

IBM MQ V8 Advanced System Administration for z/OS

WM312 (Classroom)

Course description

This course focuses on advanced IBM MQ for z/OS skills. After a baseline of IBM MQ topics, the course continues with channel security, the need to use TLS ciphers in response to current security threats, and channel authentication rules. The course also covers queue-sharing groups, queue-sharing group updates, and distributed and intra-group queuing with queue-sharing groups. Other topics include the 8-byte relative byte address and buffers above the 2-GB bar features of IBM MQ V8, the use of IBM MQ accounting and statistics, how to capture and review information to resolve or mitigate performance and capacity problems, and how to create application profiles.  
  
Hands-on lab exercises throughout the course reinforce the lectures and provide familiarity with advanced tasks and updated capabilities.

For information about other related courses, visit the IBM Training website:

http://www.ibm.com/training

General information

Delivery method

Classroom

Course level

ERC 1.1

Product and version

IBM MQ V8

Audience

This course is designed for z/OS IBM MQ administrators and other technical professionals who are responsible for IBM MQ security, architecture, availability, and performance-related tasks.

Learning objectives

After completing this course, you should be able to:

* Explain how SSL/TLS contributes to authentication and confidentiality
* Describe how to configure SSL/TLS in IBM MQ z/OS queue managers and IBM MQ clients
* Implement SSL/TLS with multiple certificate authority (CA) certificates
* Implement various types of channel authentication rules
* Describe how to configure and manage queue-sharing groups
* Explain how to incorporate shared message data sets and storage class memory to maximize coupling facility storage
* Describe how to add a queue-sharing group to an existing IBM MQ cluster
* Implement 8-byte relative byte address and buffers above the 2-GB line
* Describe how to use statistics and accounting capabilities for problem determination, tuning, and capacity planning activities

Prerequisites

Before taking this course, you should:

* Successfully complete course WM302, *IBM MQ V8 System Administration for z/OS*, or have equivalent experience
* Be proficient working with z/OS, or successfully complete course ES10G, *Fundamental System Skills in z/OS*

Duration

4 days

Skill level

Advanced

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| Classroom (ILT) setup requirements | |
| Processor | Intel Pentium 2.5 GHz or faster |
| GB RAM | 4 |
| GB free disk space | 120 |
| Network requirements | Internet |
| Other requirements | None |

Notes

The following unit and exercise durations are estimates, and might not reflect every class experience. If the course is customized or abbreviated, the duration of unchanged units will probably increase.

This course is an update of the following previous courses:

* WM310: *IBM WebSphere MQ V7 Advanced System Administration for z/OS*

Course agenda

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| Course introduction  Duration: 15 minutes |

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| Unit 1. IBM MQ baseline  Duration: 1 hour | |
| Overview | This unit reviews the IBM MQ baseline requirements for this course and establishes the advanced topics for the course. |
| Learning objectives | After completing this unit, you should be able to:   * Describe IBM MQ basic components * Explain how to resolve common channel problems * Distinguish between IBM MQ servers and IBM MQ clients * Describe clusters and cluster channels * Contrast the IBM MQ messaging styles * Describe IBM MQ architectural options * Summarize how IBM MQ is implemented in z/OS * Identify the administrative options for IBM MQ on z/OS * Describe security options for IBM MQ channels and clients |

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| Exercise 1. Configuring the IBM MQ lab environment  Duration: 1 hour | |
| Overview | In this exercise, you initialize your lab environment and create and test the IBM MQ definitions that are used in the SSL/TLS exercise. |
| Learning objectives | After completing this exercise, you should be able to:   * Assemble the queue manager parameter modules * Start the two student queue managers and channel initiators * Configure sender receiver channels across the queue managers * Exchange messages across queue managers * Set up an IBM MQ client channel definition table connection to a z/OS server connection channel * Exchange messages from the client to the queue manager * Add queue managers to IBM MQ Explorer |

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| Unit 2. Channel security with SSL/TLS  Duration: 2 hours | |
| Overview | This unit introduces encryption topics and SSL/TLS, details how to implement SSL/TLS in a queue manager, and explains how to configure IBM MQ server and IBM MQ clients to use SSL/TLS. |
| Learning objectives | After completing this unit, you should be able to:   * Explain the security considerations for IBM MQ channels * Describe symmetric and asymmetric cryptography * Explain the role of a certificate, a digital signature, and a certificate authority * Distinguish between a self-signed certificate and a certificate-authority signed certificate * Describe how SSL/TLS works to secure communications * Distinguish between TLS and SSL cipher suites * Describe how to implement SSL/TLS in a z/OS queue manager * Describe how to create a key ring and associate certificates with it * Explain how to implement SSL/TLS in a channel * Describe how to request and obtain a certificate from a certificate authority * Explain how to configure use of multiple certificates for the same queue manager * Explain how to configure SSL/TLS for an IBM MQ client |

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| Exercise 2. Configuring SSL/TLS for queue managers and channels  Duration: 3 hours | |
| Overview | This exercise provides hands-on experience with the RACF RACDCERT utility to implement SSL/TLS in a z/OS queue manager. The exercise then details how to implement SSL/TLS in selected queue manager and client channels. |
| Learning objectives | After completing this exercise, you should be able to:   * Generate a certificate authority (CA) signer certificate * Create a default queue manager certificate that is signed by the local CA * Display contents of a certificate * Create a queue manager key ring * Connect certificates to the queue manager key ring * Display certificates in a key ring * Configure the queue manager to enable use of SSL/TLS * Connect a sender-receiver channel pair that uses SSL/TLS * Resolve date range conflicts between signer and personal certificates * Configure use of multiple CA certificates for the same queue manager * Configure an SSL/TLS IBM MQ client to queue manager connection |

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| Unit 3. Channel security with channel authentication rules  Duration: 30 minutes | |
| Overview | This unit reviews the channel authentication feature of IBM MQ. |
| Learning objectives | After completing this unit, you should be able to:   * Review the use of channel authentication (CHLAUTH) in IBM MQ * Distinguish between the roles of a firewall, SSL/TLS, and channel authentication * Describe the various types of channel authentication rules * Describe channel authentication precedence behavior * Describe how to set channel authentication rules * Identify channel authentication best practices * Review IBM MQ Explorer capabilities to administer channel authentication |

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| Exercise 3. Configuring channel authentication rules  Duration: 1 hour and 30 minutes | |
| Overview | In this exercise, you use preferred practices to configure channel authentication with focus on implementing SSL/TLS type rules. |
| Learning objectives | After completing this exercise, you should be able to:   * Determine whether channel authentication is enabled in the queue manager * Allow administrative users to connect to a selected channel * Set up the “back-stop” rule * Create a channel authentication rule that maps an incoming IP address to a user * Create an SSL-based channel authentication rule that verifies the subject and issuer distinguished names |

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| Unit 4. Queue-sharing groups  Duration: 1 hour | |
| Overview | This unit describes how queue-sharing groups can be used in the infrastructure and the components that are required to implement shared queues. You also learn how to implement, back up, and restore queue-sharing groups and what overflow or offload options can be used. |
| Learning objectives | After completing this unit, you should be able to:   * Describe shared queues and their architectural role * List the components that are used by queue-sharing groups * Explain the relationship of the coupling facility capabilities and the CFLEVEL * Describe queue-sharing group offload and overflow options * Describe scenarios that are applicable to use of shared message data sets (SMDS) or storage class memory (SCM) * Explain how messages are stored in a coupling facility application structure * Contrast how the coupling facility application and administrative structures are used * Describe the coupling facility resource management (CFRM) attributes to consider in queue-sharing groups * Explain queue manager and structure failure, persistence, connectivity, and recovery as they apply to queue-sharing groups * List IBM MQ administrative commands that are related to queue-sharing groups * Explain how to configure and test a queue-sharing group |

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| Exercise 4. Configuring queue-sharing groups and shared queues  Duration: 3 hours | |
| Overview | This exercise reinforces the topics in the queue-sharing group unit. It provides configuration experience on the IBM MQ queue-sharing group implementation. You also define how to implement message offload by using shared message data sets (SMDS), and how to back up your queue-sharing group. |
| Learning objectives | After completing this exercise, you should be able to:   * Review existing coupling facility information * Define a queue-sharing group to DB2 * Add a queue manager to the queue-sharing group in DB2 * Complete the steps necessary to implement the queue-sharing group in IBM MQ * Explain how to create the IBM MQ CFSTRUCT object * Define shared queues * Put and get messages from the shared queues * Configure message offload to a shared message data set (SMDS) * Issue necessary commands to administer queue-sharing groups and shared message data sets * Back up the structures |

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| Unit 5. Intra-group, distributed queuing, and clustering with queue-sharing groups  Duration: 1 hour | |
| Overview | This unit describes the extra capabilities that are available for queue manager communication with queue-sharing groups. |
| Learning objectives | After completing this unit, you should be able to:   * Explain the advantages of intra-group and distributed queuing with queue-sharing groups * Describe how to set up peer channel recovery * Explain intra-group queuing * Explore various queue-sharing group configurations * Describe how to add a queue-sharing group to an existing cluster * Describe the optimal client connection configuration * Explain queue-sharing group differences with START CHANNEL and DISPLAY CHSTATUS commands |

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| Exercise 5. Intra-group and distributed queuing with queue-sharing groups  Duration: 3 hours | |
| Overview | This exercise provides hands-on practice in the use of shared channels in a distributed queuing environment. |
| Learning objectives | After completing this exercise, you should be able to:   * Configure a peer recovery channel scenario from a queue manager outside the queue-sharing group to the queue-sharing group * Start the generic port listener for the shared channel * Start the shared channel and check its status * Test a channel recovery configuration * Incorporate a queue-sharing group into an existing cluster * Use intra-group queuing to put messages to a clustered queue * Determine the route that a message takes in a combined cluster-queue-sharing group environment |

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| Unit 6. Eight-byte relative byte address (RBA) and buffers above the 2-GB line  Duration: 15 minutes | |
| Overview | This unit describes the IBM MQ V8 capabilities for z/OS 8-byte relative byte address (RBA) and buffers above the 2-GB line. |
| Learning objectives | After completing this unit, you should be able to:   * Explain how to configure buffers above the line * Explain how to implement 8-byte RBA in a new or existing queue manager * Describe the considerations to implement 8-byte RBA for queue managers in a queue-sharing group |

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| Exercise 6. Implementing 8-byte relative byte address and buffers above the 2-GB line  Duration: 30 minutes | |
| Overview | In this exercise, you implement the IBM MQ V8 for z/OS features. |
| Learning objectives | After completing this exercise, you should be able to:   * Implement 8-byte RBA for queue managers that are members of a queue-sharing group * Configure buffers above the 2-GB line |

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| Unit 7. Introduction to IBM MQ for z/OS statistics and accounting  Duration: 30 minutes | |
| Overview | This unit describes how to collect information that is critical for IBM MQ activities such as performance and tuning, troubleshooting, and capacity planning. |
| Learning objectives | After completing this unit, you should be able to:   * Identify the types of information that can be captured from statistics and accounting records * List the SMF record types that are used for IBM MQ accounting and statistics * Describe how to generate accounting and statistics traces * Describe how to use SupportPac MP1B to baseline application activity, identify high use queues, and analyze potential resource constraints * Describe how to use SupportPac MP1B to analyze channel initiator information for dispatchers, adapters, SSL, and channels * Describe the information that SupportPac MP1B generates to support analysis of queue-sharing group resources |

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| Exercise 7. Getting started with IBM MQ statistics and accounting records  Duration: 1 hour | |
| Overview | In this exercise, you learn how to format statistics and accounting information. You then explore how to use this information to check the health of the queue manager and create profiles for capacity planning. |
| Learning objectives | After completing this exercise, you should be able to:   * Format an SMF accounting and statistics trace * Review the information in the various JES output files that MP1B generates * Identify key fields of information for selected MP1B JES output files * Use the MP1B and MP16 documentation as a guide to continue your work with accounting and statistics * Use the MP1B SYSIN data set options to format a trace with extra details * Format an SMF accounting and statistics trace with the CSQ4SMFD utility |

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| Unit 8. Course summary  Duration: 15 minutes | |
| Overview | This unit summarizes the course and provides information for future study. |
| Learning objectives | After completing this unit, you should be able to:   * Explain how the course met its learning objectives * Access the IBM Training website * Identify other IBM Training courses that are related to this topic * Locate appropriate resources for further study |

For more information

To learn more about this course and other related offerings, and to schedule training, see **ibm.com**/training

To learn more about validating your technical skills with IBM certification, see **ibm.com**/certify