

IBM MQ V9.1 System Administration

WM156 (Classroom)

ZM156 (Self-paced)

Course description

This course teaches you how to customize, operate, administer, and monitor IBM MQ on-premises on distributed operating systems. The course covers configuration, day-to-day administration, problem recovery, security management, and performance monitoring. In addition to the instructor-led lectures, the hands-on exercises provide practical experience with distributed queuing, working with MQ clients, and implementing clusters, publish/subscribe messaging. You also learn how to implement authorization, authentication, and encryption, and you learn how to monitor performance.

**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:

**ibm.com**/training

General information

Delivery method

Classroom or self-paced virtual classroom (SPVC)

Course level

ERC 1.0

Product and version

IBM MQ version 9.1

Audience

This course is designed for technical professionals who require the skills to administer IBM MQ.

Learning objectives

After completing this course, you should be able to:

* Describe the IBM MQ deployment options
* Create and manage queue managers, queues, and channels
* Use the IBM MQ sample programs and utilities to test the IBM MQ network
* Configure distributed queuing
* Configure MQ client connections to a queue manager
* Define and administer a queue manager cluster
* Administer Java Message Service (JMS) in MQ
* 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
* Manage IBM MQ security
* Monitor the activities and performance of an IBM MQ system

Prerequisites

* Basic knowledge of IBM MQ concepts and features
* Some knowledge of TCP/IP configuration
* Basic experience with Windows 2016 system administration

Duration

5 days

Skill level

Intermediate

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| Classroom (ILT) setup requirements | |
| Processor | Intel Pentium 2.5 GHz or faster |
| GB RAM | 16 |
| 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:

* WM153, *IBM MQ V9 System Administration (using Windows for labs)*

Course agenda

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| Course introduction  Duration: 15 minutes |

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| Unit 1. Introducing IBM MQ  Duration: 1 hour and 30 minutes | |
| Overview | This unit describes IBM MQ basic concepts and components that are applicable to the administrator role. It also describes installation and deployment options for IBM MQ on-premises and in the Cloud. |
| Learning objectives | After completing this unit, you should be able to:   * Describe IBM MQ features * Identify the IBM MQ components and their functions * Describe the Administrator role and tools * Outline IBM MQ installation options * Configure IBM MQ Console |

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| Exercise 1. Getting started with IBM MQ  Duration: 1 hour | |
| Overview | In this exercise, you explore your IBM MQ installation. To validate your installation, you create a queue manager and queue, and test messaging. You also set up basic security to use IBM MQ console administration tools. |
| Learning objectives | After completing this exercise, you should be able to:   * Explore your IBM MQ installation by creating a queue and testing messaging * Validate your installation by creating a queue and testing messaging * Configure the mqweb server for user access to IBM MQ Console |

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| Unit 2. Working with IBM MQ administration tools  Duration: 1 hour and 30 minutes | |
| 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:   * Create queue managers and objects with IBM MQ control commands and script commands * Describe queue manager sets * Stop and delete queue managers |

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| Exercise 2. Working with IBM MQ administration tools  Duration: 1 hour | |
| Overview | In this exercise, you use IBM MQ control commands to create a queue manager, start it, and create queues. You also use MQ script commands and command files. You also use IBM MQ Explorer to create queue manager sets to administer a group of queue managers collectively. |
| Learning objectives | After completing this exercise, you should be able to:   * Work with IBM MQ administration tools to create and manage queue managers, queues, and messaging * Create a queue manager set to administer queue managers as a group |

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| Unit 3. Configuring distributed queuing  Duration: 1 hour and 30 minutes | |
| Overview | In this unit, you learn how to set up a distributed topology with all the required components, including message channels. |
| Learning objectives | After completing this unit, you should be able to:   * Diagram the components of a distributed topology * Explain how point-to-point messaging works * 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 3. Implementing distributed queuing  Duration: 30 minutes | |
| Overview | In this exercise, you learn how to set up a distributed topology for point-to-point message queuing. |
| Learning objectives | After completing this exercise, you should be able to:   * Set up a distributed topology * Test point-to-point message queuing |

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| Unit 4. Managing clients and client connections  Duration: 1 hour and 30 minutes | |
| 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 components of an MQI client connection * Describe the various ways to connect a client to a queue manager * Describe the client modes that MQSC supports * Use troubleshooting tools and techniques to monitor and manage clients and connections |

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| Exercise 4. 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 a client configuration file to specify a client connection channel |

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| Unit 5. Advanced IBM MQ client features  Duration: 1 hour | |
| Overview | In this unit, you learn more about IBM MQ client advanced features. |
| Learning objectives | After completing this unit, you should be able to:   * Explain how to use the extended transactional client * Manage client performance by sharing conversations * Describe the performance impact of using read ahead * Outline reasons for using asynchronous put |

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| Unit 6. Working with queue manager clusters  Duration: 1 hour and 30 minutes | |
| 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 the components of a cluster * Explain the purpose of full and partial repository queue managers * Configure a basic cluster * Outline cluster workload management features |

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| Exercise 5. Implementing a basic cluster  Duration: 2 hours | |
| Overview | In this exercise, you 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:   * Create a simple queue manager cluster * Test the cluster environment |

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| Unit 7. Publish/subscribe messaging  Duration: 2 hours | |
| Overview | In this unit, you learn about the publish/subscribe support in IBM MQ. The unit describes how to use IBM MQ commands and IBM MQ Explorer to define and manage publications and subscriptions. |
| Learning objectives | After completing this unit, you should be able to:   * Describe publish/subscribe messaging * Explain distributed publish/subscribe topologies * Manage publish/subscribe topics, subscriptions, and topologies * Compare publish/subscribe topologies |

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| Exercise 6. Configuring publish/subscribe message queuing  Duration: 1 hour | |
| Overview | In this exercise, you define and test an IBM MQ publish/subscribe network by using a direct cluster and a topic host cluster. You also use the IBM MQ sample programs and IBM MQ Explorer to test the cluster and the IBM MQ display route command to show the message route through the publish/subscribe cluster. |
| Learning objectives | After completing this exercise, you should be able to:   * Define a direct route publish/subscribe cluster * Define a topic host route publish/subscribe cluster * Test the publish/subscribe cluster * Use the IBM MQ display route (dspmqrte) command to verify the route that the message takes through the publish/subscribe cluster |

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| Unit 8. Implementing basic security in IBM MQ  Duration: 1 hour and 30 minutes | |
| 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. |
| Learning objectives | After completing this unit, you should be able to:   * Describe how the object authority manager (OAM) provides security for IBM MQ resources * Protect IBM MQ resources by using the OAM * Implement basic channel authentication |

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| Exercise 7. Controlling access to IBM MQ  Duration: 1 hour | |
| 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:   * Define and display access control on a queue * Manage authority records * Enable and monitor authority events * Test security |

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| Unit 9. Securing IBM MQ channels with TLS  Duration: 1 hour and 30 minutes | |
| Overview | In this unit, you learn how to use Transport Layer Security (TLS) to secure IBM MQ channel communications that include mutual authentication. |
| Learning objectives | After completing this unit, you should be able to:   * Describe the certificate infrastructure that is supported in IBM MQ * Manage certificates with IBM Key Management * Describe cipher specifications and their support in IBM MQ * Use certificate revocation lists or Online Certificate Status Protocol (OCSP) to validate currency of certificates * Use TLS to secure IBM MQ channel communications |

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| Exercise 8. Securing channels with TLS  Duration: 1 hour and 30 minutes | |
| Overview | In this exercise, you define and start TLS channels between IBM MQ queue managers, and between an IBM MQ client and an IBM MQ server. |
| Learning objectives | After completing this exercise, you should be able to:   * Use IBM Key Management to create a certificate request * Secure channels by using TLS on the channel |

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| Unit 10. Authenticating channels and connections  Duration: 1 hour and 30 minutes | |
| Overview | In this unit, you learn how to use channel authentication to control the access that is granted to connecting systems at a channel level. You learn how to modify the queue manager to use the local operating system or an LDAP server to authenticate user IDs and passwords of clients or applications that are requesting access to IBM MQ resources. This unit also describes channel exit programs and administration. |
| Learning objectives | After completing this unit, you should be able to:   * Determine the current level of authentication that is enabled on a queue manager and a connection * Add authentication to a channel * Add authentication to a connection * Identify and fix channel authentication and connection authentication problems * Implement a channel exit program for securing messaging channels |

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| Exercise 9. Implementing connection authentication  Duration: 1 hour and 30 minutes | |
| Overview | In this exercise, you modify an IBM MQ network to add connection authentication security. |
| Learning objectives | After completing this exercise, you should be able to:   * Check locally bound connections * Check client connections * Configure the authentication failure delay |

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| Unit 11. Supporting JMS with IBM MQ  Duration: 30 minutes | |
| Overview | In this unit, you learn about IBM MQ support for Java Message Service (JMS). |
| Learning objectives | After completing this unit, you should be able to:   * Describe IBM MQ as a JMS provider * Manage JMS resources in IBM MQ Explorer |

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| Unit 12. 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 10. 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 and examine the trace output. You also configure IBM MQ to automatically handle messages that arrive on the dead-letter queue by using the dead-letter queue handler. |
| 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 * Handle dead-letter messages |

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| Unit 13. 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 12. 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 * Recreate an IBM MQ object from an object media image |

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| Exercise 11. 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:   * Back up object definitions of a queue manager * Upload object definitions to another queue manager |

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| Unit 14. High availability  Duration: 1 hour | |
| Overview | In this unit, you learn about the IBM MQ high availability solutions. |
| Learning objectives | After completing this unit, you should be able to:   * Plan for using high availability systems with IBM MQ * Configure and manage a multi-instance queue manager |

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| Unit 15. 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. You also learn how to monitor performance with IBM MQ Console. |
| 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 * Monitor resources in the IBM MQ Console |

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| Exercise 13. 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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| Exercise 14. Monitoring resources with the IBM MQ Console  Duration: 1 hour | |
| Overview | In this exercise, you use the IBM MQ Console to monitor system resources. You also learn how to configure and share dashboard layouts. |
| Learning objectives | After completing this exercise, you should be able to:   * Monitor system resources * Configure dashboard layouts * Share an IBM MQ Console dashboard between user roles |

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| Unit 16. 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