Course duration

- 2 days

Course Benefits

- Confidently use the stack outlined in the course.
- Understand the various key components.
- Apply the knowledge to migrate applications to microservice architected solutions on Docker, Kubernetes, and Jenkins with OpenShift
- Understand the various components in an OpenShift environment for CI/CD.

Course Outline

1. Introduction to Kubernetes
    1. What is Kubernetes
    2. What is a Container
    3. Container – Uses
    4. Container – Pros
    5. Container – Cons
    6. Composition of a Container
    7. Control Groups
    8. Namespaces
    9. Union Filesystems
    10. Popular Containerization Software
    11. Microservices
    12. Microservices and Containers / Clusters
    13. Microservices and Orchestration
    14. Microservices and Infrastructure-as-Code
    15. Kubernetes Container Networking
    16. Kubernetes Networking Options
    17. Kubernetes Networking – Balanced Design
    18. Summary
2. Kubernetes – From the Firehose
    1. What is Kubernetes?
    2. Container Orchestration
    3. Kubernetes Basic Architecture
    4. Kubernetes Detailed Architecture
    5. Kubernetes Concepts
    6. Cluster and Namespace
    7. Node
    8. Master

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9. Pod
10. Label
11. Annotation
12. Label Selector
13. Replication Controller and Replica Set
14. Service
15. Storage Volume
16. Secret
17. Resource Quota
18. Authentication and Authorization
19. Routing
20. Registry
21. Using Docker Registry
22. Summary

3. Docker Introduction
    1. What is Docker
    2. Where Can I Ran Docker?
    3. Docker and Containerization on Linux
    4. Linux Kernel Features: cgroups and namespaces
    5. The Docker-Linux Kernel Interfaces
    6. Docker Containers vs Traditional Virtualization
    7. Docker as Platform-as-a-Service
    8. Docker Integration
    9. Docker Services
    10. Docker Application Container Public Repository
    11. Competing Systems
    12. Docker Command-line
    13. Starting, Inspecting, and Stopping Docker Containers
    14. Summary
4. CI/CD with OpenShift, Jenkins, and Blue Ocean
    1. What is OpenShift
    2. OpenShift Online
    3. OpenShift Origin
    4. OpenShift Architecture
    5. OpenShift Origin Installation
    6. OpenShift CLI
    7. OpenShift CLI (Contd.)
    8. Jenkins Continuous Integration
    9. Jenkins Features
    10. Running Jenkins
    11. Downloading and Installing Jenkins
    12. Running Jenkins as a Stand-Alone Application
    13. Running Jenkins on an Application Server
    14. Installing Jenkins as a Windows Service
    15. Different types of Jenkins job
    16. Configuring Source Code Management(SCM)
    17. Working with Subversion

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18. Working with Git
19. Build Triggers
20. Schedule Build Jobs
21. Polling the SCM
22. Maven Build Steps
23. Jenkins / OpenShift Pipeline
24. Jenkins / OpenShift Pipeline Output
25. Installing Jenkins Plugins
26. The Blue Ocean Plugin
27. Blue Ocean Plugin Features
28. New modern user experience
29. Advanced Pipeline visualizations with built-in failure diagnosis
30. Branch and Pull Request awareness
31. Personalized View
32. OpenShift Pipeline Output
33. Creating OpenShift Blue Ocean Pipeline
34. Summary
35. Chapter 5. Operational Readiness
36. What is Operational Readiness
37. Telemetry
38. End-to-end Requirements Traceability
39. Log Strategy
40. Monitoring Strategy
41. Runbooks
42. Summary

5. Application Modernization
    1. What is Application Modernization
    2. Typical App Modernization Projects
    3. Why Modernization?
    4. Goals for Application Modernization
    5. Modernization Process
    6. Modernization in a Nutshell
    7. Modernization in a Nutshell - Analyze
    8. Modernization in a Nutshell - Rationalize
    9. Modernization in a Nutshell - Modernize
    10. Modernization in a Nutshell – Supervise
    11. Twelve-factor Applications
    12. Twelve Factors, Microservices, and App Modernization
    13. 12-Factor Microservice Codebase
    14. 12-Factor Microservice Dependencies
    15. 12-Factor Microservice Config
    16. 12-Factor Microservice Backing Services
    17. 12-Factor Microservice Continuous Delivery
    18. 12-Factor Microservice Processes
    19. 12-Factor Microservice Data Isolation
    20. 12-Factor Microservice Concurrency
    21. 12-Factor Microservice Disposability

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22. 12-Factor Microservice Environment Parity
23. 12-Factor Microservice Logs
24. 12-Factor Microservice Admin Processes
25. Monolithic revisited
26. Monolithic vs. Microservices
27. Maintaining State in App Modernization
28. Cloud Service Fabric
29. Summary

6. Security in Microservices
    1. Why Microservice Security?
    2. Security Testing in Microservices
    3. Security Topology
    4. Authorization and Authentication
    5. J2EE Security Refresh
    6. Role-based Access Control in a Nutshell
    7. Claim-based Access Control in a Nutshell
    8. Sharing Sessions
    9. Session Cookie
    10. JSON Web Token (JWT)
    11. Spring Security
    12. Summary

Class Materials

Each student will receive a comprehensive set of materials, including course notes and all the class examples.

Class Prerequisites

Experience in the following *is required* for this Microservices class:

- A desire to learn how this Microservices toolchain can improve your organization effectiveness, build and release processes, application architecture and development, and business continuity for greenfield and application modernization.

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