Wonderware® once again leads the industry in providing new benefits for manufacturing automation by bringing the performance capabilities of thin client computing to its flagship human-machine interface (HMI) system, Wonderware InTouch® version 7.1/7.11.

The new Terminal Services for InTouch provides manufacturing users with all the benefits of using thin client applications, including:

- Centralized deployment, maintenance, and management of software including program execution, data processing and storage on a server.
- High scalability for installing and serving large numbers of remote clients.
- Centralized management while still allowing individual user flexibility with the complete Windows experience.
- Reusing PCs in new ways to take full advantage of existing hardware by allowing computers (even hardware that operates Windows 3.11 applications) to operate as thin clients.
- Simplifying installation and related costs. It can take only minutes to deploy most thin-client devices.
- High levels of operator and system security.
- Remote access to running applications for production.
- Client support for multiple operating systems and versions, including Windows CE, Embedded NT(NTE), Windows for Workgroups 3.11, Windows 95/98, Windows NT 3.51/4.0, Windows 2000, Linux and Unix.

Terminal Services for InTouch accomplishes all this by introducing the ability to use Microsoft® Windows® Terminal Services in an industrial environment. Terminal server systems can deliver the complete Windows 2000 desktop experience—including running the latest Windows-based applications, such as Wonderware InTouch—to virtually any...
desktop or remote computing device, including those that run operating systems other than Windows 2000, including Windows CE and Embedded NT. The client need only run the Terminal Server protocol.

Manufacturing users can now choose to deploy InTouch 7.1/7.11 in a fully server-centric mode, in which applications run entirely on the server. Each operator logs on and perceives only his or her presentation (known as a session), which is managed transparently by the server operating system and is independent of any other client session. Only screen, mouse and keyboard information is transmitted over the network between the client and the server. This facilitates use by plant operators as well as casual users—including maintenance staff, supervisors, engineers and/or vendors, who might need immediate access to critical manufacturing or process information that is pertinent to them.

### FEATURES AND BENEFITS—OVERVIEW

#### Architecture

The typical production plant of recent years has been a multi-layered hierarchy of systems. At the bottom is the control layer, with the associated programmable logic controllers (PLCs), distributed control systems (DCS) and input/output (I/O) systems. These are linked by the control network layer, usually implemented using Ethernet or proprietary methods. If the application is sufficiently large, there will be an InTouch Tag Server that centralizes communications with the plant floor equipment. Above this will be the InTouch operator nodes, linked to an IndustrialSQL Server™ historian, and any casual or infrequent users.

For the last decade and a half these systems typically have been implemented in client/server architectures. The problem is, anytime new operating system or application software upgrades are released, each node must be loaded with the patches, service packs or new software versions, creating a huge administrative issue.

<table>
<thead>
<tr>
<th>Client-Server/Terminal Server Architecture Comparison</th>
<th>Client-Server Architecture with PCs</th>
<th>Mixed Client-Server and Terminal Server Architecture with PCs</th>
<th>Terminal Server Architecture with old PCs functioning as thin-clients</th>
<th>Terminal Server Architecture with Thin-clients</th>
</tr>
</thead>
<tbody>
<tr>
<td>Client-Hardware</td>
<td>$50,000 (new, $50-950 MHz PII)</td>
<td>$50,000 (new, $50-950 MHz PII)</td>
<td>$0 (assume continued use of existing legacy PC IWI)</td>
<td>$20,000 (new, thin client platform—on Ave. price)</td>
</tr>
<tr>
<td>Client OS Licenses</td>
<td>Approximately $8,000</td>
<td>Approximately $8,000</td>
<td>Included with server license package</td>
<td>Included with server license package</td>
</tr>
<tr>
<td>Server Hardware</td>
<td>$8,000</td>
<td>$15,000 (assume additional memory storage)</td>
<td>$15,000 (assume additional memory storage)</td>
<td>$15,000 (assume additional memory shortage)</td>
</tr>
<tr>
<td>WinNT/2000 Server and Terminal Server Licenses</td>
<td>$2,000 (includes NT client access licenses)</td>
<td>$2,000 (includes NT client access licenses)</td>
<td>$4,000 (includes all required client licenses)</td>
<td>$4,000 (includes all required client licenses)</td>
</tr>
<tr>
<td>Total cost of Acquisition</td>
<td>$48,000</td>
<td>$75,000</td>
<td>$19,000</td>
<td>$38,000</td>
</tr>
</tbody>
</table>

* Assumes a 25-client system configuration

This is resolved using terminal server capabilities and a new thin client version of InTouch 7.1/7.11. Microsoft has embedded Terminal Services as a core part of Windows 2000. Now, the implementation of Terminal Services is as simple as checking a box within Windows 2000.

#### Flexible Configurations, Flexible Budgets

The new thin client approach to InTouch deployment also allows users to change over gradually to terminal server usage. Users can mix-and-match client/server and terminal server configurations. They can even mix and match RDP and ICA clients in order to run combinations of Windows workstations and Linux clients. This approach provides users with great flexibility to support whatever is appropriate for specific applications and to reduce total cost of ownership in the process.

Using a 25-node system, for example, if a user installed all thin clients on diskless workstations, the typical hardware cost might be $39,000. This is much lower than the typical cost for implementing applications in a full client/server architecture, at an estimated $68,000. The cost for converting existing hardware can be even lower. By adding Terminal Services for InTouch, a typical user could save thousands of dollars by installing a new server and re-deploying the older PCs as client terminals. The user could upgrade easily to InTouch 7.1/7.11 with one copy on the server and using thin clients on the PCs.

Plus, if users are already running InTouch on a full-function workstation client, they now have the choice of running tasks locally or as a terminal services session. A user running an InTouch application today can redeploy the same application in terminal services and extend usage to multiple workstations. Users can have one application on the server and just execute it multiple times, in multiple sessions. Or they can have multiple different applications running and executing simultaneously on the server. It just depends on how they want to set up the system.
Application Deployment

Although Terminal Services for InTouch looks and feels much like the original client/server versions, and most applications run without modification, there are some considerations that should be reviewed when planning a terminal server configuration. Please refer to the InTouch Terminal Services Deployment Guide for further details.

Client High Availability

The new thin client approach to deploying InTouch will also be valuable because of its enhanced system availability. There are quite simply fewer problems that can take a thin client down, and even if a component fails, it’s easy to get applications back up and in service much more quickly. Since the application is still running on the server, users just plug in the new terminal device and they’re back up in less than a minute.

Re-Use Existing Clients

The client hardware used can be from almost any platform. Windows 3.11, Windows CE, Linux, UNIX, or a workstation running Win 9x, NT, or 2000 are all supported. This allows you to reuse your existing hardware and save money and time. Instead of shutting down the plant to replace the existing hardware and network cabling, the existing system can be used.

System Performance

The performance of the server has a direct impact on the performance of the resulting Wonderware products. The server must be sized and set up correctly. Wonderware has performed massive scalability and concurrency testing on InTouch to validate its use in a thin client environment—and to insure that customers will enjoy the same high performance levels and ease of use they’ve always experienced with InTouch. If an application requires more than 25 nodes, simply install another server.

Citrix Support

Citrix MetaFrame is available as an add on option to Windows NT and 2000 Terminal Services. This permits the use of non-Windows operating systems for clients, including UNIX, Linux and Macintosh. Citrix supports their own terminal protocol (ICA) and their own set of Terminal Services tools.

Network Load Balancing

Microsoft and Citrix support network load balancing, which is important in implementing mission-critical applications. Network Load Balancing enhances the availability and scalability of applications. It redirects the connection from a failing or offline server to a backup. After maintenance is completed, the offline computer can transparently rejoin the cluster. There are many methods of deploying system redundancy. Please consult your Wonderware, Microsoft, or Citrix Websites for the latest information.

Remote Access

Another benefit of using terminal services in remote control or shadowing of applications is that if a supervisor or operator is at home and an operator problem occurs, designated users can dial in via a remote access server (RAS) and request simultaneous control of the session.

Terminal Services also supports wireless clients right out of the box, for easy mobile access to InTouch applications. Virtually any wireless remote device that supports a Terminal Server protocol can be used to gain access to a terminal server over any TCP/IP connection.
Wireless Access

Internet access is easy, too, using Microsoft’s new Terminal Services Advanced Client (TSAC), which provides almost the same functionality as the full Terminal Services client, but is designed to deliver this functionality over the web. Clients need only have an Internet Explorer 4 or greater browser installed.

IndustrialSQL Server and ActiveFactory Support

The thin client InTouch 7.1/7.11 release supports ActiveFactory client tools to allow you to analyze and view your information from an InSQL server. ActiveFactory client tools can run on the terminal server.

Communications

Inter-nodal communications are enhanced with modifications to Wonderware’s SuiteLink™ protocol to support session communications. In all cases, this is transparent to the user. InTouch will automatically detect that it is communicating inter-session rather than inter-node. Three new QuickScript functions have also been introduced to enhance support for Terminal Services, including:

- **TseClientId()** – Returns a string version of the client ID (the TCP/IP address of the client).
- **TseQueryRunningOnConsole()** – Returns a non-zero integer value if the View application is running on a Terminal Server Console.
- **TseQueryRunningOnClient()** – Returns a non-zero integer value if the View application is running on a Terminal Server client.

In addition, a console application run locally on the server—which refers to an application run locally on a computer rather than within a Terminal Server session—should be designated to manage NetDDE communications with plant floor devices. NetDDE is not supported within Terminal Server sessions.

Terminal Services for InTouch 7.11 can also leverage Network Application Development (NAD) capabilities. This allows you to dedicate memory space on the server for maintaining local history data and retained tags, so that data can be accessed properly for running an application.

I/O Server Support

Terminal Services for InTouch V7.1/7.11 supports all standard InTouch I/O Servers that have been certified Windows 2000 Compliant. I/O Servers can be deployed in a variety of means. The I/O server can be run from a terminal server or from separate node, the same as they operate today.

Security

Terminal Services can be fully locked down so that all an operator sees is InTouch. Each user can be presented only with what he or she needs, based on their login. Terminal Services for InTouch leverages the NT security system so that you can assign privileges to specific groups and users.

Enhanced Development Tools

New benefits accrue to InTouch developers as well, since Terminal Services also supports clipboard cutting and pasting between sessions. Using Terminal Services, authorized developers now can call up one version of WindowMaker locally, then call up WindowMaker in a session and cut-and-paste—and all the associated links go with it.
Specifications

Server Hardware Requirements

<table>
<thead>
<tr>
<th>CPU1</th>
<th>Physical Memory$^{2,3}$</th>
<th>Virtual Memory$^4$</th>
<th>Number of Clients</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pentium III 450 MHz</td>
<td>384 MB</td>
<td>960 MB</td>
<td>5</td>
</tr>
<tr>
<td>Pentium III 500 MHz</td>
<td>1024 MB</td>
<td>2560 MB</td>
<td>15</td>
</tr>
<tr>
<td>Pentium III 700 MHz</td>
<td>2048 MB</td>
<td>5120 MB</td>
<td>25</td>
</tr>
</tbody>
</table>

1. Multi-processors can improve performance
2. Add 128 MB of RAM for Windows 2000 Advanced Server
3. Memory requirements depend on application load and the number of users connected. RDP will need 40-60 MB per user running InTouch, while ICA will require slightly more.
4. Virtual memory (page file size) should be at least 250% of the physical memory.

Operating Systems Supported

SP2 or Advanced Server
Citrix MetaFrame 1.8 running on top of Windows 2000

Terminal Protocols Supported

Microsoft RDP (Remote Desktop Protocol) 5 or greater
Citrix Metaframe (ICA) 1.8a or greater

Hard Disk Space

- One or more hard disks with a minimum of 2 GB on the partition that will contain the system files.
- The use of RAID (Redundant Array of Inexpensive Disks) will help prevent the loss of data and server downtime.

Networking

10/100 MBPS network adapter card on a network that uses the TCP/IP protocol.

Peripheral Devices

- **Hard Disks.** Disk speed is critical for terminal server performance. SCSI (Small Computer System Interface) disk drives, especially drives compatible with fast SCSI and SCSI-2, have significantly better throughput than other types of drives.
- **Network Adapters.** A high-performance network adapter is recommended, especially if users require access to data that is stored on network servers or client/server applications, such as Wonderware InTouch. Using multiple adapters can significantly increase network throughput.

RDP Client Hardware Requirements

There will be some performance considerations depending on the model of the client being used and the applications to be supported. In general, users may deploy any terminals that support either RDP protocols (Windows CE, Embedded NT, 3.1/3.11, 95/97/98/ME, 2000 and XP). Wonderware only supports Linux hardware under the ICA protocol.