Microsoft Windows NT Server 4.0, Terminal Server Edition: Bringing Microsoft Windows to Desktops That Can’t Run Windows Today

White Paper

Abstract

Microsoft® Windows NT® Server 4.0, Terminal Server Edition is an extension of the Windows NT Server network operating system product line that delivers the Windows® operating system experience to diverse desktop hardware through terminal emulation. This new technology provides customers with a compelling new extension to the Windows-based computing environment that combines low total cost of ownership, the familiar 32-bit Windows user interface, and the power and choice of the Windows operating system family.
Microsoft® Windows NT® Server 4.0, Terminal Server Edition is an extension of the Windows NT Server network operating system product line that delivers the Windows® experience to diverse desktop hardware through terminal emulation. Terminal Server supports a full range of clients, including Windows-based Terminals, existing Windows 32-bit computers, older 16-bit Windows-based desktops, and Apple Macintosh, MS-DOS®, and UNIX-based desktops (non-Windows-based devices are supported via a third-party add-on from Citrix.)

This new technology provides customers with a compelling new extension to the Windows-based computing environment that combines low total cost of ownership, the familiar 32-bit Windows user interface, and the power and choice of the Windows operating system family. Terminal Server does the following:

- **Extends the scalable Windows family**—Terminal Server plays a critical role in serving companies that want to deploy a “thin-client” solution to deliver 32-bit Windows to a wide range of legacy desktop hardware devices.

- **Combines the low cost of a terminal with the benefits of a managed Windows-based environment**—A Terminal Server-based environment offers the same low cost, centrally managed environment of the traditional mainframe with terminals, with the familiarity, ease of use, and breadth of applications support offered by the Windows operating system platform.

Terminal Server is an extension of the Windows NT Server 4.0 product line. In the multiuser environment, a terminal emulator displays the Windows desktop operating system and Windows-based applications running completely off the server. Terminal Server provides users access to 16- or 32-bit Windows-based applications from any of the following types of desktops:

- A new class of low-cost hardware, commonly referred to as Windows-based terminals, marketed by third-party hardware vendors. A Windows-based terminal contains an embedded terminal emulation client.

- Any existing 32-bit Windows desktop operating system, such as Microsoft Windows 98 or Microsoft Windows NT Workstation (running the terminal emulation client as a window within the local desktop environment).

- Older 16-bit Windows-based desktops running the Windows 3.11 operating system (running the 16-bit terminal emulation client as a window within the local desktop environment).

- X-based terminals, Apple Macintosh, MS-DOS, Networked Computers, or UNIX-based desktops via a third-party, add-on product.
**PRODUCT OVERVIEW**

The Terminal Server product consists of four components—the Windows NT Server multiuser core, the Remote Display Protocol, the Windows-based client software, and enhanced system administration tools. Specifically:

- **Terminal Server**—A multiuser server core that provides the ability to host multiple, simultaneous client sessions on Windows NT Server 4.0 and on future versions of Windows NT Server. Terminal Server is capable of directly hosting compatible multiuser client desktops running on a variety of Windows-based and non-Windows-based hardware. Standard Windows-based applications, if properly written, do not need modification to run on the Terminal Server, and all standard Windows NT-based management infrastructure and technologies can be used to manage the client desktops. In this way, corporations can take advantage of the rich choice of applications and tools offered for use in today’s Windows-based environment.

- **Remote Display Protocol**—A key component of Terminal Server is the protocol that allows a client to communicate with the Terminal Server over the network. This protocol is based on International Telecommunications Union’s (ITU) T.120 protocol, an international, standard multichannel conferencing protocol used first in Microsoft NetMeeting™ conferencing software. It is a multichannel protocol tuned for high-bandwidth enterprise environments and also supports three levels of encryption.

- **Terminal Server Client**—The client software that presents, or displays, the familiar 32-bit Windows user interface on a range of desktop hardware:
  - New Windows-based Terminal devices (embedded).
  - Personal computers running Windows 95, Windows 98, and Windows NT Workstation 3.51, 5.0, or 5.0.
  - Personal computers running Windows for Workgroups (Windows 3.11).

- **Administration Tools**—In addition to all the familiar Windows NT Server administration tools, Terminal Server adds the Terminal Server License Manager, Terminal Server Client Creator, Terminal Server Client Connection Configuration, and Terminal Server Administration tools for managing client sessions. Two new objects, Session and User, are also added to the Performance Monitor to allow tuning of the server in a multiuser environment.
Reducing TCO with Windows

Figure 1

Source: Gartner Group

Source: Microsoft
The ability to deploy a range of cost-effective systems that precisely match user needs is critical to IT (information technology) departments. For most companies, “one size fits all” computing does not make business sense. Microsoft is committed to extending the Windows operating system family to meet a broad range of corporate customer needs—from high-end clustered servers handling billions of transactions a day to handheld roaming devices on factory floors. Terminal Server is the extension of Windows into the “thin-client” marketplace. Microsoft can now offer customers a Windows-based Terminal Server solution:

- For upgrading task-based workers using Line of Business applications to a GUI (graphical user interface) Microsoft Win32®-based environment where “green screen” terminals have traditionally been used.
- As a way to deliver 32-bit Windows-based applications to any legacy desktop, including UNIX, Macintosh, or older Windows-based personal computers that cannot be upgraded to 32-bit Windows due to hardware limitations.
- As a valuable tool that can ease operating system and application upgrades across large numbers of diverse desktops by quickly delivering a consistent desktop presentation and set of applications managed centrally from the server.

Terminal Server and Windows-based Terminals provide exciting new opportunities for enterprise customers to take advantage of the many benefits of the Windows operating system environment, while still focusing on low total cost of ownership.
**Windows-based “Thin-Client” Solution**

With Terminal Server, corporations can deploy a thin-client solution that does not require the rewriting of or downloading of applications from the server. The Terminal Server client contains only the minimum amount of software necessary to boot the device, establish a connection to the server, and present the user interface—all other operating system functions, as well as the applications, run completely on the server.

**Low Total Cost of Ownership**

Terminal Server offers ways to lower both long-term desktop management costs, as well as short-term capital outlay costs. First, since all applications reside only in a single central place—on the server—there is no client application software that must be developed, installed, or updated on the desktop. This makes application development, rollout, and updates less complex. Second, because all user profile information is stored on the Terminal Server, client desktops are administered centrally by the server. Third, remote administration capabilities further reduce the cost of handling helpdesk calls.

Thus, the Terminal Server-based environment gains the benefits of all Zero Administration for Windows capabilities available on Windows NT Server. Last, with a target price range for Windows-based Terminals in the hundreds of U.S. dollars, customers can also choose from a wide range of compatible thin-client devices from many different hardware vendors. Terminal Server can also be used to extend the life of existing low-end, Windows-based computer desktops by enabling access to the 32-bit line-of-business applications running off of the Terminal Server for single-function, task-based scenarios.

**Windows-based Applications Compatibility**

In a Terminal Server-based environment, all applications are run completely from the server. The Terminal Server provides the host-computing environment, including management of all computing resources on a per-user basis (for example, memory, CPU, and other resources). The multiuser capabilities run as part of the Windows NT operating system, thus any 16- or 32-bit Windows-based application that runs on a Windows NT–based computer today can be accessed in the Terminal Server-based environment.

Terminal Server has been thoroughly tested with popular Windows-based applications such as Microsoft Office, Microsoft Internet Explorer, Microsoft Exchange and Microsoft Outlook™ messaging and collaboration client, Microsoft Project, 16- and 32-bit Microsoft Visual Basic®-based applications, as well as other popular 32-bit Windows-based business software products. Third-party applications testing services are also available for ISVs (independent software vendors) and corporate developers to determine compatibility of existing or new applications.
Flexible Architecture to Accommodate Growth

Because the Windows family of operating systems provides a wide range of solutions, customers are not locked into a Terminal Server-based environment as their needs change or grow. Virtually any Windows-based desktop (and many non-Windows-based desktops) work with Terminal Server. If a user requires more power, administrators can easily swap out a Windows-based Terminal client for a more powerful client device, such as a low-end PC or workstation. The user interface, user profile, and applications do not have to be modified, saving end-user training and applications development resources. Also, Windows-based Terminals from different manufacturers are compatible, so they can be mixed and matched.

Microsoft Industry Partnerships

On May 12, 1997, Microsoft Corporation announced a joint development agreement with Citrix Systems Inc. Under this agreement, Microsoft licensed the Citrix multiuser technology, and the companies jointly developed the Terminal Server technologies for Windows NT Server 4.0 and future versions. Citrix has announced plans to market an add-on to Terminal Server, called Citrix MetaFrame that will support existing and future ICA-based Citrix clients. For more information on this and other Citrix products, see [http://www.citrix.com/](http://www.citrix.com/).

Microsoft also announced an agreement with Prologue Software the same day to license its multiuser technology and for Prologue to cooperate in the development and deployment of Terminal Server. Microsoft is also working closely with server hardware vendors to ensure the scalability needed for a centralized computing environment.
The advantages of a managed Windows-based environment include a familiar user interface, a wide range of applications, choice of hardware for both the server and desktop, centralized administration, and a choice of development and administration tools. With all of these advantages, Terminal Server brings the best of the Windows family of operating systems to customers needing to deliver 32-bit applications to legacy and terminal desktops or to remote or branch users.

For More Information

For the latest information on the Windows product family and lowering total cost of ownership with Microsoft Windows, see our World Wide Web site at http://www.microsoft.com/windows.

For the latest information on the Microsoft Windows NT, Terminal Server Edition product, see http://www.microsoft.com/ntserver/basics/terminalserver/.
Glossary of Terms

**Terminal Server.** Terminal Server is the short version of Microsoft Windows NT Server 4.0, Terminal Server Edition, a software product from Microsoft that adds terminal emulation, or thin-client, capabilities to the Windows NT Server product family.

**Terminal Server client.** Thin-client software that runs on Windows-based Terminals (embedded), or on existing Windows-based personal computers (Windows 3.11, Windows 95, Windows 98, or Windows NT Workstation). The Terminal Server client presents the 32-bit Windows user interface and either comes with the hardware device (Windows-based Terminal) or is downloaded by the Terminal Server to the desktop personal computer device.

**Windows-based personal computer.** A personal computer (ROM, RAM, and so on) running a 16- or 32-bit Windows operating system (Windows 3.x, Windows 95, Windows 98, or Windows NT Workstation).

**Windows-based Terminal.** A new type of low-cost hardware device optimized specifically to run the Terminal Server client. Windows-based Terminals are ideal for a task-based computing environment and might typically be used to upgrade the classic “green screen” terminals to a Win32-based environment.