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The How-To Guide™ *To*

Windows Server 2003 Terminal Services

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by Sean Daily, Series Editor

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Chapter 1: Installation and Configuration of Terminal Services

Terminal servers can be a vital component of any IT Infrastructure. They can be used to replace hundreds of workstations in a homogeneous computing environment—a call center, for example—or they can be used to complement a workstation-based environment for remote access or disaster recovery. Terminal servers can even be used in smaller environments as a way of quickly setting up and managing workgroups of 5 to 10 users with similar computing needs.

Because of their versatility, and their increased usage in the workplace today, the technologies that make up terminal servers should be familiar to Windows administrators. In addition, administrators should know the steps needed to install and configure Terminal Services. This guide will explore these tasks—it is meant to be not only a manual for learning more about Terminal Services but also a handy reference guide for systems administrators. For a more detailed introduction to Terminal Services, refer to *The Definitive Guide to Windows Server 2003 Terminal Services* (Realtimepublishers.com).

Guide Conventions

The following list highlights conventions that will be used through the guide to refer to common tasks and locations within the Windows operating system (OS):

Registry Locations:

> HKLM = HKEY_LOCAL_MACHINE
>
> HKCU = HKEY_CURRENT_USER
>
> HKCR = HKEY_CLASSES_ROOT
>
> HKU = HKEY_Users

Windows Shell Locations:

Start menu—Drill downs within the Start menu will be separated by bars "|". For example,

> Start | All Programs | Administrative Tools | Terminal Server Licensing

Administrative Tools

> Start | All Programs | Administrative Tools
>
> Start | Control Panel > Administrative Tools

System Control Panel

> Start | Control Panel > System
>
> Right-click the My Computer icon and select Properties

As with any Windows technology, the first step to a successful deployment is a clean, repeatable installation process and a consistent and usable configuration of your servers and their roles. Both Microsoft and many third-party vendors offer tools to help automate your installation and configuration process; the right solution for you will depend on your environment, the size of the deployment, and the budget you have to work with.

This chapter will cover the native options available to you from Microsoft. These include manual installation and configuration, automated installation, and disk duplication. It will introduce you to the Terminal Services entries available in unattend.txt and sysprep.inf files. First, we will explore the basic required components for any Terminal Services implementation.

Requirements for a Terminal Server Environment

There are three basic requirements for any Terminal Services implementation:

- Terminal server
- License server
- Authentication server

In a small workgroup or small office/home office (SOHO) environment, these can all be on one physical server, but in most cases, they will be distributed across two or more servers.

- A **terminal server** is a Windows Server 2003 (WS2K3) system with the Terminal Server role installed. This server is the one that the users will actually be logging onto and will be providing their working environment (in most cases, a Windows Desktop Shell). The size and configuration of this server will be determined by the number of users that it needs to support. All user applications will be installed on this server.

- A **license server** is a WS2K3 system with Terminal Server Licensing Service (TSLS) installed. TSLS is an optional Windows component. In a workgroup environment, TSLS can be installed on any server, even the terminal server itself. In a domain environment, TSLS must be installed on a domain controller.

- An **authentication server** is a WS2K3 system used to authenticate users when they log on. In a workgroup environment, this server will be the local Security Account Manager (SAM) database on the terminal server. In a domain environment, this server will be the domain controller. All user accounts must be set up on the local SAM or in the domain before users can logon to the terminal server.

In a larger enterprise environment, it is common to have more than one terminal server to support a larger number of users. In this case, you will also need a load balancer—either Session Directory or a third-party product—to evenly distribute users across the terminal servers and to reconnect users to the server hosting their session in the event of a connection drop.

How to Install the Terminal Server Role

After the installation of WS2K3, use the Manage Your Server wizard to install the Terminal Server role. The Manage Your Server wizard launches automatically when an administrator logs on to the server, or it can be launched manually from the Start menu. Figure 1.1 shows the Manage Your Server wizard.
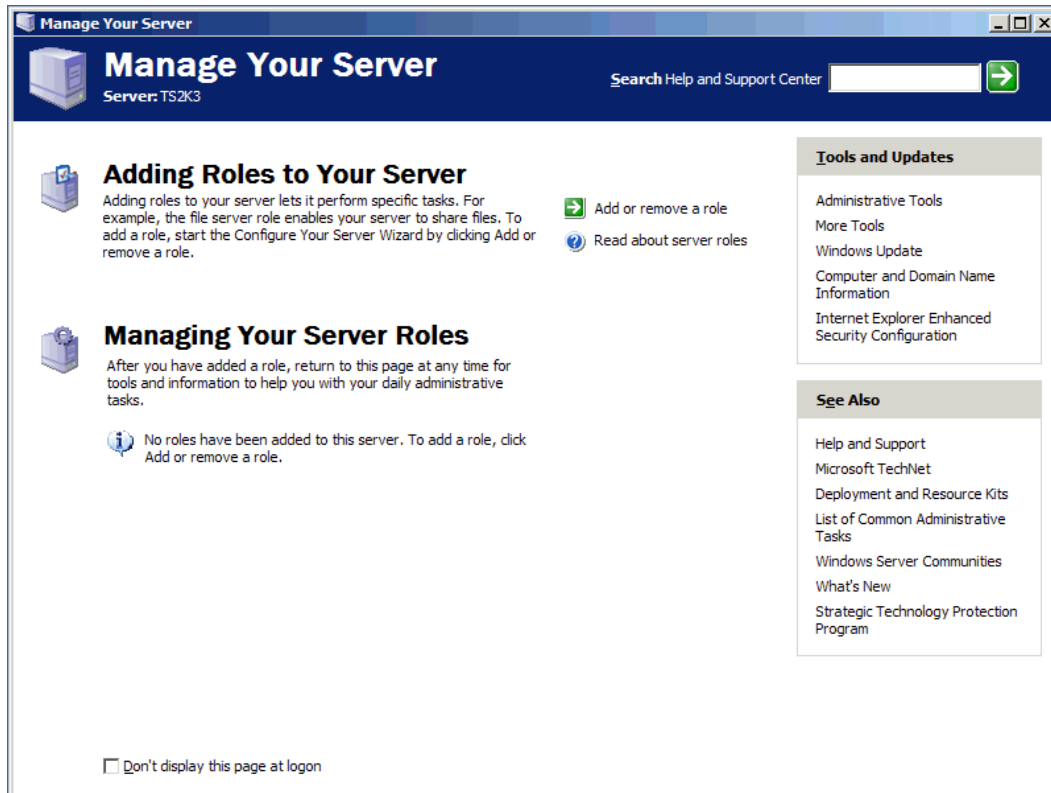
Figure 1.1: The Manage Your Server wizard.

From the window that Figure 1.1 shows, click *Add or remove a role*. You will be presented with a list of available roles (see Figure 1.2). Select *Terminal server*, and click Next.
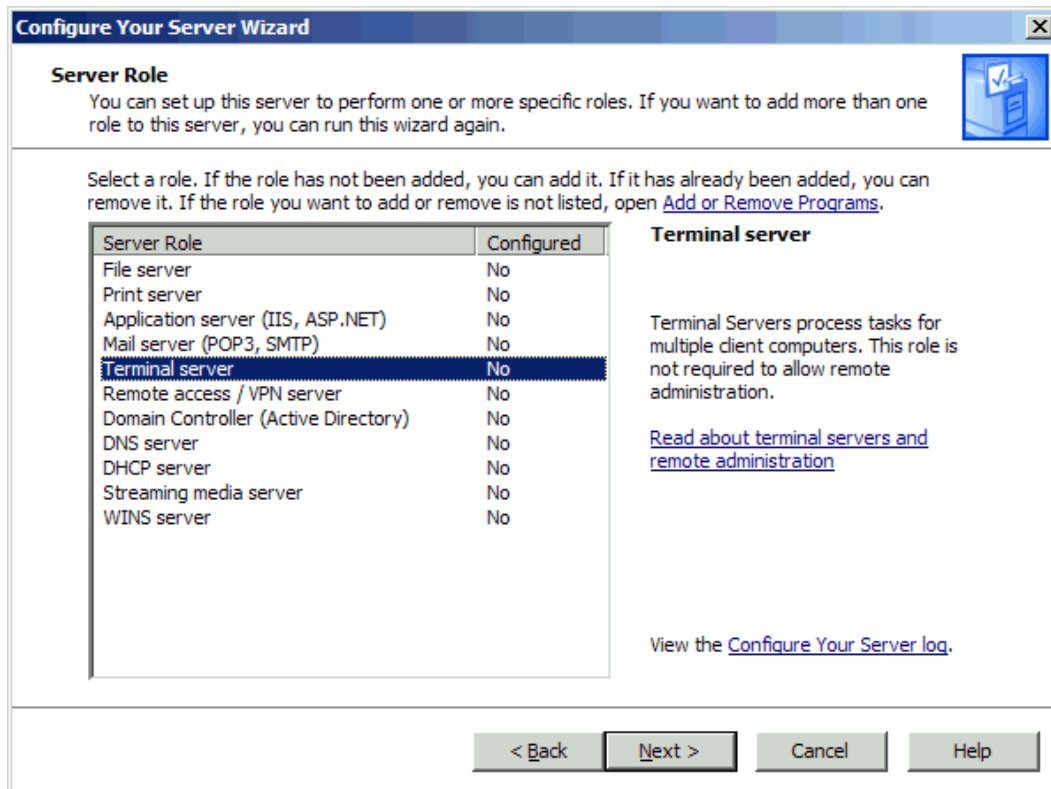
Figure 1.2: Default roles available in WS2K3 Standard Edition.

The wizard will warn you that the installation of Terminal Services will require a reboot. If you are ready to proceed, click Next—the Terminal Server role will be installed and the server will automatically reboot. You may be prompted for your WS2K3 source files during the installation.

💣 You will not have the option to delay the reboot when installing the Terminal Server role. Once you start the installation, the server will be rebooted automatically.

During an Unattended Installation of Windows

If you are automating your WS2K3 installation, you can automatically include the Terminal Server role in your base installation. To do so, modify the unatted.txt or winnt.sif file that you have created for your unattended installation by adding the following entries:

```
[Components]

TerminalServer=On
```

☞ The [Components] section may already exist in your unattend.txt file; if so, simply add the TerminalServer entry to it.

📖 For more information about unattended installations of Windows, see Microsoft's documentation included in the Deployment Tools.cab file (the WS2K3 Service Pack 1—SP1—version of the Deployment Tools.cab can be found at http://support.microsoft.com/kb/892778).

This addition will install the Terminal Server role with the default configuration for licensing mode and permissions settings. To override the default settings, add a new section to the file:

```
[TerminalServices]

AllowConnections=1

LicensingMode=PerDevice | PerUser

PermissionsSetting=0 | 1
```

📖 Later, this chapter will discuss the licensing modes.

The permissions setting determines how to harden your terminal server. Setting it to 0 applies the same permissions as would be used on a normal WS2K3 or Windows XP box. This setting is recommended because it protects critical areas of the file system from being modified by non-administrative users. Setting it to 1 applies the permissions that were used on Windows NT 4.0. You should only use the NT 4.0 permissions settings if you are planning to install a legacy application that requires these relaxed permissions.

☞ If you add [TerminalServices] AllowConnections=1 to your unattend.txt or winnt.sif file without adding Terminalserver=On to the components section, you will enable the Remote Desktop feature (known as Terminal Services in Remote Administration Mode under Windows 2000—Win2K).

In a Sysprep Image

If you are using Sysprep to prepare server images for disk duplication, simply install the Terminal Server role via either of the earlier methods before running the Sysprep utility.

📖 For more information about using Sysprep, see Microsoft's documentation at http://support.microsoft.com/kb/892778.

Via Remote Installation Services

If you are deploying a base installation of WS2K3 via Remote Installation Services (RIS), you can associate a custom .sif file to a RIS image. This SIF file will need the same entries as described earlier for an unattended installation of WS2K3. To associate a SIF file with a RIS image file, follow these steps:

1. Open Active Directory Users and Computers.

2. In the console tree, right-click the applicable RIS server.

3. Click Properties, then select the Remote Install tab.

4. Click Advanced Settings, then select the Images tab.

5. Click Add.

6. Click *Associate a new answer file to an existing image*, then click Next.

7. Click one of the following options:

    - Windows image sample files

    - Another remote installation server

    - An alternate location

8. Select the installation image to which the answer file will be associated, then click Next.

9. Select the answer file that you want to associate with the installation image, then click Next.

10. Enter the description and Help text, then click Next.

11. Review the settings summary, then click Finish to complete the process.

How to Install Terminal Server Licensing

WS2K3 will stop accepting Terminal Services connections 120 days after the first non-administrator logs on to the server via Terminal Services. To continue to use the terminal server after this 120-day trial period, the server must be able to locate a license server on the network.

☞ Even if you use Citrix MetaFrame to enhance your Terminal Services deployment, you will still need to purchase and maintain Microsoft Terminal Server Client Access Licenses (CALs) and confirm that your terminal servers can locale a license server on the network. This purchase is in addition to the MetaFrame Presentation Server licenses that you must purchase from Citrix.

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Manually

To install TSLS manually, use the Add/Remove Programs control panel applet, then select Add/Remove Windows Components. From the list of available components, select the Terminal Server Licensing check box, and click Next (see Figure 1.3).
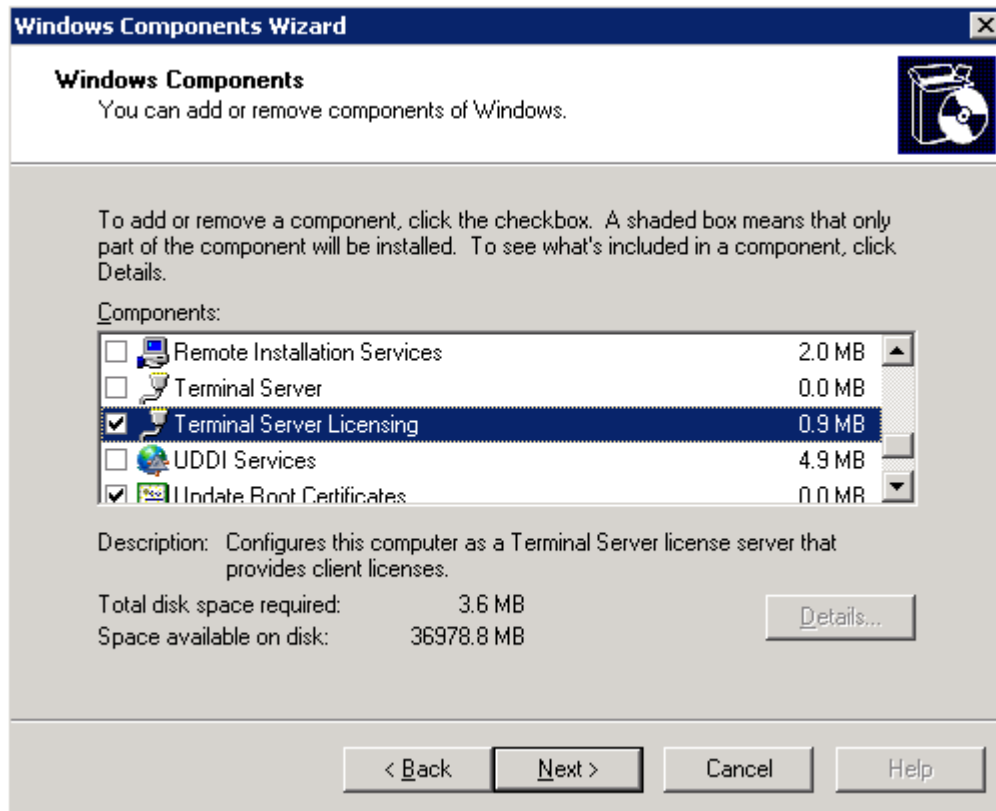
Figure 1.3: Installing Terminal Server Licensing.

If you are installing TSLS on a server on an Active Directory (AD) domain controller, you are presented with two options for the mode of the server: Domain/Workgroup and Enterprise. If you are in a workgroup or non-AD domain, the Enterprise option is not available.

> 💣 Choose your license server mode carefully. Enterprise license servers will be automatically discovered by all terminal servers in the same AD forest as long as they are in the same AD site as the domain controller. Domain license servers will be automatically discovered by all terminal servers in the same domain as the domain controller regardless of site affinity.

Select the mode in which you want the license server to run, and click Next. You may be prompted for your WS2K3 source files during the installation. No reboot is required after installing TSLS.

During an Unattended Installation of Windows

You can also automate the installation of TSLS via either the unattend.txt or sysprep.inf file during an automated installation of Windows. To do so, add the following entry to the [Components] section of the file:

```
[Components]
Licenseserver=On
```

This entry is rarely used, as you still need to manually activate the license server, and typically even a large enterprise will have only a few TSLS servers.

How to Activate a Terminal Server License Server

After you install TSLS, the license server must be activated by contacting the Microsoft Clearinghouse. To do so, launch the TSLS administrative tool, right-click the server, and click Activate Server. The Terminal Server License Server Activation Wizard will launch, offering you three options for contacting Microsoft. Figure 1.4 shows the options in the wizard:

- Automatic connection—This method is the easiest way to activate the licensing server. This method requires that the server running TSLS has Internet connectivity on port 443 (Secure Sockets Layer—SSL). Simply fill in the company and contact information, and click Activate.

- Web Browser—If the automatic connection method fails, or if the server running TSLS does not have Internet connectivity, you can still activate the server over the Web from another computer. To do so, from a Web browser, go to https://activate.microsoft.com, and fill in the company and contact information as well as the unique TSLS ID number that the activate server wizard provides. The Web site will respond with the activation code that you can then enter into the licensing service.

- Telephone—If you do not have Internet connectivity, you can contact the Microsoft Clearinghouse by telephone. Select your country/region in the activate server wizard, and the correct phone number will be displayed. Provide the customer service person with your company name, contact information, and server ID code; they will provide you with the activation code. Be sure to either activate the server while still on the phone with the customer service representative or be very careful to record the activation code accurately.
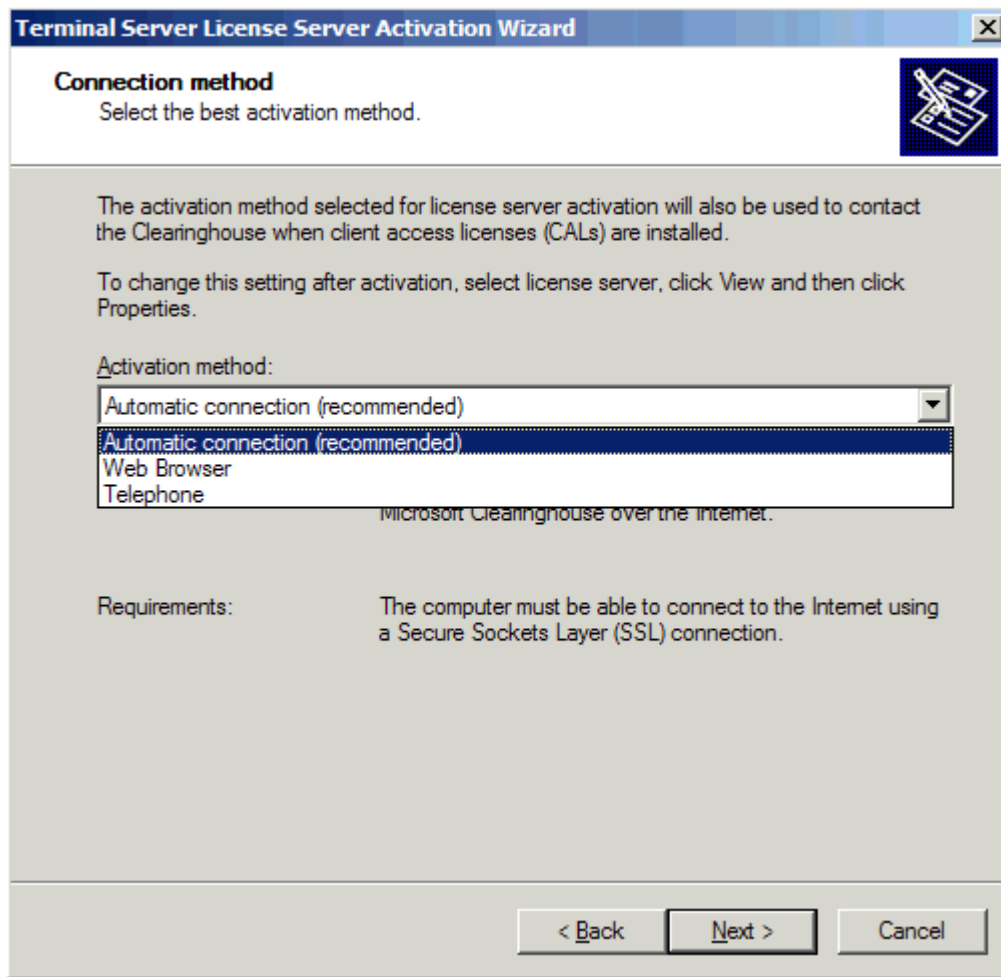
Figure 1.4: Activating a Terminal Services licensing server.

After the license server is activated, it will immediately begin to issue temporary Win2K and WS2K3 terminal server tokens. These temporary tokens give the administrator a 90-day period in which to install the appropriate permanent CALs on the license server so that it can issue permanent tokens.

☞ If you are upgrading a Win2K server that has TSLS installed to WS2K3, you might need to re-activate the licensing service. To do so, select Re-Activate Server from Advanced in the Actions menu in the TSLS administrative tool.

Types of Terminal Server CALs

Terminal Services CALs can be purchased through any of the Microsoft licensing programs—Open, Select, Enterprise, and so on. You can even purchase packs of licenses via retail or OEM channels. In addition to selecting the correct licensing program to purchase your Terminal Services CALs, you must also select the correct type of CALs to buy.

WS2K3 TSLS can issue Terminal Services CALs (also referred to as *tokens*) to both Win2K and WS2K3 terminal servers. Win2K supports only per-device licenses; WS2K3 supports both per-device and per-user licensing. You should choose the appropriate license type for your environment. The following list highlights the available license types:

- WS2K3 Terminal Server Device CALs—WS2K3 terminal servers that are in per device licensing mode will request these licenses from the TSLS server.

- WS2K3 Terminal Server User CALs—WS2K3 terminal servers that are in per user licensing mode will request these licenses.

- WS2K3 Terminal Server External Connector licenses—This license allows unlimited connections by external users to a terminal server running WS2K3.

- Win2K Terminal Services CALs—Terminal servers running Win2K will request these licenses from the licensing server for clients running OSs other than Win2K Professional or Windows XP. You need these licenses only if you have terminal servers running Win2K.

- Win2K Terminal Services Internet Connector license—This license allows as many as 200 simultaneous anonymous connections to a terminal server running Win2K by non-employees across the Internet.

- Win2K Built-In licenses—Clients that are running Win2K Professional or Windows XP are issued a token from the built-in pool of license tokens when connecting to a terminal server running Win2K.

☞ WS2K3 TSLS will issue "built-in" Terminal Services CALs to Win2K Professional and Windows XP clients that are connecting to Win2K terminal servers. These licenses are included with the purchase of the client OS. WS2K3 terminal server CALs are not built-in and must be purchased separately.

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How to Add Terminal Server CALs to a License Server

After you select the licensing program and purchase the appropriate type of Terminal Services CALs for your deployment, the licenses must be added to your license server. The connection method you used to activate the license server will determine the connection method used to install CALs. Before you go to install the CALs, be sure you have either the license code from the retail package or your agreement number for you Select/Open/Enterprise account.

To add a license pack to the license server, launch the TSLS administrative tool, right-click the server to which you want to add the licenses, and select Install Licenses. If you are installing a retail license pack, the type of license will be automatically selected. If, however, you are installing licenses through a Select, Open, or other Microsoft license agreement, you will need to select which type of licenses you want to add. Figure 1.5 shows the Terminal Server CAL Installation Wizard for the automatic connection method.

Figure 1.5: Adding licenses to a TSLS server.

After the licenses are installed, the TSLS will list how many are available and how many have been issued. You can also drill down to see the names of users and devices that have been issued licenses.

How to Configure Licensing Mode on a Terminal Server

The type of CALs that a terminal server requests from the license server is determined by the licensing mode of the terminal server. If the terminal server is in per-device licensing mode, and you only have per-user tokens installed on your TSLS, then the connection will be refused. You can configure the licensing mode of a terminal server either manually or via Group Policy.

> 💣 If your terminal server is in per-user licensing mode, it will attempt to validate both per-user and per-device tokens presented by the client. In this mode, if a per-device CAL cannot be validated, the terminal server will request a new per-user token from the TSLS. If, however, the terminal server is in per-device mode, it will not accept per-user CALs presented by the client—even if the client presents a valid per-user CAL, the terminal server will request a new per-device token.

Manually

To manually configure licensing mode on a terminal server, launch the Terminal Services Configuration administrative tool, and select the Server Settings node. Double-click the licensing setting, and choose the appropriate mode. Figure 1.6 shows the options in the tool.
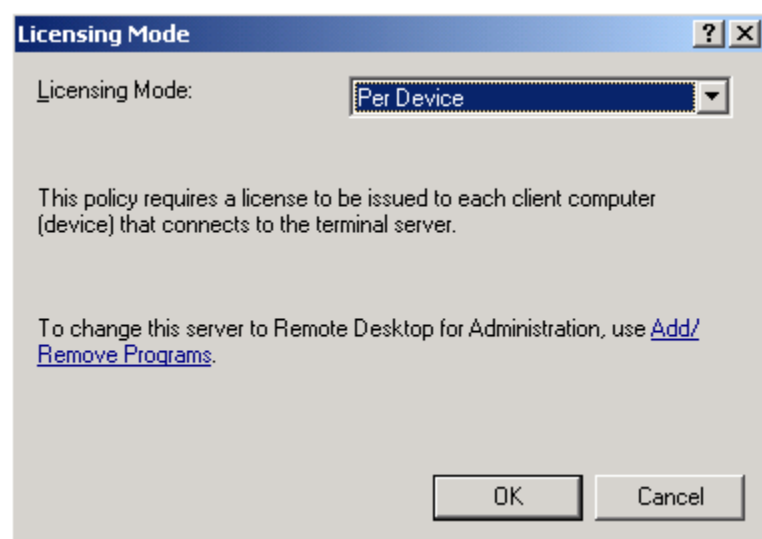
Figure 1.6: Manually specifying the terminal server licensing mode.

Via Group Policy

Under WS2K3 SP1, you can centrally configure licensing mode via Group Policy. To do so, use either the Group Policy Management Console (GPMC) or Active Directory Users and Computers to edit a Group Policy Object (GPO) that applies to your terminal servers. Within the Group Policy Editor, drill to Computer Configuration | Administrative Templates | Windows Components | Terminal Services, and double-click the *Set the Terminal Server licensing mode* setting. In the dialog box, set this setting to enabled, and choose the appropriate mode from the drop-down list (see Figure 1.7).

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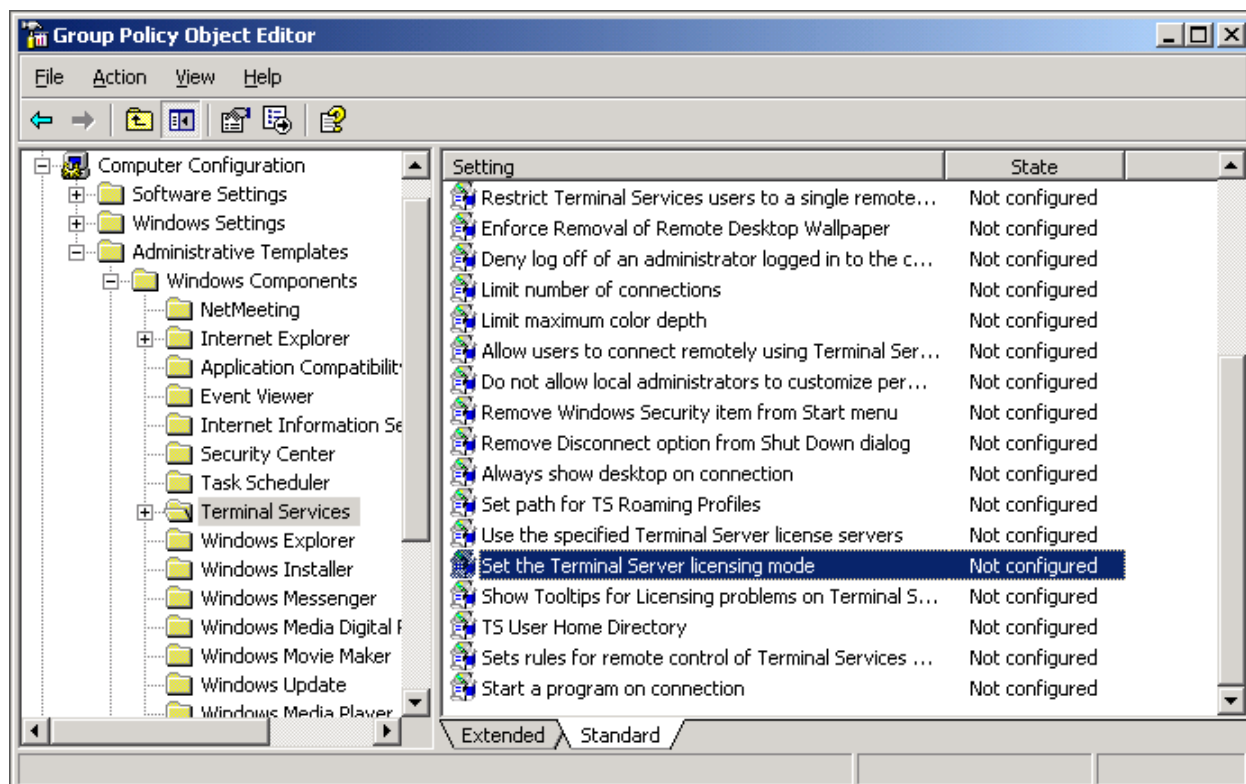*Figure 1.7: Configuring licensing mode via Group Policy.*

Terminal Server License Server Discovery

During the boot process, WS2K3 will attempt to find TSLS servers on the network. This process is called *license server discovery*. The license server discovery process is determined by your environment. However, the preference of which license servers to use is the same. Terminal servers will always request CALs from TSLS servers in the following order:

1. Enterprise or domain license servers that are specified in Group Policy

2. Enterprise or domain license servers that are specified in the registry

3. Enterprise license servers in the same AD site and forest as the terminal server (discovered automatically)

4. Domain license servers in the same domain as the terminal server (discovered automatically)

5. Workgroup license servers on the same subnet as the terminal server (discovered automatically, but only used when the terminal server is not in a domain)

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In a workgroup setting, the terminal server will first look to determine whether TSLS is installed on the terminal server (common in single-server environments). If TSLS is not installed, the server will then perform a mailslot broadcast to the local subnet and any servers running TSLS will respond. The terminal server will record the name of the license server in the registry for future reference and proceed to request CALs from the TSLS.

In a domain, TSLS must be installed on a domain controller. In fact, the installation wizard will not allow you to install TSLS on a member server. The terminal server will query each domain controller in the forest, starting with domain controllers in its own AD domain and site, using a mailslot request called TermServLicensing. All domain controllers with TSLS installed in domain mode will respond if they are in the same domain as the terminal server. However, if the domain controller has TSLS installed in enterprise mode, it will only respond if the terminal server is in the same AD site as the domain controller. Once the discovery process is complete, the terminal server will record the TSLS server names in its registry.

How to Override the TSLS Discovery Process

Regardless of whether you are in a domain or workgroup environment, you can override the discovery process by listing specific TSLS servers in either the terminal server's registry or in a GPO that applies to the server. In a workgroup setting, overriding the discovery process is required if your TSLS is on a different subnet than your terminal server. In a domain environment, the overrides can be use to force a terminal server to request licenses from a domain mode license server in a different domain or an enterprise license server in a different site.

Via Registry Setting

To manually specify license servers in the registry, follow these steps:

1. Click Start, Run, type regedit, then click OK.

2. Right-click the following key in the registry: HKEY_LOCAL_MACHINE\SYSTEM\CurrentControlSet\Services\TermService\Parameters.

3. In the context menu, point to New, then click Key, and type LicenseServers as the name of the new key.

4. Right-click the key you just created, and once again point to New, then click Key. Name this new sub-key one of the following:

   - The NetBIOS name of the server

   - The fully qualified domain name (FQDN) of the server

   - The IP address of the server

Figure 1.8 shows an example of manually configured TSLS servers. In the example, SVR1 and SVR2 are the NetBIOS names of the TSLS servers.
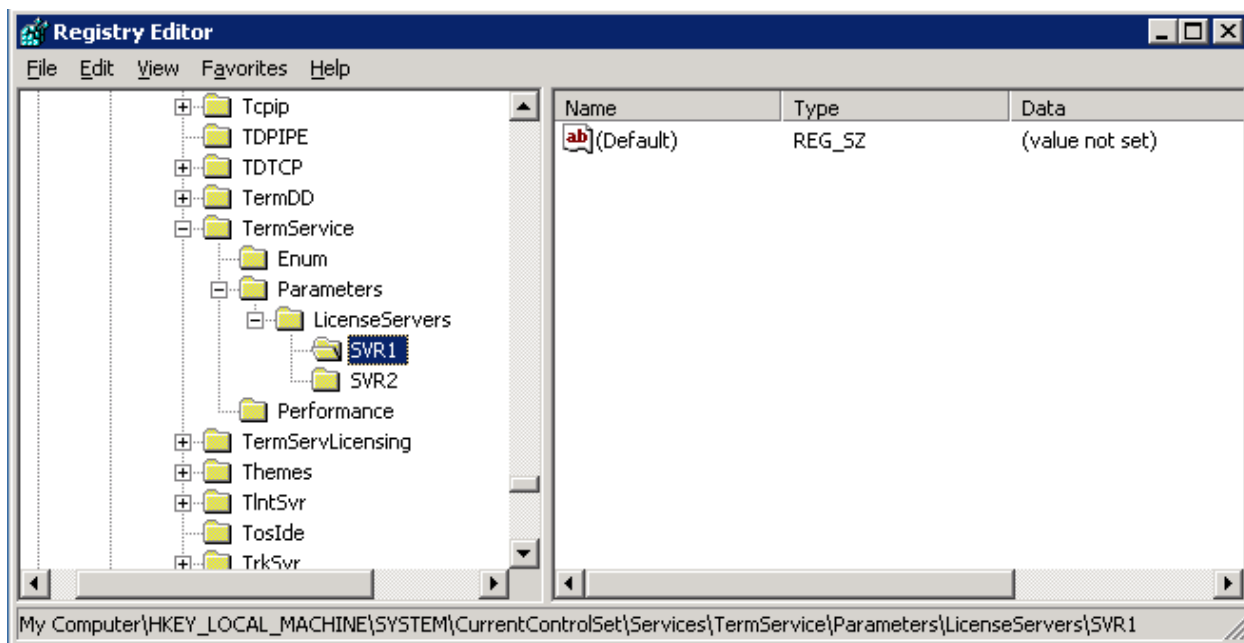
Figure 1.8: Overriding license server discovery by specifying license servers in the registry.

Via GUI

In WS2K3 SP1, Microsoft included a GUI for adding the necessary registry keys. This GUI is found in the Terminal Services Configuration administrative tool. To configure preferred license servers via this GUI, follow these steps:

1. Go to Administrative Tools, and launch Terminal Services Configuration.

2. Select Server Settings.

3. Double-click *License server discovery mode.*

4. Click *Use these license servers*, and enter the NetBIOS names, FQDN, or IP addresses of the license servers in the text box, separating them with commas.

5. Click Check names, make any necessary corrections, and click OK.

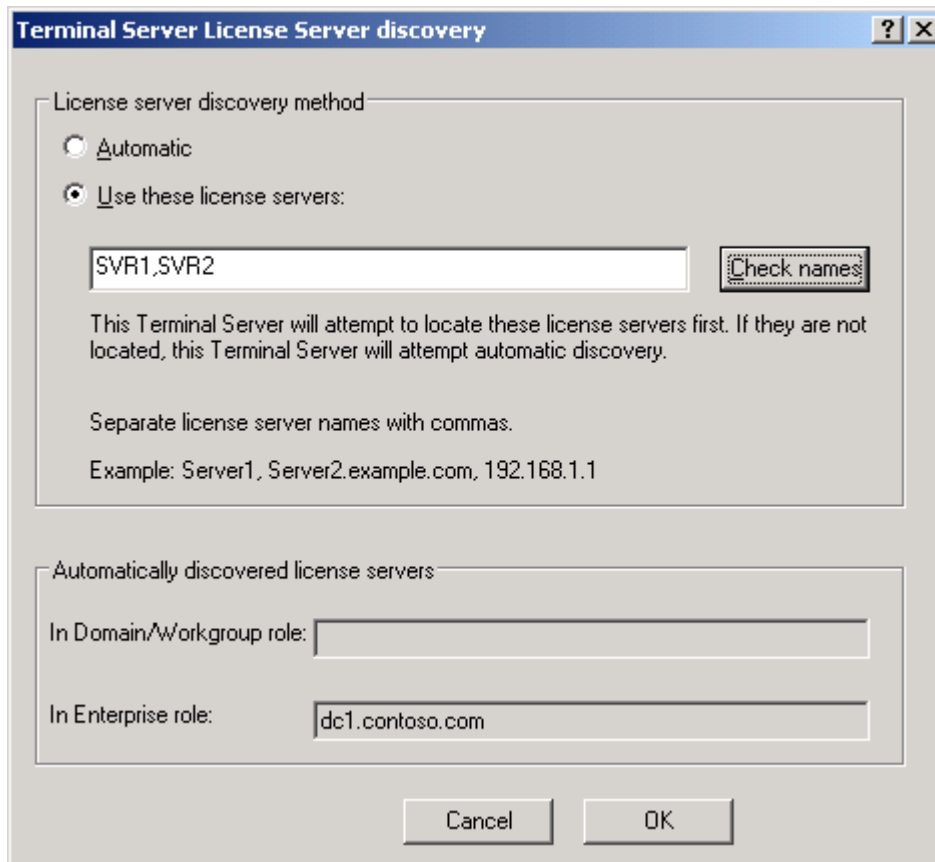Figure 1.9 shows the GUI for configuring preferred license servers.

Figure 1.9: Configuring preferred license servers via GUI.

> 💣 Configuring preferred licenses servers via either the registry or GUI requires a reboot of the terminal server to take effect.

Via Group Policy

WS2K3 SP1 also includes the ability to centrally control preferred license servers via Group Policy. To do so, use either the GPMC or Active Directory Users and Computers to edit a GPO that applies to your terminal servers. Within the Group Policy Editor, drill to Computer Configuration | Administrative Templates | Windows Components | Terminal Services, and double-click the *Use the specified Terminal Server license servers* setting (see Figure 1.10). In the dialog box, set this setting to enabled, and enter the NetBIOS names, FQDN, or IP addresses of the license servers in the text box, separating them with commas.
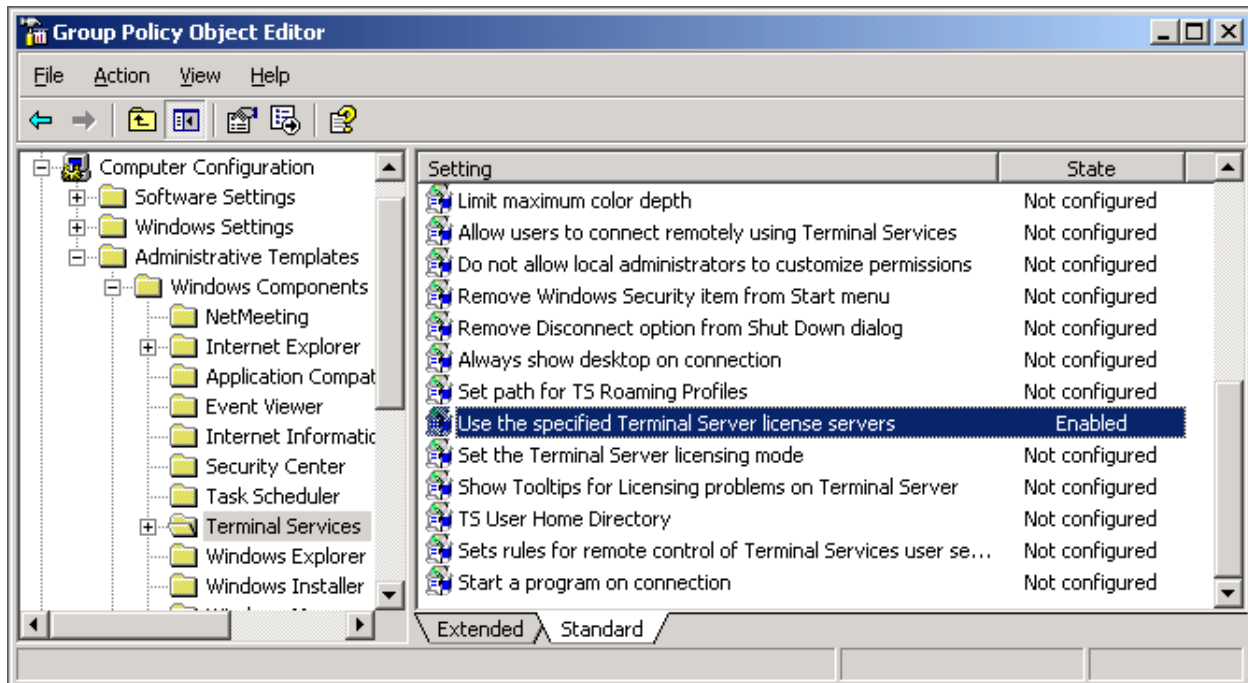
Figure 1.10: Configuring licensing mode via Group Policy.

How to Restrict Access to Terminal Server License Servers

By default, a TSLS will issue tokens to any terminal server that requests them. In a large, environment, this default action can cause problems if unmanaged terminal servers are added to the domain or rogue servers are manually pointed at your license servers. You can, however, restrict access to your license servers by using the License Server Security Group feature. When enabled, a TSLS will only issue tokens to terminal servers that are members of the Terminal Services Computers group.

In a domain environment, this group is a domain local group and is shared among all domain controllers. In a workgroup, this group is a local SAM group on the server running TSLS. If you enable the License Server Security Group in a workgroup environment, TSLS must be installed on the terminal server, and it will then only issue licenses to itself.

To enable the License Server Security Group feature, take the following steps:

1. Use GPMC, Active Directory Users and Computers (in a domain environment), or the Group Policy Editor (gpedit.msc) in a workgroup environment to edit a GPO that applies to your license servers.

> ☞ In a domain, this GPO will most likely be your domain controller security policy.

2. Drill to Computer Configuration | Administrative Templates | Windows Components | Terminal Services | Licensing, and set the License Server Security Group setting to enabled.

3. Add your terminal servers to the Terminal Services Computers group.

After policy refresh occurs, the TSLS will only issue tokens to terminal servers that are in the Terminal Services Computers local group. By default, this group is empty, so you must immediately add your terminal servers to it in order for them to continue to receive tokens from the license servers.

Group Policy Reference

To configure terminal server licensing mode:

> Computer Configuration | Administrative Templates | Windows Components | Terminal Services, and double-click the *Set the Terminal Server licensing mode*

To override automatic license server discovery:

> Computer Configuration | Administrative Templates | Windows Components | Terminal Services, and click *Use the specified Terminal Server license servers*

To enable the License Server Security Group feature:

> Computer Configuration | Administrative Templates | Windows Components | Terminal Services | Licensing, and select *License Server Security Group*

Summary

As terminal servers are increasingly utilized in today's workplace, systems administrators must become familiar with terminal server technologies and installation and administrative steps. This chapter provided an overview of the native options available from Microsoft as well as the basic requirements of a Terminal Services implementation. The next chapter will move forward with an exploration of application installation and configuration.

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