

IBM MQ V9 System Administration (using Linux for labs)

WM154 (Classroom)

Course description

This course provides technical professionals with the skills that are needed to administer IBM MQ queue managers on distributed operating systems and in the Cloud. In addition to the instructor-led lectures, you participate in hands-on lab exercises that are designed to reinforce lecture content. The lab exercises use IBM MQ V9.0, giving you practical experience with tasks such as handling queue recovery, implementing security, and problem determination.

**Note:** This course does not cover any of the features of MQ for z/OS or MQ for IBM i.

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

http://www.ibm.com/training

General information

Delivery method

Classroom

Course level

ERC 1.0

Product and version

IBM MQ version 9.0

Audience

This course is designed for technical professionals who require the skills to administer IBM MQ queue managers on distributed operating systems, in the Cloud, or on the IBM MQ Appliance.

Learning objectives

After completing this course, you should be able to:

* Describe the IBM MQ deployment options
* Plan for the implementation of IBM MQ on-premises or in the Cloud
* Use IBM MQ commands and the IBM MQ Explorer to create and manage queue managers, queues, and channels
* Use the IBM MQ sample programs and utilities to test the IBM MQ network
* Enable a queue manager to exchange messages with another queue manager
* Configure client connections to a queue manager
* Use a trigger message and a trigger monitor to start an application to process messages
* Implement basic queue manager restart and recovery procedures
* Use IBM MQ troubleshooting tools to identify the cause of a problem in the IBM MQ network
* Plan for and implement basic IBM MQ security features
* Use accounting and statistics messages to monitor the activities of an IBM MQ system
* Define and administer a simple queue manager cluster

Prerequisites

* Basic knowledge of IBM MQ V9 concepts and features, obtained either through experience or by successfully completing Technical Introduction to IBM MQ (WM103G) or Technical Introduction to IBM MQ (ZM103G)
* Ability to invoke standard functions within the operating system that is used in the lab exercises
* Some knowledge of TCP/IP configuration

Duration

4 days

Skill level

Intermediate

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| Classroom (ILT) setup requirements | |
| Processor | Intel Pentium 2.5 GHz or faster |
| GB RAM | 8 |
| GB free disk space | 120 |
| Network requirements | None |
| 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:

* WM209, *IBM MQ V8 System Administration (using Linux for labs)*

Course agenda

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| Course introduction  Duration: 15 minutes |

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| Unit 1. IBM MQ review  Duration: 30 minutes | |
| Overview | This unit reviews IBM MQ basic concepts and components. It also reviews the runtime options for IBM MQ on-premises and in the Cloud. |
| Learning objectives | After completing this unit, you should be able to:   * Summarize the features and benefits of IBM MQ * Identify the IBM MQ components and their functions * Describe the IBM MQ runtime options for on-premises and Cloud * Use the IBM Knowledge Center for IBM MQ V9 |

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| Unit 2. IBM MQ installation and deployment options  Duration: 30 minutes | |
| Overview | This unit describes the installation and deployment options for IBM MQ on-premises and in the Cloud. It also describes the release options for IBM MQ V9 and the process for locating and installing product Fix Packs. |
| Learning objectives | After completing this unit, you should be able to:   * Summarize the IBM MQ installation options for on-premises and Cloud implementations * Find the hardware and software prerequisites for an IBM MQ on-premises installation * List the steps that are required to install IBM MQ on distributed operating systems * Locate and install IBM MQ Fix Packs * Locate IBM MQ SupportPacs |

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| Unit 3. Creating a queue manager and queues  Duration: 1 hour | |
| Overview | In this unit, you learn how to use the IBM MQ commands and command scripts to verify an installation and create a queue manager and local queues. |
| Learning objectives | After completing this unit, you should be able to:   * Use IBM MQ commands to create a queue manager and local queues * Use IBM MQ commands to start and stop a queue manager * Create IBM MQ command scripts |

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| Exercise 1. Using commands to create a queue manager and queues  Duration: 30 minutes | |
| Overview | In this exercise, you use IBM MQ commands to create a queue manager, start it, and then create queues. You also create and run an IBM MQ script command file. |
| Learning objectives | After completing this exercise, you should be able to:   * Use IBM MQ commands to create a local queue manager, local queues, and alias queues * Use IBM MQ commands to display and alter queue manager and queue attributes * Create and run an IBM MQ command file |

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| Unit 4. Introduction to IBM MQ Explorer  Duration: 30 minutes | |
| Overview | IBM MQ Explorer is a graphical interface for administering IBM MQ. In this unit, you learn how to use IBM MQ Explorer to administer IBM MQ objects. |
| Learning objectives | After completing this unit, you should be able to:   * Use IBM MQ Explorer to create a local queue manager and queues * Use IBM MQ Explorer to create and manage queue manager sets * Use IBM MQ Explorer to run tests to verify IBM MQ object definitions |

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| Exercise 2. Using IBM MQ Explorer to create queue managers and queues  Duration: 30 minutes | |
| Overview | In this exercise, you use IBM MQ Explorer to create a queue manager, start it, and then create queues. You also use IBM MQ Explorer to create queue manager sets to simplify the management of many queue managers. |
| Learning objectives | After completing this exercise, you should be able to:   * Use IBM MQ Explorer to create a local queue manager, local queues, and alias queues * Use IBM MQ Explorer to display and modify queue manager and queue properties * Use IBM MQ Explorer to create a queue manager set |

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| Unit 5. Testing the IBM MQ implementation  Duration: 30 minutes | |
| Overview | This unit provides a brief introduction to the IBM MQ Message Queue Interface (MQI). You also learn about the IBM MQ sample programs that you can use to test IBM MQ applications and the network. |
| Learning objectives | After completing this unit, you should be able to:   * Recognize IBM MQ MQI calls in a program * Explain the purpose of the fields in the IBM MQ message descriptor * Use IBM MQ sample programs to put, get, and browse messages * Use IBM MQ Explorer to put, get, and browse messages |

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| Exercise 3. Using IBM MQ sample programs to test the configuration  Duration: 30 minutes | |
| Overview | In this exercise, you use the IBM MQ sample programs to put, get, and browse queues and test the queue manager configuration. You then use IBM MQ Explorer and IBM MQ commands to verify the actions of the sample programs. You also define and test an alias queue. |
| Learning objectives | After completing this exercise, you should be able to:   * Use IBM MQ sample programs to put messages onto a queue, browse messages on a queue, and get messages from a queue * Use IBM MQ Explorer and IBM MQ commands to display queue contents * Define and test an alias queue that refers to another queue |

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| Unit 6. Implementing distributed queuing  Duration: 1 hour and 30 minutes | |
| Overview | In this unit, you learn how to interconnect two or more queue managers in a network, allowing the distribution of messages between systems. You also learn about message channels, the supporting objects that are needed for channels to function correctly, and remote queue definitions. |
| Learning objectives | After completing this unit, you should be able to:   * Diagram the connection between two queue managers by using the required components * Configure message channels * Start and stop message channels * Identify channel states * Access remote queues * List considerations for data conversion * Use the dead-letter queue to find messages that cannot be delivered |

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| Exercise 4. Connecting queue managers  Duration: 1 hour | |
| Overview | In this exercise, you create channels between two queue managers. You use the IBM MQ sample programs to test the connection between the queue managers. |
| Learning objectives | After completing this exercise, you should be able to:   * Configure a distributed network of two or more interconnected queue managers * Use IBM MQ commands to create the channels and supporting objects to implement distributed queuing * Use the IBM MQ sample programs to test the connection between the queue managers |

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| Unit 7. IBM MQ clients  Duration: 1 hour | |
| Overview | In this unit, you learn how IBM MQ clients can attach to an IBM MQ server with various connection methods. |
| Learning objectives | After completing this unit, you should be able to:   * Describe the various ways to connect a client to a queue manager * Analyze client connection requirements * Describe the limitations of various client connection methods * Propose methods to ensure security with client connections |

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| Exercise 5. Connecting an IBM MQ client  Duration: 1 hour | |
| Overview | In this exercise, you configure your system to act as a client that is connected to an IBM MQ server. You use various methods to gain experience with the client connectivity methods that are available in IBM MQ. |
| Learning objectives | After completing this exercise, you should be able to:   * Create a server connection channel to support client connections * Use a URL to specify the location of the client connection definition table * Use the MQSERVER environment variable to specify a client connection channel * Use the client configuration file to specify a client connection channel |

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| Unit 8. Implementing trigger messages and monitors  Duration: 30 minutes | |
| Overview | IBM MQ can be configured to trigger an application automatically when certain conditions on a queue are met. In this unit, you learn how to configure IBM MQ to trigger an application. |
| Learning objectives | After completing this unit, you should be able to:   * Configure IBM MQ to enable a trigger monitor * Run the trigger monitors on distributed operating systems * Determine the cause of a triggering failure |

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| Exercise 6. Implementing a trigger monitor  Duration: 1 hour | |
| Overview | In this exercise, you modify queue parameters to implement triggering. You define a process object that identifies the IBM MQ **echo** sample program and triggers the program when a message arrives on a queue. You use the **request** sample program to send messages to the queue and retrieve the responses. |
| Learning objectives | After completing this exercise, you should be able to:   * Apply triggering parameters to queues * Start a trigger monitor * Test triggering by using IBM MQ sample programs |

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| Unit 9. Diagnosing problems  Duration: 1 hour | |
| Overview | In this unit, you learn about the IBM MQ tools and utilities that you can use to help you diagnose problems in the IBM MQ network. The unit describes the IBM MQ trace mechanism, explains the contents of the AMQERR01.LOG file, and describes the First Failure Support Technology (FFST). It also provides problem determination hints and tips for some of the more common types of problems. |
| Learning objectives | After completing this unit, you should be able to:   * Determine the possible causes and locations of a missing message * Analyze the error logs that IBM MQ generates * Locate First Failure Support Technology (FFST) files on a system * Use an IBM MQ trace to collect detailed information about IBM MQ operation * Describe some of the more common problem types and how to approach initial problem determination * Stop and remove a queue manager manually |

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| Exercise 7. Running an IBM MQ trace  Duration: 30 minutes | |
| Overview | In this exercise, you start a trace on the IBM MQ **amqsput** and **amqsget** sample programs. You then use the sample programs to send and receive messages and examine the trace output. |
| Learning objectives | After completing this exercise, you should be able to:   * Start and stop an IBM MQ trace * Analyze the output from the IBM MQ trace |

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| Unit 10. Implementing basic security in IBM MQ  Duration: | |
| Overview | In this unit, you learn how IBM MQ protects its objects by using access control lists (ACLs), and how the IBM MQ Object Authority Manager (OAM) uses these ACLs when a user attempts to access these objects. The unit also describes how to manage IBM MQ object authorizations and introduces Secure Socket Layer (SSL) and Transport Layer Security (TLS) support. |
| Learning objectives | After completing this unit, you should be able to:   * Describe the role of the object authority manager (OAM) to provide security to IBM MQ resources * Protect IBM MQ resources by using the OAM * Use some of the OAM control commands * Describe the Secure Sockets Layer (SSL) and Transport Layer Security (TLS) support that IBM MQ provides * Implement basic channel authentication |

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| Exercise 8. Controlling access to IBM MQ  Duration: | |
| Overview | In this exercise, you use the IBM MQ OAM commands to set access control on a queue, and then use the IBM MQ sample programs to see the effect of attempting to breach security. |
| Learning objectives | After completing this exercise, you should be able to:   * Use the **setmqaut** command to define access control on a queue * Use the **dspmqaut** command to display the access control on a queue * Use IBM MQ Explorer to manage authority records * Enable and monitor authority events * Test security by using IBM MQ sample programs |

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| Unit 11. Backing up and restoring IBM MQ messages and object definitions  Duration: 1 hour | |
| Overview | In this unit, you learn about the various ways that IBM MQ maintains messages. You learn about differences between circular and linear logging, the implications of using persistence, and transaction management. You also learn about the methods for capturing and restoring an object image and backing up and restoring IBM MQ object definitions. |
| Learning objectives | After completing this unit, you should be able to:   * Describe how IBM MQ uses logging to record significant changes to the data controlled by the queue manager * Describe the difference between circular and linear logging * Develop a method for backing up the IBM MQ environment * Use a media image to recover objects that become damaged * Save the queue manager object definitions |

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| Exercise 9. Using a media image to restore a queue  Duration: 30 minutes | |
| Overview | In this exercise, you capture a media image of a queue, deliberately damage the queue, and then restore it. |
| Learning objectives | After completing this exercise, you should be able to:   * Capture an object media image * Re-create an IBM MQ object from an object media image |

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| Exercise 10. Backing up and restoring IBM MQ object definitions  Duration: 30 minutes | |
| Overview | In this exercise, you use the **dmpmqcfg** command to unload a queue manager's object definitions. You then create a queue manager and load the same definitions, and use MQSC commands or IBM MQ Explorer to show that the definitions are the same. |
| Learning objectives | After completing this exercise, you should be able to:   * Use IBM MQ commands to back up object definitions of a queue manager * Use IBM MQ commands to upload object definitions to another queue manager |

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| Unit 12. Introduction to queue manager clusters  Duration: 1 hour | |
| Overview | In this unit, you learn about the basic concepts of queue manager clustering. The unit provides an overview of queue manager cluster components and definitions that are required for setting up a simple clustered environment. |
| Learning objectives | After completing this unit, you should be able to:   * Describe a cluster and list the components that are involved * Describe the difference between a full and a partial repository queue manager * Configure a basic cluster * Describe the administration tasks that must be considered in a clustered environment |

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| Exercise 11. Implementing a basic cluster  Duration: 1 hour | |
| Overview | In this exercise, you use IBM MQ Explorer to create a cluster of four queue managers. You then test the cluster by using the cluster mechanism to send messages between queues on all queue managers in the cluster. |
| Learning objectives | After completing this exercise, you should be able to:   * Use IBM MQ Explorer to define a simple queue manager cluster * Use the IBM MQ sample programs to test a cluster environment |

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| Unit 13. Monitoring and configuring IBM MQ for performance  Duration: 1 hour and 30 minutes | |
| Overview | In this unit, you learn about the information that the accounting and statistics system management utilities provide for monitoring an IBM MQ network. |
| Learning objectives | After completing this unit, you should be able to:   * Describe the statistics and accounting data that IBM MQ provides * View and generate accounting and statistical data * Subscribe to IBM MQ statistic topics * Interpret statistics and accounting data to identify possible system performance benefits * Configure and tune IBM MQ for improved performance |

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| Exercise 12. Monitoring IBM MQ for performance  Duration: 1 hour and 30 minutes | |
| Overview | In this exercise, you enable and configure the online monitoring, statistics, and accounting features of IBM MQ. |
| Learning objectives | After completing this exercise, you should be able to:   * Enable accounting and statistics collection in IBM MQ * View accounting and statistics data * Configure a queue manager for online monitoring * Monitor system resource usage |

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| Unit 14. Course summary  Duration: 30 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