Administering a Microsoft SQL Server 2000 Database

Syllabus and sample modules: Course 2072.

Introduction

This course provides students with the knowledge and skills required to install, configure, administer, and troubleshoot the client-server database management system of Microsoft SQL Server™ 2000. Course 2072 is a revision of Course 832, *System Administration for Microsoft SQL Server 7.0*. The course content is being revised to reflect changes in the product.

At Course Completion

At the end of the course, students will be able to:

- Describe SQL Server architecture.
- Plan for a SQL Server installation, and then install an instance of SQL Server.
- Manage files and databases, including determining resource requirements.
- Choose a login security method, configure login security, plan and implement database permissions, and describe how to help protect SQL Server in an enterprise network.
- Perform and automate administrative tasks and create custom administrative tools.
- Back up databases and implement a backup strategy.
- Restore databases.
- Monitor and optimize SQL Server performance.
- Transfer and migrate data into databases.
- Maintain the high availability of SQL Server.
- Describe how to replicate data from one SQL Server to another.

Microsoft Certified Professional Exams

This course will help the student prepare for the following Microsoft Certified Professional exam:

- Exam 70-228, *System Administration for Microsoft SQL Server 2000*

Prerequisites

Before attending this course, students must have:

- Experience using the Microsoft Windows® 2000 operating system to:
  - Connect clients running Windows 2000 to networks and the Internet.
  - Configure the Windows 2000 environment.
  - Create and manage user accounts.
  - Manage access to resources by using groups.
  - Configure and manage disks and partitions, including disk striping and mirroring.
  - Manage data by using NTFS.
  - Implement Windows 2000 security.
  - Optimize performance in Windows 2000.

For students who do not meet these prerequisites, the following courses provide students with the necessary

knowledge and skills:

- Course 2151, *Microsoft Windows 2000 Network and Operating System Essentials*
- Course 2152, *Implementing Microsoft Windows 2000 Professional and Server*

- An understanding of basic relational database concepts, including:
  - Logical and physical database design.
  - Data integrity concepts.
  - Relationships between tables and columns (primary key and foreign key, one-to-one, one-to-many, and many-to-many).
  - How data is stored in tables (rows and columns).

  For students who do not meet these prerequisites, the following course provides students with the necessary knowledge and skills:

  - Course 1609, *Designing Data Services and Data Models*
- Knowledge of basic Transact-SQL syntax (SELECT, INSERT, UPDATE, and DELETE statements).

  For students who do not meet these prerequisites, the following course provides students with the necessary knowledge and skills:

  - Course 2071, *Querying Microsoft SQL Server 2000*
- Familiarity with the role of the database administrator.

The course materials, lectures, and lab exercises are in English. To benefit fully from the instruction, students need an understanding of the English language and completion of the prerequisites.

Course Materials

The course materials are yours to keep. The student kit includes a comprehensive workbook and other necessary materials for this class.

The following software is provided for use in the classroom:

- Microsoft SQL Server 2000, Enterprise Edition Evaluation Copy

Course Outline

Module 1: SQL Server Overview

Take a closer look: **Download Sample Module 1** (Portable Document Format, 990 KB).

The following topics are covered in this module:

- What Is SQL Server
- SQL Server Integration
- SQL Server Databases
- SQL Server Security

- Working with SQL Server

The following lab is covered in this module:

- SQL Server Overview

At the end of this module, you will be able to:

- Describe SQL Server 2000 and its supported operating system platforms.
- Describe SQL Server architecture.
- Describe SQL Server databases.
- Describe SQL Server security.
- Describe SQL Server querying, implementation, administration, and data warehousing activities, as well as client application design options.

Module 2: Planning to Install SQL Server

The following topics are covered in this module:

- Hardware Installation Considerations
- SQL Server 2000 Editions
- Software Installation Considerations
- Methods of Installing SQL Server
- Verifying the Installation
- Configuring SQL Server Enterprise Manager
- Troubleshooting

The following lab is covered in this module:

- Installing SQL Server

At the end of this module, you will be able to:

- Determine hardware requirements for SQL Server 2000 and the SQL Server management tools.
- Describe the various SQL Server Editions.
- Describe the different types of licensing.
- Determine software installation options that are appropriate for your environment.
- Describe various methods of installing an instance SQL Server and install it by using SQL Server Setup.
- Verify the installation of SQL Server.
- Configure SQL Server Enterprise Manager.
- Troubleshoot the installation.

Module 3: Managing Database Files

The following topics are covered in this module:

- Introduction to Data Structures
- Creating Databases
- Managing Databases

- Placing Database Files and Logs
- Optimizing the Database Using Hardware-based RAID
- Optimizing the Database Using Filegroups
- Optimizing the Database Using Filegroups with Hardware-based RAID
- Capacity Planning
- Performance Considerations

The following lab is covered in this module:

- Managing Database Files

At the end of this module, you will be able to:

- Describe how SQL Server stores data and handles transactions.
- Create a database, including specifying options during and after database creation.
- Grow, shrink, or delete a database.
- Determine the placement of database files and transaction logs for performance and fault tolerance.
- Optimize a database by using hardware-based RAID.
- Determine when and how to use filegroups to optimize a database.
- Optimize a database by using filegroups with hardware-based RAID.
- Estimate the amount of space that a database requires.

Module 4: Managing Security

Take a closer look: **Download Sample Module 4** (Portable Document Format, 1.08 MB).

The following topics are covered in this module:

- Implementing an Authentication Mode
- Assigning Logins to Users and Roles
- Assigning Permissions to Users and Roles
- Managing Security Within SQL Server
- Managing Application Security
- Managing SQL Server Security in the Enterprise

The following labs are covered in this module:

- Managing Security
- Managing Permissions
- Managing Application Security

At the end of this module, you will be able to:

- Implement Windows Authentication Mode and Mixed Authentication Mode.
- Assign login accounts to database user accounts and roles.
- Assign permissions to user accounts and roles.
- Manage security within SQL Server.
- Manage security with views and stored procedures.
- Create and use application roles to manage application security.

- Manage SQL Server security in the enterprise environment.

Module 5: Performing Administrative Tasks

The following topics are covered in this module:

- Configuration TasksRoutine SQL Server Administrative TasksAutomating Routine Maintenance TasksCreating AlertsTroubleshooting SQL Server AutomationAutomating Multiserver Jobs

The following labs are covered in this module:

- Configuring SQL Server
- Creating Jobs and Operators
- Creating Alerts

At the end of this module, you will be able to:

- Perform common SQL Server configuration tasks.
- Describe how to upgrade SQL Server version 6.5 and SQL Server 7.0 to SQL Server 2000.
- Describe routine database administration tasks.
- Automate routine maintenance tasks by creating and scheduling jobs.
- Create alerts and operators.
- Troubleshoot automated jobs, alerts, or notifications.
- Automate administrative jobs in a multiserver environment.

Module 6: Backing Up Databases

The following topics are covered in this module:

- Preventing Data Loss
- Setting and Changing a Database Recovery Model
- SQL Server Backup
- When to Back Up Databases
- Performing Backups
- Types of Backup Methods
- Planning a Backup Strategy
- Performance Considerations

The following lab is covered in this module:

- Backing Up Databases

At the end of this module, you will be able to:

- Create backup files and backup sets.
- Back up user and system databases by using Transact-SQL and SQL Server Enterprise Manager.
- Back up databases that are created on multiple files and filegroups.
- Apply the appropriate backup options to each of the different SQL Server 2000 backup methods.
- Use the BACKUP LOG statement to back up and clear transaction logs.

- Design an appropriate backup strategy.

Module 7: Restoring Databases

The following topics are covered in this module:

- SQL Server Recovery Process
- Preparing to Restore a Database
- Restoring Backups
- Restoring Databases from Different Backup Types
- Restoring Damaged System Databases

The following lab is covered in this module:

- Restoring Databases

At the end of this module, you will be able to:

- Describe the SQL Server recovery process.
- Verify backups and perform specific tasks that enable the restore process.
- Use the RESTORE statement to get information about a backup file before you restore a database, file, or transaction log.
- Restore backups from different backup types and use the appropriate options.
- Restore damaged system databases.

Module 8: Monitoring SQL Server for Performance

The following topics are covered in this module:

- Why to Monitor SQL Server
- Performance Monitoring and Tuning
- Tools for Monitoring SQL Server
- Common Monitoring and Tuning Tasks

The following lab is covered in this module:

- Monitoring SQL Server

At the end of this module, you will be able to:

- Describe the reasons why monitoring SQL Server 2000 is important.
- Develop a performance monitoring and tuning methodology.
- Describe the tools available for monitoring SQL Server.
- Perform common monitoring and tuning tasks by using counters and appropriate tools.

Module 9: Transferring Data

The following topics are covered in this module:

- Introduction to Transferring Data
- Tools for Importing and Exporting Data in SQL Server
- Introduction to DTS
- Transforming Data with DTS

The following lab is covered in this module:

- Transferring Data

At the end of this module, you will be able to:

- Describe the rationale for, and the process of, importing, exporting, and transforming data.
- Describe the tools for importing and exporting data in SQL Server 2000.
- Transform data by using Data Transformation Services (DTS).
- Create and edit a DTS package by using the DTS Import and DTS Export Wizards.

Module 10: Maintaining High Availability

The following topics are covered in this module:

- Introduction to Availability
- Increasing Availability Using Failover Clustering
- Standby Servers and Log Shipping

The following lab is covered in this module:

- Automating the Maintenance of a Standby Server

At the end of this module, you will be able to:

- Determine availability requirements and strategies for a Microsoft Windows Server System™ environment.
- Use SQL Server failover clustering.
- Configure a standby server and use log shipping to maintain its integrity.

Module 11: Introducing Replication

The following topics are covered in this module:

- Introduction to Distributed Data
- Introduction to SQL Server Replication
- SQL Server Replication Agents
- SQL Server Replication Types
- Physical Replication Models

The following lab is covered in this module:

- Implementing Replication

At the end of this module, you will be able to:

- Describe the various methods to distribute data in SQL Server 2000.
- Explain the publisher-subscriber metaphor, including articles, publications, and subscriptions.
- Describe SQL Server replication agents.
- Explain the SQL Server replication types.
- Describe the physical replication models.