







INFRASTRUCTURE FOR THE ON-DEMAND ENTERPRISE

## **Citrix® Value-add to Microsoft® Windows Terminal Services**

**This document compares the base-level features within Windows Terminal Services to the value-added features of Citrix Presentation Server™.**









Category/ Feature	Description	Microsoft® Windows Server™ 2003	Citrix Presentation Server™ 4.5 Advanced	Citrix Presentation Server™ 4.5 Enterprise	Citrix Presentation Server™ 4.5 Platinum
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<b>Performance and End User Experience</b>	<b>Citrix enhances the usability and performance of applications running on Terminal Services. This results in higher user satisfaction and eased support requirements for IT.</b>				
<b>Performance</b>					
CPU Utilization Management	In a shared, multi-user Terminal Services environment, one user's activities can adversely impact performance for other users. Citrix's CPU management feature ensures that a CPU-intensive process initiated by one user does not degrade the performance of other sessions.	Partial support with Windows Server 2003 Enterprise Edition		✓	✓
Session Sharing	When a user requests a second application on Terminal Services, the application is launched in the existing user session. This allows the application to start up almost instantly (as opposed to creating a wholly new session) and reduces memory and CPU consumption on the server.		✓	✓	✓
Enhanced Application Performance	A <a href="#">Tolly Group study</a> showed that Citrix Presentation Server enhances Terminal Services application performance by up to 2x.		✓	✓	✓
Fast Printing	A <a href="#">Tolly Group study</a> showed that Citrix Presentation Server's Universal Printer Driver offers 2 to 3 times faster printing than Windows Terminal Services.		✓	✓	✓
Enhanced Printer Compatibility	With Citrix Presentation Server's Universal Printer Driver, users have access to advanced printing properties like paper trays, sorting, stapling, and print preview. This enhances user productivity and reduces IT support requirements.		✓	✓	✓
Bandwidth tuning	IT administrators can ensure optimal performance by limiting the amount of bandwidth used by activities like printing and file transfer. This feature is particularly critical when users are connecting from branch offices over low-bandwidth WAN links. Without tuning features, other sessions from the branch office are likely to experience performance issues during the print job or file transfer.		✓	✓	✓
Multimedia Application Support	Supporting multimedia applications like Windows Media Player (as is common with computer-based training applications) is not possible with Terminal Services, since remote display protocols do not provide for synchronized audio and video. Citrix's SpeedScreen Multimedia Acceleration feature provides synchronized audio-video delivery by intercepting the request for a media file on the Presentation Server, and streaming the media to the client where it can be rendered locally.		✓	✓	✓
2D Graphical Application Enhancements	Support for two-dimensional graphical applications like PAC S and GIS systems, even over wide area network connections (SpeedScreen Progressive Display).		✓	✓	✓
Support for high-latency network links	Applications accessed via Terminal Services over high-latency network links (i.e. satellite) may not provide adequate performance. Citrix's SpeedScreen Latency Reduction feature optimizes performance by echoing keystrokes and mouse clicks locally. This provides a far more usable experience for the end user and makes it possible to access applications over high-latency links.		✓	✓	✓






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Web Application Enhancements	Citrix enhances the performance and usability of Internet Explorer-based web applications running on Terminal Services. This is done by loading HTML text in the web page before GIF/JPEG images, so that users have immediate access to information. As the HTML pages load the images in the background, the images are progressively composed so that users don't have to wait until the entire page loads.		✓	✓	✓
Session Reliability	When a network connection issue occurs, Citrix keeps the application window visible on the client device. This ensures that once the network issue is resolved, users do not have to re-login or restart the application. This is useful in situations where users roam between wireless "hot spots" or when a transient network issue occurs.		✓	✓	✓
File Transfer Performance	When copying files over the network connection, Citrix improves the user experience by reducing wait times, especially for remote sessions where latency is high.		✓	✓	✓
Automatic detection of SmartCard-enabled applications	Citrix provides enhancements to automatically detect applications that are smartcard-enabled.		✓	✓	✓
Server-to-client URL redirection	When clicking on URL's (such as HTTP or HTTPS links) within an application running on Terminal Services, the link is opened with the local client browser instead of launching the browser on the Terminal Server. This feature enhances support for mixed desktop/Terminal Services environments, and ensures that the local browser and Internet connection is used for web browsing. This can reduce the bandwidth requirements for Internet connections within the data center, which would be used by browsers running within Terminal Services.		✓	✓	✓
Client-to-server redirection of file types	Citrix can redirect requests for a specific document or file type to a Terminal Server session. For example, clicking on a Visio® document on the client device will launch the document in a Visio application on the Terminal Server, instead of a local application. This is a useful feature in environments where a particular application may not be installed locally, but users still need to have access to the file types served by that application.		✓	✓	✓
Multi-monitor support for applications	Citrix allows the display of applications running on Terminal Services to be performed across multiple local monitors connected to the client workstation. Furthermore, the starting position of a particular application (such as the left or right-hand side monitor in a dual monitor environment) to be persistent across multiple sessions. Multi-monitor support is a common requirement in financial services environments.		✓	✓	✓
Bidirectional audio	Citrix supports audio recording and playback on a client desktop, including use of Philips SpeechMike™ transcription devices. Bidirectional audio is a common requirement in medical and legal firms, and provides a foundation to support VoIP softphones in the future.		✓	✓	✓
Prioritization of display data in presentation protocol	Citrix offers enhanced application responsiveness with built-in quality of service for graphics applications.		✓	✓	✓
Priority packet tagging	Enables the prioritization of virtual channel traffic by third-party Quality-of-Service (QoS) network infrastructure providers.		✓	✓	✓









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Pass-thru authentication	For Windows clients connected to the company directory, the credentials used for local device logon are passed automatically to sessions running on Terminal Services. This simplifies and speeds up the user's connection process.		✓	✓	✓
<b>Mobility</b>					
Reconnect to disconnected sessions	Allows users to reconnect to their Terminal Services sessions without going through the time-consuming logon process again.	✓ With Enterprise Edition of Windows Server 2003	✓	✓	✓
Application Streaming to Desktops	Publish and deliver applications on-demand to devices such as laptops that need offline application access. Applications are streamed into isolation environments so that conflicts and regression testing are avoided.			✓	✓
SmoothRoaming	Citrix allows a user to roam between devices and networks while maintaining their sessions. This enhances user productivity in manufacturing shop floors, healthcare, and wireless mobility scenarios.		✓	✓	✓
Dynamic display reconfiguration	Automatically adapts the existing Terminal Services session's display mode (i.e. resolution, color depth) to that of the reconnecting client device. Without this feature, a new user session would be established for the user, resulting in lower server scalability and lower user productivity.		✓	✓	✓
Proximity printing	Enables users within a specified IP address range to automatically access the network printing devices that exist within that same range. This increases user productivity and lessens the IT support burden.		✓	✓	✓
Panning and Scaling	Supports the delivery of full-screen Windows applications on small form factor devices using panning (scroll) and scaling (resize) functionality.		✓	✓	✓
SmartAccess	Analyzes the integrity and identity of the device connecting to the network to determine what level of access should be granted to the user.				✓
<b>Management and Configuration</b>	<b>Citrix enhances Terminal Services with a set of mature and easy-to-use management and monitoring tools. This increases IT and user productivity and provides additional capabilities not available in the base-level Terminal Services environment.</b>				
<b>Load Management</b>					
Distribute connection requests to multiple servers using round-robin process	Supports simple load management rule: connections are served by servers in a sequential order.	✓	✓	✓	✓
Distribute load relative to session count, CPU, memory consumption	Establishes user sessions across a group of load-managed servers based on configurable parameters like session count, CPU utilizations, memory consumption, time of day, etc.		✓	✓	✓





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Load Managed Server Groups ("Silos")	Provides the ability to isolate groups of servers to serve specific applications in a load managed fashion. This feature simplifies management and eliminates costly regression testing.		✓	✓	✓
Geographically distributed servers in a farm	Citrix provides a robust architecture that supports grouping and managing server farms that span multiple data centers. This ability provides business continuity and disaster recovery benefits.		✓	✓	✓
Application Streaming to Servers	Stream applications to x32 or x64-bit Terminal Servers into isolation environments, thereby avoiding application conflicts and regression testing.	 With SoftGrid™ for Terminal Services add-on license (x32 only)		✓	✓
Zone Preference and Failover	Establishes users sessions based on their proximity to and availability of a particular server. This feature enables higher performance in farms that span multiple data center and eases disaster recovery and business continuity.		✓	✓	✓
Application availability scheduling and control	Citrix provides the ability to control delivery of applications to users based on time of day and number of session or application instances.		✓	✓	✓
Administrative Logging	Keeps a running log of changes made to system configurations, for audit trail and root cause analysis purposes.		✓	✓	✓
Application Performance Monitoring	Powered by Citrix EdgeSight™, Application PerfMon provides visibility into the end user's perception of application performance. Using this feature, IT can identify poorly performing applications, manage system resources to remove bottlenecks, and report on application utilization.				✓
<b>Application Publishing</b>					
Publish applications using Seamless Window	Enables applications running on Terminal services to look and feel as if they are running locally.		✓	✓	✓
Create desktop shortcuts to individual applications	Shortcuts to Terminal Services applications can be made available on the user's local desktop.		✓	✓	✓
Publish applications to non-Windows client platforms	Allows non-Windows (Mac®, Unix®, Linux®, Java™) clients to access Windows based applications.		✓	✓	✓
Central management of multi-server app publishing	Citrix allows administrators to publish and maintain applications on multiple servers to multiple users at the same time. Application publishing is not required to be carried out from each individual server.		✓	✓	✓
Content publishing	Citrix extends the application publishing model to accommodate internal and external content. This is a useful feature for the creation of a simple remote access portal, as well as provisioning web applications accessed via the local browser along with client/server, web, and/or desktop applications executed on Terminal Services.		✓	✓	✓
Support for folders for application publishing	Citrix allows applications to be grouped within folders for cleaner and easier organization for multiple user groups.		✓	✓	✓

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<b>Web application portal</b>					
Publish to web application portal	Allows for individual applications to be made available via web browser.		✓	✓	✓
Custom branding for web application portal	Provides the ability to easily customize the look and feel of the web application portal according to customer requirements.		✓	✓	✓
Publish to third party enterprise information portal, including SharePoint® and WebSphere®	Enhances enterprise information portals as a centralized point of access by including Terminal Services applications.		✓	✓	✓
Self-Service Password Change	Allows users to change passwords from the web application portal themselves, rather than requiring users to call their help desk. This feature is important for remote access scenarios and other situations where user device do not authenticate to the directory.		✓	✓	✓
Support for multi-factor authentication	Citrix enhances the security of web application portals by easily integrating third-party multi-factor authentication solutions such as RSA SecurID® and Secure Computing SafeWord®. The token codes are integrated into the web application portal's authentication page along with the username and password.		✓	✓	✓
Publish applications to non-Windows clients	Citrix extends support for web application publishing to non-Windows (Mac, Unix, Linux, Java) clients, with automatic download of the required Presentation Server client. Citrix also provides support for users with Mozilla Firefox® and Netscape® browsers.		✓	✓	✓
Publish applications to any Windows clients	Allows older, legacy versions of Windows to access applications running on Terminal Services.		✓	✓	✓
User specification of connection speed	Users can specify their network connection speed/type for application access, thereby optimizing application performance.		✓	✓	✓
Multilingual user interface	Dynamically changes the locale of the web application portal depending on the user's or administrator's preferences.		✓	✓	✓
End Point Analysis and Advanced Access Control	Analyzes the integrity and identity of the device connecting to the network to determine the level of access granted.				✓
<b>Print Management</b>					
Fallback printer driver	Provides a "printer driver of last resort" ensuring that printers are accessible with basic printing functions.	✓	✓	✓	✓
Universal Printer Driver	Provides a printer driver that can be used for all printers, including advanced functions, so that administrators do not need to install native drivers on the servers.		✓	✓	✓
Client Printer management	Provides a centralized console for installing printer drivers on a group of servers.		✓	✓	✓

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Enhanced printer compatibility	Support for wide set of printer device types and functionalities.		✓	✓	✓
Policy based assignment of client printers	Printers can be assigned using a policy engine, allowing for conditional assignment of session printers (including the default printer) based on user name, server name, client name or IP address range.		✓	✓	✓
Session printer properties	Administrators can set default printer properties for client printers, simplifying the user's printing process.		✓	✓	✓
<b>User, Server and Application Visibility</b>					
Integrated Management Console for application publishing, load management, reporting & monitoring	Centralized management console for administrative tasks: application publishing, load management, user connection settings, and resource monitoring.		✓	✓	✓
Access Policies	Administrators can configure settings for user sessions as policies that can be applied to sessions based on username, group, server name, server management container, client IP address or subnet, client name (or partial name), or SmartAccess zone. Priorities can be applied to these policies depending on specific user session situation.		✓	✓	✓
Delegated administration	Allows administration tasks and permissions to be assigned across multiple groups within the IT department, such as the help desk, level 2 support, and the Terminal Services administration team.		✓	✓	✓
Resource Manager	Provides the ability to monitor and evaluate server performance. Custom threshold-based alerts and reports can be generated to enhance management and growth of the Terminal Services farm.			✓	✓
Installation Manager	Automates the process of installing applications across multiple servers in a Terminal Services farm.			✓	✓
Application launch limits	Allows administrators to control user access to applications by setting time and instance limits.		✓	✓	✓
Multiple options for Configuration Database – Microsoft SQL, IBM® DB2®, Oracle® database	Supports existing corporate computing standards for other data-center infrastructure components, such as Microsoft, IBM or Oracle. Provides a stable and secure architecture.		✓	✓	✓
Integration with multiple 3 <sup>rd</sup> party management consoles	Manage servers using 3 <sup>rd</sup> party management consoles like Microsoft Operations Manager, IBM Tivoli®, HP OpenView®, CA UniCenter®.			✓	✓
Native support for Windows NT® domains	Allows for role-based access to be provided using NT domain users and groups.		✓	✓	✓
Native support for Active Directory®	Allows for role-based access to be provided using any version of Active Directory.	✓	✓	✓	✓

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Active Directory Federation Services support	Supports authentication using credentials from a federated Active Directory forest, thereby increasing the security of applications used by business partners.		✓	✓	✓
Native support for Novell Directory Services™	Allows for role-based access to be provided using Novell Directory Services (eDirectory)		✓	✓	✓
Anonymous Access	Provides the ability to grant access to Terminal Services applications without requiring explicit authentication from the user. This can simply IT administration and enable support for additional authentication schemes like third-party LDAP directories.		✓	✓	✓
<b>Compatibility</b>	<b>Citrix addresses the needs of today's heterogeneous IT environments by supporting a wide variety of devices and applications.</b>				
<b>Client Device Heterogeneity</b>		○	●	●	●
Client platforms support	Supported client platforms: Windows Vista, Windows 32-bit, Windows 16-bit, DOS, Unix, Linux, Java, WinCE, Mac, IBM OS/2®, Symbian™, EPOC™, PocketPC/Windows Mobile.		✓	✓	✓
<b>Application Compatibility</b>		○	◐	●	●
Virtual IP address support	Supports applications that require a unique IP address for each application instance. Without this feature, some applications are not able to be supported on Terminal Services.		✓	✓	✓
Application Isolation Environments	Resolves compatibility issues for applications that are not compliant with the multi-user Terminal Services environment, including registry, file, and named object conflicts.			✓	✓
<b>Support for USB devices</b>		○	●	●	●
Support for Pocket PC device using ActiveSync®	Citrix supports the synchronization of a client-connected USB PocketPC devices via Microsoft ActiveSync software running in Terminal Services.		✓	✓	✓
TWAIN scanner support	Allows applications running on Terminal Services to access TWAIN-compliant scanners connected to the client device.		✓	✓	✓
<b>Security and Control</b>	<b>Citrix technologies enhance the security of a centralized architecture by providing additional security and control features.</b>				
<b>Secure remote access</b>		○	◐	●	●
SSL Gateway	Provides SSL/TLS encryption and multifactor authentication to provide authorized application access to appropriate users.		✓	✓	✓
Appliance-based SSL Gateway	Universal SSL VPN appliance that provides a secure, always-on, single point-of-access to all applications and protocols.				✓

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DMZ Traversal using SSL	Provide access to corporate resources from anywhere and from behind any firewall, protecting sensitive information in the trusted zone. Supports existing DMZ traversal policies without opening additional ports.		✓	✓	✓
Policy-based access to client devices via SSL Gateway Appliance	Administrators can enhance security and intellectual property containment by controlling users' ability to connect client devices like printers and local drivers.		✓	✓	✓
Advanced Access Control and End point analysis	Analyzes the integrity and identity of the device connecting to the network to determine the level of access granted.				✓
<b>Enterprise Single sign-on</b>		○	○	○	●
Policy based enterprise single sign-on for any application	Requires users to logon only once with their network credentials and automates subsequent logons to applications access through a Web browser, Windows client, or host terminal emulator. Specifies strong password characteristics such as length, character repetition and alphanumeric requirements on a per-application basis – applies to manual and automated password changes.				✓
Self service network password reset	Allows users to reset their domain password or unlock their Windows account from their PC, thus reducing help desk costs for password resets.				✓
<b>Two-factor authentication</b>		○	●	●	●
Integration with two-factor authentication devices	Integrates with most two-factor authentication devices like tokens, smartcards and biometrics to enhance security.		✓	✓	✓
<b>Scalability</b>	<b>Citrix enhances Terminal Services by supporting more users per server, thereby requiring fewer servers for the same number of users. In addition, Citrix allows the environment to be scaled out without increasing administration complexity, both on the network and within the server farm.</b>				
<b>Server and Farm Scalability</b>		○	◐	●	●
Enterprise class scalability - proven large deployment support: over 1000 servers	Supports large server farms that can span wide area networks, while maintaining performance and reliability.		✓	✓	✓
Session Sharing	Citrix ensures that when a user requests a second application on a Terminal Server, the application is launched in the existing user session. This reduces memory and CPU consumption on the server, thereby supporting more users per server and requiring fewer servers.		✓	✓	✓

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CPU Utilization Management	In a shared, multi-user Terminal Services environment, one user's activities can adversely impact performance for other users. Citrix's CPU management feature ensures that a CPU-intensive process initiated by one user does not degrade performance of other sessions. As a result, additional Terminal Servers do not need to be maintained to assure good user performance.	✓ Partial support with Windows Server 2003 Enterprise Edition		✓	✓
Virtual Memory Optimizations	Performs DLL rebasing for applications in order to reduce the amount of memory conflicts when loading DLLs, resulting in a reduction in overall memory requirements for some applications. This enables a single server to support more concurrent users, thereby reducing overall server count within a Terminal Services environment.			✓	✓
Enhanced Single Server Scalability	A <a href="#">Tolly Group study</a> showed that augmenting Terminal Services with Citrix Presentation Server can increase the number of users per server by 25% or more.			✓	✓
<b>Network Scalability</b>		○	●	●	●
Reduced Bandwidth Consumption	A <a href="#">Tolly Group study</a> showed that Citrix Presentation Server used 25-50% less bandwidth than Terminal Services. This ensures that the number of users can be scaled up without additional costs for network bandwidth.		✓	✓	✓

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