

## ***JBOSS AS 7 AND JBOSS EAP 6 ADMINISTRATION AND CLUSTERING***

(4 Days)

This training course covers both the unsupported open source JBoss Application Server and the supported platform available from JBoss/RedHat (JBoss Enterprise Application Platform). This class covers both so no matter which type of JBoss environment you have this course is right for you. The JBoss EAP 6 product contains the JBoss Application Server 7.1 product internally which is why there are two different version numbers in the course title. The labs for this course are done in a Linux environment.

The JBoss Application Server is one of the most popular open source Java application servers on the market. This release, JBoss AS 7, is a major release that includes many improvements and changes from the widely adopted JBoss 5 platform. The new release has a completely new structure and management model which is covered in depth in the course.

This course covers in depth the major administrative tasks required to maintain a JBoss environment. This includes use of the new administrative tools, the web-based Management Console and scripting with the admin CLI (Command Line Interface). The course starts quickly to cover installing and running the JBoss server and deploying applications. The new architecture of the JBoss server is covered so students are more familiar with how various services and settings will be configured. It then covers configuration of some of the major services like logging, database connections, messaging resources, security, and web services. The course finishes with coverage of various aspects of JBoss performance and the features that can be utilized in more complex JBoss environments and what benefit they would provide. These features used in more complex environments include the new JBoss "Domain Mode", load balancing web requests with a web server, and properly configuring applications to support a clustered JBoss environment.

An excellent "add on" for this course is the one-day course "Overview of JBoss RHQ and JBoss Operations Network (JBoss ON)". This course provides an overview of the advanced management features of the RHQ/JON product that is often used in JBoss environments. These courses can be combined for a full week of training aimed at making students effective JBoss administrators.

### **Audience**

Webmasters and System Administrators who install, configure, and maintain Java EE Applications on JBoss Application Server 7 or JBoss EAP 6.

## What you will learn

- Install and configure JBoss
- Understand the internal structure of JBoss servers
- Deploy applications to JBoss
- Use the various management tools and techniques to configure JBoss servers
- Configure JBoss logging
- Define common application resources like database and messaging connections
- Configure security of the JBoss server
- Deploy and manage applications which utilize web services
- Improve the performance of JBoss environments
- Configure JBoss in Domain Mode
- Run multiple JBoss servers in a cluster
- Load balance web requests with a web server

## Prerequisites

The student should have a familiarity with basic Linux operational skills like running commands from a command prompt and networking. Although not required, familiarity with web-based applications, web servers, and Java is suggested.

## Course Outline

### **CHAPTER 1. JBOSS INTRODUCTION**

- Goals of Enterprise Applications
- What is Java?
- What is Java EE?
- The Java EE Specifications
- Java EE 6 Web Profile
- Role of Application Server
- JBoss Family
- JBoss Application Server
- Relation to JBoss Enterprise Application Platform
- Differences Between JBoss AS and JBoss EAP
- Differences From Prior JBoss Versions
- Differences Between JBoss and Other Application Servers
- Wildfly
- JBoss Support and Documentation

### **CHAPTER 2. INSTALLING AND RUNNING JBOSS**

- Installation Prerequisites
- Java Version
- JBoss Installation
- JBoss Installer
- Standalone and Domain Mode
- Directory Structure
- Important 'bin' Commands
- JBoss Configuration Profiles

- Starting JBoss
- Network Binding Behavior
- Welcome Page
- Standalone Base Directory
- Stopping JBoss
- Other Common Components

### **CHAPTER 3. JBOSS MANAGEMENT CONSOLE**

- Approaches to Managing JBoss Configurations
- Overview of JBoss Management Console
- Accessing Management Console
- add-user Command
- Console Interface
- Deployments
- Configuration
- Runtime

### **CHAPTER 4. JAVA EE APPLICATIONS IN JBOSS**

- Java EE Components
- Java EE Vendor Specifications
- Containers
- Java EE Blueprint
- Java EE Application Structure
- EAR File
- What are Modules?
- Java EE Deployment Descriptors
- Web Module
- EJB Module
- Client Module
- JBoss Deployment Descriptors
- Code Annotations
- JBoss Application Deployment
- Deployment Scanner
- Deployment Scanner Marker Files
- CLI Deployment
- Deploying With Management Console
- Deployments in Configuration XML
- Deployment Overlay

### **CHAPTER 5. JBOSS ARCHITECTURE AND CONFIGURATION**

- JBoss Architecture
- Server Extensions
- Subsystems
- Subsystem Configuration
- Variables in Configuration Files
- Important System Properties
- Interfaces
- Controlling Network Binding

- Socket Binding
- Alternate Configurations
- Configuration Snapshots and History
- Reloading & Restarting JBoss
- JBoss Modules
- Use and Benefits of JBoss Modules

#### **CHAPTER 6. JBOSS CLI SCRIPTING**

- CLI Overview
- Starting CLI
- Connecting CLI to a Server
- CLI Security
- CLI Commands & Operations
- CLI Commands
- Command History & Autocomplete
- JBoss Management Model
- Management Model Reference
- CLI Navigation
- CLI Operations
- CLI Read Operations
- Adding Resources with CLI
- CLI GUI
- CLI Configuration
- Batch Mode
- CLI Archive

#### **CHAPTER 7. JBOSS LOGGING**

- JBoss Logging
- Logging Components
- Log Levels
- Loggers
- Logger Hierarchy
- Logging Code
- JBoss Logging Handlers
- Formatter
- Logging Configuration
- Modifying Log Level
- Creating Application Logs
- Log Viewer in Management Console
- HTTP Access Logs
- JBoss HTTP Access Log

#### **CHAPTER 8. CONNECTING TO A DATABASE**

- What is JDBC?
- JDBC Driver
- Typical Unmanaged JDBC Use
- Problems to Address
- Data Source Architecture

- JDBC Data Sources
- Typical Use of Data Source
- JPA and Data Source
- JBoss Datasources
- H2 Database
- Types of JBoss Data Sources
- Defining JBoss Datasources
- Adding JDBC Drivers
- Define Datasource
- Optional Datasource Properties
- Common Additional Properties
- Connection Pool Properties
- Validation Properties
- Timeout Properties
- Deploy Application Using Data Source
- Configuring Datasources Subsystem
- Configuration in Management Console
- Configuration with JBoss CLI
- Adding Datasource With CLI
- Deployment of \*-ds.xml Files
- Data Source Failover

#### **CHAPTER 9. JMS MESSAGING**

- Messaging Intro
- Messaging Example
- Messaging Components
- Messaging Types
- JMS (Java Messaging Service)
- JMS Resources
- Message Driven Beans (MDB)
- HornetQ
- Configuring HornetQ
- JMS Connection Factories
- JMS Destinations
- "Match" Syntax
- Address Settings
- Security Settings
- MDB Destinations
- Other HornetQ Configuration
- Configuration in Management Console
- Configuration with JBoss CLI

#### **CHAPTER 10. JBOSS SECURITY**

- Security Resources
- JBoss Security Overview
- Management Interface Security
- Default Management Authentication
- Other Management Authentication Options

- TLS/SSL (Secure Sockets Layer)
- Digital Certificates
- Creating Self-Signed Certificate
- Enable TLS/SSL on JBoss Connections
- Enable HTTPS on Web Subsystem
- Configure HTTPS on Management Console
- Management Role-Based Access Control
- Standard RBAC Roles
- Enable RBAC
- Password Vault
- Configuring Password Vault

#### **CHAPTER 11. JAVA EE SECURITY IN JBOSS**

- Authentication and Authorization
- Challenge Mechanism
- Java EE Security Roles
- JBoss Security Domain
- Login Modules
- Common Login Modules
- Configuring Security Domains
- Default Security Domain
- Default EJB Security
- UsersRoles Login Module
- Using a Database for Authentication
- Using an LDAP Server
- Chaining Multiple Login Modules
- Chaining Multiple Login Modules - Example
- Stacking Login Modules
- Stacking Login Modules - Example
- Hashed Passwords
- Testing Security

#### **CHAPTER 12. WEB SERVICE ADMINISTRATION**

- What is a Web Service?
- SOAP Overview
- WSDL Overview
- WSDL Syntax Overview
- Service Endpoint Definition
- Web Service Administration Tasks
- REST Web Services

#### **CHAPTER 13. JBOSS WEB SERVICES AND CLIENTS**

- JBoss Web Service Deployment
- Controlling Generated WSDL Address
- Routing Web Service Requests
- JBoss Web Service Deployment Descriptor
- Writing Portable Web Service Clients for JBoss
- Using a Packaged WSDL

- Managed Web Service Clients
- JBoss @WebServiceRef Customization
- JBoss Web Service Tools
- Advanced JBoss Web Service Features

#### **CHAPTER 14. JAVA MEMORY MANAGEMENT**

- Java Heap Space
- Heap Size Limits
- Default Size Limits
- Garbage Collection Basics
- Allocation Failure (AF)
- OutOfMemoryError
- Memory Leak
- Free Space Threshold
- Garbage Collection Mechanism
- GC Performance Improvements
- Generational Garbage Collection
- Thread Local Heap (TLH)
- Memory Tuning Goals
- Steady State Heap Size
- Analyzing Steady State Behavior
- Effect of Initial Heap Size on GC
- Optimizing GC Duration

#### **CHAPTER 15. JBOSS PERFORMANCE**

- Monitoring Runtime JBoss Performance
- JAVA\_OPTS Environment Variable
- Subsystem Tuning

#### **CHAPTER 16. COMPLEX JBOSS ENVIRONMENTS**

- Considerations for Complex JBoss Environments
- Clusters
- Clustering Terminology
- Horizontal Scaling
- Vertical Scaling
- Options for Defining Clusters
- Load Balancing JBoss Servers
- HA Configurations
- JGroups
- JGroups Configuration
- Modifying Server Ports
- Running Multiple Instances of JBoss on Single Machine

#### **CHAPTER 17. JBOSS DOMAIN MODE**

- Domain Mode Overview
- Domain Mode Terminology
- Defining a Domain
- Elements of domain.xml

- Elements of host.xml
- Authentication of Host Controllers
- Steps to Establish a Domain Controller
- Steps to Establish a Host Controller
- Server Group
- Changes to Management Console
- Changes to CLI
- Application Deployment in a Domain
- Domain Controller Failure
- Domain Controller Disaster Recovery

#### **CHAPTER 18. JBOSS WEB SERVER INTEGRATION**

- Role of Web Server
- Virtual Hosts
- Virtual Host Root Context
- Supported Web Servers
- Apache httpd
- mod\_cluster Overview
- Red Hat JBoss Web Server
- Configuring mod\_cluster
- JBoss Configuration
- Sticky Sessions
- mod\_cluster\_manager Application
- SSL For mod\_cluster and JBoss

#### **CHAPTER 19. DISTRIBUTED APPLICATIONS**

- Application State
- Distributed Failover
- HTTP Session State Replication
- Utilizing Session Replication
- Session Timeout
- Clustered Session EJBs
- Clustering Stateless Session Beans (EJB 3.x)
- Clustering Stateful Session Beans (EJB 3.x)