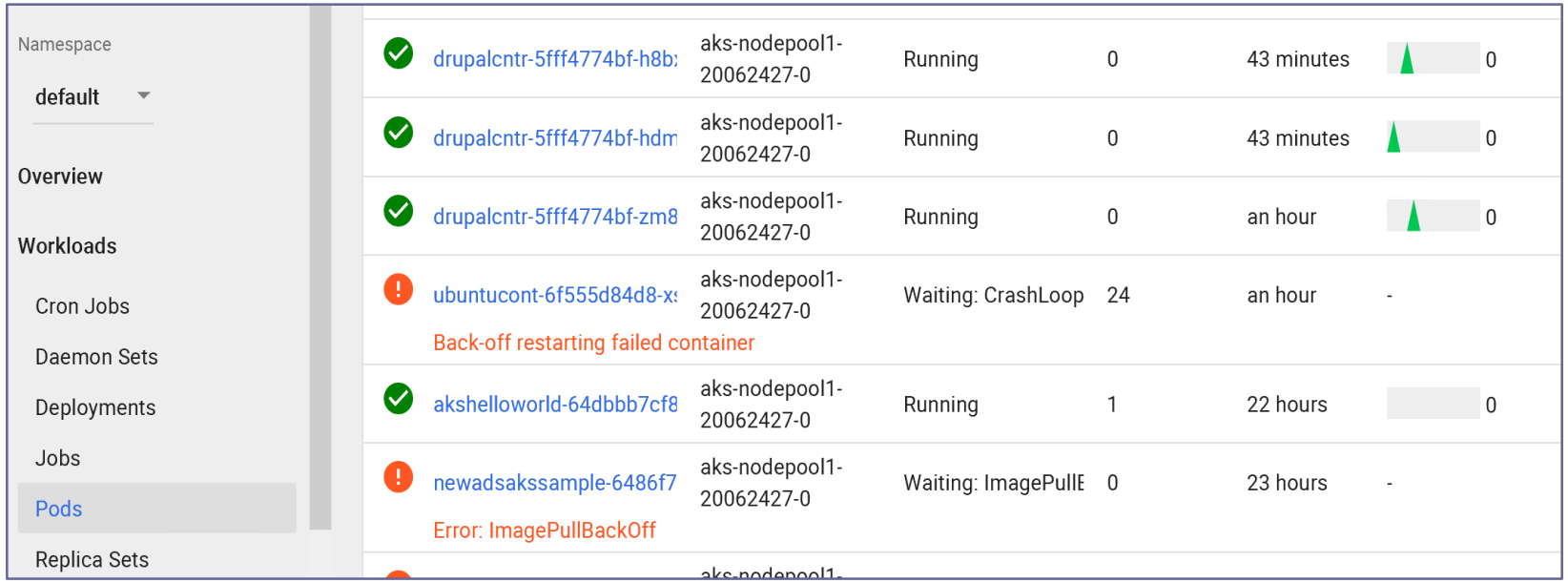


Could be beneficial in a multi-environment Kubernetes setup, as the dashboard is native to Kubernetes, no matter where the cluster runs

Using the Default Kubernetes Dashboard

You don't have to use the Azure Monitor-based version…

Shows detailed information on:
- Jobs
- Pods
- Nodes
- …



If AKS cluster is using RBAC, your dashboard will fail because of missing rolebinding:

FIX

```
kubectl create clusterrolebinding kubernetes-dashboard --clusterrole=cluster-admin --serviceaccount=kube-system:kubernetes-dashboard
```

Demo

Using the Kubernetes Dashboard

Section Take-Aways

1. Azure Kubernetes Services has built-in scaling features
2. Azure Kubernetes Services provides Azure-integrated Monitoring, relying on Azure Monitor and Log Analytics
3. AKS provides support to open the traditional« Kubernetes Dashboard »

Overall Workshop Take-Aways

1. Azure has all services available to assist in application migration and digital transformation

2. Azure integrates with Docker Containers, as an enabler for cloud migration and integration of your business-critical workloads

3. Azure provides several « Container Services », from low-level to enterprise-grade solutions, including end-to-end monitoring, relying on Azure common services

Questions?

Peter De Tender

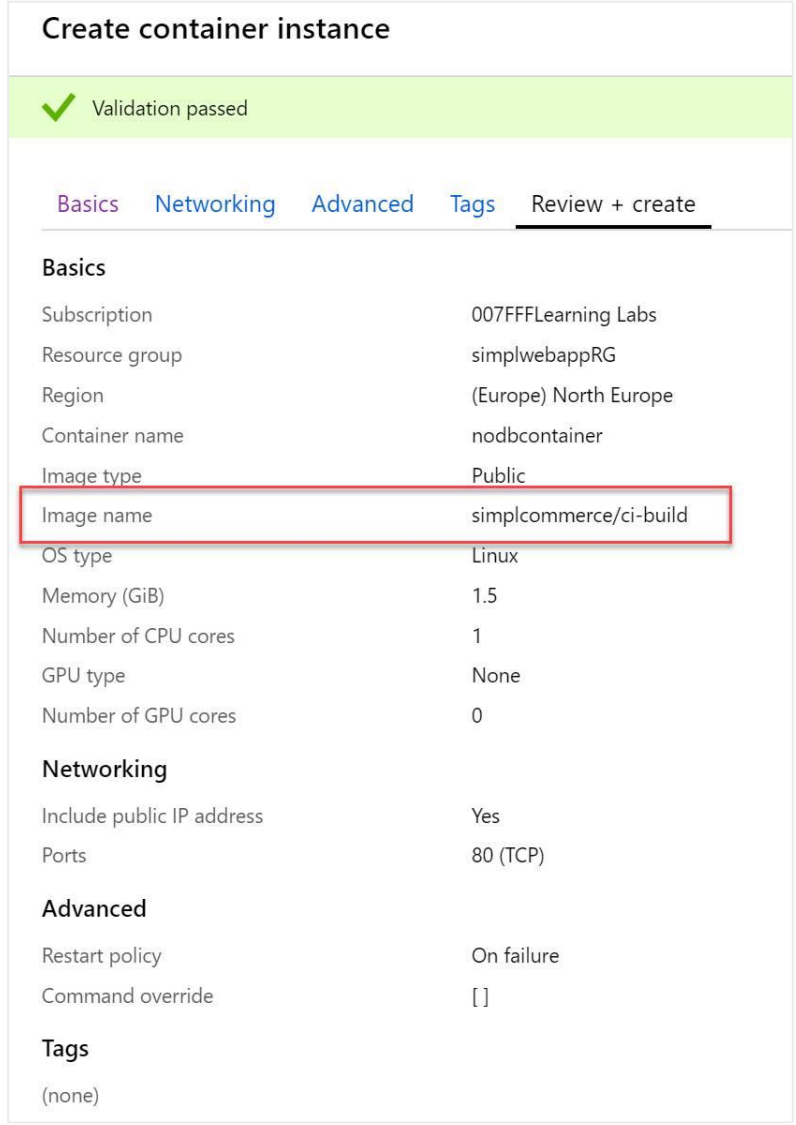
Appendix

Lab dependencies and alternate path

Alternate path

To avoid the SQL dependencies from the first series labs

- SimplCommerce offers a Docker container that uses a built-in non-SQL database
- https://hub.docker.com/r/simplcommerce/ci-build
- If you run this locally (or in ACI or AKS) it will spin up the web app and give you the option to select “sample products” (phones or fashion)



Full workshop

Dependencies from first series

The lab guide assumes that the learner has completed the first 3 labs from the previous series "Migrate a web app to Azure" and the first 2 labs from this series

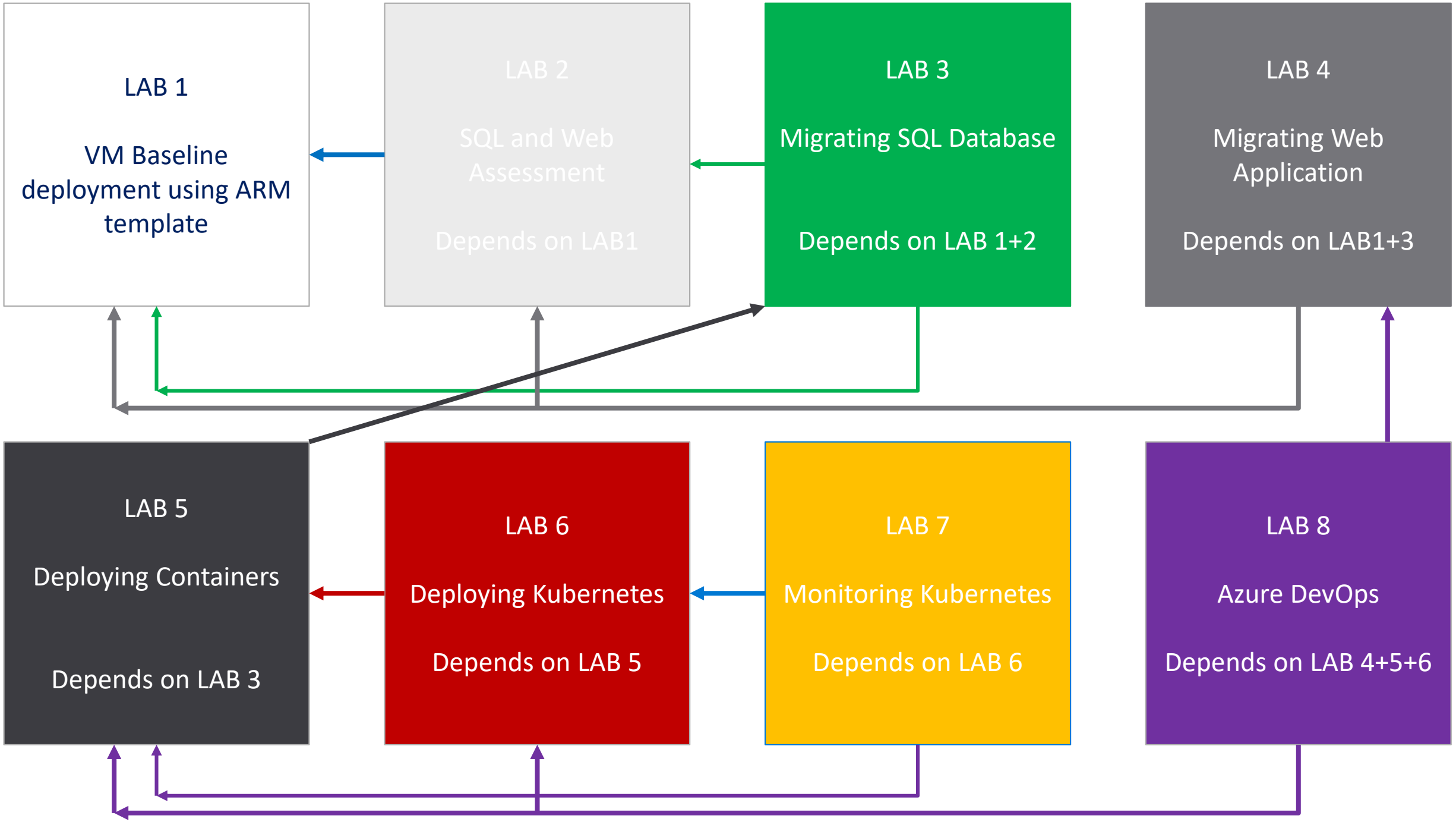
Deploying VM baseline using ARM Templates

Performing Assessments

Migrating SQL Databases

Deploying and running Azure containers

Deploying and running Azure Kubernetes Services


LAB 1
VM Baseline deployment using ARM template
LAB 2
SQL and Web Assessment
Depends on LAB1
LAB 3
Migrating SQL Database
Depends on LAB 1+2
LAB 4
Migrating Web Application
Depends on LAB1+3
LAB 5
Deploying Containers
Depends on LAB 3
LAB 6
Deploying Kubernetes
Depends on LAB 5
LAB 7
Monitoring Kubernetes
Depends on LAB 6
LAB 8
Azure DevOps
Depends on LAB 4+5+6

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Thank You