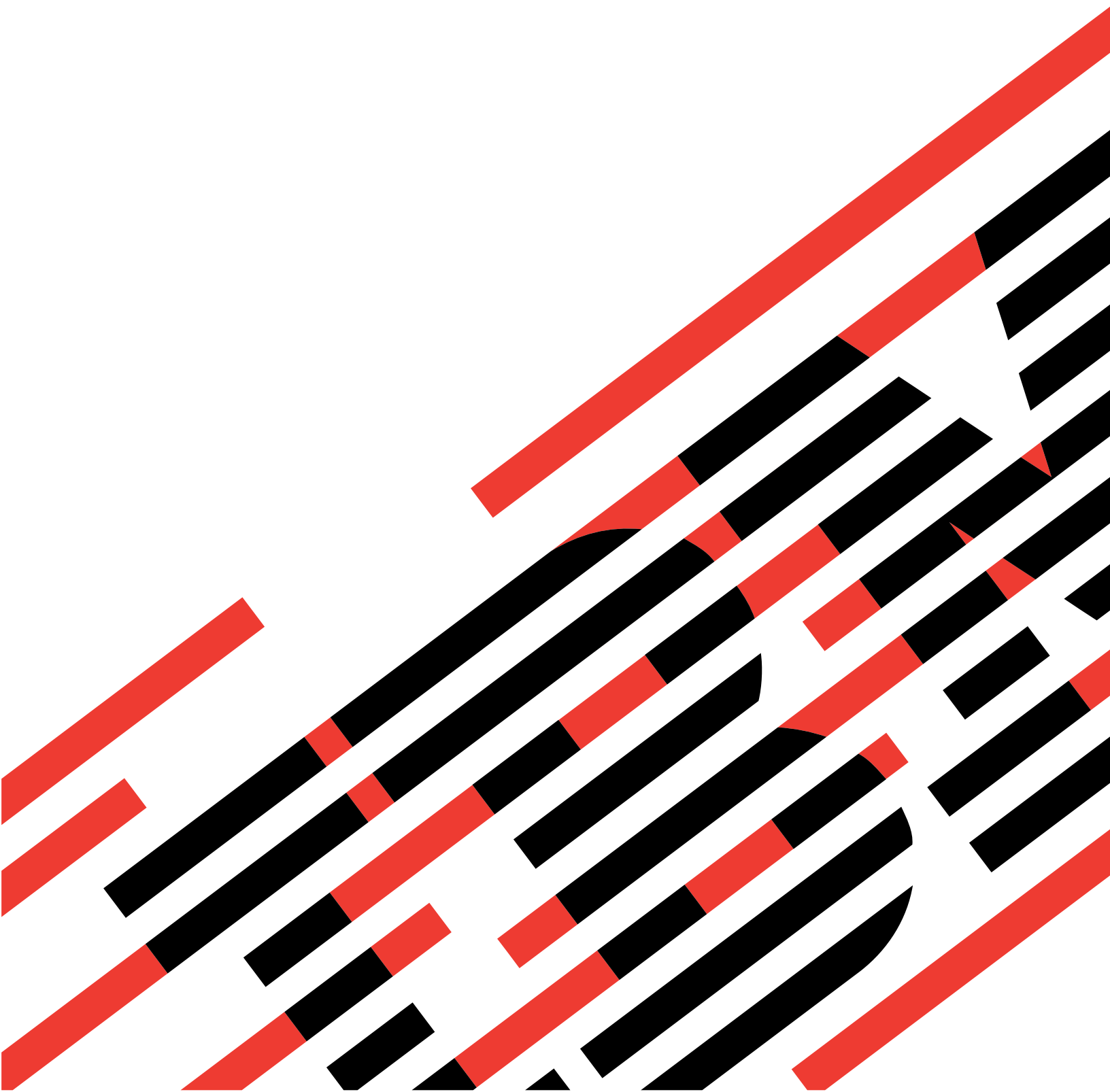


IBM

@server

iSeries

Windows server on iSeries





@server

iSeries

Windows server on iSeries

Contents

Windows server on iSeries	1
Code disclaimer information	1
What's new for V5R2	2
Print this topic	3
Terminology	3
How Windows server on iSeries differs from Windows on PC	4
What is an Integrated xSeries Server for iSeries?	5
Advantages of Windows Server on iSeries.	5
Run multiple Windows servers on multiple Integrated xSeries Servers	6
Performance and capacity of Windows server on iSeries	7
Install and configure iSeries Integration for Windows Server	7
Hardware requirements for running Windows server on iSeries	8
Integrated xSeries Server for iSeries CCIN and feature code numbers	10
Preinstallation checklist for iSeries Integration for Windows Server	11
Machine pool size requirements for iSeries Integration for Windows Server	13
Local area networks used by Windows server on iSeries	13
Windows Cluster Service on the iSeries Integrated Windows Server.	19
Installing Windows Cluster service	19
Installing Windows Cluster service on a new Windows server	20
Installing Windows Cluster service on an existing server	20
Preparing Windows before installing Windows Cluster service	21
Installing Windows Cluster service on Windows	22
Install Windows Cluster service on Windows 2000	22
Install Windows Cluster service on Windows .NET	23
Time synchronization	24
Verifying that OS/400 time zone is set	24
Tip: Find resource names when you have multiple Integrated xSeries Servers	24
Configuring OS/400 TCP/IP for Windows server on iSeries	25
iSeries Access for Windows on Windows server on iSeries	25
Enabling iSeries NetServer	26
Create a guest user profile for iSeries NetServer	26
Comparison of FAT, FAT32, and NTFS file systems	27
Network server descriptions for Windows server on iSeries	27
Supported language versions	27
Plan for iSeries Integration for Windows Server installation on Windows 2000 and Windows .NET	28
Installation work sheet for OS/400 parameters	38
Windows server installation advisor	39
Install iSeries Integration for Windows Server	40
Install Windows 2000 or Windows .NET Server on the Integrated xSeries Server	41
Software requirements for running Windows 2000 or Windows .NET Server on iSeries	41
Start the Windows 2000 or Windows .NET Server installation from the OS/400 console	41
Continue the Windows 2000 and Windows .NET installation from the Windows server console	43
Complete the installation of Windows 2000 and Windows .NET Server on iSeries	44
Plan for iSeries Integration for Windows Server installation on Windows NT 4.0	45
Install Windows NT 4.0 on the Integrated xSeries Server	46
Software requirements for running Windows NT 4.0 on iSeries	46
Start the Windows NT 4.0 server installation from the OS/400 console	46
Continue the Windows NT 4.0 installation from the Windows server console	48
Complete the installation of Windows NT 4.0 on iSeries	50
Responding to error messages during installation.	51
Upgrade your server from Windows NT 4.0 to Windows 2000 or Windows .NET Server	52
Upgrade and migration considerations for iSeries Integration for Windows Server and Integrated xSeries Server.	54

Set Windows server to automatically vary on with TCP/IP	55
Code fixes for iSeries Integration for Windows Server	56
iSeries Integration for Windows Server Code and the Microsoft Windows Update Web site	56
Types of iSeries Integration for Windows Server code fixes	56
Check iSeries Integration for Windows Server service levels on Windows 2000 and Windows .NET Server	56
Check iSeries Integration for Windows Server service levels on Windows NT 4.0	57
Install iSeries Integration for Windows Server service packs on Windows 2000 or Windows .NET Server	57
View or install service packs using Integration for Windows Server Snap-in	58
View or Install service packs using iSeries Navigator	58
Install iSeries Integration for Windows Server service packs for Windows NT 4.0	59
Install and uninstall service packs with the lvsync command	61
Remove iSeries Integration for Windows Server service pack and hot fixes on Windows 2000 and Windows .NET Server	62
Remove service packs and hot fixes using the Integration for Windows Server Snap-in	62
To view or remove service packs and hot fixes using iSeries Navigator	63
Details: Remove iSeries Integration for Windows Server service packs	63
Remove iSeries Integration for Windows Server maintenance levels for Windows NT 4.0	64
Upgrade iSeries Integration for Windows Server	64
Upgrade OS/400 and iSeries Integration for Windows Server	64
Upgrade Windows servers when you upgrade iSeries Integration for Windows Server	66
Upgrade iSeries Integration for Windows Server using iSeries Navigator	67
Migrating to 2890 Integrated xSeries Server hardware	67
Install the Savage 4 Video Driver for Windows NT 4.0 on the 2890 Integrated xSeries Server	70
Migrating to 50xx Migration Tower	71
Add new network adapters to Windows server on iSeries	71
Create line descriptions for network adapters shared between OS/400 and Windows server on iSeries	72
Configure Virtual Ethernet connections to OS/400, another Windows server, or LPAR on iSeries	73
Add a TCP interface for a new shared network adapter	74
Update network server descriptions with Windows server adapter information	74
Install network adapter drivers and adding adapter address information to Windows server	75
Install network adapter drivers and add adapter address information to Windows server for Windows 2000 or Windows .NET Server	75
Install network adapter drivers and add adapter address information to Windows server for Windows NT	76
Installing OS/400 Multi-Port protocol driver	77
Install Gigabit Ethernet adapters on Windows NT 4.0	77
Removing network adapters from Windows server on iSeries	78
Administer Windows server on iSeries	80
Starting and stopping Windows server on an Integrated xSeries Server for iSeries	81
Starting Windows server from OS/400	81
Start Windows server without starting the external host LAN	81
Shut down Windows server from OS/400	82
Details: Vary off a Windows server NWSD when OS/400 is sharing LAN adapters on the Integrated xSeries Server	83
Shut down Windows server on iSeries from Windows server	83
Restart Windows server on iSeries from Windows server	84
Avoid data loss when entering restricted state or powering down iSeries	84
Manage your Windows servers from OS/400	85
Manage properties for Windows server on iSeries	85
Display Windows server information on OS/400	85
Monitor Windows server event logs on OS/400	86
Print from Windows server on iSeries	86
Run Windows server batch commands from OS/400	86

Considerations for running Windows server batch commands from OS/400	87
Manage storage	89
OS/400 storage management	89
Disk drives for Windows server on iSeries	90
Predefined disk drives for Windows server on iSeries	91
Administer Windows disk drives from OS/400	92
Access the OS/400 integrated file system from Windows server on iSeries	92
Obtain information about disk drives for Windows server on iSeries	92
Add disk drives for Windows server on iSeries.	93
Create disk drives for Windows server on iSeries.	93
Link disk drives for Windows server on iSeries.	93
Format disk drives for Windows server on iSeries	95
Copy a disk drive	96
Unlink disk drives from Windows server on iSeries	96
Deleting disk drives for Windows server on iSeries	97
Deleting disk drives when removing a Windows server.	97
Use Windows disk management programs with Windows server on iSeries	98
Administer Windows server users from OS/400	98
User and group enrollment to Windows server.	99
Enable OS/400 user enrollment on Windows servers	100
Limit QAS400NT user profile changes	101
Use PRPDMNUSR to control user enrollment	102
Enroll a single user to Windows server on iSeries	102
Details: Enrolling users to Windows server on iSeries with network server attributes	103
Create user templates for Windows server on iSeries.	103
User enrollment templates.	105
Prevent accidental deletion of users from Windows server	106
Enroll OS/400 groups to Windows server on iSeries	106
Enrolling only the members of OS/400 groups to Windows server on iSeries	106
Check enrollment status	107
End user enrollment to Windows server on iSeries.	107
Effects of ending user enrollment to Windows server on iSeries	108
End group enrollment to Windows server on iSeries	108
Effects of ending group enrollment to Windows server on iSeries	109
Share devices	109
Determine the device description and hardware resource names for iSeries devices	109
Use iSeries optical drives with Windows server on iSeries	109
Use iSeries tape drives from Windows server.	110
Supported iSeries tape drives	111
Format a tape on OS/400 for Windows server	111
Allocate the iSeries tape drive to Windows server on iSeries	112
Identify iSeries tape devices for applications	113
Transfer control of the iSeries tape and optical drives between Windows servers.	113
Return control of a tape drive from Windows server to iSeries.	114
Return control of an optical device from Windows server to iSeries.	115
Print from Windows server on iSeries to iSeries printers	115
Back up and recover Windows server on iSeries	116
Back up the NWSD and disk drives associated with Windows server on iSeries	117
Back up NWSDs for Windows server on iSeries.	117
Back up predefined disk drives for Windows servers created on V4R5 and later OS/400 systems	118
Back up predefined disk drives for Windows servers created on pre-V4R5 OS/400 systems	118
Back up user-defined disk drives for Windows server	119
What objects to save and their location on OS/400.	121
Back up individual Windows server files and directories	122
File-level backup restrictions	122
Preliminary administrator setup tasks.	123

Create shares on Windows server	123
Add members to QAZLCSAVL file	124
Ensure iSeries NetServer and Windows server are in same domain	124
Save your files	124
Examples: How to address parts of Windows server	125
Windows Backup utility	126
Restore the NWSD and disk drives for Windows server on iSeries	126
Restore predefined disk drives for Windows servers created on V4R5 and later systems	127
Restore predefined disk drives for Windows servers created on pre-V4R5 systems	127
Restore user-defined disk drives for Windows servers on iSeries	128
Restore NWSDs for Windows server on iSeries	129
Recover Windows server files	129
Save and restore user enrollment information.	130
Uninstall Windows server from Integrated xSeries Server	130
Delete network server descriptions for Windows server on iSeries	131
Delete line descriptions for Windows server on iSeries	132
Delete TCP/IP interfaces associated with Windows server on iSeries	132
Delete controller descriptions associated with Windows server on iSeries	132
Delete device descriptions associated with Windows server on iSeries	132
Delete iSeries Integration for Windows Server	133
Troubleshoot Windows server on iSeries	133
Check message and job logs.	134
Monitor job	135
Troubleshoot problems with Windows server on iSeries	135
Blue screen errors on Windows server on iSeries	136
A full system drive on Windows server on iSeries	136
Remapping a full C drive on Windows server on iSeries	137
Drive letters	137
Optical device problems on Windows server on iSeries	138
Locked optical device for a failed server.	139
Tape problems on Windows server on iSeries	139
Verify that the iSeries Tape Drive device driver is loaded	140
Display problems with Windows NT 4.0	141
Problems starting Windows server on iSeries.	141
Vary-off failures of Windows server on iSeries	142
NWSD configuration file errors	142
Repair the NWSD configuration file	142
Reset NWSD configuration file parameter	142
Use a previous version of the Windows server file	143
DASD in externally attached xSeries servers	143
HSL communication problems with the Integrated xSeries adapter	143
Failures enrolling users and groups on Windows server on iSeries	143
User and group enrollment from a Windows NT 4.0 server to a Windows 2000 or Windows .NET Server	145
User-enrollment authorization problems	145
Password problems	146
Level Check or Integration for Windows Server snap-in program for Windows server on iSeries	147
Virtual Ethernet connection problems.	149
Troubleshooting Virtual Ethernet problems	149
OS/400 external LAN when sharing network adapters	151
External LANs for Windows 2000 and Windows .NET Server	153
Manually update LAN drivers in Windows 2000 or Windows .NET	155
Begin the LAN driver installation or update.	155
Select the adapter to install or update	156
Complete the LAN driver installation or update	156
Private LAN IP address conflicts	157

Details: assign private LAN IP addresses	158
IP forwarding problems	159
TCP/IP failure between OS/400 and Windows	160
IFS access problems.	160
Problems with saving Windows server files	161
Unreadable messages in the server message queue	162
Problems getting a Windows server system memory dump.	162
Reinstall Windows server on iSeries	163
Collect service data for Windows server on iSeries.	164
Create a Windows server memory dump on OS/400	164
Use the network server description (NWSD) dump tool on OS/400	165
Network server description configuration files	167
NWSD configuration file format	168
Create an NWSD configuration file.	168
Example: NWSD configuration file	169
Remove lines from an existing Windows server file with CLEARCONFIG entry type	170
TARGETDIR keyword	170
TARGETFILE keyword	170
Change a Windows server file with ADDCONFIG entry type	170
VAR keyword	171
ADDSTR keyword	171
ADDWHEN keyword	171
ADDWHEN and DELETEWHEN expression operators	172
DELETEWHEN keyword	172
LINECOMMENT keyword	172
LOCATION keyword	172
LINESEARCHPOS keyword	173
LINESEARCHSTR keyword	173
LINELOCATION keyword	173
FILESEARCHPOS keyword (ADDCONFIG entry type)	173
FILESEARCHSTR keyword	173
FILESEARCHSTROCC keyword	173
REPLACEOCC keyword	173
TARGETFILE keyword	174
UNIQUE keyword	174
VAROCC keyword.	174
VARVALUE keyword	174
Change a Windows server file with UPDATECONFIG entry type.	174
FILESEARCHPOS keyword (UPDATECONFIG entry type)	175
FILESEARCHSTR keyword (UPDATECONFIG entry type)	175
FILESEARCHSTROCC keyword (UPDATECONFIG entry type)	175
Setting configuration defaults with the SETDEFAULTS entry type	175
ADDWHEN	176
DELETEWHEN	176
FILESEARCHPOS keyword (SETDEFAULTS entry type)	177
FILESEARCHSTR keyword (SETDEFAULTS entry type)	177
TARGETDIR	177
TARGETFILE	177
Use substitution variables for keyword values.	177
Related information	179

Windows server on iSeries

If you are already familiar with iSeries Integration for Windows Server, you might want to start with “What’s new for V5R2” on page 2 for this release. If you want, you can “Print this topic” on page 3 or display a Portable Document Format (PDF) version of the Windows server on iSeries information.

» Running Windows server on an “What is an Integrated xSeries Server for iSeries?” on page 5 is easy and only a little “How Windows server on iSeries differs from Windows on PC” on page 4 than running Windows NT^(R) 4.0, Windows^(R) 2000, or Windows^(R) .NET Server on a PC. It provides some advantages such as allowing you to use iSeries disk storage, iSeries optical drives, and iSeries tape drives. It also gives you the benefits of OS/400 administration. «

To use Windows server on iSeries, you need these items:

- The licensed program iSeries Integration for Windows Server (product number 5722-WSV), and either option 1 (for Windows NT 4.0) or option 2 (for Windows 2000 » and Windows .NET Server). This program comes on one of the Operating System/400 CD-ROMs, and there is no extra charge for it
- One of the following is needed:
 - An Integrated xSeries Server for iSeries «
 - An Integrated xSeries Adapter for iSeries along with a supported externally attached xSeries server
 - An Integrated Netfinity Server for AS/400
- Licenses for the Windows server that you purchase from your Microsoft reseller.

Up and running

- “Install and configure iSeries Integration for Windows Server” on page 7 the integration software and a supported version of » Windows 2000, Windows .NET, or Windows NT 4.0« on your iSeries. Learn about code fixes, upgrading your software, and installing and removing network adapters.

» Windows server and users management

- “Administer Windows server on iSeries” on page 80 from OS/400.« Start and stop the server, run Windows server batch commands remotely, monitor server operation, and print to OS/400 printers.
- Go to “Manage storage” on page 89 for information about storing data and sharing network files.
- “Administer Windows server users from OS/400” on page 98 from OS/400. Change passwords and enrollment status. Use templates to create user and group profiles.
- “Share devices” on page 109 » such as tape and optical drives and printers.«

Planning your backup strategy, handling problems, and uninstalling the program.

- Read information about “Back up and recover Windows server on iSeries” on page 116 that is specific to iSeries Integration for Windows Server.
- » If necessary, “Uninstall Windows server from Integrated xSeries Server” on page 130 Windows server from your OS/400 system.«
- Use the “Troubleshoot Windows server on iSeries” on page 133 articles to help you solve problems. Read suggestions for collecting service data and solving specific problems.
- Find » “Related information” on page 179 sources.

Code disclaimer information

This document contains programming examples.



IBM grants you a nonexclusive copyright license to use all programming code examples from which you can generate similar function tailored to your own specific needs.

All sample code is provided by IBM for illustrative purposes only. These examples have not been thoroughly tested under all conditions. IBM, therefore, cannot guarantee or imply reliability, serviceability, or function of these programs.

All programs contained herein are provided to you "AS IS" without any warranties of any kind. The implied warranties of non-infringement, merchantability and fitness for a particular purpose are expressly disclaimed. <<

What's new for V5R2

>> This release brought a number of changes and enhancements to Windows server. It also provides enhancements to the Windows Administration section of iSeries Navigator. The changes and enhancements for this release include:

- Support for Windows .NET Standard and Enterprise Server was added. Official support will be provided within 30 days of their general availability. For more information and the specific requirements to run Windows .NET, see the IBM Windows Integration Web  site.
- Support for "Windows Cluster Service on the iSeries Integrated Windows Server" on page 19.
- Support for linking up to 16 shared disk drives for clustered Windows servers which increases the total number of disk drives on clustered servers to 48.
- Windows system drive size has increased to 64000 MB for supported Integrated xSeries Servers and Integrated xSeries Adapters when using Windows 2000 or Windows .NET servers.
- Support for read-only disk drives to be shared between Windows .NET Servers.
- A Delete Windows Server (DLTWNTSVR) command was added.
- In iSeries Navigator, a Run Windows command function was added to the Windows Administration section.
- In iSeries Navigator, iSeries Integration for Windows Server service functions were added to the Windows Administration section.
- Support for Tape Auto Cartridge Loader (ACL) was added.
- Support for Virtual optical media library was added.
- Support for managing user domain enrollment on multiple Windows servers was added.
- User enrollment support was added for organizational units in the Windows 2000 Active Directory.
- Enhanced the usability of the iSeries Integration MMC Snap-in for Service and Device Locking functions.
- Support for high speed Virtual Ethernet networks was added. A Virtual Ethernet network is much faster and more versatile than a token ring Internal LAN.
- New hardware type 2892, model 001 Integrated xSeries Server card is available (see "Integrated xSeries Server for iSeries CCIN and feature code numbers" on page 10 for Integrated xSeries Server cards that work with Windows servers). Details of the 2892 were not available when this topic was written. For more information about the 2892, including technical specifications, see the IBM Windows Integration Web  site. <<

Print this topic

To view or download the PDF version, select Windows server on iSeries (about 192 pages or 985 KB).

Saving PDF files

To save a PDF on your workstation for viewing or printing:

1. Right-click the PDF in your browser (right-click the link above).
2. Click **Save Target As...**
3. Navigate to the directory in which you would like to save the PDF.
4. Click **Save**.

Downloading Adobe Acrobat Reader

If you need Adobe Acrobat Reader to view or print these PDFs, you can download a copy from the Adobe Web site

Terminology

The following terms and concepts are new for V5R2. For more terms and concepts, see the Information Center glossary.

Cluster service

The Windows cluster service manages the cluster specific activities and is installed on each node of the cluster. The components of the Cluster service provide high availability, easy management and enhanced scalability for Windows.

Forming a cluster

The first node of a cluster to install the Cluster service attempts to gain control of the quorum resource and forms the cluster by creating cluster recovery databases. Windows 2000 Advanced server allows for two-node clusters while Windows .NET Enterprise Server allows for four-node clusters.

Joining a cluster

Additional nodes join an existing cluster when they can communicate with another active clustered node and can validate the node name and version compatibility.

Node A node is a network server that participates in a Windows cluster. A cluster is formed by joining together two or more network servers from the same iSeries server partition. All joined network servers share a common quorum resource drive, which appears on a shared SCSI bus, and can communicate with each other through the Virtual Ethernet. Each node can detect the other nodes as they join or leave the cluster.

Node-to-node communication

Internal communication between clustered nodes uses the Virtual Ethernet as the private network (or interconnect) that carries the heartbeat. The Cluster service on each node uses a heartbeat to keep track of the current state of the nodes within the cluster. The Cluster service uses the heartbeat to:

- Determine when a failover to another node should occur
- Synchronize the cluster databases on each node
- Verify node failures during a cluster configuration change. The private network uses the single network Virtual Ethernet model.

Quorum resource

Every cluster contains a single drive designated as the quorum resource. It contains the

configuration data used by the cluster to recover the cluster database. The quorum resource is created as a network server storage space with the cluster name specified on the Cluster name and uses the Cluster configuration information.

Shared drives

Network server storage spaces can be linked as shared using the Add Server Storage Link (ADDNWSSTGL ACCESS(*SHRUPD)) parameters once a quorum resource drive has been created and linked to a node. Drives which are shared appear to Windows as though they were on a common shared storage bus and can be controlled as separate resources by the Cluster service. These drives can be failed over to another node in the cluster. <<

How Windows server on iSeries differs from Windows on PC

Although running Windows server on an “What is an Integrated xSeries Server for iSeries?” on page 5 is much like running it from a PC, there are a few differences:

- >> Because of the hardware implementation of the Integrated xSeries Server, the most obvious difference between it and a PC-based server is the absence of a diskette drive. Unless you have an externally attached xSeries server with a diskette drive, you cannot use a startup diskette or an emergency repair diskette with your Integrated xSeries Server. However, you can use iSeries disk space to back up your Windows server files. Additionally, an externally attached xSeries server can have a diskette drive. <<
- Although the Integrated xSeries Server has no tape or disk drives of its own, it can use iSeries devices.
- >> Integrated xSeries Server does not require LAN adapters, cables, hubs, or switches for TCP/IP communication with other parts of the iSeries system or other Integrated xSeries Servers over the Virtual Ethernet LAN. <<
- Installing Windows server on an Integrated xSeries Server is different from a typical PC server installation. You first install the integration software on OS/400, then install Windows server. You enter much of the configuration information with the OS/400 INSWNTSVR command, so some of the usual Windows server installation panels do not appear. This command also includes some additional parameters that are specific to integrating the server with OS/400, such as Synchronize date and time.
- On the OS/400 side of server management, a Windows server is represented by a network server description (NWSD), and network interfaces are represented by line descriptions (LINDs). You can stop and restart the server from OS/400 by varying the NWSD off and on.
- When you install applications, you do not need to install tape drivers. The drivers that allow Windows server to use iSeries tape drives come with the Integrated xSeries Server.
- You can do a lot of your user administration tasks from OS/400, such as creating Windows users.
- Because OS/400 “OS/400 storage management” on page 89 differs differently than a PC, some techniques necessary to administer storage on a PC are unnecessary when you run Windows server on the Integrated xSeries Server. >> You do not need to partition high-growth databases, defragment disks, or employ disk striping on your Integrated xSeries Server. <<

You might also want to read about the “Advantages of Windows Server on iSeries” on page 5 and the “Performance and capacity of Windows server on iSeries” on page 7 of

What is an Integrated xSeries Server for iSeries?

Figure 1. An Integrated xSeries Server



The Integrated xSeries Server for iSeries is essentially a PC on a card. It contains an Intel processor and memory. You install it in iSeries much like a memory upgrade. Similarly, the Integrated xSeries Adapter for iSeries is an HSL bus adapter plugged into a supported Netfinity or xSeries Server. The Netfinity or xSeries Server appears as >> an HSL attached expansion unit to the iSeries system. <<

>> Neither contains disk drives; OS/400 storage is allocated to each server. You can configure the disk as one or more virtual drives of varying sizes. These virtual drives are allocated within the OS/400 integrated file system. The PC software perceives them as physical hard drives. <<

Depending on the model, the Integrated xSeries Server card has either parallel and serial ports or a Universal Serial Bus (USB) and can support Token Ring and Ethernet (copper or fiber based) adapters. A keyboard, mouse, and monitor are directly attached to the Integrated xSeries Server card. In conjunction with the Integrated xSeries Server card, these peripherals act as the console for the Windows server software.

>> Integrated and HSL-attached servers can securely communicate with OS/400 using TCP/IP, without going through LAN hardware. The newer models can also securely communicate with each other and with logical partitions on the same system without going through LAN hardware.

Because the hardware type 289x Integrated xSeries Servers require a Peripheral Component Interconnect (PCI) nodes infrastructure, it is available on OS/400 systems at Version 4 Release 5 and later. <<

For more specific information, refer to:

- “Performance and capacity of Windows server on iSeries” on page 7
- “Integrated xSeries Server for iSeries CCIN and feature code numbers” on page 10

Advantages of Windows Server on iSeries

iSeries Integration for Windows Server provides most of the capabilities of running Windows server on a personal computer and provides the following advantages:

Space savings

- A smaller hardware footprint, with fewer pieces of hardware to manage, than an iSeries system and a separate PC server.

Greater accessibility and protection for your data

- Access to iSeries disk storage, which is generally more reliable than PC hard disks.
- Improved disk storage access performance because storage is spread across multiple disk storage arms.
- Access to the faster iSeries tape drives to back up Windows server.

- Better data protection if you use mirroring or RAID on OS/400. Windows server implicitly takes advantage of it to protect your data.
- ➤ Add additional storage to a Windows 2000 or Windows .NET Server without varying the server off (2890, 2892, and 2689 models).
- Gain access to DB2 UDB for iSeries data through an enhanced Open Database Connectivity (ODBC) driver using iSeries Access. This driver enables server-to-server applications between Windows server and OS/400.
- The ability to use iSeries Integration for Windows Server as a second tier in a three-tier client/server application.
- Secure TCP/IP communications with OS/400 without using LAN hardware. ⏪

Simplified administration

- Simplified administration of user parameters, such as passwords, from OS/400. You can create users and groups and enroll them from OS/400 to Windows servers on Integrated xSeries Servers. This makes updating passwords and other user information from OS/400 easy.
- Easier maintenance of members in a group.
- Integration of user administration function, security, server management, and backup and recovery plans between the OS/400 and Windows server environments. For V4R5 and later releases you can save your Windows server data on the same media as other OS/400 data and restore individual files as well as OS/400 objects.

Multiple servers

- The ability to simultaneously run “Run multiple Windows servers on multiple Integrated xSeries Servers” on multiple Integrated xSeries Servers on a single iSeries. Also, the ability ➤ to simply switch to another up-and-running server if the hardware fails.
- Cluster service, available only for Windows 2000 Advanced Server or Windows .NET Enterprise Server running on an Integrated xSeries Server or Integrated xSeries Adapter, enables connecting multiple servers into server clusters. Server clusters provide high-availability and easy manageability of data and programs running within the cluster.
- High-performance, secure TCP/IP communications with other servers and logical partitions on the same system without using LAN hardware. This is available only for Windows 2000 or Windows .NET servers running on an Integrated xSeries server or Integrated xSeries adapter. ⏪

Remote management and problem analysis

- Ability to sign on to OS/400 from a remote location and shut down or restart your Windows server.
- Remote analysis of Windows server errors because you can mirror Windows server event log information to OS/400.

Direct-attached xSeries Server

- Greater scalability
- Better currency with Intel processor offerings
- Wider availability of supported PCI feature cards

Run multiple Windows servers on multiple Integrated xSeries Servers

If you have multiple Integrated xSeries Servers installed on your iSeries, you can define their domain roles in a way that will simplify user enrollment and access. For example, you might want to set up one of these servers as a Windows server domain controller and the others as Windows servers on the same domain. If you set up your servers this way, you enroll users to only the domain. Users can then log on to the domain from any Windows server machine on that domain. ➤ Users can have multiple Windows belonging to the same Windows domain. When the administrator enrolls users to a domain, there may be multiple Windows servers to which enrollment can be processed. A network server description parameter can be used to specify whether domain enrollment is allowed. The Propagate Domain User (PRDMNUSR)

parameter of the Install Windows Server (INSWNTSVR), Change Network Server Description (CHGNWSD), and Create Network Server Description (CRTNWSD) commands provide the capability to determine whether to allow user enrollment to domains. The ability to turn user enrollment off and on reduces redundant network processing. <<

Multiple Windows servers on Integrated xSeries Servers can share the iSeries CD-ROM and tape drives. However, only one server at a time can use an iSeries CD-ROM or tape drive because it must first be “Allocate the iSeries tape drive to Windows server on iSeries” on page 112 to the server. If your iSeries server has logical partitions, you may only allocate CD-ROM and tape drives that exist in the same partition as

Performance and capacity of Windows server on iSeries




» The Integrated xSeries Server on which Windows server runs has a 200 MHz Pentium Pro, 333 MHz Pentium II, 700 MHz Pentium III, 850 MHz Pentium III, or 1.0 GHz Pentium III processor. The Pentium Pro processor has a 512 KB L2 cache and from 64 MB to 512 MB of memory. The Pentium II processor has a 512 KB cache and up to 1 GB of memory. The 700 MHz or 850 MHz Pentium III processor has a 256 KB L2 cache and up to 4 GB of memory. For benchmarks that are processor intensive, you can refer to capacity charts for similarly configured personal computers. <<

Most benchmarks are dependent on much more than the processor speed. Disk drives also play an important part in understanding the performance and capacity of a system. Windows server on an Integrated xSeries Server does not use traditional disk drives. Instead, it uses space in OS/400 single level store to simulate disk drives for Windows server. Therefore, you need to add the disk requirements of Windows server to that of OS/400 to determine if disk capacity is adequate. On the iSeries, the disk activity should be monitored to determine if you have adequate disk capacity.

You may also monitor system loads by using the Work with Disk Status (WRKDSKSTS), Work with Network Server Storage Spaces (WRKNWSSTG), and Work with Network Server Status (WRKNWSSTS) commands.

For many other performance issues, Windows server on an Integrated xSeries Server behaves like a PC-based Windows server. You can use the Windows server Performance Monitor as you would on a PC. See Windows server documentation from Microsoft for information about using the Performance Monitor.

Use the following links to see more performance-related information:

- For supported hardware and detailed performance numbers, see the IBM Windows Integration Web  site
- For more information about performance tools and IXS performance, see the iSeries Performance Management Web  site
- For more information about IXS performance, see Chapter 17 of the iSeries Performance Capabilities Reference  on the

Install and configure iSeries Integration for Windows Server

» Installing Windows server on an Integrated xSeries Server involves installing two separate pieces of software: IBM iSeries Integration for Windows Server and the Windows server software from Microsoft. <<

If you use logical partitions on your iSeries:

- Verify that 5722-WSV is already installed and if not, install it. There is no requirement to install the licensed program on all the logical partitions. For example, one logical partition might have Integration

for Windows Server and one or more Windows servers installed while another logical partition has neither Integration for Windows Server nor any Windows servers installed.

Note: You can have both Option 1 and Option 2 installed on a partition.

- You need to install the Integration for Windows Server and a Windows server only on the logical partition that you will use to vary on the server.

» If you want to run both Windows NT 4.0 and Windows 2000 or Windows .NET Server, you can install both options of iSeries Integration for Windows Server on an iSeries or partition. When you install a Windows server on OS/400, you specify the version of Windows and the hardware resource by a network server description (NWSD) object. However, you can have only one NWSD varied on (running) for a given hardware resource at any given time. «

Once you have set up TCP/IP on OS/400, decide how many Windows servers and subnets you need for your particular business. One larger model of iSeries can hold up to 32 individual Windows servers.

Obtain TCP/IP addresses from your network administrator. These include:

- IP addresses for all external TCP/IP ports
- Subnet mask
- Your domain name or workgroup name
- IP address for your Domain Name System (DNS) server, if you have one
- IP address of the default gateway for your local area network (LAN), if you have one

If you are already running TCP/IP on your OS/400 system, you might be able to use the same values that your OS/400 system uses for the last two items in the list. (To do this, specify *SYS for those parameters on the INSWNTSVR command.)

Note: » Microsoft documentation tells you to disable disk mirroring and disconnect any uninterruptible power supply before installing or upgrading to Windows 2000 or Windows .NET Server. Be aware that this does not apply to disk mirroring or an uninterruptible power supply that you have on your iSeries. «

» The installation requires basic iSeries operational skills and a knowledge of Windows NT 4.0, Windows 2000, or Windows .NET and knowledge of network administration. «

Other setup tasks that you might want to do with your Integrated xSeries Server include:

- “Code fixes for iSeries Integration for Windows Server” on page 56
- “Upgrade iSeries Integration for Windows Server” on page 64 to a new software version.
- “Migrating to 2890 Integrated xSeries Server hardware” on page 67 to new Integrated xSeries Server hardware.
- Install a “Add new network adapters to Windows server on iSeries” on page 71.
- “Removing network adapters from Windows server on iSeries” on page 78

When you are ready to begin installation, select the Windows operating system that you will be installing:

- “Plan for iSeries Integration for Windows Server installation on Windows 2000 and Windows .NET” on page 28
- “Plan for iSeries Integration for Windows Server installation on Windows NT 4.0” on page 45

Hardware requirements for running Windows server on iSeries

To run iSeries Integration for Windows Server, you need the following hardware:

- Any 64-bit RISC iSeries or AS/400.

- “Integrated xSeries Server for iSeries CCIN and feature code numbers” on page 10 that is compatible with your model of iSeries (an internal Integrated xSeries Server, internal Integrated Netfinity Server, or an Integrated xSeries Adapter along with a supported external xSeries server model):
 - Attached SVGA compatible monitor
 - Attached mouse or other pointing device
 - At least 128 MB of random access memory (RAM)
 - >> At least 256 MB of RAM for Windows .NET Server<<
 - Attached keyboard
- You need free iSeries disk space for each network server description. Depending on the drive size you specify when you install your server, that required disk space can range from 1224 MB up to 64450 MB.
- Up to 100 MB of free iSeries disk space for the code of the iSeries Integration for Windows Server licensed program.
- >> One or more approved LAN ports or PCI adapters:
 - The **IBM iSeries 2892 Integrated xSeries Server** supports the following IBM iSeries LAN ports or PCI adapters:
 - iSeries 2892 10/100 Ethernet port
 - Feature Code 2744 - High-Speed 10/16/4 MB Token-ring PCI Adapter
 - Feature Code 5700 - iSeries Gigabit Ethernet Adapter (fiber optic)
 - Feature Code 5701 - iSeries 1000/100/10 Ethernet Adapter (copper UTP)
 - The **IBM iSeries 2890 Integrated xSeries Server** supports the following IBM iSeries LAN PCI adapters:
 - Feature Code 2743 - iSeries Gigabit Ethernet Adapter (fiber optic)
 - Feature Code 2744 - High-speed 100/16/4 MB Token-Ring PCI Adapter
 - Feature Code 2760 - iSeries Gigabit Ethernet Adapter (copper UTP)
 - Feature Code 4838 (hardware type 2838) - iSeries 10/100 Ethernet Adapter
 - The **6617 and 2850 Integrated Netfinity Servers** support the following IBM iSeries LAN PCI adapters:
 - Feature Code 2723 - iSeries Ethernet Adapter (10 Mbit/s)
 - Feature Code 2724 - PCI Token-Ring Adapter (16/4 Mbit/s)
 - Feature Code 2838 - IBM iSeries 10/100 Ethernet Adapter

Note: The Integrated xSeries Server cannot share its external LAN adapters with OS/400 (you cannot define OS/400 line descriptions for the external LAN adapters) if any of the following are true:

- >> It is a model 2890 or 2892<< Integrated xSeries Server or a model 2689 Integrated xSeries adapter.
- The IP forwarding function is enabled on Windows server.
- The Integrated Netfinity hardware was migrated to a 50xx Migration tower.

In these instances, OS/400 needs a separate LAN adapter on another input-output processor (IOP) in order to access the same LAN as the Windows server.

If you plan to run several Windows servers on multiple Integrated xSeries Servers and need to see only one server screen at a time, you can use an automated monitor, keyboard, and mouse switch. Connecting this box to the Integrated xSeries Servers enables one set of devices to control multiple integrated Windows servers.

>> **Note:**

2892 IXS hardware and 2689 IXA attached hardware do not support Windows NT 4.0. <<

For additional hardware requirements, see:

- “Machine pool size requirements for iSeries Integration for Windows Server” on page 12
- “Local area networks used by Windows server on iSeries” on page 13

You may want to read the following information:

- Planning for iSeries Integration for Windows Server installation
- “Software requirements for running Windows 2000 or Windows .NET Server on iSeries” on page 41
- “Software requirements for running Windows NT 4.0 on iSeries” on page 46
- “Upgrade and migration considerations for iSeries Integration for Windows Server and Integrated xSeries Server” on page 54.

Integrated xSeries Server for iSeries CCIN and feature code numbers

The Integrated xSeries Server for iSeries hardware that you need to install Windows server on your iSeries is identified by a feature code and a custom card identification number (CCIN). This table shows the relationship between those numbers and which Integrated xSeries Server card you can use for your model of iSeries.

Feature Code	System Model	CCIN Numbers	Description
#2852	150	2850-011 285A-003	Pentium Pro Integrated xSeries Server Windows server bridge
#2854	600/620 S10/S20 720	2850-011 285A-003	Pentium Pro Integrated xSeries Server Windows server bridge
#2857	170	2850-011 285A-003	Pentium Pro Integrated xSeries Server Windows server bridge
#2865	600/620 S10/S20 720/730/740	2850-012 285A-003	Pentium II Integrated xSeries Server Windows server bridge
#2866	170, 250	2850-012 285A-003	Pentium II Integrated xSeries Server Windows server bridge
#2868	150	2850-012 285-A003	Pentium II Integrated xSeries Server Windows server bridge
#2790	820, 830, 840, SB2, SB3, ➤ 890 ⬅	2890-001	**Pentium III Integrated xSeries Server
#2890	270	2890-001	**Pentium III Integrated xSeries Server
#6617	All RISC systems with Book Packages	6617-001	Pentium Pro Integrated xSeries Server
#6618	All RISC systems with Book Packages	6617-012	Pentium II Integrated xSeries Server
#0092	270, 820, 830, 840	2689-001	➤ ** ⬅ Integrated xSeries Adapter for iSeries. Note: The Integrated xSeries Adapter for iSeries must be ordered via AAS/WTAAS using Machine Type 1519-100.
#2791	820, 830, 840 SB2, SB3, ➤ 890 ⬅	2890-002	**Pentium III Integrated xSeries Server

Feature Code	System Model	CCIN Numbers	Description
#2891	270	2890-002	**Pentium III Integrated xSeries Server
» #2799	820, 830, 840, SB2, SB3, 890	2890-003	**Pentium III Integrated xSeries Server
#2899	270	2890-003	**Pentium III Integrated xSeries Server
#2792	820, 830, 840, SB2, SB3, 890	2892-001	** Integrated xSeries Server
#2892	270	2892-001	** Integrated xSeries Server



Notes:

- **These Integrated xSeries Server for iSeries models cannot serve as an external host LAN for your iSeries.
- Any Integrated Netfinity Server migrated to a 50xx Migration Tower cannot serve as an External Host LAN for your iSeries.
- Throughout this information, unless specifically stated otherwise, the following conventions apply:
 - » The name 2890 Integrated xSeries Server applies equally to feature codes #2790, 2791, 2799, 2890, 2891, and 2899
 - The name 2892 Integrated xSeries Server applies equally to feature codes #2792 and 2892
- Feature codes #2854, #2865, #6617, #6618 can be used in an 820, 830, 840, or SBx iSeries system model when attached via a 50xx Migration Tower.

Preinstallation checklist for iSeries Integration for Windows Server

Performing a few preliminary tasks before installing Windows server on iSeries should make the installation go smoothly. Before you begin installing the software, do the following:



- Verify that you have the necessary authority to perform the installation. To set up Windows server on an Integrated xSeries Server, you must have *IOSYSCFG, *ALLOBJ, and *JOBCTL special authority on OS/400. An administrator with *SECADM special authority must perform step 10 of this checklist.

For information about special authorities, refer to the iSeries Security Reference .

- Verify that you have the necessary “Hardware requirements for running Windows server on iSeries” on page 8 and software that is required for the version you will install.
- Also verify that you have enough memory allocated to the machine pool (see “Machine pool size requirements for iSeries Integration for Windows Server” on page 12).
- If the Integrated xSeries Server has 2 LAN adapters on the same network, disconnect one of them from the network before installing the server. By doing so, you avoid the problem of the Windows installation determining that there is a duplicate computer on the network.

To disconnect the adapter, unplug the cable that connects the adapter to the network from either the hub/switch or the back of the adapter. After the installation is complete, you can reconnect the second adapter to the network (step 3 (See 44)).

- To ensure that time synchronization will work, “Verifying that OS/400 time zone is set” on page 24 that the OS/400 QUTCFFSET system value is correctly set. » For countries other than the United States, verify that hte OS/400 QLOCALE system value is set correctly.
- If you are installing on Windows 2000 or Windows .NET, complete the “Windows server installation advisor” on page 39 and print out the summary page. If you are installing on Windows NT 4.0, complete and print the “Installation work sheet for OS/400 parameters” on page 29. <<

7. “Configuring OS/400 TCP/IP for Windows server on iSeries” on page 25 and add your gateway address.
8.  Decide whether you want to use iSeries Access for Windows, which allows you to use iSeries Navigator and run Open Database Connectivity (ODBC) as a Windows server service. See the comparison of iSeries NetServer with iSeries Access in the Information Center.
9. “Enabling iSeries NetServer” on page 26 and set up a “Create a guest user profile for iSeries NetServer” on page 26, so you can install service packs.
10. You can eliminate the need for the physical CD-ROM during installation (for example, to avoid the delay and expense of shipping the CD-ROM to a remote site if you need to reinstall a server). You can store the image of the installation CD-ROM, then use the Windows source directory field during the installation to specify the path name to that image. If you need directions, refer to the Redbook

AS/400-Implementing Windows NT on the Integrated Netfinity Server 

Note: Contents of the installation CD-ROM may be subject to licenses from their respective authors and/or distributors. Compliance with these licenses is your responsibility. By offering this function, IBM takes no responsibility for compliance with or enforcement of any CD-ROM license agreement.

11. You can customize the installation by using a to modify the default values in the Windows server unattended install setup script file (unattend.txt).
12. If you are running Windows NT 4.0 on the legacy Integrated Netfinity Server and are migrating to the 2890 Integrated xSeries Server for iSeries, and this migration includes Gigabit Ethernet, you must have Windows Service Pack 4 or later installed. See “Install Gigabit Ethernet adapters on Windows NT 4.0” on page 77 for detailed instructions
13. If the server will be installed on an external xSeries server using the 2689 Integrated xSeries Adapter, verify that there are no hard disk drives present in the external xSeries server. If there are hard disk drives present, remove them before installing the server.
14. If the server will be installed on an external xSeries server using the 2689 Integrated xSeries Adapter, upgrade the server BIOS to the latest level before installing the server.



Note: Basic input/output system (BIOS) updates can be installed either by booting the ServerGuide CD-ROM that was shipped with the Netfinity or xSeries Server and following the installation wizard up to the point of selecting a Network Operating System (NOS) to install, or by locating and creating BIOS update diskettes from the the World Wide Web or the IBM Bulletin Board System (BBS).

To find and download the latest BIOS, visit the IBM PC company web site and download a BIOS flash diskette from the World Wide Web. Go to <http://www.ibm.com/pc/support/>, select IBM Server Support, and make the selections for your server.

Follow the instructions included with the update. Before continuing with the installation, two options must be turned off in the BIOS Configuration/Setup utility when connected to an iSeries. Power on the Netfinity or xSeries server and select to enter the Configuration/Setup utility according to the specific server. Usually, this is by pressing F1 during the BIOS POST test. Select the Start Options and disable Boot Fail Count and Virus-detection. Save the settings and continue with the installation.

When you have finished the preinstallation tasks, you are ready for

Machine pool size requirements for iSeries Integration for Windows Server

 The following table provides the machine pool size requirements for iSeries Integration for Windows Server for the various types of Integrated xSeries Server and adapters: 

Integrated xSeries Server or adapter	Minimum memory required	Additional memory required for network adapter card
6617	5400 KB	1800 KB for each 2838, 2723, or 2724 network adapter card that you install with the Integrated xSeries Server.
2850	1800 KB	1800 KB for each 2838, 2723, or 2724 network adapter card that you install with the Integrated xSeries Server.
» 2689, « 2890, » 2892 «	856 KB	You do not need to consider network adapter cards that you install with this model Integrated xSeries Server because they cannot serve as shared external host LAN adapters for iSeries.

You can display or change the machine pool size by using the Work With System Status (WRKSYSSTS) command. The first storage pool on the WRKSYSSTS display is the machine pool.

The system value QMCHPOOL specifies the machine storage pool size. The machine storage pool contains highly shared machine and OS/400 licensed programs. If you set the size for these storage pools too small, you will impair system performance. You cannot set QMCHPOOL less than 256 KB.

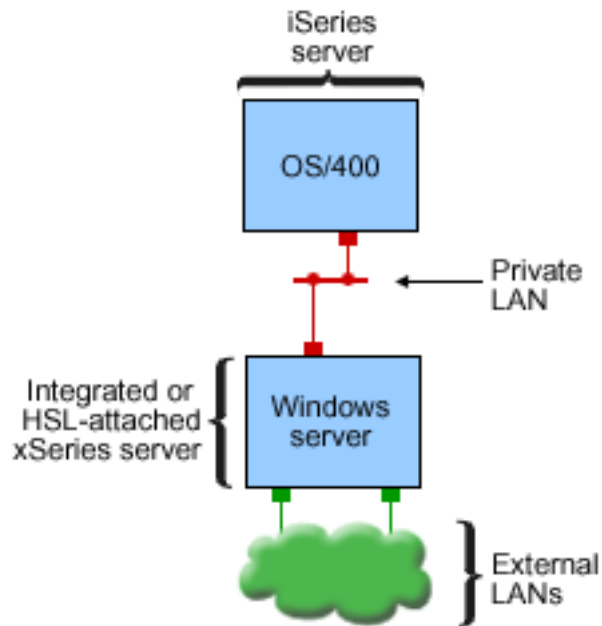
You can change the system value QPFRADJ so that the system automatically adjusts system pool sizes. However, because automatic performance adjustment can slow down a busy system, you probably want to limit its use to one of these times:

- The first couple days after the installation
- An hour or so at the time your system load changes from daytime (interactive emphasis) to nighttime (batch emphasis) and back

Go back to “Preinstallation checklist for iSeries Integration for Windows Server” on page 11. »

Local area networks used by Windows server on iSeries

When you install Windows server on an Integrated xSeries server or adapter, you must plan and configure a private local area network (LAN) and one or more external LANs. The following figure shows the relationship between the private LAN and the external LANs.



■ = Virtual adapter with TCP/IP address

■ = External adapter/port with TCP/IP address

RZAHQ017-3

Relationship between private and external LANs.

In some cases you will want to plan and configure a Virtual Ethernet network. For more information, see Virtual Ethernet networks.

Go back to “Preinstallation checklist for iSeries Integration for Windows Server” on page 11. <<

Private LAN

An integrated, or HSL-attached xSeries server communicates with OS/400 through a point-to-point private LAN. The LAN is private because there are only two endpoints, Windows and OS/400, and it doesn't use external network adapters or cables. Data sent over this LAN is secure because it never leaves your iSeries.

There are two types of private LANs, **point-to-point Virtual Ethernet**, and **internal**. Every Windows server uses one type or the other.

A **point-to-point Virtual Ethernet** LAN is considered, by both Windows and OS/400, as a high-performance Ethernet LAN. In OS/400, it corresponds to an Ethernet line description with the Port Number value *VRTETHPTP. This type of LAN is available only for Windows servers that have an Integrated xSeries Server or adapter with a resource type of 2890, 2892, or 2689; Windows 2000 or Windows .NET Server; and V5R2 Integration for Windows Server.

An **internal** LAN is considered, by both Windows and OS/400, as a token-ring line description with the Port Number value *INTERNAL. It is available for Windows servers that have an Integrated Netfinity server with a resource type of 6617 or 2850, Windows NT 4.0, or Integration for Windows Server for a release prior to V5R2. .

When you run the INSWNTSVR command, the correct type of LAN will be created based on the criteria for each type. When the environment of a Windows server using internal LAN is updated, and it meets all of the requirements for the point-to-point Virtual Ethernet, the LAN will be automatically updated to the Virtual Ethernet LAN.

iSeries Integration for Windows Server uses the TCP/IP protocol to communicate through the private LAN. The private LAN uses restricted Internet addresses in private domains, so the addresses are not propagated through gateways or routers. These addresses take the form of 192.168.xxx.yyy, where xxx is the hardware resource ending number. (The xxx and yyy can be from 1 to 3 digits.) For example, for an Integrated xSeries Server that is defined for LIN03, xxx=3, the address is 192.168.3.yyy. As you define multiple network descriptions for the same hardware resource, yyy is incremented.

You can allow the INSWNTSVR command to automatically assign these Internet addresses or specify addresses to prevent TCP/IP address collisions with other hosts on the system.

External LAN

Integrated xSeries Server allows you to install network adapter cards, allowing the Windows server to be part of a normal external LAN. This LAN connects Windows server on an Integrated xSeries Server to clients and other servers. Older models of the Integrated Netfinity Server allow you to share these network adapter cards between Windows server and OS/400 giving OS/400 access to the external LAN. The exception is when these older Integrated Netfinity Servers are installed on a 50xx Migration tower. This function is not supported for iSeries models 8xx or 270. IBM recommends that you use a separate adapter to connect iSeries to the external LAN to avoid losing your connection when Windows server shuts down.

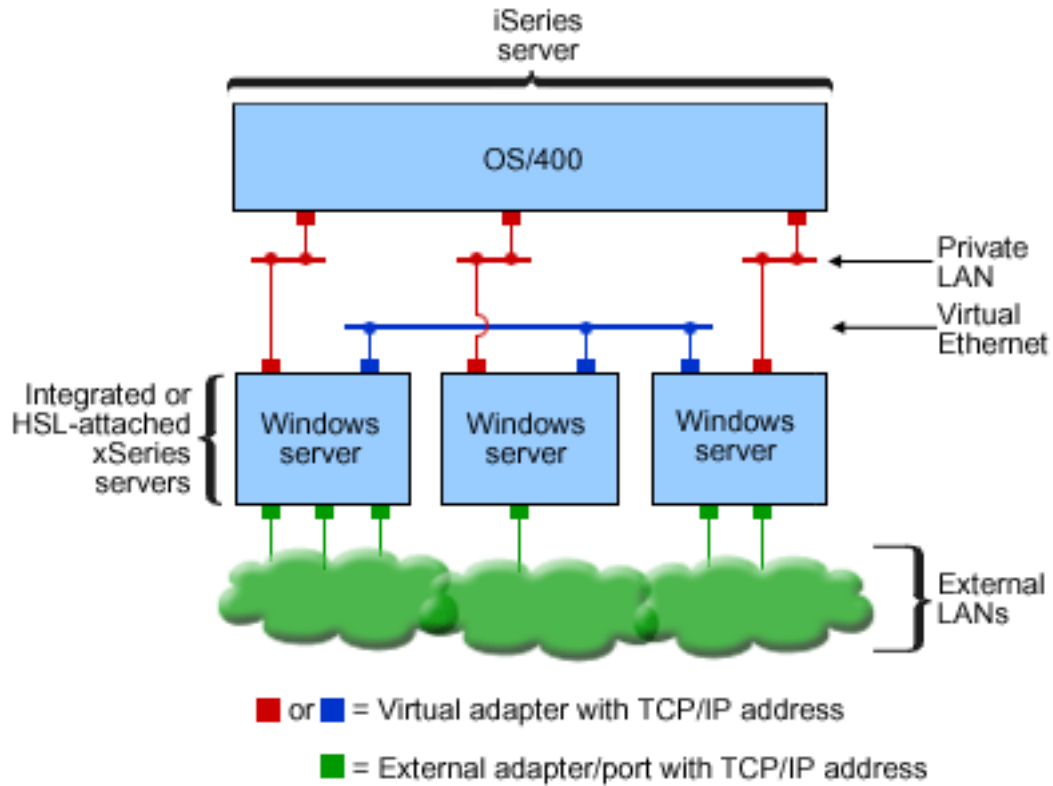
Virtual Ethernet networks

Virtual Ethernet networks enable high-performance, secure communication between a Windows server and parts of the iSeries system that are beyond the scope of the private LAN. Windows servers must have an Integrated xSeries server or adapter with a resource type of 2890, 2892, or 2689; Windows 2000 or Windows .NET Server; and V5R2 Integration for Windows Server to participate in this type of network. Virtual Ethernet is flexible and can be configured for a variety of applications, including:

- A single network that connects a group of Windows servers on the same iSeries system.
- Multiple networks on the same iSeries system that connects only selected Windows servers while maintaining isolation from others.
- Inter-LPAR networks, for systems running the logical partition (LPAR) product, that connects selected partitions that may be running Linux, OS/400, or Windows servers running under other OS/400 partitions.

Single network

As a single network, Virtual Ethernet can be used to interconnect Windows servers. This type of connection is required when configuring a group of Windows servers for clustering. The following figure shows how a Virtual Ethernet network relates to point-to-point Virtual Ethernet and external LANs.

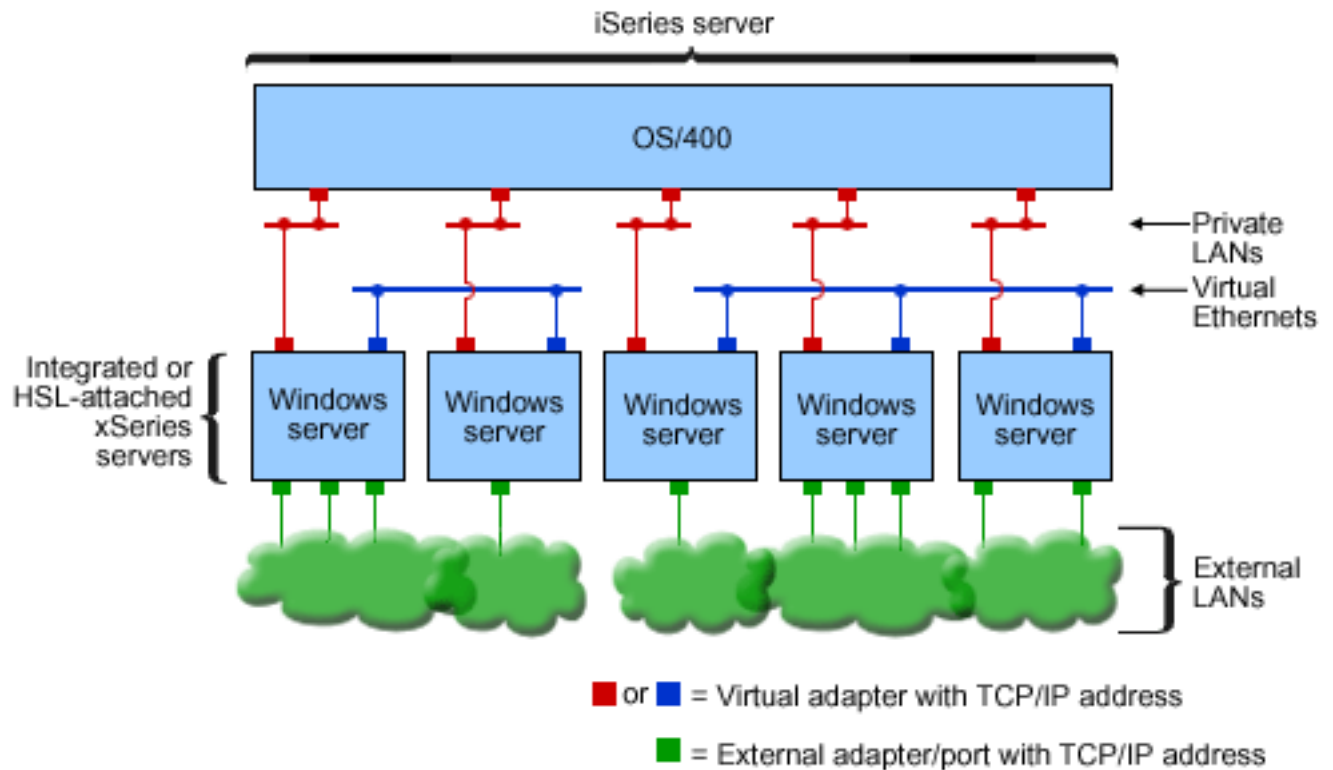


RZAHQ014-3

Virtual Ethernet network and how it relates to point-to-point Virtual Ethernet (Private LAN) and external LANs.

» Multiple networks

An iSeries system can have multiple networks, separate Virtual Ethernet networks, that exist on the same system. Each Windows server can participate in up to four separate Virtual Ethernet networks. The following figure shows two isolated groups of Windows servers on the same iSeries system. Each group has its own Virtual Ethernet network.



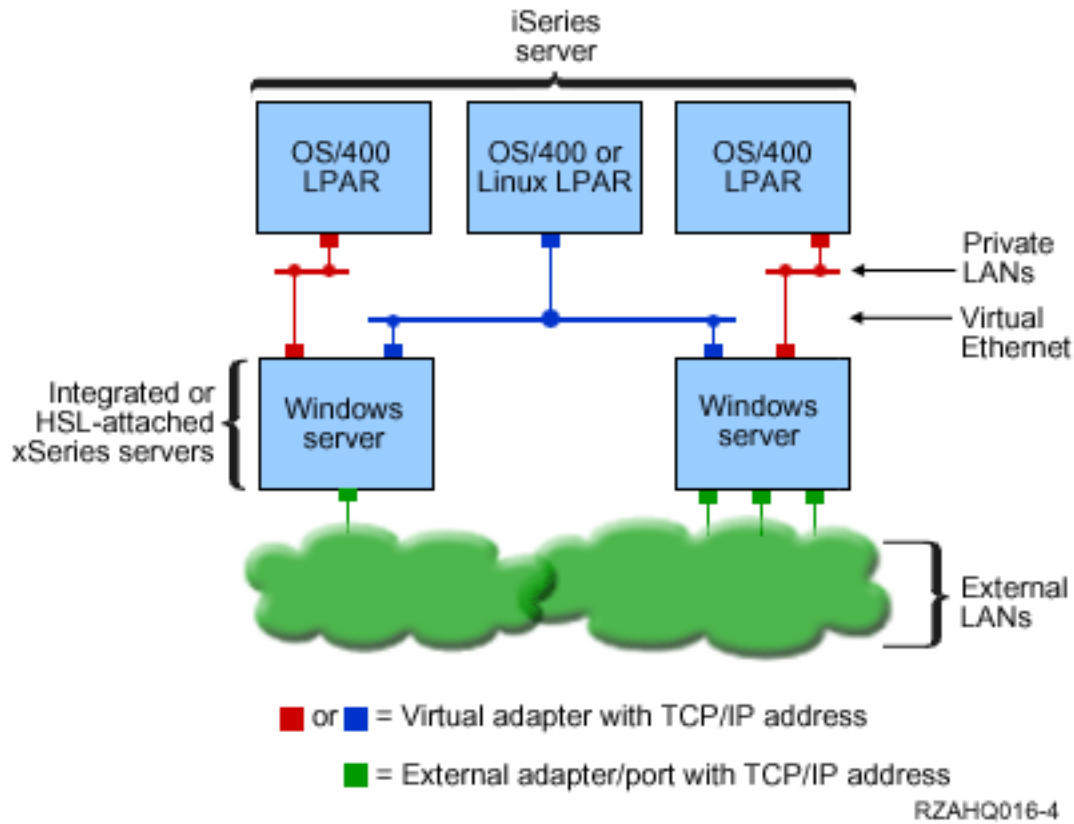
RZAHQ015-4

Two isolated groups of Windows servers on the same iSeries system. Each group has its own Virtual Ethernet network.

A Windows server is connected to a Virtual Ethernet network when its NWSD is associated with an Ethernet line description that has a Port Number with a value of *VRTETH0 through *VRTETH9. You can either allow the INSWNTSVR command to create the required line descriptions and assign a Windows TCP/IP address for each of these connections, or you can create the line descriptions and change the NWSD another time. Unlike point-to-point Virtual Ethernet, IBM recommends that you not configure a TCP/IP address on the OS/400 side of a line description that is used in a Virtual Ethernet network. With no TCP/IP interface, it is normal for these line descriptions to show VARIED ON status rather than ACTIVE status. <<

>> Inter-LPAR networks

For inter-LPAR networks, Virtual Ethernet enables Windows server to communicate with other logical partitions on the same iSeries, as well as Windows servers associated with other logical partitions. The following figure illustrates this capability.



A simple, inter-LPAR Virtual Ethernet network.

For this configuration, you need to enable an inter-LPAR connection as described in Logical partition concepts. Windows servers are limited to using Virtual Ethernet numbers 0 through 9. These numbers correspond to Port Number values *VRTETH0 through *VRTETH9 in the Ethernet line descriptions. For a Windows server to communicate with another OS/400 partition, you need to create a line description within the partition to access the Virtual Ethernet being used. You must then configure a TCP/IP address for that line.

For a Windows server to communicate with a Linux partition, you need to configure a TCP/IP address within the Linux partition to access the Virtual Ethernet. For more information, see Linux in a guest partition.

Some additional ways that you can choose to use inter-LPAR networks include:

- Multiple Windows servers in a logical partition, connected to the same inter-LPAR Virtual Ethernet network.
- Windows servers using multiple Virtual Ethernet networks to access different logical partitions. This would be useful when you want to keep your partitions as isolated as possible.
- Windows server using one Virtual Ethernet to reach an OS/400 partition, and a different Virtual Ethernet to reach a Windows server running under that OS/400 partition. This would allow you to avoid creating a second Virtual Ethernet path between the OS/400 partition and the Windows server running on it. The point-to-point Virtual Ethernet connection between them is required. Adding a second Virtual Ethernet path can make troubleshooting more difficult and can cause unpredictable results.
- Windows servers running under different OS/400 partitions using the same Virtual Ethernet port number values will be isolated if no inter-LPAR connection is enabled between the OS/400 partitions using that same Virtual Ethernet number. <<



Windows Cluster Service on the iSeries Integrated Windows Server

Support for installing and configuring the Windows Cluster Service on the iSeries Integrated Windows Servers has been added in V5R2. Support is available only for Windows servers that have an Integrated xSeries Server or Adapter with a resource type of 2890, 2892, or 2689; running either Windows 2000 Advanced Server or Windows .NET Enterprise Server.

Note: Windows clustered network server nodes must reside within a single iSeries partition in order to be clustered.

Windows 2000 Advanced Server supports a two-node cluster while Windows .NET Enterprise Server supports four-node clusters. Datacenter versions of Windows are not supported.

Although the traditional Windows clustered server solution requires a shared physical SCSI or Fibre Channel device, the Integrated Windows Server solution uses a virtual Fibre Channel bus to share the virtual disk devices between the nodes of a cluster.

In addition, the new support for Virtual Ethernet enables high-performance; secure communication for the internal node-to-node communication between clustered nodes.

Detailed checklists for planning and creating a server cluster are available in the online Microsoft help for Server clusters and should be referred to prior to installing and configuring a Windows Cluster server. Additional information, including step-by-step guides to installing Cluster service, is available on the

Microsoft Web site .

For more information about Integration for Windows Server support for Windows Cluster service, see the following topics:


Terminology (See “Terminology” on page 3)

Read about new terms and concepts important to planning and creating server clusters.

“Installing Windows Cluster service”

Find out how to install and configure Windows Cluster service on the iSeries Integrated Windows Server and on Windows.

“Installing Windows Cluster service on an existing server” on page 20

Find out how to create clusters on an existing a Windows 2000 Advanced server or Windows .NET Enterprise Server. 




Installing Windows Cluster service: Before installing the Cluster service, read all Microsoft checklists for installing Server clusters to help you avoid future problems in planning and installation.

Note: During installation of Cluster service on the first node, vary off all other nodes before to you boot Windows.

In the Server clusters information, any references to a shared SCSI or Fibre Channel device refers to the virtual Fibre Channel implementation used to access the shared network server storage spaces.

To install and run Windows Cluster service, complete the following tasks:

1. Install Windows Cluster service on the Integrated xSeries server
 - “Installing Windows Cluster service on a new Windows server” on page 20
 - “Installing Windows Cluster service on an existing server” on page 20
2. “Installing Windows Cluster service on Windows” on page 22 



Installing Windows Cluster service on a new Windows server: The easiest way to install and configure the Windows Cluster server is to do so when you first configure a Windows server. Use the Install Windows Server (INSWNTSVR) command with the following parameters that specify the cluster configuration information:

- Cluster name (CLU) parameter
- Cluster configuration (CLUCFG) parameter

For more information about installing the Windows server, see “Install Windows 2000 or Windows .NET Server on the Integrated xSeries Server” on page 41.

After you run the INSWNTSVR command (and the Windows install completes) and before you install the Windows Clustering service on the Windows side, you must perform additional configuration steps on the Windows console. For more information, see “Preparing Windows before installing Windows Cluster service” on page 21.

Cluster name: The Cluster name (CLU) parameter provides the name that the cluster will be known by. This is used by administrators to connect to the cluster and represents the group of independent network server nodes which will work together as a single system. The name entered for the cluster name is also used as the name of the network server storage space that is created and will serve as the quorum resource for the cluster.

Cluster configuration: The Cluster configuration parameter (CLUCFG) is used to define the cluster and configure the quorum resource network server storage space. Additionally, this information is used to validate that any secondary nodes have the proper OS/400 configuration necessary to create the virtual cluster connections for the shared storage devices and the Virtual Ethernet port that will be used for the private clustering interconnect. The cluster configuration value of *CLU will retrieve the cluster configuration from the existing quorum resource network server storage space specified on the CLU parameter,

Note: The clustering connection port requires configuration of a matching Virtual Ethernet port. For more information about configuring a Virtual Ethernet port, see “Configure Virtual Ethernet connections to OS/400, another Windows server, or LPAR on iSeries” on page 73. <<



Installing Windows Cluster service on an existing server: You can install Windows Cluster service on an existing Windows 2000 Advanced server or a Windows .NET Enterprise Server that run on a supported file server resource with V5R2 Integration for Windows Server software.

If you installed the server before V5R2, ensure that the server has performed an **Install release from iSeries**. This ensures the availability of all server functions required to install the Windows Cluster service.

To install Windows Cluster service on an existing server, perform the following tasks:

- Create a storage space (quorum resource)
- Configure the Virtual Ethernet connection port
- Link the quorum resource drive to the network server description

After you complete the steps above and before you install the Windows Clustering service on the Windows side, you must perform some additional configuration steps on the Windows console. For more information, see “Preparing Windows before installing Windows Cluster service” on page 21.

Create a storage space (quorum resource): The first step is to create a storage space to use as the quorum resource. To create a storage space, use the Create NWS Storage space (CRTNWSSTG) CL command and specify the special format *NTFSQR.

The name of the network server storage space should match the name of the cluster you are creating. The recommended size is 505 MB or larger. The command prompts for the following cluster information, which you need to provide:

- Cluster domain name
- Virtual Ethernet connection port
- IP Address for the Windows cluster
- Subnet mask for the Windows cluster

Configure the Virtual Ethernet connection port: The next step is to configure the Virtual Ethernet connection port that you want to use for the private cluster communication. See “Configure Virtual Ethernet connections to OS/400, another Windows server, or LPAR on iSeries” on page 73. The Virtual Ethernet port that you use must match the connection port you specify with the quorum resource network server storage space.

Link the quorum resource drive to the network server description: Link the quorum resource storage space to the network server by using the Add Server Storage Link (ADDNWSSTGL) command, using ACCESS(*SHRUPD), DYNAMIC(*YES) and DRVSEQNBR(*QR).

Note: During installation of Cluster service on the first node, all other nodes must be varied off prior to Windows booting. Additional shared storage devices can be created and linked at this time. All shared storage spaces must be *NTFS and linked with ACCESS(*SHRUPD). <<



Preparing Windows before installing Windows Cluster service: After you install the Windows server, you need to prepare the server to install the Windows Cluster service.

To prepare Windows before you install the Windows Cluster service, perform the following tasks:

1. Format the quorum resource
2. Configure the private network adapter

When you complete these steps, Windows is ready for you to install the Windows Cluster service. For more information, see “Installing Windows Cluster service on Windows” on page 22.

Format the quorum resource: The first step to prepare Windows for a Windows Cluster installation is to format the quorum resource as NTFS. Formatting the quorum resource is not only required to install the Windows Cluster service, it is also the first step when installing the first node of a cluster. For more information, see “Format disk drives for Windows server on iSeries” on page 95.

The quorum resource appears as an unformatted E: drive. You should format the volume and label it using the same name as the cluster, which is also the name of the quorum resource network server storage space name. Also format any other shared storage spaces at this time. It is also recommended that you assign a fixed drive letter to this drive (**the quorum resource?**) and any other shared storage drives.

Note: The drive letter assigned to all storage spaces on the shared storage bus must be the same on all nodes of the cluster.

Configure the private network adapter: Next, configure the private network adapter for use by the Windows Cluster service by completing the following steps on the first node in your cluster:

1. In Windows, right-click **My Network Places** and select **Properties**.
2. Right-click the **Local Area Connection 2** icon.

Note: Which network adapter is private and which is public depends on how you configured the server. This information assumes the following:

- The first network adapter (Local Area Connection) is connected to the public network by using a physical LAN adapter under the Integrated Windows server
- The second network adapter (Local Area Connection 2) is the Virtual Ethernet adapter configured as the cluster configuration connection port that you want to use as the private cluster network
- The third network adapter (Local Area Connection 3) is the private Virtual Ethernet point-to-point connection to OS/400 and should not be enabled for any clustering use

The number and order of network adapters may not be the same, depending on the physical and virtual configuration of the server and the network.

3. Click **Status** to display the **Local Area Connection 2 Status** window, which shows the connection status, as well as the speed of connection.
4. In the **Local Area Connection 2 Status** window, click **Properties**.
5. In the **Properties** dialog box, make sure that the contents of the **Connect using** field contains IBM iSeries Virtual Ethernet x, where x matches the *VRTETHx that you specified for the cluster configuration connection port.
6. Click **Close**, then click **Close** again.

For clarity, you should rename your Local Area Network Icons. For example, you might want to change the name of Local Area Connection 2 to something like Private Cluster Connection. << >>

Installing Windows Cluster service on Windows: The actual installation of the Windows Cluster service depends on the version of Windows installed during the Windows server for iSeries installation. For the most part, refer to the Microsoft documentation for instructions on installing the Windows Cluster service. This information highlights specific steps required to install the Windows Cluster service on an Integrated Windows server.

- “Install Windows Cluster service on Windows 2000”
- “Install Windows Cluster service on Windows .NET” on page 23

Note: Make sure that Windows Cluster service is installed and running on one server before starting Windows on another server in the cluster. Starting the operating system on multiple servers before the Windows Cluster service is running on one server can corrupt the cluster storage. After you configure the first server, you can simultaneously install the remaining servers. << >>

Install Windows Cluster service on Windows 2000: Use the Cluster Service Configuration wizard to install the Windows Cluster service. You supply the wizard with all the initial cluster configuration information.

To install Windows Cluster service on Windows 2000, perform the following tasks:

1. Start the Cluster Service Configuration wizard
2. Use the wizard to configure the cluster service

Start the Cluster Service Configuration wizard: To start the Cluster Service Configuration wizard, complete the following steps:

1. From the Windows **Start** menu, click **Settings**, then click **Control Panel**.
2. In the **Control Panel** window, double-click **Add/Remove Programs**.
3. In the **Add/Remove Programs** window, click **Add/Remove Windows Components**.
4. In the **Windows Components Wizard** dialog box, select **Cluster Service**, then click **Next**.

Configure the Windows Cluster service: After you have started the Cluster Service Configuration wizard, it prompts you through the installation of the Windows Cluster service. You supply the wizard with all the initial cluster configuration information, which is required in order to create the cluster.

When prompted for the quorum resource, select the drive that you formatted and labeled. Although this drive is typically the E: drive for a new installation, the Disk Manager may have fixed another letter to the drive.

Network connections require special consideration:

Note: The order in which the Cluster Service Configuration wizard presents the network configuration information may vary.

- Uncheck the box **Enable this network for cluster use** for the IBM iSeries Virtual Ethernet Point-to-Point (typically Local Area Connection 3)
- Select the option **Internal cluster communications only** for the IBM iSeries Virtual Ethernet xwhere x matches the *VRTETHx specified on the cluster configuration connection port (typically Local Area Connection 2)
- Configure the remaining network connections according to their need

Specify the IBM iSeries Virtual Ethernet x adapter (typically Local Area Connection 2) as the primary network for the Internal Cluster Communication. <>

Install Windows Cluster service on Windows .NET: Use the Cluster Administrator to install Windows Cluster service on Windows .NET and to join an existing cluster. Both installing the cluster service and joining an existing cluster require you to open the Cluster Administrator. Open the **Cluster Administrator** from the Windows **Start** menu by selecting **All Programs**, then **Administrative Tools**, then **Cluster Administrator**.

Install Windows Cluster service on Windows .NET: Install and configure the Windows Cluster service on Windows .NET by completing the following steps.

1. Open the **Cluster Administrator**.
2. In the **Open Connection to Cluster** dialog box that appears, in **Action**, select **Create new cluster**.
3. Click **OK** to display the New Server Cluster wizard, which prompts you through the installation of the Cluster service for the first node.
4. Click **Next**.
5. Type the **Domain** (defaulted) and **Cluster name**.
6. Type the **Computer name** (defaulted).
7. Type the **IP Address** for the cluster management
8. Type the **Cluster Service Account User name**, **Password** and **Domain**.
9. Verify the **Proposed Cluster Configuration**.

Join an existing cluster: Join an existing cluster by completing the following steps:

1. Open the **Cluster Administrator**.
2. In the **Open Connection to Cluster** dialog box, in **Action**, select **Add nodes to cluster**.
3. Then in **Cluster or server name**, either type the name of an existing cluster, select a name from the list, or click **Browse** to search for an available cluster.
4. Click **OK** to display the Add Server Cluster wizard.
5. Select one or more computer names to add to the cluster, then click **Add**.
6. Enter the domain account password for the cluster service.
7. After Cluster service has finished installing, use the Cluster Administrator to locate and select the cluster that you just created.

8. Expand **Cluster Configuration, Network Interfaces**. This will open up the right panel with a list of all **Local Area Connections**.
9. Type the network name (Local Area Connection x) for the virtual IBM iSeries Virtual Ethernet xwhere x matches the *VRTETHxspecified on the Cluster configuration connection port. You need to identify this network later, so remember the name.
10. Identify the network name (Local Area Connection x) for the virtual IBM iSeries Virtual Ethernet Point-to-Point. You need to identify this network later, so remember the name.
11. In the **Cluster Administrator** window, expand **Cluster Configuration, Networks**.
12. Right-click the network name (Local Area Connection x) for the virtual IBM iSeries Virtual Ethernet xand select **Properties**.
13. Select the option **Internal cluster communications only** for this network.
14. Right-click the network name (Local Area Connection x) for the virtual IBM iSeries Virtual Ethernet Point-to-Pointand select **Properties**.
15. Uncheck the box **Enable this network for cluster use** for this network.

Configure the remaining network connections according to their need. <<

Time synchronization

To keep the time on OS/400 and Windows server synchronized, do the following:

1. Select *YES for synchronize date and time in the INSWNTSVR command or the CHGNWSD command. Selecting *YES will synchronize the time between OS/400 and Windows server every 30 minutes. Selecting *NO will synchronize the time only when the server is started.
2. Type DSPSYSVAL SYSVAL(QUTCFFSET) on the OS/400 to view the current time zone offset. This value will need to be changed every 6 months if daylight savings is observed. For example, in Wellington, New Zealand, the standard time zone offset is +12. During the daylight savings time period, the adjustment is +1, and the offset on OS/400 during the daylight savings time period is set to +13. When Wellington is not in the daylight savings time period, the offset on OS/400 is set to +12.
3. On Windows server, click Date/Time in the Control Panel, then select the Time Zone tab. Select your time zone from the drop-down list.
4. Make sure the check for adjust clock for daylight savings changes is checked. Then click OK.

If you have problems with time synchronization, check the OS/400 sytem value for LOCALE to make sure it is set properly.

Verifying that OS/400 time zone is set

To verify the OS/400 time zone is set properly, follow these steps:

1. On OS/400, type the command WRKSYSVAL QUTCFFSET and press Enter.
2. Place a 5 in the Opt field to the left and press Enter.
3. Verify that the value is the correct current offset from the universal time coordinate (UTC), also known as Greenwich mean time.
4. If the QUTCFFSET system value is not correct, type 2 in the Opt field next to the QUTCFFSET system value. Then type the correct value and press Enter.

Go back to “Preinstallation checklist for iSeries Integration for Windows Server” on page 11.

Tip: Find resource names when you have multiple Integrated xSeries Servers

You can have multiple Integrated xSeries Servers of the same type installed on your iSeries. If so, you may not be able to tell them apart on the Display Communication Resources display.

To find out which Integrated xSeries Server a resource name refers to, follow these steps:

1. If you are not already at the Display Communication Resources display, type DSPHDWRSC *CMN; then press Enter.

2. Type a 7 in the Opt field to the left of the resource name for a file server IOA or file server IOP. The Display Resource Detail display appears.
3. Look at the Card Position under the Physical Location heading.
4. Look at the labels on the slots of your iSeries. One slot should be labeled with the same number or combination of letters and numbers shown in the Card Position field. This slot contains the Integrated xSeries Server to which the resource name refers.

Go back to “Installation work sheet for OS/400 parameters” on page 29.

Configuring OS/400 TCP/IP for Windows server on iSeries

When you install Windows server on iSeries, you have the option of using values that you specified in the OS/400 TCP/IP configuration as default values to configure your Windows server. If you want to take this option and do not already have TCP/IP configured, you must configure it before installing iSeries Integration for Windows Server. You also need to add your gateway address to OS/400. For more information about configuring TCP/IP, see TCP/IP.

» If you have iSeries Navigator installed, you can use it to configure your TCP/IP connections. The iSeries Navigator online help tells you how to configure TCP/IP. If you do not have iSeries Navigator installed, follow these steps: «

1. On the OS/400 console, enter the command CFGTCP and press Enter. The Configure TCP/IP menu appears.
2. Select option 12 Change TCP/IP Domain information and press Enter. The Change TCP/IP Domain (CHGTCPDMN) display appears.
3. Specify the Local domain name » from the “Installation work sheet for OS/400 parameters” on page 29.
4. « In the Domain name server field, specify up to 3 Internet addresses from the “Windows server installation advisor” on page 39; then press Enter.
To add your gateway address to OS/400:
5. From the Configure TCP/IP menu, choose option 2 Work with TCP/IP routes. The Work with TCP/IP Routes display appears.
6. Type 1 in the Option field to add a TCP/IP route. The Add TCP/IP Route display appears.
7. Fill in the appropriate fields with the information for your gateway address.

Go back to

iSeries Access for Windows on Windows server on iSeries

» IBM iSeries Access for Windows allows you to connect a personal computer (PC) to an iSeries « server over a local area network (LAN), a twinaxial connection, or a remote link. It features a complete set of integrated functions that enable desktop users to use OS/400 resources as easily as their local PC functions. With » iSeries Access, « users and application programmers can quickly process information, applications, and resources for their entire company.

You can enable Open Database Connectivity (ODBC) to run as a Windows server service by installing » iSeries Access for Windows on Windows « servers on Integrated xSeries Servers. This enables you to write server applications that call the ODBC driver to access DB2 for iSeries.

To enable ODBC to be invoked from a Windows server service, run the CWBCFG command with the /s option after you install iSeries Access.

As a single user signed on to Windows server, you have full support for all other » iSeries Access « features.

Additional information sources:

- You can read a comparison of iSeries Access for Windows with iSeries NetServer.

You can go back to “Preinstallation checklist for iSeries Integration for Windows Server” on page 11. [»](#)

Enabling iSeries NetServer

iSeries NetServer enables Windows clients to connect to OS/400 shared directory paths and shared output queues by way of TCP/IP. Before you can install service packs or perform file-level backups on Windows server, you must enable iSeries NetServer and set up a guest user profile.

If you plan to use iSeries NetServer only to apply service packs, you can set it up without iSeries Navigator. In that case, you can use the quickstart method. If you want the full capabilities of iSeries NetServer, you need iSeries Navigator, which requires setting up OS/400 “iSeries Access for Windows on Windows server on iSeries” on page 25 on a PC that you use for administration. Once you have set up either version, you need to set up a “Create a guest user profile for iSeries NetServer”. [«](#)

Create a guest user profile for iSeries NetServer

Before you can apply code fixes and system upgrades to iSeries Integration for Windows Server, you must set up a guest user profile for iSeries NetServer. [«](#) You must have *SECADM special authority to perform this task.

If you have [»](#) iSeries Navigator on your system, you can use the graphical interface to set up a guest user profile for iSeries NetServer [«](#) with no special authorities and no password.

If you do not have [»](#) iSeries Navigator, follow these steps to set up a guest user profile for iSeries NetServer: [«](#)

1. On OS/400, create a user profile with no special authorities and no password:

```
CRTUSRPRF USRPRF(username) PASSWORD(*NONE) SPCAUT(*NONE)
```

[»](#) Note:

See the iSeries Security Reference  for information about user profiles. [«](#)

2. Enter the following command, where *username* is the name of the user profile that you created:

```
CALL QZLSCHSG PARM(username X'00000000')
```

3. To stop iSeries NetServer, enter the following command:

```
ENDTCPSVR SERVER(*NETSVR)
```

4. To restart iSeries NetServer, enter the following command:

```
STRTCPSVR SERVER(*NETSVR)
```

You can go back to “Enabling iSeries NetServer” or to the “Preinstallation checklist for iSeries Integration for Windows Server” on page 11. [«](#)

Comparison of FAT, FAT32, and NTFS file systems

Windows NT 4.0 allows FAT or NTFS file systems. Windows 2000 Server or Windows .NET Server allow you to choose between NTFS, FAT, and, for larger disks, FAT32. iSeries Integration for Windows Server installs your system drives using an appropriate file system that depends on the hardware resource capabilities, Windows version and intended use. The installation command gives you the option of converting FAT or FAT32 drives to NTFS. In some cases, the conversion to NTFS is automatically performed based on the intended use of the server (ex. a domain role of *DMNCTL).

Note: Do not convert the D drive to NTFS. It must remain FAT.

You do have the option of converting the C drive. Here are some comparisons that might help you decide:

FAT	FAT32	NTFS
Volume from floppy disk size up to 4 GB	Volumes from 512 MB to 2 terabytes (TB)	Volume 10 MB to 2 TB
Maximum file size 2 GB	Maximum file size 4 GB	File size limited by size of volume
Does not support Windows 2000 or Windows .NET Active Directory	Does not support Windows 2000 or Windows .NET Active Directory	Required to use Windows 2000 or Windows .NET Active Directory
Allows access to files on the hard disk with MS-DOS for Windows NT 4.0, Windows 2000, or Windows .NET	Does not allow access to files on the hard disk with MS-DOS.	Does not allow access to files on the hard disk with MS-DOS.
Allows you to customize your server with NWSD configuration files	Allows you to customize your server with NWSD configuration files.	Cannot use NWSD configuration files.
Allows you to use the NWSD dump tool (QFPDMPLS) to retrieve files from the disk for service	Allows you to use the NWSD dump tool to retrieve files from the disk for service	Cannot use the dump tool to retrieve files from the disk

Network server descriptions for Windows server on iSeries

Network server descriptions (NWSDs) represent a Windows server on iSeries. The INSWNTSVR command automatically creates an NWSD for each Windows server that you install. The NWSD usually has the same name as the server. When you perform an action on the NWSD, you also take action on the server. For example, varying the NWSD on starts the server, and varying the NWSD off shuts down the server.

Supported language versions

These languages are supported on the Language version parameter (LNGVER) of the Install Windows server (INSWNTSVR) command:

LNGVER	National Language
*PRIMARY	Uses the language version of the primary language that is installed on iSeries
2911	Slovenian
2922	Portuguese
2923	Dutch
2924	English upper/lowercase
2925	Finnish
2926	Danish
2928	French
2929	German
2931	Spanish
2932	Italian
2933	Norwegian
2937	Swedish
2938	English uppercase DBCS
2939	German MNCS
2940	French MNCS
2942	Italian MNCS
2950	English uppercase
2962	Japanese DBCS

LNGVER	National Language
2963	Dutch MNCS
2966	Belgian French
2975	Czech
2976	Hungarian
2978	Polish
2980	Portuguese
2981	Canadian French MNCS
2984	English upper/lowercase DBCS
2986	Korean DBCS
2987	Chinese, Traditional
2989	Chinese, Simplified
2994	Slovakian
2996	Polish MNCS

iSeries Integration for Windows Server supports Windows 2000 Multi-Language User Interface.

Plan for iSeries Integration for Windows Server installation on Windows 2000 and Windows .NET

Before you install iSeries Integration for Windows Server on Windows 2000 or Windows .NET, you need to be aware of what “Hardware requirements for running Windows server on iSeries” on page 8 and “Software requirements for running Windows 2000 or Windows .NET Server on iSeries” on page 41 you need. If you are upgrading your version of OS/400 from V4R4 or prior releases to V4R5 and later, and also upgrading to the Pentium III 2890 Integrated xSeries Server, first read “Upgrade and migration considerations for iSeries Integration for Windows Server and Integrated xSeries Server” on page 54

The “Preinstallation checklist for iSeries Integration for Windows Server” on page 11 takes you through preliminary steps you need to take to get ready for the installation.

» In addition:

- Make the first Windows 2000 or Windows .NET on your network a domain controller and name it carefully. (To change its name, you have to first change its role). Domain controllers house the master security database. Instead of designating domain controllers as primary and backup domain controllers, Windows 2000 allows any domain controller to make changes and replicate them to all other domain controllers, which act as backups.
- A member server is part of the domain, but it has no role in security administration. Windows 2000 and Windows .NET allow you to promote a server to a domain controller without reinstalling the server. «

To get iSeries Integration for Windows Server installed and running:

1. » Complete the steps in the “Windows server installation advisor” on page 39 and print the finished installation information page. The answers provided while completing the advisor will assist you in installing and configuring your iSeries server. «
2. “Install iSeries Integration for Windows Server” on page 40 from IBM.
3. Install the “Install Windows 2000 or Windows .NET Server on the Integrated xSeries Server” on page 41 software from Microsoft.
4. A few configuration tasks “Complete the installation of Windows 2000 and Windows .NET Server on iSeries” on page 44.

Installation work sheet for OS/400 parameters







➤ Prior to installing Windows 2000 or Windows .NET Server, complete either the “Windows server installation advisor” on page 39 or this installation work sheet.

Prior to installing Windows NT 4.0, complete this installation work sheet.

The completed work sheet will help you install and configure your system. ⏪

Field	Description and Instructions	Value
Network server description	Defines the operating characteristics and communications connections of the network server that controls the Windows server. See “Network server descriptions for Windows server on iSeries” on page 27 for more information about network server descriptions. Use a name that is easy to remember. The name can have up to eight characters. Use only the characters A-Z and 0-9 in the name, and use a letter for the first character. The network server description name is also the computer name and TCP/IP host name of the Windows server.	
Install type	Specifies the type of install to perform. Choose one of the following: *FULL If the install process should be controlled by the OS/400 INSWNTSVR command. This type of install is required when installing on an internal Integrated xSeries Server and is optional when installing on an external xSeries server attached via an Integrated xSeries Adapter. *BASIC If installing on an external xSeries server that is attached via an Integrated xSeries Adapter. For this type of install, the early part of the install process is controlled by the OS/400 INSWNTSVR command. Then the install is completed by the xSeries install process. This is the recommended install type when installing on an externally attached xSeries server.	
Resource name	Identifies the Windows server hardware. To determine the name, enter DSPHDWRSC *CMN at the OS/400 command line. ➤ The 2850 Integrated Netfinity Server, 2890 or 2892 Integrated xSeries Server or 2689 Integrated xSeries Adapter will have resource names in the format LINxx where xx is a number. The text associated with this name will indicate that the resource is a File Server IOA. The 6617 Integrated Netfinity Server has a resource name in the format CCxx where xx is a number. The text associated with this name will indicate that the resource is a File Server IOP. ⏪ Tip “Tip: Find resource names when you have multiple Integrated xSeries Servers” on page 24	

Field	Description and Instructions	Value
Domain role	<p>Specifies the role performed by this network server:</p> <p>*DMNCTL This network server is a domain controller, managing user access between servers and clients.</p> <p>» Windows 2000 or Windows .NET Server: To complete the installation of a *DMNCTL, you must promote the server using the Windows DCPROMO command once the INSWNTSVR command has completed. «</p> <p>*BKUCTL » If you are installing Windows NT 4.0, you can designate this network server as a backup domain controller. Windows 2000 and Windows .NET Server do not have backup domain controllers. «</p> <p>*SERVER This network server is a stand-alone or member server that provides services such as printing or e-mail to client computers but does not control access.</p> <p>For Windows NT 4.0: To change the domain role to or from *SERVER, you must reinstall Windows NT Server. Consider your options carefully before choosing a role. If you are “Run multiple Windows servers on multiple Integrated xSeries Servers” on page 6, you can define their domain roles to simplify user enrollment and access. See your Windows NT 4.0 documentation for more information about deciding the role of your Windows NT Server.</p> <p>For Windows 2000 » or Windows .NET Server: « To change the domain role to or from *SERVER, you promote or demote the server. You do not need to reinstall Windows 2000 or Windows .NET Server.</p>	

Field	Description and Instructions	Value
TCP/IP port configuration	Use this parameter if you are installing Windows 2000  or Windows .NET Server  and you do not want OS/400 to share access with the PCI LAN adapters on the Integrated xSeries Server for external host LAN. Specify the Windows TCP/IP configuration values that are specific to each adapter port. Otherwise, skip this step and use the default value *NONE. If you plan to share the adapters with the iSeries using external host LAN (on models that support doing so), use the Port 1 and/or Port 2 parameters instead (included on the next worksheet).	<ul style="list-style-type: none"> • Port 1 <ul style="list-style-type: none"> – IP address – Subnet mask – Gateway • Port 2 <ul style="list-style-type: none"> – IP address – Subnet mask – Gateway • Port 3 <ul style="list-style-type: none"> – IP address – Subnet mask – Gateway •  Port 4 <ul style="list-style-type: none"> – IP address – Subnet mask – Gateway 
 Virtual Ethernet port	<p>Specifies the TCP/IP configuration for the Virtual Ethernet networks used by the file server.</p> <p>Notes: This parameter is only available for servers installing Windows 2000 or Windows .NET Server on an Integrated xSeries Server (models 2890, 2892) or an Integrated xSeries Adapter (model 2689).</p> <p>A matching Virtual Ethernet port is required to install the Windows Cluster service.</p> <p>*NONE: Specifies that there is no virtual ethernet port configuration</p> <p>*VRTETHn: The network server virtual ethernet port 'n' is configured, where 'n' has a value of 0 through 9.</p>	<ul style="list-style-type: none"> • Virtual port 1 <ul style="list-style-type: none"> – *VRTETHx – IP Address – Subnet mask • Virtual port 2 <ul style="list-style-type: none"> – *VRTETHx – IP Address – Subnet mask • Virtual port 3 <ul style="list-style-type: none"> – *VRTETHx – IP Address – Subnet mask • Virtual port 4 <ul style="list-style-type: none"> – *VRTETHx – IP Address – Subnet mask 
TCP/IP local domain name	Specifies the TCP/IP local domain name associated with the Windows server. You can specify *SYS to use the same value the OS/400 system uses.	
TCP/IP name server system	Specifies the Internet address of the name server used by the Windows server. You can specify up to three Internet addresses, or you can specify *SYS to use the same value the OS/400 uses.	
Server domain name	Applies only to domain controllers (and also backup domain controllers for Windows NT 4.0). Specifies the Windows server domain on which the server will be a domain controller.	
To workgroup	Specifies the name of the Windows server workgroup in which the server participates.	
To domain	Specifies the name of the Windows server domain in which the server participates.	

Field	Description and Instructions	Value
Server message queue and library	<p>Specify the name of the message queue and the library it will be located in. If the message queue does not already exist, the INSWNTSVR command creates it. The message queue is where all event logs and errors associated with this server are sent. You should specify a MSGQ name and library. You can also specify *JOBLOG to send non-severe errors to the job log of the user administration monitor and severe errors to QSYSOPR. If you specify *NONE, non-severe errors are not sent to OS/400, and severe errors are sent to QSYSOPR.</p>	Queue: Library:
Event log	<p>Specifies whether or not OS/400 receives event log messages from the Windows server. The choices are all, system, security, application, or none:</p> <p>*ALL OS/400 receives all event log messages.</p> <p>*NONE No event log messages are received.</p> <p>*SYS OS/400 receives system event log messages.</p> <p>*SEC OS/400 receives security event log messages.</p> <p>*APP OS/400 receives application event log messages.</p> <p>Note: If you propagate the security log (by specifying *ALL or *SEC), be sure to set up the message queue with the proper security.</p>	

Field	Description and Instructions	Value
Installation source and system drive sizes and auxiliary storage pool (ASP)	<p>Specify the size of the network server storage spaces for the installation source and system drives and in which ASP >> (1-255) << you want them.</p> <p>The installation source drive (Drive D) must be large enough to hold the contents of the I386 directory on the Windows server installation CD-ROM image and the iSeries Integration for Windows Server code.</p> <p>>> The system drive (Drive C) must be large enough to hold the Windows server operating system. When installing Windows NT 4.0 or when installing on Integrated Netfinity Servers 6617 and 2850, the limit is 1024 to 8000 MB. When installing Windows 2000 or Windows .NET Server on all other hardware types, the limit is 1024 to 64000 MB, depending on your resource capabilities. << Consider these factors:</p> <ul style="list-style-type: none"> • Your version of Windows server (Refer to Microsoft documentation for Windows server operating system requirements.) • Primary usage (print/file serving) and number of users (Terminal Server) • Free space on system drive • Application resource requirements • Need for crash dump file <p>OS/400 creates and links the drive as a FAT or NTFS network server storage space, depending on the size.</p> <p>For more information about these drives, see "Predefined disk drives for Windows server on iSeries" on page 91.</p> <p>Notes:</p> <ol style="list-style-type: none"> 1. The INSWNTSVR command automatically sets the system drive size to the recommended size if a size is specified that is smaller than the value listed as the minimum free system partition disk space (FreeSysPartDiskSpace in the TXTSETUP.SIF file). 2. When deciding the size of each drive, allow room for future needs such as new applications or upgrades to the Windows server product. 3. Support for independent ASPs (33-255) is provided through iSeries Navigator. For more information about working with independent ASPs, see Independent disk pools. Both the Information Center and iSeries Navigator refer to ASPs as Disk Pools. To use an independent ASP, the ASP device must be varied on prior to running the INSWNTSVR command. 	<p>Installation source drive:</p> <p style="padding-left: 40px;">Size</p> <p style="padding-left: 40px;">ASP</p> <p>System drive:</p> <p style="padding-left: 40px;">Size</p> <p style="padding-left: 40px;">ASP</p>

Field	Description and Instructions	Value
License Mode	<p>Determines the license mode to install the Window server.</p> <p>Element 1 License type:</p> <p>*PERSEAT Indicates that a client license has been purchased for each computer that accesses the server.</p> <p>*PERSERVER Indicates that client licenses have been purchased for the server to allow a certain number of concurrent connections to the server.</p> <p>Element 2 Client licenses:</p> <p>*NONE Indicates that no client licenses are installed. *NONE must be specified when *PERSEAT is specified.</p> <p>number-client-licenses: Specifies the number of client licenses purchased for the server being installed.</p> <p>» Element 3 Terminal services:</p> <p>number-desktop-licenses: For Windows Nt 4.0 Terminal Server Edition, this specifies the number of Terminal Server desktop licenses purchased for the server being installed. The valid range is 5 to 9999. This value only applies to Windows NT 4.0.</p> <p>*TSENABLE For Windows 2000, install the Terminal Services and the Terminal Services licensing.</p> <p>*PERSEAT Installs and configures Terminal Services to require that each connected client computer have a valid client access license (CAL) for Windows .NET Server (2002).</p> <p>*PERSESSION Installs and configures Terminal Services to provide one session for each available client access license (CAL) for Windows .NET Server (2002). <<</p> <p>*NONE There are no Terminal Server desktop licenses for this server.</p>	<p>License type:</p> <p>Client licenses:</p> <p>Desktop licenses:</p>
» Propagate domain user (PRPDMNUSR)	<p>Specifies if this server should be used to propagate and synchronize users to the Windows domain or active directory.</p> <p>*YES Send user updates to the Windows domain or active directory through this server.</p> <p>*NO Do not send user updates to the Windows domain or active directory through this server. <<</p>	

Field	Description and Instructions	Value
Restricted device resources	<p>Restricts iSeries tape and optical devices from being used by the Windows server.</p> <p>*NONE Restricts no tape or optical devices from being used by the network server.</p> <p>*ALL Restricts all tape and optical devices from being used by the network server.</p> <p>*ALLTAPE Restricts all tape resources from being used by the network server.</p> <p>*ALLOPT Restricts all optical resources from being used by the network server.</p> <p>restricted-device Specify up to 10 device resources that you do not want the network server to use.</p>	
Time zone	(Optional) record OS/400 offset from Greenwich Mean Time for use in the Windows server phase of installation. (See "Verifying that OS/400 time zone is set" on page 24.)	
Internal LAN port (For Windows NT 4.0 or Integrated Netfinity Servers)	<p>An "Local area networks used by Windows server on iSeries" on page 13 exists between OS/400 and Windows server. Both the OS/400 side and the Windows server side of this LAN have IP addresses and subnet masks.</p> <p>Note: By default, the INSWNTSVR command sets up these addresses automatically. These addresses are in the form of 192.168.xx.yy. If your site uses class C addresses, it is possible for duplicate IP addresses to be generated.</p> <p>To avoid potential conflicts, you can also specify Internet addresses that you know will be unique across your system. Use addresses in the form a.b.x.y where a.b.x is the same value for both sides of the internal LAN and ensure that the internal LAN occupies its own subnet on OS/400. Use the Internal LAN port parameter under additional parameters of the INSWNTSVR command.</p> <p>Note: For Windows NT 4.0, you must do the configuration yourself. Record the Windows server-side address during the Windows server phase of the installation, when it appears on the OS/400 screen. (If you miss it there, you can also find it in the joblog.) From that information, you can infer the OS/400-side information. The fourth octet of the OS/400-side internal IP address is always 1 less than the fourth octet of the Windows server internal IP address.</p> <p>The subnet mask is always 255.255.255.0.</p>	<p>OS/400-side IP address:</p> <p>Windows server-side IP address:</p>

Field	Description and Instructions	Value
<p>➤ Virtual Ethernet point-to-point (For Windows 2000 or Windows .NET Server and Integrated xSeries Servers and Adapters)</p>	<p>A “Local area networks used by Windows server on iSeries” on page 13 exists between OS/400 and Windows server. Both the OS/400 side and the Windows server side of this LAN have IP addresses and subnet masks.</p> <p>Note: By default, the INSWNTSVR command sets up these addresses automatically. These addresses are in the form of 192.168.xx.yy. If your site uses class C addresses, it is possible for duplicate IP addresses to be generated.</p> <p>To avoid potential conflicts, you can also specify Internet addresses that you know will be unique across your system. Use addresses in the form a.b.x.y where a.b.x is the same value for both sides of the internal LAN and ensure that the internal LAN occupies its own subnet on OS/400. Use the Virtual PTP Ethernet port parameter under additional parameters of the INSWNTSVR command.</p> <p>The subnet mask is always 255.255.255.0.</p>	<p>OS/400-side IP address:</p> <p>Windows server-side IP address:</p> <p>⏪</p>
Configuration file	<p>You can create and specify during the installation a customized NWSD .</p> <p>The default is *NONE. To specify a configuration file that you have created, substitute the name of the file and the library where it is stored (*LIBL, *CURLIB, or the name of the library).</p>	

➤ Windows Cluster Service information

Notes:

Fill in this work sheet only when your model of Integrated xSeries Server supports Windows Cluster service. (Integrated Netfinity Servers do not support Windows Cluster service.)

Network adapters are referred to as “ports” in OS/400.

Item	Description and Instructions	Value
Cluster name	<p>Specifies the name of the cluster. Administrators will use this name for connections to the cluster. The cluster name must be different from the domain name, from all computer names on the domain, and from other cluster names on the domain.</p> <p>The cluster name is also used to create the network server storage space that will be used as the Windows cluster quorum resource.</p> <p>*NONE: Do not form or join a Windows Cluster.</p> <p>cluster-name: Specify the name of the cluster.</p>	

Item	Description and Instructions	Value
Cluster configuration: (Elements 1 - 3)	<p>Specifies the parameters required to configure a new Windows Cluster.</p> <p>Notes: This parameter is used to verify the OS/400 cluster configuration. The Microsoft configuration wizards are used to install the Cluster service.</p> <p>This parameter is only required when forming a new Windows cluster using the Cluster name (CLU) parameter.</p> <p>Element 1: Cluster domain name Specifies the domain to which the cluster belongs. If the cluster already exists, the cluster will be joined, otherwise, the cluster will be formed. If forming a cluster, the Cluster configuration (CLUCFG) parameter must be specified.</p> <p>cluster-domain-name: Specify the domain name to which the cluster belongs when forming a new cluster.</p> <p>Element 2: Quorum resource ASP Specifies the auxiliary storage pool for the storage space used as the Windows quorum resource. Specify one of the following values:</p> <p>1: The storage space is created in auxiliary storage pool 1, the system auxiliary storage pool (ASP).</p> <p>quorum-ASP: Specify a value ranging from 2 through 255 for the ASP identifier. Valid values depend on how many ASPs are defined on the system.</p> <p>Element 3: Cluster connection port Specifies the connection port used for the Cluster service communication.</p> <p>*VRTETHn: The network server virtual ethernet port 'n' is configured, where 'n' has a value of 0 through 9.</p> <p>Note: The virtual ethernet port must be configured to match this value.</p>	<p>Cluster domain name:</p> <p>ASP:</p> <p>Connection port:</p>

Item	Description and Instructions	Value
Cluster configuration: (Elements 4 - 7)	<p>Element 4: Cluster Internet Address Specifies the internet address for the cluster.</p> <p>internet-address: Specify the cluster internet address in the form, xxx.yyy.zzz.nnn, where xxx, yyy, zzz, and nnn are decimal numbers ranging from 0 through 255.</p> <p>Note: The internet address selected must be unique across all NWSD objects and the OS/400 TCP/IP configuration.</p> <p>Element 5: Subnet Mask</p> <p>subnet-mask: Specifies the subnet mask for the cluster in the form, nnn.nnn.nnn.nnn, where nnn is a decimal number ranging from 0 through 255.</p> <p>Element 6: Account name Specifies the name of the account under which Cluster service runs.</p> <p>Element 7: Password Specifies the password of the account under which Cluster service runs.</p>	<p>IP Address:</p> <p>Subnet mask::</p> <p>Account:</p> <p>Password:</p>



Windows server networking information

Note: Fill in this work sheet only in these conditions:

- Your model of Integrated Netfinity Server supports external host LAN (the Integrated xSeries Server does not).
- You plan to use the LAN adapters installed in models of the Integrated xSeries Server as external host LAN for your iSeries.

LAN adapters are referred to as "ports" in OS/400.

Item	Description and Instructions	Value
Line Type	Identifies the type of network adapter that is installed in the Integrated xSeries Server and that will be shared by OS/400 and Windows server. This value can be one of four types: *ETH10M (10 Mbps ethernet), *ETH100M (100 Mbps ethernet), *TRN4M (4 Mbps token-ring), or *TRN16M (16 Mbps token-ring).	Port 1: Port 2:
Local adapter address	Identifies the network adapter address on OS/400. The values you can specify depend on the line type. Ethernet lines use values between 020000000000 and 7EFFFFFFFFFFFF. The second character must be 2, 6, A, or E. Token-ring lines use values between 400000000000 and 7EFFFFFFFFFFFF. Your network administrator can assign your local adapter address. Every network adapter on the LAN must have a unique local adapter address.	Port 1: Port 2:

Item	Description and Instructions	Value
Maximum transmission unit	Specifies the maximum size (in bytes) of IP datagrams that are transmitted. Either take the default of 1492 or specify MTU to take the optimized value of your interface type. A larger size increases the efficiency of sending and receiving data. However, problems can arise if your network has bridges or routers that cannot accommodate larger sizes.	Port 1: Port 2:
OS/400 Internet address	Specify the OS/400 Internet address for each shared LAN adapter. (An Internet address consists of four numbers, each between 0 and 255, separated by periods.) All Internet address must be unique on the network. Your network administrator can give you the Internet addresses.	OS/400 Port 1 OS/400 Port 2
OS/400 Subnet mask	Used in TCP/IP communications. A subnet mask consists of four numbers, each between 0 and 255, separated by periods. Your network administrator can give you the subnet mask.	OS/400 Port 1 OS/400 Port 2
Windows server Internet address	Specify the Windows server Internet address for each shared LAN adapter. (An Internet address consists of four numbers, each between 0 and 255, separated by periods.) All Internet addresses must be unique on the network. Your network administrator can give you the Internet addresses.	Windows server Port 1 Windows server Port 2
Windows server subnet mask	Used in TCP/IP communications. A subnet mask consists of four numbers, each between 0 and 255, separated by periods. Your network administrator can give you the subnet mask.	Windows server Port 1 Windows server Port 2
Windows server gateway	Used in TCP/IP communications. Your network administrator can give you the gateway address.	Windows server Port 1 Windows server Port 2

Go back to “Preinstallation checklist for iSeries Integration for Windows Server” on page 11.

Windows server installation advisor

Welcome

Warning: This advisor uses Javascript to function. Ensure you are using a browser which supports Javascript and that Javascript is enabled.

This advisor is for installing Windows 2000 and Windows .NET server on your iSeries server. If you are installing Windows NT 4.0, go to “Plan for iSeries Integration for Windows Server installation on Windows NT 4.0” on page 45.

If you plan to share the adapters with the iSeries using external host LAN (on models that support doing so), do not use this advisor. Follow the “Install Windows 2000 or Windows .NET Server on the Integrated xSeries Server” on page 41 instructions for installing your server.

The goal of this advisor is to help you prepare to install Windows server on iSeries. The advisor will not install the product for you, but it will guide you through answering questions about the parameters you will need to install Windows server. You can install Windows server once you have completed the advisor, or at a later date.

The advisor builds a summary sheet that you can use when installing Windows server. In addition, you will have a results page with a command string that you can copy and paste to install your Windows server.

Before beginning the advisor, you should read the “Preinstallation checklist for iSeries Integration for Windows Server” on page 11.

Install iSeries Integration for Windows Server

➤ Before you install the Windows server software from Microsoft, you need to install the iSeries Integration for Windows Server base code and Option 1 for Windows NT 4.0 or Option 2 for Windows 2000 or Windows .NET Server. Install both options if you plan to run more than one Windows version on Integrated xSeries Server on your iSeries. Be sure to first complete the “Preinstallation checklist for iSeries Integration for Windows Server” on page 11. If you are upgrading from an earlier version of iSeries Integration for Windows Server, be sure to first read “Upgrade and migration considerations for iSeries Integration for Windows Server and Integrated xSeries Server” on page 54. ⏪

To install the iSeries Integration for Windows Server licensed program, perform these steps on iSeries:

1. Insert the OS/400 CD-ROM containing 5722-WSV.
2. Type G0 LICPGM and press Enter.
3. Choose option 11 from the Work with Licensed Programs menu; then press Enter.
4. Page down the list of licensed programs until you see the description Integration for Windows Server.
5. Unless you are upgrading from V4R4 or an earlier version of this product, enter a 1 in the Option field to the left of the base program.
6. Enter a 1 in the Option field to the left of option 1 if you plan to install Windows NT 4.0.
7. Enter a 1 in the Option field to the left of option 2 if you plan to install Windows 2000 ➤ or Windows .NET Server. ⏪
8. Press Enter.
9. Enter the name of the Installation device in which you inserted the OS/400 CD-ROM.
10. Press Enter, and the system installs the integration software.
11. After installing iSeries Integration for Windows Server, install the latest cumulative program temporary fix (PTF) from IBM when there are no users on your iSeries. If your system uses logical partitions, load the PTFs on the secondary partitions on which you are installing iSeries Integration for Windows Server and set them for apply delay. Then load them on the primary partition. Refer to Install program temporary fixes on a system with logical partitions.
12. To install the latest PTF, complete the following steps:
 - a. On the OS/400 command line, type G0 PTF and press Enter.
 - b. To install the program temporary fix package, type 8 and press Enter.
 - c. In the Device field, enter the name of your optical device.
 - d. Use the default *YES for Automatic IPL unless your system uses logical partitions. Press Enter to install all PTFs. Unless you changed the value to *NO, your system automatically shuts down and restarts.





For more information about PTFs see Fixes in the **Get Started with iSeries** topic.

13. If you are upgrading to a new version of OS/400 support for Integrated xSeries Server, you need to upgrade any existing Windows servers to the new level. Find out how to do that in “Upgrade Windows servers when you upgrade iSeries Integration for Windows Server” on page 66. That article also tells you where to find information about upgrading to a new version of Windows server from Microsoft.
14. ➤ Next you need to install “Install Windows 2000 or Windows .NET Server on the Integrated xSeries Server” on page 41 or “Install Windows NT 4.0 on the Integrated xSeries Server” on page 46. ⏪

Install Windows 2000 or Windows .NET Server on the Integrated xSeries Server

After “Install iSeries Integration for Windows Server” on page 40 from IBM, you are ready to install the Windows 2000 or Windows .NET Server software.

What you need:

-  A CD-ROM that contains the Windows 2000 or Windows .NET Server software (or an image of the CD-ROM)
- Your Windows server license key (printed on the back of the Windows server CD-ROM jewel case)
-  A completed, and printed, “Windows server installation advisor” on page 39 or “Installation work sheet for OS/400 parameters” on page 29 for each server


What to do:


1. Start “Start the Windows 2000 or Windows .NET Server installation from the OS/400 console”.
2. Continue the installation from your “Continue the Windows 2000 and Windows .NET installation from the Windows server console” on page 43 console.

Then go to “Complete the installation of Windows 2000 and Windows .NET Server on iSeries” on page 44.

Software requirements for running Windows 2000 or Windows .NET Server on iSeries

To run Windows 2000 or Windows .NET Server on iSeries, you need this software:

- OS/400 5722-SS1 Version 5, Release 2. To check your release level:
 1. On the OS/400 command line, type Go LICPGM and press Enter.
 2. Type 10 in the option field to look at installed products.
 3. Look for 57xxSS1. Whatever release shows beside that is your version. (On some releases, you may need to press F11 before the VRM number appears.)
- IBM iSeries Integration for Windows Server 5722-WSV (the base licensed program and option 2). The Version and Release of the WSV product must match the Version and Release of OS/400 on your system.
- TCP/IP Connectivity Utilities for OS/400 OS/400 V5R2 (5722-TC1).
- Windows 2000 or Windows .NET Server from Microsoft.
- Any required Microsoft Windows service packs. For the latest information about available Windows server service packs that IBM has tested with iSeries Integration for Windows Server, refer to the Applications topic on the IBM Windows Integration Web site .

For additional information about the installation of required software, see the iSeries Software Installation manual .

You can go back to Planning for iSeries Integration for Windows Server installation or read about “Hardware requirements for running Windows server on iSeries” on page 8. You might also want to read “Upgrade and migration considerations for iSeries Integration for Windows Server and Integrated xSeries Server” on page 54.


Start the Windows 2000 or Windows .NET Server installation from the OS/400 console

To install Windows server on iSeries, you need *IOSYSCFG, *ALLOBJ, and *JOBCTL special authority. You must have your Windows server license key available. In most cases, it is printed on the back of the Windows server CD-ROM jewel case.

1. When performing an Install type of *FULL, place the Windows server CD in the iSeries optical drive (unless you plan to use an image of the installation CD).

When performing an Install type of *BASIC, place the ServerGuide CD in the attached Netfinity or xSeries server CD-ROM.

Note: If you are using an upgrade version of the Windows server CD-ROM for the installation, Windows server prompts you for a non-upgrade version during the text mode of the installation.

2. Use one of the following methods to begin installing the Windows server:
 - If the INSWNTSVR command generated by the Windows Server Installation Advisor is available:
 - a. Call QCMD at the OS/400 command line to start a command entry prompt and select F11=Display Full.
 - b. Paste the INSWNTSVR command generated by the Windows Server Installation Advisor at the OS/400 command line and press F4 to prompt the command.
 - Otherwise, begin the installation at the OS/400 command line by typing INSWNTSVR and pressing F4 to prompt the command.
3. In the “Network server descriptions for Windows server on iSeries” on page 27, type the name for this server that you filled out in the “Windows server installation advisor” on page 39; press Enter.
4. In the Install type field, type the value (*FULL or *BASIC) that you filled out in the advisor.
5. In the Resource Name and Domain Role fields, type the information that you filled out in the advisor.
6. Choose the Windows server version you want to install.
7. Press F10 to see more parameters.
8. If you want to install the server from a stored image instead of the physical CD-ROM, specify the path to that image in the Windows source directory field.
9. In the Install option field, use the default *INSTALL unless you are upgrading your server from Windows NT 4.0 to Windows 2000  or Windows .NET Server.
10. If you want Windows server to access the PCI LAN adapters on the Integrated xSeries Server, specify the Windows TCP/IP configuration values from the “Installation work sheet for OS/400 parameters” on page 29. Otherwise, skip this step and use the default value *NONE.
11. Type the value from “Installation work sheet for OS/400 parameters” on page 29 for the TCP/IP local domain name.
12. Page down to see the second installation display.
13. Type the values from the “Installation work sheet for OS/400 parameters” on page 29 in these fields:
 - TCP/IP name server system
 - Server message queue
 - Library
 - In the Event log field, specify which event log messages you want OS/400 to receive from the server.
 - In the fields for Server storage space sizes, type the values from the “Installation work sheet for OS/400 parameters” on page 29. Increase the install source size from the default to at least 400 MB to hold the Windows 2000 CD-ROM image. OS/400 creates and links the drives as network server storage spaces.
 - If you want to choose a different auxiliary storage pool (ASP) for the source and system drives, specify it in the Storage space ASP fields.
 - For system drives up to 2047 MB, in the Convert to NTFS field, you can specify *N0 to leave the Windows server system drive formatted with the file allocation table (FAT) file system. If you want the system drive converted to the New Technology File System (NTFS) during the installation, specify *YES. For information that might help you decide, see “Comparison of FAT, FAT32, and NTFS file systems” on page 26. OS/400 automatically formats system drives larger than 2047 MB as NTFS if necessary, depending on hardware and software capabilities.

14. Page down to the Full name field.
15. In the Full Name field, specify the name of the user who holds the Windows server license you are installing.
16. In the Organization field, specify the name of the organization that holds the Windows server license you are installing.
17. In the Language version field, specify *PRIMARY to have iSeries Integration for Windows Server use your primary language. To prevent problems with predefined names that cannot be enrolled, choose the language that matches the language of the Windows server that you are installing. If you need to know which languages the command supports, look at “Supported language versions” on page 27.
18. In the Synchronize date and time field, specify *YES to have OS/400 synchronize the date and time with Windows server every 30 minutes. If you want OS/400 to synchronize the date and time with Windows server only when you vary on the network description for Windows server, type *NO.
19. In the Windows license key field, specify the CD key that Microsoft has provided, including the dash. In most cases, you can find this CD key printed on the back of the Windows server CD-ROM jewel case.
20. In the License type field, specify the type of Windows server license that you purchased.
21. If you specified *PERSERVER in the License type field, then in the Client licenses field, specify the number of client licenses that you purchased.
22. In the Restricted device resources field, type the value from the “Installation work sheet for OS/400 parameters” on page 29.
23. Page down to view the next installation screen if you plan to do any of the following:
 - Install a keyboard type on the Windows server other than the default. (Valid keyboard layout identifiers are listed in the TXTSETUP.SIF file in the I386 directory of the Windows server installation source.)
 - Use your own IP addresses for the >> private << LAN.
 - Use an .
 - Use the Integrated Netfinity Server as an external host LAN (not supported for the model 2890 >> or 2892 Integrated xSeries Server or type 2689 Integrated xSeries Adapter).

Provide any other information on the screen that seems relevant for your needs and press Enter.

The Windows server starts to install. The installation process will proceed with Windows server console and you may be prompted to enter additional hardware configuration information. The process will take approximately 1 hour, depending on your hardware configuration. See “Continue the Windows 2000 and Windows .NET installation from the Windows server console” from the Windows server console for more information. <<







Continue the Windows 2000 and Windows .NET installation from the Windows server console



When the OS/400 phase of the installation completes, the Integrated xSeries Server starts. The Windows server phase of the installation begins. Your having completed the tasks in “Preinstallation checklist for iSeries Integration for Windows Server” on page 11 and provided information with the INSWNTSVR command makes this phase of the installation easy. The Windows server installation does require you to enter some information, however.

To complete installation of Windows server, for a *FULL install, perform these tasks:

1. If the installation program prompts you for a non-upgrade version of the Windows server CD-ROM, insert the non-upgrade version. Then press Enter to continue with the installation.


Note: If the installation program prompts you again for the non-upgrade CD-ROM, just press Enter.
2. In the **License Agreement** step >> (in Windows Server Setup << window), click on the **I accept this agreement** radio button. Then click on **Next**.

3. If you get error messages, click **OK**, and the installation program lets you correct the situation or provide the necessary information. For examples of these error messages and how to respond, see “Responding to error messages during installation” on page 51.
4. Enter and confirm the password on the **Computer Name and Administrator Password** screen.
5. On the **Date/Time Settings** panel:
 - a. Confirm that the “Verifying that OS/400 time zone is set” on page 24 is correct and matches your OS/400 offset from Greenwich Mean Time (the QUTCOFFSET system value recorded on  “Windows server installation advisor” on page 39). 
 - b. If you are in an area that observes Daylight Savings Time, leave the **Automatically adjust clock** box checked. Note that you must manually adjust OS/400 for Daylight Savings Time.
If you know for sure that you do not observe Daylight Savings Time, clear the “Automatically adjust clock for daylight savings changes” check box.
6. On the Completing the  Windows Setup Wizard  panel, click **Finish**.
7. On the  **Windows Setup**  window, click the **Restart Now** button, or wait 15 seconds and the server automatically restarts.

Note: When installing a domain controller (DMNROLE of *DMNCTL) in Windows 2000  or Windows .NET Server,  the active directory should be installed at this time by running the DCPROMO command. Refer to the Microsoft documentation for more information on the Active Directory installation.




To complete the installation of Windows server for a *BASIC install, perform these tasks:

- Insert the ServerGuide CD-ROM in the local CD drive of the HSL attached server.
- Respond **G** to the message NTA100C “Insert ServerGuide CD-ROM into &2 optical device. (C G)”
- Follow the ServerGuide Wizard through the install process.

Now you should perform just a few steps  to Complete the installation of Windows server on iSeries for “Complete the installation of Windows 2000 and Windows .NET Server on iSeries”. 

Complete the installation of Windows 2000 and Windows .NET Server on iSeries

Performing a few final tasks after installing the Windows server software on OS/400 verifies that Windows server is correctly installed and ready. After installing Windows server, do these tasks:

1. The latest supported level is recommended. Refer to the Microsoft Service packs page for the latest supported service pack list on the Service Information page of the IBM Windows Integration Web site. 
2. If you want Windows server to automatically vary on when you start TCP/IP, see “Set Windows server to automatically vary on with TCP/IP” on page 55.
3.  If you disconnected a LAN adapter before the installation (step 4 (See 11) of the Preinstallation checklist), reconnect it now by plugging in the cable.
4. Changing the QRETSVRSEC system value on OS/400 to ensure that OS/400 keeps passwords (this avoids delays when users sign on):
 - On the OS/400 command line, enter the command:
WRKSYSVAL SYSVAL(QRETSVRSEC)
 - To display the value, enter a 2 in the Option field and press Enter.
 - Change the value of Retain server security data to 1. 
5. You can prevent the CD-ROM drive from changing drive letters whenever you link a user storage space to the server. Use **Disk Management** to assign the Windows server CD-ROM drive letter. (For example, you could make it drive X.)
6. You can customize your servers by creating your own NWSD .

7. ➤ If you want Windows clustering, see “Installing Windows Cluster service on Windows” on page 22.◀

Attention: If you plan to use a firewall with Windows server, be sure not to route the Internet addresses for the private LAN to a software common knowledge IR system (SOCKS) server acting as a firewall. Doing so causes connection failures. For information about setting up a firewall, see the topic Firewall: getting started.

Now that you have installed Windows server on an Integrated xSeries Server, you need to know how to do some everyday tasks from OS/400. This setup book tells you how to start and stop your server (see “Starting and stopping Windows server on an Integrated xSeries Server for iSeries” on page 81). For additional information on managing your server from OS/400 see the iSeries Information Center.

Plan for iSeries Integration for Windows Server installation on Windows NT 4.0

Before you install iSeries Integration for Windows Server on Windows NT 4.0, you need to be aware of the following:

- “Hardware requirements for running Windows server on iSeries” on page 8 (Windows NT 4.0 cannot be installed on hardware types 2892 and 2689)
- “Software requirements for running Windows NT 4.0 on iSeries” on page 46

If you are upgrading your version of OS/400 from V4R4 or prior releases to V4R5 and later, and also upgrading to the Pentium III 2890 Integrated xSeries Server, first read “Upgrade and migration considerations for iSeries Integration for Windows Server and Integrated xSeries Server” on page 54

The “Preinstallation checklist for iSeries Integration for Windows Server” on page 11 takes you through preliminary steps you need to take to get ready for the installation.

You specify the role of Windows NT 4.0 Servers when you install them and cannot change that role from server to domain controller without a reinstallation. If you will have multiple Windows NT 4.0 Servers, use these guidelines to decide each server’s network role (primary domain controller, backup domain controller, or member server):

- Make the first Windows NT 4.0 Server on your network the primary domain controller. The primary domain controller houses the master security database and is the only server that can change that database. Changes are then replicated to any backup domain controllers.
- Designate an Integrated xSeries Server as a backup domain controller only if you already have a primary domain controller and you want an alternate server to authenticate logons.
- A member server is part of the domain, but it has no role in security administration. Use this option only if you already have a primary domain controller and a backup domain controller on your network. Although you can change roles between backup domain controllers and primary domain controllers, changing a member server to either type of domain controller requires reloading the entire operating system.

To get iSeries Integration for Windows Server installed and running:

1. ➤ Complete the steps in the “Installation work sheet for OS/400 parameters” on page 29 and print the finished work sheet. The answers provided on the completed work sheet will assist you in installing and configuring your iSeries server.◀
2. “Install iSeries Integration for Windows Server” on page 40 from IBM.
3. Install the “Install Windows NT 4.0 on the Integrated xSeries Server” on page 46 software from Microsoft.
4. A few configuration tasks “Complete the installation of Windows NT 4.0 on iSeries” on page 50.

Install Windows NT 4.0 on the Integrated xSeries Server

After “Install iSeries Integration for Windows Server” on page 40 from IBM, you are ready to install the Windows NT 4.0 software.

Note: Windows NT 4.0 cannot be installed on hardware types 2892 and 2689.

What you need:



- >> A CD-ROM that contains the Windows NT 4.0 server software (or an image of the CD-ROM)<<
- Your Windows server license key (printed on the back of the Windows server CD-ROM jewel case)
- >> A completed, and printed, “Installation work sheet for OS/400 parameters” on page 29 for each server<<


What to do:

1. Start “Start the Windows NT 4.0 server installation from the OS/400 console”.
2. Continue the installation from your “Continue the Windows NT 4.0 installation from the Windows server console” on page 48 server console.
3. Then go to “Complete the installation of Windows NT 4.0 on iSeries” on page 50.

Software requirements for running Windows NT 4.0 on iSeries

To run Windows NT 4.0, Server or Terminal Server Edition on iSeries, you need the following software:





- Operating System/400 (5722-SS1) >> Version 5, Release 2. << To check your release level:
 1. On the OS/400 command line, type Go LICPGM and press Enter.
 2. Type 10 in the option field to look at installed products.
 3. Look for 57xxSS1. Whatever release shows beside that is your version. (On some releases, you may need to press F11 before the VRM number is shown.)
- >> IBM iSeries Integration for Windows Server 5722-WSV. << The Version and Release of the WSV product must match the Version and Release of OS/400 on your system.
- Windows NT 4.0, Server or Terminal Server Edition from Microsoft.
- For Windows NT 4.0, Terminal Server Edition, you also need Citrix MetaFrame, which is available from Citrix resellers. For information about Citrix MetaFrame, see the Citrix Web site .
- Any required Microsoft Windows NT 4.0 service packs. For the latest information about available Windows server service packs that IBM has tested with iSeries Integration for Windows Server, refer to the Applications topic on the IBM Windows Integration Web site .
- If you are going to be running Microsoft Windows NT 4.0 on the 2890 Integrated xSeries Server for iSeries and you are going to be using the Gigabit Ethernet adapters you need to review “Install Gigabit Ethernet adapters on Windows NT 4.0” on page 77.

For additional information about the installation of required software, see the iSeries Software Installation manual .

You can go back to Plan for iSeries Integration for Windows Server installation or read about “Hardware requirements for running Windows server on iSeries” on page 8. You might also want to read “Upgrade and migration considerations for iSeries Integration for Windows Server and Integrated xSeries Server” on page 54.

Start the Windows NT 4.0 server installation from the OS/400 console

To install Windows server on iSeries, you need *IOSYSCFG, *ALLOBJ, and *JOBCTL special authority. You must have your Windows server license key available. In most cases, it is printed on the back of the Windows server CD-ROM jewel case.


1. Place the Windows server CD in the iSeries optical drive (unless you plan to use an image of the installation CD).
2. At the OS/400 command line, type INSWNTSVR and press F4. The Install Windows server display appears.
3. In the Network Server Description, type the name for this server that you filled out in the "Installation work sheet for OS/400 parameters" on page 29 and press Enter.
4. In the Install type field, type *FULL.
5. In the Resource Name and Domain Role fields, type the information that you filled out in "Installation work sheet for OS/400 parameters" on page 29.
6. In the Windows server version field, type *NT40.
7. Press F10 to see more parameters.
8. If you want to install the server from a stored image instead of the physical CD-ROM, specify the path to that image in the Windows source directory field.
9. In the Install option field, use the default *INSTALL.
10. Type the values from the  "Installation work sheet for OS/400 parameters" on page 29  in the following fields:
 - TCP/IP local domain name
 - TCP/IP name server system
 - Server message queue
 - Library
11. In the Event log field, specify which event log messages you want OS/400 to receive from the server.
12. Page down to see the second installation display.
13. In the fields for Server storage space sizes, type the values from the "Installation work sheet for OS/400 parameters" on page 29 . OS/400 creates and links the drives as network server storage spaces.
14. If you want to choose a different auxiliary storage pool for the source and system drives, specify it in the Storage space ASP fields.
15. For system drives up to 2047 MB, in the Convert to NTFS field, you can specify *NO to leave the Windows server system drive formatted with the file allocation table (FAT) file system. If you want the system drive converted to the New Technology File System (NTFS) during the installation, specify *YES. For information that might help you decide, see "Comparison of FAT, FAT32, and NTFS file systems" on page 26. OS/400 automatically formats system drives larger than 2047 MB as NTFS.
16.  If you are installing Windows NT 4.0 Server on the 2890 Integrated xSeries Server with more than 2 GB of RAM, the system will fail to boot, with a stop message of:


```
0X0000003F NO_MORE_SYSTEM_PTES
```


Microsoft has identified this as a problem and fixed it in Service Pack 2 and later. In order to successfully install the server, follow these steps:

- a. Remove enough of the physical RAM so that the remaining total is less than or equal to 2 GB.
- b. Install Windows NT 4.0 and apply service pack 2 or later.
- c. Reinstall the physical RAM.

See the Microsoft knowledge Base and article Q160392, "Systems with 4 GB or More of RAM Cannot Boot Windows NT 4.0," for more information.

Note: This does not apply to Windows Terminal Server installations as it already has SP3 included. Windows 2000 and Windows .NET Server installations are not affected. 

17. If your server is a domain controller, type the Server domain name from "Installation work sheet for OS/400 parameters" on page 29 ; otherwise, specify values in the To workgroup or To domain fields.

18. In the Full Name field, specify the name of the user who holds the Windows server license you are installing.
19. In the Organization field, specify the name of the organization that holds the Windows server license you are installing.
20. In the Language version field, specify *PRIMARY to have iSeries Integration for Windows Server use your primary language. To prevent problems with predefined names that cannot be enrolled, choose the language that matches the language of the Windows server that you are installing. If you need to know which languages the command supports, look at “Supported language versions” on page 27.
21. In the Synchronize date and time field, specify *YES to have OS/400 synchronize the date and time with Windows server every 30 minutes. If you want OS/400 to synchronize the date and time with Windows server only when you vary on the network description for Windows server, type *NO.
22. In the Windows license key field, specify the CD key that Microsoft has provided, including the dash. In most cases, you can find this CD key printed on the back of the Windows server CD-ROM jewel case.
23. Page down to see the third installation display.
24. In the License type field, specify the type of Windows server license that you purchased.
25. If you specified *PERSERVER in the License type field, specify the number of client or desktop licenses that you purchased.
26. In the Restricted device resources field, type the value from the “Installation work sheet for OS/400 parameters” on page 29 .
27. Page down for further displays if you plan to:
 - Install a keyboard type on the Windows server other than the default. (Valid keyboard layout identifiers are listed in the TXTSETUP.SIF file in the I386 directory of the Windows installation source.)
 - Use your own IP addresses for the Internal LAN.
 - Use an .
 - Use the Integrated xSeries Server as an external host LAN (not supported for the model 2890 Integrated xSeries Server).

Provide any other information on the screen that seems relevant for your needs and press Enter.

Windows NT 4.0 starts to install. The installation process takes between 15 and 45 minutes to finish, depending on what hardware you have and how you have configured it. When this stage completes, OS/400 displays the message Specify a.b.c.d as the IP address for the Virtual Token Ring Adapter. At that time, the console attached to the Integrated xSeries Server starts. “Continue the Windows NT 4.0 installation from the Windows server console” from

Continue the Windows NT 4.0 installation from the Windows server console

When the OS/400 phase of the Windows NT 4.0 installation completes, the Integrated xSeries Server starts. The Windows server phase of the installation begins.

The Windows NT 4.0 phase of the installation has four parts (known as modes). You do not need to take any action during the first three modes. The Windows server console restarts after each mode. Your having completed the tasks in “Preinstallation checklist for iSeries Integration for Windows Server” on page 11 and provided information with the INSWNTSVR command makes this phase of the installation easy. The Windows server installation does require you to enter some information, however.

To complete the installation of Windows server, perform these tasks:

1. If the installation program prompts you for a non-upgrade version of the Windows server CD-ROM, insert the non-upgrade version. Then press Enter to continue with the installation.

Note: If the installation program reprompts you for the non-upgrade CD, just press Enter again.

2. After the first three modes complete, the INSWNTSVR command displays Internet address information for the internal LAN on the OS/400 screen (and in the joblog). If you allowed the command to generate addresses, record this information in the “Installation work sheet for OS/400 parameters” on page 29. You will need it later. The console screen that is attached to the Integrated xSeries Server for iSeries displays the Microsoft License agreement. Click on **I agree**.
3. Enter and confirm the password on the **Administration Account** screen.
4. Click **Next** on the **Windows NT Server Setup** screen.
5. The installation program prompts you for TCP/IP information with the following error message:

Error (Unattended Setup)

The IP Address key in the TCP/IP section of the database must be set to a value. Please correct the problem after the property sheet is displayed.

Click **OK**.

The installation program prompts you for the subnet mask with the following error message:

Error (Unattended Setup)

The subnet mask that you have entered for the IP address is not set to a value. Please correct the problem after the property sheet is displayed.

Click **OK**.

- a. From the list of adapters in the **Adapter** box, select the **IBM Internal LAN Adapter**.
 - b. In the **IP Address** and **Subnet Mask** fields for the Internal LAN, enter the values that you recorded in “Installation work sheet for OS/400 parameters” on page 29 from the INSWNTSVR command display if you had the command generate the address.
 - c. Enter the Internet address information for the remaining LAN adapters for Windows NT Server:
 - 1) In the **Adapter** box, select an adapter card.
 - 2) Fill in the **IP Address** and **Subnet Mask** fields with the values from “Installation work sheet for OS/400 parameters” on page 29 table.
 - 3) Fill in the correct value in the **Default Gateway** field.
 - 4) If you have a second adapter card, repeat steps 5c.i to 5c.iii for that card.

Note: If you have only one card of a particular type, go to step 6. If you have two network adapters of the same type, however, a limitation in the Windows NT Server unattended installation mechanism causes both adapters to have the same network address. The number in brackets that precedes each of the adapters does not necessarily identify the port into which they are installed. If you want to share one or both of the adapters between OS/400 and Windows server, verify the network addresses for each adapter after the installation (see Complete the installation of Windows server on iSeries for “Complete the installation of Windows NT 4.0 on iSeries” on page 50). If it is not clear which number in the brackets corresponds to what port, contact your technical support provider for assistance.
 - d. Configure any additional TCP/IP properties required for the installation that you did not configure on the INSWNTSVR command. You can configure Properties for Domain Name System (DNS), Domain name, and Windows Internet Name Services (WINS) now.
6. If you get other error messages, click **OK**, and the installation program lets you correct the situation or provide the necessary information. For examples of these error messages and how to respond, see “Responding to error messages during installation” on page 51.
 7. On the Date/Time Properties screen:
 - a. Select the time zone that matches your offset from Greenwich Mean Time (recorded on “Windows server installation advisor” on page 39).

- b. If you are in an area that observes Daylight Savings Time, leave the **Automatically adjust clock** box checked. Note that the QUTCFFSET on OS/400 must match the Windows server offset and that you must manually adjust OS/400 for Daylight Savings Time.

If you know for sure that you do not need to manually adjust the QUTCFFSET on OS/400 for Daylight Savings Time, clear the "Automatically adjust clock for daylight savings changes" check box.

8. Configure the display adapter. Select the display color palette, resolution, and refresh frequency for the SVGA monitor that is connected to the Integrated xSeries Server for iSeries.



The installation process will vary off and then on and leave you at the sign-on screen. Some versions of Windows server have additional automatic installation steps beyond those under the control of the INSWNTSVR command. These steps may cause additional installation phases and corresponding reboots of the Integrated xSeries Server for iSeries.

Note: Windows server may require certain fixes before it can run reliably on the Integrated xSeries Server for iSeries. Before you put any Windows server into regular operation, you must put on any required Microsoft Windows server service packs (such as Windows NT service pack 4). You may also need to install a service pack for the iSeries Integration for Windows Server code (see "Code fixes for iSeries Integration for Windows Server" on page 56 for details). For the latest information about available Windows server service packs that IBM has tested with iSeries Integration for

Windows Server, refer to the IBM Windows Integration Web site  .


Tips

Back up the predefined C and D drives immediately after completing this phase of the installation. This will make recovery easier if Windows server becomes corrupt. See "Back up predefined disk drives for Windows servers created on V4R5 and later OS/400 systems" on page 118 for information about backing up these drives.

Now you should perform just a few steps  to Complete the installation of Windows server on iSeries for "Complete the installation of Windows NT 4.0 on iSeries". .

Complete the installation of Windows NT 4.0 on iSeries

Performing a few final tasks after installing the Windows server software on OS/400 verifies that Windows server is correctly installed and ready. After installing Windows server, do these tasks:

1. The latest supported level is recommended. For more information about latest supported Microsoft service packs, see the Service Information page of the IBM Windows Integration Web site. .
2. If you want Windows server to automatically vary on when you start TCP/IP, see "Set Windows server to automatically vary on with TCP/IP" on page 55.
3. If you disconnected a LAN adapter before the installation (in step 4 (See 11) of the Preinstallation checklist), reconnect it now by plugging in the cable.
4. Changing the QRETSVRSEC system value on OS/400 to ensure that OS/400 keeps passwords (this avoids delays when users sign on):
 - On the OS/400 command line, enter the command:
WRKSYSVAL SYSVAL(QRETSVRSEC)
 - To display the value, enter a 2 in the Option field and press Enter.
 - Change the value of Retain server security data to 1.
5. You can prevent the CD-ROM drive from changing drive letters whenever you link a user storage space to the server. Use **Disk Administrator** to assign the Windows server CD-ROM drive letter. (For example, you could make it drive X.)

6. You can customize your servers by creating your own NWSD .
7. If the Integrated xSeries Server has 2 LAN adapters of the same type (both Ethernet or both token ring), verify their network addresses. To verify that each adapter has the network address that you specified on the INSWNTSVR command, follow these steps:
 - a. Click **Start**, then **Settings**, then **Control Panel**.
 - b. Double-click on the **Network** application.
 - c. Select the **Adapters** tab.
 - d. Double-click on each physical network adapter that you installed to display its properties.
 - e. Verify that the network address for each adapter corresponds to the local adapter address that you specified on the INSWNTSVR command.
 - f. For two token-ring adapters, also verify that the **DataRate** and **MaxTxFrameSize** fields contain the correct values.
 - g. If you are configuring only one of the adapters to be shared by OS/400, do one of the following:
 - Delete the **Network Address** field of the unshared adapter to use the burned in address of the shared adapter.
 - Specify a unique address for the network.

Attention: If you plan to use a firewall with Windows server, be sure not to route the Internet addresses for the internal LAN to a software common knowledge IR system (SOCKS) server acting as a firewall. Doing so causes connection failures. For information about setting up a firewall, see the topic Firewall: getting started.

Now that you have installed Windows server on an Integrated xSeries Server, you need to know how to do some everyday tasks from . OS/400. This setup book tells you how to start and stop your server (see “Starting and stopping Windows server on an Integrated xSeries Server for iSeries” on page 81). For additional information on managing your server from OS/400 see the iSeries Information Center.

Responding to error messages during installation

The Windows server phase of the installation flags missing information that you did not provide during the OS/400 phase of the installation, then allows you to supply the information. This section contains some examples of those error messages and how to respond.

Duplicate name on network

If the Integrated xSeries Server has 2 LAN adapters that are connected to the same network, the installation program will indicate that the computer name already exists on the network. This is a limitation of the Windows server installation process. To work around this limitation, do the following:

- Disconnect one of the Integrated xSeries Server LAN adapter cables from the network.
- On the Windows server console, retype the same computer name.
- Press **OK** to continue with the installation.

After the installation is complete, you can reconnect the disconnected LAN adapter cable.

(Installing Windows server) **Error (Installing Backup controller).**

If you are installing a backup domain controller without first creating a computer account for the new server on the domain, you will receive the following error message:

```
Error (Installing Backup controller)
Unable to connect to the domain controller for this domain.
Have your administrator check your computer account on the domain.
```

Click **OK**. The Domain will default back to DOMAIN.

You can then take one of two steps:

- Create a computer account for the server from the domain controller, using the NWSD name as the computer name
- OR**
- Enter an Administrator user name and password for the domain and have the installation program create the computer account for you

Microsoft recommends that an Administrator create a computer account on the domain before you install Windows server. Refer to your Windows server documentation for more information about creating a computer account in the domain.

Error (Installing Server)

You may not have specified a value in the To workgroup or To domain fields of the Install Windows Server display on OS/400. If not, then you will see the following error message:

Error (Installing Server)

A setup parameter specified by your system administrator or computer manufacturer is missing or invalid. Setup must therefore ask you to provide this information now.



Once you have furnished the required information, unattended Setup operation will continue.

You may wish to inform your system administrator or computer manufacturer that the "JoinWorkgroup" value is missing or invalid.

Click **OK**.

The installation program then prompts you to make the computer a



Upgrade your server from Windows NT 4.0 to Windows 2000 or Windows .NET Server

The process for upgrading your Integrated xSeries Server from Windows NT 4.0 to  Windows 2000 or Windows .NET  is different than it would be on a standalone PC. You cannot upgrade your server by starting from the Windows server console. You must begin at the OS/400 console, just as you do for a fresh installation.

Note: Do not try to upgrade from Windows server. If you do, you will have to restore a recent backup of your system drive and possibly your user drives to recover. You might have to reinstall.

To upgrade your server, you need *IOSYSCFG, *ALLOBJ, and *JOBCTL special authority. You must have your Windows server license key available. In most cases, it is printed on the back of the Windows server CD-ROM jewel case.





To upgrade from Windows NT 4.0 to Windows 2000  or Windows .NET,  do this:

1. Back up all drives related to your Windows server. Otherwise, you will lose any user data that is stored on the D drive because the upgrade process re-creates that drive.
2. Ensure that you have installed the latest prerequisite program temporary fixes (PTF).
3. Verify that the server is inactive. (For information about checking the status, see "Display Windows server information on OS/400" on page 85.) If necessary, vary off the server (see "Shut down Windows server from OS/400" on page 82).
4.  Place the Microsoft installation CD-ROM for the version you want to install in the CD-ROM drive (unless you plan to use an image of the installation CD-ROM). 



Note: If you are using an upgrade version of the Windows server CD-ROM for the installation, Windows server may prompt you for a non-upgrade version. At that time, insert the non-upgrade Windows server CD-ROM and press Enter to continue the installation.

5. On the OS/400 command line, type INSWNTSVR and press F4.
6. In the "Network server descriptions for Windows server on iSeries" on page 27 field, type the name for the server that you are upgrading and press Enter. Upgrade your primary domain controller first. OS/400 retrieves NWSD information about the existing server, and the Install Windows server display appears.



Note: If you are upgrading from a Windows NT 4.0 Backup Domain Controller, OS/400 considers the Domain role to be *SERVER. You can promote it to a domain controller after the upgrade.

7. In the Windows server version field, specify *WIN2000 or  *WIN2002 (for Windows .NET)  and press F10 to see additional parameters.
8. Specify TCP/IP port configuration information on this screen unless you used the Port 1 and Port 2 parameters on your original installation (for sharing network adapters). In that case, use the Port 1 and Port 2 parameters instead.
9. Page down to see the second installation display.
10. Change the install source size from the default to at least 400.
11. You **cannot** change the size for the system server storage space during an upgrade. If your system drive is not large enough to hold  the new version,  you must do a fresh installation instead of an upgrade. An upgrade requires at least 1 GB of free space. Consult Microsoft documentation for recommendations for your specific configuration.

Note: More free space may be required if additional services or functions have been installed such as Terminal Server. These additional requirements may not be detected by the INSWNTSVR command and will only appear when the QUPGRADE.BAT file is run to start the Windows upgrade. Insufficient free space may not allow the upgrade to continue, requiring additional space on the system drive to be freed up or the upgrade to be canceled and a new server installed. Consult Microsoft documentation for recommendations for your specific configuration.

12. If you want to choose a different auxiliary storage pool (ASP) for the source drive, specify it in the Storage space ASP field.
13. Other values that you can change during an upgrade include:
 - Text 'description'
 - To workgroup
 - To domain
 - Name
 - Organization
 - Language version
 - Windows license key
 - License mode
 - Keyboard type
 - Message queue
 - Event log processing
 - Restricted devices
 - NWSD configuration file
 -  Propagate domain user 

If you want to change values for parameters that do not appear, press F10 to see all parameters. Make any of these changes that you want and press Enter to have OS/400 upgrade your server.

14. In inquiry message NTA103F: Windows server MYSERVER will be upgraded. (C G) will appear. Respond G to the inquiry message to have OS/400 continue with the upgrade or C to cancel it.
15. When OS/400 finishes copying files, the Windows NT 4.0 logon appears on the Windows server console. After you log on, go to the **Start** menu and click **Run**.
16. Type D:\QUPGRADE.BAT and click **OK** to continue the upgrade. The  Windows server setup window  appears. (If you remapped the install source drive, substitute the new drive letter.)
17. Click **I Accept** on the License agreement window. The upgrade goes through several phases that require no intervention.
18. Click **Yes** to restart the server. After the final restart, the Windows 2000 screen appears.
19. Use the **Configure your Server** window that appears to install applications such as Active Directory.
20. If you are installing or upgrading a domain controller that was not the primary domain controller, you need to promote the Windows server. You can do this by running the Windows server dcpromo program:
 - a. Go to the **Start** menu; click **Run**.
 - b. Type dcpromo and click **OK**.




Upgrade and migration considerations for iSeries Integration for Windows Server and Integrated xSeries Server

Beginning with V4R5, IBM redesigned the device drivers that ship with iSeries Integration for Windows Server to function with the hardware abstraction layer (HAL) that Microsoft ships and maintains.

NOTE:

You must copy the HAL from the appropriate Microsoft media during the upgrade process if upgrading from V4R4 or prior releases. Failure to do so, or copying from the wrong media, could result in irreparable damage to your network server description. To upgrade from V4R4, or prior releases, you must know what Microsoft Service Pack is currently installed on your network server description and have that Service Pack CD-ROM available.

To upgrade your system from V4R4 or V4R5, and also migrate to the Pentium III 2890 Integrated xSeries Server, you must complete the steps in the correct order to avoid losing access to your data. Refer to “Migrating to 2890 Integrated xSeries Server hardware” on page 67 and be careful to complete the steps in this order:

1.  First install the version of Integration for Windows Server which matches the version of OS/400 on your iSeries. Follow the instructions in “Upgrade OS/400 and iSeries Integration for Windows Server” on page 64 and the iSeries Software Installation manual . The installation process deletes the old option 29 and installs the new WSV base code for Integration for Windows Server on your server. .
2. Install your choice of options from the OS/400 CD-ROM containing the 5722-WSV product: option 1 for Windows NT 4.0, option 2 for Windows 2000, or both. “Install iSeries Integration for Windows Server” on page 40 has information about installing these options.
3. If you are migrating to new Integrated xSeries Server hardware, first upgrade your Windows servers on the **old** Integrated Netfinity Server hardware. This updates the device drivers to be compatible with the new Integrated xSeries Server hardware. Refer to “Migrating to 2890 Integrated xSeries Server hardware” on page 67.

If you have been using your Integrated Netfinity Server as an external host LAN for your iSeries, be aware that the 2890 Integrated xSeries Server and migrated hardware to a 50xx Migration Tower does not support external host LAN. When you migrate to the new hardware, you lose your external host LAN. You need to remove line descriptions for those adapters and do some other cleanup work. Be careful not to remove the line description of the internal LAN.

4. ➤ If you are running Windows NT 4.0 on the legacy Integrated Netfinity Server and are migrating to the 2890 Integrated xSeries Server for iSeries, and this migration includes Gigabit Ethernet, you must have Windows Service Pack 4 or later installed. See “Install Gigabit Ethernet adapters on Windows NT 4.0” on page 77 for detailed instructions ◀
5. If you are running Windows NT 4.0 on the 2890 Integrated xSeries Server, you need to “Install the Savage 4 Video Driver for Windows NT 4.0 on the 2890 Integrated xSeries Server” on page 70 for Windows NT 4.0. The 2890 Integrated xSeries Server hardware includes an S3 video chip, whose driver is not included in the NT 4.0 distribution CD. As a result, you need to install the S3 Inc. Savage 4 display driver on Windows server to get video to display correctly.

Note: The HSL attached Integrated xSeries Adapter for iSeries (2689), does not support migration from any previous version of the Integrated xSeries Server. A new install of Windows 2000 ➤ or Windows .NET Server ◀ is required.

The 2892 Integrated xSeries Server does not support hardware migration from any server types. A new install of Windows 2000 ➤ or Windows .NET Server◀ is required.

6. ➤ If you are migrating a Windows 2000 NWSD installed on V4R5 (or earlier release) to V5R1 (or future release) or any previous release, and you are planning to use in the new hardware a Gigabit Ethernet Adapter (2670 or 2743), you must perform additional steps to install these adapters. For more information, see “Manually update LAN drivers in Windows 2000 or Windows .NET” on page 155.◀

The following hardware migrations from previous Integrated servers are not allowed. This includes the ability to hotspare between the two resource types. A new install of the Windows server and any applications will be required. You should plan to backup any user data using any of the available backup methods listed in “Back up and recover Windows server on iSeries” on page 116 to migrate your user data to the new server. Under some conditions, this may be as simple as unlinking and relinking user storage spaces to the new server.

- The Integrated Netfinity Server model 6617, does not allow migrations from an Integrated Netfinity Server model 2850, the Integrated xSeries Servers (models 2890, 2892), or the Integrated xSeries Adapter model 2689.
- The Integrated Netfinity Server model 2850, does not allow migrations from an Integrated Netfinity Server model 6617, the Integrated xSeries Servers (models 2890, 2892), or the Integrated xSeries Adapter model 2689.
- The Integrated xSeries Adapter model 2689, does not allow migrations from any of the Integrated xSeries Servers (models 2890, 2892) or the Integrated Netfinity servers (models 6617, 2850).
- The Integrated xSeries Server model 2892, does not allow migrations from the Integrated xSeries Server (model 2890) or the Integrated Netfinity servers (models 6617, 2850).

Set Windows server to automatically vary on with TCP/IP

You can set Windows server to automatically vary on when you start TCP/IP. However, if multiple Windows servers use a single file server resource, configure only one of them to autostart. Only one network server can use the file server resource at a time. Configuration of multiple TCP/IP interfaces to autostart for network servers that share the same resource can cause unpredictable results.

To have Windows server automatically vary on when you start TCP/IP, follow these steps:

1. On the OS/400 command line, enter the Configure TCP/IP (CFGTCP) command.
2. Choose Option 1 Work with TCP/IP interfaces and press Enter.
3. Specify 2 (Change) in the Option field next to the interface for the ➤ private LAN (internal token-ring or Virtual Ethernet point-to-point) ◀ line description for the server, and press Enter.

Note: ➤ The private LAN line description has a name that consists of the network server description

(NWSD) name followed by '00' for the Internal token-ring or by 'PP' for the virtual Ethernet point-to-point LAN. For example, if the NWSD name is MYSVR, then the private << LAN line description is MYSVR00.

4. Change the Autostart parameter value to *YES and press Enter. The Windows server automatically varies on when you start TCP/IP.

Note: Beginning in V5R1, TCP/IP can be automatically started by the system at IPL by changing the system's IPL attributes. A startup procedure is no longer necessary. Any TCP interfaces with the Autostart parameter set to *YES will be started along with TCP/IP at IPL.

Note: Be aware that an IP address entered at the Windows console for the >> private LAN overrides the value set in the NWSD for the TCP/PRTCFG parameters *INTERNAL or *VRTETHPTP port. However, operations such as SBMNWSCMD use the value set in the NWSD to find the server. Both values must be consistent.<<

Code fixes for iSeries Integration for Windows Server

iSeries Integration for Windows Server “Types of iSeries Integration for Windows Server code fixes” provide the most current and error-free code possible without requiring you to wait for the next release of iSeries Integration for Windows Server. iSeries Integration for Windows Server code fixes update the code that enables Windows server to run on the Integrated xSeries Server. They are separate from the service packs for Windows server itself, which you must get from Microsoft.

iSeries Integration for Windows Server Code and the Microsoft Windows Update Web site

Windows device drivers provided with the iSeries Integration for Windows Server license program product must be serviced by using the OS/400 fix (PTF) mechanism and the related maintenance snap-in that installs IBM service packs. Any device drivers appearing on the Microsoft Windows Update Web site that are directly related to iSeries Integration for Windows Server must not be downloaded for the Integrated xSeries Server. USB device drivers for devices not provided specifically for the Integrated xSeries Server may be downloaded from Windows Update at your own risk. Do not download any SCSI storage drivers and LAN drivers from Windows Update.

Types of iSeries Integration for Windows Server code fixes

iSeries Integration for Windows Server code fixes come in two types: code fixes to the OS/400 side and code fixes to the Windows server side. IBM distributes both types in OS/400 Program Temporary Fixes (PTFs). For more information on PTFs, see Fixes .

An OS/400 PTF that contains a code fix to the OS/400 side is a “regular” PTF. Because it applies to OS/400-side code, installing it on OS/400 is the only action you must take with it.

An OS/400 PTF that contains a code fix to the Windows server side is referred to as a *service pack PTF* or a *hot fix PTF*. After you install a service pack PTF to OS/400, you must take additional steps to install that service pack PTF to each Windows server. “Install iSeries Integration for Windows Server service packs on Windows 2000 or Windows .NET Server” on page 57 tells you how to install service packs to Windows servers.

Hot fixes are not cumulative and contain only the critical fix that is needed to solve the problem.

The number of the service pack or hot fix is the number of the OS/400 service pack or hot fix PTF that it is distributed with, and the format is SInnnnn.

Check iSeries Integration for Windows Server service levels on Windows 2000 and Windows .NET Server

To assure that you have the latest version of iSeries Integration for Windows Server code installed, you can check the >> software levels available from OS/400 and installed on Windows server. To check the service level that is installed and available, use the Integration for Windows Server snap-in.

To run the snap-in, you must first enable “Enabling iSeries NetServer” on page 26 and create a “Create a guest user profile for iSeries NetServer” on page 26 to allow the Integration for Windows Server application to see the iSeries. You can also sign on with a propagated OS/400 user which has Administrator rights on the Windows Server.

» To check the service levels, Start the Integration for Windows Server snap-in from the Windows Server. Select **Start** choose **Programs** then **IBM iSeries**. Select and expand **Integration for Windows Server**. Expand the Network Server Description name, and click on **Software Level**.

The following fields show software level status:

- In the **Service Pack** field, the **Installed** column indicates the service pack that you have installed on your Windows Server. The **Available** column indicates the latest service pack available for installation from OS/400.

The **Hot Fix** field indicates whether there are currently any hot fixes installed on, or available for, your Windows Server.

For Windows NT 4.0, see “Check iSeries Integration for Windows Server service levels on Windows NT 4.0”.

Check iSeries Integration for Windows Server service levels on Windows NT 4.0

To assure that you have the latest version of iSeries Integration for Windows Server code installed, you can check the software levels available from OS/400 and installed on Windows server. To check the service level that is installed and available, use the Level Check application.

To run Level Check, you must first enable “Enabling iSeries NetServer” on page 26 and create a “Create a guest user profile for iSeries NetServer” on page 26 to allow the Level Check to see the iSeries. You can also sign on with a propagated OS/400 user which has Administrator rights on the Windows Server.

To start the Level Check application from the Windows NT 4.0 server **Start** menu, choose **Programs**, then **Windows Server**, then **Level Check**.

Note: » If you log on as an administrator when a new maintenance level is available for installation from OS/400, Level Check starts automatically.

The following fields show software level status:

- In the **iSeries System** box, the **Service Pack Available** field indicates the latest service pack available for installation from OS/400. In the **Windows Server** box, the **Service Pack** field indicates the latest service pack that you have installed on your Windows Server.

If a newer service pack is available than the one you have installed, you should “Install iSeries Integration for Windows Server service packs on Windows 2000 or Windows .NET Server” the newer service pack.


You can also view or install a new service pack using the “View or Install service packs using iSeries Navigator” on page 58

» For Windows 2000 or Windows .NET Server, see “Check iSeries Integration for Windows Server service levels on Windows 2000 and Windows .NET Server” on page 56.

Install iSeries Integration for Windows Server service packs on Windows 2000 or Windows .NET Server

Installing service packs gives you the latest iSeries Integration for Windows Server code and corrects problems that existed in previous code. You can apply an OS/400 program temporary fix (PTF)

with a service pack in it. After you install a service pack PTF to OS/400 or a hot fix for » Windows, you must take additional steps to install that service pack PTF to each Windows server. «

Note: To install Microsoft service packs, follow the instructions from Microsoft. If you go to the Microsoft Web site  and search for the service pack that you want to install, you can also download a readme file with instructions for that service pack.

» To use the Integration for Windows Server Snap-in to install service packs, you must be a Windows server system administrator. Before beginning the installation, end any applications that are running and make sure that no users are logged on to Windows server. If you fail to do this, you risk data loss because Windows server automatically restarts after completing the installation.

If you install an iSeries Windows service pack, you must be at the same release level as your iSeries. If you select to install iSeries Windows Server Hot Fix, you must be at the same release level as your iSeries and have the most current service pack installed. Beginning with Version 5, Release 2, you can view and install service packs on Windows 2000 or Windows .NET Server by using either the Integration for Windows Server Snap-in or iSeries Navigator. «

View or install service packs using Integration for Windows Server Snap-in: To view or install iSeries Integration for Windows Server service packs on a Windows server, using the Integration for Windows Server Snap-in, follow these steps:

1. From the **Start** menu choose **Programs** then **IBM iSeries** then **Integration for Windows Server**. Select and expand one of the servers listed. Select **Software level**. The current release, service pack, and hot fix are displayed in the results pane, as well as, any available to install.

Note: » If you log on as an administrator and there is a new service pack or hot fix available , or there is a mismatch in release levels, the service utility launched by the snap-in will start automatically.

2. If you choose to install a service pack, you can use the update button on the snap-in toolbar, or you can right-click on **Software Level** select **Tasks** then **Update**. «

Follow the on-screen instructions to complete installation of the service pack.

View or Install service packs using iSeries Navigator: » To view what is currently installed on a specific server, do the following:

1. Start **iSeries Navigator**.
2. Select **Network**
3. Select **Windows Administration**
4. Select **Integrated xSeries Servers**
5. Select one of the servers and right-click.
6. Select **Properties**
7. Go to the Software tab on the server properties display.

To install a service pack, do the following:

1. Start **iSeries Navigator**
2. Select **Network**
3. Select **Windows Administration**
4. Select **Integrated xSeries Servers**
5. Select one of the servers and right-click.
6. Select **Server Integration Software**
7. Select one of the service options listed.

Follow the on-screen instructions to complete installation of the service pack.

Tip: After you install a service pack, back up the NWSD and storage space objects (the source and system drives). See “Back up the NWSD and disk drives associated with Windows server on iSeries” on page 117 for more information.

For Windows NT 4.0, see “Install iSeries Integration for Windows Server service packs for Windows NT 4.0” <<

Install iSeries Integration for Windows Server service packs for Windows NT 4.0

1. >> From the **Start** menu, choose Programs, then **Windows Server**, then **Level Check** to start the Level Check application.

Note: If you log on as an administrator when a new service pack is available for installation from OS/400, Level Check starts automatically.

2. From the **Install Action** drop down box, choose **Install available service pack from OS/400**.
3. Follow the on-screen instructions to complete installation of the maintenance pack.
4. **Tip:** After you install a maintenance pack, back up the NWSD and storage space objects (the source and system drives). See “Back up the NWSD and disk drives associated with Windows server on iSeries” on page 117 for more information. <<

You can also use the “View or Install service packs using iSeries Navigator” on page 58 to install a service pack.

For Windows 2000 or Windows .NET Server, see “Install iSeries Integration for Windows Server service packs on Windows 2000 or Windows .NET Server” on page 57

Install and uninstall service packs with the lvlsync command

For V4R3 and later releases, the character-based lvlsync command provides another way to install and uninstall iSeries Integration for Windows Server service packs or reinstall the base code. You can run it remotely from OS/400 to upgrade to a new release or apply service packs to multiple Windows servers on multiple remote OS/400s.

For V4R5 and later releases, iSeries Integration for Windows Server no longer includes a customized version of the Windows server hardware abstraction layer (HAL). During an upgrade from V4R4 or earlier, you must first copy the hal.dll file from the appropriate Microsoft media. The hal.dll file is located in the i386 directory on the CD-ROM that contains the latest Microsoft service pack that was installed on your Windows server.

Copying the HAL:

Before you use the lvlsync command, follow these steps to replace the customized HAL:

1. Insert the latest Microsoft Service Pack CD-ROM that you have installed on your Windows servers.
2. From a Windows server command prompt:
 - a. Issue an FTP *your remote OS/400 system name*
 - b. Type **cd /**.
 - c. Type **cd qibm/proddata/ntap/service/image/option01/vrm**
 - d. Type **binary**.
 - e. Put *CD-ROM drive letter*:\i386\hal.dll hal.dll
You should see a success message in the command prompt window for the file transfer.
 - f. Type **quit** to exit from the FTP processing.

It is now safe to proceed with the remote installation. If you are upgrading multiple Windows server from this OS/400 that are at the same Microsoft service pack level, you need to complete this process only before the first upgrade. If the Microsoft service pack levels are different, you need a different copy of the hal.dll file.

Note: To remotely run lvlsync from OS/400, you must have *IOSYSCFG special authority. You must also have *JOBCTL authority or both *USE and *OBJECT authority to the network server description (NWSD). To use the Level Check command, you must be a Windows server administrator.


To make a remote call to lvlsync from OS/400, use the “Run Windows server batch commands from OS/400” on page 86. Use the lvlsync command for the command parameter, and identify the server as *WINDOWSNT.

Refer to these sources of information about the lvlsync command:

- The lvlsync tasks and syntax table has a complete listing of tasks and their program calls.
- The lvlsync error codes table shows the error codes that lvlsync can return.

If you have not yet upgraded your version of iSeries Integration for Windows Server, refer to “Upgrade Windows servers when you upgrade iSeries Integration for Windows Server” on page 66.

lvlsync tasks and syntax

Task	Windows server syntax	OS/400 syntax
 Install all available hot fixes (Valid for Windows 2000 servers at V5R1 or later.)	lvlsync /hotfix install ALL	SBMNWSCMD CMD('lvlsync /hotfix install all') SVRTYPE(*WINDOWSNT) SERVER('servername')
Install individual hot fix (Valid for Windows 2000 servers at V5R1 or later.)	lvlsync /hotfix install Slxxxx	SBMNWSCMD CMD('lvlsync /hotfix install sixxxxx') SVRTYPE(*WINDOWSNT) SERVER('servername')
Uninstall all installed hot fixes (Valid for Windows 2000 servers at V5R1 or later.)	lvlsync /hotfix uninstall Slxxxxx	SBMNWSCMD CMD('lvlsync /hotfix uninstall ALL') SVRTYPE(*WINDOWSNT) SERVER('servername')
Uninstall individual hot fix (Valid for Windows 2000 servers at V5R1 or later.)	lvlsync /hotfix uninstall Slxxxxx	SBMNWSCMD CMD('lvlsync /hotfix uninstall sixxxxx') SVRTYPE(*WINDOWSNT) SERVER('servername')
Install release and service pack (Valid for Windows 2000 servers at V5R1 or later.)	lvlsync /release /servpack	SBMNWSCMD CMD('lvlsync /release /servpack') SVRTYPE(*WINDOWSNT) SERVER('servername')
Install release and individual hot fix (Valid for Windows 2000 servers at V5R1 or later.)	lvlsync /release /hotfix sixxxxx	SBMNWSCMD CMD('lvlsync /release /hotfix Slxxxxx') SVRTYPE(*WINDOWSNT) SERVER('servername')
Install release and all available hot fixes (Valid for Windows 2000 servers at V5R1 or later.)	lvlsync /release /hotfix ALL	SBMNWSCMD CMD('lvlsync /release /hotfix ALL') SVRTYPE(*WINDOWSNT) SERVER('servername')
Install service pack and all available hot fixes (Valid for Windows 2000 servers at V5R1 or later.)	lvlsync /servpack /hotfix install ALL	SBMNWSCMD CMD('lvlsync /servpack /hotfix install ALL') SVRTYPE(*WINDOWSNT) SERVER('servername')

Task	Windows server syntax	OS/400 syntax
Install service pack and individual hot fixes (Valid for Windows 2000 servers at V5R1 or later.)	lvlsync /servpack /hotfix install Slxxxx	SBMNWSCMD CMD('lvlsync /servpack /hotfix install sixxxxx') SVRTYPE(*WINDOWSNT) SERVER('servername')
Uninstall service pack and all available hot fixes (Valid for Windows 2000 servers at V5R1 or later.)	lvlsync /servpack /hotfix uninstall ALL	SBMNWSCMD CMD('lvlsync /servpack /hotfix uninstall ALL') SVRTYPE(*WINDOWSNT) SERVER('servername')
Uninstall service pack and individual hot fixes (Valid for Windows 2000 servers at V5R1 or later.)	lvlsync /servpack /hotfix uninstall Slxxxx	SBMNWSCMD CMD('lvlsync /servpack /hotfix uninstall sixxxxx') SVRTYPE(*WINDOWSNT) SERVER('servername')
Install release, service pack, and individual hot fix (Valid for Windows 2000 servers at V5R1 or later.)	lvlsync /release /servpack /hotfix Slxxxx	SBMNWSCMD CMD('lvlsync /release /servpack /hotfix sixxxxx') SVRTYPE(*WINDOWSNT) SERVER('servername')
Install release, service pack, and all available hot fixes (Valid for Windows 2000 servers at V5R1 or later.)	lvlsync /release /servpack /hotfix ALL	SBMNWSCMD CMD('lvlsync /release /servpack /hotfix ALL') SVRTYPE(*WINDOWSNT) SERVER('servername') ⚡
Getting syntax help	lvlsync /?	not supported
Installing the currently available service pack from OS/400 to Windows server	lvlsync /servpack install	SBMNWSCMD CMD('lvlsync /servpack install') SVRTYPE(*WINDOWSNT) SERVER(servername)
Uninstalling the currently installed service pack from Windows server	lvlsync /servpack uninstall	SBMNWSCMD CMD('lvlsync /servpack uninstall') SVRTYPE(*WINDOWSNT) SERVER(servername)
Reinstalling iSeries Integration for Windows Server base code using current language ¹	lvlsync /release	SBMNWSCMD CMD('lvlsync /release') SVRTYPE(*WINDOWSNT) SERVER(servername)
Reinstalling iSeries Integration for Windows Server base code using language MRI29nn ⚡ (Valid for NT 4.0 only.) ⚡	lvlsync /release /lang mri29nn	SBMNWSCMD CMD('lvlsync /release /lang mri29nn') SVRTYPE(*WINDOWSNT) SERVER(servername)
<p>Notes: ¹When you upgrade from releases prior to V4R5, you must first replace the customized hal.dll file before running this command. "Install and uninstall service packs with the lvlsync command" on page 59 tells you how.</p> <p>When using lvlsync from Windows server, you can abbreviate the parameters. In the OS/400 syntax, servername is the name of the Windows server where you want to run lvlsync.</p>		

lvlsync error codes

Error Code	Error
0	No errors
01	Must be an administrator to run lvlsync
02	Release level on Windows server higher than on OS/400
03	Service pack level on Windows server higher than on OS/400

Error Code	Error
04	Cannot install release from OS/400 - language files not on OS/400
05	Syntax not valid
06	Cannot access service pack information on OS/400
07	Cannot map network drive
08	Cannot access service pack information in registry
09	Cannot open qvnacfg.txt file
10	No service pack installed on OS/400
11	NWSD not found
13	NWSD not active
20	No service pack available on OS/400
21	Cannot start InstallShield application
31	Unexpected error invoking lvlsync
44	Unexpected error during lvlsync

Note: The error message NTA0218 is a diagnostic (*DIAG) message for syntax, authorization, and NWSD not found errors.

Remove iSeries Integration for Windows Server service pack and hot fixes on Windows 2000 and Windows .NET Server

» An iSeries Integration for Windows Server service pack can be removed from the Windows Server. «
 Doing this restores Windows server to the state that it was in before you installed the service pack. If you need to revert back more than one service level, see “Details: Remove iSeries Integration for Windows Server service packs” on page 63.

» You must be a Windows server system administrator to use the Integration for Windows Server Snap-in.

Note: You cannot revert back to a previous version level of iSeries Integration for Windows Server. «

» Before removing an iSeries Integration for Windows Server service pack or hot fix, end any applications that you have running and make sure that no users are logged on to Windows server. If you fail to do this, you risk losing data because Windows server may automatically restart after completion of the installation. You can use both the iSeries Navigator and the Integration for Windows Server Snap-in to remove an iSeries Integration for Windows Server service pack on Windows 2000 and Windows .NET Server.

You can remove a service pack from a Windows Server. However, any hot fixes that were applied after the service pack was installed, will be automatically removed from the server. Removing a service pack restores the server to the service pack and hot fix level that existed prior to the installation of the service pack being removed.

Remove service packs and hot fixes using the Integration for Windows Server Snap-in: If you need to, you can use the Integration for Windows Server Snap-in to remove service packs and hot fixes from your system. If you choose to remove a service pack from a system that also has hot fixes applied, iSeries Maintenance will automatically select all installed hot fixes to be removed.

- » From the **Start** menu, choose **Programs** then **IBM iSeries** then **Integration for Windows Server**.
- Once the snap-in is started, double-click on the server name.
- Right-click **Software Level** then choose **All Tasks** then **Launch**. «
- Follow the screen flow to select from the options available.

To view or remove service packs and hot fixes using iSeries Navigator: To view what is currently installed on a specific server:

1. Start **iSeries Navigator**
2. Select **Network**
3. Select **Windows Administration**
4. Select **Integrated xSeries Servers**
5. Select one of the servers and right-click.
6. Select **Properties**
7. Go to the Software tab on the server properties display.

To remove a service pack or hot fix:

1. Start **iSeries Navigator**
2. Select **Network**
3. Select **Windows Administration**
4. Select **Integrated xSeries Servers**
5. Select one of the servers and right-click
6. Select **Server Integration Software**
7. Select one of the service options listed.

Follow the on-screen instructions to complete the removal of the service pack.

After you remove a service level, back up the predefined system and source drives (server storage spaces). See “Back up predefined disk drives for Windows servers created on V4R5 and later OS/400 systems” on page 118 for information about backing up these drives. [«](#)

Details: Remove iSeries Integration for Windows Server service packs: iSeries Integration for Windows Server gives you the ability to remove a service pack and revert to the previously installed service pack. However, you can only revert to the most recently installed previous service pack. For example, if you install SI00300, then SI00301, and then SI00302, you can uninstall SI00302, and you will still have SI00301 installed. You cannot then uninstall SI00301.

[»](#) To revert back more than one service pack level, you must reinstall the base code of iSeries Integration for Windows Server. You then can install the desired service pack from OS/400.

Note: You cannot revert back to a previous version level of iSeries Integration for Windows Server.

To reinstall the base code, choose **Install release from iSeries** from the **Install Action** drop down box, then Click **OK**.

To remove service packs, perform the following steps:

1. Click **Start**
2. Click **Programs**
3. Click **IBM iSeries**
4. Select **Integration for Windows Server**
5. Expand **Integration for Windows Server**
6. Expand the Network Server Description name
7. Select software level
8. Right-click and select **All Tasks Update**, or click the **Update** button on the toolbar

You must **Install release from iSeries** from a Windows 2000 or Windows .NET Server after update has been selected from the snap-in. To install the release from iSeries:

1. From the Welcome dialog, select next to view the management dialog.
2. Select next from the management dialog to view the maintenance options.
3. Select Install Release from iSeries, then select next to begin the maintenance function. <<



Remove iSeries Integration for Windows Server maintenance levels for Windows NT 4.0

1. From the **Start** menu, choose **Programs**, then **AS400 Windows server**, then **Level Check** to start the Level Check application.

Note: Level Check starts automatically when you log on as an administrator if the maintenance level available on OS/400 is different from the maintenance level installed on Windows server.
2. In the **Install Action** drop down box, choose **Uninstall current service pack on Windows server**.
3. Click **OK**. <<

Upgrade iSeries Integration for Windows Server

You need to upgrade your existing Windows servers when you install:

- >> A “Upgrade OS/400 and iSeries Integration for Windows Server” from IBM.

When upgrading from OS/400 V4R4 or earlier, the the installation process deletes the old SS1 option 29 and installs the new 5722-WSV LP - Integration for Windows Server with all LP options on the system. For information about upgrading your existing Windows servers, see “Upgrade Windows servers when you upgrade iSeries Integration for Windows Server” on page 66. For information about upgrading multiple Windows servers remotely from OS/400 with the lvsync command, see “Install and uninstall service packs with the lvsync command” on page 59. >> Beginning in V5R2, you can use iSeries Navigator to perform the upgrade. For more information, see “Upgrade iSeries Integration for Windows Server using iSeries Navigator” on page 67.
- A new version of Windows server from Microsoft:

Upgrade the primary domain controller (PDC) before upgrading any other machines. To upgrade your servers from Windows NT 4.0 to Windows 2000 or Windows .NET, see “Upgrade your server from Windows NT 4.0 to Windows 2000 or Windows .NET Server” on page 52.<<

If the PDC is a stand-alone machine (not your Integrated xSeries Server), then you need to run QCONVGRP on all the servers connected to this domain. If the PDC is an Integrated xSeries Server, using the UPGRADE option of the INSWNTSVR command converts the groups on the PDC itself. However, you need to run QCONVGRP on all Windows NT 4.0 machines that are attached to this domain.

If you are upgrading to Version 4, Release 5 or later of OS/400, and also upgrading your model of Integrated xSeries Server, see the topic “Migrating to 2890 Integrated xSeries Server hardware” on page 67.

Upgrade OS/400 and iSeries Integration for Windows Server

If you are upgrading OS/400 and iSeries Integration for Windows Server to >> V5R2, << you need the CD-ROM containing the 5722-WSV product. If you also plan to install new Integrated xSeries Server hardware, make sure you complete this software installation first. As you follow the upgrade procedure in


the iSeries Software Installation manual , take these additional steps:

Preparing to upgrade:

1. Ensure that you have “Code fixes for iSeries Integration for Windows Server” on page 56 on all your existing Windows servers, as well as on your OS/400.
2. Ensure that you have a system backup available that includes the storage allocated to your Windows servers.

3. As a precaution, record the associated resources for your hardware:
 - a. On the OS/400 command line, type WRKCFGSTS *NWS and press Enter.
 - b. Type 8 in the option column next to the network server description. The Work with Network Server Descriptions display appears.
 - c. Type 5 in the option column next to the network server description.
 - d. Page down until you see the field Resource name and record the value for this network server (for example, CC07 or LIN05).
 - e. Press F12 twice to back out of this command.
 - f. On the OS/400 command line, type WRKHDWRSC TYPE(*CMN) and press Enter.
 - g. Type 7 (Display resource detail) in the option column next to the resource name that you identified in step 3d (See 65). The type column has the CCIN number for the Integrated xSeries Server hardware, and the text description should be File Server IOP or File Server IOA.
 - h. If you have multiple Integrated xSeries Servers of the same type installed on your iSeries, you may be able to identify the correct one by card position:
 - 1) look at the Card Position under the Physical Location heading.
 - 2) Look at the labels on the slots of your iSeries. One slot should be labeled with the same number or combination of letters and numbers shown in the Card Position field. This slot contains the Integrated xSeries Server to which the resource name refers.
 - i. Record the information that appears in the Type-model and Serial number fields.
 - j. Press F12 twice to back out of the command.
4. "Shut down Windows server from OS/400" on page 82 (vary off) all your network servers.

To install the new version of OS/400 on your iSeries, return to the procedure in the the iSeries Software

Installation manual  . The installation process deletes the old SS1 option 29 when upgrading from V4R4 or earlier, 5769-WSV for V4R5, and installs the new 5722-WSV base code for Integration for Windows Server on your iSeries. Consequently, after you complete the OS/400 installation, you need to return here for some additional steps.

After upgrading OS/400, complete these additional steps:

1. "Starting Windows server from OS/400" on page 81 the Integrated xSeries Server and verify that it has the same resource name:
 - a. On the OS/400 command line, type WRKHDWRSC TYPE(*CMN) and press Enter.
 - b. Type 7 (Display resource detail) in the option column next to the resource name that you identified in step 3d (See 65). Verify that the information that appears in the Type-model and Serial number fields match what you recorded for this resource.
 - c. If these fields do not match what you recorded, do this:
 - 1) Press F12 to back out to the previous display.
 - 2) Use option 7 to display the resource details for other resource names in the list until you find the one whose Type-model and Serial number match those your recorded. Note the resource name that OS/400 now associates with this Integrated xSeries Server hardware. Press F12 to back out of this command.
 - 3) On the OS/400 command line, type WRKCFGSTS *NWS and press Enter.
 - 4) Type 8 in the option column next to the network server description and press Enter. The Work with Network Server Descriptions display appears.
 - 5) Type 2 (change) in the option column next to the network server description and press Enter. The Change Network Server Description display appears.
 - 6) Change the resource name to the new correct resource name for this network server.
2. "Install iSeries Integration for Windows Server service packs on Windows 2000 or Windows .NET Server" on page 57 on your existing Windows servers.

If you are also installing new Integrated xSeries Server hardware, see

Upgrade Windows servers when you upgrade iSeries Integration for Windows Server

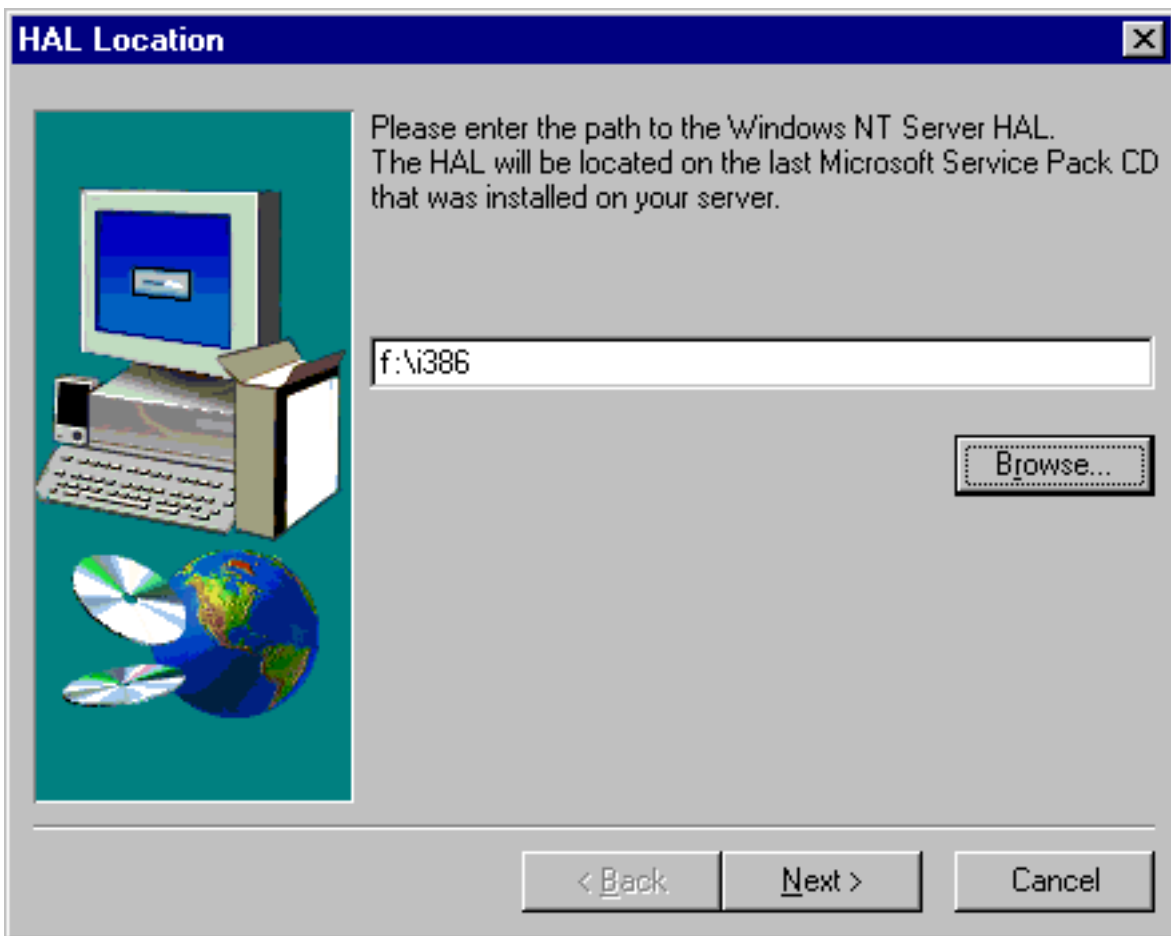
When you install a new version of iSeries Integration for Windows Server, you need to upgrade all your existing Windows servers to that level. (If you have multiple Windows servers, you might want to upgrade the base code on those servers remotely from OS/400. "Install and uninstall service packs with the lvlsync command" on page 59 has information about how to do that.)

This procedure requires that you have the same userid and password on Windows server and OS/400. To use the Level Check command to upgrade your servers, you must be a Windows server administrator.

For V4R5 and later releases, iSeries Integration for Windows Server no longer includes a customized version of the Windows server hardware abstraction layer (HAL). During an upgrade from V4R4 or earlier, you must copy the hardware abstraction layer (HAL) from the appropriate Microsoft media. The HAL is located in the i386 directory on the CD-ROM that contains the latest Microsoft Service Pack that was installed on your server. Therefore, you need that CD-ROM during the upgrade. If you do not have the CD-ROM, you must first order the Service Pack CD-ROM from Microsoft.

To upgrade the base code level on a Windows server, follow these steps:

1. End any applications that are running.
2. Ensure that no users are logged on to Windows server.
Attention: Windows server automatically restarts after completion of the installation, so if you skip steps 1 and 2, you risk data loss.
3. From the **Start** menu, choose **Programs**, then **OS/400 Windows Server**, then **Level Check** to start the Level Check application.
Note: When a new level of the base code is available for installation from Windows server, logging on as an administrator causes Level Check to start automatically.
4. From the **Install Action** drop down box, choose **Install release from OS/400**.
5. Click **OK**.
6. A message appears that says, "If you continue, you will eventually be asked to reboot. Do you want to continue?" Click **OK** to confirm that you want to continue.
7. Follow the on-screen instructions to complete installation of the new base code. Be especially careful when you enter the path to the Windows server HAL. Failure to copy the correct HAL can result in irreparable damage to your network server description. Insert the Microsoft Service Pack CD-ROM that contains the latest service pack you have installed on your server. The HAL is located in the i386 directory on that CD-ROM. Enter the path to the i386 directory or click **Browse** to find it. The CD-ROM drive for the server in this example is drive F.



Click **Next**. Level Check copies the correct Hal.d11 file to replace the customized version of the HAL that is currently running in the WINNT/System32 directory.

8. **Tip:** After installing new base code, back up the predefined installation and system drives for this server. “Back up predefined disk drives for Windows servers created on pre-V4R5 OS/400 systems” on page 118 has information about backing up these drives. Since it is safer to back up all storage spaces for the server at the same time, you should also back up the associated user-created storage (described in “Back up user-defined disk drives for Windows server” on page 119).

Upgrade iSeries Integration for Windows Server using iSeries Navigator

To view the current version and install the latest version using iSeries Navigator, do the following:

1. To view what is currently installed on a specific server, start **iSeries Navigator**. Select **Network** then **Windows Administration** then **Integrated xSeries Servers**. Select one of the servers and right-click. Select **Properties**. Go to the Software tab on the server properties display.
2. To install the latest version, start **iSeries Navigator**. Select **Network** then **Windows Administration** then **Integrated xSeries Servers**. Select one of the servers and right-click. Select **Server Integration Software** then select the install latest version option.

Follow the on-screen instructions to complete installation of the latest version. >>

Migrating to 2890 Integrated xSeries Server hardware

Before migrating from 285x or 661x hardware to 2890 Integrated xSeries Server hardware, you must “Upgrade OS/400 and iSeries Integration for Windows Server” on page 64 and “Code fixes for iSeries Integration for Windows Server” on page 56 on your OS/400 and on all your existing Windows servers.

Look for information and follow any directions you find at the IBM Windows Integration Web  site.

Attention: If you were using your Integrated xSeries Server as an external host LAN for your OS/400, be aware that the 2890 Integrated xSeries Server does not support external host LAN. When you migrate to the new hardware, you lose your external host LAN. Please note that all statements referring to the 2890 Integrated xSeries Server apply to the 2790 model as well.

To migrate to new hardware, complete these steps:

1. If you did not already record the associated resources for your old Integrated xSeries Server hardware during the software installation, do this now:
 - a. On the OS/400 command line, type WRKNWSD and press Enter. The Work with Network Server Descriptions display appears.
 - b. Type 5 in the option column next to the network server description.
 - c. Page down until you see the field Resource name and record the value for this network server (for example, CC02 or LIN05).

If you have Integrated xSeries Servers of the same type installed on your iSeries, refer to “Tip: Find resource names when you have multiple Integrated xSeries Servers” on page 24.
 - d. On the OS/400 command line, type WRKHDWRSC TYPE(*CMN) and press Enter.
 - e. Type 7 (Display resource detail) in the option column next to the resource name that you identified in step 1c. (The text description should be File Server IOP or File Server IOA.)
 - f. Record the information that appears in the Type-model and Serial number fields.
2. Record the Internet address for the internal LAN:
 - a. On the OS/400 command line, type CFGTCP and press Enter. The Configure TCP display appears.
 - b. Type 1 to Work with TCP/IP Interfaces.
 - c. Identify the correct line description for the Windows server and record the Internet address. (The name of the line description begins with the NWSD name.)
 - d. Press F3 twice to exit from the command.
3. Remove the IBM AS/400 Protocol Driver (IBM AS/400 HostLAN Bridge Driver):
 - **On Windows 2000, perform the following steps:**
 - a. Click **Start, Settings, and Control Panel**.
 - b. Open **Network and Dial-up Connections**.
 - c. Double-click on any connection.
 - d. Click on the **Properties** button.
 - e. Select the **AS/400 Line Multi-Port Protocol Driver** and click the **Uninstall** button.
 - f. Answer **Yes** and click **Close** and **Close** to complete the removal.
 - **On Windows NT 4.0, perform the following steps:**
 - a. Click on **Start, then Settings, then Control Panel**.
 - b. Open the **Network** application.
 - c. Click the **Protocols** tab.
 - d. Click on **IBM AS/400 Protocol Driver (IBM AS/400 HostLAN Bridge Driver) 1 (or 2)**. You may see IBM AS/400 Protocol Driver (IBM AS/400 HostLAN Bridge Driver) 1, 2, or both. If you have both, repeat this procedure to remove the second one.
 - e. Click the **Remove** button.
 - f. Click **Yes** on the warning box to confirm that you want to remove the component.
 - g. Click **Close**.
 - h. On the Network Settings Change warning that you must shut down and restart, click **Yes** to restart.
4. “Removing network adapters from Windows server on iSeries” on page 78 except the IBM Internal LAN adapter.
5. Remove the line description for the old adapter.

Attention: Do not remove the line description of the internal LAN. It has the name *nwsdname00*, where *nwsdname* is the name of the network server description.

6. “Back up NWSDs for Windows server on iSeries” on page 117 and its associated “Back up the NWSD and disk drives associated with Windows server on iSeries” on page 117 (described in “Back up the NWSD and disk drives associated with Windows server on iSeries” on page 117).
7. “Shut down Windows server from OS/400” on page 82 (vary off) all your network servers. This step is not necessary if a full system save is done prior to the hardware upgrade.
8. If the new 2890 Integrated xSeries Server hardware is not already installed, follow the directions that come with the hardware to install it.
9. Restore “Restore NWSDs for Windows server on iSeries” on page 129 and their associated “Restore the NWSD and disk drives for Windows server on iSeries” on page 126 on the new Integrated xSeries Server hardware. To have OS/400 automatically relink restored storage spaces in the integrated file system to the appropriate NWSD, restore those storage spaces before you restore the NWSD.
10. Restore the line description:
 - a. To restore the line description, type RSTCFG on the OS/400 command line again and press F4.
 - b. In the Objects field, specify the name of the line description.
11. Supply a TCP/IP interface to allow OS/400 to communicate with the new Integrated xSeries Server:
 - a. On the OS/400 command line, type CFGTCP and press Enter. The Work with TCP/IP Interface display appears.
 - b. Type 1 on the command line to add an interface.
 - c. Type the Internet address for the Internal LAN from the old system that you recorded in step 2c.
 - d. In the Line description field, specify the name of the line description that you restored in step 10a.
 - e. For the subnet mask, specify 255.255.255.0. Press Enter to complete the command.
12. Use the Work with Hardware Resources (WRKHDRSC) command to determine the CCIN number of the new Integrated xSeries Server hardware and find the resource name:
 - a. On the OS/400 command line, type WRKHDRSC TYPE(*CMN) and press Enter.
 - b. The 2890 Integrated xSeries Servers has Operational File Server IOA in the text field. (Other models have File Server IOA or File Server IOP.) To identify the hardware in the list, look for the CCIN number of the new Integrated xSeries Server in the Type column. (“Integrated xSeries Server for iSeries CCIN and feature code numbers” on page 10 lists CCIN numbers for Integrated xSeries Servers.)
 - c. Note the resource name for that Integrated xSeries Server (in the form LINxx).
13. Use the Change Network Server Description (CHGNWSD) command to change the resource name for the NWSD to the new resource name for the model 2890 Integrated xSeries Server:
 - a. On the OS/400 command line, type CHGNWSD NWSD(*nwsdname*) and press F4.
 - b. In the Resource name field, specify the resource name for the new Integrated xSeries Server hardware that you identified in the previous step; press Enter.
14. “Create a guest user profile for iSeries NetServer” on page 26 for iSeries NetServer.
15. Vary on the NWSD. A message appears to alert you to the possible need for manual intervention.
16. On the first boot after the restore has completed the Windows 2000 will freeze, so you must reboot at this time.
17. After the Windows 2000 reboot completes, the line description of the Internal LAN adapter will be in VARY-ON PENDING state and the corresponding icon under Windows 2000 will have a red X, indicating the Cable is Disconnected. Ignore any Event Log messages listed for the driver qvndhli.sys and perform an additional reboot of the Windows 2000 server.
18. Only if you are running Windows NT 4.0 on the 2890 Integrated xSeries Server, you need to “Install the Savage 4 Video Driver for Windows NT 4.0 on the 2890 Integrated xSeries Server” on page 70 for Windows NT 4.0.

19. When migrating involves adding Gigabit Ethernet Adapters, please consider the following:
 - **When running Microsoft Windows 2000 installed on a V4R5 or previous release:**
The Microsoft supplied driver under Windows 2000 for the Gigabit Ethernet Adapter is not compatible with our hardware. A driver update is required after VRM has completed. For more information, see detailed instructions on how to Manually update the external LAN drivers in Windows 2000 or Windows .NET.
 - **When running Microsoft Windows NT 4.0:**
See “Install Gigabit Ethernet adapters on Windows NT 4.0” on page 77 for detailed special instructions.
20. Add the new adapters:
 - **When running Microsoft Windows 2000 or Windows .NET:**
First, let Windows plug-n-play detect your adapters. Then, manually configure the IP address by referring to the steps in “Install network adapter drivers and add adapter address information to Windows server for Windows 2000 or Windows .NET Server” on page 75.
 - **When running Microsoft Windows NT 4.0:**
Simply add the new adapters.◀◀



Install the Savage 4 Video Driver for Windows NT 4.0 on the 2890 Integrated xSeries Server

The 2890 Integrated xSeries Server includes an S3 video chip, whose driver is not included in the NT distribution CD. You need to install the S3 Inc. Savage4 Display Driver on Windows server to get video to display correctly. Your system must have Windows NT 4.0 Service Pack 3, or later, installed before you can install the S3 Savage4 Video drivers.

To install the Savage 4 Video Driver for Windows NT 4.0, follow these steps:

1. Start Windows NT 4.0. When the “Please select the operating system to start...” message appears, select **Windows NT Server Version 4.00 [VGA mode]**.
2. From **Start**, select **Settings**, then **Control Panel**.
3. Double-click on the **Display** icon.
4. Click on the **Settings** tab.
5. Click the **Display type** button.
6. Click on the **Change** button In the Adapter type section of the Display Type screen.
7. On the resulting **Change Display** screen, click on the **Have disk** button.
8. Change the location to **D:\AS400NT**.
9. From the list of displayed Devices, select **S3savag4.inf**.
10. From “Third-party Drivers”, click the **Yes** button to proceed.
11. If a message states the driver is already installed on the system and asks if you want to use the current or new drivers, select the **New** button.
12. When the message “The drivers were successfully installed” appears, click **OK**.
13. Back at the Display Type window, click **Close**.
14. Back at the Display Properties window, click **Close**.
15. On the System Settings Change window, click **Yes** to restart your computer now.

After installing the Savage 4 video drivers on servers that were migrating to the 2890, an event will appear in the System Event log each time the system is booted (Event ID 7026: The following boot start or system start drivers failed to load: s3)

To correct this problem, it is necessary to disable the old s3 video driver that was installed for the 6617 or 2850 Integrated Netfinity Servers. To do this:

- Select **Start> Settings> Control Panel**
- Double-click the **Devices** icon
- Locate the s3 driver

Note: There will be two video drivers on a system that has been migrated to 2890 hardware after installing the Savage 4 video drivers. The s3 driver was used by the 6617 or 2850 File Server for video support and will appear with a blank Status and Startup of System. The Savage 4 install adds a S3Inc video driver that shows a status of Started and a Startup of System. <<

Migrating to 50xx Migration Tower

If you are using your Integrated Netfinity Server as an External Host LAN for your iSeries, be aware that this function is no longer supported. When you migrate your hardware you lose your External Host LAN. A new line description has to be created and a new LAN adapter may need to be installed to replace this function under OS/400.

IBM recommends that you use a separate adapter to connect iSeries to the external LAN. This will result in improved performance and will avoid losing your connection when the Windows server shuts down. To remove the External Host LAN:

On **Windows 2000**, follow these steps:

1. Click **Start, Settings, and Control Panel**.
2. Open **Network and Dial-up Connections**.
3. Double-click on any connection.
4. Click on the **Properties** button.
5. Select the **AS/400 Line Multi-Port Protocol Driver 1** and click the **Uninstall** button.
6. Answer **Yes**, click **Close** and **Close** again to complete the removal.

On **Windows NT 4.0**, follow these steps:

1. Click **Start, Settings, and Control Panel**.
2. Open the **Network** application.
3. Click the **Protocols** tab.
4. Click on **OS/400 HostLAN Bridge Driver 1** (or 2). If you see both, repeat this procedure to remove the second one.
5. Click the **Remove** button.
6. Click **Yes** on the warning message to confirm that you want to remove the component.
7. Click **Close**.
8. Select **Yes** on the warning message to restart.

To remove the shared adapter from OS/400, refer to “Removing network adapters from Windows server on iSeries” on page 78.

Add new network adapters to Windows server on iSeries

>> You can install a new network adapter card in an open PCI slot. If you do this, you need to configure the new adapter on Windows server. Older models of Integrated Netfinity Server allow you to share the adapter between OS/400 and Windows server. The Integrated xSeries Server, models 2890 and 2892, do not allow an adapter to be shared between OS/400 and Windows server.

Note: If you have an older 6617 model Integrated xSeries Server that has three available PCI slots, you can share only the first two with OS/400 when this 6617 is not installed on a 50xx Migration Tower.



To set up a new shared network adapter on Integrated xSeries Server models that support external host LAN, perform these tasks:

1. “Create line descriptions for network adapters shared between OS/400 and Windows server on iSeries”
2. “Add a TCP interface for a new shared network adapter” on page 74
3. “Update network server descriptions with Windows server adapter information” on page 74
4. “Install network adapter drivers and adding adapter address information to Windows server” on page 75

➤ To create a Virtual Ethernet connection, see “Configure Virtual Ethernet connections to OS/400, another Windows server, or LPAR on iSeries” on page 73. ⏪

To remove a network adapter, see “Removing network adapters from Windows server on iSeries” on page 78.

If you are going to install any of the Gigabit Ethernet Adapter and will be running Microsoft Windows NT 4.0, see the “Install Gigabit Ethernet adapters on Windows NT 4.0” on page 77 section for detailed special instructions.

Create line descriptions for network adapters shared between OS/400 and Windows server on iSeries

Creating a line description is the first step in configuring a new network adapter for sharing between OS/400 and Windows server on Integrated Netfinity Servers that support external host LAN. The 2890

➤ and 2892 ⏪ Integrated xSeries Servers, 2689 Integrated xSeries Adapter, and any NWSD migrated to the 50xx Migration Tower does not support this function.

To create a line description, follow these steps:

1. On OS/400, type the appropriate command:
 - For token-ring ports, type CRTLINTRN and press Enter.
 - For Ethernet ports, type CRTLINETH and press Enter.
2. In the Line Description field, enter the name of your network server description (NWSD), followed by a 0, followed by the port number.
 - **Example:** For an adapter in port 1 that you want to share between OS/400 and an NWSD called NTSVR, name the line description NTSVR01.
3. In the Resource Name field, enter *NWSD.
4. In the Network server description field, enter the name of the NWSD that will use the adapter.
5. Press Enter twice.
6. In the Port Number field, enter the port number where you have plugged in the card.
7. In the Local Adapter Address field, enter a unique address for the adapter. *ADPT is not valid.
Note: Make note of this address. You will need it in a later step.
8. In the Line Speed field, enter the speed of the line that you have plugged into the adapter.
9. (Optional) Page down to the Link Speed field.
10. In the Link Speed field, enter the same value that you entered for the Line Speed.
11. (Optional) Page down to the Text 'description' field and type a brief description of the line description.
12. Press Enter.

Next you need to “Add a TCP interface for a new shared network adapter” on page 74 for the new adapter.

Configure Virtual Ethernet connections to OS/400, another Windows server, or LPAR on iSeries

The first step to configure a Virtual Ethernet connection between an Integrated xSeries Server and OS/400, another Windows server, or LPAR is creating a line description. The 2892 Integrated xSeries Server, 2890 Integrated xSeries Server, and 2689 Integrated xSeries adapter support Virtual Ethernet when running Windows 2000 or Windows .NET server. The NWSD installation process creates a line description and TCP/IP interface for point-to-point Virtual Ethernet, and can also create line descriptions for Virtual Ethernet networks.

To create additional line descriptions for Virtual Ethernet networks (or if the line description for point-to-point Virtual Ethernet is missing for some reason), complete the following steps **after** completing the NWSD installation process:

1. On OS/400, type the Create Line Desc (Ethernet) CRTLINETH and press Enter.
2. In the Line Description field, enter the name of your network server description (NWSD), followed either by the proper suffix for either point-to-point Virtual Ethernet or for a Virtual Ethernet network.
 - For a Virtual Ethernet network: Use V and a number (0 through 9) that corresponds to the Virtual Ethernet network that you will use (for example, NWSDnameV0)
 - For point-to-point Virtual Ethernet: Use the suffix PP (for example NWSDnamePP)
3. In the Resource Name field, enter *NWSD.
4. In the Network server description field, enter the name of the NWSD that will use the adapter.
5. Press Enter twice.
6. In the Port Number field, enter the port number that corresponds to the Virtual Ethernet network that you will use:
 - Virtual Ethernet network port values are *VRTETH0 through *VRTETH9
 - The point-to-point Virtual Ethernet port is *VRTETHPTP
7. In the Local Adapter Address field, *ADPT is required.
8. The Line Speed must be 1G, Duplex must be *FULL, and the Max frame size should be 8996 for Virtual Ethernet.
9. (Optional) Page down to the Link Speed field.
10. In the Link Speed field, specify *MAX.
11. (Optional) Page down to the Text 'description' field and write a brief description of the line description.
12. Press Enter.

The next task applies only to point-to-point Virtual Ethernet because OS/400 should have a TCP/IP interface only on point-to-point Virtual Ethernet. If the TCP/IP interface for point-to-point Virtual Ethernet is missing for some reason, complete the following steps:

1. On OS/400 type the command ADDTCPIFC and press Enter.
2. In the Internet address field, type the OS/400 Internet address for the point-to-point Virtual Ethernet.
3. In the Line description field, type the name of the line description for the point-to-point Virtual Ethernet.
4. In the Subnet mask field, type the OS/400 subnet mask for the port and press Enter.

The next task applies only to Virtual Ethernet networks. If you want the Windows server to use the Virtual Ethernet network to communicate with a different logical partition (LPAR) in the same system, or a Windows server associated with a different OS/400 partition, complete the following steps:

1. Enable an inter-LPAR connection as described in the Logical partition concepts. Windows servers are limited to using Virtual Ethernet numbers 0 through 9, which correspond to Port Number values *VRTETH0 through *VRTETH9.

2. If you want the Windows server to use the Virtual Ethernet network to communicate with other OS/400 logical partitions, each of the other partitions must have a line description and TCP/IP interface on the Virtual Ethernet network being used. See Logical partition concepts for more information.
3. If you want the Windows server to use the Virtual Ethernet network to communicate with Linux partitions, each Linux partition must have a TCP/IP address on the Virtual Ethernet network being used. See Linux in a guest partition.

Note: The status of a Virtual Ethernet line description under a network server description may show a status of VARIED ON. This status is normal and expected for Virtual Ethernet.

The next step, which applies to any new Virtual Ethernet, is to update the “Update network server descriptions with Windows server adapter information”.

When you vary on the NWSD, a utility will install an IBM iSeries Virtual Ethernet adapter and set the Windows TCP/IP address that has been specified for it in the NWSD. An IP address entered at the Windows console overrides the values that are set in the NWSD. <<

Add a TCP interface for a new shared network adapter

You can install a new network adapter card to share between OS/400 and Windows server on the Integrated >> xSeries Server. External host LAN is available only on older models of Integrated xSeries Server. To do this, you must add a TCP interface for the port in which you installed the card. Before doing this, you must have “Create line descriptions for network adapters shared between OS/400 and Windows server on iSeries” on page 72 for the port.

To add a TCP interface, follow these steps:

1. On OS/400 enter the command ADDTCPIFC and press Enter.
2. In the Internet address field, enter the OS/400 Internet address for the port.
3. In the Line description field, enter the name of the line description for the port. Provided you followed the recommended naming conventions, this will be the name of your network server description (NWSD), followed by a 0, followed by the port number.
 - **Example:** For an adapter in port one that you want to share between OS/400 and an NWSD called NTSVR, the line description name is NTSVR01.
4. In the Subnet mask field, enter the OS/400 subnet mask for the port and press Enter.

Note: You can use a TCP route for the new port that is different from the one OS/400 uses. To do this, set a TCP route with the Add TCP/IP Route (ADDTCPRTE) command. For more information about

TCP routes, see the TCP/IP Configuration and Reference .

You also need to “Update network server descriptions with Windows server adapter information” for your new shared adapters.

Update network server descriptions with Windows server adapter information

You add the Windows server side networking information for a >> new external or virtual network adapter << by updating the server’s network server description (NWSD) on OS/400.



To add the new networking information for the new network adapter to your NWSD, follow these steps:

1. Enter the OS/400 command CHGNWSD and press Enter.
2. In the Network server description field, enter the name of your NWSD and press Enter.
3. Page Down to the TCP/IP port configuration information.
4. In the blank to the right of the words + for more values, type a + and press Enter.
5. In the Port field, enter the port number of the new adapter.
6. In the Internet address field, enter the address that Windows server will use for the new adapter.
7. In the Subnet mask field, enter the subnet mask that Windows server will use for the new adapter.

8. Press Enter.

Install network adapter drivers and adding adapter address information to Windows server


You install adapter drivers and add adapter address information for the new adapters on Windows server. Follow the steps for the version of Windows server that you are running.

-  “Install network adapter drivers and add adapter address information to Windows server for Windows 2000 or Windows .NET Server”
- “Install network adapter drivers and add adapter address information to Windows server for Windows NT” on page 76 

Install network adapter drivers and add adapter address information to Windows server for Windows 2000 or Windows .NET Server: The adapters and device drivers under Windows 2000 support Plug-n-Play. Once an adapter has been physically installed, reboot the Windows server by varying it on for the adapters to become available. Remember to configure the IP address for every adapter (connection).

If you are upgrading your Integrated xSeries Server from Windows NT 4.0 to Windows 2000, “Removing network adapters from Windows server on iSeries” on page 78 before adding the new one. Windows 2000 or Windows .NET Server recognizes the new adapter. To configure the IP address for a given adapter:

1. Right-click on **My Network Places**; then click on **Properties** from the pull-down menu.
2. Double-click on the desired adapter (Local Area Connection) to configure the IP address.
3. Click the **Properties** button.
4. Select the **Internet Protocol (TCP/IP)**, then click the **Properties** button.
5. If it is not already selected, click the **Use the following IP address** radio button.
6. In the **IP Address** field, specify the Internet address.
7. In the **Subnet Mask** field, specify the subnet mask.
8. In the **Default Gateway** field, specify the default gateway address.
9. Click **OK, OK, and Close** to complete the IP address setting.

Note: If Windows indicates that the IP address is already configured for another adapter, but you cannot find an adapter already using the address, Windows is probably aware of a previous hardware environment that used the address. To display a LAN adapter from a previous hardware environment so that you can free the IP address, see the Microsoft Knowledge Base article Q241257 Device Manager Does Not Display Devices Not Currently Present in Windows 2000  .

If you want only the Windows server to use this network adapter, you are finished with the configuration. If you have a model of Integrated xSeries Server that supports external host LAN and want to share the new adapter with OS/400, perform these additional steps:

10. Click the **Adapters** tab.
11. Select the desired connection be shared.
12. Click the **Configure** button.
13. Click the **Advanced** tab
14. Select from the list the Network Address (Ethernet or token ring)
15. Select the radio button to input a value and type the Network Address that matches the iSeries Line Description and Local Administered Address field.
16. Select from the list the **Data Rate** and **Duplex** (token ring) and **External PHY** (Ethernet) and click the radio button to input a value. Ensure that these settings match the corresponding iSeries Line Description fields.
17. Click **OK, OK, and Close** for the settings to take effect

18. You need to shutdown and restart for the changes to take effect.

Note: You will install the new external port at the level of the latest iSeries Integration for Windows Server service pack. You do not need to reinstall the service pack after installing the port.

Install network adapter drivers and add adapter address information to Windows server for Windows NT: ➤ The adapters and device drivers under Windows 2000 and Windows .NET Server support plug-n-play. Remember to configure the IP address for every adapter (connection). ⏪

If you are upgrading your Integrated Netfinity Server from Windows NT 4.0 to Windows 2000 or Windows .NET Server, “Removing network adapters from Windows server on iSeries” on page 78 before adding the new one. Windows 2000 recognizes the new adapter. To configure the IP address for a given adapter:

1. Click on **Start**, then **Settings**, then **Control Panel**.
2. Open the **Network** application.
3. Click the **Adapters** tab.
4. Click the **Add** button.
5. Click the **Have Disk** button.
6. In the single field on the **Insert Disk** window, type the location of the adapter configuration files.

- For token-ring adapters, enter

d:\i386\oem\$\net\ibmpcitr

- For Ethernet adapters and the model 2890 Integrated xSeries Server, enter

d:\i386\oem\$\net\amdpcie2

For Ethernet adapters and other Integrated xSeries Server models, enter:

d:\i386\oem\$\net\amdpciet

For Gigabit Ethernet adapters, enter:

d:\i386\oem\$\net\alt

Note: The Gigabit Ethernet Adapters ➤ (Feature Codes 2760 or 2743)⏪ are only supported on the 2890 Integrated xSeries Server. In addition, they require Microsoft Windows NT 4.0 Service Pack 4 or later. Install Service Pack 4.0 or later prior to installing the Adapter. If you are installing the adapter and plan to install a new Microsoft Windows NT 4.0 Server, see “Install Gigabit Ethernet adapters on Windows NT 4.0” on page 77 for special instructions.

7. Click **OK**.
8. Windows NT 4.0 displays the name of the adapter that you have selected. Confirm that this is correct; then click **OK**.
9. Click the **Bindings** tab. The new adapter binds.
10. Click the **Protocols** tab
11. From the list of protocols, double-click on **TCP/IP**.
12. In the **Adapter** drop-down box, select the new adapter. If this is the first adapter that you have installed, a 1 precedes the entry. If this is the second adapter that you have installed, a 2 precedes the entry.
13. If it is not already selected, click the **Specify an IP address** radio button.
14. In the **IP Address** field, specify the Internet address.
15. In the **Subnet Mask** field, specify the subnet mask.
16. In the **Default Gateway** field, specify the default gateway address.
17. Click **OK**.

» If you want only the Windows server to use this network adapter, you are finished with the configuration. If you want to share the new adapter with OS/400, perform steps 18 to 26 (See 77).«

18. Click the **Adapters** tab.
19. Select the desired connection be shared.
20. Click the **Configure** button.
21. Click the **Advanced** tab
22. Select from the list the Network Address (Ethernet or token ring)
23. Select the radio button to input a value and type the Network Address that matches the iSeries Line Description and Local Administered Address field.
24. Select from the list the **Data Rate** and **Duplex** (token ring) and **External PHY** (Ethernet) and click the radio button to input a value. Ensure that these settings match the corresponding iSeries Line Description fields.
25. Click **OK**, **OK**, and **Close** for the settings to take effect
26. You need to shutdown and restart for the changes to take effect.

Note: You will install the new external port at the level of the latest iSeries Integration for Windows Server service pack. You do not need to reinstall the service pack after installing the port.

Installing OS/400 Multi-Port protocol driver

When External Host LAN is required under Windows 2000 and this function was not migrated from NT 4.0 follow these steps to enable and configure it from the Windows console:

1. Click Start, Settings, and Control Panel.
2. Open Network and Dial-up Connections.
3. Double-click on any connection to open.
4. Click the Properties button.
5. Click the Install button.
6. Select Protocols for the type of network to install and click the Add button.
7. Select the IBM OS/400 Multit-Port Protocol and click the OK button.
8. Click Close

Notes:

1. External Host LAN is not supported on the » 2890 or 2892 Integrated xSeries Server« and the and the 2689 Integrated xSeries adapter and any NWSD migrated to the 50xx Migration Tower.
2. It is required that the Network Address, Speed, and Duplex match between the shared Connection and the OS/400 Line Description.

Install Gigabit Ethernet adapters on Windows NT 4.0

If you have Microsoft Windows NT 4.0 already installed and you are adding a new Gigabit Ethernet adapter be aware that you need to install Service Pack 4 or later.

If you do not have Microsoft Windows NT 4.0 installed and are here because you are about to run the INSWNTSVR command carefully read the following instructions.

» Any type of new installation of the Microsoft Windows NT 4.0 Server when using the Gigabit Ethernet Adapters (Feature Codes 2760 or 2743) requires the following additional steps to be carefully followed:

1. Have Microsoft Service Pack 4.0 or later
2. Locate in the Service Pack the file NDIS.SYS. Rename the file to NDIS.SY_ (Note the underscore requirement when renaming).
3. Install the renamed NDIS.SY_ to the following directory of the OS/400 Integrated File System "/QIBM/ProdData/NTAP/Install/Image/Option01/I386" prior to issuing the INSWNTSVR command. This

can be done using Windows Explorer from a separate PC, FTP (binary is required) or OS/400 CPY command from CD-ROM using the /QOPT file system.

4. When Install Command completes, you should remove the NDIS.SY_ from the IFS directory.
5. Repeat these steps (1-4) every time a new INSWNTSVR command is issued when installing Microsoft Windows NT 4.0 and Gigabit Ethernet Adapters are present.

If these steps are not followed, the install command will not install the device driver for the Gigabit Ethernet Adapters. The steps are extremely important when installing a BDC (Backup Domain Controller). The install will not be allowed until the required NDIS.SY_ file is found on the listed directory. The following Messages will result when failing to follow the above steps. If the INSWNTSVR command is issued with DMNROLE(*BKUCTL) and WNTVER(*NT40), the error messages below will appear in the job log. <<

```
Message ID . . . . . : CPFA0A9
Message . . . . . : Object not found.
Cause . . . . . :
Object /QIBM/ProdData/NTAP/Install/Image/Option01/I386/NDIS.SY_ or a directory in the object
path could not be found or its type cannot be resolved by this function.
```

>>

```
Message ID . . . . . : CPD0006
Message . . . . . : System resource required to complete this request not available.
```

<<

```
Message ID . . . . . : NTA1013
Message . . . . . : Windows server installation not successful.
Cause . . . . . Display the previous messages in the job log to determine the error on the Install
Windows Server (INSWNTSVR) command for server &1. When installing a domain controller
or server domain role, WNTVER(*NT40) server, and a copy of the SP 4 or later NDIS file is NOT found
in the IFS tree, the following messages will appear in the joblog for each gigabit Ethernet adapter detected
and the adapter will not be configured. The driver(s) will need to be installed and configured manually after
the installation is complete and SP4 or later has been installed:
Message ID . . . . . : CPD0006
Message . . . . . : Hardware resource name &1(cmnXX) not configured or accessible on
node &2(nwsdname).
```

Removing network adapters from Windows server on iSeries

Before you remove a network adapter card from an Integrated xSeries Server, you need to uninstall it from Windows server. If Windows server shares the network adapter card with OS/400, you also need to uninstall it from OS/400. You also need to remove shared adapters if you are “Migrating to 2890 Integrated xSeries Server hardware” on page 67 to a 2890 Integrated xSeries Server, which does not support external host LAN.

Note: If you want to stop sharing an adapter with OS/400, but do not want to uninstall it from Windows server, proceed directly to step 8.

To uninstall network adapters from Windows server on an Integrated xSeries Server, follow these steps:

For Windows 2000 >> or Windows .NET: <<

1. Click on **Start**, then **Settings**, then **Control Panel**.
2. Start the **Add/Remove Hardware** wizard and click **Next** on the opening panel.
3. Click on **Uninstall/unplug a device**.
4. On the **Choose a remove task** panel, click **Next** to take the default (Uninstall a device).
5. Select the device from the list that you want to uninstall (for example, IBM PCI Token-ring adapter).
6. Click **Yes** to confirm that you want to remove the adapter.
7. Because Windows 2000 >> and Windows .NET << is a Plug and Play operating system, you must either physically remove the adapter from OS/400 or disable it before restarting the server. If you restart

Windows 2000 » and Windows .NET« with the adapter still plugged into the Integrated xSeries Server, Windows 2000 » and Windows .NET« will detect that it has new hardware and reinstall the device driver. If you want to disable the adapter rather than remove it, follow these steps:

- a. From the **Control Panel**, select **Network and Dial-up Connections**.
 - b. Select the LAN adapter.
 - c. Right-click and select **Disable**.
8. If Windows server is the only user of the network adapter, then restart Windows server to complete the procedure. If Windows server shares the network adapter with OS/400, then do not restart Windows server yet. Instead, proceed with step 8.

For Windows NT 4.0:

1. Click on **Start**, then **Settings**, then **Control Panel**.
2. Open the **Network** application.
3. Click the **Adapters** tab.
4. Click on the adapter that you want to remove. If you need to remove more than one adapter, repeat this procedure. If you are migrating to new Integrated xSeries Server hardware, you need to remove all but the IBM Internal LAN adapter.
5. Click the **Remove** button.
6. Click **Yes** to confirm that you want to remove the adapter.
7. If Windows server is the only user of the network adapter, then restart Windows server to complete the procedure. If Windows server shares the network adapter with OS/400, then do not restart Windows server yet. Instead, proceed with step 8.

Removing a shared adapter from OS/400:

8. To record needed information and vary off the network server description (NWS) for the Windows server, type WRKCFGSTS *NWS and press Enter. The Work with Configuration Status display appears.

Figure 3. Work with Configuration Status display example

```

-----+-----
                                Work with Configuration Status                                SYSAS400
                                                                                               11/14/97  14:13:02
Position to . . . . .           Starting characters

Type options, press Enter.
 1=Vary on  2=Vary off  5=Work with job  8=Work with description
 9=Display mode status 13=Work with APPN status...

Opt  Description      Status      -----Job-----
_2   NTSVR             ACTIVE
    NTSVR01           ACTIVE
    NTSVRNET00        ACTIVE
    NTSVRTCP00        ACTIVE      QTCPIP    QTCP    007075
    NTSVR00           ACTIVE
    NTSVRNET          ACTIVE
    NTSVRTCP          ACTIVE      QTCPIP    QTCP    007075
    RAMP              VARIED  OFF
    RAMP01            VARIED  OFF
    RAMP00            VARIED  OFF
    RAMP0NET          VARIED  OFF
    RAMP0TCP          VARIED  OFF

Parameters or command
===>
F3=Exit  F4=Prompt  F12=Cancel  F23=More options  F24=More keys
-----+-----


```


While you have the Work with Configuration Status display, do the following:

- a. Type a 2 in the Opt field to the left of the network server description you want to vary off (NTSVR in the example).
 - b. Record the line description. The line description name begins with the NWSD name followed by 01 or 02. The line description name depends on the port to which you attached it. In the example, the line description for NTSVR is NTSVR01.
Attention: Line description *nwsdname00* is the line description for the internal LAN. You do not want to shut this down.
 - c. Record the controller description, which appears directly under the line description for the port you are removing. The controller description name begins with the first five letters of *nwsdname* and includes 'NET'. In the example, the controller description is NTSVRNET00.
Attention: Be careful **not** to use the controller description for the internal LAN (under the line description that ends in 00).
 - d. Record the device description. The device description name begins with the first five letters of *nwsdname* and includes 'TCP'. In the example, the device description is NTSVRTCP00.
Attention: Be careful **not** to use the device description for the internal LAN (under the line description that ends in 00).
 - e. Press Enter. The Windows server shuts down.
9. If you configured a special route for the adapter, then remove the route by using the RMVTCPRTE command.
 10. Enter the command RMVTCPIFC.
 11. Press Enter.
 12. In the Internet address field, specify the OS/400-side IP address for the adapter. You recorded this value in Windows server networking information worksheet (See 38) during installation.
 13. Press Enter.
 14. Enter the command WRKDEVD DEVD(*CMN) and press Enter.
 15. Page down until you see the device description that you noted for the line of the adapter you are removing.
 16. Place a 4 (Delete) in the Opt field to the left of the device description and press Enter.
 17. Enter the command WRKCTLD CTLD(*CMN).
 18. Page down until you see the controller description that you noted for the line of the adapter you are removing.
 19. Place a 4 (Delete) in the Opt field to the left of the controller description and press Enter.
 20. Enter the command WRKLIND.
 21. Page down until you see the line description that you noted for the adapter you are removing.
 22. Place a 4 in the Opt field to the left of the line description and press Enter.
 23. Follow the instructions in your hardware documentation to remove the adapter card.
 24. Vary on the Windows server (described in "Starting Windows server from OS/400" on page 81).

Administer Windows server on iSeries

Now that you have installed Windows server on an Integrated xSeries Server, you need to know how to do some everyday tasks from OS/400. These tasks include:

-  "Starting and stopping Windows server on an Integrated xSeries Server for iSeries" on page 81

Note: Be sure to stop the server **before** "Avoid data loss when entering restricted state or powering down iSeries" on page 84 your server or installing applications that would cause it to power down automatically. Corruption of the server or network server storage spaces is possible if iSeries powers down before Windows server shuts down completely. 

- “Manage your Windows servers from OS/400” on page 85 from OS/400. See if the server is running, view information about CPU utilization, paging file usage, registry quota, and the number of server sessions. Change NWSD characteristics. Monitor Windows server event logs.
- “Print from Windows server on iSeries” on page 86
- “Run Windows server batch commands from OS/400” on page 86 remotely from your OS/400 console.

Starting and stopping Windows server on an Integrated xSeries Server for iSeries

You can stop and start Windows server on an Integrated xSeries Server from either your OS/400 or from the Windows server environment. However, if you shut down your server from OS/400, you must restart it from OS/400.





To start and stop your Windows server from OS/400, see:

- “Starting Windows server from OS/400”
- “Start Windows server without starting the external host LAN”
- “Shut down Windows server from OS/400” on page 82
- “Shut down Windows server on iSeries from Windows server” on page 83
- “Restart Windows server on iSeries from Windows server” on page 84

Starting Windows server from OS/400

If you shut down a Windows server from OS/400, you should also start the server from OS/400. If you shut down a server from the Windows server environment, you can “Restart Windows server on iSeries from Windows server” on page 84 the Windows server from either that environment or from OS/400. To start the Windows server from OS/400 in this situation, first “Shut down Windows server from OS/400” on page 82 on OS/400; then restart it (vary it on).

To start an Integrated xSeries Server by using iSeries Navigator, follow these steps: 

1. Expand **Network**.
2. Expand **Windows Administration**.
3.  Expand **Integrated xSeries Servers**.
4. Select the server you want to start by clicking on it. If you want to start all Windows servers, right-click within the Integrated xSeries Servers container and select **Start All**.
5.  Start the server either by right-clicking and selecting **Start** or by clicking the appropriate icon from the iSeries Navigator toolbar.

If you want to use CL commands, see WRKCFGSTS and VRYCFG.

If you have Windows disk drives in user disk pools, OS/400 automatically mounts that file system (and logs a message to QSYSOPR) when you start the server.

Note: Do not shut down the server immediately after starting it. Wait several minutes to allow Windows server to start completely. This also allows the Service Control Manager to alert you to any device failures or any service failures.

If you have problems with starting Windows server, see “Problems starting Windows server on iSeries” on page 141.

Start Windows server without starting the external host LAN

If you are using an earlier model of the Integrated xSeries Server that supports external host LAN, this information is for you. You can start Windows server without starting the external host LAN. You might find

this useful if you are trying to do OS/400 or Windows server maintenance, such as applying PTFs. To start Windows server without starting the external host LAN, do this:

1. On the OS/400 command line, type the command VRYCFG and press F4.
2. In the Configuration object field, type the name of the server that you want to start.
3. In the Type field, put *NWS.
4. Put *ON in the Status field and press Enter to get more parameters.
5. In the Start TCP/IP interfaces field, put *NO and press Enter.OS/400 starts the server you specified without starting the external host LAN.

Shut down Windows server from OS/400

When you shut down the server from OS/400, you are varying off the network server description (NWSD) for the server. If you shut down the server from OS/400, you must restart the server from OS/400 in order to vary the NWSD back on.

» To shut down an Integrated xSeries Server by using iSeries « Navigator, follow these steps:

1. Expand **Network**.
2. Expand **Windows Administration**.
3. » Expand **Integrated xSeries Servers**.
4. Select the server you want to stop by clicking on it. If you want to shut down all Windows servers, right-click within the Integrated xSeries « Servers container and select **Shut Down All**.
5. Shut down the server either by right-clicking and selecting **Shut Down** or by clicking the appropriate icon from the » iSeries« Navigator toolbar.
6. Click **OK** on the confirmation panel.

If you want to use CL commands, see WRKCFGSTS and VRYCFG.

Attention: Be careful to shut down the server **before** “Avoid data loss when entering restricted state or powering down iSeries” on page 84 your iSeries or installing applications that would cause it to power down automatically. Corruption of the server or server disk drives is possible if iSeries powers down before the Windows server shuts down completely.

» By default, the Windows server is allowed 15 minutes to shutdown completely before the file server resource is varied off. When Windows does not shutdown completely, the hardware resource is varied off abnormally which can cause the loss of data on the Windows server.

In some cases, the application load of either the iSeries and/or the Windows server may require that additional time is required to completely shutdown the Windows server. The wait time allowed for a Windows server to vary off can be adjusted from 15 seconds to 45 minutes (2700 seconds) using a supplied utility program.

The QHNAUTO program requires *IOSYSCFG special authority and accepts two parameters:

- The NWSD name
- The hex value for the number of seconds to wait

For example, if you want to specify that an NWSD allow 20 minutes for a vary off of the server to complete, the number of seconds is:

20 minutes times 60 seconds = 1200 seconds

The hex value for 1200 is 04B0, so the second parameter value is X'000004B0'. In this example, start the QHNAUTO program by using the following command:

```
CALL PGM(QHNAUTO) PARM(newsdname X'000004B0')
```

Details: Vary off a Windows server NWSD when OS/400 is sharing LAN adapters on the Integrated xSeries Server: ➤ If OS/400 is sharing the LAN adapters on the Integrated xSeries Server, you must either:

- End the external LAN interfaces that are running on OS/400 before you vary off the network server description (NWSD).
- Force the vary off.
- Use iSeries Navigator to shut down, which forces the vary off.



To **end the external LAN interfaces** (while leaving the internal LAN interface active), do this:

1. At the OS/400 command line, type CFGTCP and select option 1 to get to the Work with TCP/IP Interfaces screen.
2. Enter 10 on each external line description that is attached to the network server.

Attention: Be careful not to end the interface for the internal LAN (the line description that ends in 00) or OS/400 will not be able to communicate with the Windows server. For example, this user wants to end the shared external LAN interfaces for the NWSD named IF:

```

+-----+
|                                     |
|                               Work with TCP/IP Interfaces                               |
|                                     System:  SYSAS400                                     |
| Type options, press Enter.                                                     |
|   1=Add  2=Change  4=Remove  5=Display  9=Start  10=End                         |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| Opt  | Internet | Subnet | Line  | Line  |
|      | Address  | Mask   | Description | Type  | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
|      | 9.5.7.53 | 255.255.255.0 | TRLINE | *TRLAN |
| 10_ | 9.5.149.243 | 255.255.255.128 | IF01   | *ELAN  |
| 10_ | 9.5.149.245 | 255.255.255.128 | IF02   | *ELAN  |
| ___ | 192.168.1.3 | 255.255.255.0 | IF00   | *TRLAN |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
+-----+

```

➤ You can **force the vary off** in one of these ways:

- Respond G (for continue) to system inquiry message CPA2614 "Network server *nwsdname* cannot be varied off at this time. (C G)". (This message appears in the QSYSOPR message queue if you vary off the server without first ending the external LAN interfaces.)
- Specify FRCVRYOFF(*YES) on the Vary Configuration (VRYCFG) command to avoid this inquiry message:
 - At the OS/400 command line, type: VRYCFG CFGOBJ(IT) CFGTYPE(*NWS) STATUS(*OFF) FRCVRYOFF(*YES) Specifying *YES ends active jobs without issuing inquiry messages.

⏪ Then go back to "Shut down Windows server from OS/400" on page 82.

If you have problems trying to vary the server off, see the troubleshooting article on "Vary-off failures of Windows server on iSeries" on page 142.

Shut down Windows server on iSeries from Windows server

You can shut down Windows server from the Windows server environment.

Note: The preferred way to shut down a direct-attached xSeries Server with Integrated xSeries adapter is to perform a vary off on the iSeries server. If you perform a shut down on the xSeries server from Windows 2000 or Windows .NET Server, it will cause the server to power off. This appears to the iSeries server as an I/O tower powering off and leaving the HSL loop. This causes the iSeries server to go into HSL recovery mode.

Powering off multiple external servers could cause problems for other direct-attached xSeries Server towers on the high speed link (HSL) loop (a tower between two external servers that are

powered off would become isolated from the iSeries). If DASD were in this isolated tower it would cause the iSeries server to become inoperable and crash. Thus performing a vary off on the iSeries is the preferred method. Configuring your HSL loop with no iSeries I/O towers between pairs of Direct-attached xSeries Servers is also very important.

This shuts down the server, but does not vary off the network server description (NWSD) of the server. If you shut down from the Windows server environment, you should also restart from the Windows server environment. If you want to restart Windows server from OS/400 after shutting down with this method, you must first vary off the NWSD as described in "Shut down Windows server from OS/400" on page 82.

To shut down Windows server from the Windows server environment, follow these steps:

1. From the **Start** menu, choose **Shut Down**.
2. For Windows NT 4.0, select the **Shut down the computer** radio button. For Windows 2000, select **Shut down** from the drop-down box.

Tip:

When you install new software on Windows server or perform other Windows server-side maintenance, you may need to shut down, then immediately restart Windows server. In these cases, select the **Restart the computer** radio button (for Windows NT 4.0) or **Restart** from the drop-down box (for Windows 2000) instead.

3. You will also get a Shutdown Monitor Close Confirmation window. Click **Yes**.
4. You may get a Shutdown Confirmation window with the message: "Shutting down will stop the external host LAN, and will also end AS/400 communications. Continue?" If you are using the external host LAN for your OS/400 system and do not want to lose the connection, stop the shutdown by selecting **No**. Select **Cancel** if you never want this confirmation message to be displayed again. Otherwise, click **Yes**.

Restart Windows server on iSeries from Windows server

If you shut down Windows server from the Windows server environment, you can also restart it from the Windows server environment. If you shut down Windows server from OS/400, then you must restart it from OS/400. See "Starting Windows server from OS/400" on page 81 for instructions on starting a Windows server from OS/400.

If you have problems with starting the server, see the page on "Problems starting Windows server on iSeries" on page 141.

Avoid data loss when entering restricted state or powering down iSeries

➤ When you are running Windows server on an Integrated xSeries Server, always shut down the Windows server before subsystems enter a restricted state or before ending TCP/IP communication between OS/400 and the Windows server. If you do not shut down the Windows server, you risk losing Windows server data.

Using the command `PWRDWN SYS *IMMED` will not vary off NWSDs. The command `PWRDWN SYS *CNTRLD` initiates a vary off, but there is no guarantee that it will complete. You risk corruption of the server, or network server storage space, if iSeries powers down before the Windows server shuts down completely.

Ending subsystems with the `ENDSBS` or `ENDSYS` command has a similar effect. The `ENDSBS *IMMED` command will not vary off the NWSDs. The `ENDSBS *CNTRLD` command initiates a vary off, but there is no guarantee that it will complete. Corruption of the server or network server storage spaces is possible if subsystems are ended, or the iSeries powers down, before the Windows server shuts down completely.

If Network server storage spaces are allocated in an independent disk pool (ASP), and a reclaim storage is to be performed, you should take additional precautions. To avoid data corruption, servers that have storage allocated to the independent disk pool should be varied off before a reclaim storage is performed.



For information about shutting down Windows server on iSeries, see “Shut down Windows server from OS/400” on page 82.

Manage your Windows servers from OS/400


You can manage your Windows servers from OS/400.

- You can view, and in some cases change, the current “Manage properties for Windows server on iSeries” (attributes) of your Windows server from OS/400.
- You can “Display Windows server information on OS/400” and the status of Windows server resources.
- You can “Monitor Windows server event logs on OS/400” on page 86 from OS/400.
- You can manage line descriptions that are created when you install Windows server by using the Work with Line Descriptions command: `WRKLIND LIND(network-server-name)`.
- You can manage TCP interfaces that are created during the installation by using either of these commands:
 - Work with TCP/IP Network Status (NETSTAT) command, option 1
 - Configure TCP/IP (CFGTCP) command, option 1
- You can monitor system loads by:
 - Work with Disk Status: Type `WRKDSKSTS` and press Enter
 - Displaying a list of Windows disk drives and associated attributes

Manage properties for Windows server on iSeries

You can view, and in some cases change, the current properties (attributes) of your Windows server from OS/400. Properties that you can access include:

- Hardware name and type
- Windows server version, build, and service pack level
- iSeries Integration for Windows Server version, language version, and service packs
- Message logging information


To view or change current properties on the Windows server from OS/400 by using  iSeries  Navigator, follow these steps:

1. Expand **Network**
2. Expand **Windows Administration**
3. Select **Integrated xSeries Servers**
4. Right-click on the Windows server and select **Properties**
5. On the **Properties** dialog, click on any of the tabs to view or change the current properties of the server

If you want to use CL commands, see `WRKNWSD`, `CHGNWSD`, and `DSPNWSD`.

Display Windows server information on OS/400

From OS/400, you can display information about your Windows server and its operation. You can find out whether a Windows server on an Integrated xSeries Server is running. You can also check the status of resources that are associated with the server. You can see information about CPU utilization, paging file usage, registry quota, and the number of server sessions.

 To view or monitor the status of the Integrated xSeries Server by using **iSeries Navigator**, follow these steps :

1. Select **Network**
2. Select **Windows Administration**◀

If the server is not started, you can view system operator messages.

If you want to use CL commands, see WRKCFGSTS and WRKNWSSTS.

Monitor Windows server event logs on OS/400

You can monitor Windows server event logs from OS/400. Windows server event logs are recorded in the OS/400 job log or a message queue you specify. In case of problems with the Windows server, service personnel can then consult that record by way of a remote link to OS/400.

To view or change the way OS/400 records Windows server event logs by using ▶ iSeries ◀ Navigator, follow these steps:

1. Expand **Network**
2. Expand **Windows Administration**
3. Expand **Integrated xSeries Servers**
4. Right-click on the server you want and select **Properties**
5. Select the **Messages** tab and make any changes you want to the settings
6. Click **OK**

If you want to use the CL command, see CHGNWSD.

Note: If you propagate the security event log, be sure to set up the message queue with the proper security. You need to do this because the status of user logons and password changes might appear in the log.

If you have problems with unclear messages, see “Unreadable messages in the server message queue” on page 162.

Print from Windows server on iSeries

You can print from Windows server on Integrated xSeries Servers with the following methods:

- “Print from Windows server on iSeries to iSeries printers” on page 115
- Print to printers that are connected to the Windows server network
- Print to printers that are connected to the parallel port on the Integrated xSeries Server

Refer to your Windows server documentation for information about setting up and using the last two items in the above list.

Run Windows server batch commands from OS/400

You can use OS/400 to remotely submit Windows server batch commands. Windows server commands that can run in batch mode without user interaction will work.

Before submitting a remote command verify that the following is true.:

- The server is an Integrated xSeries Server on this OS/400 and is active.
- ▶ Your user profile is enrolled to the Windows server or domain, or you sign on with the QSECOFR profile.◀
- You have authority to run SBMNWSCMD, which requires *JOBCTL special authority. You must also have at least *USE authority to the QSYS/SBMNWSCMD *CMD object.
- The system value, QRETSVRSEC, must be set to 1, and users must sign on to OS/400 after the system value is set.

- The OS/400 user profile password, and Windows password must be equivalent. The easiest way to keep them consistent is to use User and Group enrollment. For more information, see “Administer Windows server users from OS/400” on page 98.

➤ Also, before submitting a remote command, refer to “Considerations for running Windows server batch commands from OS/400”.

To run Windows batch commands by using iSeries Navigator, follow these steps:

1. Select **Network**.
2. Select **Windows Administration**.
3. Select **Integrated xSeries Servers**.
4. Right-click on the server on which to run the batch command and select **Run Windows Command**.
5. On the Run Windows Command panel, type the Windows command to run (such as `dir \`).
Tip: You can select the command from a list of 10 commands that you have run previously on the server.
6. Click **OK** to run the command. ⏪

If you want to use the CL command, see SBMNWSCMD.

Note: A command using the Run Windows Command panel uses *PRIMARY as the authentication domain. For alternative domains use SBMNWSCMD.

Considerations for running Windows server batch commands from OS/400

➤ To remotely submit Windows server commands, keep these guidelines in mind:

Note: Many of the SBMNWSCMD parameters referenced in this section are not available when running Windows commands by using iSeries Navigator. If you need to use a parameter that iSeries Navigator does not support, then you must use SBMNWSCMD directly.

- The requested command is run under the Windows console command “cmd.exe.” SBMNWSCMD returns when “cmd” returns.
- The authentication domain field of SBMNWSCMD indicates the Windows domain where your user ID is to be authenticated. The default, *PRIMARY, logs on to the primary domain of the server, if the server is a domain member. *LOCAL logs on to the server itself. The name of a trusted domain may also be specified.
- The QSECOFR user profile is handled differently than all other user profiles. User authentication is not performed on Windows when SBMNWSCMD is run by the QSECOFR profile. The requested Windows command is run under the Windows Local System Account. The Local System Account is used even if the QSECOFR profile is enrolled. The Local System Account does not have a password and lacks network access rights. ⏪
- Do not use the “/u” parameter with the Windows “cmd” command.
- ➤ The Remote Command service and SBMNWSCMD are able to distinguish between ASCII multi-byte, and unicode output data and convert them as appropriate. ⏪
- You can combine Windows server commands into a single command string by using features of the Windows server “cmd.exe” command interpreter. For example, on the SBMNWSCMD command line, you can enter `net statistics workstation && net statistics server` to collect statistics.

However, commands that you combine in a single SBMNWSCMD request should not return mixed data (for example, a combination of ASCII and Unicode data), or data in mixed codesets. If the commands return different types of data, SBMNWSCMD may end abnormally with a message which indicates “a problem occurred in the data output conversion.” In that case, run the commands separately.

- Do not use characters that are not normally available from the Windows server keyboard. In rare cases, an EBCDIC character in the active job's coded character set may not have an equivalent in the active code page on Windows server. » Each different Windows application will give different conversion results. «
- The Submit Network Server Command does not completely initialize your logon environment. For Windows NT 4.0, it uses environment variables from the local system environment. For Windows 2000 and Windows .NET Server, the user's environment variables are set, but may not be completely equal to those provided by an interactive logon. Thus, environmental variables that an interactive logon normally sets to user-specific values may not exist or may be set to system default values. Any scripts or applications that rely on user-specific environmental variables may not operate correctly.
- » On Windows 2000 or Windows .NET Server, if a user profile exists, SBMNWSCMD will attempt to load it. You can then use commands that use or alter profile dependencies. However, there is no indication of profile load failures, beyond event log messages that may be produced by Windows. «
- If the home directory for your user ID on Windows server is mounted on the local server, the Submit Network Server Command sets the current directory to your home directory. Otherwise, it tries to use /home/default or the local system drive.
- You can use SBMNWSCMD to run Windows server applications as long as they do not require user intervention. The commands run in a background window, not on the Windows server console. If an application requests user intervention, such as popping up a message dialog, then SBMNWSCMD will hang, waiting for the Windows command to complete - but no intervention is possible. If you end SBMNWSCMD on OS/400, it will attempt to end the hung Windows command. However, on Windows NT 4.0, only a console command will terminate, a GUI command will not. The background GUI process can be ended via the NT Resource kit command: kill. On Windows 2000, the background command terminates whether GUI or console based.
- You can also run commands that require a **yes** or **no** reply to proceed. You do this by using input pipe syntax to provide the response. For example, echo y|format f: /fs:ntfs will let the format proceed after the **Proceed with Format** question raised by the format command. Note that the "y" and the pipe symbol "|" do not have a space between them.
- Not all Windows batch commands support the piping of input (for example, the "net" command). » Attempts to pass a default response may not be possible. «
- You can prevent SBMNWSCMD from logging the command. If the command string contains sensitive data, such as passwords, that you do not want logged in error messages, do the following:
 1. Specify *NOLOGCMD as the command string.
 2. When the Command (not logged) field appears, enter the command to execute in this field.

Note, however, that the *NOLOGCMD option does not affect data that the Windows server command returns. If the command returns sensitive data, you can use the command standard output (CMDSTDOUT) parameter to store the output in a secure location, such as an IFS file.
- You can direct standard output from the Windows server command to your job log (*JOBLOG), to a spool file (*PRINT), or to an integrated file system (IFS) object. Standard error data always goes to the job log.

» When you specify *PRINT, the Work with Spool File (WRKSPLF) display shows SBMNWSCMD in the User Data field for the spooled file. If you select option 8 to display the attributes, the names of the specified Windows server and Windows command appear in the user-defined data field.

When you specify an IFS object, the path name must already exist. If the IFS object name does not exist, SBMNWSCMD creates it. «
- In the Convert standard output field, you can specify (*YES) to convert output from the Windows server code set to the coded character set identifier (CCSID) of the OS/400 job.

» New IFS files will be created with the job CCSID. Output directed to an existing IFS object is converted to the IFS object CCSID. Output directed to a new member of an existing file in the /QSYS.LIB file system is converted to the existing file CCSID.

- If Convert standard output is (*NO), the Windows standard output will be written to the IFS object, or spool file, and will not be converted. <<

Go to “Run Windows server batch commands from OS/400” on page 86.

Manage storage

Instead of having its own hard disk drives, Windows server on an Integrated xSeries Server uses OS/400 disk storage for storing client data and sharing network files. A network server storage space is the disk storage that OS/400 allocates to the Integrated xSeries Server. Creating and formatting what Windows server perceives as disk drives for your applications and data involves creating network server storage spaces on OS/400. The way “OS/400 storage management” might influence your decisions about such issues as drive sizes, partitioning, and disk volumes. You can also read about “Predefined disk drives for Windows server on iSeries” on page 91 and “Disk drives for Windows server on iSeries” on page 90 storage spaces.

Running Windows servers on Integrated xSeries Servers helps you handle data storage in the following ways:

- By allowing you to use OS/400 to “Administer Windows disk drives from OS/400” on page 92.
- By giving you the option of “Use Windows disk management programs with Windows server on iSeries” on page 98 tools.

OS/400 storage management

This brief overview of OS/400 storage management concepts is intended for administrators who are more familiar with how Windows servers manage storage. Because OS/400 handles storage management differently than a PC, some techniques that you need in the PC world are unnecessary when you run Windows servers on the Integrated xSeries Server.

OS/400 and disk drives

OS/400, the operating system that runs on an iSeries, does not need to deal directly with disk drives. Beneath the operating system a level of software (called System Licensed Internal Code (SLIC)) “hides” the disk drives and manages the storage of objects on those disk drives. A virtual address space is mapped over the existing disk space and used for addressing objects rather than disk drive IDs, cylinders, and sectors. Needed objects are copied (“paged in”) from this address space on disk into the address space of main memory.

Because of the way OS/400 manages disk data, you do not generally need to worry about partitioning high-growth databases, defragmenting disks, or disk striping on your Integrated xSeries Server. The Integrated xSeries Server uses device drivers to share the OS/400 disk drives. These device drivers send and receive disk data to the OS/400 storage management subsystem. OS/400 storage management handles the hard disks, including spreading the Windows disk drive images across multiple hard disk drives and applying RAID and file mirroring (if configured). Disk defragmentation software manages logical file fragmentation of the hard disk images. Because OS/400 storage management handles these tasks, running a defragmentation program on the Integrated xSeries Server helps only in cases where “critical file system structures” can be defragmented.

Disk pools

» Administrators manage storage through the concept of disk pools. You can logically join hard disk units to form a disk pool and place objects into this disk pool. This disk pool is also called an auxiliary storage pool (ASP). Every system has at least one disk pool, the system disk pool (system ASP). The system disk pool is disk pool 1. You can configure additional user disk pools, numbered 2-255. You can use disk pools to distribute your OS/400 data over several groups of disks. You can also use this concept to move less

important applications or data to your older, slower disk drives. Support for independent ASPs (33-255) is provided through iSeries Navigator. Both the Information Center and iSeries Navigator refer to ASPs as Disk Pools. <<

Disk protection:

OS/400 disks can be protected in two ways:

- **RAID-5**

The RAID-5 technique groups several disks together to form an array. Each disk holds checksum information of the other disks in the same array. If a disk fails, the RAID-5 disk controller can re-create the data of the failing disk with the help of the checksum information on the other disks. When you replace the failing disk with a new one, OS/400 can rebuild the information from the failed disk on the new (and therefore empty) disk.

- **Mirroring**

Mirroring keeps two copies of data on two different disks. OS/400 performs write operations on both disks at the same time, and can simultaneously perform two different read operations on the two disks of a mirrored pair. If one disk fails, OS/400 uses information from the second disk. When you replace the failing disk, OS/400 copies the data from the intact disk to the new disk.

To further increase the level of protection, you can attach the mirrored disks to two different disk controllers. Then if one controller fails, and with it one set of disks, the other controller can keep the system up. On larger models of iSeries, you can attach controllers to more than one bus. Attaching the two disk controllers that form a mirrored pair to two different buses increases availability even more.

You can define disk pools on OS/400 to have different levels of protection or no protection at all. Then you can put applications and data into a disk pool with the right amount of protection, depending on how important their availability is. For more information about OS/400 disk protection and availability options,

read Backup and Recovery  .

Disk drives for Windows server on iSeries

Network server storage spaces are disk storage partitions that iSeries Integration for Windows Server makes available to Windows server. OS/400 contains network server storage spaces, but only the Windows server and its clients use them. Windows server uses and manages this OS/400 disk storage like a disk drive on a PC. It identifies each disk drive with a drive sequence number.

Windows server disk drives can reside in either the OS/400 system disk pool (ASP) or a user disk pool. You can statically link up to 16 disk drives. For Windows 2000 servers, an additional 16 disk drives can be linked either while the server is shut down or linked dynamically while the server is active. You can copy one disk drive to another to move it to a different disk pool.

If formatted with the NTFS file system, each disk drive that you create can be up to 64000 MB.

>> However, the predefined system (C) drive is limited to 8000 MB for servers installed on an Integrated Netfinity Server (6617, 2850) or installed with Windows NT 4.0. Integrated xSeries Servers (2890, 2892) and Integrated xSeries Adapter (2689) servers installed with Windows 2000 or Windows .NET are limited to 64000 MB. << If formatted with the FAT file system, each disk drive can be up to 2047 MB. The predefined installation source drive (drive D), which must remain FAT, is therefore limited to 2047 MB. Windows 2000 allows you to format disk drives as FAT-32, with a maximum size of 32000 MB and a minimum of 512 MB. The amount of disk storage you can attach depends on the total system storage available on OS/400.

Network server storage spaces are one of the two types of network storage that Windows server on iSeries uses. Windows server on iSeries can also access resources on OS/400 that an administrator has shared with the network by using >> iSeries << NetServer.

The iSeries Integration for Windows Server installation process creates several disk drives that are used to install and run Windows servers. See the topic on “Predefined disk drives for Windows server on iSeries”.

Predefined disk drives for Windows server on iSeries

For V4R5 and later releases, the iSeries Integration for Windows Server installation process creates two “Disk drives for Windows server on iSeries” on page 90 (network server storage spaces) for installing and running Windows servers. (Earlier releases created server storage spaces in QUSRSYS.) By default, OS/400 creates these disk drives in the system disk pool (ASP), but you can choose a different location during the installation. OS/400 also uses these disk drives to load and start the Windows server.

Servers first installed on V4R5 and later systems have these predefined disk drives:

Boot and Windows server system drive (C)

This drive contains the programs necessary to start the Windows server. For Version 4, Release 5 and later installations, this drive also serves as the system drive. OS/400 names this drive *server1*, where *server* is the name of the network server description (NWSD). This disk drive resides in the integrated file system and is automatically linked as the first user-defined drive.

The C drive is >> ranges from 1024 to 64000 MB, depending on the Windows version, server type, and install type. Server types 6617 and 2850 are limited to 8000 MB. 0 << You can choose to have Windows server convert the drive to NTFS, which Windows 2000 or Windows .NET Server require for Active Directory. If the C drive is 2047 MB or larger, OS/400 formats it as an NTFS drive. However, if you plan to create , be aware that support for NWSD configuration files exists only for predefined disk drives that are formatted as FAT. A system drive that has been converted to NTFS is not accessible for NWSD configuration files. For more information about the different file systems, see “Comparison of FAT, FAT32, and NTFS file systems” on page 26.

Installation source drive (D)

The D drive can be 200 - 2047 MB and holds the copy of the Windows server installation code and the iSeries Integration for Windows Server code. OS/400 names this drive *server2*, where *server* is the name of the NWSD. This disk drive resides in the integrated file system and is automatically linked as the second user-defined drive. OS/400 initially formats the D drive as a file allocation table (FAT) disk.

Attention: This drive must remain as a FAT drive. Do not make any changes to this drive. You use this drive to perform updates, and changing the drive can make performing updates impossible.

Servers upgraded from pre-V4R5 systems have these predefined disk drives:

Boot drive (C)

The boot drive contains the programs necessary to start Windows server. This drive must remain a FAT drive to ensure that the Integrated xSeries Server can write configuration information to it when it is varied on. Do not convert this drive to NTFS. The C drive is 10 MB, and OS/400 names this drive *server1*, where *server* is the name of the network server description (NWSD). This storage space resides in the QUSRSYS library.

Note: If the C drive is too small for a particular Windows server application that must be installed there, see “Remapping a full C drive on Windows server on iSeries” on page 137.

Installation source drive (D)

The source drive can be 200 to 1007 MB and holds the copy of the Windows server installation code and the iSeries Integration for Windows Server code. OS/400 names this drive *server2*, where *server* is the name of the NWSD. This disk drive resides in the QUSRSYS library. This drive must remain a FAT drive. Do not make any changes to this drive. You use this drive to perform updates, and changing the drive can make performing updates impossible.

System drive (E)

For servers first installed on pre-V4R5 systems, the E drive is the Windows server system drive. It can be 500 to 8000 MB and holds the installed copy of Windows server and the iSeries Integration for Windows Server code. OS/400 names this drive *server3*, where *server* is the name of the NWSD.

A system drive less than or equal to 1007 MB is created as a server storage space in QUSRSYS. Although you can convert this drive to the NTFS file system, leaving the drive as FAT increases the recovery options in case of a Windows server problem.

A system drive greater than 1007 MB is created as a network server storage space in the integrated file system and automatically linked as the first user-defined drive. By default, OS/400 creates it in the system disk pool (ASP), but you can customize this when you install Windows server. System drives greater than 2047 are too large to remain as FAT. During the installation, Windows server automatically converts them to NTFS and expands them to use all but the last cylinder of the disk image.

Note: If you plan to create your own , be aware that support for NWSD configuration files exists only for predefined disk drives that are formatted as FAT. A system drive that includes a network server storage object or that has been converted to NTFS is not accessible for NWSD configuration files.

Administer Windows disk drives from OS/400

Administering Windows disk drives (network server storage spaces) from OS/400 includes these tasks:

- “Access the OS/400 integrated file system from Windows server on iSeries”
- “Obtain information about disk drives for Windows server on iSeries”
- “Add disk drives for Windows server on iSeries” on page 93
- “Copy a disk drive” on page 96
- “Unlink disk drives from Windows server on iSeries” on page 96
- “Deleting disk drives for Windows server on iSeries” on page 97

If you install Windows server applications that require the C drive during installation and the current C drive is too small, Windows server on iSeries allows you to “Remapping a full C drive on Windows server on iSeries” on page 137. You might also want to look at “Back up the NWSD and disk drives associated with Windows server on iSeries” on page 117.

Access the OS/400 integrated file system from Windows server on iSeries

You can access the OS/400 integrated file system from Windows server through [» IBM iSeries Support for Windows Network Neighborhood \(iSeries NetServer\)](#). [«](#) This allows you to easily work with file system resources on OS/400. For information about using iSeries NetServer, see:

- [»](#) Create an iSeries NetServer file share
- Set up your PC client to use iSeries NetServer
- Access iSeries NetServer file shares with a Windows client [«](#)

For more information, see “Enabling iSeries NetServer” on page 26.

Obtain information about disk drives for Windows server on iSeries

If you want to know what percentage of a Windows disk drive (network server storage space) is in use or what its format is, you can obtain the information from OS/400.

To obtain disk drive information by using [» iSeries «](#) Navigator, follow these steps:

1. Expand **Network**

2. Expand **Windows Administration**
3. Select **Disk Drives**
4. Select a disk drive from the list available
5. Right-click the disk drive and select **Properties** or click the appropriate icon from the iSeries Navigator toolbar

If you want to use the CL command, see WRKNWSSTG.





Add disk drives for Windows server on iSeries

Creating and formatting what Windows server perceives as disk drives for your applications and data involves creating network server storage spaces on OS/400. For conceptual information about user-defined network server storage spaces, see “Disk drives for Windows server on iSeries” on page 90. To add a Windows disk drive (network server storage space), perform these tasks:

1. “Create disk drives for Windows server on iSeries”
2. Link disk drives for Windows server on iSeries (See “Link disk drives for Windows server on iSeries”)
3. “Format disk drives for Windows server on iSeries” on page 95

Create disk drives for Windows server on iSeries: Creating a Windows disk drive (network server storage space) is the first step toward adding disk space for Windows servers on Integrated xSeries Servers. The time that you need to create a disk drive is proportional to the size of the drive. After creating the disk drive, you must link (See “Link disk drives for Windows server on iSeries”) it to the network server description of your Windows server and “Format disk drives for Windows server on iSeries” on page 95 it before you can use it.

To create a Windows disk drive by using  iSeries  Navigator, follow these steps:

1. Expand **Network**.
2. Expand **Windows Administration**.
3. Right-click the **Disk Drives** folder and select **New Disk** or click the appropriate icon from the  iSeries
4.  Navigator toolbar. Specify a disk drive name and description.
5. If you want to copy data from another disk, select **Initialize disk with data from another disk**. Then select the source disk to copy data from.
6.  Specify the disk capacity.  See the online help for details on valid disk sizes associated with a particular file system format.
7. Select a disk pool (auxiliary storage pool) to contain the disk.
8. Click **OK**.
9. Link the new storage space (See “Link disk drives for Windows server on iSeries”) to the network server description of your Windows server.

If you want to use the CL command, see CRTNWSSTG.

Notes:

Creating a storage space creates a partition for the drive but does not format it.

Creating or starting a server with a disk drive in an independent disk pool (ASP) requires that the disk pool device is varied on.

Link disk drives for Windows server on iSeries: In order for Windows server to recognize disk drives (network server storage spaces), you must link them to your network server description (NWSD). You must “Create disk drives for Windows server on iSeries” a disk drive before you can link it. After you create and link a new disk drive, it appears as a new hard drive on Windows server. After creating the drive, you must first “Format disk drives for Windows server on iSeries” on page 95 before you can use it.

Disk drives can be linked to servers in one of the following ways:

1. Static disk drive links allow disk drives to be linked to the server using user specified link sequence positions. The order that the Windows server sees the drives is determined by the relative order of the link sequence positions. The Windows server must be shut down when adding a static disk drive link. This type of link is allowed for any version of Windows server. Up to 16 disk drives can be linked using the static type. The system defined drives created by the INSWNTSVR command are linked as static drives.
2. A cluster quorum resource disk drive link is used to link the cluster quorum resource disk drive to the servers in the cluster. This type of link is not allowed for Windows NT 4.0 servers or for the Integrated Netfinity Servers (6617 or 2850) resource types..
3. Cluster shared disk drive links allow a disk drive to be shared among clustered Windows 2000 or Windows .NET servers. This type of link is not allowed for Windows NT 4.0 servers or for the Integrated Netfinity Servers (6617 or 2850) resource types. Up to 15 disk drives can be linked as shared between the nodes that are clustered together. A shared drive can only be linked to nodes that share a common quorum resource drive. Drives of this type are available to all nodes that are joined together by the links of the cluster quorum resource. Each node has access to the shared drives under the control of Windows Cluster services running on each node.


NOTE:

Drives that are linked as shared should be linked to ALL nodes that are clustered together.


4. Dynamic disk drive links allow additional disk drives to be linked to a Windows 2000 or Windows .NET server using dynamically assigned link sequence positions. The disk link sequence position is assigned dynamically at the time that the disk is linked to an active server. The disk link sequence position can be specified, but it is not used until the server is restarted. The Windows server can either be shut down or active when adding a dynamic disk drive link. However, if adding a dynamic link to a server that is running on a type 2850 or 6617 Integrated Netfinity Server, then the server must be shut down and restarted in order for Windows to see the disk drive. This type of link is not allowed for Windows NT 4.0 servers.

When a Windows server is started, it sees the disk drives in the following order:

1. Statically linked disk drives
2. Cluster quorum resource disk drive
3. Cluster shared disk drives
4. Dynamically linked disk drives

Within each of these link type categories, the disks appear to Windows in the order of their user specified link sequence positions.  When dynamically linking a disk drive to an active server, the new disk drive appears to Windows server following all other linked disk drives.

To link a disk drive to a Windows server by using iSeries Navigator, follow these steps:

1. If you are not linking a disk drive dynamically, then “Shut down Windows server from OS/400” on page 82 your Windows server
2. In iSeries Navigator, expand **Network**
3. Expand **Windows Administration**
4. Select **Disk Drives**
5. Right-click an available disk drive and select **Add Link**, or select the drive and click the appropriate icon from the iSeries Navigator toolbar
6. Select the server to link the disk to
7.  Select one of the available link types and the link sequence position
8. Select one of the available data access types
9. Click **OK**

10. If you are not linking a disk drive dynamically, then “Starting Windows server from OS/400” on page 81 your Windows server

If you want to use the CL command, see ADDNWSSTGL.

If the disk drive is a new disk drive that has not previously been formatted, now you need to “Format disk drives for Windows server on iSeries”.

Managing disk drives when running out of drive letters:

The maximum number of disk drives that can be linked to a Windows 2000 or Windows .NET server is 32 disk drives (48 with cluster service). Since not all drives will have a drive letter, other options must be used to utilize all storage linked to the server. Here are two options to utilize all disk drives which are linked to a server.

1. A disk drive letter can be made up of multiple disk drives using a spanned volume set.
 - a. From **Disk Management**, right click on each disk drive number and select **Upgrade to Dynamic Disk...** from pop-up menu.
 - b. Right click on a disk drive partition and select **Create Volume...** from pop-up menu.
 - c. Follow the create volume wizard to create a Spanned volume making sure to add the multiple disks to the spanned volume. Note: This feature is nice because if the volume eventually gets full, a disk can be dynamically added, and immediately added to the spanned volume without ever requiring to reboot the server.
2. A disk drive can be mounted over a subdirectory of an existing disk drive letter.
 - a. Create a directory on a disk drive letter that is formatted with NTFS. For example, MD C:\MOUNT1.
 - b. From **Disk Management**, click over disk drive partition you wish to format and select **Format** from the pop-up menu.
 - c. Once drive is formatted, right click over disk drive partition again and select **Change Drive Letter and Path...** from pop-up menu.
 - d. Select **Add**.
 - e. Select radio button **Mount in this NTFS folder:**
 - f. Use **Browse** button to find directory C:\MOUNT1 that was created in step 1.
 - g. Click **OK** to make that directory a mount point for this disk drive.

Drives that are added to a Windows cluster have some additional special restrictions. The ADDNWSSTGL command may generate new message reason codes that indicate the following new additional errors:

- CPD8F81 - Network server storage space link cannot be added.
- RC = 1A - the storage is already linked to a server in a different windows cluster.
This indicates that an attempt to link a drive as shared was made but the NWSD does not have the same quorum resource as other node the drive is already linked to.
- RC = 1B - the storage is already linked to a server of different type than the server currently trying to link to. An attempt was made to link a drive to a NWSD of different types. This is not allowed.

Format disk drives for Windows server on iSeries: In order to use Windows disk drives (network server storage spaces), you must format them. Before you can format them, you must first “Create disk drives for Windows server on iSeries” on page 93 and link (See “Link disk drives for Windows server on iSeries” on page 93) the disk drives, then “Starting Windows server from OS/400” on page 81 the Windows server from OS/400.

NOTE:

Windows 2000 or Windows .NET servers running on an Integrated xSeries Server or Adapter can dynamically link storage spaces while the server is varied on using the Dynamic storage link parameter. <<

To format disk drives, follow these steps.

For Windows 2000 >> or Windows .NET Server:

1. On the Windows server console, from the **Start** menu, select **Programs**, then **Administrative Tools**, then **Computer Management**.
2. Double-click **Storage**.
3. Double-click **Disk Management**.
4. Select the drive letter that you wish to format. Click over it with the right mouse button and select **Format** from the pop-up menu.
5. Select the file system you specified when you created the storage space.
6. Follow the prompts to format the new drive.

For Windows NT 4.0:

1. On the Windows server console, from the **Start** menu, select **Programs**, then **Administrative Tools**, then **Disk Administrator**.
2. Select the drive letter that you wish to format. Click over it with the right mouse button and select **Format** from the pop-up menu.
3. Select the file system you specified when you created the storage space.
4. Follow the prompts to format the new drive.

Copy a disk drive

You can create a new Windows disk drive (network server storage space) by copying data from an existing disk drive.

To copy a disk drive by using >> iSeries << Navigator, follow these steps:

1. Expand **Network**.
2. Expand **Windows Administration**.
3. Select **Disk Drives**.
4. Select a disk drive from the list available.
5. Right-click the disk drive and select **New Based On** or click the appropriate icon from the iSeries Navigator toolbar.
6. Specify a disk drive name and description.
7. Specify the disk capacity. See the online help for details on valid disk sizes associated with a particular file system format. If you want to increase the size of the disk while copying it, you can specify a larger size. The extended portion of the disk will be unpartitioned free space.
8. Select a disk pool (auxiliary storage pool) to contain the disk.
9. Click **OK**.


If you want to use the CL command, see CRTNWSSTG.

Unlink disk drives from Windows server on iSeries

Unlinking Windows disk drives (network server storage spaces) disconnects them from Windows server, making them inaccessible to users. Because you can simultaneously link only 32 disk drives to a Windows 2000 >> or Windows .NET server (48 with cluster service) << and only 16 disk drives to a Windows NT 4.0 server, you may sometimes want to unlink disk drives that contain infrequently used data.



You also need to unlink disk drives if you are uninstalling Windows server from an Integrated xSeries Server. You need to unlink the disk drive objects ('nwsdname1' and 'nwsdname2') that OS/400 uses for the Windows server system and install drives.

To unlink a disk drive by using iSeries Navigator, follow these steps:

1. "Shut down Windows server from OS/400" on page 82 your Windows server.
2. In iSeries Navigator, expand **Network**.
3. Expand **Windows Administration**.
4. Select **Disk Drives**.
5. Right-click an available disk drive and select **Remove Link**, or select the drive and click the appropriate icon from the iSeries Navigator toolbar
6. Select a server from the list of linked servers.
7. If you are unlinking a disk drive that you  plan to relink, uncheck the **Compress link sequence** checkbox. You need to relink the disk drive as the same link sequence number before you vary on the server. By preventing compression of the link sequence values, you avoid having to unlink and relink all the disk drives to get them in the proper sequence.
8. Click **Remove**.
9. If you are uninstalling Windows server from an Integrated xSeries Server, your next step is to "Deleting disk drives for Windows server on iSeries". Otherwise, "Starting Windows server from OS/400" on page 81.

If you want to use the CL command, see RMVNWSSTGL.

Deleting disk drives for Windows server on iSeries

 Deleting a disk drive (network server storage space) destroys the data on the disk drive and frees the iSeries disk storage so that it can be used for other purposes. 



Before you can delete a disk drive, you must "Unlink disk drives from Windows server on iSeries" on page 96. Once you have unlinked it, you can delete it.

To delete the disk drive by using  iSeries  Navigator, follow these steps:

1. Expand **Network**
2. Expand **Windows Administration**
3. Select **Disk Drives**
4. Select a disk drive from the list available
5. Right-click the disk drive and select **Delete** or click the appropriate icon from the iSeries Navigator toolbar
6. Click **OK** on the confirmation panel

If you want to use the CL command, see DLTNWSSTG.

Deleting disk drives when removing a Windows server: When you manually remove a Windows server from an Integrated xSeries Server, you need to delete Windows disk drives (network server storage spaces) that are associated with the network server description (NWS) for that server. You can delete user-created disk drives that you own.

 The Delete Windows Server (DLTWNTSVR) command is provided to remove all objects created by the Install Windows Server (INSWNTSVR) command. It removes the network server description (NWS), line descriptions (LIND), storage spaces (NWSSTG, SRVSTG), TCP interfaces, controller descriptions (CTLD), and device descriptions (DEV). This is the recommended way to permanently remove a Windows server from the system. 

You also need to delete any disk drives that OS/400 predefined as the system drive and installation drive for your server. For NWSDs that were created in V4R5 or later, you need to delete the system drive, named nwsdname1, and the installation drive, named nwsdname2. For NWSDs that were created before V4R5 with a system drive larger than 1007 MB, you need to delete the system drive, named nwsdname3.

To find out what disk drives are associated with your server, see the topic “Obtain information about disk drives for Windows server on iSeries” on page 92

Use Windows disk management programs with Windows server on iSeries

You can use Windows disk management programs to administer your disk drives (network server storage spaces), just as if they were individual physical disk drives. Features such as assigning drive letters, partitioning, and volume set creation are fully functional. For Windows NT 4.0, you use Disk Administrator. For Windows 2000 [»](#) or Windows .NET Server, [«](#) you use Disk Management.

When using Windows disk management programs, consider the following:

- When you link user-defined disk drives, you can assign relative positions for the drives or have OS/400 do it automatically. OS/400 also assigns sequence numbers to the predefined disk drives.
- Unless you use Disk Administrator or Disk Management to assign the Windows server CD-ROM drive letter, the CD-ROM drive appears as the next available drive letter after all disk drives on the Windows server. If no user-defined disk drives are linked to your NWSD, the CD-ROM drive typically appears as drive F for NWSDs prior to V4R5 and drive E for V4R5 and later releases.
- It is possible to link up to 32 user-defined disk drives to each Windows 2000 [»](#) or Windows .NET Server (48 with cluster service) [«](#) and up to 16 user-defined disk drives to each Windows NT 4.0 server.

Administer Windows server users from OS/400

When you run Windows server on an Integrated xSeries Server, you can enroll existing OS/400 users and groups on Windows server. This permits you to administer one unified set of users and groups instead of both an OS/400 set and a Windows server set. This synchronization provides advantages to both the users and administrators. For a list of these advantages and other conceptual information about user and group enrollment, see “User and group enrollment to Windows server” on page 99.

Note: Some of the tasks listed below involve creating OS/400 user and group profiles, which requires *SECADM special authority.

Administering users and groups on Windows server on iSeries includes these tasks:

- Create a computer account on the domain for the new server. Use the network server description (NWSD) name as the computer name. See your Windows server documentation for information about creating computer accounts.
- “Enable OS/400 user enrollment on Windows servers” on page 100 by creating a QAS400NT user for each network server description (NWSD).

Note: Be sure not to delete this user or let the password expire. To minimize the effects of expired passwords among multiple systems on the same Windows server domain, you can choose to let only one system propagate changes to the QAS400NT user profile.

- “Enroll a single user to Windows server on iSeries” on page 102
- “Create user templates for Windows server on iSeries” on page 103 that you can use to enroll users in a group. Then you can simultaneously enroll multiple users on Windows server by “Enroll OS/400 groups to Windows server on iSeries” on page 106 After you enroll a group, users that you add to that group on OS/400 automatically enroll on Windows server.

- You can also “Enrolling only the members of OS/400 groups to Windows server on iSeries” on page 106 of an OS/400 group.
- “Check enrollment status” on page 107 of users and groups.
- “End user enrollment to Windows server on iSeries” on page 107
- “End group enrollment to Windows server on iSeries” on page 108

User and group enrollment to Windows server



Using OS/400 to enroll users and groups synchronizes characteristics of users and groups between OS/400 and Windows server. This synchronization provides advantages to both the users and administrators. These advantages include:

- Centralized (and thus simplified) control of user administration from OS/400. For enrolled users, changes that you make to passwords, password expiration dates, text, and enabled status on OS/400 also take effect on the Windows server side. Changes that you make to these fields from the Windows server side revert to their OS/400 values the next time you vary on or restart the Windows server.
- Management of only one set of users, rather than having to manage users both on OS/400 and Windows server
- The ability to use Windows server groups for security levels
- Only one password for users to remember and change

Notes:

1. The user should use OS/400 passwords containing only characters and password lengths allowed in Windows passwords if they want to enroll users. The password level of OS/400 can be set to allow for user profile passwords from 1-10 characters or to allow for user profile passwords from 1-128 characters. An OS/400 password level change of the system value QPWDLVL requires an IPL.
2. The OS/400 password level of 0 or 1 supports passwords from 1-10 characters and limits the set of characters. At level 0 or 1, OS/400 will convert passwords to all lowercase for Windows server.
3. The OS/400 password level of 2 or 3 supports passwords from 1-128 characters and allows more characters including upper and lower case characters. At level 2 or 3, OS/400 will preserve password case sensitivity for Windows server.
4. When the OS/400 passwords of enrolled users expire, their Windows server passwords also expire. Users can change their password on Windows server, but they must remember to also change their password on OS/400. Changing the OS/400 password first automatically changes the Windows server password.
5. If the OS/400 system value QSECURITY is 10, the Windows server users that are created do not require a password to sign on. All other OS/400 QSECURITY levels require that a user object have a password to sign on. You can find more information on security levels in the iSeries Security

Reference  .

6. Set QRETSVRSEC to 1 (see step 4 (See 44)). To successfully enroll, users must sign on to OS/400 after this system value is set to 1.
7. If you are using a language other than English, be aware that using anything but invariant characters in user profiles and passwords can cause unpredictable results.  The Globalization topic  contains information about what characters are in the invariant character set. This statement is only true when QPWDLVL is 0 or 1. When QPWDLVL is 2 or 3, invariant characters can be used without causing any problems.

You can enroll an OS/400 user or group as a user or group on Windows server. You can create users as any one of the following:

- Domain users to a Windows server domain
- Local users to a Windows server
- Users that are defined for a combination of domains and servers

Note: You can also enroll a user who already exists on Windows server. The password for the user must be the same on OS/400 as for the already existing Windows server user or group.

You can create groups as Windows server local or global groups and can enroll them to one or more Windows server domains or member servers. You can also enroll only the members of a group or enroll both the group and its members. You can customize the rights and properties a user receives during enrollment through the use of user “User enrollment templates” on page 105. If you do not use a template when you enroll users, they receive the following default rights and properties:



- Users become members of the AS400_Users group and either the Users group on a local Windows server or the Domain Users group on a Windows server domain.
- The system keeps the user’s OS/400 password, password expiration date, description text, and enabled status.

When you add users on OS/400 to a previously enrolled OS/400 group, you automatically create and enroll those users on Windows server.

Note: You can enroll users and groups to multiple domains, but usually this is unnecessary. In most Windows server installations, multiple domains set up trust relationships with each other. In such cases, you only need to enroll the user in one domain because trust relationships automatically give the user access to other domains. See your Windows server documentation for additional information about trust relationships.

Enable OS/400 user enrollment on Windows servers

To enable OS/400 user enrollment on Windows servers, create a QAS400NT user for each network server description (NWSD). To create a QAS400NT user for each NWSD, follow these steps:

1. Create QAS400NT user on  iSeries
2. Create QAS400NT on Windows domain or server that you wish to enroll users to. Note that the iSeries  password and Windows password must be the same for QAS400NT.
3. For a Windows server, add QAS400NT to the Administrators group on Windows. For a Windows domain, add QAS400NT to the Domain Admins group on Windows.
4. Enroll the QAS400NT user using the CHGNWSUSRA command to your Windows server or domain.

Doing this enables you to use templates with Universal Naming Convention (UNC) names (\\servername\sharename) for the home directory names. This is also necessary for successfully enrolling to the domain when the NWSD is not the Primary Domain Controller.

If the NWSD is a member of a domain or a domain controller, enroll QAS400NT only to the domain and put it in the Domain Admins group. If the NWSD is a server that is part of a workgroup rather than a domain, enroll QAS400NT only locally to that server and put it in the Administrators group.

Note: To give domain administrator rights to a Windows NT 4.0 non-domain controller, you must have Windows NT 4.0 service pack 3 or later installed on the primary domain controller. For the latest information about available Windows server service packs that IBM has tested with iSeries Integration for Windows Server, refer to the Applications topic on the IBM Windows Integration



Web site.

For a Windows 2000  or Windows .NET Server  domain controller:

To give QAS400NT domain administrator rights to the User Administration Service on a domain controller, follow these steps:

1. Click on **Start**
2. Select **Programs**
3. Select **Administrative Tools**

4. Select **Active Directory Users and Computers**.
5. Add the user QAS400NT to the Domain Administrators group or to the Administrators group (on a server that belongs only to a workgroup).

For a Windows 2000 >> and Windows .NET Server: <<

To give QAS400NT domain administrator rights to the User Administration Service on a local server or to the Administrators group (on a server that belongs only to a workgroup), follow these steps:

1. Click on **Start**
2. Select **Programs**
3. Select **Administrative Tools**
4. Select **Computer Management**,
5. Select **System Tools**
6. Select **Local Users and Groups**
7. Add the user QAS400NT to the Domain Administrators group or to the Administrators group (on a server that belongs only to a workgroup).

For Windows NT 4.0:

To give QAS400NT domain administrator rights to the User Administration Service on a backup domain controller or local server, follow these steps:

1. On the Windows NT 4.0 domain controller, use **User Manager for Domains** to create a domain user that is named QAS400NT.
2. Add the user QAS400NT to the Domain Admins group.

Notes:

1. If multiple Windows servers on Integrated xSeries Servers in the same OS/400 belong to different domains, you must perform this procedure for each domain. Each domain administrator QAS400NT must have the same password. Alternatively, consider using Windows server trust relationships between domains, and enroll users to only a single domain.
2. If multiple OS/400 with multiple Integrated xSeries Servers participate in a domain, each one needs to create a QAS400NT user profile with the same password. Failing to keep the password or account current on any of the systems can cause enrollment problems on all the systems. To minimize problems, you can choose to allow just **one** system to propagate changes to the "Limit QAS400NT user profile changes". Other systems retain sufficient authority to enroll users.
3. You can change the password for the domain administrator QAS400NT. To do so, you change the password from OS/400, since it is now an enrolled user. You must vary on the network server description for the Windows server that is connected to the domain when the password change occurs.

Limit QAS400NT user profile changes

If multiple iSeries with multiple Integrated xSeries Servers participate in a domain, each one needs to create a QAS400NT user profile with the same password. An expired password or account on any of the systems updates the QAS400NT user account on the Windows server domain and causes enrollment problems on all the systems. To minimize problems, you can choose to allow just **one** system to propagate changes to the QAS400NT user profile. Then failure to change a password on one of the other systems prevents user enrollment from only that system. Other systems retain sufficient authority to enroll users. >> There are two methods to limit QAS400NT user profile propagation. The first method is to use the PRPDMNUSR parameter of the Change network server description (CHGNWSD) or the Create network server description (CRTNWSD) command. The second method is to create data areas with the Create data area (CRTDTAARA) command.

To use the CHGNWSD or CRTNWSD commands to control user enrollment, do the following (This parameter controls all users' enrollment for the specified NWSD):

1. Select the NWSD on which you want to define enrollment.
2. For each NWSD that you want to end enrollment, use this command

```
CHGNWSD NWSD(nwsdname) PRPDMNUSR(*NO)
```

This “Code disclaimer information” on page 1 pertains to code examples.

To use the CRTDTAARA command to control user enrollment, do the following (This method controls only the QAS400NT user profile’s enrollment for the specified NWSD.): <<

1. Choose **one** iSeries to do all the propagation of the QAS400NT user profile.
2. On all other iSeries systems, create a data area with this command:

```
CRTDTAARA DTAARA(QUSRSYS/nwsdnameAU)
          TYPE(*CHAR)
          LEN(10)
          VALUE(' *NOPROP')
```

where *NOPROP is the keyword that signals that QAS400NT user profile parameters are not propagated from this system.

3. Then create and enroll the QAS400NT user profile on each system.

You still have to keep passwords current on all the systems.

Go back to “Enable OS/400 user enrollment on Windows servers” on page 100.

Use PRPDMNUSR to control user enrollment

>> If multiple NWSDs on an iSeries belong to the same Windows domain, domain user enrollment will, by default, go through all of the NWSDs on that domain. To reduce the network traffic, you can turn off domain enrollment on some NWSDs in that domain by using the PRPDMNUSR parameter of the Change network server description (CHGNWSD) or the Create network server description (CRTNWSD) command. This parameter controls all users’ enrollment for the specified NWSD.

To use the PRPDMNUSR parameter to control user enrollment, do the following:

1. Select the NWSD on which you want to define enrollment.
2. For each NWSD that you want to end enrollment, type CHGNWSD NWSD(nwsdname) PRPDMNUSR(*NO)


Notes:

1. Do not turn domain enrollment off for all of the NWSDs on your domain at one time. Your users may all go to update pending (*UPDPND) status.
2. You may want to have two NWSDs for domain user enrollment so that you can still make changes if one of the servers is down.
3. If you use a Windows NT 4.0 Primary Domain Controller or a Windows 2000 or Windows .NET Server domain controller, you may not need to set up QAS400NT. <<

Enroll a single user to Windows server on iSeries

You can enroll a single OS/400 user to Windows server. If you want to use a user template to enroll a user, you must create the user template before performing this procedure. You can also enroll users by using “Details: Enrolling users to Windows server on iSeries with network server attributes” on page 103.

Before enrolling users, you may want to read about “User and group enrollment to Windows server” on page 99.

Create an OS/400 user profile for the user if one does not already exist. You can find information about creating OS/400 user profiles in the iSeries Security Reference  .

To enroll a single user to Windows server by using iSeries Navigator, follow these steps:

1. Expand **Network**
2. Expand **Windows Administration**
3. Select **User Enrollment**
4. Right-click on an available Windows domain or server from the list
5. Select **Enroll Users**
6. Select the user from the list
7. (Optional) If you want to use a user template as a basis for user settings, specify a Windows user to use as a template when creating the user on Windows
8. Click **Enroll**

If you want to use the CL command, see CHGNWSUSRA.

Notes:

If you change the user template after you enroll a user, the changes will not affect the user.

This method adds the newly enrolled user to the Windows server group AS400 _Users, which contains all enrolled users.

Attention:

To avoid unpredictable results, do not enroll the same OS/400 user from multiple OS/400 systems to the same Windows domain. ➤ It is recommended that you select one OS/400 and define enrollment to the Windows domain and one network server description (NWS). You can do this by using the Change network server description (CHGNWS) command and specifying the PRPDMNUSR(*YES) or PRPDMNUSR(*NO) parameter. ⏪

If you have problems enrolling users, see “Failures enrolling users and groups on Windows server on iSeries” on page 143.

Details: Enrolling users to Windows server on iSeries with network server attributes

You can enroll users to the domains or servers that you specified in the network server attributes of Windows server. To do this, specify *NWSA in the Server and Domain fields of the Change NWS User Attributes display. You can set these attributes with the Change Network Server Attributes (CHGNWSA) command. Take care if you choose to enroll users to *NWSA instead of to specific domains or servers, however. If you do this, then later change the network server attributes, you may accidentally unenroll users from domains or

Create user templates for Windows server on iSeries

“User enrollment templates” on page 105 enable you to enroll OS/400 users and groups to Windows server with a predefined set of characteristics.

To create a user template on Windows server, follow these steps:

➤ For a Windows 2000 or Windows .NET Server domain:

Windows 2000 and Windows .NET Server ⏪ provide an MMC snap-in utility called Security Templates and some sample templates that you can use when you create your own templates. Consult Windows 2000 documentation for more information about Security Templates.


1. From the Windows server **Start** menu, select **Programs**, then **Administrative Tools**.
2. Select **Active Directory Users and Computers**.
3. Click on the domain name.
4. Right-click on **Users** and select **New**, then **User** from the menu.

5. In the **Username** and **Logon name** fields, enter a distinctive name for the template, such as *stduser* or *admtemp*. Enter any other descriptive information you want and click **Next**.
6. Enter a password, clear the **User must change password at next login** checkbox, and click **Finish**.
7. To set up group memberships, double-click on the template name in the list of domain users and groups that appears in the right pane. Click on the **Member of** tab, then **Add** to add the groups that you want.

You can make a user template a member of any Windows server group, whether you enrolled that group from OS/400 or not. You can enroll users with a template that is a member of a group that was not enrolled from OS/400. If you do this, however, the users become members of that non-enrolled group as well. OS/400 does not know about groups that were not enrolled from OS/400. This means that you can only remove users from the group by using the User Manager program on Windows server.

You might want to make the template a member of the AS400_Permanent_Users group to prevent accidentally deleting users that you enroll with this template.

For a Windows 2000  or Windows .NET Server:

Windows 2000 and Windows .NET Server  provide an MMC snap-in utility called Security Templates and some sample templates that you can use when you create your own templates. Consult Windows 2000 documentation for more information about Security Templates.

1. From the Windows server **Start** menu, select **Programs**, then **Administrative Tools**.
2. Select **Computer Management**.
3. Expand **System Tools**; then expand **Local Users and Groups**.
4. Right-click on **Users** and select **New User** from the menu.
5. In the **Username** and **Logon name** fields, enter a distinctive name for the template, such as *stduser* or *admtemp*. Enter any other descriptive information you want and click **Next**.
6. Enter a password, clear the **User must change password at next login** checkbox, and click **Create**, then **Close**.
7. Left-click on **Users** or refresh to show the new user template.
8. To set up group memberships, double-click on the template name in the list of domain users and groups that appears in the right pane. Click on the **Member of** tab, then **Add** to add the groups that you want.

You can make a user template a member of any Windows server group, whether you enrolled that group from OS/400 or not. You can enroll users with a template that is a member of a group that was not enrolled from OS/400. If you do this, however, the users become members of that non-enrolled group as well. OS/400 does not know about groups that were not enrolled from OS/400. This means that you can only remove users from the group by using the User Manager program on Windows server.

You might want to make the template a member of the AS400_Permanent_Users group to prevent accidentally deleting users that you enroll with this template.

For Windows NT 4.0:

1. From the Windows server **Start** menu, select **Administrative Tools (Common)**, then **User Manager**. The **User Manager** window appears.

Note: On domain controllers, you will find **User Manager for Domains** program instead of **User Manager** because of a name change.
2. From the **User** menu, click **New User...** The **New User** dialog box appears.
3. In the **Username** field, enter a distinctive name for the template, such as *stduser* or *admtemp*.
4. In the **Description** field, enter a description of the template.
5. Press the **Groups** button. The **Group Memberships** dialog box appears.

6. Using the **Add** and **Remove** buttons, place the template into groups. It will then appear in the **Member of:** list for a group.

You can make a user template a member of any Windows server group, whether you enrolled that group from OS/400 or not. You can enroll users with a template that is a member of a group that was not enrolled from OS/400. If you do this, however, the users become members of that non-enrolled group as well. OS/400 does not know about groups that were not enrolled from OS/400. This means that you can only remove users from the group by using the User Manager program on Windows server.

You might want to make the template a member of the AS400_Permanent_Users group to prevent accidentally deleting users that you enroll with this template.

7. Click **OK**. The **Group Memberships** dialog box disappears.
 - **Tip:** To make a complex template, refer to the sections on creating users in your Windows server documentation before completing this procedure.
8. Click **OK**.

User enrollment templates

You use user templates to enroll users from OS/400 to Windows server with a predefined set of characteristics. ➤ Each template is a Windows server user profile that defines user privileges, such as group membership, folder or directory paths, and organizational unit containers. ⏪

When you enroll users and groups from OS/400 to Windows server, you can specify a user template on which to base the new Windows server users. For example, you could create a user template and name it USRTEMP. USRTEMP could be a member of the Windows server groups NTG1 and NTG2. On OS/400 you could have a group called MGMT. You could decide to enroll the MGMT group and its members to Windows server. During the enrollment process, you could specify USRTEMP as the user template. During enrollment, you automatically add all members of the MGMT group to the NTG1 and NTG2 groups.

User templates save you the trouble of having to set up group memberships individually for each user. They also keep the attributes of multiple enrolled users consistent.

You can make a user template a member of any Windows server group, whether you enrolled that group from OS/400 or not. You can enroll users with a template that is a member of a group that was not enrolled from OS/400. If you do this, however, the users become members of that non-enrolled group as well. OS/400 does not know about groups that were not enrolled from OS/400. This means that you can only remove users from the group by using the User Manager program on Windows server.

➤ If you use a template to define a new user enrollment, and the template has a folder or directory "Path" or "Connect To" defined, the newly-created Windows user will have the same "Path" and "Connect To" definitions. The folder definitions allow the user administrator to take advantage of folder redirection and to manage terminal service sign on.

If you use a template when you define a new user enrollment, and the template is a user object in a Windows Active Directory organizational unit container, the newly created Windows user object will be in the same organizational unit container. An organizational unit provides a method to grant users administrative control to resources. ⏪

You can change existing user templates. Such changes affect only users that you enroll after you change the template.

You use templates only when you create a newly enrolled user on Windows server. If you perform enrollment in order to synchronize an existing Windows server user with his or her OS/400 counterpart, Windows server ignores the template.


Prevent accidental deletion of users from Windows server

Generally, when you end enrollment for a user or when you delete an enrolled user from OS/400, you automatically delete that user from Windows server. Any users that you accidentally delete from Windows server and then restore lose all special properties that you added to the user from Windows server.

To avoid automatically deleting Windows server users, you can enroll users with a user template that is a member of the AS400_Permanent_Users group. You cannot accidentally delete any users that you create with that template. Even ending the enrollment of the user or deleting the user from OS/400 does not automatically delete the user from Windows server. However, synchronization of the Windows server user with the OS/400 user does stop when enrollment ends or you delete the user on OS/400.

Note: You cannot place a group in the AS400_Permanent_Users group.

Enroll OS/400 groups to Windows server on iSeries

If it does not already exist, create the OS/400 group. You can find information about creating OS/400 user and group profiles in the iSeries Security Reference  .

To enroll an OS/400 group and its members to Windows server by using iSeries Navigator, follow these steps:

1. Expand **Network**.
2. Expand **Windows Administration**.
3. Select **User Enrollment**.
4. Right-click on an available Windows domain or server from the list.
5. Select **Enroll Groups**.
6. Select the group from the list.
7. To use a template to create new users, specify a Windows user to use as a template when creating users in the group on Windows.
Note: If you change the user template after you enroll a user, the changes do not affect the user.
8. Select **Global** if the group is being enrolled to a domain and the group should be visible to the domain. Otherwise, select **Local**.
Note: Windows server local groups can contain users and Windows server global groups, while Windows server global groups can contain only users. See your Windows server online help for more information about group types.
9. Click **Enroll**.

Note: The method described above adds all users in the newly enrolled group to the Windows server group AS400_Users, which contains all enrolled users.

For details, see “Prevent accidental deletion of users from Windows server” “Details: Enrolling users to Windows server on iSeries with network server attributes” on page 103.

If you have problems enrolling groups, see “Failures enrolling users and groups on Windows server on iSeries” on page 143.

If you want to use the CL command, see CHGNWSUSRA.

Enrolling only the members of OS/400 groups to Windows server on iSeries

You can use a user template to enroll all of the users in a group. To do this, you must create the user template before performing the enrollment procedure. See “Create user templates for Windows server on iSeries” on page 103 for information about creating templates.

To enroll only the members of an OS/400 group to Windows server without creating the group as a Windows server group, follow these steps:

1. Type CHGNWSUSRA PMTCTL(*WINDOWSNT) on OS/400 command line and press F4. The Change NWS User Attributes display appears.
2. In the User Profile field, type the name of the group whose members you want to enroll.
3. In the Profile Type field, type *GROUP.
4. Press Enter. More parameters appear following Prompt Control.
5. In the Propagate group members field, type *MBRONLY.
6. You can enroll users to a Windows server domain or to a Windows server, or both. To enroll to a domain, in the Domain field of the Windows server domain list, type the name of the domain you want to enroll to.
7. To enroll to a server, type the server name in the Server field of the Windows server list section.
8. (optional) You can use a user template to create the new users on Windows server. To do this, type the name of the template in the User Template field of the section you used in Step 6.



Note: If you change the user template after you enroll a user, the changes will not affect the user. Only new users created on Windows server use the template.

9. Press Enter.

Note: The above method adds newly enrolled users to the Windows server group AS400_Users, which contains all enrolled users.

For details, see “Prevent accidental deletion of users from Windows server” on page 106 and “Details: Enrolling users to Windows server on iSeries with network server attributes” on page 103.

Check enrollment status



To check the enrollment status of users and groups for a Windows server by using  iSeries  Navigator, follow these steps:

1. Expand **Network**
2. Expand **Windows Administration**
3. Expand **User Enrollment**
4. Expand the domain or server that contains the selected user or group
5. Expand either the **Users** folder or the **Groups** folder to see the enrollment status for the user or group, respectively

If you want to use the CL command, see WRKNWSEN

End user enrollment to Windows server on iSeries

Before ending a user's enrollment, consider the “Effects of ending user enrollment to Windows server on iSeries” on page 108. If you want to ensure against accidentally deleting a user when you end that user's enrollment, first see “Prevent accidental deletion of users from Windows server” on page 106.

To end the enrollment of a user to Windows server domains and servers (when the user changes departments, for example) by using  iSeries  Navigator, follow these steps:

1. Expand **Network**
2. Expand **Windows Administration**
3. Expand **User Enrollment**
4. Expand the domain or server that contains the user that you want to unenroll
5. Select **Users**
6. Right-click the user that you want to unenroll

7. Select **Unenroll**
8. Click **OK** on the confirmation window

If you want to use the CL command, see CHGNWSUSRA.

Effects of ending user enrollment to Windows server on iSeries

You can end the enrollment of a user to a Windows server on an Integrated xSeries Server. When you do this, you also remove the user from the list of enrolled Windows server users, as well as from the Windows server group AS400_Users. Unless the user is a member of the Windows server group AS400_Permanent_Users, you also delete the user from Windows server.

You cannot delete users who are members of the Windows server group AS400_Permanent_Users from Windows server by either ending enrollment or deleting them from OS/400. However, ending enrollment does remove the user from the list of enrolled Windows server users and from the Windows server group AS400_Users.

You can keep users on Windows server after you have ended their enrollment on OS/400. We do not recommend this practice, however. This makes it possible to add these users to groups on OS/400 and change passwords on OS/400 without these updates ever appearing on Windows server. These discrepancies can make it difficult to keep track of users on either system.

You can end user enrollment in a number of ways. Actions that end user enrollment include the following:

- Intentionally ending enrollment for the user.
- Deleting the OS/400 user profile.
- Ending enrollment for all OS/400 groups to which the user belongs.
- Removing the user from an enrolled OS/400 group when the user does not belong to any other enrolled groups.
- Changing the WNTDMNLST or WNTLCLSVRL parameter in the Network Server Attributes (NWSA) when either the user or one of its groups refers to the NWSA.

End group enrollment to Windows server on iSeries

» You can end enrollment of a group to Windows server when the group gets reassigned to a new project, for example. « This ends the enrollment of the group and of all users who were enrolled through that group. Before ending a group enrollment, consider the “Effects of ending group enrollment to Windows server on iSeries” on page 109.

To end the enrollment of a group to Windows server domains and servers, by using » iSeries « Navigator, follow these steps:

1. Expand **Network**
2. Expand **Windows Administration**
3. Expand **User Enrollment**
4. Expand the domain or server that contains the group that you want to unenroll
5. Select **Groups**
6. Right-click the group that you want to unenroll
7. Select **Unenroll**
8. Click **OK** on the confirmation window

If you want to use the CL command, see CHGNWSUSRA.

Effects of ending group enrollment to Windows server on iSeries



When you end enrollment of a group to Windows server on an Integrated xSeries Server, all users whose enrollment is limited to that group also have their enrollment ended. If the group has only members that were enrolled through it, the group is deleted from Windows server.

However, if the group has any members that were added from Windows server rather than enrolled from OS/400, the group is not deleted from Windows server. The only members that group can still have are non-enrolled users.

Share devices

One advantage to using Windows servers on one or more Integrated xSeries Servers is the ability to use iSeries devices. You can use iSeries optical drives, tape drives, and printers from your Windows server.

Accessing iSeries devices includes these tasks:

- OS/400 and Windows server refer to devices by different names, so you first need to learn the appropriate “Determine the device description and hardware resource names for iSeries devices” you plan to use.
- To use  an “Use iSeries optical drives with Windows server on iSeries”  from Windows server, vary it on from OS/400.
- See articles on “Use iSeries tape drives from Windows server” on page 110 for information about allocating drives to Windows server, formatting tape, transferring the drives between servers, and transferring drives back to OS/400.
- Read about “Print from Windows server on iSeries to iSeries printers” on page 115.

Determine the device description and hardware resource names for iSeries devices

When you refer to iSeries devices on OS/400, you need to use their device description name. When you refer to those devices from Windows server, you need to use their hardware resource name. If the names are different and you use the wrong name, you get the wrong device.

To determine the hardware resource name and see whether it is the same as the device description name, follow these steps:

1. On the OS/400 command line, type `DSPDEVD device_description_name` and press Enter.
2. The Resource name field has the hardware resource name for this device. Check to see if it has the same name as the Device description field. If the names are different, you must remember to use the appropriate name when you are working from Windows server and when you are working from OS/400.

Some tape devices report in under more than one device description. Tape libraries (3590, 3570, and so forth) report in as devices (TAPxx) as well as tape libraries (TAPMLBxx), where xx is a number. iSeries Integration for Windows Server does not support tape libraries. Therefore, if your device has a tape library description, both the tape device and tape library device must be in a varied off state before locking the device on the Windows server.

Use iSeries optical drives with Windows server on iSeries

Windows server can use the iSeries optical drive just as it does a local optical drive. The iSeries optical drive appears as a normal local optical drive in **My Computer** in Windows server.



If you have logical partitions on your iSeries, the optical drive is allocated to a single partition. It cannot be shared by Windows servers that are in other partitions and the optical drive must be allocated (locked) to a NWSD to be used.

The optical drive must be varied on before you can allocate it to a Windows Server. If the optical drive is not varied on, follow these steps to vary it on:

1. At the OS/400 command line, type WRKCFGSTS *DEV *OPT and press Enter.
2. In the Opt column next to the desired optical device, typically OPT01, type 1 to vary on the optical drive.
3. Press Enter and the optical drive varies on.

To lock an optical drive, follow the steps below:

For Windows 2000  and Windows .NET Server .

1. Click **Start**, then **Programs**, then **IBM iSeries**, then **Integration for Windows Server**.
2. Expand **Integration for Windows Server**.
3.  Expand the Network Server Description name.
4. Select **iSeries Devices** .
5. Select the device name.
6. Right-click and select **All Tasks, Lock Device**.

For Windows NT 4.0:

1. From the **Start** menu on Windows server, choose **Programs**, then **AS400 Windows Server**, then **AS400 Devices**.
2. In the **AS400 Available Devices list**, click on the device name of your iSeries optical drive.
3. Click **Lock** to make the optical drive accessible to Windows server. Windows server can now use the device.
4. Click **Done** to close the AS400 Devices program.

If you have any problems using the iSeries optical drive from Windows server, see “Optical device problems on Windows server on iSeries” on page 138.

Note: If the Windows Server fails before unlocking an optical device (or varying off the server), the optical device will be unavailable to OS/400 or other Windows Servers. You will need to vary off the optical device using WRKCFGSTS *DEV *OPT and vary it back on to free the lock.

Use iSeries tape drives from Windows server

iSeries tape drives can perform significantly faster than drives you normally attach to a PC server. You can allocate “Supported iSeries tape drives” on page 111 to the integrated Windows server.

Because multiple integrated Windows servers in the same iSeries system can all access the same tape drive (although not at the same time), you need to allocate only one tape drive for multiple Windows servers.

Notes:

1. Although you can dedicate tape drives to the integrated Windows server and to OS/400, both systems cannot simultaneously use the same tape drive. The two operating systems require different tape formats. You cannot use the same tape for both Windows server and OS/400 without reformatting it.
2. If you have logical partitions on your iSeries, the tape drive is allocated to a single partition. It cannot be shared by Windows servers that are in other partitions.

To use an iSeries tape drive from Windows server  you must perform the following tasks: 

- “Format a tape on OS/400 for Windows server” on page 111 for use on Windows server.
- “Allocate the iSeries tape drive to Windows server on iSeries” on page 112 an iSeries tape drive to Windows server by varying off the tape drive from OS/400 and locking it on the Windows server.

- “Transfer control of the iSeries tape and optical drives between Windows servers” on page 113 an iSeries tape drive to a different Windows server.
- “Return control of a tape drive from Windows server to iSeries” on page 114 a tape drive from Windows server so that OS/400 can use it. Ensure that you have a correctly formatted tape.

If you have problems with an iSeries tape drive, see “Tape problems on Windows server on iSeries” on page 139.

Supported iSeries tape drives

Your ability to use iSeries tape drives from Windows server depends on tape device model, tape controller, and media type. Use these guidelines to determine if you can use a particular tape device:

Extensive testing has been done on these devices:

- 3570 — 8mm Tape Cassette Subsystem
- 3590 — 1/2" Cartridge High Performance Tape Subsystem
- 6385 — 13G 1/4" Cartridge Tape Unit

Other supported tape devices are:

- 1/4" cartridge tape device that has a device type of 63A0 and 6385
- 3494 L1, D12
- 3570 B00, B01, B11, B1A, B02, B12
- 3570e C00, C01, C11, C1A, C02, C12
- >> 3580
- 3581
- 3583
- 3584 <<
- 3590 B11, B1A, B21, B2A
- 3590e B21, B2A, E01, E11, E1A
- 6381
- 6382
- >> 6383 <<
- 6385
- 6386
- 6390
- All 7208s
- 9427, 210, 211, 310, 311

Tape libraries are not supported as libraries, but they may be supported as single devices.

>> Manual and automatic modes are both supported on Auto Cartridge Facilities (ACF) and Auto Cartridge Loaders (ACL). If the ACL or ACF is in automatic mode the next tape will be loaded automatically if the backup application ejects the full tape. The Windows Backup Utility does this automatically with no user intervention. Veritas' Backup Exec displays a dialog box that displays the following "Please remove the media from the drive, and Respond OK." Clicking **Respond OK** in this dialog box causes the backup to continue normally. <<

Format a tape on OS/400 for Windows server

To use iSeries tape drives on Windows server, you must format a tape that Windows server recognizes. To produce a non-labeled tape acceptable to Windows server, use the OS/400 Initialize tape (INZTAP) command.

This “Code disclaimer information” on page 1 pertains to code examples.

To format a tape, do the following:

- Put the tape you want to use in the iSeries tape drive.
- At the OS/400 command line, type:

```
INZTAP DEV(tap01) NEWVOL(*NONE) NEWOWNID(*BLANK) VOL(*MOUNTED)
CHECK(*NO) DENSITY(*CTGTYPE) CODE(*EBCDIC)
```

where *tap01* is the name of your tape drive. Press Enter.

Allocate the iSeries tape drive to Windows server on iSeries

To use an iSeries tape drive from the Windows server console, you must vary it off on OS/400 and lock it on Windows server. You must lock the device before starting applications or their services.

This “Code disclaimer information” on page 1 pertains to code examples.

Note: Some tape devices report in under more than one device description. Tape libraries (3590, 3570, and so forth) report in as devices (TAPxx) as well as tape libraries (TAPMLBxx), where xx is a number. iSeries Integration for Windows Server does not support tape libraries. Therefore, if your device has a tape library description, you must vary off both the tape device and the tape library device before locking the device on the Windows server.

To transfer control of the iSeries tape drive to a Windows server, follow these steps:

1. Vary off the tape drive on OS/400:
 - a. At the OS/400 command line, type WRKCFGSTS *DEV *TAP, and press the Enter key. The Work with Configuration Status display appears.
Note: WRKCFGSTS *DEV *TAPMLB will bring up a list of the tape library devices.
 - b. In the Opt column next to the device name of your tape drive, type 2 to vary off the tape drive.
 - c. Press Enter. The tape drive varies off.
2. Lock the tape device on Windows server:

For Windows 2000 >> or Windows .NET Server:<<

- a. From the **Start** menu, choose **Programs**, then **IBM iSeries**, then **Integration for Windows Server**
- b. Expand **Integration for Windows Server** .
- c. >> Expand the Network Server Description name.<<
- d. Select >> **iSeries Devices**.
- e. Select the tape object that you want to lock.
- f. Right click and select **All Tasks, Lock Device.<<**


For Windows NT 4.0:

- a. From the **Start** menu on Windows server, choose **Programs**, then **AS400 Windows Server**, then **AS400 Devices**.
 - b. In the **AS400 Available Devices** list, click on the device name of your iSeries tape drive.
 - c. Click **Lock** to make the tape drive accessible to Windows server. Windows server can now use the tape device.
 - d. Click **Done** to close the AS400 Devices program.
3. If you need other information about the tape device to enable an application to recognize it, see “Identify iSeries tape devices for applications” on page 113. If you have problems, see “Tape problems on Windows server on iSeries” on page 139.

Identify iSeries tape devices for applications: Applications do not refer to tape devices by device description or hardware resource name as OS/400 does. Instead they show tape devices in one of three ways:

- Manufacture-feature-model number
- Device map
- Port-bus-target id-lun

If you need these values, do this:

For Windows 2000  or Windows .NET Server:

1. Click **Start**, > **Programs** > **Administrative Tools** > **Computer Management**.
2. Click on **System Tools**.
3. Click on **Device Manager**.
4. Double-Click on **Tape Devices**.
5. Right-Click on a tape device.
6. Select **Properties**.
7. The properties box has two tabs, one marked **General** and one marked **Driver**. The General tab shows the OS/400 manufacture-feature-model number and the Bus Number, Target ID and LUN.

For Windows NT 4.0:

1. On Windows server, click **Start**, **Settings**, then **Control Panel**.
2. Double-click on **Tape Devices**.
3. Click on the **Properties** button.
4. The properties box has two tabs, one marked **General** and one marked **Settings**. The General tab shows the OS/400 manufacture-feature-model number and the device map number on Windows server. The Settings tab shows the manufacture-feature-model number and the port-bus-target id-lun numbers.

If all the tape devices on your iSeries are of different types, this information is enough to distinguish between them in Windows server applications. If you have multiple tape devices of the same manufacture-feature-model number, you must experiment to determine

Transfer control of the iSeries tape and optical drives between Windows servers

If you have multiple Windows servers that run on multiple Integrated xSeries Servers, only one server at a time can use the iSeries tape or optical drive. To transfer control of tape and optical from one server to another, you must unlock it on one server and lock it on the other.

Note: If you have logical partitions on your iSeries, the tape and optical drive is allocated to a single partition and cannot be shared by Windows servers that are in other partitions.

To transfer control of an iSeries tape or optical drive between Windows servers, follow these steps:

Unlock the tape or optical drive from the Windows server that has it locked.

For Windows 2000  or Windows .NET Server: 

1. Click **Start**, then **Programs**, then **IBM iSeries**, then **Integration for Windows Server**
2. Expand **Integration for Windows Server**
3. Expand the **Network Server Description** name
4. Select **iSeries Devices**
5. Select the device that you want to unlock.
6. Select **Action**, then **All Tasks**, then **Unlock Device**

For Windows NT 4.0:

1. From the **Start** menu on the first Windows server, choose **Programs**, then **AS400 Windows Server**, then **AS400 Devices**.
2. In the **NT Available Devices** list, click the resource name of the iSeries device to be unlocked.
3. Click **Unlock** to free the tape or optical drive for use by a second Windows server.
4. Click **Done**.

On the Windows server that you want to give control, lock the tape or optical drive.

For Windows 2000 >> or Windows .NET Server: <<

1. Click **Start**, then **Programs**, then **IBM iSeriesPrograms**, then **Integration for Windows Server**
2. Expand **Integration for Windows Server**
3. Expand the **Network Server Description** name
4. Select **iSeries Devices**
5. Select the device that you want to lock.
6. Select **Action**, then **All Tasks**, then **Lock Device**.

For Windows NT 4.0:

1. From the **Start** menu on the second Windows server, choose **Programs**, then **AS400 Windows Server**, then **AS400 Devices**.
2. In the **AS400 Available Devices** list, click on the resource name of the iSeries device.
3. Click **Lock** to make the device accessible by this Windows server.
4. Click **Done**. This server can now use the iSeries tape or optical drive.

Return control of a tape drive from Windows server to iSeries

You can reallocate an iSeries tape drive from Windows server to iSeries. To use the tape drive from OS/400, you must first unlock it from Windows server and vary it on from OS/400. To unlock the tape drive from Windows server, you must either be the person who originally locked the drive or have Administrator or Backup Operator authority.

To transfer control of the iSeries tape drive from a Windows server to iSeries, follow these steps:

For Windows 2000 >> or Windows .NET Server: <<

1. Click **Start**, then **Programs**, then **IBM iSeries**, then **Integration for Windows Server**
2. Expand **Integration for Windows Server**
3. >> Expand the **Network Server Description** name.<<
4. Select **iSeries Devices**.
5. Select the tape object that you want to lock.
6. Select **Action**, then **All Tasks**, then **Unlock Device**.
7. >> At the OS/400 command line, type WRKCFGSTS *DEV *TAP, and press Enter. The Work with Configuration Status display appears.
8. In the Opt column next to the tape drive device name (e.g., TAP01), type 1 to vary on the tape drive.
9. Press Enter and the tape drive varies on.
10. Change the tape to one formatted for OS/400. <<

For Windows NT 4.0:

1. From the **Start** menu on Windows server, choose **Programs**, then **AS400 Windows Server**, then **AS400 Devices**.



2. In the **NT Available Devices** list, click on **TAP01**, where TAP01 is the resource name for the iSeries tape drive.
3. Click **Unlock** to make the tape drive available to OS/400.
4. Click **Done**.
5. At the OS/400 command line, type WRKCFGSTS *DEV *TAP, and press the Enter key. The Work with Configuration Status display appears.
6. In the Opt column next to TAP01, type 1 to vary on the tape drive.
7. Press Enter and the tape drive varies on.
8. Change the tape to one formatted for OS/400.

Return control of an optical device from Windows server to iSeries

You can reallocate an iSeries optical drive from Windows server to iSeries. To use the optical drive from OS/400, you must first unlock it from the Windows server. To unlock the optical drive from the Windows server, you must either be the person who originally locked the drive or have Administrator or Backup Operator authority.

To transfer control of the iSeries optical drive from a Windows server to iSeries, follow these steps:

For Windows 2000  or Windows .NET Server : 

1. Click **Start**, then **Programs**, then **IBM iSeries**, then **Integration for Windows Server**.
2. Expand **Integration for Windows Server**.
3.  Expand the **Network Server Description** name.
4. Select **iSeries Devices**.
5. Select the device that you want to unlock.
6. Right click and select **All Tasks**, then **Unlock Device**.

For Windows NT 4.0:


1. From the **Start** menu on Windows server, choose **Programs**, then **AS400 Windows Server**, then **AS400 Devices**.
2. In the **NT Available Devices**, click on **OPT01**, where OPT01 is the resource name for the iSeries optical drive.
3. Click **Unlock** to make the optical drive available to OS/400.
4. Click **Done**.

Print from Windows server on iSeries to iSeries printers

To send a print job to OS/400, you must set up the OS/400 printer for TCP/IP printing. You must also set up the Windows server to use that printer through the LPD/LPR protocol. Your Windows server system must also have the **Microsoft TCP/IP Printing** Network Service installed. See your Windows server documentation for more information about TCP/IP Printing.



To set up Windows server on an Integrated xSeries Server to print to OS/400 printers, perform these tasks:

1. Set up the OS/400 printer for TCP/IP printing. For more information, see TCP/IP Configuration and

Reference  .

2. Set up Windows server to print to OS/400 printers:

For Windows 2000  or Windows .NET Server:

- a.  From the **Start** menu on Windows 2000 or Windows .NET Server, click  **Settings**, then **Printers**. The **Printers** window appears.
- b. Double-click the **Add Printer** icon. The **Add Printer Wizard** starts.

- c. Click the **Network Printer** button.
- d. On the **Locate your Printer** panel, type the printer name or click **Next** to browse for the printer.

For Windows NT 4.0:

- a. From the **Start** menu on Windows NT 4.0, click **Settings**, then **Printers**. The **Printers** window appears.
- b. Double-click the **Add Printer** icon. The **Add Printer Wizard** starts.
- c. Click the **My Computer** radio button.
- d. Click **Next** to go to the next dialog box.
- e. Click the **Add Port...** button. The **Printer Ports** window appears.
- f. Click **LPR Port** to highlight this item in the list.
- g. Click the **New Port...** button. The **Add LPR compatible printer** dialog box appears.
- h. Fill in the **Name or address of server providing lpd** field with the TCP/IP host name or the Internal LAN address of the OS/400 system. Refer to “Installation work sheet for OS/400 parameters” on page 29 to find the Internal LAN address.
- i. Fill in the **Name of printer or print queue on that server** field.
- j. Click **OK**.
- k. Click **Close**. The **Add LPR compatible printer** dialog box disappears.
- l. Click **Next** to go to the next dialog box.
- m. In the **Manufacturers** list, click the manufacturer of the printer you are using.
- n. In the **Printers** list, click the name of the printer you are using.
- o. Click **Next** to go to the next dialog box.
- p. Fill in the **Printer name** field with the name you want to give the printer.
- q. Click **Next** to go to the next dialog box.
- r. Click either the **Shared** or **Not Shared** radio button.
 - 1) If you clicked **Shared**, fill in the **Share name** field with the name you want other people to see the printer as.
 - 2) From the list that is provided, select the operating systems that will be using the printer.
- s. Click **Next** to go to the next dialog box.
- t. Choose whether or not to print a test page.
- u. Click **Finish** to create the new printer.


Back up and recover Windows server on iSeries

Because iSeries Integration for Windows Server combines two operating systems (➤ Windows NT 4.0, Windows 2000, or Windows .NET Server ◀ and OS/400), you can use either OS/400 or Windows server utilities or a combination of both to manage backups. When you are planning your backup strategy, refer to Backup, recovery, and availability, as well as Microsoft documentation.

To back up Windows server on iSeries, you have these basic options:

- Doing a full system backup on OS/400.
- Backing up the network server description (NWSD) and the “Back up the NWSD and disk drives associated with Windows server on iSeries” on page 117 that are associated with Windows server on iSeries.
- Backing up “Back up individual Windows server files and directories” on page 122 by using the OS/400 SAV and RST commands and OS/400 NetServer or a backup utility.

Your recovery options depend on how you backed up your system, as well as what you need to recover.

- If you need to recover your entire system, refer to the book Backup and Recovery  .
- If you need to restore a network server description and its associated OS/400 disk drives, refer to “Restore the NWSD and disk drives for Windows server on iSeries” on page 126.
- To restore Windows server data (files, directories, shares, and the Windows registry) that you backed up with the Save (SAV) command, see “Recover Windows server files” on page 129.
- To restore files that you saved with Windows backup utilities or other utilities, use those utilities.



Back up the NWSD and disk drives associated with Windows server on iSeries

When you install the Windows server on iSeries, OS/400 creates a network server description and “Predefined disk drives for Windows server on iSeries” on page 91 for your server that you need to back up. Some of the disk drives are system-related (the installation and system drives); others are user-related. Because Windows server considers them a unified system, you need to save all the disk drives and the network server description to restore properly.

The Windows server operating system and the files that are required to start the Windows server are located on the C and D drives of the server (or C, D, and E drives for servers created before V4R5). The implementation of the Integrated xSeries Server for iSeries allows you to save and restore these drives as OS/400 network server storage space objects. These objects are saved as part of the OS/400 system when you perform a full OS/400 system backup. You can also specifically save the network server description and storage spaces that are associated with Windows server on iSeries. Daily backup of the system drive is a good idea.

Saving storage spaces is the fastest but least flexible method for backing up your Windows server because you cannot restore individual files. You can effectively use this option and “Back up individual Windows server files and directories” on page 122 to eliminate the BOOT disk, RDISK, and registry backups that you would take with a PC-based Windows server.

To back up the network server description and the disk drives that are associated with Windows server on iSeries, see these topics:

-  “Back up NWSDs for Windows server on iSeries”.
- “Back up predefined disk drives for Windows servers created on V4R5 and later OS/400 systems” on page 118.
- “Back up predefined disk drives for Windows servers created on pre-V4R5 OS/400 systems” on page 118.
- “Back up user-defined disk drives for Windows server” on page 119. 
- You can see a table of user objects and system objects that you “What objects to save and their location on OS/400” on page 120.

Back up NWSDs for Windows server on iSeries

When you save the storage space objects that are associated with Windows server on iSeries, you also need to save the network server description (NWSD). Otherwise, Windows server may not be able to re-establish items such as Windows server File System permissions. To save the NWSD, you use the Save Configuration (SAVCFG) command:

1. On the OS/400 command line, type SAVCFG.
2. Press Enter to have OS/400 save the NWSD configuration.

Note: The save configuration command (SAVCFG) will save the objects associated with an NWSD and the current static network server storage spaces. It does not save the links associated with the dynamically added storage spaces. These will need to be added manually once the configuration and the dynamically linked storage spaces have been restored.

Back up predefined disk drives for Windows servers created on V4R5 and later OS/400 systems

When you install Windows server on V4R5 and later systems, OS/400 creates the system and installation source (C and D) drives as “Predefined disk drives for Windows server on iSeries” on page 91 that you need to save.

Note: Treat a network server description (NWSD) of type *WINDOWSNT, its predefined disk drives, and any user-defined disk drives linked to it as a unit. Save and restore them at the same time. To Windows server, they are a full system, and should be treated as such. Otherwise, Windows server may not be able to re-establish items such as Windows server File System permissions.

To save disk drives (network server storage spaces) that are in the system disk pool (ASP) on OS/400, do this:

1. If you are saving to tape, ensure that you have mounted a tape that is formatted for OS/400.
2. “Shut down Windows server from OS/400” on page 82 the Windows server to prevent users from updating files during the backup.
3. On the OS/400 command line, type SAV and press F4.
4. If you are saving the storage space to tape, specify the name of your tape device (for example, TAP01) in the Device field.

If you are saving the storage space to a save file instead of to tape, specify the path to the save file as the device. For example, to use a save file named MYSAVF in library WINBACKUP, you would specify '/QSYS.LIB/WINBACKUP/MYSAVF' for the device.

5. In the Name field under Objects:, specify '/QFPNWSSTG/stgspc', where stgspc is the name of the network server storage space.
 - For the system (C) drive, use /QFPNWSSTG/nwsdname1
 - To save the D drive, use /QFPNWSSTG/nwsdname2
 - For storage spaces created in a user disk pool, use /QFPNWSSTG/stgspcand also dev/QASPnn/stgspc.UDFS, where stgspcis the name of the network server storage space and nn is the number of the user disk pool
 - For an independent disk pool, use /QFPNWSSTG/stgspc and also dev/independent ASP name/stgspc.UDFS, where independent ASP name is the name of the independent disk pool and stgspcis the name of the network server storage space
6. Specify values for any other parameters that you want and press Enter to save the storage space.
7. “Starting Windows server from OS/400” on page 81 the Windows server.

Refer to “What objects to save and their location on OS/400” on page 120. You can read more about saving parts of your system.

Back up predefined disk drives for Windows servers created on pre-V4R5 OS/400 systems

Windows servers created on pre-V4R5 systems have C, D, and E as predefined drives. Server “Predefined disk drives for Windows server on iSeries” on page 91 that contain these drives are in library QUSRSYS. If the system drive (E drive) is larger than 1007 megabytes, that data goes into a user storage space, which you also need to back up. Even after you migrate your system to V4R5, these drives remain where they were created unless you reinstall Windows server.

Note: Treat a network server description (NWSD) of type *WINDOWSNT, its predefined disk drives, and any user-defined disk drives linked to it as a unit. Save and restore them at the same time. To Windows server, they are a full system, and should be treated as such. Otherwise, Windows server may not be able to re-establish items such as Windows server File System permissions.

To save the disk drives for these NWSDs, use the Save Object (SAVOBJ) command:

1. If you are saving to tape, ensure that you have mounted a tape that is formatted for OS/400.

2. "Shut down Windows server from OS/400" on page 82 the Windows server to prevent users from updating the files while you are saving them.
3. On the OS/400 command line, type SAV0BJ and press F4.
4. In the Objects field, specify the *nwsdname*.
5. In the Library field, specify QUSRSYS.
6. If you are saving the storage space to tape, specify the name of your tape device in the Device field (for example, TAP01). If you want to use a save file instead of tape, specify *SAVF as the device and enable the data compression option.
7. For Object type, specify *SVRSTG.
8. If you are using a save file, press F10 to see additional parameters.
9. In the Save file field, specify the path to your save file (for example *winbackup/svrstg3*).
10. If you are using a save file, page down twice and change the value for Data compression to *YES.

If the system drive (E drive) is larger than 1007 megabytes, to save the data that goes into a user storage space, you use the Save (SAV) command:

1. On the OS/400 command line, type SAV and press F4.
2. If you are saving the storage space to tape, specify the name of your tape device (for example, TAP01) in the Device field.
If you are saving the storage space to a save file instead of to tape, specify the path to the save file as the device. For example, to use a save file named MYSAVF in library WINBACKUP, you would specify '/QSYS.LIB/WINBACKUP/MYSAVF' for the device.
3. In the Name field under Objects:, specify '/QFPNWSSTG/nwsdname3', where *nwsdname* is the name of the network server storage space.
4. Specify values for any other parameters that you want and press Enter to save the storage space.
5. "Starting Windows server from OS/400" on page 81 the Windows server.

Back up user-defined disk drives for Windows server

The disk drives that you create for your Windows servers are in the integrated file system. To save these storage spaces from the user disk pool (ASP) on OS/400, you use the Save (SAV) command.

Note: Treat a network server description (NWS) of type *WINDOWSNT, its predefined disk drives, and any user-defined disk drives linked to it as a unit. Save and restore them at the same time. To Windows server, they are a full system, and should be treated as such. Otherwise, Windows server may not be able to re-establish items such as Windows server File System permissions.

To save disk drives in a user disk pool (ASP) on OS/400, do this:

1. If you are saving to tape, ensure that you have mounted a tape that is formatted for OS/400.
2. For network server storage spaces created in an independent disk pool, verify that the auxiliary storage pool (ASP) device is varied on prior to saving the 'dev/independent ASP name/stgspc.UDFS' object.
3. "Shut down Windows server from OS/400" on page 82 the Windows server by varying off the network server description to prevent users from updating files during the backup.
4. On the OS/400 command line, type SAV and press F4.
5. If you are saving the storage space to tape, specify the name of your tape device (for example, TAP01) in the Device field.
If you are saving the storage space to a save file instead of to tape, specify the path to the save file as the device. (For example, to use a save file named MYSAVF in library WINBACKUP, you would specify: '/QSYS.LIB/WINBACKUP/MYSAVF') for the device.) Otherwise, use the name of your device (for example, TAP01).
6. In the Name field under Objects:, specify '/QFPNWSSTG/stgspc' and also 'dev/QASPnn/stgspc.UDFS', where stgspc is the name of the network server storage space and nn is the number of the disk pool.

- For storage spaces created in a user disk pool, use /QFPNWSSTG/stgspcand also dev/QASPnn/stgspc.UDFS, where stgspcis the name of the network server storage space and nn is the number of the user disk pool
- For an independent disk pool, use /QFPNWSSTG/stgspc and also dev/independent ASP name/stgspc.UDFS where independent ASP name is the name of the independent disk pool and stgspcis the name of the network server storage space

7. Specify values for any other parameters that you want and press Enter to save the storage space.

8. “Starting Windows server from OS/400” on page 81 the Windows server.

You can find more information about backing up system objects and the appropriate save commands in Backup, recovery, and availability.

The method that is described above allows you to back up and recover entire network server storage spaces. To back up and recover individual files, you can use the new “Back up individual Windows server files and directories” on page 122 function

What objects to save and their location on OS/400

Many objects are created as a result of installing iSeries Integration for Windows Server. Some of these objects are system-related, others user-related. You need to save them all if you want to restore properly. You can save these objects by using options of the OS/400 GO SAVE command. Option 21 saves the entire system. Option 22 saves system data. Option 23 saves all user data (which includes objects in QFPNWSSTG).

If you want to save a particular object, use one of the following tables to see the location of that object on OS/400 and the command to use. Manually saving parts of your system. has more information about using the save commands. In addition to saving the entire drive (storage space), you can also save and restore “Back up individual Windows server files and directories” on page 122.

For Windows servers created on V4R5 and later systems

Object content	Object name	Object location	Object type	Save command
Windows server boot and system drive	nwsdname1	/QFPNWSSTG	Predefined network server storage spaces in system disk pool (ASP)	GO SAVE, option 21 or 23 SAV OBJ('/QFPNWSSTG/nwsdname1') DEV('/QSYS.LIB/TAP01.DEVD')
Windows server boot and system drive	nwsdname1	/QFPNWSSTG	Predefined network server storage spaces in user disk pool	SAV OBJ('/QFPNWSSTG/stgspc') ('/dev/QASPnn/stgspc.UDFS')) DEV('/QSYS.LIB/>TAP01.DEVD')
Windows server installation source drive	nwsdname2	/QFPNWSSTG	Predefined network server storage space in system disk pool	GO SAVE, option 21 or 23 SAV OBJ('/QFPNWSSTG/nwsdname2') DEV('/QSYS.LIB/TAP01.DEVD')
Windows server installation source drive	nwsdname2	/QFPNWSSTG	Predefined network server storage spaces in user disk pool	GO SAVE, option 21 or 23 SAV OBJ('/QFPNWSSTG/stgspc') ('/dev/QASPnn/stgspc.UDFS')) DEV('/QSYS.LIB/TAP01.DEVD')
Windows server installation source drive	nwsdname2	/QFPNWSSTG	Predefined network server storage spaces in an independent disk pool (ASP)	GO SAVE, option 21 or 23 SAV OBJ('/QFPNWSSTG/stgspc') ('dev/independent ASP name/stgspc.UDFS')) DEV('/QSYS.LIB/TAP01.DEVD')

For Windows servers created on pre-V4R5 systems

Object content	Object name	Object location	Object type	Save command
Windows server boot drive	nwsdname1	QUSRSYS	Predefined server storage space	GO SAVE, option 21 or 23 SAVOBJ OBJ(nwsdname1) LIB(QUSRSYS) DEV(TAP01) OBJTYPE(*SVRSTG)
Windows server installation source drive	nwsdname2	QUSRSYS	Predefined server storage space	GO SAVE, option 21 or 23 SAVOBJ OBJ(nwsdname2) LIB(QUSRSYS) DEV(TAP01) OBJTYPE(*SVRSTG)
Windows server system drive	nwsdname3	QUSRSYS	Predefined server storage space	GO SAVE, option 21 or 23 SAVOBJ OBJ(nwsdname2) LIB(QUSRSYS) DEV(TAP01) OBJTYPE(*SVRSTG)
Windows server system drive	nwsdname3	/QFPNWSSTG	Predefined network server storage space used for system drives larger than 1007 MB	GO SAVE, option 21 or 23 SAV OBJ('/QFPNWSSTG/nwsdname3') DEV('/QSYS.LIB/TAP01.DEVD')

For all Windows servers

Object content	Object name	Object location	Object type	Save command
User data and applications	Various	/QFPNWSSTG	User-defined network server storage spaces in system disk pool	GO SAVE, option 21 or 23 SAV OBJ('/QFPNWSSTG/stgspc') DEV('/QSYS.LIB/TAP01.DEVD')
User data and applications	Various	/QFPNWSSTG	User-defined network server storage spaces in user disk pool	GO SAVE, option 21 or 23 SAV OBJ('/QFPNWSSTG/stgspc') ('/dev/QASPnn/stgspc.UDFS')) DEV('/QSYS.LIB/TAP01.DEVD')
User data and applications	Various	/QFPNWSSTG	User defined network server storage spaces in an independent disk pool	GO SAVE, option 21 or 23 SAV OBJ('/QFPNWSSTG/stgspc') ('dev/independent ASP name/stgspc.UDFS')) DEV('/QSYS.LIB/TAP01.DEVD')
Messages from the Windows server	Various	Various	Server message queue	GO SAVE, option 21 or 23 SAVOBJ OBJ(msgq) LIB(qlibrary) DEV(TAP01) OBJTYPE(*MSGQ)
OS/400 config objects for Windows server	Various	QSYS	Device config objects	GO SAVE, option 21, 22, or 23 SAVCFG DEV(TAP01)


Object content	Object name	Object location	Object type	Save command
Various	Various	All QUSRSYS	Various	GO SAVE, option 21 or 23 SAVLIB LIB(*NONSYS) or LIB(*ALLUSR)
OS/400 based Windows server code	QNTAP	QSYS	Library	GO SAVE, option 21 or 22 SAVLIB LIB(*NONSYS) or LIB(*IBM)
PC-based Windows server code	NTAP and subdirectories	/QIBM/ProdData/NTAP	Directory	GO SAVE, option 21 or 22 SAV
Windows server file shares	QNTC and subdirectories	/QNTC/servername/sharename	Directory	GO SAVE, option 21 or 22 SAV

Back up individual Windows server files and directories

In V4R5, or later, iSeries Integration for Windows Server allows you to save Windows server data (files, directories, shares, and the Windows registry) to tape or disk along with other OS/400 data and restore the data on an individual basis. However, you should not use this approach as your primary backup procedure. You should still periodically save your entire system and the “Back up the NWSD and disk drives associated with Windows server on iSeries” on page 117 associated with your Windows server for disaster recovery. Then you can choose to do daily backups of only the Windows server files that have changed.

For information on the new file-level backup function, see these topics:

- First read “File-level backup restrictions”.
- To do file-level backup of your Windows server, you must first do some “Preliminary administrator setup tasks” on page 123.
- “Save your files” on page 124

You can also use a utility such as “Windows Backup utility” on page 126 or the Tivoli Storage Manager to back up your Windows server files. You can find information about Tivoli Storage Management Solutions on the Tivoli Storage Management Solutions Web Page. 

File-level backup restrictions

When you use the file-level backup of Windows server on iSeries, you need to be aware of the following limitations and restrictions:

Limitations:

- This support is not available to a network-connected Windows servers because the code comes packaged with iSeries Integration for Windows Server.
- This method does not back up files that are part of the iSeries Integration for Windows Server code.
- Windows server provides no way to stop users from signing on and accessing data on the server while the Save (SAV) or Restore (RST) command is running. iSeries Integration for Windows Server can save a file that is in use as long as it can read the file. Consequently, you should back up Windows server files when you expect few users to be accessing the system. A note telling users to avoid accessing the server would be a good precaution.

- » The QSECOFR user profile should not be used to perform a file-level backup. , Even if enrolled to the Windows server, QSECOFR will not be used to backup the Windows files. The Windows Local System Account will be used instead. It may not have the necessary authority to backup all of the requested files.◀

Requirements:

- The Windows server running on an Integrated xSeries Server must be active and have a working » TCP/IP private (Internal or Virtual Ethernet Point-to-Point) LAN ◀ connection with OS/400. You must back up your Windows server files either before putting the system into restricted state to back up the rest of the OS/400 files or after completing restricted state operations.
- This procedure requires that you have the same userid and password on Windows server and OS/400.
- Your Windows server user account must be a member of the Administrators group.
- File-level backup uses the QNTC file system (NetClient) to build the list of files to be saved. QNTC uses iSeries NetServer to locate servers in the domain. You need to have the iSeries NetServer in the same domain (See “Ensure iSeries NetServer and Windows server are in same domain” on page 124) as the Integrated xSeries Server from which you are going to save files.
- Be careful about trying to restore all files on all drives that you previously saved through the QNTC file system. Certain Windows system files (for example, files in the Recycle Bin) can cause unexpected results after you restore them.
- On Windows 2000 » or Windows .NET Server,◀ you need to give special consideration to System File Protection when you are backing up and recovering Windows system files. Refer to Microsoft documentation.

Preliminary administrator setup tasks

Before you can back up your Windows server on iSeries files at file-level, you must do some preliminary setup tasks:

1. Ensure that the person who is saving and restoring files has the same password on OS/400 and Windows server. The easiest way is to “Enroll a single user to Windows server on iSeries” on page 102 to Windows server. “Create user templates for Windows server on iSeries” on page 103 so that the user is a member of the Administrators group.
2. “Create shares on Windows server” for each drive or volume that you want to save when you request to save all the files on a Windows server. iSeries Integration for Windows Server accesses the file system and translates these shares into pathnames.
3. “Add members to QAZLCSAVL file” on page 124 to the QAZLCSAVL file in QUSRSYS that lists the share names that you want to be able to save.
4. Ensure that iSeries NetServer is in the same domain (See “Ensure iSeries NetServer and Windows server are in same domain” on page 124) as the Windows server for which you want to save files.

Create shares on Windows server: To enable file-level backup and restoration of Windows server files on OS/400, create a share over each directory that contains data you want to save. To create shares on Windows server, do this:

1. Open the **My Computer** icon to bring up **Windows Explorer**.
2. Right-click on the drive or volume that you want.
3. From the pop-up menu, select **Sharing**.
4. Click **Shared As** (from Windows NT 4.0) or **Share this folder** (from Windows 2000» or Windows .NET).◀ Provide a **Share Name** (characters in the share name must be in the more restrictive code page 500 character set). The default share name is the same as the last part of the directory name. Share names can be no longer than 12 characters and can include embedded blanks.
5. You can choose unlimited access or limit the number of users who can access the share at one time. You can also use the **Permissions** button to set up the level at which you want to share (No Access, Read, Change, or Full Control).

6. Click on **Apply** to create the share.

Add members to QAZLCSAVL file: To enable file-level backup and recovery from OS/400, add a member for each Windows server that you have running on an Integrated xSeries Server to the QAZLCSAVL file in QUSRSYS. For the member name, use the NWSD name of the server (*nwsdname*).

This “Code disclaimer information” on page 1 pertains to code examples.

To add a member, do this:

1. On the OS/400 command line, type:


```
ADDPFM FILE(QUSRSYS/QAZLCSAVL) MBR(nwsdname)  
TEXT('description') EXPDATE(*NONE) SHARE(*NO) SRCTYPE(*NONE)
```

2. In the file member that you just created, list all the shares that you want to be able to save. List each share name that you defined for the server on a separate line. The maximum length that the Windows share name can be is 12 characters. Share names can have embedded blanks. For example, if you defined cshare, dshare, eshare, fshare, gshare, and my share as shares on WINSVR1, your member name WINSVR1 would look like this:

```
                                QUSRSYS/QAZLCSAVL  
                                WINSVR1  
  
0001.00  cshare  
0002.00  dshare  
0003.00  eshare  
0004.00  fshare  
0005.00  gshare  
0006.00  my share
```

Note: If you specify multiple share names that point to the same directory on Windows server, OS/400 saves the data multiple times for a “save all” request. To avoid duplicating data when you save it, do not include multiple shares that include the same directory or data.

Ensure iSeries NetServer and Windows server are in same domain: To save Windows server files for file-level backup, you must have iSeries NetServer in the same domain as the files you want to save.

1. Use iSeries Navigator  to check the domain for your Windows server:
 - a. Expand **Network**, then **Windows Administration**, then **Integrated xSeries Servers**.
 - b. Find your Windows server in the list in the right pane; then look in the Domain column to find the domain for that server.
2. Use iSeries Navigator to check the domain for iSeries NetServer:
 - a. Under the OS/400 name, expand **Network**, then **Servers**, then **TCP/IP**.
 - b. Find iSeries NetServer in the list of TCP/IP servers.
 - c. Right click on **iSeries NetServer**, and pick **Properties** (or double-click on **iSeries NetServer**, then select **File**, then **Properties**). The domain name for iSeries NetServer appears under the **General** information file tab.
3. If iSeries NetServer is not in the same domain as the Windows server, change the domain for iSeries NetServer:
 - a. Click the **Next Start** button.
 - b. In the **Domain name** field, type the name of the Windows server domain.
 - c. Stop and start iSeries NetServer (right-click on iSeries NetServer and pick **Stop**, then **Start**.)

Save your files

When you finish the necessary “Preliminary administrator setup tasks” on page 123, you are ready to back up Windows server files on OS/400. To be able to restore a directory or file by share name, you must specify that file or share name specifically on the SAV command.

Note: To avoid duplicating data, be careful specifying what you want to save on the SAV command. If you specify multiple share names that point to the same directory on Windows server, OS/400 saves the data multiple times.

To specify what you want OS/400 to save, do this:

1. Ensure that the Windows server is active (described in “Display Windows server information on OS/400” on page 85). Also ensure that the QSYSWRK subsystem, QSERVER, and TCP/IP are active (you can do this by using the Work with Active Jobs (WRKACTJOB) command).
2. On the OS/400 command line, type SAV and press F4.
3. In the Device field, specify the device on which you want OS/400 to save the data. For example, 'QSYS.LIB/TAP01.DEVD' saves the data to tape.
4. In the Object field, specify what you want OS/400 to save in the form '/QNTC/servername/sharename'. You can use wildcard characters. Refer to “Examples: How to address parts of Windows server” for how to specify particular parts of Windows server.
5. Use the Directory subtree field to specify whether you want to save subtrees under a directory. The default is to save all directories.
6. To specify that you want to save changes since the last save, specify *LASTSAVE in the Change period field. You can also specify a specific range of dates and times.
7. Press Enter to save the shares that you specified.

Examples: How to address parts of Windows server: These examples show how to refer with the SAV or RST commands to specific parts of Windows server for a server that is named *server1*:


This “Code disclaimer information” on page 1 pertains to code examples.

To save or restore this:	Specify this:
All Windows server objects.	OBJ('/QNTC/*') SUBTREE(*ALL)
All objects for <i>server1</i> .	OBJ('/QNTC/server1/*') SUBTREE(*ALL)
All objects for <i>server1</i> that changed since you last saved the files.	OBJ('/QNTC/server1/*') SUBTREE(*ALL) CHGPERIOD(*LASTSAVE)
All objects for <i>server1</i> that changed during a certain period (in this case between 10/19/99 and 10/25/99).	OBJ('/QNTC/server1/*') SUBTREE(*ALL) CHGPERIOD('10/19/99' '00:00:00' '10/25/99' '23:59:59')
All directories, files, and shares to which a particular share (for example, 'fshare') refers. OS/400 does not save and restore the directory over which the share is built.	OBJ('/QNTC/server1/fshare/*') SUBTREE(*ALL)
Only files to which the specified share (for example, 'fshare') refers that match the specified pattern (pay*). OS/400 does not save directories nor shares.	OBJ('/QNTC/server1/fshare/pay*')
Only directories and shares (no objects) for 'fshare' and its immediate children.	OBJ('/QNTC/server1/fshare') SUBTREE(*DIR)
Directories, shares, and files for 'terry' and its subtrees (not directory 'terry').	OBJ('/QNTC/server1/fdrive/terry/*') SUBTREE(*ALL)
Only the specific file 'myfile.exe'.	OBJ('/QNTC/server1/gdrive/myfile.exe')
The Windows server registry.	OBJ('/QNTC/server1/\$REGISTRY')

Windows Backup utility

You can use the Windows Backup utility and an “Use iSeries tape drives from Windows server” on page 110 to do backups from Windows server.

To start the Backup utility under Windows 2000  or Windows .NET Server:

1.  Click on **Start**
2. Select **Accessories**
3. Select **System Tools**
4. **Backup.**

To start the Backup utility under Windows NT 4.0:

1. Click on **Start**
2. Select **Administrative Tools**
3. Select **Backup.**

For information about backup or recovery by using LAN-connected mass storage devices, refer to in your Windows server documentation from Microsoft.

Restore the NWSD and disk drives for Windows server on iSeries


One method of restoring your Windows server data is to restore the network server description (NWSD) and disk drives that OS/400 associates with that server. On pre-V4R5 systems, this is your primary OS/400 recovery option. It remains the faster method for restoring large amounts of data. For V4R5 and later systems, if you used file-level backup, you can also restore specific Windows server files.

When you restore saved objects from OS/400, you need to be aware of these considerations:

Notes:

1. Treat a network server description (NWSD) of type *WINDOWSNT, its “Predefined disk drives for Windows server on iSeries” on page 91, and any user-defined disk drives that are linked to it as a unit. Restore them at the same time. Otherwise, Windows server may not be able to re-establish items such as Windows server File System permissions.
2. To have OS/400 automatically relink restored disk drives in the integrated file system to the appropriate NWSD, restore the NWSD after you restore the disk drives.
3. If you restore an NWSD of type *WINDOWSNT before restoring the predefined and user-defined disk drives in the integrated file system, you need to relink those disk drives. You can do this by using the Add Network Server Storage Link (ADDNWSSTGL) command for each disk drive that is associated with the NWSD:

```
ADDNWSSTGL NWSSTG(Storage_Name) NWSD(NWSD_Name)
```



4. When you restore a domain controller, ensure that the domain database held on the server is synchronized with the other domain controllers.  When restoring shared drives used by a Windows cluster node, it may be necessary to manually relink the shared drives. Begin by linking the shared quorum resource drive first. You can use the following command to link the shared quorum resource drive:

```
ADDNWSSTGL NWSSTG(Quorum_name) NWSD(NWSD_Name) ACCESS(*SHRUPD) DYNAMIC(*YES) DRVSEQNBR(*QR)
```

Once the quorum resource has been relinked, the remaining shared drives can then be re-linked as well. Use the following command to relink the remaining shared drives:

```
ADDNWSSTGL NWSSTG(Shared_name) NWSD(NWSD_Name) ACCESS(*SHRUPD) DYNAMIC(*YES) DRVSEQNBR(*CALC)
```

Follow normal Windows server procedures to do this and refer to documentation from Microsoft as necessary.

5.  Restoring NWSD installed on certain hardware types to different hardware type may be restricted. For more information, see “Restore NWSDs for Windows server on iSeries” on page 129. 

To restore the the NWSD and disk drives for Windows server on iSeries, refer to these pages:

- “Restore predefined disk drives for Windows servers created on V4R5 and later systems”
- “Restore predefined disk drives for Windows servers created on pre-V4R5 systems”
- “Restore user-defined disk drives for Windows servers on iSeries” on page 128
- “Restore NWSDs for Windows server on iSeries” on page 129

Restore predefined disk drives for Windows servers created on V4R5 and later systems

For Windows servers that you create on V4R5 or later systems, disk drives that contain the Windows server operating system and registry are in the integrated file system. You restore these predefined disk drives just as you do user-defined disk drives. To restore disk drives in the integrated file system on OS/400, use the Restore (RST) command:

1. If you are restoring from save media, ensure that you have mounted your media.
2. If there are no network server storage spaces that currently exist on the system (none appear when you use the WRKNWSSTG command), you must create the /QFPNWSSTG directory before you can restore network server storage spaces that you saved beneath that directory. To create the /QFPNWSSTG directory, complete these steps:
 - a. On the OS/400 command line, type CRTNWSSTG to create a server storage space and press F4.
 - b. Provide a name for the storage space.
 - c. Use the minimal size allowed and specify the appropriate disk pool (ASP).
 - d. Press Enter to create the storage space. OS/400 creates the storage space in the /QFPNWSSTG directory.
3. To restore the storage spaces, type RST and press F4.
4. If you saved the storage space to a save file instead of to tape, use *SAVF for the device. Otherwise, specify the device name.
5. In the Name field under Objects:, specify '/QFPNWSSTG/stgspc', in which stgspc is the name of the network server storage space.
To restore the system (C) drive, use /QFPNWSSTG/nwsdname1. To restore the D drive, use /QFPNWSSTG/nwsdname2.
6. Specify values for any other parameters that you want and press Enter to restore the storage space.
7. You also need to restore any “Restore user-defined disk drives for Windows servers on iSeries” on page 128 that are associated with the server and restore the NWSD. When you are done restoring the NWSD and all its associated disk drives, vary on the Windows server.

Restore predefined disk drives for Windows servers created on pre-V4R5 systems

Earlier versions of iSeries Integration for Windows Server created disk drives for the C, D, and E drives in the QUSRSYS library. Those disk drives contain the Windows server operating system and registry, boot and system drives. Even after you upgrade your system to V4R5, these storage spaces remain where OS/400 created them unless you reinstall Windows server. You restore those storage spaces with the Restore Object (RSTOBJ) command. System drives that are larger than 1007 megabytes also have data in a network storage space that you need to restore.

To restore server storage spaces, you use the Restore Object (RSTOBJ) command:

1. On the OS/400 command line, type RSTOBJ and press F4.
2. If you are restoring from save media, ensure that you have mounted your media.
3. In the Objects field, specify the name the storage space. (If you want to restore all the predefined storage spaces, first type + and press Enter.)
 - To restore the C drive, specify the name of the NWSD followed by 1.

- To restore the D drive, specify the name of the NWSD followed by 2.
 - To restore the E drive, specify the name of the NWSD followed by 3.
4. In the Save Library field, specify QUSRSYS.
 5. In the Device field, specify either the name of the device that contains the save media or specify *SAVF if you are restoring from a save file.
 6. In the Object types field, specify *SVRSTG.
 7. If you are restoring from a save file, specify the name and library for the save file.
 8. Press Enter to restore the storage spaces.
 9. If your system drive (E) is not larger than 1007 megabytes, go directly to step 10. If your system drive is larger than 1007 megabytes, you need to restore data that you saved from an additional disk drive in the integrated file system:
 - a. If there are no network server storage spaces that currently exist on the system (none appear when you use the WRKNWSSTG command), you must create the /QFPNWSSTG directory before you can restore network server storage spaces that you saved beneath that directory. To create the /QFPNWSSTG directory, complete these steps:
 - 1) On the OS/400 command line, type CRTNWSSTG to create a disk drive and press F4.
 - 2) Provide a name for the storage space.
 - 3) Use the minimal size allowed and specify the appropriate disk pool (ASP).
 - 4) Press Enter to create the storage space. OS/400 creates the it in the /QFPNWSSTG directory.
 - b. To restore the storage space, type RST and press F4.
 - c. If you saved the storage space to a save file instead of to tape, use *SAVF for the device. Otherwise, specify the device name.
 - d. In the Name field under Objects:, specify '/QFPNWSSTG/nwsdname3', in which nwsdname3 is the name of the storage space for the E drive.
 - e. Specify values for any other parameters that you want and press Enter to restore the storage space.
 10. You also need to restore any "Restore user-defined disk drives for Windows servers on iSeries" that are associated with the server and restore the NWSD. When you are done restoring the NWSD and all its associated disk drives, vary on the Windows server.

Restore user-defined disk drives for Windows servers on iSeries

Although, you can now "Back up individual Windows server files and directories" on page 122, the fastest way to restore large amounts of data is to restore the entire storage space. If you "Back up user-defined disk drives for Windows server" on page 119 your user storage space from the \QFPNWSSTG directory, you can restore only the entire storage space. You cannot restore individual files from this backup.

To restore disk drives in the integrated file system, do this:

1. If you are restoring from save media, ensure that you have mounted your media.
2. If there are no network server storage spaces currently exist on the system (none appear when you use the WRKNWSSTG command), you must create the /QFPNWSSTG directory before you can restore network server storage spaces that you saved beneath that directory. To create the /QFPNWSSTG directory, complete these steps:
 - a. On the OS/400 command line, type CRTNWSSTG to create a server storage space and press F4.
 - b. Provide a name for the storage space.
 - c. Use the minimal size allowed and specify the appropriate disk pool (ASP).
 - d. Press Enter to create the storage space. OS/400 creates the storage space in the /QFPNWSSTG directory.
3. To restore the storage spaces, type RST and press F4.
4. In the Objects: name field, specify '/QFPNWSSTG/stgspc' and 'dev/QASPnn/stgspc.UDFS', where stgspc is the name of the network server storage space and nn is the number of the disk pool.

Note: To restore the .UDFS object to an independent disk pool, the disk pool device must be varied on. ➤ Specify 'dev/independent ASP name/stgspc.UDFS' where independent ASP name is the name of the independent disk pool and stgspc is the name of the network server storage space. ⏪

5. Specify values for any other parameters that you want and press Enter to restore the storage space.
6. You also need to restore any predefined disk drives that are associated with the server and restore the "Restore NWSDs for Windows server on iSeries". When you are done restoring the NWSD and all its associated disk drives, vary on the Windows server.

Restore NWSDs for Windows server on iSeries

In a disaster recovery situation, you would restore all the configuration objects, which include the network server description (NWSD) for your Windows server. In some situations, for example when you migrate to new Integrated xSeries Server hardware, you need to specifically restore the NWSD. To have OS/400 automatically relink disk drives within the integrated file system to the restored NWSD, restore those disk drives first. To restore the NWSD, you use the Restore Configuration (RSTCFG) command:

1. On the OS/400 command line, type RSTCFG and press F4.
2. In the Objects field, specify the name of the NWSD.
3. In the Device field, specify the device name if you are restoring from media. If you are restoring from a save file, specify *SAVF and identify the name and library for the save file in the appropriate fields.
4. Press Enter to have OS/400 restore the NWSD.
5. When you are done restoring the NWSD and all its associated storage spaces, "Starting Windows server from OS/400" on page 81 the Windows server.

Notes:

When you restore a NWSD, you must also restore any line, controller, and device description objects that are associated with the NWSD. ➤ You must also restore any line descriptions that had TCP/IP interfaces defined.

Some restrictions apply when restoring a NWSD to new hardware or hardware of a different type from the one on which NWSD was originally installed. For more information, see "Upgrade and migration considerations for iSeries Integration for Windows Server and Integrated xSeries Server" on page 54. ⏪.

Recover Windows server files

For Windows servers at V4R5 and later :

Release V4R5 of supports file-level backup and recovery of your files. Now you can recover a particular file from your OS/400 backup without restoring the entire disk drive. Before using this method, however, consider the amount of data you need to restore. For large amounts of data, restoring an entire disk drive object is much faster than restoring all the individual files in the disk drive. To restore a smaller amount of data, this method works great.

You should restore the directory first, then files, then the registry, then reboot for new registry entries to take effect. To restore files that you saved by this method, use the RST command:


1. Ensure that the and TCP/IP are running.
2. On the OS/400 command line, type RST and press F4.
3. In the Device field, specify the device on which the data is available. (For example, 'QSYS.LIB/TAP01.DEVD' restores the data from tape.)
4. In the Object field, specify what you want OS/400 to restore in the form '/QNTC/servername/sharename'

You can use wildcard characters. Refer to "Examples: How to address parts of Windows server" on page 125 for how to specify particular parts of Windows server. Avoid restoring Windows system files by this method because the restored files may behave unpredictably.

5. In the Name field, specify the pathname of the object to restore.
6. You can use the Include or omit field to include or omit objects with the pattern that you specify in the Name portion of the Object parameter.
7. In the New object name field, leave the object name the same or specify a new pathname. The new pathname must be referenced by a sharename that exists on Windows server.

Note: When you save a directory that has shares defined over it, OS/400 saves the share information with the directory. If you specify a new object name when you restore the directory, OS/400 does not recreate these shares.
8. Use the Directory subtree field to specify whether you want to restore subtrees under a directory. The default is to restore all directories.
9. To specify that you want to restore files that were saved during a particular period, specify starting and ending dates and times in the Change period field.
10. Provide any other information on the screen that you want OS/400 to use to restore the files and press Enter.
11. When the files are restored, reboot Windows server for new registry entries to take effect.

Save and restore user enrollment information

In some situations, you may need to restore user profiles and their enrollment information. The following information describes the OS/400 commands and API to save and restore user profiles used for Windows server enrollment. More OS/400 backup and recovery security information may be found in the Backup and Recovery of Security Information section in the iSeries Security Reference .

User profiles may be saved using the SAVSECDTA command or the QRSAAVO API. The OS/400 system value QRETSVRSEC must be set to 1 for Windows server enrollment support. User profiles saved with the SAVSECDTA command or QRSAAVO API may be restored using the RSTUSRPRF command and specifying the parameter USRPRF(*ALL). If the parameter USRPRF(*ALL) is not specified, then user profiles may be restored if the parameter and value SECDTA(*PWDGRP) is specified.

» If you save user profiles using the QRSAAVO API, and a previous target release value is used, the user profile enrollment definitions will not be restored. After restoring the user profiles, the enrollment needs to be defined. Use iSeries Navigator or the Change NWS user attribute (CHGNWSUSRA) command to define the enrollment. «

User profiles need to be saved and restored using the above methods for Windows server enrollment. User profiles saved and restored using other commands or API are not supported for Windows

Uninstall Windows server from Integrated xSeries Server

» You can use the Delete Windows Server (DLTWNTSVR) command to uninstall Windows server from an Integrated xSeries Server. Prior to running the Delete Windows Server command, “Shut down Windows server from OS/400” on page 82 your Windows server from OS/400.

The Delete Windows Server » (DLTWNTSVR) « command deletes the specified Windows network server description and all associated objects that were created by the Install Windows Server (INSWNTSVR) command. These objects include the network server description, line descriptions, TCP/IP interfaces, server storage spaces and system created network server storage spaces. The network server must be varied offline before this command is issued.

To manually uninstall Windows server from an Integrated xSeries Server, do the following: «

1. “Shut down Windows server from OS/400” on page 82 your Windows server from OS/400.
2. “Unlink disk drives from Windows server on iSeries” on page 96 that are associated with the server.

3. “Deleting disk drives for Windows server on iSeries” on page 97 that are associated with the server.
4. “Delete network server descriptions for Windows server on iSeries” that defines the server for OS/400
5. “Delete line descriptions for Windows server on iSeries” on page 132 that are associated with the server.
6. “Delete TCP/IP interfaces associated with Windows server on iSeries” on page 132 that are associated with the server.
7. “Delete controller descriptions associated with Windows server on iSeries” on page 132 that are associated with the server.
8. “Delete device descriptions associated with Windows server on iSeries” on page 132 that are associated with the server.
9. (Optional) If you remove all your Windows servers from OS/400 and plan not to install any more, you can “Delete iSeries Integration for Windows Server” on page 133 to free up the storage the product uses.

Delete network server descriptions for Windows server on iSeries

Before you delete a network server description (NWSD), you need to “Unlink disk drives from Windows server on iSeries” on page 96 and “Deleting disk drives for Windows server on iSeries” on page 97 storage spaces that are associated with that NWSD. Then you can delete the NWSD.

For NWSDs created before V4R5:

1. To unlink the storage space object for NWSDs created before V4R5, on the OS/400 command line, type `RMVNWSSTGL NWSSTG(nwsdname3) NWSD(nwsdname)` and press Enter.
2. To delete the network server storage space object, type the command `DLTNWSSTG NWSSTG(nwsdname3)` and press Enter.

For NWSDs created at V4R5 and later:

1. To unlink the storage space for the system drive for NWSDs created at V4R5 and later, on the OS/400 command line, type `RMVNWSSTGL NWSSTG(nwsdname1) NWSD(nwsdname)`. Press Enter.
2. To unlink the storage space for the install source drive, type `RMVNWSSTGL NWSSTG(nwsdname2) NWSD(nwsdname)` and press Enter.
3. Any user defined storage spaces that have been linked to the NWSD can also be removed at this time using the command as often as needed `RMVNWSSTGL NWSSTG(nwsstgname) NWSD(nwsdname)` and press Enter.
4. To delete the network server storage space object for the system drive, type the command `DLTNWSSTG NWSSTG(nwsdname1)` and press Enter.
5. To delete the network server storage space object for the install source drive, type `DLTNWSSTG NWSSTG(nwsdname2)` and press Enter.
6. Remove any additional storage spaces that are no longer needed using the `DLTNWSSTG NWSSTG(nwsstgname)` command and press Enter.

To delete the network server description (NWSD) for a Windows server on an Integrated xSeries Server, follow these steps:

1. On OS/400, type the command `WRKNWSD` and press Enter.
2. Type 8 in the Opt field to the left of the Network Server; press Enter. The Work with Configuration Status display appears.
3. If the status of the NWSD is not varied off, type 2 in the Opt field to the left of the Network Server; press Enter. Otherwise, go to the next step.
4. Press F3 to return to the previous screen.
5. Enter a 4 in the Opt field to the left of the Network Server and press Enter.

6. On the Confirm Delete of Network Server Descriptions display, press Enter.

Delete line descriptions for Windows server on iSeries

To delete all of the line descriptions for a Windows server on an Integrated xSeries Server, follow these steps:

1. On OS/400, type the command WRKLIND and press Enter.
2. Page down until you see the line description that you want to delete.

Note: The name of the line description should be the name of the network server description (NWSD) followed by 00, 01, 02, PP, V0, V1, V2, V3, V4, V5, V6, V7, V8 or V9. This depends on the port number to which you attached it.

3. Place a 4 in the Opt field to the left of the line description and press Enter. Repeat this step for any other line descriptions that are associated with the NWSD.

Note: An alternate method to steps 1 and 2 is to use the WRKLIND nwsdname* command, where nwsdname is the name of the associated network server description.

Delete TCP/IP interfaces associated with Windows server on iSeries

To delete TCP/IP interfaces that are associated with a Windows server on an Integrated xSeries Server, follow these steps:

1. On the OS/400 console, enter the CFGTCP command.
2. Choose option 1. Work with TCP/IP interfaces from the Configure TCP/IP menu.
3. Type a 4 in the Opt field next to the TCP/IP interface you want to remove, then press Enter.
You can identify the TCP/IP interfaces that are associated with the network server description (NWSD) by looking at the name of the attached line description. This name consists of the NWSD name, followed by a number.
4. Repeat step 3 for each TCP/IP interface that is associated with the NWSD.

Delete controller descriptions associated with Windows server on iSeries

To delete all of the controller descriptions for a Windows server on an Integrated xSeries Server, follow these steps:

1. On OS/400, type the command WRKCTLD and press Enter.
2. Page down until you see the controller description that you want to delete.

Note: The name of the controller description starts with the first five characters of the NWSD name, followed by 'NET' and a two-digit number. For example, if the NWSD name is MYSERVER, the controller name might be MYSERNET01.

3. Place a 4 in the Opt field to the left of the controller description and press Enter. Repeat this step for any other controller descriptions that are associated with the NWSD.

Note: An alternate method to steps 1 and 2 is to use the WRKCTLD MYSER* command, where MYSER is the first 5 characters of the NWSD name.

Delete device descriptions associated with Windows server on iSeries

To delete all of the device descriptions for a Windows server on an Integrated xSeries Server, follow these steps:

1. On OS/400, type the command WRKDEV and press Enter.
2. Page down until you see the device description that you want to delete.

Note: The name of the device description starts with the first five characters of the NWSD name, followed by 'TCP' and a two-digit number. For example, if the NWSD name is MYSERVER, the device name might be MYSERTCP01.

3. Place a 4 in the Opt field to the left of the device description and press Enter. Repeat this step for any other device descriptions that are associated with the NWSD.

Note: There may be many devices on a system. Use the WRKDEVD MYSERTCP* or WRKDEVD *NET commands to get the complete list of network devices that need to be deleted.

Delete iSeries Integration for Windows Server

If you remove Windows server from your Integrated xSeries Server and do not plan to reinstall it, you may also want to remove the iSeries Integration for Windows Server licensed program from OS/400. Removing the program frees the storage space it occupied on OS/400.


Note: Removing the program does not automatically delete existing network server descriptions or user-defined disk drives. However, it does render them unusable. You can find information on deleting network server descriptions and disk drives in “Uninstall Windows server from Integrated xSeries Server” on page 130.

To delete iSeries Integration for Windows Server, follow these steps:

1. On OS/400, type the command GO LICPGM and press Enter.
2. Choose option 12 from the Work with Licensed Programs menu and press Enter.
3. Page down the list of licensed programs until you see the description Integration for Windows Server
4. Type 4 in the Option field to the left of the base program. Press Enter, and OS/400 deletes the licensed program and its optional parts.

Troubleshoot Windows server on iSeries

If your Windows server is not functioning properly, follow these steps to attempt to correct the problem:

1. Try “Shut down Windows server on iSeries from Windows server” on page 83 Windows server from the Windows server console.
2. If step 1 is not successful, “Shut down Windows server from OS/400” on page 82 for Windows server from OS/400.
3. “Display Windows server information on OS/400” on page 85 of the NWSD and its associated lines, controllers, and devices. When the status is Varied Off, “Starting Windows server from OS/400” on page 81.
4. If the problem persists, look for helpful information in the “Check message and job logs” on page 134.
5. Next look for the specific problem in the section “Troubleshoot problems with Windows server on iSeries” on page 135.
6. Also check the Informational APARs for the latest tips and service information. You can find these at the IBM Windows Integration  Web site.
7. If the Windows server becomes damaged, you may be able to preserve installed applications and user data by “Reinstall Windows server on iSeries” on page 163.
8. If you need information about collecting service data to send to support personnel, see “Collect service data for Windows server on iSeries” on page 164.

Other options to resolve problems

If a solution to the problem you are having is not addressed by the troubleshooting sections in this chapter, other service options may help resolve the problem.

- For problems with specific applications, contact the application provider for support.
- For Integrated xSeries Server or Integrated Netfinity Server hardware errors or server installation problems, contact IBM Service.
- For fatal server errors (e.g. blue screens), there may be pertinent information at websites as400service.ibm.com or support.microsoft.com relating to the problem.

If additional assistance is required, under IBM service contracts, IBM service will assist in determining the proper path for problem resolution. Please contact the IBM Support Line for

Check message and job logs

Windows server on an Integrated xSeries Server logs information in several places. If you have a problem, this information may help determine its cause.

Monitor job log

The “Monitor job” on page 135 log contains messages that vary from normal processing events to detailed error messages. To check this log, do this:

1. At the OS/400 command line, use the Work with active job (WRKACTJOB) command and find the job in the QSYSWRK subsystem with the same name as your network server. If the job does not appear on this display, the job has either ended or has not started.
2. If you find the job, use option 5 to work with the job and option 10 to display the job log.
3. Press F10 for detailed messages.
4. If you find useful information in the log, write down the job ID (all three parts: Name, User, and Number). Then print the log with this command: `DSPJOBLOG JOB(number/user/name) OUTPUT(*PRINT)`.

Note: If the problem caused your monitor job to end or you are debugging a problem that happened before the present monitor job, search for a spooled file that contains information in the previous job log. To find spooled files that deal with your network server, use this command: `WRKSPLF SELECT(QSYS *ALL *ALL nwsd_name)`.

QVNAVARY job log

The QVNAVARY job log contains messages that deal with the vary on and vary off of the network server description when you shut down and restart from Windows server. To check this log for shutdown and startup errors, do this:

1. At the OS/400 command line, use the Work with active job (WRKACTJOB) command and find the QVNAVARY job in the QSYSWRK subsystem.
2. Use option 5 to work with the job and option 10 to display the job log.

You can also use `WRKJOB JOB(QVNAVARY)`.

Job log of the job that initiated a vary on or off

If a batch job or interactive user initiated a vary on or off of the NWSD from OS/400, the log for that job might provide helpful information. For example, if you used a `VRYCFG` or `WRKCFGSTS` command, you can use the Display job (`DSPJOB`) command and option 10 to look at the job log.

Server message queue

If during the installation you specified a message queue for your network server, that message queue can provide helpful information.

1. If you need to verify whether you specified a message queue, at the OS/400 command line, type `DSPNWSN NWSD(nwsd_name)` and press Enter. If it is set to *none, only serious messages go to the QSYSOPR message queue.
2. If a message queue is specified, use this command on OS/400 to display the messages: `DSPMSG MSGQ(library/queue)`

System operator's message queue

The Integrated xSeries Server updates the system operator's message queue (QSYSOPR) with normal startup and shutdown messages in addition to failure messages. To display these messages on

Monitor job

Every active Integrated xSeries Server has a monitor job that starts when you start the server. The monitor job runs in the QSYSWRK subsystem under the QSYS user profile. ➤ The job name is the name of the network server description ◀ that it is monitoring.

When the monitor job starts, OS/400 sends an informational message, CPIA41B, to the QSYSOPR message queue. This message contains the job ID of the monitor job. You can use this job ID with the Work with Job (WRKJOB) command to find the monitor job log and other job-related information for the monitor job.

If an Integrated xSeries Server does not appear to be

Troubleshoot problems with Windows server on iSeries


If your Windows server on iSeries is not working correctly, check to see if your problem fits into this list:

- “Blue screen errors on Windows server on iSeries” on page 136
- **Drive problems**
 - “A full system drive on Windows server on iSeries” on page 136
 - “Drive letters” on page 137 when upgrading OS/400
- **Device problems**
 - ➤ “Optical device problems on Windows server on iSeries” on page 138◀
 - “Tape problems on Windows server on iSeries” on page 139
 - “Display problems with Windows NT 4.0” on page 141
- **Starting/stopping problems**
 - “Problems starting Windows server on iSeries” on page 141 problems of Windows server on iSeries
 - “Vary-off failures of Windows server on iSeries” on page 142 of Windows server on iSeries
 - “NWSD configuration file errors” on page 142 problems
- **Externally attached xSeries servers**
 - “DASD in externally attached xSeries servers” on page 143
 - “HSL communication problems with the Integrated xSeries adapter” on page 143
- **User and group enrollment problems**
 - “Failures enrolling users and groups on Windows server on iSeries” on page 143 users and groups
 - “User-enrollment authorization problems” on page 145 problems
 - “User and group enrollment from a Windows NT 4.0 server to a Windows 2000 or Windows .NET Server” on page 145
 - “Password problems” on page 146 problems
- Problems using Software maintenance (See “Level Check or Integration for Windows Server snap-in program for Windows server on iSeries” on page 147) program
- **Networking problems**
 - ➤ “Virtual Ethernet connection problems” on page 149◀
 - “OS/400 external LAN when sharing network adapters” on page 151 when sharing network adapters
 - ➤ “External LANs for Windows 2000 and Windows .NET Server” on page 153◀
 - ➤ “Manually update LAN drivers in Windows 2000 or Windows .NET” on page 155◀
 - ➤ “Private LAN IP address conflicts” on page 157◀
 - “IP forwarding problems” on page 159 problems

- “IFS access problems” on page 160 problems
- » “TCP/IP failure between OS/400 and Windows” on page 160«
- Problems “Problems with saving Windows server files” on page 161
- “Unreadable messages in the server message queue” on page 162 in the server message queue
- Problems with “Problems getting a Windows server system memory dump” on page 162

Blue screen errors on Windows server on iSeries

When you get blue screen errors on Windows server on iSeries, take the following actions to try to determine the cause of the errors and how to correct the errors:

1. On the OS/400 command line, type DSPMSG QSYSOPR.
2. Press Enter. The QSYSOPR message queue appears.
3. Look through the messages for any that may help you determine what caused the blue screen.
4. Restart Windows server by varying it off, then back on, from OS/400 (see “Shut down Windows server from OS/400” on page 82 and “Starting Windows server from OS/400” on page 81).
5. » Inspect the Event log on Windows for errors, type of stop code, and other diagnostic information. «
6. If the problem still persists, check the technical information databases at the IBM iSeries Support Web page  . If you cannot find the solution there, contact your technical support provider.

A full system drive on Windows server on iSeries

» The system drive contains the Windows server operating system and may contain applications and data as well. « If this drive fills up, it can cause such errors as full drive messages and paging file errors.

To keep the system drive from filling up, take one or more of these steps:

- Increase the size of the system drive during the installation of Windows server.
- When you install applications, install them on a user-defined storage space instead of taking the default of installing them to your system drive.
- “Remapping a full C drive on Windows server on iSeries” on page 137.
- Move your Windows server paging file to a user-defined storage space instead of defaulting to the system drive. If you move your paging file, you will not be able to collect a system-memory dump if a STOP error or bluescreen occurs. However, if you want to do this, follow these steps:

For Windows 2000 » or Windows .NET Server:«


1. Right-click on the **My Computer** icon and select **Properties**.
2. Select the **Advanced** tab.
3. Click the **Performance** options button.
4. Click the **Change** button for **Virtual Memory**.
5. Select a user-defined storage space that has the amount of free space that you need.
6. Click **OK**.

For Windows NT 4.0:

1. Right-click on the **My Computer** icon and select **Properties**.
 2. Select the **Performance** tab.
 3. Click the **Change** button for **Virtual Memory**.
 4. Select a user-defined storage space that has the amount of free space that you need.
 5. Click **OK**.
- Move your Windows server memory dump to a user-defined storage space instead of defaulting to the system drive. To do this, follow these steps:
 1. Go to **Start**, then **Settings**, then **Control Panel**.
 2. Click the **Startup/Shutdown** tab.

3. Select the **Write debugging information to** box in the **Recovery** section of the panel.
4. Select a user-defined storage space that has enough free space (about 12 MB larger than your RAM size). Refer to the Windows documentation for additional recommendations and requirements for page size.
5. Click **OK**.

Note: If you move your Windows server memory dump to a user-defined space, you will have to copy the dump file to tape to send it to technical support.

- If the problem still persists, check the technical information databases at the IBM iSeries Support Web page  . If you cannot find the solution there, contact your technical support provider.

Remapping a full C drive on Windows server on iSeries: If your C drive is too small to hold Windows server applications that require the C drive during installation, you can remap the C drive. With Windows server Administrator authority, you can use the Disk Administrator application (for Windows NT 4.0) or Disk Manager (for Windows 2000) to remap the current C drive (which is the first physical drive) to another available drive letter. Then you can map a larger network storage space as the new C drive. Windows server on iSeries can still locate control files after you reassign the drives. To do this, follow these steps:

1. On OS/400, vary off the network server description (NWSD) for your Windows server. “Shut down Windows server from OS/400” on page 82 tells you how.
2. On OS/400, use the Create Network Server Storage Space (CRTNWSSTG) command to create a network storage space.
3. On OS/400, use the Add Network Server Storage Link (ADDNWSSTGL) command to link that storage space to the Windows server.
4. Vary on the network server description (NWSD) for your Windows server. “Starting Windows server from OS/400” on page 81 tells you how.
5. On the Windows server, use **Disk Administrator** or **Disk Manager** to do this:
 - a. Map the current C drive to another available letter
 - b. Map the new network storage space to the C drive
 - c. Format your new network storage space
6. Install the Windows server application.

Drive letters

Version 4 Release 2 of iSeries Integration for Windows Server reserved drives F, G, H, I, and J as placeholder drives. As a result, Windows NT 4.0 began assigning network storage space drive letters at K. Version 4 Release 2 PTF MF18124 and Version 4 Release 3 removed those placeholder drives, so now network storage space drives begin at F when viewed from Windows server.

For any servers installed before this PTF, upgrading to Version 4 Release 3 or later may affect applications or data that refer to these drives. If it does, you have the option of either reinstalling the applications and data or returning the drive lettering to its original state. Both of these operations require knowledge of Windows server and the configuration of this specific Windows server installation. Only someone with this knowledge, for instance, the Administrator of this server, should try them.

Option 1: Reinstall applications and data

Before upgrading to Version 4 Release 3 or later of iSeries Integration for Windows Server, do this:



1. Back up all data files.
2. Uninstall the applications according to the application directions.

After installing Version 4 Release 3 or later of iSeries Integration for Windows Server, do this:



1. Reinstall applications according to the application directions.
2. Restore data files to the appropriate location.

Option 2: Return the Windows server drive lettering to its original state


If you choose to return the drive lettering to its original state, do this:

1. Before installing Version 4 Release 3 or later of iSeries Integration for Windows Server, click on **Start**; then **Programs**; then **Tools**; then **Disk Administrator** (for Windows NT 4.0) or **Disk Manager** (for Windows 2000  or Windows .NET Server ). Note the network server storage space configuration. By default, linked network server storage space drives begin at K. Additional linked network server storage spaces are consecutively assigned the next available drive letter (L, M, N, and so forth). Also note what drive letter is assigned to each CD-ROM that is shown. On OS/400, vary off the NWSD (for how to do that, see “Shut down Windows server from OS/400” on page 82).

Note: Unless you recorded the drive letters for the NWSDs and CD-ROM before installing Version 4 Release 3 or later, you may not know the correct drive letters. Use one of the following methods to determine the drive letters:

- If you did not previously use the Windows server Disk Administrator or Disk Manager to assign drive letters, use the default drive letters, beginning with K. Each additional linked network server storage space is assigned the next available drive letter (L, M, N, and so forth). The CD-ROM is assigned the first available drive letter after the network server storage space drive letters.
 - If you did previously use the Windows server Disk Administrator or Disk Manager to assign drive letters, use the same drive letters that you assigned.
2. Install Version 4 Release 3 or later of iSeries Integration for Windows Server on OS/400.
 3. On OS/400, vary on the NWSD (for how to do that, see “Starting Windows server from OS/400” on page 81). The drive lettering of network server storage spaces now begins at F and continues sequentially. The CD-ROM is assigned the first available drive letter after the network server storage space drive letters.
 4. Using the Windows server Disk Administrator or Disk Manager and the notes that you saved in step 1, assign each network server storage space and CD-ROM its original drive letter. To do this, perform the following for each network server storage space and CD-ROM:
 - a. Click on **Start**, then **Programs**, then **Tools**, then **Disk Administrator** (for Windows NT 4.0) or **Disk Manager** (for Windows 2000  or Windows .NET Server ).
 - b. Select the appropriate drive.
 - c. Click with the right mouse button to bring up a menu.
 - d. Select **Assign Drive Letter**, and use the drop-down box to choose the appropriate drive letter.
 - e. Select **OK**
 - f. When asked to confirm your changes, select **Yes**.

Note: You should review all shares that have been defined for the server and correct them if necessary.

5. If the problem still persists, check the technical information databases at the IBM iSeries Support Web page . If you cannot find the solution there, contact your technical support provider.

Optical device problems on Windows server on iSeries

If the OS/400 optical device does not work from Windows server, take these actions:

1. Make sure that you have varied on the optical device on OS/400. (Find out how to vary on the optical device in “Use iSeries optical drives with Windows server on iSeries” on page 109.)
2. Make sure the optical drive is allocated to the Windows server.
3. Make sure that there is optical media in the drive.
4. If your system has logical partitions, make sure that you have allocated the optical device to the same partition as the Windows server.
5. Look in the event log for optical device errors.

6. Make sure that the optical device shows up in **My Computer** in Windows server.
7. Recovery steps for optical devices:
 - a. Close the Windows 2000  or Windows .NET Server Integration for Windows Server snap-in  or the Windows NT 4.0 AS400 Devices program
 - b. Vary off the optical device on the iSeries
 - c. Vary the optical device on
 - d. Reallocate the device to the Windows server
8. If the problem still persists, check the technical information databases at the IBM iSeries Support Web page  .
9. If you cannot find the solution there, contact your technical support provider.

If a Windows server fails before unlocking an optical device, the device will be unavailable to OS/400 or other Windows servers. For more information, see “Locked optical device for a failed server”.

Locked optical device for a failed server: If the Windows Server fails before unlocking an optical device (or varying off the server), the optical device will be unavailable to OS/400 or other Windows Servers. You will need to vary off the optical device using WRKCFGSTS *DEV *OPT and vary it back on to free the lock.

Tape problems on Windows server on iSeries

If the iSeries tape drive does not work from Windows server, take these actions:




1. Verify that you have varied off the tape drive on OS/400 and locked it on Windows server (see “Allocate the iSeries tape drive to Windows server on iSeries” on page 112). Devices may fail to lock for one of these reasons:
 - The tape device or its tape library is varied on.
 - The device driver is not loaded.
 - The tape device is not supported.
 - If you have problems with locking the device, “Verify that the iSeries Tape Drive device driver is loaded” on page 140 is loaded on the Windows server. This usually happens automatically.
 - Verify that your “Supported iSeries tape drives” on page 111.
2. More advanced applications might lock devices to services that continue after the application interface is dismissed. This prevents other applications from being able to use the device. These services may restart automatically after a system restart, locking the device to the application. To see services of an application (such as Seagate and Computer Associates), do this:

On Windows 2000 or Windows .NET Server:

- a. Click on **Start, Programs, Administrative Tools**, then **Component Services**.
- b. Double-click on **Services**.
- c. If necessary, you can stop services from the **Services** window.

On Windows NT 4.0:

- a. Click on **Start, Settings, Control Panel**, then **Services**.
- b. If necessary, you can stop services from the **Services** window.
3. You may have multiple Windows servers on multiple Integrated xSeries Servers. If so, verify that the tape drive is unlocked on all Windows servers except the one on which you want to use it (see “Transfer control of the iSeries tape and optical drives between Windows servers” on page 113).
4. If your system has logical partitions, ensure that you allocated the tape drive to the same partition as the Windows server.
5. Verify that the drive contains a properly formatted tape (see “Format a tape on OS/400 for Windows server” on page 111).

6. Verify that the drive is not on the list of restricted devices on OS/400 by using the Display NWSD command (DSPNWSD).
7. Look in the event log for tape errors.
8. See if the tape device shows up in the Device List:
 - On Windows 2000  or Windows .NET Server: **
 - a. Click on **Start**, **Programs**, **Administrative Tools**, then **Computer Management**.
 - b. Select **System Tools**, then **Device Manager**.
 - c. Verify that the tape drive shows up in **Device List**.
 - On Windows NT 4.0:**
 - a. Click on **Start**, then **Settings**, then **Control Panel**.
 - b. Double-click on **Devices**.
 - c. Verify that the tape drive shows up in **Device List**.
9. If the problem still persists, check the technical information databases at the IBM iSeries Support Web page  . If you cannot find the solution there, contact your technical support provider.

Verify that the iSeries Tape Drive device driver is loaded: Before applications running on Windows server can use the iSeries tape drive, the IBM iSeries Tape Drive device driver must be loaded on the Windows server. This is usually automatic. To ensure that the tape device driver is loaded, follow these steps:

On Windows 2000  or Windows .NET Server: 

1. On the Windows server task bar, click **Start**, then **Programs**, then **Administrative Tools**.
2. Click **Computer Management**, then **System Tools**, then **Device Manager**.
3. Expand the icon with your computer's name on it. If a tape device is loaded, a Tape Device icon appears.
4. Expand the **Tape device** icon to see the loaded tape drivers.

Manually loading a tape driver:

5. If you need to manually load a tape driver, complete these steps:
 - a. Click on **Start**, then **Settings**, then **Control Panel**.
 - b. Click on **Add/Remove Hardware**.
 - c. On the Add/Remove Hardware Wizard, click **Next**.
 - d. Select **Add/Troubleshoot a device** and click **Next**.
 - e. On the **Choose a Hardware Device** section of the Add/Remove Hardware Wizard window, choose **Add a new device** and click **Next**.
 - f. From the **Find New Hardware** section of the Add/Remove Hardware Wizard window, choose "No, I want to select the hardware from a list," and click **Next**.
 - g. On the Hardware Type section, scroll down the combo box to **Tape drives**, select it, and click **Next**.
 - h. In the Manufacturers pane of the Select a Device Driver section, select **IBM**. In the Models pane, select **IBM AS/400 Tape Drive** and click **Next**.
 - i. Click **Next** on the "IBM iSeries Tape Drive" section of this window.
 - j. If the "Files Needed" box appears, enter c:\WINNT\System32\drivers, where c: is your system drive, into the "Copy files from" box. Click **OK**.
 - k. On the "Completing the Add/Remove Hardware Wizard" section of the Add/Remove Hardware Wizard window, click **Finish**. All the tape devices should load.
 - l. After restarting your computer, repeat steps >1 through 4 to confirm that your devices are loaded.

On Windows NT 4.0:

1. On the Windows server task bar, click **Start**.
2. Choose **Settings**, then **Control Panel**.
3. Double-click on **Tape Devices**.
4. Windows server generates a list of detected tape devices. Tape device entries include the feature and model number of the device as well as whether the device is loaded or not.
5. If a device is not loaded, click on the **Detect** button and follow the prompts to load the device. You do not need a diskette (there is no diskette drive). You do not need to tell it where to load the driver from; it will know. Because the drivers ship with iSeries Integration for Windows Server, they should always be available.

Display problems with Windows NT 4.0

The 2890 Integrated xSeries Server includes an S3 video chip, whose driver is not included in the NT distribution CD and does not support the AGP function. You need to install the S3 Inc. Savage4 Display Driver on Windows server to get video to display correctly.

Your system must have Windows NT 4.0 Service Pack 3, or later, installed before you can install the S3 Savage4 Video drivers. See “Install the Savage 4 Video Driver for Windows NT 4.0 on the 2890 Integrated xSeries Server” on page 70 for more information.

Problems starting Windows server on iSeries

If your Windows server will not start, perform these steps to determine the problem:

1. Check the status of the server (see “Display Windows server information on OS/400” on page 85). Verify that the current status of the NWSD is VARIED OFF. If it is not, “Shut down Windows server from OS/400” on page 82 the NWSD; then retry “Starting Windows server from OS/400” on page 81. If the status of the server is VARY ON PENDING even though Windows server did not start, there may be a device driver problem.
2. Look for error messages and possible corrective actions in the job log where the vary on of the NWSD was performed.
3. Look in the QSYSOPR message queue for failure messages and possible corrective actions.
4. If you created a server configuration file that might be causing problems, try repairing or resetting the server configuration file. (See “NWSD configuration file errors” on page 142.)
5. If you initiated a restart from Windows server, perform these steps:
 - a. On OS/400, enter the command `WRKACTJOB SBS(QSYSWRK)`.
 - b. Press Enter.
 - c. Locate the job QVNAVARY.
 - d. Select option 5 to work with the job.
 - e. If the job is active or on the job queue, select option 10 to display the job log. Look for failure messages and possible corrective actions.
 - f. If you have ended the job, enter `WRKSPLF SELECT(*CURRENT *ALL *ALL QVNAVARY)` to display the spooled file.
6. Enter the command `WRKPRB` to see logged problems.

Emergency Repair



If the problem persists due to a failing system drive but you have a successful backup of that drive, try this emergency repair. To recover lost data and return the system to a functioning state, follow these steps:

Note: These examples use the NWSD name *ERS* with a system drive named *ERS1*.

1. Unlink the failing system drive (typically the c: drive) by using this command: `RMVNWSTGL NWSSTG(ERS1) NWSD(ERS)`.

2. Copy the failing system drive to a new name by using this command: CRTNWSSTG NWSSTG(ERSBKP) FROMNWSSTG(ERS1).
3. Restore your latest backup of the system drive.
4. Link in the restored system drive by using this command: ADDNWSSTGL NWSSTG(ERS1) NWSD(ERS).
5. Link in the failing system drive from step 1 by using this command: ADDNWSSTGL NWSSTG(ERS1BKP) NWSD(ERS)
6. Vary on the NWSD by using this command: VRYCFG CFGOBJ(ERS) CFGTYPE(*NWS) STATUS(*ON).
7. Copy any key files, such as data files, from the failing system drive which have changed from the latest backup.
8. Install any applications that you added or upgraded since the latest backup.
9. Vary off the NWSD by using this command: VRYCFG CFGOBJ(ERS1) CFGTYPE(*NWS) STATUS(*OFF).
10. Unlink the failing system drive from step 5 by using this command: RMVNWSSTGL NWSSTG(ERS1BKP) ERS(ERS1).
11. Until you are sure you have removed all data from the failing system drive, you can relink the drive (step 5) and copy additional files to the restored drive. Once you are sure that you have removed all data from the failing system drive, make a new backup of all storage spaces. Refer to “Back up predefined disk drives for Windows servers created on V4R5 and later OS/400 systems” on page 118 for steps to backup storage spaces. Then delete the failing system drive by using this command: DLTNWSSTG NWSSTG(ERS1BKP).

Vary-off failures of Windows server on iSeries

If you get a blue screen and an error message that says ECONNREFUSED (3425) when you are trying to vary off a Windows server, look to see if the internal OS/400 Internet addresses are routed to a software common knowledge IR system (SOCKS) server that is acting as a firewall. Routing the  private  LAN through a firewall causes communications failure. For information about setting up a firewall, see the page Firewalls.

NWSD configuration file errors

If you suspect that an NWSD configuration file that you created is causing an error, try “Reset NWSD configuration file parameter” the NWSD configuration file parameter to *NONE. If the error disappears, your NWSD configuration file most likely has a problem.

If the NWSD configuration file is causing errors, you can choose to:

- Continue without using your own NWSD configuration file.
- Use an earlier “Use a previous version of the Windows server file” on page 143 of the Windows server file.
- “Repair the NWSD configuration file” your NWSD configuration file.

Repair the NWSD configuration file: If you want to repair your NWSD configuration file to eliminate the errors, do this:

1. Check the “Check message and job logs” on page 134 for error and recovery information.
2. Edit the NWSD configuration file.
3. “Starting Windows server from OS/400” on page 81 the network server again.

Reset NWSD configuration file parameter: You can set the Configuration file parameter of the NWSD to *NONE to prevent the changes that are causing errors from being made to the Windows server file. To prevent OS/400 from using your NWSD configuration file, do this:

1. On the OS/400 command line, type WRKNWSD to work with your network server descriptions (NWSD).
2. On the line by the network server that is having problems, choose option 2 (Change).
3. In the Configuration file field, select *NONE.
4. Vary on the network server and see if the error has gone away.

» **Note:**

Existing modifications to any files that are processed by a configuration file will remain unchanged. A .BKU file exists with the file contents prior to the last modification performed by varying on the server. This file can be used to replace the modified version or the file can be restored from a previous backup if one is available. «

Use a previous version of the Windows server file: If you have a working version of the Windows server file, you can change the Windows server file back to this working version. To change the Windows server file:

1. “Reset NWSD configuration file parameter” on page 142 of the NWSD to *NONE to prevent the changes that are causing errors from being made to the Windows server file.
2. Choose the Windows server file that you want to reset to a previous version.
3. If the server is functional and varied on, log on to the server or use the “Run Windows server batch commands from OS/400” on page 86 command from the OS/400 console to rename the files:
 - Rename the file that is causing problems to another name.
 - Rename the previous version of the Windows server file to the original name.
4. Vary the network server off and back on to use the previous version of the Windows server file.

DASD in externally attached xSeries servers

Local hard drives are not supported in an xSeries server when it is direct attached to the iSeries with the Integrated xSeries Adapter. In most cases, the local hard drive will simply not show up. If the drive does happen to appear, and it is used, unpredictable results may occur. When using an xSeries server in the direct attach mode, make sure any hard drives are removed.

HSL communication problems with the Integrated xSeries adapter

The preferred way to shut down a direct attach server with Integrated xSeries Adapter is vary off on the iSeries server. The shut down process on the xSeries server from Windows 2000 » or Windows .NET Server causes the server to power off. This appears to the iSeries server as an I/O tower powering off and leaving the loop. This causes the iSeries server to go into recovery mode. Powering off multiple external servers could cause problems for other non-Integrated xSeries Server towers on the high speed link (HSL) loop (e.g. a tower between two external servers that are powered off could become isolated from the iSeries). Thus performing a vary off on

Failures enrolling users and groups on Windows server on iSeries

» If you cannot enroll groups or users to Windows server on iSeries, do this to determine the problem:

From OS/400:

- Check for errors in the message log for this network server description (NWSD) (designated during server installation to be QSYSOPR, a user-defined message log, or the user job log). » Follow the error message Recovery actions to correct the problem. « You can also find error codes on the Work with NWS Enrollment (WRKNWSENR) display.
- If the message log has User Admin error NTA0282, see “User-enrollment authorization problems” on page 145.
- Make sure that the status of the server is VARIED ON (see “Display Windows server information on OS/400” on page 85).
- Check enrollment status (see “Check enrollment status” on page 107) and look for error messages. Press F5 to refresh the status.
- Verify that OS/400 is set to keep passwords (QRETSVRSEC is set to 1). (Step 4 of “Complete the installation of Windows NT 4.0 on iSeries” on page 50 tells you how.) Also verify that users who are trying to enroll sign on to OS/400 **after** this value is set.
- Specify and create a message queue for the NWSD; check the queue for messages.

- On OS/400, enter the WRKACTJOB command. Check the QPRFSYNCH job in the QSYSWRK subsystem. Check the job log by pressing F10 for more detailed messages.
- On OS/400, enter the WRKJOB *nwsdname* command, where *nwsdname* is the name of the NWSD for your Windows server. If the job is active, display the job log (Press F10 for more detail messages). If you end the job, display the spooled file.

From Windows server:







You can also try the following steps to determine the problem.

- See if the User Administration Service is running:

On Windows 2000 or Windows .NET Server:

1. From the Windows server **Start** menu, select **Programs**, then **Administrative Tools**, then **Component Services**.
2. Select **System Tools**, then **Services**.
3. See if **iSeries User Administration** appears in the list of services.
4. If the **iSeries User Administration** service is listed, but the status does not show that it is started, right-click on **iSeries User Administration** and select **Start** from the menu.
5. If **iSeries User Administration** is not listed, do the following to reinstall it:
 - a. From the **Start**, select **Run**, and type command to open a command prompt window.
 - b. Go to the C: drive (or the current Windows drive).
 - c. Type `c:\winnt\as400wsv\admin\qvnadaem /install` and press Enter.
 - d. Close the **Services** window.
 - e. Re-open **Services**.
 - f. If you have not started **iSeries User Administration**, click **Start**.

On Windows NT 4.0:

1. From the Windows server **Start** menu, select **Settings**, then **Control Panel**, then **Services**.
 2. See if **AS/400 User Administration** appears in the list of services.
 3. If the **AS/400 User Administration** service is listed, but the status does not show that it is started, select **AS/400 User Administration** and click **Start**.
 4. If **AS/400 User Administration** is not listed, do the following to reinstall it:
 - a. Open a command prompt window.
 - b. Type `qvnadaem /install` and press Enter.
 - c. Close the **Services** window.
 - d. Re-open **Services**.
 - e. If you have not started **AS/400 User Administration**, click **Start**.
- If you start to have trouble with enrolling users from Windows NT 4.0, do this:
 1. See if you are in a mixed domain of Windows NT 4.0 and Windows 2000  or Windows .NET Server  servers. (Use Windows Server Manager to see if that server is running Windows 2000  or Windows .NET Server .)
 2. If you are in a mixed domain, you need to run a conversion utility on all remaining Windows NT 4.0 NWSDs on the domain:
 - a. Click on **Start**, then **Run**.
 - b. Type `QCONVGRP.exe` and click OK. This utility changes the name of the iSeries users group (to meet Windows 2000  or Windows .NET Server  requirements).




User and group enrollment from a Windows NT 4.0 server to a Windows 2000 or Windows .NET Server

Windows 2000 » and Windows .NET Server « do not support the '/' character in group names. iSeries Integration for Windows Server uses two special groups for user enrollment that contain this character: AS/400_Users and AS/400_Permanent_Users. If you have a Windows NT 4.0 Integrated » xSeries Server that belongs to a domain that has a Windows 2000 or Windows .NET « domain controller and you are enrolling OS/400 users to that Windows domain, a utility must be run to remove this character from existing groups and to update the user administration program to use the new names. You do not need to run this utility if:

- You do not have a Windows 2000 » or Windows .NET domain controller on your domain
- Your Windows NT 4.0 machines are not Integrated xSeries Servers
- You are not enrolling users to your Integrated xSeries « Server

To run this utility, perform the following steps:

1. Install the QCONVGRP utility on your Windows NT 4.0 Integrated xSeries Server. If your OS/400 is at V4R4, V4R3, or V4R2, you can Install the latest Service Pack PTF to automatically install this utility.

See the IBM Windows Integration  Web site for the latest service pack information. If your OS/400 is at V4R5, complete the migration steps for your Integrated xSeries Server for V4R5 if you have not already done so. The QCONVGRP utility is automatically installed when the Integrated xSeries Server is migrated to V4R5.

2. Run the QCONVGRP utility. On your Windows NT 4.0 Integrated xSeries Server, run QCONVGRP from a command prompt or the Start...Run window. There are no parameters on this command.
3. Restart the OS/400 User Administration Service.
 - a. Go to **Start, Settings, Control Panel, and Services**.
 - b. Select the **AS/400 User Administration Service** in the list.
 - c. Press the Stop button.
 - d. After the service has stopped, press the Start button to restart it.
4. Repeat steps 1-3 for all Windows NT 4.0 » Integrated xSeries Servers in this domain. This only needs to be run once on each machine, but should be run on every Windows NT 4.0 Integrated xSeries Server in the domain. It is not necessary to run this on Windows 2000 xSeries xSeries Server machines or Windows NT Servers that are not Integrated xSeries Servers. «

User-enrollment authorization problems


If you get an error (NTA0282) that indicates insufficient authorization to create and update Windows server users, take action as appropriate:

- If you are trying to enroll users and groups to a domain for the first time, ensure that you set up a QAS400NT user ID to provide the necessary authorization. "Enable OS/400 user enrollment on Windows servers" on page 100 tells you how.
- If you have been successfully enrolling users and groups for awhile, check to see if the OS/400 password for the QAS400NT user has expired. When the QAS400NT user password expires, the account on Windows server also expires. To correct this situation, do the following:
 1. Enable the Windows server account.

On a Windows 2000 » or Windows .NET Server domain controller:

- a. On Windows 2000 or Windows .NET Server, « open **Start, Programs, Administrative Tools**.
- b. Select **Active Directory Users and Computers**.
- c. Right-click on **Users**; then double-click on **QAS400NT**.
- d. Click on the **Account** tab at the top of the **User Properties** screen.
- e. Change the **Account expires** date to a date in the future and click on **Never**.



On a Windows 2000 or Windows .NET Server:

- a. On Windows 2000 or Windows .NET Server,  open **Start, Programs, Administrative Tools**.
- b. Select **Computer Management**.
- c. Expand **System Tools**; then expand **Local Users and Groups**.
- d. Right-click on **QAS400NT** from the list.
- e. Click on the **Account** tab at the top of the **User Properties** screen.
- f. Change the **Account expires** date to a date in the future and click on **Never**.



On Windows NT 4.0:

- a. On Windows NT 4.0, open **Start, Programs, Administrative Tools**, then **User Manager for Domains**.
 - b. Double-click on **QAS400NT**.
 - c. Press the **Account** button at the bottom of the **User Properties** screen.
 - d. Change the **Account expires** date to a date in the future and click on **Never**.
2. On OS/400, use the Change user profile (CHGUSRPRF) or Change password (CHGPWD) command to change the QAS400NT user password.
 3. Restart the OS/400 User Administration Service.

On Windows 2000 or Windows .NET Server:

- a. On Windows 2000 or Windows .NET, click on **Start**, then **Programs**, then **Administrative Tools**, then **Component Services**.
- b. Click on **Services**.
- c. Click on  **iSeries User Administration**, then right-click on **Stop** to stop the service.
- d. Click on **iSeries User Administration**,  then right-click on **Start** to restart the service.


On Windows NT 4.0:

- a. On Windows NT 4.0, click on **Start**, then **Settings**, then **Control Panel**.
- b. Click on **Services**.
- c. Click on  **AS/400 User Administration**, then **Stop** to stop the service.
- d. Click on **AS/400 User Administration**,  then **Start** to restart the service.

Restarting the service automatically retries the enrollment of the users and groups.

To avoid this problem, be sure to change the QAS400NT password periodically on your OS/400 system to prevent the password from expiring.



If you have more than one iSeries with multiple Integrated xSeries Servers that participate in an Windows server domain, you can minimize password expiration problems by “Limit QAS400NT user profile changes” on page 101.

- If the problem still persists, check the technical information databases at the IBM iSeries Support Web page  . If you cannot find the solution there, contact your technical support provider.

Password problems

Previously, all characters that were allowed in OS/400 passwords were also allowed in Windows passwords. Now, OS/400 allows longer passwords and more characters than Windows supports. You should use OS/400 passwords containing only characters and password lengths allowed in Windows passwords if you want to enroll users. More OS/400 password level security information may be found in

the Planning Password Level Changes section of the iSeries Security Reference  .

Password truncation will occur if the OS/400 is at a newer version than the Windows server and the OS/400 password is longer than 10 characters. The passwords will be corrected when the current release of xSeries Integration for Windows Server is installed on the Windows system. The message NTA0287 is sent to the QSYSOPR message queue after the server is started if the versions do not match. To install the current release on Windows NT, run  iSeries Windows Server Level Check, or for Windows 2000 or Windows .NET,  run Integration for Windows Server Snap-in. Select to install the current release from OS/400.


If password truncation is encountered, an administrator should install the latest code on the Windows server.

If a password keeps expiring each day after being changed on Windows server, it means that the user forgot to also change his OS/400 password. Changing the OS/400 password eliminates the problem.

If the OS/400 and Windows server passwords do not match, perform these tasks to determine why:

1. Check the security level on OS/400:
 - a. On the OS/400 command line, type `WRKSYSVAL SYSVAL(QSECURITY)`.
 - b. Enter a 5 in the Option field and press Enter.
 - c. Check to see if the System security level is set to 10, which prevents OS/400 from synchronizing passwords. To have OS/400 synchronize passwords, an administrator with *SECADM special authority must change the system security level to a value other than 10.
2. Check to see that OS/400 is set to store passwords:
 - a. On the OS/400 command line, type `WRKSYSVAL SYSVAL(QRETSVRSEC)`.
 - b. Enter a 2 in the Option field; press Enter.
 - c. Verify that Retain server security data is set to 1. If it is not, change it to 1.
3. On Windows server, make sure that the User Administration Service is running. See “Failures enrolling users and groups on Windows server on iSeries” on page 143 for related information.
4. Check to see the OS/400 password support level:
 - a. On the OS/400 command line, type `WRKSYSVAL SYSVAL(QPDDLVL)`.
 - b. Enter a 5 in the Option field; press Enter.

The password level of OS/400 can be set to allow user profile passwords from 1-10 characters or to allow user profile passwords from 1-128 characters. The OS/400 password level of 0 or 1 supports passwords from 1-10 characters and limits the set of characters. At level 0 or 1, OS/400 will convert passwords to all lowercase for Windows server. The OS/400 password level of 2 or 3 supports passwords from 1-128 characters and allows more characters including upper and lower case characters. At level 2 or 3, OS/400 will preserve password case sensitivity for Windows server. A change to the OS/400 password level takes effect following an IPL.

5. Check the enrollment status of the user. Make sure the user did not already exist on Windows server with a different password before you attempted to enroll the user (see “Check enrollment status” on page 107). If the user did exist with a different password, enrollment will have failed. Change the password on Windows server to match the OS/400 password; then perform the enrollment procedure again.
6. If the problem still persists, check the technical information databases at the IBM iSeries Support Web page  . If you cannot find the solution there, contact your technical support provider.

Level Check or Integration for Windows Server snap-in program for Windows server on iSeries

You may experience an error when trying to run the Level Check or Integration for Windows Server snap-in program. The programs may not start, and may provide unexpected information, or an error could occur when you use them.


If the **Level Check** or **Integration for Windows Server snap-in** display never appears for **iSeries Windows Server**, the following steps can help you determine the problem:

- Check to see if there is already an instance of Level Check (or lvlsync) or Integration for Windows Server snap-in on the system. Windows server allows only one instance of the programs at a time. If there is already an instance of either program in operation, then a new call to either program will return. Finish using the current program before trying to start a new instance.
- Ensure that the user has administrator-level access and special authorities. The Level Check or Integration for Windows Server snap-in programs require these authorizations. Retry starting the program with administrator authority.
- Ensure that you have started iSeries NetServer. iSeries NetServer starts automatically with the QSERVER subsystem on OS/400. Start iSeries NetServer if OS/400 has not already started it. <<
- Ensure that you have enabled the guest user profile on iSeries NetServer. If not, then enable the guest user profile so that guests can access the iSeries NetServer (see “Create a guest user profile for iSeries NetServer” on page 26). When you have enabled guest access, first stop and then restart iSeries NetServer and then retry running the Level Check or Integration for Windows Server snap-in program.
- Check the system event log on the Windows server for any messages pertaining to Level Check >> or Integration for Windows Server snap-in. <<

The **Level Check** or **Integration for Windows Server snap-in** display may appear for iSeries Windows Server, but the information that OS/400 displays may not be what you expected. You may also be unable to select an item that you want. If so, then the following steps can help you determine the problem:

- Verify that the latest service pack PTF is available and in an active state on OS/400. You can use the Display PTF (DSPPTF) command to do this.
- Verify that the service pack you believe that you have installed is actually installed on the Windows server. You can use **Add/Remove Programs** in the Windows server **Control Panel** to do this.
- Check the system and application event log on the Windows server for any messages pertaining to Level Check or the Integration for Windows Server snap-in.

When you perform an action with Level Check or Integration for Windows Server snap-in, problems can occur. The following list helps you solve problems that can occur after you click the **OK** button:

- If the action was Install available service pack from iSeries or Install release from iSeries, then a drive letter must be available for Level Check or Integration for Windows Server snap-in to proceed. This drive letter need only be available temporarily. If all drive letters are in use, try freeing a drive letter for use with Level Check or Integration for Windows Server snap-in and retry the program.
- If the action was Install available service pack from iSeries, review this file for more information:
%SystemRoot%\AS400WSV\SERVICE\servpack\ptflog.txt
- If the action was Uninstall current service pack on Windows Server, review this file for more information:
%SystemRoot%\AS400WSV\SERVICE\servpack\ptfunin.txt
- If the action was Install release from iSeries, review this file for more information:
%SystemRoot%\AS400WSV\SERVICE\servpack\vrmllog.txt
- The Level Check program takes the specified action and restarts the system. It may take a short time for the system shutdown and start up to occur.
- Check the system and application event log on the Windows server for any messages pertaining to Level Check.
- If the problem still persists, check the technical information databases at the IBM iSeries Support Web page  . If you cannot find the solution there, contact your technical support provider.



Virtual Ethernet connection problems

For the purposes of this section, the Virtual Ethernet Point-to-Point (Private LAN) and the Virtual Ethernet Ports 0-9 are all considered Virtual Ethernet Adapters or Virtual Ethernet Ports.

There are two kinds of Virtual Ethernet device drivers, Virtual Ethernet Adapter (VE) and a Virtual Ethernet Data Transport (DT).

- The Virtual Ethernet Adapter corresponds to the driver that appears as the adapter, called 'virtual' because no NIC hardware is associated with it.
- The Virtual Ethernet Data Transport is the driver that provides a connection to the system bus connecting all the virtual ethernet networks.

When a VE port can not communicate across the system bus, it reports that the cable for the port is unplugged (cable disconnected). This is an important concept for troubleshooting Virtual Ethernet errors.

The Virtual Ethernet Ports under Windows are automatically installed and uninstalled by the Virtual Ethernet Utility (VEU). The utility receives signaling through a configuration file from the NWSD. For example, when a user creates a Line Description under the NWSD for a given Virtual Ethernet Port the VEU installs the corresponding VE port. Rebooting the Windows server configures the VE port address.

The following Virtual Ethernet components use the listed driver:

- Virtual Ethernet Adapter: qvndvemp.sys
- Virtual Ethernet Data Transport: qvndvedt.sys
- Virtual Ethernet Install Utility: qvndveu.exe

Troubleshooting Virtual Ethernet problems: When the communication between any VE ports is not functioning, you need to perform two general tasks to troubleshoot the problem:

1. Determine the status of the VE ports (See 149)
2. Match the observed results to the following troubleshooting cases (See 149)

Determine VE port status

To determine the status of the VE ports:

- Use the iSeries console to determine if a line description for the VE port is created under the NWSD.
- Use the the Windows console to open the **Network and Dial Up Connections** folder and determine if the VE port icon is present.

Match port status with troubleshooting cases

Match results of your determination of the status of the VE ports to one of the following troubleshooting cases:

- "Both line description and icon are present" on page 150
- "Line description is present and icon is missing" on page 150
- "Line description is missing and icon is present" on page 150
- "Both line description and icon are missing" on page 151

In each case, you must first verify the OS/400 side then verify the Windows side. To verify the Windows side, you may need to open the Event Log and the Device Manager.

- To open the Event Log, from the Windows **Start** menu, select **Programs**, then **Administrative Tools**, then **Event Viewer**.
- To open the Device Manager, from the Windows **Start** menu, select **Settings**, then **Control Panel**, then **Administrative Tools**, then **Computer Management**, then **Device Manager**.

Both line description and icon are present: **Verify the OS/400 side**

Check the line description. When the line description is in the FAIL state, perform the following steps:

1. Collect PAL entries and VLOGs
2. Contact support
3. Verify the Windows side

Otherwise, when the line description is in the VARY-ON PENDING, VARY-ON, or RCYPND state, verify the Windows side.

Verify the Windows side

Open the **Network and Dialup Connections** window and check the VE icon:

- When the VE icon appears functional and the line description is in the VARY-ON state, verify that the IP addresses are properly configured. If the problem persists, contact support.
- When the VE icon appears functional and the line description is in VARY-ON PENDING or RCYPND state, verify for entries in the PAL and contact support.
- When the VE icon has a red X (cable disconnected), open the Event Log and locate entries for the qvndvemp.sys driver.
 - When you find entries for qvndvemp.sys, record them and contact support. Driver initialization is likely to have failed, and an IOP dump may be required to determine the problem.
 - When you do not find any entries for qvndvemp.sys, contact support and indicate the state of the line description. The problem is likely to be related to an OS/400 LIC problem.

Line description is present and icon is missing: **Verify the OS/400 side**

Check the line description. When the line description is in the FAIL state, perform the following steps:

1. Collect PAL entries and VLOGs
2. Contact support
3. Verify the Windows side

Otherwise, when the line description is in the VARY-ON PENDING, VARY-ON, or RCYPND state, verify the Windows side.

Verify the Windows side

Open the **Device Manager**, click **Network Adapters** to list the installed adapters, and locate the entry for the VE port.

- When the VE port has a yellow bang, complete the following steps:
 1. Open the Event Log, locate any entries for the qvndvemp.sys driver and record them.
 2. Contact support. The driver failed to initialize, which requires assistance to diagnose the cause.
- When the VE port has a red X, complete the following steps:
 1. Right-click the VE port and select **Enable**.
 2. Open the **Network and Dialup Connections** window and locate the VE icon.
 3. If the VE port icon is missing or it remains gray, open the **Event Log**.
 4. Locate entries for the qvndvemp.sys driver, record any that you find, and contact support. The VE port failed to load or start.

Line description is missing and icon is present: **Verify the OS/400 side**

Verify that no line description is currently present for the VE port under the NWSD, then verify the Windows side.

Verify the Windows side

Open the **Network and Dialup Connections** window and check the VE icon. When the installation VEU failed to remove the VE port, reboot the Windows Server to clear this condition. If the problem persists, complete the following steps:

1. Use the VEU to manually remove the VE port by using the following command:

```
qvndveu -a -R -x [port_id]
```

where [port_id] is either a decimal (0-9) that corresponds to the port being removed or p, for Point-to-Point (Private LAN).

2. After running the command, if the VE port icon is no longer present, the process has completed. However, if the VEU failed to uninstall and remove the VE port, continue with the remaining steps.
3. Collect the VEU log file (d:\as400nt\qvndveu.log).
4. Open the **Event Log**, locate any entries for the qvndvemp.sys driver and record them.
5. Contact support. Ensure that you have the following at hand:
 - Any entries that you recorded for qvndvemp.sys
 - The VEU log file that you previously collected

Both line description and icon are missing: **Verify the OS/400 side**

You must have a line description in the NWSD for a VE port to be installed. Use the instructions in “Configure Virtual Ethernet connections to OS/400, another Windows server, or LPAR on iSeries” on page 73 to create a line description.

Note: To add a line description, the NWSD needs to be varied off. Once you have created the line description and rebooted the Windows server, the installation VEU automatically creates the VE port under Windows.

When a VE port problem persists after you successfully create a line description and reboot the Windows server, come back to this troubleshooting section and follow the instructions for the newly matched failing case.

Verify the Windows side

When no line description is present, a VE port should not be listed under Windows. Install the line description as described in Verify the OS/400 side for this case. <<

OS/400 external LAN when sharing network adapters

Be aware that the Pentium III Integrated xSeries Server does not support sharing external network adapters with OS/400. When you upgrade to this model of Integrated xSeries Server, you need to manually remove any “Delete line descriptions for Windows server on iSeries” on page 132 and “Delete TCP/IP interfaces associated with Windows server on iSeries” on page 132 that are associated with external host LAN.


If you are using an Integrated xSeries Server model that supports shared adapters and experience an error while trying to use the OS/400 external LAN, try this:

From OS/400:

- Ensure that you have started TCP/IP services on OS/400 by using the Start TCP/IP (STRTCP) command.
- Review the QSYSOPR message queue for any TCP/IP errors.

- Ensure that you have properly configured the OS/400 TCP/IP address and that this address is unique on the network. You can use option 1 of the Configure TCP/IP (CFGTCP) command to do this.
- Ensure that the line description to which the OS/400 TCP/IP address is bound is the appropriate TCP/IP address for the 6617 or 2850 adapter card.
- If you added a line description for a network adapter on OS/400 after installing the server, ensure that the Windows server Internet address matches the one you configured under the Windows server for that adapter.
- Ensure that the TCP/IP interface status is active. To do this, follow these steps:
 1. Use option 1 of the CFGTCP command.
 2. Press F11 to view the interface status.
 3. Type a 9 next to the appropriate network service to start the TCP/IP interface.
 4. Press F5 to refresh the view. The appropriate TCP/IP service should now be active.
- Test the communication link by using the PING command.
 - If you can PING local addresses (those on your network), but not remote addresses, use option 2 (Work with TCP/IP routes) of the Change TCP/IP domain information (CFGTCP) command. Ensure that a *DFTRROUTE entry exists for the local gateway system.
 - If you can PING systems by their IP addresses but not by their system names, use option 12 of the CFGTCP command. Ensure that the name of the system, the domain, and the domain name server addresses are correct.

From Windows server:

For Windows 2000  or Windows .NET , see “External LANs for Windows 2000 and Windows .NET Server” on page 153. 

For Windows NT 4.0:


- Review the Windows server event log for either communication errors or device driver errors. You can use the Windows server **Event Viewer** to do this.
- Ensure that the drivers IBM iSeries Protocol Driver 1 (AS/400 HostLan Bridge Driver 1) and IBM iSeriesLine Device Driver Port 1 (iSeries HostLAN Port 1 Device Driver) are listed and have a status of started.
 1. From Windows NT 4.0, click on **Start**, then **Settings**, then **Control Panel**.
 2. Click on **Devices**.
 3. Ensure that the drivers are listed and have a status of **started**.

Note: The start up setting should be **Manual**.


- If so, you should start the IBM iSeries Protocol Driver 2 (AS/400 HostLan Bridge Driver 2) and IBM iSeries Line Device Driver Port 2 (AS/400 HostLAN Port 2 Device Driver) drivers.
- For Ethernet adapters, also in **Devices**, ensure that the driver **AMD PCNET PCI Ethernet Adapter** is listed and has a status of **started**.
- For token-ring networks, also in **Devices**, ensure that you have started the **IBM PCI Token-Ring Adapter Driver**.

Note: The start up setting should be **Automatic**.

- For Ethernet networks, from the **Control Panel**, select **Network**, then the **Adapters** tab. Ensure that **AMD PCNET PCI Ethernet Adapter** is listed.
- For Ethernet networks, ensure that the Duplex setting is appropriate. Also ensure that you have set the **Network Address** to the same value that appears in the Adapter address field for the corresponding line description of OS/400. To review this, do the following:
 1. Select **Control Panel**, then **Network**, then the **Adapters** tab and press the **Properties** button.

2. On OS/400, use the WRKLIND command and select option 5 on the corresponding line to view the Local Adapter Address and Duplex values.
- For token-ring networks, ensure that the **Data Rate**, **Duplex**, and **Locally Administered Address** settings match the values on the corresponding line description of OS/400: Line Speed, Duplex, and Adapter Address. To review this, do the following:
 1. Select **Control Panel**, then **Network**, then the **Adapters** tab and press the **Properties** button.
 2. On OS/400, use the WRKLIND command and select option 5 on the corresponding line to view the Line Speed, Duplex, and Local Adapter Address values.
 - Ensure that the **IP Address**, **Subnet Mask**, and **Default gateway** values are correct and that each adapter present has a unique IP address. To do this, do the following:
 1. Click on **Start**, then **Settings**, then **Control Panel**.
 2. Select **Network**.
 3. Select the **Protocols** tab.
 4. Select **TCP/IP Protocol** from the list of installed protocols and press the **Properties** button.
 5. Check the values for the **IP Address**, **Subnet Mask**, and **Default gateway**. Also ensure that each adapter present has a unique IP address.
 - Ensure that all IBM iSeries Protocol Driver (iSeriesHostLAN Bridge Driver) entries are present and enabled under all network adapters. To do this, again from **Network**, select the **Binding** tab, then **All Adapters**.
 - Test the communication link by using the PING command. You should be able to ping external systems as well as the external LAN port of OS/400 that shares the same physical network adapter.
 - If the problem still persists, check the technical information databases at the IBM iSeries Support Web page . If you cannot find the solution there, contact your technical support provider.






External LANs for Windows 2000 and Windows .NET Server


- Review the Windows server event log for either communication errors or device driver errors. You can use the Windows server **Event Viewer** to do this.  In Windows 2000, if you can not find text in event logs for the IBMTRP token-ring service, you need to make changes in the Windows 2000 Registry.

Note: If you are not familiar with the process for making changes in the Windows 2000 Registry, contact a service representative.


If you are familiar with this process, to make the text in the event logs viewable, complete the following steps:


1. From the Windows 2000 **Start** menu, click **Run**.
 2. Type regedit.
 3. In the Registry Editor, go to HKEY_LOCAL_MACHINE\SYSTEM\CurrentControlSet\Services\IBMTRP
 4. Select **EventMessageFile**.

Note: If the **EventMessageFile** value does not exist, you must create it. From the Registry Editor **Edit** menu, select **New**, then **String Value**, and type EventMessageFile.
 5. From the Registry Editor **Edit** menu, select **Modify**.
 6. Type %SystemRoot%\System32\netevent.dll;%SystemRoot%\System32\ibmsgnet.dll
 7. Close the Registry Editor and restart Windows. 
-  When sharing adapters with OS/400,  ensure that the drivers **IBM iSeries Line Device Driver Port 1** and **iSeries Line Device Driver Port 2** are listed and have a status of **Enabled**.
 1. From Windows 2000  or Windows .NET Server,  click on **Start**, then **Programs**, then **Administrative Tools**, then **Computer Management**.
 2. Select **System Tools**; then click **Device Manager**.

3. At the top menu bar, select **View** and from the drop-down menu, select **Show Hidden Devices** to list all drivers.
 4. Expand the **Non-Plug and Play Drivers** entry and locate in the list the **iSeries Line Device Driver Port 1** and **iSeries Line Device Driver Port 2**.
 5. Double-click on each driver and verify that the **Device Usage** is set to **Enable**.
 6. Verify that the **Device Status** window indicates that *This Device is working properly*.
 7. Click **Cancel** to terminate the verification.
-  For Ethernet adapters, ensure that a driver with **iSeries** or **AMD PCNET Family Ethernet Adapter (PCI)** in its name is listed and has a status of **started**:
 1. Click on **Start**, then **Administrative Tools**, then **Computer Management**, then **System Tools**, then **Device Manager**, then **Network Adapters**.
 2. Ensure that a driver with **iSeries** or **AMD PCNET Family Ethernet Adapter (PCI)** in its name is listed and has a status of **started**.
 - For token-ring networks, also in **Device Manager**, ensure that you have started the **IBM High-Speed 100/16/4 Token-Ring PCI Adapter** or **IBM PCI Token-Ring Adapter**.

Note: The start up setting should be **Enable**.


 - For token-ring networks, ensure that the Network Data Rate setting is appropriate for your network.
 - For Ethernet networks, ensure that the Link Speed and Duplex settings are appropriate for your switch or hub. If you have an IBM iSeries 1000/100/10 Ethernet Adapter, (Feature Code 5701) that does not connect with an early model of copper UTP gigabit Ethernet switch at speeds greater than 100 million bits per second, ensure that your switch is fully compliant with the IEEE 802.3ab standard for gigabit Ethernet on copper. Your switch manufacturer may be able to provide information about the standards compliance for your switch. If the switch is not fully IEEE 802.3ab compliant, the 5701 adapter may be limited to 100 million bits per second when running under Windows. This limitation generally does not apply to 5701 adapters running under OS/400 and Linux, however, as these environments include some support beyond the IEEE standard.
 - If sharing adapters with OS/400,  also ensure that you have set the **Network Address** to the same value that appears in the Adapter address field for the corresponding line description of OS/400. To review this, follow these steps:
 1. Click on **Start**, then **Programs**, then **Administrative Tools**, then **Computer Management**, then **System Tools**.
 2. Double-click **Device Manager**.
 3. Expand **Network Adapters**, right-click on the adapter in the list, and select **Properties** from the menu.
 4. Select the **Advanced** tab. From the list of parameters, find the **Network Address** and click to select. Ensure that the **Values** box is filled with the matching iSeries Line Description Local Adapter Address value.
 5. Find and select the **External Phy** parameter. Ensure that the value is set to match the Line Speed and Duplex set in the iSeries Line Description.
 6. On OS/400, use the WRKLIND command and select option 5 on the corresponding line to view the Local Adapter Address, Line Speed, and Duplex values.
 - For token-ring networks, ensure that the **Data Rate**, **Duplex**, and **Locally Administered Address** settings match the values on the corresponding line description of OS/400: Line Speed, Duplex, and Adapter Address. To review this, follow these steps:
 1. Select **Control Panel**, then **Network**, then the **Adapters** tab and press the **Properties** button.
 2. Select the **Advanced** tab. From the list of parameters, find the Network Address (LAA) and click to select. Ensure that the Value Box is filled with the matching iSeries Line Description Local Adapter Address value.
 3. Find the Data Rate and Duplex parameters. Select each and ensure that the value is set to match the Line Speed and Duplex set in the iSeries Line Description.

4. On OS/400, use the WRKLIND command and select option 5 on the corresponding line to view the Line Speed, Duplex, and Local Adapter Address values.
- Ensure that the **IP Address**, **Subnet Mask**, and **Default gateway** values are correct and that each adapter present has a unique IP address. To do this, do the following:
 1. Click on **Start**, then **Settings**, then **Network and Dial-up Connections**.
 2. Right-click on **Local Area Connections** and select **Properties** from the menu.
 3. Select **TCP/IP Protocol** from the list of installed protocols and press the **Properties** button.
 4. Check the values for the **IP Address**, **Subnet Mask**, and **Default gateway**. Also ensure that each adapter present has a unique IP address.
 - Ensure that all **iSeries Line Multi-Port Protocol Driver** entry is present and enabled under all network adapters. To verify, open **Network and Dial-up Connections**, double-click on each connection, click on the **Properties** button, and ensure that the **iSeries Line Multi-Port Protocol Driver** is listed and selected.
 - Test the communication link by using the PING command. You should be able to ping external systems as well as the external LAN port of OS/400 that shares the same physical network adapter.
 - If the problem still persists, check the technical information databases at the IBM iSeries Support Web page . If you cannot find the solution there, contact your technical support provider.




Manually update LAN drivers in Windows 2000 or Windows .NET

Windows 2000 and Windows .NET generally automatically install LAN drivers that are appropriate for your LAN adapters and ports. However, if you have a special situation you can manually install or update a LAN driver.


To manually install or update a LAN driver for an adapter other than Virtual Ethernet in an externally attached Netfinity or xSeries server, go to the IBM Personal computing support Web site  and select **Servers**, then **Device driver file matrix**.

To manually install or update a LAN driver for an adapter or port in an Integrated xSeries Server or for Virtual Ethernet, complete the following tasks:

1. "Begin the LAN driver installation or update"
2. "Select the adapter to install or update" on page 156
3. "Complete the LAN driver installation or update" on page 156 



Begin the LAN driver installation or update: To begin the manual installation or update of the LAN driver or port in an Integrated xSeries Server or for Virtual Ethernet, complete the following steps:

1. From the Windows **Start** menu, select **Settings**, then **Control Panel**.
2. Double-click **System**.
3. In the **System Properties** window, select the **Hardware** tab.
4. If the new LAN driver is not digitally signed, or if you are unsure whether or not the LAN driver is digitally signed, ensure that the driver signing policy is set to Ignore:
 - a. In the **System Properties** window, click **Driver Signing**.
 - b. Note the current setting, then click **Ignore**, and then click **OK**.
5. Click **Device Manager**.
6. "Select the adapter to install or update" on page 156 



Select the adapter to install or update: After you complete the steps to “Begin the LAN driver installation or update” on page 155 of the LAN driver or port in an Integrated xSeries Server or for Virtual Ethernet, you will need to select the adapter.

To select the adapter that you want to install or update, complete the following steps:

1. In the **Device Manager** window, open **Network Adapters**.
2. Under **Network Adapters**, right-click the adapter that you want to update and select **Properties**.
3. In the **Properties** windows for the adapter, click the **Driver** tab.
4. Click **Update Driver** or **Install Driver** (only one will display).
5. In the **Update Device Driver Wizard** dialog, click **Next**.
6. “Complete the LAN driver installation or update” <<



Complete the LAN driver installation or update: Ensure that you have completed the first two tasks required to manually install or update the LAN driver or port in an Integrated xSeries Server or for Virtual Ethernet:

- “Begin the LAN driver installation or update” on page 155
- “Select the adapter to install or update”

To complete the LAN driver or port installation or update, use one of the following procedures that fits your situation:

- You are using Windows 2000, or have been directed to install the LAN driver from a specific folder for Windows .NET
- You are using Windows .NET and have not been directed to install the LAN driver from a specific location

If you are using Windows 2000, or if you have been directed to install the LAN driver from a specific location for Windows .NET.

To complete the LAN driver installation or update, perform the following steps:

1. Select **Display a list of the known drivers for this device so that I can choose a specific driver** and click **Next**.
2. Click **Have Disk** to open the **Install From Disk** dialog and specify the location of the driver:
 - If you were directed to install the driver from a specific drive and folder, click **Browse** to specify the location, then click **Open**.
 - Otherwise, click **Browse** to specify the location on the system drive (usually C:) of the driver that corresponds to the adapter that you are installing or updating. Use the following list to locate the folder that contains the driver for your specific hardware:
 - \wsv\amd for hardware types 2723 and 2838
 - \wsv\ibm for hardware types 2724 and 2744
 - \wsv\alt for hardware types 2743 and 2760
 - \wsv\it1 for hardware types 2892, 5700, and 5701
 - \wsv for Virtual Ethernet
3. Click **OK**.
4. In the **Update Device Driver Wizard** dialog, if the appropriate driver is not already highlighted, select it from the list, then click **Next**.
5. Click **Next** again.

6. If there is a Ret Code 22 when the Update Driver procedure completes, the adapter may be disabled. To enable the adapter in this case, in the **Device Manager** window, right-click the disabled adapter and select **Enable**.
7. If you want to install or update more adapters, “Select the adapter to install or update” on page 156.
Note: If Windows indicates that a restart is needed after any driver update, defer the Windows restart until there are no more adapters to update.
8. If you changed the driver signing policy when you “Begin the LAN driver installation or update” on page 155, restore the original policy.

If you are using Windows .NET and you have not been directed to install the LAN driver from a specific location.

To complete the LAN driver installation or update, perform the following steps:

1. Select **Search for a suitable driver for my device** and click **Next**.
2. Click **Next** to show compatible hardware.
3. Deselect all **Optional search locations**, click **Next**, then click **Next** again.
4. If there is a Ret Code 22 when the Update Driver procedure completes, the adapter may be disabled. To enable the adapter in this case, in the **Device Manager** window, right-click the disabled adapter and select **Enable**.
5. If you want to install or update more adapters, “Select the adapter to install or update” on page 156.
Note: If Windows indicates that a restart is needed after any driver update, defer the Windows restart until there are no more adapters to update.
6. If you changed the driver signing policy when you “Begin the LAN driver installation or update” on page 155, restore the original policy.⏪

Private LAN IP address conflicts

iSeries Integration for Windows Server uses IP addresses in the range of 192.168.x.y for the internal local area network (LAN) on the Integrated xSeries Server. By default, the actual addresses are selected by the OS/400 Install Windows server (INSWNTSVR) command. For details and examples, see ⏩ “Details: assign private LAN IP addresses” on page 158 ⏪. Depending on your network, there could be conflicts with addresses that are already in use. To avoid potential conflicts, you can use the INTLANPORT parameter on this command to assign IP addresses that you know are unique on your system.

If a conflict requires you to change the addresses, you must ensure that the ⏩ private LAN occupies its own subnet on OS/400. The subnet mask that is used is 255.255.255.0. To ensure that the private LAN is on its own subnet, use IP addresses of the form a.b.x.y, where a.b.x is the same value for both sides of the internal LAN. Also verify that the value of a.b.x is unique on your network. ⏪

To change the private LAN addresses because of a conflict, take the following action:

1. At the OS/400 console, enter the command DSPNWSN NWSN(name) OPTION (*PORTS). ⏩ Make a note of the Attached line for the port number *VRTETHPTP or *INTERNAL,⏪ which is also known as the line description.
2. Use the Configure TCP (CFGTCP) command and option 1 to display the TCP interfaces. Make a note of the IP address and the subnet mask associated with the line description that you found in step 1.

On Windows 2000 ⏩ or Windows .NET Server:

Note: ⏩ An IP address entered at the Windows console for the private LAN overrides the values that are set in the NWSN for the TCPPRTCFG parameters *INTERNAL or *VRTETHPTP. ⏪

1. Click on **Start**, then **Settings**, then **Network and Dial-up Connections**.

2. Right-click on the correct **Local Area Connection** » for the private « LAN and select **Properties** from the menu.
3. Select **TCP/IP Protocol** from the list of installed protocols and press the **Properties** button to display the TCP/IP properties.
4. » Change the IP address for the new value that you have selected.«
5. Click **OK**, then **Close** to close the application.
6. Shut down Windows server without doing a restart.
7. On OS/400, vary off the NWSO.
8. Use the Remove TCP/IP interface (RMVTCPIFC) command with the IP address you recorded in step 2.
9. Use the Add TCP/IP interface (ADDTCPIFC) command to add the new interface. Use the IP address that you selected for the OS/400 side of the private LAN. You also need to enter the subnet mask and line description that you recorded in steps 1 and 2.
10. On the OS/400 command line, type CHGNWSO NWSO(name), and press F4.
 - a. Page down to the section labeled TCP/IP port configuration.
 - b. Change the IP address in the Internet address field for the port » *VRTETHPTP or« *INTERNAL to the value that you used in step 3. Press Enter for the change to take effect.
 - c. Vary on the NWSO.

Note: If you are installing multiple servers, to avoid further conflicts, “Details: assign private LAN IP addresses” instead of letting the INSWNTSVR command generate them. The Internal LAN port parameter allows you to enter IP addresses that you know to be unique on your system.

On Windows NT 4.0:

1. Click on **Start**, then **Settings**, then **Control Panel**.
2. Open the **Network** application.
3. Click on the **Protocols** tab.
4. Double-click on the TCP/IP protocol to display the TCP/IP properties.
5. » Change the IP address for the new value that you have selected.«
6. Make a note of this new IP address, as you will need it later.
7. Click **OK**, then **Close** to close the **Network** application.

Windows NT 4.0 tells you that it needs to shut down and restart for the changes to take effect and asks if you want to do that now. Click **No**.

Details: assign private LAN IP addresses: By default, the Install Windows server (INSWNTSVR) command assigns private LAN IP addresses of the form 192.168.x.y. To avoid potential conflicts, you can use the INTLANPORT or VRTPTPPTP « parameter on this command to assign IP addresses that you know are unique on your system.

If you let the command assign addresses and then discover a conflict, you can change the IP addresses. The command assigns to x a value that is based on the resource number of the Integrated xSeries Server. The command looks for a pair of values y and y+1 (starting with y=1), with addresses that are not in use on that OS/400. The command assigns the lower number of the pair to the OS/400 side of the » private « LAN and the higher number to the Windows server side.


For example, suppose you have a 6617 Integrated PC Server with a resource name of CC03. After running the INSWNTSVR command you might end up with the following addresses for the internal LAN:

```
192.168.3.1 (OS/400 side)
192.168.3.2 (Windows server side)
```


In case of a conflict on a server that you have installed, verify that a particular substitute value (for example, 192.168.17) is not used on your network and change the IP addresses to that value:

192.168.17.1 (OS/400 side)
192.168.17.2 (Windows server side)

» Be aware that an IP address entered at the Windows console for the private LAN overrides the value set in the NWSD for the TCPPOPCFG parameters *INTERNAL or *VRTETHPTP port . «

If the problem still persists, check the technical information databases at the IBM iSeries Support Web page  . If you cannot find the solution there, contact your technical support provider. If the problem persists, contact IBM for service.

IP forwarding problems

By default IP forwarding is disabled for Windows NT 4.0, » Windows 2000, and Windows .NET Server.

« When the IP Forwarding function is enabled for Windows server, OS/400 should not use the LAN adapters on the Integrated xSeries Server. This means that you should not create a line description for the adapters. However, a line description for the *INTERNAL » or *VRTETHPTP « line is always required. Not observing this restriction can cause a TCP/IP packet storm. Note that this restriction applies only when IP forwarding is enabled for Windows server, not when IP Forwarding is enabled for OS/400.

To verify or change the setting of the IP forwarding function in Windows server, do the following:

On Windows 2000 » or Windows .NET Server:

On Windows 2000 or Windows .NET Server, « IP forwarding is a registry entry. Refer to Microsoft documentation on how to disable IP forwarding.


On Windows NT 4.0:

1. At the Windows server control panel, double-click on the **Network** icon.
2. Select the **Protocols** tab.
3. Next, select the TCP/IP protocol and click on the **Properties** button.
4. In the TCP/IP Properties select the **Routing** tab. If the box labeled **Enable IP Forwarding** is checked (marked), then IP forwarding is enabled.
5. To disable, remove the check from the box and click **OK** to make this change take effect on the next restart.













If IP Forwarding on Windows server is required, do one of the following:




- If you are installing a new Windows server, install it without creating line descriptions for the external ports. To do that, use the Install Windows server (INSWNTSVR) command to define ports 1 and 2 as (*NONE).
 1. At the OS/400 command line, enter INSWNTSVR PORT1(*NONE) PORT2(*NONE).
- If the server is already installed, remove the line descriptions for the external ports. Perform the following steps:
 1. At the OS/400 command line, enter the Display NWSD (DSPNWSD) command, and look at the attached lines. Note the names of the attached lines for ports 1 and 2.
 2. Enter the Work with Line Descriptions (WRKLIND) command.
 3. In the Opt column next to the line descriptions for the external ports of the NWSD that you noted, type option 4 (delete) and press Enter.

Attention: The line description for the *INTERNAL line is always required, so be careful not to delete it.



- If the problem still persists, check the technical information databases at the IBM iSeries Support Web page  . If you cannot find the solution there, contact your technical support provider.

TCP/IP failure between OS/400 and Windows

1. Verify that the  private LAN (internal token ring or Virtual Ethernet point-to-point) IP Address was configured and that the default DHCP is not being used. If during the install the  Private  LAN IP Address was set, not all the following steps are required:
 - a.  Click **Start**, then **Settings**, then **Control Panel**. 
 - b. Open **Network and Dial-up Connections** .
 - c.  Find the IBM Private  LAN Adapter connection and double-click to open. 
 - d. Click on the **Properties** button.
 - e. Select the Internet Protocol (TCP/IP)
 - f. Click on the **Properties** button. If the **Use the Following IP Address** is selected and the IP address from the OS/400 console is displayed, you do not need to proceed any further. If the Obtain an IP address automatically is selected, continue with the next step.
 - g. Select the radio button: **Use the Following IP Address**.
 - h. On an OS/400 command line, type the following command, where 'nwsd' is the name of the NWSD for your server, and press Enter: DSPNWSD NWSD(nwsd) OPTION(*TCPIP)
 - On the DSPNWSD screen, find the port named *INTERNAL. This shows the IP address and subnet mask values for the  Private  LAN.
 - On the Windows server console, type the  Private  LAN IP address and subnet mask values that were shown by the DSPNWSD command.

Note:  An IP address entered at the Windows console for the  private LAN overrides the values set in the NWSD for the TCPPRTCFG parameters *INTERNAL or *VRTETHPTP port. 
 - i. Click OK.
 - j. Click OK.
 - k. Click Close.



The process is complete and the  Private  LAN should now be active.

Attention: If you plan to use a firewall with Windows server, be sure not to route the Internet addresses for the  private  LAN to a software common knowledge IR system (SOCKS) server acting as a firewall. Doing so causes connection failures. For information about setting up a firewall, see the topic Firewall: getting started.

Now that you have installed Windows server on an Integrated xSeries Server, you need to know how to do some everyday tasks from . OS/400. This setup book tells you how to start and stop your server (see "Starting and stopping Windows server on an Integrated xSeries Server for iSeries" on page 81). For additional information on managing your server from , OS/400 see the iSeries Information Center.

IFS access problems

When you try to access the OS/400 integrated file system (IFS) from the Windows server through iSeries NetServer, the access may fail in the following situation:

- If you are using a Universal Naming Convention (UNC) name with an IP address in it and
- Both  private  and external LAN paths exist between the Windows server and OS/400

Either change the UNC name to use the iSeries NetServer name instead, or disable the external LAN path and then retry the

Problems with saving Windows server files

If you have problems with doing file-level backup of your Windows server files, check the Windows server event log and OS/400 QSYSOPR message queue for messages.



- If you get a session initialization error (CPDB050) or session communication error (CPDB055) when you try to save files, do this:
 1. Ensure that OS/400 NetServer is in the same domain (See “Ensure iSeries NetServer and Windows server are in same domain” on page 124) as the Windows server for which you want to save files.
 2. Ensure that you “Create shares on Windows server” on page 123 and “Add members to QAZLCSAVL file” on page 124 to the QAZLSAVL file for the network server description (NWSD).
 3. Ensure that the QSERVER subsystem is running.
 4. Ensure that TCP/IP is active:
 - a. Use option 1 of the CFGTCP command.
 - b. Press F11 to view the interface status.
 - c. Type a 9 next to the appropriate network service to start the TCP/IP interface.
 - d. Press F5 to refresh the view. The appropriate TCP/IP service should now be active.
 5. Then try saving your files again.
- If you get an error message that indicates a problem with exchanging security information (CPDB053) or logging on to the server (NTA02AE), do this:
 1. Ensure that you are enrolled on Windows server as part of the Administrators group.
 2. Ensure that you have the same password on OS/400 and on Windows server.
 3. Then try saving your files again.
- If you get an error message (CPDB058) that indicates a problem with processing the share file member, ensure that the QAZLCSAVL file is set up correctly:
 1. Ensure that you “Create shares on Windows server” on page 123.
 2. Ensure that you “Add members to QAZLCSAVL file” on page 124 to the QAZLSAVL file for the NWSD and listed in that file the share that you specified on the Save (SAV) command.
- If you get an error message (NTA02A3) that indicates a problem communicating with NTSAV, verify that the Remote Procedure Call service is running:

On Windows 2000 or Windows .NET Server:

1. On the Windows server task bar, click **Start**; under **Programs**, click **Administrative Tools**.
2. Double-click **Services**.
3. Verify that the Remote Command Service is running.

On Windows NT 4.0:

1. On the Windows server task bar, click **Start**; under **Settings**, click **Control Panel**.
 2. Double-click the **Services** icon.
 3. Verify that the Remote Command Service is running.
- If you get the following errors when doing a SAV on a Windows 2000 system:
 - CPFA09C Not authorized to object
 - CPD3730 Cannot save directory /qntc/(server)/(share)/System Volume Information

the directory, **System Volume Information**, was not saved. This is a hidden, system directory that can be accessed only by the Windows 2000 SYSTEM account. If you ignore this message, the directory and its contents will not be saved (it contains intermediate log files used when encrypting files). Otherwise, you can add permissions for the user who is running SAV to this directory. To set the permissions, you will need to make the directory visible (don't hide hidden files, and don't hide protected operating system files). Refer to the Windows 2000  or Windows .NET Server  help for information on setting folder permissions.


» You may also see a CPFA09C error if you run file-level backup as QSECOFR, whether QSECOFR is enrolled to the server or not. Use a different enrolled user profile that has backup on the Windows server. «

Unreadable messages in the server message queue

Windows server event log messages do not display correctly if the message queue coded character set identifier (CCSID) is set to *HEX (65535). If you get unreadable messages in the server message queue (identified by the MSGQ parameter of the NWSD), take the following action:

1. At the OS/400 console, enter the command CHGMSGQ to change the server message queue CCSID to something other than *HEX (65535), for example *MSG.

For example, if the message queue name is MYSVRQ in library MYLIB, then you can use the following command on OS/400 to change the message queue CCSID: CHGMSGQ MSGQ(MYLIB/MYSVRQ) CCSID(*MSG).

2. If the problem still persists, check the technical information databases at the IBM iSeries Support Web page . If you cannot find the solution there, contact your technical support provider.

Problems getting a Windows server system memory dump

If sufficient space is available on the system drive, your Windows server is automatically configured to collect a system memory dump when a STOP error or bluescreen occurs. If a system memory dump is not collected, do the following:

On Windows 2000 » or Windows .NET Server: «

1. Select **Start**, then **Programs**, then **Administrative Tools**.
2. Click on **Computer Management**.
3. In the **Action** menu, click on **Properties**.
4. Select the **Advanced** tab
5. Click the **Startup/Recovery** button.
6. Check the **Write debugging information to:** box. The default path to the memory.dmp file that is created when a bluescreen occurs is %SystemRoot%, which is C:\WINNT (E:\WINNT for servers installed prior to V4R5)» for Windows 2000 and C:\WINDOWS for Windows .NET Server« for Windows server on iSeries.

On Windows NT 4.0:

1. Select **Start**, then **Settings**, then **Control Panel**.
2. Double-click on **System**, and select the **Startup/Shutdown** tab.
3. Check the **Write debugging information to:** box. The default path to the memory.dmp file that is created when a bluescreen occurs is %SystemRoot%, which is C:\WINNT (E:\WINNT for servers installed prior to V4R5) for Windows server on iSeries.

Other problems that can prevent a system-memory dump from being taken include:

- Insufficient paging file size specified. The paging file size must be large enough to hold all of physical RAM, plus 12 MB. To verify the amount of physical RAM on your machine, do the following:
 1. Select **Start**, then **Settings**, then **Control Panel**.
 2. Double-click on **System**. The value listed under **Computer** on the **General** page indicates the amount of physical RAM you have on your system.


To verify or change the paging file size, do the following:

On Windows 2000 » or Windows .NET Server «:

1. Select the **Advanced** tab, and click on the **Performance Options** button of the **Virtual Memory** section. The **Virtual Memory** part of the window shows the current paging file size.

2. If you need to change the paging file size, click the **Change** button.

On Windows NT 4.0:

1. Select the **Performance** tab, and click on the **Change** button of the **Virtual Memory** section. The resulting display shows how much space is available and the paging file size for all the drives. If you need to increase the paging file size, enter an appropriate number and click **Set**.
- The paging file is not located on the system drive. A system memory dump is not collected unless the paging file is located on the system drive. The system drive for V4R5 and later releases of Windows server on iSeries is the C: drive; for earlier releases it is the E drive. To verify or change this, do the following:
 1. Select the **Advanced** tab, and click on the **Performance Options** button of the **Virtual Memory** section.
 - Insufficient space is available on the drive you specified as the path to the memory.dmp file. The default path for the memory.dmp file is the system drive, but you may change it to another drive. Verify that sufficient free space exists on the system drive or the drive you chose if you changed it. The free space needed is equal to the size of physical RAM, plus 12 MB.
 - If the problem still persists, check the technical information databases at the IBM iSeries Support Web page . If you cannot find the solution there, contact your technical support provider.

Reinstall Windows server on iSeries

If the Windows server becomes damaged, you may be able to preserve installed applications and user data by reinstalling Windows server. Try either logging on to Windows server or starting up with DOS by using the Boot menu of the NT loader (NTLDR). (This is only possible if the boot drive is still formatted as FAT.) You can then reinstall Windows server. Doing this returns the system to the base level code of Windows server originally installed. You must then reapply any Microsoft service packs that you had installed. You should also reinstall the latest iSeries Integration for Windows Server service pack.

To reinstall Windows server, try this:

1. “Starting Windows server from OS/400” on page 81 the network server description (NWS) for the server.
2. At the boot menu, select to boot PC-DOS or Windows server, whichever is working.
3. If you selected Windows server, open an MS-DOS window.
4. In the DOS window, enter this:

For Windows 2000  or Windows .NET Server 


```
d:  
cd \i386  
winnt /s:d:\i386 /u:d:\unattend.txt
```

For Windows NT 4.0

```
d:  
cd \i386  
winnt /b /s:d:\i386 /u:d:\unattend.txt
```

5. Press Enter.

Note: The network drives may become so damaged that you cannot log on to Windows server or start up with DOS. In this case, try restoring all predefined and user-defined storage spaces from usable backups (see “Back up predefined disk drives for Windows servers created on V4R5 and later OS/400 systems” on page 118 and “Back up user-defined disk drives for Windows server” on page 119).

Windows 2000  and Windows .NET also provides the Windows 2000 Recovery Console, which is a command-line console that provides limited access to the system to perform many administrative tasks or repair the system. Refer to the Windows 2000 or Windows .NET Server

◀ documentation for additional information. You may also have to reinstall from the very beginning by using the “Start the Windows 2000 or Windows .NET Server installation from the OS/400 console” on page 41.

Collect service data for Windows server on iSeries

If you need to supply service data to support personnel, first consult the “Check message and job logs” on page 134 and Windows server event log. iSeries Integration for Windows Server allows you to mirror the “Monitor Windows server event logs on OS/400” on page 86 and supports Windows server Dumps for remote troubleshooting. These topics help you create dumps to collect further diagnostic information:

1. “Create a Windows server memory dump on OS/400”.
2. Look at “Use the network server description (NWSD) dump tool on OS/400” to find out how this dump can tell you which configuration and log files to look at first for problem analysis.

Create a Windows server memory dump on OS/400

You can create a Windows server memory dump file on OS/400 to help you solve problems with Windows server. When you install Windows server on iSeries, by default the dump goes to the system drive:

- C:\WINDOWS\Memory.Dmp for Windows .NET Server
- C:\WINNT\Memory.Dmp for V4R5 or later installations
- E:\WINNT\Memory.Dmp for prior releases

Note: For Windows to successfully create a complete memory dump the pagefile must reside on the system drive and be at least equal to the memory size plus one megabyte. The memory contents are written into the pagefile during the dump. This is the first step in the memory dump process. During the second step the data from the pagefile is written to the actual dump file. This step occurs when the system is booted again after the dump. The drive that contains the memory dump file (memory.dmp by default) must have free space at least as large as the amount of installed memory.

The memory dump is enabled by default if the system drive has enough room for the paging file. To verify that the memory dump support is enabled or to write the memory.dmp file to a different drive, follow these steps:

1. Go to **Start**, then **Settings**, then **Control Panel**.
2. Open the **System** application.
 - On Windows NT 4.0, click the **Startup/Shutdown** tab.
 - On Windows 2000 ▶ or Windows .NET Server ◀, click the **Advanced** tab, then the **Startup and Recovery** button.
3. Click on the **Write Debugging Information To** check box.
4. Change the location of the dump file if necessary.
5. If you want the system to overwrite the file every time a Kernel STOP Error occurs, click on the **Overwrite any Existing File** check box.
6. Click **OK**.

Use the network server description (NWSD) dump tool on OS/400

You can use the network server description (NWSD) dump tool (QFPDMPLS) to dump the different configuration and log files that are used with your Integrated Windows server. To do this you need *ALLOBJ special authority.

To do this, take these steps:

1. Vary off the *WINDOWSNT NWSD (see “Shut down Windows server from OS/400” on page 82).

Attention: If you do not vary off the NWSD before running QFPDMPLS, you risk possible data corruption of the predefined storage spaces for the network server.
2. At the OS/400 command line, type

CALL QFPDMPLS PARM(nwsdname)

where nwsdname is the network server description name.

The program creates a database file QGPL/QFPNWSMDMP with multiple members. Each database file member name has the NWSD name followed by two digits (01-99). For example, for an NWSD named MYSERVER, the first member name would be MYSERVER01.

3. Display the member to see the contents of the different files associated with your server description. Different files are important for problem analysis, depending on which installation step is causing a problem.
4. Refer to the following table to note the importance of each file during a particular installation step. If a file is marked 1, refer to it first during problem analysis, 2 second, and 3 last. Files that are not marked are not relevant to installation, but may be relevant at other times. Some members are not created until the post-installation phase.

Note: You cannot use QFPDMPLS to retrieve files on the system drive if you convert the drive to NTFS.

» You may not find all the files listed below on some servers. If a particular file is not found, the file will not be retrieved by the QFPDMPLS API and the corresponding database member will not be created. «

NWSD configuration and log files

Member Name	Data Type	File Name	Windows Directory	Install	Post-Install
nwsdname01	Txt	CONFIG.SYS	C:\	3	3
nwsdname02	Txt	AUTOEXEC.BAT	C:\	2	2
nwsdname03	Txt	BOOT.INI	C:\		
nwsdname04	Txt	HOSTS	C:\ or D:\		3
nwsdname05	Txt	QVNI.CFG	C:\ or D:\		
nwsdname06	Txt	QVNACFG.TXT	C:\ or D:\		
nwsdname07	Txt	QVNADAEM.LOG	C:\ or D:\		
nwsdname08	Bin	HOSTLANI.CFG	C:\ or D:\		
nwsdname09	Bin	HOSTLAN1.CFG	C:\ or D:\		
nwsdname10	Bin	HOSTLAN2.CFG	C:\ or D:\		
nwsdname11	Txt	DUMPFIL.C01	C:\		
nwsdname12	Bin	DUMPFIL.C01	C:\		
nwsdname13	Txt	DUMPFIL.C02	C:\		
nwsdname14	Bin	DUMPFIL.C02	C:\		
nwsdname15	Txt	UNATTEND.TXT	D:\	1	
nwsdname16	Txt	INSWNTSV.LNG	D:\	2	
nwsdname17	Txt	INSWNTSV.VER	D:\	2	
nwsdname18	Txt	QVNADAEM.LOG	D:\		
nwsdname19	Txt	QVNARCMD.LOG	D:\		
nwsdname20	Txt	QVNDT400.LOG	D:\		
nwsdname21	Txt	QVNDHLE1.LOG	D:\AS400NT		
nwsdname22	Txt	QVNDHLE2.LOG	D:\AS400NT		
nwsdname23	Txt	QVNDVSTP.LOG	D:\		

Member Name	Data Type	File Name	Windows Directory	Install	Post-Install
nwsdname24	Txt	QVNDVSCD.LOG	D:\		
nwsdname25	Txt	QVNDVSDD.LOG	D:\		
nwsdname26	Txt	EVENTSYS.TXT	D:\		
nwsdname27	Txt	EVENTSEC.TXT	D:\		
nwsdname28	Txt	EVENTAPP.TXT	D:\		
nwsdname29	Txt	PERFDATA.TSV	D:\		
nwsdname30	Txt	REGSERV.TXT	D:\		
nwsdname31	Txt	REGIBM.TXT	D:\		
nwsdname32	Txt	REGIBMCO.TXT	D:\		
nwsdname33	Txt	DUMPFIL.E01	D:\		
nwsdname34	Bin	DUMPFIL.E01	D:\		
nwsdname35	Txt	DUMPFIL.E02	D:\		
nwsdname36	Bin	DUMPFIL.E02	D:\		
nwsdname37	Txt	HOSTS	(for V4R5) C:\WINNT\SYSTEM32\DRIVERS\ETC (prior releases) E:\WINNT\SYSTEM32\DRIVERS\ETC		3
nwsdname38	Txt	LMHOSTS	(for V4R5) C:\WINNT\SYSTEM32\DRIVERS\ETC (prior releases) E:\WINNT\SYSTEM32\DRIVERS\ETC		3
nwsdname39	Bin	MEMORY.DMP	(for V4R5) C:\WINNT (prior releases) E:\WINNT		
nwsdname40	Txt	VRMFLOG.TXT	E:\PROGRA~1\IBM\AS400NT\SERVICE\VRM		
nwsdname41	Txt	PTFLOG.TXT	E:\PROGRA~1\IBM\AS400NT\SERVICE\PTF		
nwsdname42	Txt	PTFUNIN.TXT	E:\PROGRA~1\IBM\AS400NT\SERVICE\PTF		
nwsdname43	Txt	A4EXCEPT.LOG	D:\		
nwsdname44	Txt	DUMPFIL.E01	E:\		
nwsdname45	Bin	DUMPFIL.E01	E:\		
nwsdname46	Txt	DUMPFIL.E02	E:\		
nwsdname47	Bin	DUMPFIL.E02	E:\		
nwsdname48	Txt	CMDLINES.TXT	D:\I386\\$\OEM\$	2	
nwsdname49	Txt	QVNABKUP.LOG	D:\AS400NT		
nwsdname50	Txt	QVNADAEM.LOG	D:\AS400NT		
nwsdname51	Txt	QCONVGRP.LOG	D:\AS400NT		
nwsdname52	Txt	SETUPACT.LOG	C:\WINNT	1	
nwsdname53	Txt	SETUPAPI.LOG	C:\WINNT	1	
nwsdname54	Txt	SETUPERR.LOG	C:\WINNT	1	
nwsdname55	Txt	SETUPLOG.TXT	C:\WINNT	1	
nwsdname56	Txt	VRMFLOG.TXT	D:\AS400NT		

Member Name	Data Type	File Name	Windows Directory	Install	Post-Install
nwsdname57	Txt	PTFLOG.TXT	D:\AS400NT		
nwsdname58	Txt	PTFUNIN.TXT	D:\AS400NT		
nwsdname59	Txt	VRMLOG.TXT	C:\WINNT\AS400WSV\SERVICE\VRM		
nwsdname60	Txt	PTFLOG.TXT	C:\WINNT\AS400WSV\SERVICE\SERVPACK		
nwsdname61	Txt	PTFUNIN.TXT	C:\WINNT\AS400WSV\SERVICE\SERVPACK		
nwsdname62	Txt	QVNDHLIU.LOG	D:\AS400NT		
nwsdname63	Txt	QVNDHILI.LOG	D:\AS400NT		
nwsdname64	Txt	QVNDHLMF.LOG	D:\AS400NT		
nwsdname65	Txt	QVNDHLP1.LOG	D:\AS400NT		
nwsdname66	Txt	QVNDHLP2.LOG	D:\AS400NT		
» nwsdname67	Txt	QVNDVEU.LOG	D:\AS400NT		
nwsdname68	Txt	SERVICE.LOG	D:\AS400NT		
nwsdname69	Txt	LVDELOEM.LOG	D:\AS400NT		
nwsdname70	Txt	INVOKINF.LOG	D:\AS400NT		
nwsdname71	Txt	LVMMASTER.LOG	D:\AS400NT		



Network server description configuration files

You can » customize your Windows servers by creating your own configuration « files. For example, you might want to change screen resolution or suppress installation of the IPX protocol. You can do this by following these steps:

1. Create a “Network server descriptions for Windows server on iSeries” on page 27 (NWSD) configuration file
2. Specify this file with the Configuration file parameter when you install a server or create or change a network server description.

Each time the network server starts, OS/400 uses the configuration file to change the specified Windows server file on the server’s C or D drive.

When the Install Windows server (INSWNTSVR) command activates the network server, it generates a Windows server unattended installation setup script file (UNATTEND.TXT). By specifying your configuration file on the INSWNTSVR command, you can use this file during the installation to modify the UNATTEND.TXT file.

Attention: Be careful what you change with configuration files. Avoid removing device drivers from UNATTEND.TXT, for example, or changing the OEM section or the section that installs TCP. Otherwise, your changes could prevent your server from starting. If you are creating a configuration file to modify an installed server, first make a backup copy of whatever files you plan to change.

- To see how your system drive is formatted, you can use the Work with Network Server Storage Spaces Command (WRKNWSSTG) command.
- Before creating a configuration file, read “NWSD configuration file format” on page 168. This section tells you how to use each entry type.
- You should also read the about “Use substitution variables for keyword values” on page 177 to see what variables are available for you to use and how to create your own list.

- You might also want to see an “Example: NWSD configuration file” on page 169.
- Then you are ready to “Create an NWSD configuration file” configuration file.

If you have problems starting a server after you create a configuration file, see “NWSD configuration file errors” on page 142.

NWSD configuration file format

An NWSD configuration file consists of multiple occurrences of **entry types**, each with a different function. The entry types are:

“Remove lines from an existing Windows server file with CLEARCONFIG entry type” on page 170

Use this entry type if you want to remove all lines from the Windows server file.

“Change a Windows server file with ADDCONFIG entry type” on page 170

Use this entry type to add, replace, or remove lines in the Windows server file.

“Change a Windows server file with UPDATECONFIG entry type” on page 174

Use this entry type to add or remove strings within lines in the Windows server file.

“Setting configuration defaults with the SETDEFAULTS entry type” on page 175

Use this entry type to set the default values for certain keywords. OS/400 uses the defaults only when processing ADDCONFIG and UPDATECONFIG entries in the current file member.

An **entry** is one occurrence of an entry type. Each entry contains a series of keywords that are followed by equal signs (=) and values for those keywords.

Format guidelines

- Source physical file record length must be 92 bytes.
- A line can have only one entry, but an entry can occupy multiple lines.
- You can use blank spaces between the entry type and the keyword, around the equal sign, and after the commas.
- You can use blank lines between entries and between keywords.

Keywords

- You can put entry keywords in any order.
- Use a comma after all keyword values except the last one in the entry.
- Enclose keyword values in single quotation marks if they contain commas, blank spaces, asterisks, equal signs, or single quotation marks.
- When you use keyword values that contain single quotation marks, use two single quotation marks to represent a quotation mark within the value.
- Keyword value strings can have a maximum length of 1024 characters.
- Keyword values can span lines, but you must enclose the value in single quotation marks. The value includes leading and trailing blanks in each line.

Comments

- Begin comments with an asterisk (*).
- You can put a comment on its own line or on a line with other text that is not part of the comment.

Create an NWSD configuration file

Before creating a configuration file, read about “NWSD configuration file format” and using “Use substitution variables for keyword values” on page 177. You might also want to see an “Example: NWSD configuration file” on page 169.

To create an NWSD configuration file, do this:

1. Create a source physical file.

- a. At the OS/400 command line, type CRTSRCPF and press F4.
 - b. Supply a name for the file, any text you want to describe it, and a member name and press Enter to create the file.
2. Use an available editor to add entries to the file that fit the NWSA "NWSA configuration file format" on page 168. For example, you can use the Work with members using PDM (WRKMBRPDM) command:
- a. At the OS/400 command line, type WRKMBRPDM file(*yourfilename*) mbr(*mbrname*) and press Enter.
 - b. Type 2 next to the file you want to edit.

If you have problems with your configuration files, see

Example: NWSA configuration file

This "Code disclaimer information" on page 1 pertains to code examples.

This example configuration file:

- Sets a default file path
- Deletes the time zone and uses a configuration variable to add it back
- Sets default search values that cause the display configuration lines to be added before the UserData section
- Adds lines that configure the display

```

+-----+
| ***** Beginning of data *****
| *****
| * Update D:\UNATTEND.TXT
| *****
| *
| *=====
| * Set default directory and file name values.
| *=====
| SETDEFAULTS TARGETDIR = 'D:\', TARGETFILE = 'UNATTEND.TXT'
| *
| *=====
| * Delete and use a substitution variable to re-add TimeZone line.
| *=====
| ADDCONFIG VAR      = 'TimeZone', ADDWHEN = 'NEVER', DELETEWHEN = 'ALWAYS'
| ADDCONFIG ADDSTR = 'TimeZone="%TIMEZONE"',
| FILESEARCHSTR = '%FPA_L_BRACKET%GuiUnattended%FPA_R_BRACKET%'
| *
| * Add lines to configure the display.
| *=====
| * Set default search values to add new statements to the file
| * before the UserData section header line.
| SETDEFAULTS FILESEARCHSTR = '%FPA_L_BRACKET%UserData%FPA_R_BRACKET%',
| FILESEARCHPOS = 'BEFORE'
| *
| * Add the display statements to the file.
| ADDCONFIG ADDSTR = '%FPA_L_BRACKET%Display%FPA_R_BRACKET%',
| UNIQUE = 'YES'
| ADDCONFIG ADDSTR = 'ConfigureAtLogon = 0', UNIQUE = 'YES'
| ADDCONFIG ADDSTR = 'BitsPerPel = 16', UNIQUE = 'YES'
| ADDCONFIG ADDSTR = 'XResolution = 640', UNIQUE = 'YES'
| ADDCONFIG ADDSTR = 'YResolution = 480', UNIQUE = 'YES'
| ADDCONFIG ADDSTR = 'VRefresh = 60', UNIQUE = 'YES'
| ADDCONFIG ADDSTR = 'AutoConfirm = 1', UNIQUE = 'YES'
| *
+-----+

```

Remove lines from an existing Windows server file with CLEARCONFIG entry type

You can use the CLEARCONFIG entry type to remove all lines from an existing Windows server file.

This “Code disclaimer information” on page 1 pertains to code examples.

Attention: Removing all lines from the Windows server file may result in your being unable to vary on the network server. If you have problems, see “NWSD configuration file errors” on page 142.

To clear a Windows server file, create an NWSD configuration file that contains the CLEARCONFIG entry type as follows:

```
CLEARCONFIG
LINECOMMENT = '<"REM "|<comment_string>>',      (optional)
TARGETDIR   = '<BOOT|path>',                  (optional)
TARGETFILE  = '<file_name>'                    (required)
```

For a detailed explanation of the CLEARCONFIG keywords, use the following keyword links. You can also go back to the NWSD configuration file “NWSD configuration file format” on page 168 or on to “Change a Windows server file with ADDCONFIG entry type” entry type.

- “LINECOMMENT keyword” on page 172
- “TARGETDIR keyword”
- “TARGETFILE keyword”

TARGETDIR keyword

Use TARGETDIR to specify the path for the Windows server file to be cleared.

Note: When changing a file, OS/400 uses only the first directory for that file. It ignores any other entries that specify a different target directory.

TARGETFILE keyword

Use TARGETFILE to specify the Windows server file to be cleared.

Change a Windows server file with ADDCONFIG entry type

You can use the ADDCONFIG entry type to change a Windows server file in these ways:

- Add a line to the beginning or end of the file.
- Add a new line before or after a line that contains a specific string.
- Delete a line in the file.
- Replace the first, last, or all occurrences of a line in the file.
- Specify in which directory to change the file.

To change a Windows server file, create an NWSD configuration file that contains the ADDCONFIG entry type as follows:

```
ADDCONFIG
VAR           = '<variable_name>',              (conditionally required)
ADDSTR        = '<line to process>',            (optional)
ADDWHEN       = '<ALWAYS|NEVER|<expression>>',  (optional)
DELEWHEN      = '<NEVER|ALWAYS|<expression>>',  (optional)
LINECOMMENT   = '<"REM "|<comment_string>>',    (optional)
LOCATION        = '<END|BEGIN>',                 (optional)
FILESEARCHPOS = '<AFTER|BEFORE>',              (optional)
FILESEARCHSTR = '<search_string>',              (conditionally required)
FILESEARCHSTROCC = '<LAST|FIRST>',              (optional)
REPLACEOCC    = '<LAST|FIRST|ALL>',             (optional)
TARGETDIR     = '<BOOT|path>',                  (optional)
TARGETFILE    = '<CONFIG.SYS|<file_name>>',    (optional)
UNIQUE        = '<NO|YES>'                      (optional)
```

For a detailed explanation of the ADDCONFIG keywords, use the following keyword links. You can also go back to the NWS configuration file “NWS configuration file format” on page 168 or on to the “Change a Windows server file with UPDATECONFIG entry type” on page 174 entry type.

- “VAR keyword”
- “ADDSTR keyword”
- “ADDWHEN keyword”
- “DELETEWHEN keyword” on page 172
- “LINECOMMENT keyword” on page 172
- “LOCATION keyword” on page 172
- “FILESEARCHPOS keyword (ADDCONFIG entry type)” on page 173
- “FILESEARCHSTR keyword” on page 173
- “FILESEARCHSTROCC keyword” on page 173
- “REPLACEOCC keyword” on page 173
- TARGETDIR (See 173)
- “TARGETFILE keyword” on page 174
- “UNIQUE keyword” on page 174

VAR keyword

VAR specifies the value on the left side of the equal sign that identifies the line you want to add to or delete from the file. For example:

```
ADDCONFIG
VAR = 'FILES'
```

OS/400 requires the keyword if you do not specify REPLACEOCC,

ADDSTR keyword

Use ADDSTR to specify the string that you want to add to the Windows server file. For example:

```
ADDCONFIG
VAR = 'FILES'
ADDSTR = '60'
```

ADDWHEN keyword

Use ADDWHEN to specify when during processing you want OS/400 to add the new line or string to the Windows server file.

This “Code disclaimer information” on page 1 pertains to code examples.

You can specify:

- ALWAYS if you want OS/400 to add the line or string every time it processes the configuration file. (ALWAYS is the default unless you defined a different default value by using a SETDEFAULTS entry in the member.)
- NEVER if you want OS/400 to never add the line or string.
- An expression that directs OS/400 to add the line or string when the specified condition is true. Expressions are composed of “ADDWHEN and DELETEWHEN expression operators” and operands and must equate to either TRUE or FALSE.

Note: If you do not want OS/400 to interpret an expression (such as one that contains an asterisk (*)) as a mathematical operation, enclose the expression in quotation marks. For example, to add a line when the NWS type is *WINDOWSNT, you could use this:

```
ADDWHEN = '(%FPANWSDTYPE%=="*WINDOWSNT")'
```

ADDWHEN and DELETEWHEN expression operators: You can use these operators for expressions:

Operator	Description
==	Returns TRUE if operands are equivalent, FALSE if they are not.
!=	Returns FALSE if operands are equivalent, TRUE if they are not.
>	Returns TRUE if the operand on the left is greater than the operand on the right, FALSE if it is not. If the operands are strings, the ASCII values are compared.
<	Returns TRUE if the operand on the left is less than the operand on the right, FALSE if it is not. If the operands are strings, the ASCII values are compared.
>=	Returns TRUE if the operand on the left is greater than or equal to the operand on the right, FALSE if it is not. If the operands are strings, the ASCII values are compared.
<=	Returns TRUE if the operand on the left is less than or equal to the operand on the right, FALSE if it is not. If the operands are strings, the ASCII values are compared.
&&	Logical AND. Returns TRUE if both operands have a value other than 0. Operands must be integers.
	Logical OR. Returns TRUE if either operand has a value other than 0. Operands must be integers.
+	If the operands are both integers, the result is the sum of the integers. If the operands are both strings, the result is the concatenation of the two strings.
-	Subtracts integers.
*	Multiplies integers.
/	Divides integers.
()	Parentheses force an evaluation order.
!	Logical NOT. Returns TRUE if the value of a single operand is 0. Returns FALSE if it is not 0.
ALWAYS	Always returns TRUE.
NEVER	Always returns FALSE.

DELETEWHEN keyword

Use DELETEWHEN to specify when during processing you want OS/400 to delete a line or string from the file. You can specify:

- ALWAYS if you want OS/400 to delete the line or string every time it processes the configuration file.
- NEVER if you want OS/400 to never delete the line or string. (NEVER is the default unless you defined a different default value by using a SETDEFAULTS entry in the member)
- An expression that directs OS/400 to delete the line or string when the specified condition is true. Expressions are composed of "ADDWHEN and DELETEWHEN expression operators" on page 171 and operands and must equate to either TRUE or FALSE.

Note: If you do not want OS/400 to interpret an expression (such as one that contains an asterisk (*)) as a mathematical operation, enclose the expression in quotation marks. For example, to delete a line when the NWSN type is *WINDOWSNT, you can use this:

```
DELETEWHEN = '(%FPANWSDTYPE%=="*WINDOWSNT")'
```

LINECOMMENT keyword

LINECOMMENT specifies the prefix string that identifies comments in a file. Use the default value if you want LINECOMMENT to use 'REM' to identify comments. You can specify a different value. For example, to use a semicolon to identify comments, use LINECOMMENT = ';' within the **first** entry that refers to that file. (OS/400 ignores the LINECOMMENT keyword on any other entry.)

LOCATION keyword

LOCATION specifies where in the file to add the new line. The default value END directs OS/400 to add the line at the end of the file. If you want OS/400 to add the line at the beginning of the

LINESEARCHPOS keyword

Use LINESEARCHPOS to specify whether to add the string you specify with the ADDSTR keyword value AFTER (the default) or before

LINESEARCHSTR keyword

Specifies the string to search for within the lines.

Note: Only the right side of the equal sign is searched for the LINESEARCHSTR value.

LINELOCATION keyword

Use LINELOCATION to specify where in the line to add the string that you specify with the ADDSTR keyword value.

Use the default value of END if you want OS/400 to add the string at the end of the line. If you want OS/400 to add the string at the beginning of the line instead, specify BEGIN.

FILESEARCHPOS keyword (ADDCONFIG entry type)

Specify where to locate a line relative to the file search string. You can specify:

- AFTER if you want OS/400 to add the line after the line that contains the file search string. (AFTER is the default unless you defined a different default value by using a SETDEFAULTS entry in the member.)
- BEFORE if you want OS/400 to add the line before the line that contains the search string.

FILESEARCHSTR keyword

Use FILESEARCHSTR with the REPLACEOCC keyword to specify the line to replace. You must specify the entire line as the value.

When you are adding a new line, FILESEARCHSTR can be any part of a line you want to find.

There is no default value, unless you defined a default value by using a SETDEFAULTS entry in the member.

FILESEARCHSTROCC keyword

Specifies which occurrence of a string that appears multiple times in the file to use for positioning the new line.

The default value of LAST specifies the last occurrence of the search string. If you want OS/400 to use the first occurrence of

REPLACEOCC keyword

Specifies which occurrence of a line you want to replace:

- Use LAST if you want OS/400 to replace the last occurrence of the FILESEARCHSTR.
- Use ALL if you want OS/400 to replace all occurrences of the FILESEARCHSTR.
- Use FIRST if you want OS/400 to replace the first occurrence of the FILESEARCHSTR.

Use FILESEARCHSTR to specify the entire line that you want to replace.

OS/400 deletes the line that matches the FILESEARCHSTR and adds the specified VAR and ADDSTR to the file at this location.

Note: REPLACEOCC has precedence over LOCATION and FILESEARCHPOS. If OS/400 does not find the FILESEARCHSTR value used with a REPLACEOCC keyword, it adds a new line based on the value of the LOCATION keyword but does not replace a line.

TARGETDIR keyword

Use TARGETDIR to specify the path for the Windows server file to be changed.

Unless you first use a SETDEFAULTS entry to change the default, you need to specify the path for UNATTEND.TXT or your own Windows server file. (This keyword defaults to BOOT, which directs OS/400 to change the file in the root directory of the E drive.)

Notes:

1. Support for NWSD configuration files exists only for “Predefined disk drives for Windows server on iSeries” on page 91 that are formatted as FAT. Storage spaces that are converted to NTFS are not accessible for configuration files.
2. When changing a file, OS/400 uses only the first directory for that file. It ignores any other entries that specify a different target directory.

TARGETFILE keyword

TARGETFILE specifies the Windows server file to be changed. The value of UNATTEND.TXT directs OS/400 to change the Windows server unattended install setup script file.

Unless you first use a SETDEFAULTS entry to change the default, you need to specify UNATTEND.TXT or your own Windows server file. (This keyword defaults to CONFIG.SYS.)

UNIQUE keyword

Specify YES if you want to allow only one occurrence of a line in the file.

The default value of NO specifies that multiple occurrences are

VAROCC keyword

Use VAROCC to specify which occurrence of the variable you want to change.

If you want to change the last occurrence of the variable, you can use the default value. Otherwise, specify FIRST to change the

VARVALUE keyword

Use VARVALUE if you want to change a line only if it has this particular value for the variable you specify.

You can specify all or part of the string on the right side of an expression that you want to change.

Change a Windows server file with UPDATECONFIG entry type

You can use the UPDATECONFIG entry type to change a Windows server file in these ways:

- Add strings to lines in the file.
- Add new strings before or after a specified string.
- Delete strings from lines in the file.
- Specify in which paths to change the file.

To change a Windows server file, create an NWSD configuration file that contains the UPDATECONFIG entry type as follows:

```
UPDATECONFIG
VAR           = '<variable_name>',           (required)
ADDSTR        = '<line to process>',         (required)
ADDWHEN       = '<ALWAYS|NEVER|<expression>>', (optional)
DELEWHEN      = '<NEVER|ALWAYS|<expression>>', (optional)
LINECOMMENT   = '<"REM " |<comment_string>>', (optional)
LINELOCATION   = '<END|BEGIN>',               (optional)
LINESEARCHPOS = '<AFTER|BEFORE>',           (optional)
LINESEARCHSTR = '<string within a line>',     (optional)
FILESEARCHPOS = '<AFTER|BEFORE>',           (optional)
FILESEARCHSTR = '<search string>',           (optional)
FILESEARCHSTROCC = '<LAST|FIRST>',          (optional)
TARGETDIR     = '<BOOT|<path>>',            (optional)
```


TARGETFILE	= '<CONFIG.SYS <file_name>>'	(optional)
VAROCC	= '<LAST FIRST>'	(optional)
VARVALUE	= '<variable value>	(optional)

For a detailed explanation of the UPDATECONFIG keywords, use the following keyword links. You can also go back to the NWSD configuration file “NWSD configuration file format” on page 168 or on to “Setting configuration defaults with the SETDEFAULTS entry type”.

- “VAR keyword” on page 171
- “ADDSTR keyword” on page 171
- “ADDWHEN keyword” on page 171
- “DELETEWHEN keyword” on page 172
- “LINECOMMENT keyword” on page 172
- “LINELOCATION keyword” on page 173
- “LINESEARCHPOS keyword” on page 173
- “LINESEARCHSTR keyword” on page 173
- “FILESEARCHPOS keyword (UPDATECONFIG entry type)”
- “FILESEARCHSTR keyword (UPDATECONFIG entry type)”
- “FILESEARCHSTROCC keyword (UPDATECONFIG entry type)”
- TARGETDIR (See 173)
- “TARGETFILE keyword” on page 174
- “VAROCC keyword” on page 174
- “VARVALUE keyword” on page 174

FILESEARCHPOS keyword (UPDATECONFIG entry type)

You can use FILESEARCHPOS to specify which occurrence of the variable you want OS/400 to find relative to a line that contains the search string. Use the value:

- AFTER if you want OS/400 to find the first occurrence of the variable on or after the line that contains the search string. (AFTER is the default unless you defined a different default value by using a SETDEFAULTS entry in the member.)
- BEFORE if you want OS/400 to find the first occurrence of the variable on or before the line that contains the search string.

Note: If OS/400 does not find the search string, it determines the line to change from the VAROCC keyword.

FILESEARCHSTR keyword (UPDATECONFIG entry type)

Use FILESEARCHSTR to provide a search string for OS/400 to use to locate the occurrence of the variable to replace.

There is no default value, unless you defined a default value by using a SETDEFAULTS entry in the member.

FILESEARCHSTROCC keyword (UPDATECONFIG entry type)

Use FILESEARCHSTROCC to specify which occurrence of a string that appears multiple times in the file to use for finding the lines to be modified.

Use the default value of LAST if you want OS/400 to use the last occurrence of the search string. If you want OS/400 to use the

Setting configuration defaults with the SETDEFAULTS entry type

You can set default values for certain keywords on the ADDCONFIG and UPDATECONFIG entry types by using SETDEFAULTS. You can set defaults to:

- Add and delete lines.

- Search for lines.
- Identify the file name and path to change.

To set the defaults, create an NWSD configuration file that contains the SETDEFAULTS entry type as follows:

```
SETDEFAULTS
ADDWHEN      = '<ALWAYS|NEVER|<expression>>', (optional)
DELETEWHEN  = '<NEVER|ALWAYS|<expression>>', (optional)
FILESEARCHPOS = '<AFTER|BEFORE>', (optional)
FILESEARCHSTR = '<search_string>', (optional)
TARGETDIR    = '<path>', (optional)
TARGETFILE   = '<file_name>' (optional)
```

For a detailed explanation of the SETDEFAULTS keywords, use the following keyword links.

- ADDWHEN
- “DELETEWHEN”
- “FILESEARCHPOS keyword (SETDEFAULTS entry type)” on page 177
- “FILESEARCHSTR keyword (SETDEFAULTS entry type)” on page 177
- “TARGETDIR” on page 177
- “TARGETFILE” on page 177

ADDWHEN

Use ADDWHEN with the SETDEFAULTS entry type to set the default value for the ADDWHEN keyword on ADDCONFIG and UPDATECONFIG entry types.

Set the default for when during processing you want OS/400 to add the new line or string to the file. You can specify:

- ALWAYS if you want OS/400 to add the line or string every time it processes the configuration file. (ALWAYS is the default unless you defined a different default.)
- NEVER if you want OS/400 to never add the line or string.
- An expression that directs OS/400 to add the line or string when the specified condition is true. Expressions are composed of “ADDWHEN and DELETEWHEN expression operators” on page 171 and operands and must equate to either TRUE or FALSE.

Note: If you do not want OS/400 to interpret an expression (such as one that contains an asterisk (*)) as a mathematical operation, enclose the expression in quotation marks. For example, to add a line when the NWSD type is *WINDOWSNT, you could use this:

```
ADDWHEN = '(%FPANWSDTYPE%=="*WINDOWSNT")'
```

DELETEWHEN

Use DELETEWHEN with the SETDEFAULTS entry type to set the default value for the DELETEWHEN keyword on ADDCONFIG and UPDATECONFIG entry types.

Specify when during processing you want OS/400 to delete the line or string from the file.

This “Code disclaimer information” on page 1 pertains to code examples.

You can specify:

- ALWAYS if you want OS/400 to delete the line or string every time it processes the configuration file.
- NEVER if you want OS/400 to never delete the line or string. (NEVER is the default unless you defined a different default.)
- An expression that directs OS/400 to delete the line or string when the specified condition is true. Expressions are composed of “ADDWHEN and DELETEWHEN expression operators” on page 171 and operands and must equate to either TRUE or FALSE.

Note: If you do not want OS/400 to interpret an expression (such as one that contains an asterisk (*)) as a mathematical operation, enclose the expression in quotation marks. For example, to delete a line when the NWSD type is *WINDOWSNT, you can use this:

```
DELETEWHEN = '(%FPANWSDTYPE%=="*WINDOWSNT")'
```

FILESEARCHPOS keyword (SETDEFAULTS entry type)

Use FILESEARCHPOS with the SETDEFAULTS entry type to set the default value for the FILESEARCHPOS keyword on ADDCONFIG and UPDATECONFIG entry types.

Specify where to locate a line relative to the file search string. You can specify:

- AFTER if you want the line located after the line that contains the file search string. (AFTER is the default unless you defined a different default.)
- BEFORE if you want OS/400 to add the line before the line that contains the search string.

FILESEARCHSTR keyword (SETDEFAULTS entry type)

Use FILESEARCHSTR with the SETDEFAULTS entry type to set the default value for the FILESEARCHSTR keyword on ADDCONFIG and UPDATECONFIG entry types.

The FILESEARCHSTR value can be any part of the line you want to

TARGETDIR

Use TARGETDIR with the SETDEFAULTS entry type to set the default value for the TARGETDIR keyword on ADDCONFIG and UPDATECONFIG entry types.

A path specifies the directory that contains the file to be processed.

For example, to set the default TARGETDIR value for a file on drive D, you could use this:

```
SETDEFAULTS TARGETDIR = 'D:\'
```

TARGETFILE

Use TARGETFILE with the SETDEFAULTS entry type to set the default value for the TARGETFILE keyword on ADDCONFIG and UPDATECONFIG entry types.

A name specifies the file to be processed.

This “Code disclaimer information” on page 1 pertains to code examples.

For example, to set the default TARGETFILE value for file UNATTEND.TXT on drive D, you could use this:

```
SETDEFAULTS
  TARGETDIR = 'D:\',
  TARGETFILE = 'UNATTEND.TXT'
```

Use substitution variables for keyword values

You can use substitution variables for keyword values. The NWSD configuration file substitutes the correct values for the variables. These substitution variables are configured using the values stored in the NWSD or the hardware that is detected on the NWSD.

This “Code disclaimer information” on page 1 pertains to code examples.

OS/400 supplies these variables:

Substitution variable	Description
%FPALANDRIVER00%	Device driver name (Port *INTERNAL)
%FPALANDRIVER01%	Device driver name (Port 1)
%FPALANDRIVER02%	Device driver name (Port 2)

Substitution variable	Description
%FPALANDRIVER03%	Device driver name (Port 3)
%FPAMACADDR00%	MAC address (NWSD Port *INTERNAL) *
%FPAMACADDR01%	MAC address (NWSD Port 1) *
%FPAMACADDR02%	MAC address (NWSD Port 2) *
%FPAMACADDR03%	MAC address (NWSD Port 3) *
%FPAIPADDR00%	TCP/IP address (NWSD Port *INTERNAL) *
%FPAIPADDR01%	TCP/IP address (NWSD Port 1) *
%FPAIPADDR02%	TCP/IP address (NWSD Port 2) *
%FPAIPADDR03%	TCP/IP address (NWSD Port 3) *
%FPASUBNET00%	TCP/IP subnet address (NWSD Port *INTERNAL) *
%FPASUBNET01%	TCP/IP subnet address (NWSD Port 1) *
%FPASUBNET02%	TCP/IP subnet address (NWSD Port 2) *
%FPASUBNET03%	TCP/IP subnet address (NWSD Port 3) *
%FPAMTU00%	TCP/IP interface MTU (NWSD Port *INTERNAL)*
%FPAMTU01%	TCP/IP interface MTU (NWSD Port 1) *
%FPAMTU02%	TCP/IP interface MTU (NWSD Port 2) *
%FPAMTU03%	TCP/IP interface MTU (NWSD Port 3) *
%FPAPORTTYPE00%	Adapter port type (Port *INTERNAL - 2B00)
%FPAPORTTYPE01%	Adapter port type (Port 1 - ex.2723,2724,2838, 2744,2743,2760)
%FPAPORTTYPE02%	Adapter port type (Port 2 - ex.2723,2724,2838, 2744,2743,2760)
%FPAPORTTYPE03%	Adapter port type (Port 3 - ex.2723,2724,2838,2744,2743,2760)
%FPATCPHOSTNAME%	TCP/IP host name
%FPATCPDOMAIN%	TCP/IP domain name
%FPATCPDNSS%	TCP/IP DNS's, separated by commas
%FPATCPDNS01%	TCP/IP Domain Name Server 1
%FPATCPDNS02%	TCP/IP Domain Name Server 2
%FPATCPDNS03%	TCP/IP Domain Name Server 3
%FPANWSDTYPE%	The type of the NWSD that you are varying on (*WINDOWSNT)
%FPANWSDNAME%	The name of the NWSD that you are varying on
%FPACARDTYPE%	The resource type of the NWSD that you are varying on (ex. 6617,2850,2890,2689)
%FPAINSMEM%	The amount of installed memory detected
%FPAUSEMEM%	The amount of useable memory detected
%FPACODEPAGE%	The ASCII codepage used to translate from EBCDIC
%FPALANGVERS%	The OS/400 Language version used on the NWSD
%FPASYSDRIVE%	The drive letter used for the system drive (C, E when server was installed with V4R4 or earlier)
%FPA_CARET%	The caret symbol (^)
%FPA_L_BRACKET%	The left bracket symbol ([)
%FPA_R_BRACKET%	The right bracket symbol (])

Substitution variable	Description
%FPA_PERCENT%	The percent symbol (%) NOTE: Since the percent symbol is used as the substitution variable delimiter, this substitution variable should be used when a string contains a percent symbol that should NOT be interpreted as a substitution variable delimiter.
%FPABOOTDRIVE%	This is always drive E for the Integrated xSeries Server
%FPACFGFILE%	The name of the NWSD configuration file being processed
%FPACFGLIB%	The library that contains the NWSD configuration file being processed
%FPACFGMBR%	The name of the NWSD configuration file member being processed
* Values are retrieved from the NWSD	

You can configure additional substitution variables by creating a file in QUSRSYS and giving it the same name as the NWSD followed by the suffix 'VA'. You must create the file as a source physical file with a minimum record length of 16 and maximum record length of 271.

For example, at the OS/400 command line, type this:

```
CRTSRCPF FILE(QUSRSYS/nwsdnameVA) RCDLEN(271)
        MBR(nwsdname) MAXMBRS(1)
        TEXT('Configuration file variables')
```

The member 'nwsdname' contains data in fixed columns formatted as:





- A variable name in column 1-15 padded with blanks and
- A value that starts in column 16

For example:

```
Columns:
12345678901234567890123456789012345678901234567890...
myaddr          9.5.9.1
```

where %myaddr% is added to the list of available substitution variables and has a value of "9.5.9.1".

Related information

- For the latest product and service information, see the IBM Windows Integration  Web site.
- For more detailed technical information about Windows NT 4.0 on an Integrated xSeries Server, see the Redbook AS/400-Implementing Windows NT on the Integrated Netfinity Server .
- For more detailed technical information about Windows 2000 on an Integrated xSeries Server, see the Redbook Consolidating Windows 2000 Servers in iSeries: An Implementation Guide for the IBM Integrated xSeries Server for iSeries.
-  For more detailed information about using Windows servers on a direct-attached xSeries server, see the Redbook Direct Attach xSeries for the IBM iSeries Server. 



Printed in U.S.A.