Microsoft

Kubernetes Technical Briefing

Overview

You Trainer

Mark Kizhnerman

Microsoft Cloud Solutions Architect

Software Engineer/Developer for more than 25 years

Specialize in .NET, T-SQL and Containers

Live in Lafayette, Colorado (near Boulder) with my wife and 3 daughters

Your Role/Experience

Please introduce yourself:

- What is your role in your organization? (Sys Admin, Developer, Manager, etc.)
- How much experience do you have with:
  - Azure
  - Docker / Containers
  - Kubernetes
- What do you hope to get from this workshop?

Agenda

Day 1 & 2

- Kubernetes Core Concepts
- Azure Kubernetes Service (AKS)
- Intermediate Kubernetes Topics

* Optional Day 3 – For Developers

- Application Development with Kubernetes
- Application Deployment to Kubernetes using DevOps

* Optional Day 3 – For Administrators

- Advanced Kubernetes Concepts

* **Note:** Only one track will be covered during the optional 3rd day.

Workshop Content - General

Module 1 – Kubernetes Core Concepts

- Introduction to Kubernetes and Kubernetes Clusters
- Pods, Replica Sets and Deployments
- Deployment Strategies
- Networking Services
- Config Maps and Secrets
- Namespaces

Module 2 – Azure Kubernetes Service

- Azure Kubernetes Service Overview
- Regions and Availability Zones
- Node Pools / Cluster Auto Scaler
- Authentication/Authorization
- AKS Networking
- AKS Integrations with other Azure Services

Workshop Content - General

Module 3 – Intermediate Kubernetes Topics

- Volumes and Persistence
- Multi-Container Pods
- Init Containers
- Jobs and Cron Jobs
- Daemon Sets
- Health Probes
- Ingress
- Helm Package Manager

Workshop Content - Development

Module 4 – Application Development with Kubernetes

- Microservices Overview
- Implementing Microservices in Kubernetes
- Bridge To Kubernetes
- Application Monitoring

Module 5 – Application Deployment to Kubernetes

- Basic Microservices Deployments with DevOps
- Complex Microservices Deployments w/Helm and Azure Key Vault
  - CI/CD Pipelines in Azure DevOps
  - CI/CD Pipelines in GitHub

Workshop Content - Administration

Module 6 – Advanced Kubernetes Topics – Part 1

- Integration with Azure Key Vault
- Kubernetes RBAC with Azure AD
- Node Affinity
- Taints and Tolerations
- Pod Affinity/Anti-Affinity
- Pod Topology Spread Constraints
- Stateful Sets
- Network Policy

Module 7 – Advanced Kubernetes Topics – Part 2

- Requests and Limits
- Limit Ranges and Resource Quotas
- Horizontal Pod Auto Scalar
- Kubernetes Event-Driven Autoscaling (KEDA)
- AKS Patching and Upgrading
- Pod Disruption Budget (PDB)
- Open Service Mesh (OMS)
- Chaos Mesh with Azure Chaos Studio

Big Picture - Terminology

- **Microservices** – An architectural design approach to break up monolith applications into small, independent components.
- **Containers** - Standard unit of software that packages up code and all its dependencies, so the application runs quickly and reliably from one computing environment to another.
- **Docker** – A technology to containerize applications. Can be used for microservices or monolith applications.
- **Kubernetes** – A technology to manage and orchestrate Docker containers at enterprise scale.
- **Azure Kubernetes Service (AKS)** – A PaaS (Platform as a Service) offering that simplifies deploying and management of a hosted Kubernetes cluster in Azure.

Workshop and Lab

- Students will be provided with an online lab environment (max 16 students).
- The lab includes a **free 30-day/$50 Azure subscription** for each student.
- It's recommended you use a personal account (Outlook, Hotmail, Gmail, etc.) when signing up for the lab and Azure subscription.
  - Please sign up for a free account at ***Outlook.com*** and use that account to create your Azure subscription.
  - If you prefer to use your own existing Azure subscription, please download the Lab Files and Lab Guides from the lab interface.
- The workshop is delivered in Lab/Lecture format.
  - We'll take 15-minute breaks every 1.5-2 hours
  - Labs will be combined with the lunch break whenever possible, giving you extra time to complete the labs (if needed).
- If you have a question, please unmute yourself and ask. Please return to mute afterwards.

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Thank you