# Workshop – Containers & AKS

**Prerequisites**:

1. Azure Subscription
2. Internet Connection
3. Remote Desktop client (Built in Windows)
4. Web Browser (Any)

Section 1: Tools Installations

Setting up a VM on Azure is the easiest way to kickstart workshops and provides a clean development environment to start with. However, if you prefer to work with your own setup, feel free to do that; and in that case *skip irrelevant portions of Section 1 of this Setup*

Create Windows 10 VM

* Login into your azure portal (https://portal.azure.com)
* Click on *Create Resource* to start creating new windows VM. Choose one *Windows 10 Pro*
* On Next screen, click *Create* button to start VM Creation
* In Basics tab, select an existing resource group or use *Create new* button to create new one. Then enter name of new VM : *Windows10VM* **(***or anything of your choice***)** and then scroll down for more settings
* On next section, provide user credentials and port to be open for *RDP* access.
* Click Next – *Disk.* Click Next*: Networking* to skip the disk configuration (Accept defaults).
* Click Next - *Management* to skip networking (Accept defaults)
* Turn off both diagnostics and click *Review + Create*
* On final page, click *Create* after validation is passed
* Wait for VM Provisioning to finish

Install Docker CE for Windows

* Once VM is Ready, Click on *Connect* button to start RDP Session
* Choose *Use different account* in login box and then enter *username* & *password*. You may have to accept server certificate to begin session.
* Go to Start menu and click on *Windows PowerShell*
* Install VirtualBox ( <https://www.virtualbox.org/wiki/Downloads> ) Or Hyper-V ( <https://docs.microsoft.com/en-us/virtualization/hyper-v-on-windows/quick-start/enable-hyper-v> )
* (for the above selected VM, you might just need to Enable Hyper-V from *turn On/Off windows features*)
* Install *Docker For Windows* from: <https://docs.docker.com/v17.09/docker-for-windows/install/>
* This should install docker-compose as well. Check this by running - *docker-compose version* from PowerShell
* Test Docker Installation – ***docker version***

Install Azure CLI for Windows

* Go to link: <https://docs.microsoft.com/en-us/cli/azure/install-azure-cli-windows?view=azure-cli-latest> and install CLI
* Check Installation – ***az --version***

***az login***

Install Kubectl for Windows

* In *PowerShell* : *Install-Script -Name install-kubectl -Scope CurrentUser -Force*
* Specify a *DownloadLocation*
* *install-kubectl.ps1 [-DownloadLocation <path>]*
* Note: If you do not specify a *DownloadLocation*, *kubectl* will be installed in the user’s temp Directory.
* The installer creates *$HOME/.kube* and instructs it to create a config file
* Test to ensure the version you installed is sufficiently up-to-date: *kubectl version*

OR

You can follow instructions at: <https://kubernetes.io/docs/tasks/tools/install-kubectl/#install-kubectl>

Install VSCode for Windows

This is primarily for better editing on the Windows VM. If you are using your own machine/setup then you can use any other editor of your choice

*https://code.visualstudio.com/download*

Install Helm for Windows

K8s de-facto package manager: <https://docs.helm.sh/using_helm/#from-the-binary-releases>

Section 2: Environment Setup

Note: Please create a working folder in your local directory – ***ASKSChallenge***. ***CD*** into it.

We would run all our examples/downloads into this directory

Create an AKS cluster

* Create Service Principle

*az ad sp create-for-rbac --skip-assignment*

Note down the ***appId*** and ***password***

* Create a Resource Group

*az group create --name akschallenge --location $region*

* Create AKS using the latest version and enable the monitoring addon

Go to Portal *(https*://portal.azure.com)and follow instructions during workshop

Ensure you can connect to the cluster using *kubectl*

* Authenticate

*az aks get-credentials --resource-group akschallenge --name <unique-aks-cluster-name>*

* List the available nodes

*kubectl get nodes*

* *Deploy an instance of MongoDB to your cluster. The application expects a database called akschallenge*

If the cluster is RBAC enabled, you have to create the appropriate ServiceAccount for Tiller (the server side Helm component) to use.

* YAML link *-* [*https://aksworkshop.io/yaml-solutions/01.%20challenge-02/helm-rbac.yaml*](https://aksworkshop.io/yaml-solutions/01.%20challenge-02/helm-rbac.yaml)
* Deploy it using

*kubectl apply -f helm-rbac.yaml*

* Initialize Tiller (omit the ***--service-account*** flag if your cluster is not ***RBAC*** enabled)

*helm init --upgrade --service-account tiller*

* Install MongoDB using Helm chart

*helm install stable/mongodb --name orders-mongo --set mongodbUsername=orders-user,mongodbPassword=orders-password,mongodbDatabase=akschallenge*

Create Azure Container Registry

* Go to your resource group in Azure Portal
* Select *Add* and then *Container Registry*
* Follow instructions to Create the ACR. This will take few minutes.
* Once created, Open *Access Keys* section in the portal and note down the details

Alternate using PowerShell:

*az acr create --resource-group akschallenge --name <unique-acr-name> --sku Standard --location <location>*

Deploy the Order Capture API

* Source Link: <https://hub.docker.com/r/azch/captureorder/>
* YAML link: <https://aksworkshop.io/yaml-solutions/01.%20challenge-02/captureorder-deployment.yaml>

*kubectl apply -f captureorder-deployment.yaml*

* Verify that the pods are up and running

*kubectl get pods -l app=captureorder*

* YAML link: [*https://aksworkshop.io/yaml-solutions/01.%20challenge-02/captureorder-service.yaml*](https://aksworkshop.io/yaml-solutions/01.%20challenge-02/captureorder-service.yaml)

*kubectl apply -f captureorder-service.yaml*

* Retrieve the External-IP of the Service

*kubectl get svc captureorder (note down the IP address)*

Note: This might show you as pending, if your cluster is RBAC enabled. You should also map the IP with DNS.

Follow instructions in the workshop

* Check ***CaptureOrder*** service

*curl -d "EmailAddress=email@domain.com&Product=prod-11&Total=100" -H "Content-Type: application/json" -X POST http://<dns\_name>/v1/order*

Deploy the frontend using Ingress

* Source Link: <https://github.com/Azure/azch-frontend>
* YAML link: https://aksworkshop.io/yaml-solutions/01.%20challenge-02/frontend-deployment.yaml

*kubectl apply -f frontend-deployment.yaml*

* Verify that the pods are up and running

*kubectl get pods -l app=frontend*

Expose the frontend on a hostname

* Enable the HTTP routing add-on on your cluster

*az aks enable-addons --resource-group akschallenge --name <unique-aks-cluster-name> --addons http\_application\_routing*

* YAML link: <https://aksworkshop.io/yaml-solutions/01.%20challenge-02/frontend-service.yaml>

*kubectl apply -f frontend-service.yaml*

* Ingress*:*

*az aks show --resource-group akschallenge --name <unique-aks-cluster-name> --query addonProfiles.httpApplicationRouting.config.HTTPApplicationRoutingZoneName -o table*

[*https://aksworkshop.io/yaml-solutions/01.%20challenge-02/frontend-ingress.yaml*](https://aksworkshop.io/yaml-solutions/01.%20challenge-02/frontend-ingress.yaml)

*kubectl apply -f frontend-ingress.yaml*

* *Display App:*

*http://<frontend\_dns\_name>*

Monitoring

* Primarily done by Insights and Log Analytics in the portal
* Follow discussion on this during workshop and try out various options

Scaling

* Run Load Test:

*az container create -g akschallenge -n loadtest --image azch/loadtest --restart-policy Never -e SERVICE\_IP=<public ip of order capture service>*

* Check Container Logs:

*az container logs -g akschallenge -n loadtest*

Go to portal and follow instructions in the workshop

*az container delete -g akschallenge -n loadtest*

* Create Horizontal Pod Autoscaler:

YAML link: <https://aksworkshop.io/yaml-solutions/01.%20challenge-04/captureorder-hpa.yaml>

*kubectl apply -f captureorder-hpa.yaml*

*az container create -g akschallenge -n loadtest --image azch/loadtest --restart-policy Never -e SERVICE\_IP****=****<public ip of order capture service>*

*kubectl get pods -l*

Go to portal and follow instructions in the workshop

*az aks scale -g akschallenge --name <unique-aks-cluster-name> --node-count 4*

*az container delete -g akschallenge -n loadtest*

DEVOPS

* Login to the registry

*az acr login --name <unique-acr-name>*

* Clone the application code on Azure Cloud Shell

*git clone https://github.com/Azure/azch-captureorder.git*

* cd *azch-captureorder*
* Use Azure Container Registry Build to build and push the container images

*az acr build -t "captureorder:{{.Run.ID}}" -r <unique-acr-name> .*

* Create Kubernetes secret

*kubectl create secret docker-registry acr-auth --docker-server <acr-login-server> --docker-username <service-principal-ID> --docker-password <service-principal-password> --docker-email <email-address>*

* Update your deployment with a reference to the created secret

*spec:*

*imagePullSecrets:*

*- name: acr-auth*

*containers:*

* Edit deployment

*kubectl edit deploy*

Follow instructions in the session to complete the DevOps exercise