

IBM MQ V8 System Administration for z/OS

WM302 (Classroom)

ZM302 (Self-paced)

Course description

This course provides the skills that are necessary to configure and manage an IBM MQ V8 queue manager on z/OS.

Through lectures and hands-on lab exercises, you learn how to install, customize, operate, and administer IBM MQ V8. The course covers configuring a z/OS queue manager, setting up distributed queuing, IBM MQ clustering, IBM MQ on z/OS recovery and restart, security, and performance considerations. It also covers day-to-day administration and problem recovery. The hands-on lab exercises give you direct experience with IBM MQ V8 tasks such as defining and monitoring channels, configuring IBM MQ clusters, and problem determination activities.

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

http://www.ibm.com/training

General information

Delivery method

Classroom or self-paced virtual classroom (SPVC)

Course level

ERC 1.1

Product and version

IBM MQ V8.0

Audience

This course is designed for technical support personnel who implement, operate, and perform day-to-day administration of IBM MQ V8 on z/OS.

Learning objectives

After completing this course, you should be able to:

* Describe message-oriented middleware and the capabilities it must provide
* Identify the key components of IBM MQ for z/OS
* Summarize the responsibilities of the IBM MQ administrator
* Configure IBM MQ IBM V8 for z/OS
* Enable IBM MQ for z/OS eight-byte RBA and buffers above 2 GB
* Demonstrate how to create and change queues and place and retrieve messages from a queue
* Define and demonstrate how to set up and work with distributed queuing
* Differentiate between an IBM MQ queue manager and an IBM MQ client
* Describe and demonstrate how to set up an IBM MQ cluster
* Contrast point-to-point and publish/subscribe messaging styles
* Describe shared queues and queue sharing groups
* Summarize IBM MQ for z/OS recovery and restart activities
* Demonstrate how to use IBM MQ events for monitoring
* Summarize performance considerations
* Describe security considerations for IBM MQ for z/OS
* Describe and implement connection authentication and channel authentication
* Identify correct problem determination techniques for IBM MQ for z/OS
* Summarize basic use and configuration of IBM MQ Managed File Transfer
* Describe IBM MQ support for CICS and IMS interfaces

Prerequisites

Before taking this course, you should have:

* Basic knowledge of IBM MQ V8 concepts, obtained through experience or by successfully completing course WM102, *Technical Introduction to IBM MQ*.
* Working proficiency with the z/OS platform, obtained through experience or by successfully completing course ES10G, *Fundamental System Skills in z/OS*.

Knowledge of TCP/IP is also helpful.

Duration

4 days

Skill level

Intermediate

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| Classroom (ILT) setup requirements | |
| Processor | 2.5 GHz or faster Duo Core |
| 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 course:

* WM201: IBM WebSphere MQ V7 System Administration (using Windows for labs)

Course agenda

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| Course introduction  Duration: 15 minutes |

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| Unit 1. IBM MQ review  Duration: 45 minutes | |
| Overview | This unit reviews basic IBM MQ concepts. |
| Learning objectives | After completing this unit, you should be able to:   * Summarize how message-oriented middleware is critical to an enterprise * Describe the role of a queue manager * Describe messages and their contents * Describe a queue * Distinguish between queues that hold messages and queues that do not hold messages * Explain some of the queues that are used for special purposes * Describe the role of a channel * Describe the calls that help place and retrieve messages from queues * Identify key queue and message attributes and how to set them * Summarize JMS support * Describe transactions |

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| Unit 2. IBM MQ architecture, installation, and configuration  Duration: 1 hour and 15 minutes | |
| Overview | This unit describes the IBM MQ z/OS components and describes installation and configuration details for a queue manager on z/OS. |
| Learning objectives | After completing this unit, you should be able to:   * Identify the key components of an IBM MQ z/OS queue manager * List the responsibilities of the IBM MQ z/OS system administrator * Identify z/OS system configuration tasks that are required before a queue manager can be configured * Summarize the installation process for IBM WebSphere MQ for z/OS * Describe the process, data sets, and JCL used to configure a z/OS queue manager * Summarize eight-byte relative byte address considerations * Complete and start a z/OS IBM MQ V8 queue manager |

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| Exercise 1. Configuring an IBM MQ for z/OS queue manager  Duration: 1 hour and 30 minutes | |
| Overview | This exercise provides skills that are necessary to set up the required data sets, and configure and start a z/OS queue manager. |
| Learning objectives | After completing this exercise, you should be able to:   * Describe the z/OS setup for a queue manager * Start and stop a queue manager master and channel initiator task * Describe and use the input command files * Explain some of the messages that a z/OS queue manager issues at startup * Implement eight-byte RBA; change the OPMODE parameter and convert BSDS to Version 2 format |

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| Unit 3. IBM MQ for z/OS administrative interface options  Duration: 1 hour | |
| Overview | This unit examines the facilities that are available to administer IBM MQ on z/OS and demonstrates these capabilities with queue definitions. |
| Learning objectives | After completing this unit, you should be able to:   * Explain the differences between the various types of queues * Contrast the effect of selected queue definition attributes and development options on the handling of messages * Demonstrate use of the Interactive System Productivity Facility (ISPF) panel interface to change queue manager and queue attributes * Describe how to issue IBM MQ script commands (MQSC) by using the IBM MQ for z/OS CSQUTIL or the command line to create queues, including local, model, and alias queues * Describe and use the display and monitoring functions that allow inquiry on queue-related application activities * Demonstrate how to use supplied programs to put and retrieve messages in queues |

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| Exercise 2. Working with queues  Duration: 1 hour | |
| Overview | This exercise provides an opportunity to create, display, and delete queues with the IBM MQ for z/OS ISPF panels and the CSQUTIL batch program. It uses sample IBM MQ programs to PUT (write) and GET (read) messages to and from queues. |
| Learning objectives | After completing this exercise, you should be able to:   * Create, alter, and display queues by using the command prefix string and MQSC commands at the system prompt, and the IBM MQ for z/OS ISPF panels * Place and retrieve messages from queues with the batch sample programs * Describe the behavior of various combinations of persistence in the application specification and queue definition attributes |

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| Unit 4. Distributed queuing  Duration: 1 hour and 30 minutes | |
| Overview | This unit describes the IBM MQ components that are required to exchange messages with other queue managers, and follows the path of a message from source to end point. |
| Learning objectives | After completing this unit, you should be able to:   * Identify the distributed queuing components * Describe queue name resolution * Summarize the use of remote and transmit queues * Describe message channel agents, listeners, and channel initiators * Differentiate among the various types of channels * Describe the object definitions that are necessary to connect queue managers * Describe connectivity behaviors that client channel definition attributes control * Demonstrate how to monitor and solve problems with channels |

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| Exercise 3. Working with channels  Duration: 1 hour and 30 minutes | |
| Overview | This lab covers sending a message from the local queue manager to a remote queue manager, defining required objects, and starting and checking the channels. it also covers how to trigger-start a channel, and how to define a queue manager alias and create a multi-hop definition. |
| Learning objectives | After completing this exercise, you should be able to:   * Define transmission queues * Define sender-receiver channels * Define remote queues * Start channels * Trigger-start channels * Determine the status of a channel * Demonstrate how to track the path of a message * Use the message handler sample to process messages in the dead letter queue * Define a multi-hopping configuration |

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| Unit 5. IBM MQ clients  Duration: 45 minutes | |
| Overview | This unit covers differences between an IBM MQ client and an IBM MQ server, and explains connectivity options. |
| Learning objectives | After completing this unit, you should be able to:   * Distinguish between an IBM MQ server and an IBM MQ client * Describe the various ways of connecting WebSphere MQ clients to IBM MQ servers * Describe security considerations of an IBM MQ client * Summarize transactional capabilities of an IBM MQ client |

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| Exercise 4. Working with IBM MQ clients  Duration: 45 minutes | |
| Overview | This exercise explores how to configure IBM MQ client connectivity with a Client Channel Definition Table (CCDT) and with an MQSERVER variable. |
| Learning objectives | After completing this exercise, you should be able to:   * Use the IBM MQ V8 client side **runmqsc** command to configure a client channel definition table (CCDT) on the client side * Define a client connection to a queue manager with the MQSERVER variable * Use sample IBM MQ client programs to place messages in an IBM MQ server queue * Configure IBM MQ Explorer to administer your queue manager, and browse the MQ00, MQ0A, and MQ0B queue managers |

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| Unit 6. IBM MQ cluster basics  Duration: 1 hour | |
| Overview | This unit reviews what an IBM MQ cluster is, describes cluster configuration, identifies considerations to observe, and provides cluster troubleshooting tips. |
| Learning objectives | After completing this unit, you should be able to:   * Describe what an IBM MQ cluster is * List the information to review before implementing IBM MQ clusters * Describe the components of an IBM MQ cluster * Define a basic cluster * Interpret the contents of a cluster display and other cluster commands * Recognize and resolve cluster problems * Define and put messages to cluster queues * Describe the commands and options that are used to administer a cluster * Summarize how to influence cluster workload balancing * Describe how to define a connection from outside the cluster to a cluster gateway * List cluster best practices |

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| Exercise 5. Working with IBM MQ clusters  Duration: 1 hour | |
| Overview | This exercise shows you how to create a cluster, and how the full repositories are created. You add the queue to the cluster and perform checks for problem determination. After the checks are completed, you define a clustered queue and put messages to that queue from a different queue manager where the queue is not hosted. You also learn how to route messages to a clustered queue with distributed channels by using a queue manager alias. |
| Learning objectives | After completing this exercise, you should be able to:   * Review the cluster configuration * Use a queue manager alias to route messages to clustered queues from a queue manager outside the cluster * Add a queue manager to an existing cluster * Interpret the information in a cluster display * Put messages to a clustered queue * Review the IBM MQ Explorer cluster administrative capabilities |

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| Unit 7. Publish/subscribe basics  Duration: 1 hour | |
| Overview | This unit describes the publish/subscribe messaging style, analyzes the evolution of publish/subscribe, and details ways to configure and use the technology. |
| Learning objectives | After completing this unit, you should be able to:   * Differentiate between publish/subscribe and point-to-point messaging * Summarize the history of publish/subscribe and how it influences current functionality * Identify the basic components of publish/subscribe * Describe key properties of topics, subscriptions, and publications * Summarize managed and unmanaged subscriptions * Describe ways to administer publish/subscribe * Summarize publish/subscribe life cycles * Describe distributed publish/subscribe topologies and when to use them * Identify factors to consider when implementing or maintaining publish/subscribe |

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| Exercise 6. Publish/subscribe basics  Duration: 30 minutes | |
| Overview | In this exercise, you perform basic work with publish/subscribe, provide exposure with the topic tree, and use some of the facilities to administer publish/subscribe. |
| Learning objectives | After completing this exercise, you should be able to:   * Create a topic * Create a managed subscription * Publish messages * Subscribe to messages without a managed subscription * Display publish/subscribe subscription status * Use IBM MQ Explorer to display publish/subscribe details |

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| Unit 8. Queue sharing groups  Duration: 1 hour | |
| Overview | This unit covers the support in WebSphere MQ for shared queues in a z/OS sysplex environment. |
| Learning objectives | After completing this unit, you should be able to:   * Describe the concept and use of queue-sharing groups * Differentiate between non-shared and shared queues * Identify coupling facility capabilities according to coupling facility level * Differentiate among coupling facility offload and overflow options for queue sharing groups * Identify commands to manage the queue sharing group environment * Summarize distributed queuing support for queue sharing groups * Describe Intra-group queuing * Differentiate between queue sharing groups and cluster capabilities * Describe how to join a queue sharing group to a cluster |

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| Unit 9. Using IBM MQ events and the dead-letter queue utility  Duration: 30 minutes | |
| Overview | This unit describes the monitoring and auditing capabilities that IBM MQ events facilitate. It also introduces the dead-letter queue handler utility. |
| Learning objectives | After completing this unit, you should be able to:   * Describe the use of IBM MQ event types * List the queues that are associated with each event * Summarize use of the dead-letter queue handler |

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| Exercise 7. Working with IBM MQ events  Duration: 30 minutes | |
| Overview | This exercise enforces how to work with IBM MQ events and how to set up the dead-letter queue utility. |
| Learning objectives | After completing this exercise, you should be able to:   * Explain the uses of performance events * Configure the queue manager and queues to generate events * Use publish/subscribe to redirect event messages |

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| Unit 10. Security considerations  Duration: 1 hour and 30 minutes | |
| Overview | This unit identifies the security capabilities that are available with IBM MQ for z/OS and sets the base for designing security standards in the organization. |
| Learning objectives | After completing this unit, you should be able to:   * Contrast security areas as they apply to IBM MQ * Differentiate between link level and application level security * Summarize the way security is implemented in IBM MQ for z/OS * Describe how to implement connection authentication * Describe how to use channel authentication records * Summarize the mechanisms that are available to secure IBM MQ for z/OS |

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| Exercise 8. Security  Duration: 1 hour and 30 minutes | |
| Overview | In this exercise, you work with selected security areas. |
| Learning objectives | After completing this exercise, you should be able to:   * Determine the queue manager connection authentication (CONNAUTH) settings * Test initial client connection authentication settings * Change client connection authentication settings to require full credentials * Use available tools to test connection authentication changes * Adjust IBM MQ Explorer to work with client connection authentication enabled * Display the initial channel authentication (CHLAUTH) rules * Add a rule to allow selected administrative users * Implement the back-stop rule in full blocking mode * Add CHLAUTH rules that allow valid connections * Change and delete CHLAUTH rules * Interpret event messages that are related to CHLAUTH * Back up CHLAUTH rules * Explain how to set rules in warning mode and where to check results of rules that are running in warning mode |

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| Unit 11. Problem determination  Duration: 30 minutes | |
| Overview | This session augments the troubleshooting concepts that were presented in earlier units with topics such as how to handle internal failures and analyze performance. |
| Learning objectives | After completing this unit, you should be able to:   * Differentiate between queue manager and IBM MQ problems * Identify the cause of channel problems * Examine performance-related data |

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| Unit 12. IBM MQ Managed File Transfer  Duration: 45 minutes | |
| Overview | This unit introduces the IBM MQ Managed File Transfer component, describes installation and configuration, explains ways of initiating a file transfer, and summarizes auditing capabilities and other transfer options. |
| Learning objectives | After completing this unit, you should be able to:   * Summarize the capabilities of IBM MQ Managed File Transfer * List the key components of IBM MQ Managed File Transfer * Describe how to configure an IBM MQ Managed File Transfer agent and supporting environment * List the mechanisms that are available to initiate a file transfer * Describe facilities that are available to display transfer status * Explain how to perform basic problem determination * Describe the IBM MQ File Transfer logger component |

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| Exercise 9. IBM MQ Managed File Transfer configuration for z/OS  Duration: 1 hour | |
| Overview | This exercise shows how to configure a basic IBM MQ Managed File Transfer environment and transfer a file. |
| Learning objectives | After completing this exercise, you should be able to:   * Examine the parameters that are required to configure IBM MQMFT on z/OS * Configure and execute the IBM MQMFT customization job * Create an IBM MQMFT configuration and agent * Review changes to the Unix System Services file structure during the IBM MQMFT configuration * Start the IBM MQMFT agent * Display the health of the agent * Perform a basic file transfer by using batch JCL * Add the MQMFT configuration to IBM MQ Explorer * Check transfer results with IBM MQ Explorer * Modify an existing MQMFT configuration |

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| Unit 13. IBM MQ for z/OS backup, recovery, and related file tasks  Duration: 1 hour | |
| Overview | This unit covers critical tasks and utilities that the z/OS IBM MQ administrator needs to master, such as restart and recovery. |
| Learning objectives | After completing this unit, you should be able to:   * Describe the contents and use of the IBM MQ for z/OS log and bootstrap data sets * Describe and use the options to dynamically adjust the number and sizes of logs, page data sets, and buffers * Determine the appropriate log and archive parameter module options according to requirements * Describe how IBM MQ for z/OS maintains consistency with IMS, CICS, and Resource Recovery Services (RRS) * Use the appropriate commands to display and control affected units of recovery * Describe how IBM MQ for z/OS cleans up inconsistent data on restart * Perform queue and page set management functions, such as expanding page data sets and restoring unloaded data |

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| Exercise 10. Working with file handling utilities  Duration: 1 hour | |
| Overview | In this exercise, you work with critical backup, recovery, and related MQ-specific file utilities |
| Learning objectives | After completing this exercise, you should be able to:   * Dynamically create a new page set * Move buffers for a page set to reside above the 2GB line * Move queues to a new page set * Dynamically add and switch to a new log * Back up object definitions * List the contents of the BSDS data set |

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| Unit 14. Support for CICS, IMS, and HTTP applications  Duration: 30 minutes | |
| Overview | This unit covers the ways in which WebSphere MQ for z/OS interacts with CICS and IMS. It explains what is necessary during setup and during ongoing production, what steps need to be considered, and alternative approaches. |
| Learning objectives | After completing this unit, you should be able to:   * Describe how to set up an adapter and bridge for CICS and IBM MQ * Describe how to configure and use the IBM MQ IMS OTMA Bridge * Describe how to configure the IBM MQ IMS Adapter * Compare the IBM MQ IMS OTMA Bridge and the IBM MQ IMS adapter * Summarize the IBM MQ Bridge for HTTP |

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| Unit 15. 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

To stay informed about IBM training, see the following sites:

IBM Training News: ibm.com/training/blog

YouTube: youtube.com/IBMTraining

Facebook: facebook.com/ibmtraining

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