

Designing and Implementing Microsoft DevOps Solutions

Overview

This course provides the knowledge and skills to implement DevOps processes. Students will learn how to use source control, scale Git for an enterprise, and implement and manage build infrastructure. This course provides the knowledge and skills to design and implement DevOps processes and practices. Students will learn how to plan for DevOps, use source control, scale Git for an enterprise, consolidate artifacts, design a dependency management strategy, manage secrets, implement continuous integration, implement a container build strategy, design a release strategy, set up a release management workflow, implement a deployment pattern, and optimize feedback mechanisms.

Duration

5 Days

Who Should Attend

Students in this course are interested in implementing DevOps processes or in passing the Microsoft Azure DevOps Solutions certification exam.

Prerequisites

- Students should have fundamental knowledge about Azure, version control, Agile software development, and core software development principles. It would be helpful to have experience in an organization that delivers software.
- It is recommended that you have experience working in an IDE, as well as some knowledge of the Azure portal. However, students who may not have a technical background in these technologies, but who are curious about DevOps practices as a culture shift, should be able to follow the procedural and expository explanations of continuous integration regardless.

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Course Objectives

After completing this course, students will be able to:

- Plan for the transformation with shared goals and timelines
- Select a project and identify project metrics and KPIs
- Create a team and agile organization structure
- Describe the benefits of using Source Control
- Migrate from TFVC to Git
- Scale Git for Enterprise DevOps
- Recommend artifact management tools and practices
- Abstract common packages to enable sharing and reuse
- Migrate and consolidate artifacts
- Migrate and integrate source control measures
- Manage application config and secrets
- Develop a project quality strategy
- Plan for secure development practices and compliance rules
- Implement and manage build infrastructure
- Explain why continuous integration matters
- Implement continuous integration using Azure DevOps
- Manage code quality including: technical debt, SonarCloud, and other tooling solutions
- Manage security policies with open source, OWASP, and WhiteSource Bolt
- Implement a container strategy including how containers are different from virtual machines and how microservices use containers
- Implement containers using Docker
- Inspect open source software packages for security and license compliance to align with corporate standards
- Configure build pipeline to access package security and license rating
- Configure secure access to package feeds
- Inspect codebase to identify code dependencies that can be converted to packages
- Identify and recommend standardized package types and versions across the solution
- Refactor existing build pipelines to implement version strategy that publishes packages
- Manage security and compliance
- Differentiate between a release and a deployment
- Define the components of a release pipeline
- Explain things to consider when designing your release strategy
- Classify a release versus a release process and outline how to control the quality of both

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- Explain things to consider when designing your release strategy
- Classify a release versus a release process and outline how to control the quality of both
- Describe the principle of release gates and how to deal with release notes and documentation
- Explain deployment patterns, both in the traditional sense and in the modern sense
- Choose a release management tool
- Explain the terminology used in Azure DevOps and other Release Management Tooling
- Describe what a Build and Release task is, what it can do, and some available deployment tasks
- Classify an Agent, Agent Queue, and Agent Pool
- Explain why you sometimes need multiple release jobs in one release pipeline
- Differentiate between multi-agent and multi-configuration release job
- Use release variables and stage variables in your release pipeline
- Deploy to an environment securely using a service connection
- Embed testing in the pipeline
- List the different ways to inspect the health of your pipeline and release by using alerts, service hooks, and reports
- Create a release gate
- Describe deployment patterns
- Implement Blue Green Deployment
- Implement Canary Release
- Implement Progressive Exposure Deployment
- Configure crash report integration for client applications
- Develop monitoring and status dashboards
- Implement routing for client application crash report data
- Implement tools to track system usage, feature usage, and flow
- Integrate and configure ticketing systems with development team's work management
- Implement a mobile DevOps strategy
- Apply infrastructure and configuration as code principles
- Deploy and manage infrastructure using Microsoft automation technologies such as ARM templates, PowerShell, and Azure CLI
- Describe deployment models and services that are available with Azure
- Deploy and configure a Managed Kubernetes cluster
- Deploy and configure infrastructure using 3rd party tools and services with Azure, such as Chef, Puppet, Ansible, SaltStack, and Terraform

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- Define an infrastructure and configuration strategy and appropriate toolset for a release pipeline and application infrastructure
- Implement compliance and security in your application infrastructure
- Design practices to measure end-user satisfaction
- Design processes to capture and analyze user feedback from external source
- Define an infrastructure and configuration strategy and appropriate toolset for a release pipeline and application infrastructure
- Implement compliance and security in your application infrastructure
- Design practices to measure end-user satisfaction
- Design processes to capture and analyze user feedback from external sources
- Design routing for client application crash report data
- Recommend monitoring tools and technologies
- Recommend system and feature usage tracking tools
- Analyze alerts to establish a baseline
- Analyze telemetry to establish a baseline
- Perform live site reviews and capture feedback for system outages
- Perform ongoing tuning to reduce meaningless or non-actionable alerts

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Course Topics

Module 1	Planning for DevOpsLessons - Transformation Planning - Project Selection - Team Structures - Migrating to Azure DevOps Lab : Agile Planning and Portfolio Management with Azure Boards After completing this module, students will be able to: - Plan for the transformation with shared goals and timelines - Select a project and identify project metrics and KPIs - Create a team and agile organizational structure - Design a tool integration strategy - Design a license management strategy (e.g. VSTS users) - Design a strategy for end-to-end traceability from work items to working software - Design an authentication and access strategy - Design a strategy for integrating on-premises and cloud resources
Module 2	Getting started with Source ControlLessons - What is Source Control - Benefits of Source Control - Types of Source Control Systems - Introduction to Azure Repos - Introduction to GitHub - Migrating from Team Foundation Version Control (TFVC) to Git in Azure Repos - Authenticating to Git in Azure Repos Lab : Version Controlling with Git After completing this module, students will be able to: - Describe the benefits of using Source Control - Describe Azure Repos and GitHub - Migrate from TFVC to Git

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Module 3	Scaling Git for enterprise DevOpsLessons • How to Structure your Git Repo • Git Branching Workflows • Collaborating with Pull Requests in Azure Repos • Why care about GitHooks • Fostering Inner Source Lab : Code Review with Pull Requests After completing this module, students will be able to: • Explain how to structure Git repos • Describe Git branching workflows • Leverage pull requests for collaboration and code reviews • Leverage Git hooks for automation • Use git to foster inner source across the organization
Module 4	Consolidating Artifacts & Designing a Dependency Management Strategy Lessons • Packaging Dependencies • Package Management • Migrating and Consolidating Artifacts Lab : Updating Packages After completing this module, students will be able to: • Recommend artifact management tools and practices • Abstract common packages to enable sharing and reuse • Migrate and consolidate artifacts • Migrate and integrate source control measures

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Module 5	Implementing Continuous Integration with Azure Pipelines Lessons • The concept of pipelines in DevOps • Azure Pipelines • Evaluate use of Hosted vs Private Agents • Agent Pools • Pipelines and Concurrency • Azure DevOps and Open Source Projects (Public Projects) • Azure Pipelines YAML vs Visual Designer • Continuous Integration Overview • Implementing a Build Strategy • Integration with Azure Pipelines • Integrate External Source Control with Azure Pipelines • Set Up Private Agents • Analyze and Integrate Docker Multi-Stage Builds Lab : Enabling Continuous Integration with Azure Pipelines Lab : Integrating External Source Control with Azure Pipelines After completing this module, students will be able to: • Implement and manage build infrastructure • Explain why continuous integration matters • Implement continuous integration using Azure DevOps
Module 6	Managing Application Config and Secrets Lessons • Introduction to Security • Implement secure and compliant development process • Rethinking application config data • Manage secrets, tokens, and certificates • Implement tools for managing security and compliance in a pipeline Lab : Integrating Azure Key Vault with Azure DevOps After completing this module, students will be able to: • Manage application config and secrets • Implement tools for managing security and compliance in pipeline

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Module 7	Managing Code Quality and Security PoliciesLessons - Managing Code Quality - Managing Security Policies Lab : Managing Technical Debt with Azure DevOps and SonarCloud After completing this module, students will be able to: - Manage code quality including: technical debt SonarCloud, and other tooling solutions - Manage security policies with open source and OWASP
Module 8	Implementing a Container Build StrategyLessons - Implementing a Container Build Strategy Lab : Modernizing Existing ASP.NET Apps with Azure After completing this module, students will be able to: - Implement a container strategy including how containers are different from virtual machines and how microservices use containers - Implement containers using Docker
Module 9	Manage Artifact versioning, security & complianceLessons - Package security - Open source software - Integrating license and vulnerability scans - Implement a versioning strategy Lab : Manage Open Source Security and License with WhiteSource After completing this module, students will be able to: - Inspect open source software packages for security and license compliance to align with corporate standards - Configure build pipeline to access package security and license rating - Configure secure access to package feeds - Inspect codebase to identify code dependencies that can be converted to packages - Identify and recommend standardized package types and versions across the solution - Refactor existing build pipelines to implement version strategy that publishes packages - Manage security and compliance

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Module 10

Design a Release Strategy Lessons

- Introduction to Continuous Delivery
- Release strategy recommendations
- Building a High-Quality Release pipeline
- Choosing a deployment pattern
- Choosing the right release management tool

After completing this module, students will be able to:

- Differentiate between a release and a deployment
- Define the components of a release pipeline
- Explain things to consider when designing your release strategy
- Classify a release versus a release process and outline how to control the quality of both
- Describe the principle of release gates and how to deal with release notes and documentation
- Explain deployment patterns, both in the traditional sense and in the modern sense
- Choose a release management tool

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Module 11

Set up a Release Management Workflow Lessons

- Create a Release Pipeline
- Provision and Configure Environments
- Manage and Modularize Tasks and Templates
- Integrate Secrets with the release pipeline
- Configure Automated Integration and Functional Test Automation
- Automate Inspection of Health

Lab : Configuring Pipelines as Code with YAMLLab : Setting up secrets in the pipeline with Azure Key vault

Lab : Setting up and Running Functional Tests Lab : Using Azure Monitor as release gate

Lab : Creating a release Dashboard

After completing this module, students will be able to:

- Explain the terminology used in Azure DevOps and other Release Management Tooling
- Describe what a Build and Release task is, what it can do, and some available deployment tasks
- Classify an Agent, Agent Queue, and Agent Pool
- Explain why you sometimes need multiple release jobs in one release pipeline
- Differentiate between multi-agent and multi-configuration release job
- Use release variables and stage variables in your release pipeline
- Deploy to an environment securely using a service connection
- Embed testing in the pipeline
- List the different ways to inspect the health of your pipeline and release by using alerts, service hooks, and reports
- Create a release gate

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Module 12	Implement an appropriate deployment patternLessons • Introduction to Deployment Patterns • Implement Blue Green Deployment • Feature Toggles • Canary Releases • Dark Launching • AB Testing • Progressive Exposure Deployment Lab : Feature Flag Management with LaunchDarkly and Azure DevOps After completing this module, students will be able to: • Describe deployment patterns • Implement Blue Green Deployment • Implement Canary Release • Implement Progressive Exposure Deployment
Module 13	Implement process for routing system feedback to development teamsLessons • Implement Tools to Track System Usage, Feature Usage, and Flow • Implement Routing for Mobile Application Crash Report Data • Develop Monitoring and Status Dashboards • Integrate and Configure Ticketing Systems Lab : Monitoring Application Performance After completing this module, students will be able to: • Configure crash report integration for client applications • Develop monitoring and status dashboards • Implement routing for client application crash report data • Implement tools to track system usage, feature usage, and flow • Integrate and configure ticketing systems with development team's work management

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Module 14	Infrastructure and Configuration Azure ToolsLessons • Infrastructure as Code and Configuration Management • Create Azure Resources using ARM Templates • Create Azure Resources using Azure CLI • Create Azure Resources by using Azure PowerShell • Desired State Configuration (DSC) • Azure Automation with DevOps • Additional Automation Tools Lab : Azure Deployments using Resource Manager Templates After completing this module, students will be able to: • Apply infrastructure and configuration as code principles • Deploy and manage infrastructure using Microsoft automation technologies such as ARM templates, PowerShell, and Azure CL
Module 15	Azure Deployment Models and ServicesLessons • Deployment Modules and Options • Azure Infrastructure-as-a-Service (IaaS) Services • Azure Platform-as-a-Service (PaaS) services • Serverless and HPC Computer Services • Azure Service Fabric Lab : Deploying a Dockerized Java app to Azure Web App for Containers After completing this module, students will be able to: • Describe deployment models and services that are available with Azure
Module 16	Create and Manage Kubernetes Service InfrastructureLessons • Azure Kubernetes Service Lab : Deploying a multi-container application to Azure Kubernetes Service After completing this module, students will be able to: • Deploy and configure a Managed Kubernetes cluster

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Module 17	Third Party Infrastructure as Code Tools available with AzureLessons • Chef • Puppet • Ansible • Terraform Lab : Infrastructure as Code Lab : Automating Your Infrastructure Deployments in the Cloud with Terraform and Azure Pipelines After completing this module, students will be able to: • Deploy and configure infrastructure using 3rd party tools and services with Azure, such as Chef, Puppet, Ansible, and Terraform
Module 18	Implement Compliance and Security in your InfrastructureLessons • Security and Compliance Principles with DevOps • Azure security Center Lab : Implement Security and Compliance in an Azure DevOps Pipeline After completing this module, students will be able to: • Define an infrastructure and configuration strategy and appropriate toolset for a release pipeline and application infrastructure • Implement compliance and security in your application infrastructure
Module 19	Recommend and design system feedback mechanismsLessons • The inner loop • Continuous Experimentation mindset • Design practices to measure end-user satisfaction • Design processes to capture and analyze user feedback • Design process to automate application analytics Lab : Integration between Azure DevOps and Teams After completing this module, students will be able to: • Design practices to measure end-user satisfaction • Design processes to capture and analyze user feedback from external sources • Design routing for client application crash report data • Recommend monitoring tools and technologies • Recommend system and feature usage tracking tools

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Module 20

Optimize feedback mechanismsLessons

- Site Reliability Engineering
- Analyze telemetry to establish a baseline
- Perform ongoing tuning to reduce meaningless or non-actionable alerts
- Analyze alerts to establish a baseline
- Blameless Retrospectives and a Just Culture

After completing this module, students will be able to:

- Analyze alerts to establish a baseline
- Analyze telemetry to establish a baseline
- Perform live site reviews and capture feedback for system outages
- Perform ongoing tuning to reduce meaningless or non-actionable alerts