

**Continuous Integration with Jenkins for Developers and DevOps Initiatives**

**Course Number:** JEN-106
**Duration:** 2 days

**Overview**

This Continuous Integration with Jenkins training course teaches attendees the principles of continuous integration and how to implement automated test execution using Jenkins. Participants learn the fundamentals of Continuous Integration & Continuous Delivery (CI/CD) and Jenkins CI. By the end of this Jenkins course, students develop an understanding of the various job types in Jenkins and learn how to use the Jenkins Pipeline.

**Prerequisites**

Attendees should have familiarity with Java development practices.

**Materials**

All students receive comprehensive courseware.

**Software Needed on Each Student PC**

Attendees will not need to install any software on their computers for this class. The class will be conducted in a remote environment that Accelebrate will provide; students will only need a local computer with a web browser and a stable Internet connection. Any recent version of Microsoft Edge, Mozilla Firefox, or Google Chrome will work well.

**Objectives**

* Configure Tools in Jenkins
* Create basic and advanced Jenkins Jobs
* Use a Node.js-based Jenkins Job
* Create a Pipeline
* Apply an advanced Pipeline with Groovy DSL
* Configure Jenkins Security
* Incorporate Docker

**Outline**

* Introduction to Continuous Integration, Continuous Delivery, and Jenkins-CI
	+ Foundation of Agile AppDev
	+ XP Flow
	+ Extreme Programming
	+ Agile Development
	+ What is Continuous Integration
	+ Typical Setup for Continuous Integration
	+ Setup Notes for Continuous Integration
	+ CI with Artifact Management
	+ What is Continuous Delivery?
	+ Why Continuous Delivery?
	+ DevOps and Continuous Delivery
	+ Continuous Delivery Challenges
	+ Continuous Delivery vs. Continuous Deployment
	+ Jenkins Continuous Integration
	+ Jenkins Features
	+ Running Jenkins
* Installing and Running Jenkins
	+ Downloading and Installing Jenkins
	+ Running Jenkins as a Stand-Alone Application
	+ Running Jenkins as a Stand-Alone Application (cont'd)
	+ Running Jenkins on an Application Server
	+ The Jenkins Home Folder
	+ Installing Jenkins as a Windows Service
	+ Initial Configuration
	+ Configuration Wizard
	+ Configuring Tools
	+ Configuring Tools - Best Practices
	+ Logging in Jenkins
	+ Custom Log Recorders
* Job Types in Jenkins
	+ Introduction
	+ Different types of Jenkins Items
	+ Configuring Source Code Management (SCM)
	+ Working with Subversion
	+ Working with Git
	+ Storing Credentials
	+ Service Accounts
	+ Storing Credentials
	+ Build Triggers
	+ Schedule Build Jobs
	+ Polling the SCM
	+ Polling vs Triggers
	+ Maven Build Steps
* Advanced Jobs
	+ Parameterized Jobs
	+ Built-in Environment Variables
	+ Parameter Types
	+ Defining Parameters
	+ Using Parameters / Environment Variables
	+ Parameters in the config.xml File
	+ Launching a Build with Parameters
	+ Configuration Matrix
	+ Configuration Matrix – Example
	+ Defining Configuration Matrix
	+ Monitoring External Jobs
	+ Summary
* Non-Java Jenkins Jobs
	+ Jenkins Jobs
	+ Non-Java Jobs
	+ Building .NET Projects with Jenkins
	+ Installing MSTest Plugin in Jenkins
	+ Configuring the MSBuild Plugin
	+ Creating a Jenkins Job and Specify a Build Step
	+ Specifying a Step for Running Unit Tests
	+ Adding a Step for Deploying the .NET Project
	+ Building a Node.js Application with Jenkins
	+ Node.js Plugin
	+ Provides direct Pipeline support
	+ Building a C++ Project with Jenkins
	+ Executing PowerShell Scripts with Jenkins
* Continuous Delivery and the Jenkins Pipeline
	+ Continuous Delivery
	+ DevOps and Continuous Delivery
	+ Continuous Delivery Challenges
	+ Continuous Delivery with Jenkins
	+ The Pipeline Plugin
	+ Defining a Pipeline
	+ A Pipeline Example
	+ Parallel Execution
	+ Creating a Pipeline
	+ Invoking the Pipeline
	+ Interacting with the Pipeline
	+ Pipeline vs. Traditional Jobs
* Groovy DSL
	+ What is Groovy
	+ Groovy in Jenkins
	+ Comments in Groovy
	+ Data Types
	+ Identifiers
	+ Variables
	+ def
	+ String Interpolation
	+ Operators
	+ Ranges
	+ Conditional Statements
	+ Loops
	+ Lists
	+ Maps
	+ Exception Handling
	+ Methods
	+ Closures
	+ this Keyword
	+ Classes
	+ Static Methods
	+ Inheritance
	+ Abstract Classes
	+ Interfaces
	+ Generics
	+ Jenkins Script Console
	+ Extending with Shared Libraries
	+ Directory Structure
	+ Sample Groovy Code
	+ Defining Shared Libraries
	+ Using Shared Libraries
	+ Same Shared Library Usage Code
	+ Defining Global Variables
* Securing Jenkins
	+ Jenkins Security - Overview
	+ Jenkins Security
	+ Authentication
	+ Authorization
	+ Confidentiality
	+ Activating Security
	+ Configure Authentication
	+ Using Jenkins's Internal User Database
	+ Creating Users
	+ Authorization
	+ Authorization
	+ Matrix-Based Security
	+ Note – Create the Administrative User
	+ Project-based Matrix Authorization
	+ Project-Based Authentication
	+ Role-Based Access Control
* Jenkins Plugins
	+ Jenkins Plugins - SCM
	+ Jenkins Plugins – Build and Test
	+ Jenkins Plugins – Analyzers
	+ Jenkins for Teams
	+ Installing Jenkins Plugins
* Distributed Builds with Jenkins
	+ Distributed Builds - Overview
	+ Distributed Builds – How?
	+ Agent Machines
	+ Configure Jenkins Master
	+ Configure Projects
* Containerized Builds
	+ Introduction to Docker
	+ Docker – Benefits
	+ Containers vs. Virtual Machines
	+ Running Jenkins in a Docker Container
	+ Delete Jenkins Container and Image
	+ Configuring Command Prompt to Connect to Docker
	+ Creating Docker Container from Jenkins Job
	+ Test Custom Image Created by a Jenkins Job
	+ The Jenkins Docker Build Step Plugin
	+ Ephemeral Build Agents
* The Jenkins API
	+ Remote Access API
	+ What you can do with the Jenkins Remote API
	+ Remote API and CSRF Protection – API Token
	+ Remote API and CSRF Protection – Crumb
	+ Configure Jobs to Support the Jenkins Remote API
	+ Making Remote API Calls
	+ Example - Advanced REST Client
	+ Example – cURL
	+ Jenkins CLI
	+ Configure Jenkins to use CLI
	+ Download and Use Jenkins CLI
* Scripting
	+ Introduction to Scripting
	+ Benefits of Scripting
	+ The Jenkins Script Console
	+ Calling Scripts using cURL
	+ Sample Scripts
	+ Calling Groovy Scripts from a Jenkins Job
	+ Jenkins API
* User Interface Options
	+ User Interface Options
	+ Customizing the UI with CSS
	+ The User Content Folder
	+ Using the User Content Folder and Simple Theme Plugin
	+ Writing a Jenkins Plugin
	+ Modify settings.xml
	+ Generate Boilerplate Code for Custom Jenkins Plugin
	+ Modify pom.xml
	+ Package and Deploy the Plugin
	+ The Blue Ocean Plugin
	+ Blue Ocean Plugin Features
	+ New modern user experience
	+ Advanced Pipeline visualizations with built-in failure diagnosis
	+ Branch and Pull Request awareness
	+ Personalized View
* Best Practices for Jenkins
	+ Secure Jenkins
	+ Users
	+ Backups
	+ Reproducible Builds
	+ Testing and Reports
	+ Large Systems
	+ Distributed Jenkins
* Conclusion