

MICROSOFT  
TRAINING  
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# Module 2: Planning to Install SQL Server

## Contents

Overview	1
Hardware Installation Considerations	2
SQL Server 2000 Editions	6
Software Installation Considerations	8
Methods of Installing SQL Server	18
Upgrading SQL Server	24
Verifying the Installation	26
Configuring SQL Server Enterprise Manager	31
Troubleshooting	33
Recommended Practices	36
Lab A: Installing SQL Server	37
Review	47

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## Instructor Notes

**Presentation:**  
**60 Minutes**

**Lab:**  
**45 Minutes**

This module provides students with information on hardware installation considerations for Microsoft® SQL Server™ 2000; the different editions, licensing options, and software installation considerations; the different methods in which to install SQL Server; and upgrading to SQL Server 2000. The module also discusses how to verify the installation, configure SQL Server, and how to troubleshoot and resolve common installation and configuration problems.

In the lab, students will install SQL Server and all SQL Server management tools by using SQL Server Setup. Students also will verify the installation, configure SQL Server Agent and SQL Server Enterprise Manager, create shared registration information, troubleshoot installation problems, and then create a database diagram.

After completing this module, students will be able to:

- Determine hardware requirements for SQL Server 2000 and the SQL Server management tools.
- Describe the various SQL Server editions.
- Determine software license and installation options that are appropriate for their environments.
- Describe various methods of installing a default instance of SQL Server and a named instance of SQL Server and install them by using SQL Server Setup.
- Describe how to upgrade SQL Server version 6.5 and SQL Server version 7.0 to SQL Server 2000.
- Verify the installation of SQL Server.
- Configure SQL Server Enterprise Manager.
- Troubleshoot the installation.

## Materials and Preparation

This section provides the materials and preparation tasks that you need to teach this module.

### Required Material

To teach this module, you need the Microsoft PowerPoint® file 2072A\_02.ppt.

### Preparation Tasks

To prepare for this module, you should:

- Read all of the materials for this module.
- Complete the lab.
- Practice the presentation.
- Review any relevant white papers located on the Trainer Materials compact disc.

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## Module Strategy

Use the following strategy to present this module:

- Hardware Installation Considerations

Present the minimum hardware requirements for SQL Server and then present some of the typical hardware issues that can affect SQL Server performance, such as processor, disk subsystem, memory, and network.

- SQL Server 2000 Editions

Describe the different editions of SQL Server 2000, and be sure to highlight which editions can be installed on specific operating systems.

- Software Installation Considerations

Present the two licensing modes available for SQL Server 2000: per processor licensing and per seat licensing.

Emphasize that SQL Server Setup presents several installation options and that identifying the appropriate settings for these options *before* running SQL Server Setup ensures that SQL Server is configured to meet users' needs.

Discuss the guidelines for selecting SQL Server services logon accounts, using named and multiple-instances of SQL Server, selecting an authentication mode, specifying SQL Server collations and sort rules, and selecting network libraries.

- Methods of Installing SQL Server

Compare the types of installation. Point out that students should choose a custom installation if they want to change any installation defaults or to add or delete components. Briefly describe how to configure and perform an unattended and a remote installation.

- Upgrading SQL Server

Describe how to upgrade SQL Server version 6.5 and SQL Server version 7.0 to SQL Server 2000.

- Verifying the Installation

Emphasize the importance of verifying that the installation was complete and understanding what happened as a result of the installation. Discuss reviewing the installation results, starting the SQL Server service, and connecting to it.

Demonstrate how to start, pause, and stop SQL Server service by using SQL Server Service Manager and **Services** in Control Panel in Microsoft Windows®2000. Demonstrate how to connect to a default instance of SQL Server and a named instance of SQL Server by using SQL Query Analyzer.

- **Configuring SQL Server Enterprise Manager**

Describe how to configure SQL Server Enterprise Manager. Demonstrate how to register additional instances or servers by using the Register SQL Server Wizard.

Demonstrate how to change the default client network library or create an alias by using the Client Network utility. Be sure to show how to share registration information and how to access shared information.

- **Troubleshooting**

Review the troubleshooting process—first, identify the problem; second, apply a solution. Briefly demonstrate how to view each log file. Discuss common installation and configuration problems and possible solutions for them—for example, what to do if the SQL Server service does not start or if a SQL Server management tool cannot connect to SQL Server.

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## Customization Information

This section identifies the lab setup configuration changes that occur on student computers during the lab. This information is provided to assist you in replicating or customizing Microsoft Official Curriculum (MOC) courseware.

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**Important** The lab in this module is dependent on the classroom configuration that is specified in the Customization Information section at the end of the *Classroom Setup Guide* for course 2072A, *Administering a Microsoft SQL Server 2000 Database*.

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### Lab Setup

There are no lab setup requirements that affect replication or customization.

### Lab Results

Performing the lab in this module introduces the following configuration changes:

- SQL Server 2000 is installed by using the SQLService domain user account as the service account.
- The SQLService domain user account is made a member of the local group, **Administrators**.

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# Overview

**Topic Objective**

To provide an overview of the module topics and objectives.

**Lead-in**

In this module, you will learn about SQL Server installation requirements and install SQL Server by using SQL Server Setup.

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

This module provides you with information on hardware installation considerations for Microsoft® SQL Server™ 2000; the different editions, licensing options, and software installation considerations; the different methods in which to install SQL Server; and upgrading to SQL Server 2000. The module also discusses how to verify the installation, configure SQL Server, and troubleshoot and resolve common installation and configuration problems.

After completing 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.
- Determine software license and installation options that are appropriate for your environment.
- Describe various methods of installing a default instance of SQL Server and a named instance of SQL Server and install them by using SQL Server Setup.
- Describe how to upgrade SQL Server version 6.5 and SQL Server version 7.0 to SQL Server 2000.
- Verify the installation of SQL Server.
- Configure SQL Server Enterprise Manager.
- Troubleshoot the installation.

## ◆ Hardware Installation Considerations

**Topic Objective**

To discuss hardware installation considerations.

**Lead-in**

You should consider the demands on SQL Server when choosing hardware.

- **Minimum Hardware Requirements**
- **Optimize Hardware for SQL Server**

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You should consider the anticipated demands on SQL Server when choosing hardware. Inadequate system resources are common sources of bottlenecks in SQL Server performance. The anticipated demands involve the size of the database, the number of concurrent users, the desired transaction throughput, and the type of operations being performed on the database.

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## Minimum Hardware Requirements

### Topic Objective

To describe the minimum hardware requirements for SQL Server.

### Lead-in

This table describes the SQL Server minimum hardware requirements.

Component	Minimum requirements
<b>Processor</b> 	Intel and compatible systems (166-MHz Pentium or higher)
<b>Memory</b> 	Minimum 256 MB (All server versions of Windows 2000) Minimum 64 MB (All server versions of Windows NT 4.0)
<b>Hard disk space</b> 	250 MB (typical installation) 100 MB (client tools) 270 MB (full installation) 50 -130 MB (Analysis Services) 80 MB (English Query)

Knowing the minimum hardware installation requirements before you install SQL Server assists you in selecting the appropriate hardware platform. The following table describes the minimum hardware requirements for a SQL Server installation. For more information about supported hardware, see the Microsoft Windows®2000 Hardware Compatibility List (HCL) at <http://www.microsoft.com/hcl>.

Component	Minimum requirements
Processor	The minimum processor required for your operating system varies according to the SQL Server edition that you select. A 166-MHz Pentium or higher processor is required for all versions of Windows 2000 and Microsoft Windows NT®.
Memory	A minimum of 256 megabytes (MB) is the recommended minimum for all server versions of Windows 2000. A minimum of 64 MB is the recommended minimum for all server versions of Windows NT version 4.0. Additional memory is required for large databases and for replication.
Hard disk space	A typical installation requires 250 MB, and a full installation requires 270 MB. Installation of client tools requires only 100 MB. SQL Server 2000 Analysis Services requires 50-130 MB, and Microsoft English Query requires 80 MB. These hard disk space requirements do not include upgrading user databases or installing custom installation options.

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**Caution** Only use a write-caching disk controller that is designed specifically for a database. Other write-caching disk controllers can seriously jeopardize SQL Server data integrity.

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## Optimize Hardware for SQL Server

### Topic Objective

To discuss some of the typical hardware issues that can affect SQL Server performance.

### Lead-in

In most production databases, you typically upgrade system resources beyond the minimum hardware requirements to avoid performance bottlenecks.

- **Processor**
  - Scale up
  - Scale out
- **Disk Subsystem**
  - RAID levels
- **Memory**
  - Read from disk or memory cache
- **Network**
  - Impact throughput and performance of SQL Server

In most production databases, you typically upgrade system resources beyond the minimum hardware requirements to avoid performance bottlenecks.

### Processor

Scaling up to more or faster processors allows SQL Server to process queries more quickly. SQL Server can use up to 32 processors on symmetrical multiprocessing (SMP) computers running Windows 2000 Datacenter Server. Scaling out to multiple servers is generally required for very large databases.

### Disk Subsystem

Typically, large databases require faster disk subsystems. If a production environment requires redundancy, then you should consider implementing RAID through hardware or through the operating system. You can use RAID to increase performance, reliability, storage, and capacity.

The different levels of RAID provide varying levels of performance and fault tolerance. Hardware-based RAID provides more performance than operating system-based RAID.

### Delivery Tip

Recommendations on when to use specific RAID levels are discussed in module 3, "Managing Database Files," of course 2072A, *Administering a Microsoft SQL Server 2000 Database*.

RAID level	Description	Advantages/disadvantages
RAID 1	Disk mirroring and disk duplexing	Provides excellent redundancy and good read and write performance.
RAID 5	Disk striping with parity	Provides excellent redundancy and read performance, but only moderate write performance.
RAID 10	Disk mirroring with disk striping	Provides the highest level of performance and redundancy, but at the cost of using more disks.

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## Memory

If your computer has insufficient physical memory, SQL Server reads data from disk continually rather than from the memory cache. Reading from disk can impact query performance. When your computer has sufficient physical memory, SQL Server can store more data in the memory cache. Having more data in the memory cache allows SQL Server to process queries against databases with large amounts of data more efficiently.

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**Note** SQL Server can use the Windows 2000 Address Windowing Extensions (AWE) application programming interface (API) to support up to a maximum of 64 GB of physical memory. The specific amount of memory that you can use depends on hardware and operating system support.

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## Network

Although you can install and use SQL Server only on a local computer, SQL Server clients generally access SQL Server across the network. The transfer of requests and results across the network can impact the throughput and perceived performance of SQL Server. These network factors can affect the performance of SQL Server:

- Network cards.
- Bandwidth.
- Concurrent activity on the underlying network.

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## SQL Server 2000 Editions

### Topic Objective

To describe the editions of SQL Server and the operating systems on which they run.

### Lead-in

SQL Server 2000 comes in six editions. If you are installing SQL Server 2000 in a production environment, you can either install the Standard or Enterprise Edition.

- **Comparing Standard and Enterprise Editions**
  - Standard Edition supports many SQL Server 2000 features
  - Enterprise Edition contains all features required to support an enterprise-wide environment
- **Installing Other SQL Server 2000 Editions**
- **Selecting the Appropriate Operating System**

SQL Server 2000 comes in six editions: Enterprise, Enterprise Evaluation, Standard, Developer, Personal, and Windows CE.

### Comparing Standard and Enterprise Editions

If you are installing SQL Server 2000 in a client/server production environment you can either install the Standard or Enterprise Edition.

- **Standard Edition**

The Standard Edition supports many SQL Server 2000 features but lacks the features required to scale up and out to support very large databases, data warehouses, and Web sites. This edition is for a small workgroups or departments.
- **Enterprise Edition**

The Enterprise Edition contains all of the features required to scale to the performance levels required to support Web sites, enterprise online transaction processing (OLTP), and data warehousing systems. This edition includes the following features.

#### Relational database engine

Failover clustering support  
 Log shipping  
 Parallel DBCC statement  
 Parallel CREATE INDEX statement  
 Enhanced read-ahead and scan  
 Indexed views

#### Analysis Services

User-defined OLAP partitions  
 Partition Wizard  
 Linked OLAP cubes  
 ROLAP dimension support  
 HTTP internet support  
 Custom rollups

(continued)

Relational database engine	Analysis Services
Federated database server	Writeback to dimensions
System Area Network (SAN) support. SAN supports a cluster of servers.	Very large dimension support
Graphical utilities support for language settings	

**Note** SQL Server 2000 Enterprise Edition is installed during class.

## Installing Other SQL Server 2000 Editions

If SQL Server is not required to support a client/server production environment, you can install the following SQL Server 2000 editions to meet specific needs.

Edition	Description
Enterprise Evaluation	Contains all of the features of the Enterprise Edition, which is freely available from the Web. The Enterprise Evaluation Edition stops running 120 days after you download it.
Developer	Contains all of the features of the Enterprise Edition but is licensed for development and test system use only. It is intended for programmers who develop applications that use SQL Server as their data store.
Personal	Is intended for users that operate in mobile environments and run applications that require local data storage.
Windows CE	Is used as the data store on Microsoft Windows CE devices. The Windows CE Edition can replicate data with SQL Server Enterprise and Standard Editions to keep the Windows CE data synchronized with the primary database.

## Selecting the Appropriate Operating System

After you determine which edition of SQL Server 2000 to install, you must select the appropriate operating system for that edition of SQL Server.

Editions	Windows 2000 and Windows NT Server	Windows 2000 Professional and Windows NT Workstation	Windows 98 and Windows Millennium Edition (Me)	Windows CE
Enterprise	Yes	No	No	No
Enterprise Evaluation	Yes	No	No	No
Standard	Yes	No	No	No
Developer	Yes	Yes	No	No
Personal	Yes	Yes	Yes	No
Windows CE	No	No	No	Yes

**Note** SQL Server client software runs on Windows 95, Windows 98, Windows Me, and all versions of Microsoft Windows NT® and Windows 2000.

## ◆ Software Installation Considerations

**Topic Objective**

To discuss software installation considerations.

**Lead-in**

You are required to select a number of installation options during the installation of SQL Server. These options include...

- **Licensing**
- **Determining the Security Context of the Services Accounts**
- **Using Named and Multiple-Instances of SQL Server**
- **Selecting a Security Mechanism**
- **Selecting SQL Server Collations and Sort Rules**
- **Selecting Network Libraries**

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You are able to select a licensing mode and a number of installation options during the installation of SQL Server. These options include selecting the appropriate service account and authentication mode, specifying named and multiple-instances of SQL Server, selecting collations and sort rules for international support, and whether to modify default network libraries.

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## Licensing

**Topic Objective**

To describe the licensing options.

**Lead-in**

During installation, you must select the licensing mode—per processor or per seat.

**■ Per Processor Licensing**

- Acquire a license for each processor running SQL Server 2000
- Allows an unlimited number of users to connect from a LAN or WAN

**■ Per Seat Licensing**

- Acquire a server license for each SQL Server and a CAL for each workstation that connects to any instance of SQL Server

During installation, SQL Server Setup requires you to select a licensing mode and then to accept the terms of the license agreement. You have a choice of two licensing modes—per processor or per seat.

### Per Processor Licensing

With per processor licensing, you acquire a processor license for each processor running SQL Server 2000. This type of licensing agreement allows an unlimited number of users to connect from either a local area network (LAN) or wide area network (WAN). Additional server or client licenses are not required.

In general, a per processor licensing agreement is more cost effective for organizations with a large number of users, such as enterprise-level, or organizations that offer Web-based solutions.

### Per Seat Licensing

With per seat licensing, you acquire a seat license for each SQL Server and a client access license (CAL) for each workstation that connects to any instance of SQL Server. Each workstation that connects to an instance of SQL Server with either Microsoft-provided client software or third-party software requires a CAL.

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**Note** Workstation connections and user connections are not the same. A workstation can run several different clients, each using multiple user connections, with one CAL.

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Per seat licensing agreements may be more appropriate for smaller organizations or organizations that experience high usage among a smaller, known set of users.

## Determining the Security Context of the Services Accounts

### Topic Objective

To provide guidelines for selecting SQL Server services logon accounts.

### Lead-in

Each SQL Server service runs in the security context of an assigned logon account.

- **Default SQL Server Services Logon Account**
  - An instance of SQL Server service
  - An instance of SQL Server Agent service
- **Using a Domain User Logon Account**
  - Uses Windows 2000 trusted connections
- **Using the Local System Logon Account**
  - Cannot communicate with remote servers that use Windows 2000 trusted connections
- **Autostart Services**
  - Run automatically when Windows 2000 services are started

The SQL Server service runs in the security context of an assigned logon account. The assigned logon account that you specify for the SQL Server and SQL Server Agent services can be a domain user account or the local system account.

Microsoft Distributed Transaction Coordinator (MS DTC) and Microsoft Search service are assigned the security context of the local system account by SQL Server Setup.

### Default SQL Server Services Logon Account

SQL Server Setup selects the domain user account of the logged on user as the default logon account for the SQL Server and SQL Server Agent services. In general, create and use a dedicated logon account, and use the same logon account for instances of both services for administrative convenience.

### Using a Domain User Logon Account

If you use a domain user logon account, the SQL Server and SQL Server Agent services can communicate with remote servers by using Windows 2000 trusted connections. When you select a domain user logon account, SQL Server Setup grants the right to the domain user account to log on as a service on the computer running SQL Server.

You must use a domain user logon account:

- If SQL Server must access files on another computer in the domain.
- If you plan to set up multiserver jobs.
- If you plan to use SQL Server to send notifications through e-mail.
- If multiple server products, such as Microsoft Exchange Server and SQL Server, are installed on a single computer, and the server products must communicate with one another.

### Delivery Tip

Determine whether students understand the concept of a Windows 2000 trusted connection. Briefly review the concept if necessary.

When you use a domain user logon account, consider the following facts and guidelines:

- If you use a domain user logon account that is not a member of the **Administrators** local group, the logon account must have file system permissions and must have read-write permissions on the following registry keys:
  - HKEY\_LOCAL\_MACHINE\Software\Microsoft\MSSQLServer (default instance)
  - HKEY\_LOCAL\_MACHINE\Software\Microsoft\Microsoft SQL Server\NAMEDINSTANCE
  - HKEY\_LOCAL\_MACHINE\System\CurrentControlSet\Services\MSSQLServer (default instance)
  - HKEY\_LOCAL\_MACHINE\System\CurrentControlSet\Services\MSSQL\$NAMEDINSTANCE
  - HKEY\_LOCAL\_MACHINE\Software\Microsoft\Windows NT\Current Version\Perflib
  - HKEY\_LOCAL\_MACHINE\Software\Clients\Mail
- Use a dedicated domain user logon account, select the Password Never Expires attribute, and allow all logon hours.
- SQL Server often is installed in environments that are composed of one or more Windows domains. In these environments, install SQL Server in a domain that has access to all user accounts for all domains.
- Installing SQL Server on domain controllers is generally not recommended because these computers perform the resource-intensive tasks of maintaining and replicating the network accounts database and performing network logon authentication.

## Using the Local System Logon Account

If you choose the local system logon account, the SQL Server services cannot communicate with remote servers that use Windows trusted connections.

## Autostart Services

By default, SQL Server Setup installs the SQL Server and Microsoft Search services to run automatically when Windows 2000 or Windows NT is started. During installation, you can choose to start SQL Server service manually rather than automatically. After installation, you can configure all services to start automatically or manually.

The benefit of starting services automatically is that a system administrator does not have to log in to start them each time that Windows 2000 or Windows NT starts.

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**Note** The SQL Server database engine and SQL Server Agent run as executable applications on Windows 98 and Windows Me, rather than as services that can be started automatically.

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## Using Named and Multiple Instances of SQL Server

**Topic Objective**

To discuss named and multiple instances of SQL Server.

**Lead-in**

SQL Server provides the option of installing named and multiple instances of SQL Server on one computer.

- **Default Instance**
  - Is identified by the network name on which it is running
  - Only one default instance is permitted
- **Named Instance**
  - Is identified by the network name plus an instance name
  - Applications must use SQL Server 2000 client components to connect to a named instance
- **Multiple Instances**
  - Default instance and one or more named instances
  - Each instance operates independently on the same computer

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SQL Server provides the option of installing named and multiple instances of SQL Server on one computer. When installing SQL Server, you can specify the installation as either a default or a named instance.

### Default Instance

When you specify a default instance, it is identified by the network name of the computer on which it is running. Only one default instance is permitted. Existing SQL Server 6.5 and SQL Server 7.0 servers operate as default instances. Applications using client software from earlier versions of SQL Server can connect to a default instance.

### Named Instance

When you specify a named instance, it is identified by the network name of the computer on which it is running, plus an instance name, in the format of <computername>\<instancename>. Applications must use SQL Server 2000 client components to connect to a named instance. A computer can run up to 16 named instances concurrently. A named instance can run at the same time as an existing installation of SQL Server 6.5 or SQL Server 7.0.

### Multiple Instances

Multiple instances occur when you have both a default instance and one or more named instances installed concurrently. Each instance operates independently on the same computer. Each named instance has a distinct set of services and can have different settings for collations and other options. The directory structure, registry structure, and service names reflect the specific instance name specified.

## Selecting a Security Mechanism

**Topic Objective**

To provide guidelines for selecting an authentication mode.

**Lead-in**

You must select a security mechanism for SQL Server when you install SQL Server.

**■ Selecting Windows Authentication Mode**

- User must have valid Windows 2000 or Windows NT user account
- User must receive validation by the operating system

**■ Selecting Mixed Mode**

- User can use Windows Authentication
- User can use SQL Server Authentication

You must select a security mechanism for SQL Server when you install SQL Server. SQL Server can use the security mechanism of the Windows 2000 or Windows NT operating system, or its own security database.

### Selecting Windows Authentication Mode

When you select Windows Authentication Mode, SQL Server uses the security mechanism of the Windows 2000 or Windows NT operating system. To connect to SQL Server, a user must have:

- A valid Windows 2000 or Windows NT user account.
- Received validation by the operating system.

### Selecting Mixed Mode

When you select Mixed Mode, a user can connect to SQL Server by using either a valid:

- Windows 2000 or Windows NT user account (Windows Authentication), or
- SQL Server login account (SQL Server Authentication).

If you select Mixed Mode, you must type and confirm a password for the SQL Server system administrator (sa) account, or select a blank password. A blank password is never recommended for any security account.

## Selecting SQL Server Collations and Sort Rules

**Topic Objective**

To provide guidelines for selecting SQL Server services collations and sort rules.

**Lead-in**

When you install SQL Server, you designate a collation and select sort order rules.

**■ Groups of Collations**

- Windows collation is based on the rules for an associated Windows locale
- SQL collation matches attributes of code page number and sort order specified in earlier versions of SQL Server

**■ Default Collation and Sort Rules**

- SQL Server applies the default if you do not designate a collation and sort rules
- Avoid changing the default collation and sort rules

When you install SQL Server, you designate a *collation* and select sort order rules. The term collation refers to a set of rules that determines how data is compared and collated. Character data is sorted by using rules that define the correct sequence of characters. You can specify the sensitivity to case, accent marks, kana character types, and character width when sorting.

### Groups of Collations

SQL Server has two groups of collations: Windows collations and SQL collations.

#### Windows Collations

When you designate Windows collations, the operating system defines a set of rules for storing and sorting character data that is based on the rules for an associated Windows locale. Windows collation rules specify which alphabet or language is used when dictionary sorting is applied and the code page used to store non-Unicode character data. For example, the French Windows collation for SQL Server matches the collation attributes of the French locale for Windows.

Because several languages share common alphabets and rules for sorting and comparing characters, these languages can use the same Windows collation. The default Windows collation uses the Latin1\_General code page to support the Latin alphabet and dictionary order case-insensitive sorting and comparison rules to support 33 Windows locales.

## SQL Collations

When you designate SQL collations, SQL Server matches the attributes of common combinations of code page number and sort order that may have been specified in earlier versions of SQL Server. SQL collations control the code page used for storing non-Unicode data and sort rules for both Unicode and non-Unicode data.

For example, you may want to match a SQL Server 2000 SQL collation with what is specified in earlier versions of SQL Server. The SQL Server 2000 SQL collation, `SQL_Latin1_General_CP1_CI_AS`, matches the SQL Server 7.0 default specification of ISO code page 1252, dictionary sort order, case-insensitive character sort order, and General Unicode collation.

You must use SQL collations if:

- You use the replication feature with earlier versions of SQL Server.
- Your application code depends on the behaviors of the previous SQL Server collations.

## Default Collation and Sort Rules

If you do not designate a collation and select sort rules, SQL Server applies the default. SQL Server selects both the:

- Windows collation based on the Windows locale of the computer on which SQL Server is installed.
- SQL collation that is compatible with previous versions of SQL Server based on the Windows locale detected.

You should not change the default collation and sort rules. However, you may want change the default collation and sort rules in certain circumstances.

- Change the default Windows locale only if your installation of SQL Server must match the collation settings used by another instance of SQL Server, or you must match the Windows locale of another computer.
- Change the default sort rules if you have no compatibility requirements for synchronizing with any type of existing system.

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**Warning** You cannot change the collation and sort order of a server without completely rebuilding all of the databases. You can select a new collation and sort order for a new database.

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## Selecting Network Libraries

### Topic Objective

To describe network libraries.

### Lead-in

SQL Server uses network libraries to communicate with a specific network protocol and to pass network packets between a client and SQL Server

### ■ Default Network Libraries

- Named Pipes and TCP/IP Sockets are the default for server network libraries for an instance of SQL Server
- TCP/IP sockets client network library for all management tools
- Named Pipes as a second client network library on all versions of Windows NT 4.0 and Windows 2000

### ■ Server Network Libraries That SQL Server Supports

- |                        |                   |
|------------------------|-------------------|
| ● TCP/IP sockets       | ● VIA GigaNet SAN |
| ● Named pipes          | ● Multiprotocol   |
| ● NWLink IPX/SPX       | ● AppleTalk ADSP  |
| ● VIA ServerNet II SAN | ● Banyan VINES    |

### Delivery Tip

Note that selecting the appropriate network support for SQL Server requires a thorough understanding of your Windows 2000 network topography.

Point out that the client network library must match one of the server network libraries.

SQL Server uses network libraries to communicate with a specific network protocol and to pass network packets between a client and the SQL Server database engine. SQL Server simultaneously listens on multiple network libraries; a client communicates with SQL Server by using a specific network library.

### Default Network Libraries

SQL Server Setup selects the following default network libraries:

- Named Pipes and TCP/IP Sockets network libraries as the default server network libraries for SQL Server.
- TCP/IP sockets client network library for all management tools.
- Named Pipes as a second client network library on all versions of Windows NT 4.0 and Windows 2000. The client network library must match one of the server network libraries.

### Selecting a Server Network Library

When you select a server network library, consider the following facts:

- Your choice of server network libraries depends on the network protocols that an operating system uses.
- Using Windows Authentication requires one of the default server network libraries.
- Using Windows 2000 secure sockets layer (SSL) encryption requires the TCP/IP Sockets server network library. Use Multiprotocol encryption only for compatibility for existing systems.
- The Multiprotocol network library server is not supported on named instances.
- Windows 98 does not support server-side Named Pipes.



**Delivery Tip**

Discuss the difference among SAN, WAN, and LAN connections.

The following table describes the SQL Server network libraries that SQL Server supports.

Server network library	Description
TCP/IP Sockets	Allows clients to communicate by using standard Windows Sockets across TCP/IP.
Named Pipes	Allows clients to connect with named pipes over any Microsoft-supplied transport protocol.
NWLink IPX/SPX	Allows Novell SPX clients to connect.
VIA ServerNet II SAN	Allows clients to use virtual interface architecture on a ServerNet II System Area Network (SAN). A SAN is a high-speed, highly reliable network for interconnecting servers or clusters of servers.
VIA GigaNet SAN	Allows clients to use virtual interface architecture on a GigaNet SAN.
Multiprotocol	Allows clients to communicate simultaneously over one or more interprocess communication (IPC) mechanisms that Windows 2000 supports, including Named Pipes, TCP/IP Sockets, and NWLink IPX/SPX.
AppleTalk ADSP	Allows Apple Macintosh-based clients to connect to SQL Server by using native AppleTalk (as opposed to TCP/IP).
Banyan VINES	Supports Banyan VINES Sequenced Packet Protocol (SPP) as the IPC method across the Banyan VINES IP network protocol.

**Note** To change a server network library after installation, use the Server Network utility. To change the default client network library after installation, or to create an alias, use the Client Network utility.

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## ◆ Methods of Installing SQL Server

**Topic Objective**

To present the topics in this section.

**Lead-in**

You can use SQL Server Setup to install SQL Server on a local or a remote computer, or you can perform an unattended installation.

- **Standard Installation**
- **Unattended Installation**
- **Remote Installation**

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You can use SQL Server Setup to install SQL Server on a local or a remote computer, or you can perform an unattended installation.

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## Standard Installation

### Topic Objective

To compare the types of SQL Server installations.

### Lead-in

SQL Server Setup offers these installation types—minimum, typical, and custom.

- **The Default Installation Type Is Typical**
- **Types of SQL Server Installation**
  - Minimum installation—installs a minimum server configuration
  - Typical installation—presents a limited selection of server configuration options
  - Custom installation—presents all components and server configuration options

SQL Server Setup offers these installation types—minimum, typical, and custom. SQL Server Setup runs from the compact disc that is packaged with SQL Server or from a shared network directory. Before you can install SQL Server or any component, you must log in to the computer on which you are installing SQL Server with an account that is a member of the Windows 2000 local group, **Administrators**.

### Default Installation

SQL Server Setup selects a typical installation as the default. If you want to change any installation defaults or add or delete components, perform a custom installation.

### Delivery Tip

Describe and compare the types of installation.

### Types of SQL Server Installation

The following table describes the principal differences between the three installation types.

Installation option	Minimum	Typical	Custom
Database server	Yes	Yes	Optional
Upgrade tools	No	Yes	Optional
Replication support	Yes	Yes	Optional
Full-text search	No	Yes	Optional
Client management tools	None	All	Optional
Client connectivity	Yes	Yes	Not an option
SQL Server Books Online	No	Yes	Optional

*(continued)*

<b>Installation option</b>	<b>Minimum</b>	<b>Typical</b>	<b>Custom</b>
Development tools	None	Debugger only	Choice of tools
Code samples	None	None	Choice of samples
Collation settings	Yes	Yes	Choice of settings

---

**Note** Microsoft English Query and Analysis Services, included on the Microsoft SQL Server 2000 compact disc, install separately from SQL Server 2000.

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## Unattended Installation

### Topic Objective

To describe how to configure and perform an unattended installation.

### Lead-in

You can perform an unattended installation if you want to install several SQL Servers with identical configurations, without using the interactive SQL Server Setup.

- Performing an Unattended Installation
- Command and Setup Initialization Files
- Creating a Custom Setup Initialization File
  - Use a text editor
  - Run SQL Server Setup

An unattended installation installs several SQL Servers with identical configurations, without using the interactive SQL Server Setup.

### Performing an Unattended Installation

An unattended installation executes a command file that calls a setup initialization file. The command file detects the platform of the computer, runs the appropriate version of SQL Server Setup, specifies setup arguments, and calls a setup initialization file. The setup initialization file specifies all of the options that a user might choose during SQL Server Setup.

### Command and Setup Initialization Files

The following table describes the pairs of sample command and setup initialization files that are included with SQL Server 2000.

Command file	Setup initialization file	Installation
Sqlcli.bat	Sqlcli.iss	SQL Server management tools
Sqlins.bat	Sqlins.iss	Typical installation of SQL Server by using the Windows 2000 Local System account
Sql70cst.bat	Sql70cst.iss	Custom installation of SQL Server by using the Local System account and installing all typical SQL Server components
Sqlrem.bat	Sqlrem.iss	Remove SQL Server

## Creating a Custom Setup Initialization File

You can create a custom setup initialization file by:

- Using a text editor to modify one of the sample setup initialization files in order to add or change entries.
- Running SQL Server Setup interactively.
  - When you install SQL Server, SQL Server Setup records your setup options in a file named Setup.iss, which is placed in the C:\Program Files\Microsoft SQL Server\MSSQL\Install folder.
  - You can have a setup initialization file created without installing SQL Server by using the Record Unattended.iss file in SQL Server Setup.

---

**Note** You also can use Microsoft Systems Management Server version 1.2 or later to perform unattended installations on numerous servers running Windows 2000 or Windows NT. Batch files for use with Smssql.pdf are also included on the Microsoft SQL Server 2000 compact disc.

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## Remote Installation

**Topic Objective**

To describe how to configure and install SQL Server on a remote computer.

**Lead-in**

SQL Server Setup allows you to install SQL Server on a remote computer.

**■ How SQL Server Performs a Remote Installation**

- 1 Saves information into a Setup.iss file
- 2 Starts the remote setup process: starts remote service, copies files, and runs an unattended installation

**■ Requirements for Remote Installation**

- User account must be an administrator on the remote computer
- User account must have read access to the Setup source files folder

SQL Server Setup allows you to install SQL Server on a remote computer.

### How SQL Server Performs a Remote Installation

When you perform a remote installation, SQL Server Setup:

1. Saves the information that you specify in the series of SQL Server Setup dialog boxes into a Setup.iss file.
2. Starts the remote setup process. This remote setup process:
  - Starts a remote service.
  - Copies files to the Admin\$ share folder.
  - Runs an unattended installation on the remote computer by using the options specified in the Setup.iss file.

### Requirements for Remote Installation

To install SQL Server on a remote computer, you must specify a user account under which SQL Server Setup starts the remote setup process on the remote computer. This user account must:

- Be an administrator on the remote computer.
- Have read access to the Setup source files folder.

# Upgrading SQL Server

**Topic Objective**

To discuss upgrading earlier versions of SQL Server.

**Lead-in**

You can upgrade from earlier versions to SQL Server 2000, and also perform upgrade operations after SQL Server 2000 is installed.

- **Upgrading from Version 7.0**
  - Install a default instance (upgrades existing installation)
  - Install a new named instance (retains existing installation)
- **Upgrading from Version 6.5**
  - Install a default or named instance (both create new instances)
  - Use version switching to switch between versions
- **Upgrading from Version 6.0**
  - First upgrade to version 6.5 or 7.0

---

You can upgrade from earlier versions to SQL Server 2000, and also perform upgrade operations after SQL Server 2000 is installed.

## Upgrading from SQL Server 7.0

If you have SQL Server version 7.0 installed, you can install an instance of SQL Server 2000 as either a default or a named instance. You can overwrite your existing installation of SQL Server 7.0 by installing a default instance of SQL Server 2000. You can also keep your installation of SQL Server 7.0 intact by installing a named instance of SQL Server 2000.

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**Note** If you install SQL Server 2000 on a computer that has SQL Server 7.0 installed, the tools will be upgraded to SQL Server 2000.

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## Upgrading SQL Server 7.0 Databases

If you do not overwrite your existing installation of SQL Server 7.0, you can upgrade SQL Server 7.0 databases and associated metadata from the SQL Server 7.0 default instance to a SQL Server 2000 named instance by using the Copy Database Wizard.



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## Upgrading from SQL Server 6.5

If you have SQL Server 6.5 installed, you can install SQL Server 2000 as either a default or a named instance. In either case, the instance of SQL Server 6.5 remains intact and may be used in a version switch configuration with SQL Server 2000. After installing SQL Server 2000, you can upgrade your SQL Server 6.5 server configuration and databases by using the SQL Server Upgrade Wizard. In this process, SQL Server 6.5 information and data is transferred to a SQL Server 2000 installation.

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**Note** If you plan to keep SQL Server 6.5 installed alongside a named instance of SQL Server 2000 (for version switching purposes), you must apply SQL Server Service Pack (SP5) to SQL Server 6.5 before installing SQL Server 2000.

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**Note** You can have SQL Server 6.5 and SQL Server 7.0 installed on one computer, but they cannot run simultaneously. However, they can run simultaneously with SQL Server 2000.

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## Upgrading from SQL Server 6.0

You cannot directly upgrade from SQL Server 6.0 to SQL Server 2000. To upgrade from SQL Server 6.0 to SQL Server 2000, you can either:

- Use the SQL Server Upgrade Wizard provided with SQL Server 7.0 to upgrade from SQL Server 6.0 to SQL Server 7.0, and then use SQL Server Setup to upgrade from SQL Server 7.0 to SQL Server 2000.
- Convert SQL Server 6.0 data to SQL Server 6.5, and then convert the SQL Server 6.5 data to SQL Server 2000.

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## ◆ Verifying the Installation

**Topic Objective**

To present the topics in this section.

**Lead-in**

After you install SQL Server, you should verify the installation by reviewing the installation results, starting the SQL Server services, and connecting to SQL Server.

- **Reviewing Installation Results**
- **Starting, Stopping, and Pausing SQL Server Services**
- **Connecting to SQL Server**

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After you install SQL Server, you should verify the installation by reviewing the installation results, starting the SQL Server services, and connecting to SQL Server.

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## Reviewing Installation Results

### Topic Objective

To describe the SQL Server environment after installation.

### Lead-in

After you run SQL Server Setup and install SQL Server, it is important to understand what has been installed.

- **SQL Server Services**
- **Management Tools**
- **Databases**
- **Directories and Files**
- **Default Startup Options**
- **Default Security Mode**

After you run SQL Server Setup and install SQL Server, it is important to understand what has been installed.

Installed component	Description
SQL Server services	SQL Server, SQL Server Agent, MS DTC, and Microsoft Search
Management tools	Group of tools that for administering SQL Server
Databases	<b>master</b> , <b>model</b> , <b>msdb</b> , <b>pubs</b> , <b>Northwind</b> , and <b>tempdb</b>
Folders and files	Relational database engine and all tools in C:\Program Files\Microsoft SQL Server
Default startup options	A set of default startup options that are written to the Windows 2000 registry
Default security mode	Windows Authentication—allows users to connect by using Windows Authentication only

## Starting, Stopping, and Pausing the SQL Server Services

### Topic Objective

To explain the different ways to start, stop, and pause the SQL Server services.

### Lead-in

To use SQL Server, you must start the SQL Server service. You can do so automatically or manually, and override the default startup options.

- **Automatically Starting the SQL Server Service**
- **Manually Starting, Pausing, and Stopping a Service**
  - Default instance: **net start mssqlserver**, **net pause mssqlserver**, or **net stop sqlserveragent**
  - Named instance: **net start mssql\$instancename**

### Delivery Tip

Briefly demonstrate starting, pausing, and stopping the SQL Server services by using SQL Server Service Manager and **Services** and **Applications** in the Computer Management console.

To use SQL Server, you must start the SQL Server service. You can do so automatically or manually, and override the default startup options.

### Automatically Starting the SQL Server Service

If you configured an instance of a SQL Server service to start automatically *during* the installation process, that service starts each time that the operating system starts.

If you want the SQL Server service to start automatically *after* you have installed SQL Server, you can configure it by using:

- SQL Server Enterprise Manager.
- SQL Server Service Manager.
- **Services** and **Applications** in the Computer Management console.

### Manually Starting, Pausing, and Stopping a Service

You can start, pause, and stop SQL Server service manually by using:

- SQL Server Enterprise Manager.
- SQL Server Service Manager.
- **Services** in Control Panel.
- A **net** command at the command prompt:
  - For a default instance, the format is **net start mssqlserver**, **net pause mssqlserver**, or **net stop sqlserveragent**.
  - For named instances of a SQL Server service, you must specify it by using the format, **net start mssql\$instancename**.

Starting, pausing, and stopping the SQL Server service has the following effects.

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#### SQL Server service

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- Starting the SQL Server service allows users to establish new connections.
- Pausing the SQL Server service prevents new connections. Users who are already connected are unaffected.  
You may want to pause SQL Server service in preparation for server maintenance. Pausing prevents new users from logging in. It also allows you to send a message that asks current users to log off.
- Stopping the SQL Server service:
  - Disables logins.
  - Performs a CHECKPOINT in each database.
  - Shuts down SQL Server after all currently executing Transact-SQL statements and stored procedures are processed.  
To stop the SQL Server service immediately, use the SHUTDOWN WITH NO WAIT statement by using the **osql** utility.

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#### SQL Server Agent service

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- Starting the SQL Server Agent service allows you to automate activities and activate alerts.
- Pausing the SQL Server Agent service prevents automatic activities and alerts from occurring.
- Stopping the SQL Server Agent service prevents automatic activities and alerts from occurring.

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**Note** You can also start SQL Server in single-user mode or minimal configuration mode. Search on “sqlservr application” in SQL Server Books Online for more information.

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## Connecting to SQL Server

**Topic Objective**

To describe several methods of connecting to SQL Server.

**Lead-in**

Connecting to SQL Server is the final task in verifying the installation.

- **Using a Graphical Tool**
  - SQL Query Analyzer
  - SQL Server Enterprise Manager
- **Using the osql Command Prompt Utility**
  - Communicates by using ODBC

**Delivery Tip**

Briefly demonstrate how to connect to a default instance of SQL Server and a named instance of SQL Server by using SQL Query Analyzer.

Connecting to SQL Server is the final task in verifying the installation. You can connect to SQL Server by using one of the SQL Server graphical administration tools or a command-prompt utility.

You connect to the default instance of SQL Server by specifying the server name. You must connect separately to a named instance by specifying the instance name in the format <server name>\<instance name>.

### Using a Graphical Tool

To connect to SQL Server, you should use one of the following tools:

- SQL Query Analyzer
- SQL Server Enterprise Manager

**Note** Connecting with SQL Query Analyzer is simpler than with SQL Server Enterprise Manager, so you typically should use it to test SQL Server connectivity.

### Using the osql Command-Prompt Utility

**osql** uses Open Database Connectivity (ODBC) to communicate with SQL Server.

# Configuring SQL Server Enterprise Manager

**Topic Objective**

To describe how to configure SQL Server Enterprise Manager.

**Lead-in**

To manage a local or remote server with SQL Server Enterprise Manager, you must register the server with SQL Server Enterprise Manager.

- **Registering Servers**
- **Registration Information**
- **Registering Multiple Named Instances and Servers**
  - Administering SQL Server
  - Creating server groups
- **Accessing Registration Information**
  - Registration information is private by default
  - Sharing registry information

**Delivery Tip**

Demonstrate how to register additional servers by using the Register SQL Server Wizard.

Demonstrate how to change the default client network library or create an alias by using the Client Network utility.

To manage a local or remote server by using SQL Server Enterprise Manager, you must register the server with SQL Server Enterprise Manager.

## Registering Servers

When you register a server, you must be able to connect to that server. The local server is registered automatically when you install SQL Server. To register a server, you must specify:

- The server name.
- The named instance, if applicable.
- Windows 2000 Authentication or SQL Server Authentication.
- A server group, if you plan to manage a remote server or multiple named instances on the local computer with SQL Server Enterprise Manager.

## Registration Information

SQL Server registration information is maintained in the Windows 2000 registry. SQL Server Enterprise Manager uses this information each time that users connect to a registered SQL Server. This functionality is similar to the way that Windows 2000 keeps a separate profile for each user. Windows 2000 profiles track user-specific information, such as user preferences, desktop settings, and messaging profiles.

## Registering Multiple Named Instances and Servers

Registering multiple named instances and servers allows you to administer multiple instances and servers from one instance of SQL Server Enterprise Manager on one computer. You can register multiple named instances and multiple servers with SQL Server Enterprise Manager by using the Register SQL Server Wizard.

## Administering SQL Server

To administer SQL Server, you must be a member of the **sysadmin** role on that instance of SQL Server.

## Creating Server Groups

When you register SQL Server on a computer, you can either place it within an existing server group or create a new server group. A server group provides a way to organize instances on servers for administration and management tasks.

## Accessing Registration Information

SQL Server allows you to maintain private or shared registration information.

### Delivery Tip

Demonstrate how to share registration information and access shared information.

### Registration Information Is Private by Default

If you manage multiple instances of SQL Server on one or more computers and want to configure all computers and users to have the same SQL Servers and groups, you must configure each user individually. By default, registration information is private, which prevents others from having access to your configuration.

### Sharing Registry Information

However, you can configure all computers and users at one time if the registry information is shared. Sharing registry information allows multiple users to use the same configuration from a local computer or from a central computer.

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# Troubleshooting

**Topic Objective**

To outline guidelines for troubleshooting problems during installation.

**Lead-in**

If you encounter difficulties in installing or connecting to SQL Server after installation, first identify the problem, and then apply a solution.

- **Identifying the Problem**
  - Review error messages
  - Review the Sqlstp.log file
  - View log information
  - Test network connections
- **Finding Solutions to Common Problems**

**Delivery Tip**

Briefly demonstrate how to view each log file.

If you encounter difficulties in installing or connecting to SQL Server after installation, first identify the problem, and then apply a solution.

## Identifying the Problem

If problems occur during installation or startup, or if you cannot connect to SQL Server, review error messages and the Sqlstp.log file, view log information, and test network connections.

### Review Error Messages

Read the error message displayed during setup. For example, if Microsoft Internet Information Services is running, you will receive a message during setup asking you to shut down all applications that use ODBC before setup can proceed.

### Review the Sqlstp.log File

The C:\Winnt\Sqlstp.log file is an output file that is generated by the scripts that run during setup and records Database Consistency Checker (DBCC) error messages.

### View Log Information

The SQL Server and SQL Server Agent error logs and Windows 2000 application log allow you to view information about the installation and operation of SQL Server. Each time that the SQL Server and SQL Server Agent services start, a new error log is opened. Application events are appended to the Windows 2000 application log and, by default, overwrite events older than seven days. The following table describes the different logs that you can view.

<b>Log</b>	<b>Description</b>	<b>Location</b>	<b>View by using</b>
Sqlstp log	Records all SQL Server Setup actions	C:\Winnt	Any text editor
Windows 2000 application log	Provides information about application-related events in Windows 2000	Not applicable	Windows 2000 Event Viewer
SQL Server error log	Records the step-by-step process of starting SQL Server	C:\Program Files\Microsoft SQL Server\MSSQL\Log	SQL Server Enterprise Manager or any text editor
SQL Server Agent error log	Records errors incurred by the SQL Server Agent	C:\Program Files\Microsoft SQL Server\MSSQL\Log	SQL Server Enterprise Manager or any text editor

### Test Network Connections

If a local client can connect to SQL Server but a network client cannot to determine the source of the problem you should:

- Ensure that the client and server network libraries match.
- Determine whether the default client network library is appropriate for your network.
- Verify that a network connection between the client workstation and the server can be established.

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## Finding Solutions to Common Problems

Finding a solution to a problem involves isolating and verifying the symptom. As a starting point, you may find the answer in one of the online troubleshooting tools from SQL Server product support. The following table describes solutions to common problems.

Symptom	Problem	Solution
The SQL Server service does not start.	Windows 2000 cannot access a domain controller to validate the domain user logon account.	Reestablish access to a domain controller or reconfigure SQL Server service to use the Local System account.
<i>“Error 1069: The service did not start due to a logon failure.”</i>	The password for the domain user logon account has changed or has expired.	Specify a valid password for SQL Server service.
The SQL Server service does not start.	SQL Server entries in the Windows 2000 registry are corrupted.	Rerun Setup, and under <b>Advanced Options</b> , click <b>Registry Rebuild</b> to rebuild the SQL Server registry entries.
The SQL Server Agent service does not start.	The domain user logon account does not have permission to access SQL Server.	Add the domain user logon account to the Windows 2000 local group <b>Administrators</b> , or to the <b>sysadmin</b> role in SQL Server.
A SQL Server management tool cannot connect to SQL Server.	SQL Server service has not been started.	Verify that the SQL Server service has started.
<i>“A connection could not be established to [servername].”</i>	The client and server network libraries do not match.	Modify the default network library on the client; add a network library to the server, or both.
	You do not have permission to administer the computer running SQL Server.	Log on to Windows 2000 with an account that has permission to administer the computer running SQL Server, or connect with a SQL Server login account, such as <b>sa</b> .

**Note** When you troubleshoot SQL Server problems, check the HCL to verify that your hardware is certified for Windows 2000 compatibility.

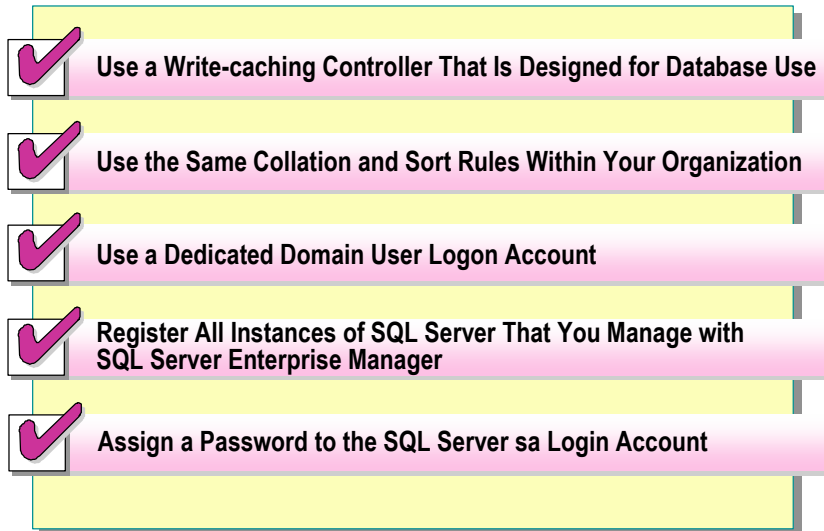
## Recommended Practices

### Topic Objective

To identify recommended practices when planning to install SQL Server.

### Lead-in

The following are recommended practices for installing and configuring SQL Server.



You must consider a number of issues before and after you install SQL Server. The following recommended practices should help you install and configure SQL Server:

- Use a write-caching controller that is designed for database use only.
- Use the same collation and sort rules so that all SQL Server databases within your organization are compatible.
- Use a dedicated domain user logon account, select **Password Never Expires**, and allow all logon hours.
- Register all instances of SQL Server that you manage with SQL Server Enterprise Manager.
- Assign a password to the SQL Server **sa** login account, if mixed mode security is used. Do not use a blank password.

Additional information on the following topics is available in SQL Server Books Online.

Topic	Search on
Selecting SQL Server collations and sort rules	“using SQL collations” “Unicode collation”
Selecting network libraries	“network protocol”
Methods of installing SQL Server	“setup type: typical” “unattended installation”
Starting, stopping, and pausing the SQL Server services	“sqlservr application”
Configuring SQL Server Enterprise Manager	“accessing server registration options”
Troubleshooting installation	“setup troubleshooting” “hardware and software requirements for installing SQL Server 2000”

## Lab A: Installing SQL Server

**Topic Objective**

To introduce the lab.

**Lead-in**

In this lab, you will install SQL Server and then verify and troubleshoot the installation.



Explain the lab objectives.

### Objectives

After completing this lab, you will be able to:

- Install SQL Server 2000 by using SQL Server Setup.
- Verify the installation of SQL Server by starting an instance of the SQL Server and SQL Server Agent services.
- Configure the SQL Server Agent service.
- Share registration information.
- Troubleshoot installation problems.
- Create a database diagram.

### For More Information

If you require help in executing files, search SQL Query Analyzer Help for “Execute a query”.

Other resources that you can use include:

- The **Northwind** database schema.
- SQL Server Books Online.

### Scenario

The organization of the classroom is meant to simulate that of a worldwide trading firm named Northwind Traders. Its fictitious domain name is nwtraders.msft. The primary DNS server for nwtraders.msft is the instructor computer, which has an Internet Protocol (IP) address of 192.168.x.200 (where *x* is the assigned classroom number). The name of the instructor computer is London.

The following table provides the user name, computer name, and the IP address for each student computer in the fictitious nwtraders.msft domain. Find the user name for your computer and make a note of it.

User name	Computer name	IP address
SQLAdmin1	Vancouver	192.168.x.1
SQLAdmin2	Denver	192.168.x.2
SQLAdmin3	Perth	192.168.x.3
SQLAdmin4	Brisbane	192.168.x.4
SQLAdmin5	Lisbon	192.168.x.5
SQLAdmin6	Bonn	192.168.x.6
SQLAdmin7	Lima	192.168.x.7
SQLAdmin8	Santiago	192.168.x.8
SQLAdmin9	Bangalore	192.168.x.9
SQLAdmin10	Singapore	192.168.x.10
SQLAdmin11	Casablanca	192.168.x.11
SQLAdmin12	Tunis	192.168.x.12
SQLAdmin13	Acapulco	192.168.x.13
SQLAdmin14	Miami	192.168.x.14
SQLAdmin15	Auckland	192.168.x.15
SQLAdmin16	Suva	192.168.x.16
SQLAdmin17	Stockholm	192.168.x.17
SQLAdmin18	Moscow	192.168.x.18
SQLAdmin19	Caracas	192.168.x.19
SQLAdmin20	Montevideo	192.168.x.20
SQLAdmin21	Manila	192.168.x.21
SQLAdmin22	Tokyo	192.168.x.22
SQLAdmin23	Khartoum	192.168.x.23
SQLAdmin24	Nairobi	192.168.x.24

**Estimated time to complete this lab: 45 minutes**

## Exercise 1

### Installing a Default Instance of SQL Server

In this exercise, you will run SQL Server Setup and install the default instance of SQL Server database engine and all management tools on your computer.

#### ► To install the default instance of SQL Server

In this procedure, you will install SQL Server.

1. Log on to the **NWTraders** classroom domain by using the information in the following table.

Option	Value
User name	<b>SQLAdminx</b> (where <i>x</i> corresponds to your computer name as designated in the nwtraders.msft classroom domain)
Password	<b>password</b>

2. Insert the SQL Server 2000 compact disc into the CD-ROM drive.
3. When the **Microsoft SQL Server 2000 Enterprise Edition** dialog box appears, click **SQL Server 2000 Components**.
4. Click **Install Database Server**.
5. Use the information in the following table to complete the installation.

Option	Value
Computer name	Local computer
Installation selection	New instance of SQL Server
Name	Your name
Company	Your company name
Software license agreement	Yes
Instance name	Default
Setup type	Typical
Service accounts	Same account for each service and auto start SQL Server service
Service settings	Domain user account
User name	<b>SQLService</b>
Password	<b>sqlservice</b>
Domain	<b>NWTraders</b>
Authentication mode	Windows authentication mode

6. After installing SQL Server, click **Finish**.

## Exercise 2

### Verifying the Installation

In this exercise, you will use the SQL Server Service Manager to start the SQL Server service. You then will connect to and test the SQL Server service on your computer by using SQL Query Analyzer.

#### ► To start the SQL Server service by using SQL Server Service Manager

In this procedure, you will start the SQL Server service by using SQL Server Service Manager.

1. On the taskbar, click **Start**, point to **Programs**, point to **Microsoft SQL Server**, and then click **Service Manager**.
2. Start the SQL Server service on your computer.
3. After SQL Service Manager indicates that the SQL Server service is running, close **SQL Server Service Manager**.

Notice that the **SQL Server Service Manager** icon remains on the taskbar.

#### ► To connect to SQL Server and execute a query to verify the installed databases

In this procedure, you will connect to SQL Server by using SQL Query Analyzer and execute a query to verify the installed databases.

1. On the taskbar, click **Start**, point to **Programs**, point to **Microsoft SQL Server**, and then click **Query Analyzer**.
2. Click **Windows authentication** and then click **OK** to log in by using Windows Authentication.

You have permission to log in to and administer SQL Server because you are logged on as **SQLAdminx**, which is a member of the Windows 2000 local group, **Administrators**. All members of this group are automatically mapped to the SQL Server **sysadmin** role.

3. On the toolbar, verify that your database is **master**.
4. In the query window, type and execute the following query:

```
SELECT * FROM INFORMATION_SCHEMA.SCHEMATA
```

The results pane displays the installed databases: **master**, **tempdb**, **model**, **msdb**, **pubs**, and **Northwind**. Notice the additional information that is displayed.

5. On the **Query** menu, click **Results in Text**.

This changes the default destination for query results.

6. Execute the query again.

Notice the difference in the manner in which information is displayed.



► **To verify the installed version of SQL Server**

In this procedure, you will execute a query to verify the installed version of SQL Server.

1. On the toolbar, click **Clear Window**.
2. In the query window, type and execute the following query:

```
SELECT @@VERSION
```

**@@VERSION** is a global system variable that returns current product version information.

The results pane displays the installed version of SQL Server.

3. On the **Query** menu, click **Results in Grid**.  
This changes the destination for query results.

► **To verify the installed files**

In this procedure, you will verify the installed files.

1. Open Windows Explorer, and expand the **C:\Program Files\Microsoft SQL Server** folder.
2. Open each subfolder, and review the installed files.

In particular, notice the files in the C:\Program Files\Microsoft SQL Server\Mssql\Binn and C:\Program Files\Microsoft SQL Server\Mssql\Log folders.

3. Close Windows Explorer.

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## Exercise 3

# Configuring SQL Server Agent and SQL Server Enterprise Manager

In this exercise, you will review the registration information in SQL Server Enterprise Manager. You then will configure the SQL Server Agent service to start automatically. Finally, you will start the SQL Server Agent service.

### ► To review SQL Server registration in SQL Server Enterprise Manager

In this procedure, you will verify and modify the registration information in SQL Server Enterprise Manager for the default instance.

1. On the taskbar, click **Start**, point to **Programs**, point to **Microsoft SQL Server**, and then click **Enterprise Manager**.
2. In the console tree, expand **Microsoft SQL Servers**, and then expand **SQL Server Group**.

Notice that the default instance of SQL Server is registered automatically using your computer name.

How can you tell whether SQL Server is started?

**The green arrow next to SQL Server indicates that it is started.**

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3. Right-click your server name, and then click **Edit SQL Server Registration Properties**.

Notice the default properties of this registration.

What type of authentication is used to connect to SQL Server?

**Windows Authentication.**

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4. Click **OK** to close the **Registered SQL Server Properties** dialog box.

### ► To configure the SQL Server Agent service to start automatically

In this procedure, you will modify the properties SQL Server to start the SQL Server Agent service automatically.

1. On the taskbar, double-click **SQL Server Service Manager**.
2. In the **Services** list, click **SQL Server Agent**.
3. Select the **Auto-start service when OS starts** check box.
4. Click **Start/Continue**.

After a few moments, notice that the green arrow indicates that the SQL Server Agent service is running.

5. Close SQL Server Service Manager.

## Exercise 4

### Creating Shared Registration Information

In this exercise, you will use SQL Server Enterprise Manager to share registration information, and you will use the Register SQL Server Wizard to register additional servers.

#### ► To create shared registration information

In this procedure, you will create shared registration information by using SQL Server Enterprise Manager.

1. In the SQL Server Enterprise Manager console tree, verify that your server is selected.
2. On the **Tools** menu, click **Options**.
3. In the **SQL Server Enterprise Manager Properties** dialog box, clear the **Read/Store user independent** check box, and then click **OK**.
4. Expand **SQL Server Group**.

Are any instances of SQL Server registered? Why or why not?

**No instances are registered. When you clear the Read/Store user independent check box, the shared registration information is displayed. Until you create shared registration information, no shared information will exist. The previous information that you viewed in SQL Server Enterprise Manager was private information.**

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- 
5. Right-click **SQL Server Group**, and then click **New SQL Server Registration**.

The Register SQL Server Wizard appears.

6. Use the information in the following table to register SQL Server on your computer in a newly created SQL Server group.

Option	Value
Available servers	Your server
Authentication mode	Windows Authentication
SQL Server group	Create a new top-level SQL Server group
Group name	Shared SQL Server Group

In the SQL Server Enterprise Manager console tree, notice that the newly created group appears.

7. Expand **Shared SQL Server Group**.  
Notice that your server is registered.
8. On the **Tools** menu, click **Options**.
9. In the **SQL Server Enterprise Manager Properties** dialog box, select the **Read/Store user independent** check box, and then click **OK**.

Notice that **Shared SQL Server Group** no longer appears.

## Exercise 5

### Troubleshooting Installation Problems

In this exercise, you will view the SQL Server error log and the Windows 2000 application log in Event Viewer.

► **To view the SQL Server error log**

In this procedure, you will review the entries in SQL Server error log.

1. In the SQL Server Enterprise Manager console tree, expand **SQL Server Group**, expand your server name, and then expand **Management**.
2. Click **SQL Server Logs**.
3. In the details pane, double-click **Current** to open the current SQL Server error log.
4. Scroll through the SQL Server error log.

What has caused all of the entries in this file?

**Starting SQL Server.**

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► **To view the Windows 2000 application log in Event Viewer**

In this procedure, you will open the application logs and review the entries that relate to the installation and startup of SQL Server.

1. On the taskbar, click **Start**, point to **Programs**, point to **Administrative Tools**, and then click **Event Viewer**.
2. In the console tree, click **Application Log**.

Does the Windows 2000 application log contain any entries as a result of the installation or startup of SQL Server?

**The Windows 2000 application log contains numerous entries that are associated with the startup the SQL Server and SQL Server Agent services. These entries relate to the entries in the SQL Server and SQL Server Agent error logs.**

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3. Close Event Viewer.

## Exercise 6

### Creating a Database Diagram

In this exercise, you will use the Create Database Diagram Wizard to generate a diagram for the **Northwind** database automatically. You will then use Query Designer to build a query.

#### ► To create a database diagram

In this procedure, you will create a database diagram of the **Northwind** database by using the Create Database Diagram Wizard.

1. In the SQL Server Enterprise Manager console tree, expand your server name, expand **Databases**, and then expand **Northwind**.
2. Right-click **Diagrams**, and then click **New Database Diagram**.  
The Create Database Diagram Wizard appears.
3. Add all user tables to the diagram. User tables appear with initial caps.
4. Maximize the **New Diagram** dialog box.
5. On the toolbar, click **Zoom**, and then click **50%**.
6. Arrange the tables to fit on the screen.
7. Save the database diagram as **Northwind**.

#### ► To build a query by using Query Designer

In this procedure, you will use Query Designer to build a query joining the **Products** and **Categories** tables.

1. In the diagram, right-click **Products**, point to **Task**, and then click **Open Table**.  
This will display all rows in the **Products** table.
2. On the toolbar, click **Show/Hide Diagram Pane**.  
This will display the **Products** table in the diagram pane.
3. Right-click an open area of the diagram pane, and then click **Add Table**.
4. Double-click **Categories**, and then click **Close**.  
This will add the **Categories** table to the diagram pane and display the relationship between the **Categories** and **Products** tables.
5. On the toolbar, click **Show/Hide SQL Pane**.  
This will display the Transact-SQL script that has been created for you.
6. In the **Products** table, select the **ProductName** and **UnitPrice** check boxes, and in the **Categories** table, select the **CategoryName** check box.
7. In the **Products** table, click **UnitPrice**, and then on the toolbar, click **Sort Descending**.

Notice the modifications that occur to the Transact-SQL script.

8. In the SQL pane, in the select list, delete the asterisk and comma.
9. On the toolbar, click **Run**.

What is the highest-priced product, and what is its price?

**Côte de Blaye, 263.5**

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**Note** Query Designer is running as a Microsoft Management Console (MMC) snap-in. Note that you now have three active MMC windows—SQL Server Enterprise Manager, Database Designer, and Query Designer.

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10. Close Query Designer and Database Designer. Do not close Enterprise Manager.

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## Review

**Topic Objective**

To reinforce module objectives by reviewing key points.

**Lead-in**

The review questions cover some of the key concepts taught in the module.

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

1. You are installing SQL Server on several different computers. You want the SQL Server and SQL Server Agent services on each computer to communicate with one another and be able to access other network resources by using trusted connections. In what security context should these services run? Why?

**The SQL Server and SQL Server Agent services must run in the context of a domain user logon account to use a trusted connection. If these services run in the context of the Local System, neither service will be able to establish a trusted connection. A trusted connection is necessary for these services to connect to network resources.**

2. You want to use SQL Server Enterprise Manager to manage a named instance of SQL Server running on a remote computer. What is required in order for you to register and manage SQL Server on the remote computer?

**You must either know the server and instance name of SQL Server installed on the remote computer, or you must be able to browse and identify it. Second, you must be able to connect to the remote instance as a member of the sysadmin role.**

3. You installed SQL Server with the default settings. Later, you decide to add a database that requires characters that are not part of the default Windows collation. What must you do to support the new character set?

**You can either install a separate instance of SQL Server with a different collation, or you can specify a non-default collation for this particular database.**

