



# TSE Licensing

**By Citrix Consulting Services**

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**TABLE OF CONTENTS**

**OVERVIEW** ..... 1

**TERMINAL SERVICES LICENSING MODEL**..... 2

**WINDOWS 2000 LICENSING SERVERS** ..... 3

    MANAGED LICENSES ..... 3

    COMPATIBILITY WITH NT4.0 TSE..... 3

    LICENSE SERVER SETUP ..... 4

**CLIENT DEVICE LICENSING** ..... 5

**TERMINAL SERVICES INTERNET CONNECTOR LICENSING**..... 6

**ERRORS** ..... 7

**TERMINAL SERVICES LICENSING ENHANCEMENTS** ..... 8

    POST LOGON LICENSE TOKEN ISSUANCE ..... 8

    AUTOMATIC LICENSE TOKEN RE-ISSUANCE ..... 8

    TERMINAL SERVICES CLIENTS CONSUME MULTIPLE TERMINAL SERVICES CALS..... 8



## Overview

This document details the components and operation of Terminal Services Licensing and its impact on enterprise computing.



## Terminal Services Licensing Model

Each device initiating a Windows 2000 Terminal Services session must be licensed with the following:

- Windows 2000 Professional license or Windows 2000 Terminal Services Client Access license.
- Windows 2000 Server Client Access license or BackOffice Family ® Client Access license.

Terminal Services Licensing operates between the following components: the Terminal Services Licensing Server, the Microsoft Certificate Authority and License Clearinghouse, Terminal Servers, and TS Clients.



## Windows 2000 Licensing Servers

The Licensing Server stores all available CALs and delivers these licenses when clients connect without one. This server is a Windows 2000 Terminal Server installed in 'Application Mode'. It can manage unlicensed, pre-licensed, temporarily licensed, and client access licensed clients. It supports both TS CAL and Internet Connector licensing for Terminal Services.

There are two types of Windows 2000 Licensing Servers. In most cases, these types are determined based on the type of Domain/Directory services supported at an Enterprise location:

- A **Domain License Server** is appropriate if you want to maintain a separate license server for each domain. If you have workgroups or Windows NT 4.0 domains, a domain license server is the only type that can be installed. Terminal servers can only access domain license servers if they are in the same domain as the license server. By default, a license server is installed as a domain license server. The license service must be discoverable by the terminal servers. For a Windows 2000 domain, this means the license server must be deployed on a domain controller. The terminal server will discover the license server by enumerating its domain controllers and checking for Terminal Services Licensing. For a workgroup or a Windows NT 4.0 domain, the license server may be deployed on the terminal server or any peer server. In this scenario, terminal servers will locate the available license server through broadcast.
- An **Enterprise License Server** can serve terminal servers in any domain within a site, but the domain must be a Windows 2000 domain. It can only serve terminal servers in the same site. This type of license server is appropriate if you have many domains. Enterprise license servers can only be installed using Add/Remove Programs, not during Windows 2000 setup.

**Note:** When a Windows 2000 Terminal Server cannot connect to a licensing server, that server is placed on a 90-day countdown before it will no longer accept TSE client requests. This was not the case with NT 4.0 TSE.

## Managed Licenses

The license server can manage the following types of licenses:

- **TS Client Access licenses (TS CALs)** - For non-Windows 2000 devices connecting to a terminal server.
- **TS Internet Connector licenses** - To allow anonymous use of a terminal server.
- **Built-in licenses for Windows 2000 clients.**
- **Temporary licenses** - These last for a period of 90 days.

## Compatibility with NT4.0 TSE

Windows 2000 Terminal Server Licensing and NT 4.0 TSE licensing are not compatible. A W2K TSE server cannot make use of the NT 4.0 TSE licensing model, and neither can a NT 4.0 TSE server use the W2K licensing model.

In NT 4.0, TSE licenses are stored on the Terminal Server in the %systemroot%\system32\server directory in the hydra.mdb file. The local NT 4.0 licensing service stores and manages just that one server's TSE Client Access Licenses CALs. Under this model, licensing is managed on an individual server basis.

Microsoft's Licensing Server only runs on Windows 2000 servers and only manages licenses for Windows 2000 Terminal Services. It does not manage or communicate with terminal servers running Windows NT Server 4.0, Terminal Server Edition.



## License Server Setup

License Server setup involves enabling the Terminal Services Licensing service on a Windows 2000 server. This service can be enabled during the operating system installation or later by using Add/Remove Components wizard in the Control Panel. Once this has been done, the licensing service must be activated by contacting the Microsoft Certificate Authority and License Clearing House. This is accomplished by one of four methods:

- **Internet** - This method requires Internet connectivity from the device running the *Terminal Services Licensing Admin Tool*.
- **Web** - The Web method should be used when the device running the *Terminal Services Licensing Admin Tool* does not have Internet connectivity, but the customer has access to the Worldwide Web through a Web browser from another machine.
- **Phone**
- **Fax**

The license service must be discoverable by the terminal servers. For a Windows 2000 domain, this means the license server must be deployed on a domain controller. For a workgroup or a Windows NT 4.0 domain, the license server may be deployed on the terminal server or any peer server. It is critical for an Enterprise to back up their license server, thereby ensuring that the company can recover the TSE licensing information easily in the case of a system failure.



## Client Device Licensing

When a client device attempts to connect to a terminal server, the terminal server will check that the client is fully licensed. If the client is running Windows 2000 or has a valid CAL, it will be allowed to connect. If a client has no license, or a temporary license, the terminal server will attempt to contact a license server from its list of discovered license servers. When a license server responds, the terminal server requests a permanent TS CAL for the client. When it finds an available license, it will mark it as taken by that client and remove it from the available pool. A certificate for that license is sent to the terminal server, which then sends this certificate down to the client. The client uses this certificate on subsequent terminal server connection.

**Note:** A supported fix is available from Microsoft, which affects the way TS CAL licenses are assigned. Please see section 7 *Terminal Services Licensing Enhancements* for more information)



## Terminal Services Internet Connector Licensing

Terminal Services Internet Connector licenses allow terminal servers to serve up to 200 concurrent connections. This replaces the need for a Terminal Services CAL and Windows 2000 Server CAL to be assigned to a specific device. Terminal Services Internet Connector licensing must only be used for anonymous connections from non-employees.

Internet Connector licenses are installed the same way CALs are installed. Once an Internet Connector license is installed on the license server, it can be pulled onto a specific terminal server by turning on the Internet Connector licensing mode.

Once in Internet Connector mode, all connections to that terminal server are automatically logged on as the local account *TSInternetUser*. This cannot be overridden unless the Internet Connector licensing is disabled. Terminal Services client access licensing and Internet Connector licensing are mutually exclusive. If a client has a TS CAL, it will still use one of the 200 concurrent connections when accessing a server with Internet Connector licensing enabled.



## Errors

The following list of errors describe Windows 2000 licensing service issues:

- **Error 1000** – Unable to acquire a license for user '%1', domain '%2'.
- **Error 1003** – The terminal service client '%1' has provided an invalid license.
- **Error 1004** – The terminal server cannot issue a client license. This error is logged when the terminal server requests a CAL for a client device but cannot locate a license server to request.
- **Error 1007** – Unable to log in the Internet user as TSInternetUser. If the problem is not corrected in 20 minutes, delete the account and run Setup again.
- **Error 1008** – The terminal services licensing grace period has expired and the service has not registered with a license server. A terminal services license server is required for continuous operation. A terminal server can operate without a license server for 90 days after initial start up.
- **Error 1009** – The terminal services licensing grace period is about to expire on %1 and the service has not registered with a license server. A terminal services license server is required for continuous operation. A terminal server can operate without a license server for 90 days after initial start up.
- **Error 1010** – The terminal services could not locate a license server. Confirm that all license servers on the network are registered in WINS\DNS, accepting network requests, and the Terminal Services Licensing Service is running.
- **Error 1011** – The terminal services client %1 has been disconnected because its temporary license has expired.



# Terminal Services Licensing Enhancements

The following are enhancements to Windows 2000 Terminal Services Licensing for Windows 2000 that are available as a hotfix. The available hotfix should only be applied to systems that are experiencing the specific problems described in this section. (Refer to Microsoft Knowledge Base article: Q287687 for more information and downloads regarding this fix).

## Post Logon License Token Issuance

When an unlicensed client connects for the first time, the Terminal Server issues a temporary TS CAL token. Once the user logs into the session, the temporary TS CAL token will be marked by the License Server as being validated. The next time the client connects, an attempt is made to upgrade the validated temporary TS CAL token to a full TS CAL token. If no license tokens are available, the temporary TS CAL token will continue to function for 90 days.

## Automatic License Token Re-issuance

A random expiration period between 52-89 days of issuance has been added to each TS CAL token that is issued. When a client connects to a Terminal Server, this date is checked. If the expiration is within 7 days, the TS CAL token will be renewed for an additional 52-89 days. If the License Server is not available, the TS CAL token functions as normal, with the Terminal Server attempting to replace it at each login. Any TS CAL token that has not been renewed is returned to the group of available license tokens upon expiration.

**Important:** Only TS CAL tokens that are issued after the installation of this fix will utilize the re-issuance logic.

## Terminal Services Clients Consume Multiple Terminal Services CALs

Windows-based terminals may consume multiple Terminal Services CAL tokens if the Terminal Services CAL token is not flushed to flash memory before the device is turned off. The hotfix described in this section will also take care of this problem. For more information on this particular problem, please see Microsoft's Knowledge Base article #294792.



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