

# ActiveMQ Artemis

## Course outline

### **Module 1: Introduction to ActiveMQ Artemis**

Module 1: Introduction to ActiveMQ Artemis is an introductory course designed to provide an overview of the ActiveMQ Artemis messaging system. It covers the basics of the system, including its architecture, components, and features. It also provides an introduction to the Artemis CLI and JMS API, as well as a brief overview of the Artemis broker. Finally, it provides an introduction to the Artemis console and how to use it to manage and monitor the system.

#### ***Lessons***

- Overview of ActiveMQ Artemis
- Installing and Configuring ActiveMQ Artemis
- Working with the Artemis Console
- Understanding Artemis Core Concepts
- Configuring Artemis for High Availability
- Working with Artemis Security
- Connecting to Artemis with JMS
- Working with Artemis Bridges
- Working with Artemis Clusters
- . Monitoring and Managing Artemis with JMX

#### **After completing this module, students will be able to:**

- Understand the architecture of ActiveMQ Artemis and its components.
- Configure and manage ActiveMQ Artemis brokers.
- Create and manage durable and non-durable queues and topics.
- Monitor and troubleshoot ActiveMQ Artemis using the web console and command line tools.

### **Module 2: Installing and Configuring ActiveMQ Artemis**

Module 2 of the ActiveMQ Artemis course covers the installation and configuration of the ActiveMQ Artemis module. It provides step-by-step instructions on how to install and configure the module, as well as how to create and manage queues and topics. Additionally, the module covers topics such as security, clustering, and performance tuning.

#### ***Lessons***

- Overview of ActiveMQ Artemis

- Installing and Configuring ActiveMQ Artemis
- Configuring Artemis for High Availability
- Configuring Artemis for Security
- Managing Artemis with the CLI
- Managing Artemis with the Web Console
- Configuring Artemis for Performance
- Troubleshooting Artemis Issues
- Integrating Artemis with Other Messaging Systems
- . Best Practices for Managing Artemis

### **After completing this module, students will be able to:**

- Understand the architecture of ActiveMQ Artemis and how it works.
- Install and configure ActiveMQ Artemis on a server.
- Create and manage queues, topics, and durable subscriptions.
- Monitor and manage the performance of ActiveMQ Artemis.

## **Module 3: Working with Queues and Topics**

Module 3 of the ActiveMQ Artemis course covers the use of queues and topics to manage message flow. It covers topics such as creating queues and topics, configuring message delivery, and using message selectors. It also covers topics such as message grouping, message expiration, and message filtering. Finally, it covers topics such as message routing and message transformation.

### ***Lessons***

- Introduction to Queues and Topics
- Configuring Queues and Topics
- Creating and Managing Queues and Topics
- Working with Durable Subscriptions
- Message Selectors and Filtering
- Message Expiration and Dead Letter Queues
- Message Priorities and Ordering
- Message Grouping and Load Balancing
- Monitoring Queues and Topics
- . Security and Authentication for Queues and Topics

### **After completing this module, students will be able to:**

- Understand the differences between queues and topics in ActiveMQ Artemis.
- Create and configure queues and topics in ActiveMQ Artemis.
- Monitor queues and topics in ActiveMQ Artemis.
- Troubleshoot and debug issues related to queues and topics in ActiveMQ Artemis.

## **Module 4: Message Durability and Reliability**

Module 4 of the ActiveMQ Artemis course covers the topics of message durability and reliability. It explains how to configure message durability and reliability settings in ActiveMQ Artemis, as well as how to use the message store and message expiry features. It also covers topics such as message redelivery, message grouping, and message ordering. Finally, it provides an overview of the various message delivery policies available in ActiveMQ Artemis.

## **Lessons**

- Introduction to Message Durability and Reliability
- Understanding Message Durability and Reliability in ActiveMQ Artemis
- Configuring Message Durability and Reliability in ActiveMQ Artemis
- Implementing Message Durability and Reliability in ActiveMQ Artemis
- Troubleshooting Message Durability and Reliability Issues in ActiveMQ Artemis
- Best Practices for Message Durability and Reliability in ActiveMQ Artemis
- Advanced Topics in Message Durability and Reliability in ActiveMQ Artemis

## **After completing this module, students will be able to:**

- Understand the concept of message durability and reliability in ActiveMQ Artemis.
- Configure message durability and reliability in ActiveMQ Artemis.
- Implement message durability and reliability in ActiveMQ Artemis.
- Troubleshoot message durability and reliability issues in ActiveMQ Artemis.

## **Module 5: Security and Authentication**

Module 5 of the ActiveMQ Artemis course covers security and authentication. It provides an overview of the security features available in ActiveMQ Artemis, including authentication, authorization, encryption, and access control. It also covers how to configure and use these features to secure your messaging environment.

## **Lessons**

- Introduction to Security and Authentication in ActiveMQ Artemis
- Configuring Security and Authentication in ActiveMQ Artemis
- Securing Connections with SSL/TLS
- Authentication and Authorization with JAAS
- Using LDAP for Authentication and Authorization
- Using Kerberos for Authentication and Authorization
- Using Apache Shiro for Authentication and Authorization
- Using Apache Ranger for Authentication and Authorization
- Using Apache Knox for Authentication and Authorization
- . Securing the Broker with Firewalls and Network Segmentation

## **After completing this module, students will be able to:**

- Understand the authentication and authorization mechanisms available in ActiveMQ Artemis.
- Configure authentication and authorization for users and roles in ActiveMQ Artemis.

- Implement security policies to protect data and resources in ActiveMQ Artemis.
- Monitor and troubleshoot security issues in ActiveMQ Artemis.

## Module 6: Clustering and High Availability

Module 6 of the ActiveMQ Artemis course covers Clustering and High Availability. It provides an overview of the different clustering options available in ActiveMQ Artemis, as well as how to configure and manage a cluster. It also covers topics such as failover, load balancing, and high availability. Finally, it provides an introduction to the High Availability features of ActiveMQ Artemis.

### Lessons

- Introduction to Clustering in ActiveMQ Artemis
- Configuring Clusters in ActiveMQ Artemis
- High Availability in ActiveMQ Artemis
- Setting up a Master/Slave Configuration in ActiveMQ Artemis
- Configuring Shared Storage for High Availability in ActiveMQ Artemis
- Troubleshooting Clustering and High Availability Issues in ActiveMQ Artemis
- Best Practices for Clustering and High Availability in ActiveMQ Artemis
- Performance Tuning for Clustering and High Availability in ActiveMQ Artemis
- Security Considerations for Clustering and High Availability in ActiveMQ Artemis
- . Monitoring Clustering and High Availability in ActiveMQ Artemis

### After completing this module, students will be able to:

- Understand the concepts of clustering and high availability in ActiveMQ Artemis.
- Configure and manage a cluster of ActiveMQ Artemis brokers.
- Implement high availability and failover strategies for ActiveMQ Artemis.
- Monitor and troubleshoot ActiveMQ Artemis clusters.

## Module 7: Performance Tuning

Module 7 of the ActiveMQ Artemis course focuses on performance tuning. It covers topics such as optimizing message throughput, configuring memory usage, and using the Artemis CLI to monitor performance. It also provides guidance on how to troubleshoot and diagnose performance issues.

### Lessons

- Overview of Performance Tuning
- Analyzing Performance Bottlenecks
- Configuring Artemis for Optimal Performance
- Tuning the Broker for High Throughput
- Tuning the Broker for Low Latency
- Tuning the Client for High Throughput
- Tuning the Client for Low Latency
- Monitoring Performance with JMX

- Troubleshooting Performance Issues
- . Best Practices for Performance Tuning

### **After completing this module, students will be able to:**

- Understand the performance tuning techniques for ActiveMQ Artemis.
- Identify and resolve performance bottlenecks in ActiveMQ Artemis.
- Configure and optimize ActiveMQ Artemis for maximum performance.
- Monitor and analyze the performance of ActiveMQ Artemis.

## **Module 8: Monitoring and Management**

Module 8 of the ActiveMQ Artemis course covers the monitoring and management of the messaging system. It provides an overview of the various tools available for monitoring and managing the system, as well as how to use them to ensure the system is running optimally. It also covers topics such as performance tuning, troubleshooting, and security.

### **Lessons**

- Overview of Artemis Monitoring and Management
- Configuring Artemis Monitoring and Management
- Using the Artemis Web Console
- Using the Artemis CLI
- Using JMX for Artemis Monitoring and Management
- Using the Artemis REST API
- Using the Artemis JMS Client
- Using the Artemis JMS Bridge
- Using the Artemis JMS Bridge for High Availability
- . Using the Artemis JMS Bridge for Load Balancing
- . Troubleshooting Artemis Monitoring and Management Issues
- . Best Practices for Artemis Monitoring and Management

### **After completing this module, students will be able to:**

- Understand the different types of monitoring and management tools available for ActiveMQ Artemis.
- Be able to configure and use the Artemis Web Console for monitoring and management.
- Be able to use the Artemis CLI for monitoring and management.
- Be able to use JMX for monitoring and management.

## **Module 9: Integrating with Other Systems**

Module 9: Integrating with Other Systems module for ActiveMQ Artemis course covers the various ways to integrate ActiveMQ Artemis with other systems, such as databases, message brokers, and web services. It also covers topics such as using JMS and AMQP protocols, configuring bridges, and using the REST API. This module provides an overview of the different integration options available and how to use them.

## **Lessons**

- Overview of Integration with Other Systems
- Connecting to External JMS Providers
- Integrating with Apache Camel
- Integrating with Apache ActiveMQ
- Integrating with Apache Kafka
- Integrating with Apache CXF
- Integrating with Apache ServiceMix
- Integrating with Apache Karaf
- Integrating with Apache Tomcat
- . Integrating with Apache Axis2
- . Integrating with Apache Axis
- . Integrating with Apache Web Services
- . Integrating with Apache Axis2 Web Services
- . Integrating with Apache Axis2 SOAP Services
- . Integrating with Apache Axis2 REST Services
- . Integrating with Apache Axis2 JAX-WS Services
- . Integrating with Apache Axis2 JAX-RS Services
- . Integrating with Apache Axis2 JMS Services
- . Integrating with Apache Axis2 JPA Services
- . Integrating with Apache Axis2 JCA Services

### **After completing this module, students will be able to:**

- Understand the different types of messaging protocols and how to integrate them with ActiveMQ Artemis.
- Configure and manage ActiveMQ Artemis to communicate with other systems.
- Utilize the ActiveMQ Artemis API to create custom messaging solutions.
- Develop applications that can send and receive messages from other systems using ActiveMQ Artemis.

## **Module 10: Troubleshooting and Debugging**

Module 10 of the ActiveMQ Artemis course covers troubleshooting and debugging techniques for ActiveMQ Artemis. It provides an overview of the tools and techniques available for troubleshooting and debugging ActiveMQ Artemis, as well as how to use them to identify and resolve issues. It also covers topics such as logging, monitoring, and performance tuning.

## **Lessons**

- Identifying and Resolving Common Artemis Issues
- Debugging Artemis Connectivity Problems
- Troubleshooting Artemis Performance Issues
- Analyzing Artemis Logs
- Resolving Artemis Configuration Issues
- Debugging Artemis Security Issues

- Troubleshooting Artemis Message Delivery Problems
- Investigating Artemis Network Connectivity Issues
- Resolving Artemis Cluster Issues
- Debugging Artemis Message Persistence Problems

**After completing this module, students will be able to:**

- Identify and resolve common issues related to ActiveMQ Artemis.
- Utilize the Artemis CLI to troubleshoot and debug problems.
- Analyze and interpret log files to identify potential problems.
- Implement strategies to prevent and mitigate future issues.