AS/400e

IBM AS/400 Integration for Windows Server – Setup

Version 4

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> **Note**
>
> Before using this information and the product it supports, be sure to read the information in "Notices" on page 75.

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About IBM AS/400 Integration for Windows Server – Setup (SC41-5439)

This book describes installing and configuring Windows NT Server or Windows 2000 Server edition on an Integrated Netfinity Server in an AS/400 by using the AS/400 Integration with Windows NT Server Licensed Program Product. Once you have the software installed, refer to the articles "Windows Server on AS/400" under the Networking topic in the Information Center for information on administering your server. You can access the Information Center on CD-ROM (English version SK3T-2027) or on the Internet at:

- `http://www.as400.ibm.com/infocenter`
- `http://publib.boulder.ibm.com/pubs/html/as400/infocenter.htm`

If you want to print that information, a PDF version is available in the Information Center.

Nor does this book contain comprehensive information on Windows NT Server. You should also have Windows NT Server documentation for issues specific to Windows NT Server.

Who should read this book

This book is written for administrators of Windows NT Server on AS/400. Users of this book should be familiar with AS/400 and Windows NT Server concepts, or have other documentation on those concepts available for reference.

Conventions and terminology used in this book

In this book, bold text is used to indicate elements in the Windows NT Server environment, such as buttons and menus. Monospaced text is used to indicate elements in the AS/400 environment, such as fields and displays.

For example:
- On Windows NT Server, Click **OK**.
- In the `Network server description field` on AS/400, enter the name of your server.

By Windows NT Server we mean Windows NT Server installed on an Integrated Netfinity Server. We intend that you perform Windows NT tasks on the Integrated Netfinity Server unless we tell you otherwise.

AS/400 Operations Navigator

AS/400 Operations Navigator is a powerful graphical interface for Windows 95/NT clients. With AS/400 Operations Navigator, you can use your Windows 95/NT skills to manage and administer your AS/400 systems.

- You can work with basic operations (messages, printer output, and printers), job management, system configuration, network administration, security, users and groups, database administration, file systems, and multimedia.
- You can schedule regular system backups, work with Interprocess Communication through application development, and manage multiple AS/400

systems through a central system by using Management Central. You can also customize the amount of Operations Navigator function that a user or user group can use through application administration.

- You can create a shortcut to any item in the explorer view of Operations Navigator. For example, you can create a shortcut either to **Basic Operations** or to the items that are listed under **Basic Operations** (**Messages**, **Printer Output**, and **Printers**). You can even create a shortcut to an individual printer or use a shortcut as a fast way to open the item.

Figure 1 shows an example of the Operations Navigator display:
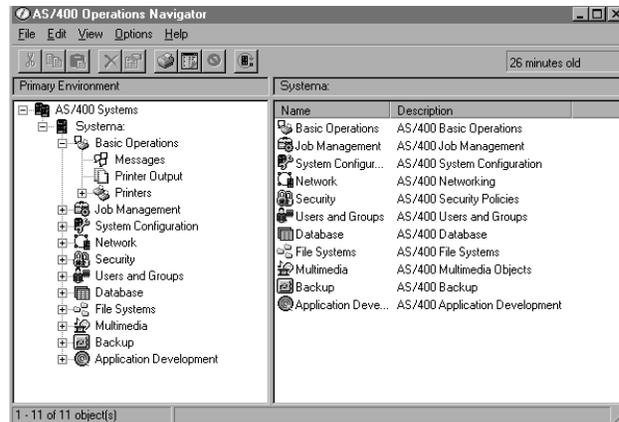
Figure 1. AS/400 Operations Navigator Display

IBM recommends that you use this new interface. It has online help to guide you. While we develop this interface, you will still need to use either of the following to do some of your tasks:

- Graphical Access (which provides a graphical interface to AS/400 screens). Graphical Access is part of the base Client Access.
- A traditional emulator such as PC5250.

Installing Operations Navigator subcomponents

AS/400 Operations Navigator is packaged as separately installable subcomponents. If you are upgrading from a previous release of AS/400 Operations Navigator, only those subcomponents that correspond to the function that is contained in the previous release will be installed. If you are installing for the first time and you use the **Typical** or **Minimum** installation options, the following options are installed by default:

- Operations Navigator base support
- Basic operations (messages, printer output, and printers)

To install additional AS/400 Operations Navigator subcomponents, either use the **Custom** installation option or use **selective setup** to add subcomponents after Operations Navigator has been installed:

1. Display the list of currently installed subcomponents in the **Component Selection** window of **Custom** installation or selective setup.
2. Select AS/400 Operations Navigator and click **Details**.
3. Select any additional subcomponents that you want to install and continue with **Custom** installation or selective setup.

Note: To use AS/400 Operations Navigator, you must have Client Access installed on your Windows 95/NT PC and have an AS/400 connection from that PC. For help in connecting your Windows 95/NT PC to your AS/400 system, consult *Client Access for Windows 95/NT - Setup*, SC41-3512-05 .

Accessing AS/400 Operations Navigator

To access Operations Navigator after you install Client Access and create an AS/400 connection, do the following:

1. Double-click the **Client Access** folder on your desktop.
2. Double-click the **Operations Navigator** icon to open Operations Navigator. You can also drag the icon to your desktop for even quicker access.

Prerequisite and related information

Use the AS/400 Information Center as a starting point for your AS/400 information needs. It is available in either of the following ways:

- The Internet at this uniform resource locator (URL) address:

  `http://publib.boulder.ibm.com/html/as400/infocenter.html`

- On CD-ROM: *AS/400 Information Center*, SK3T-2027-03 .

The AS/400 Information Center contains browsable information on important topics such as Java, program temporary fixes (PTFs), and Internet security. It also contains hypertext links to related topics, including Internet links to Web sites such as the AS/400 Technical Studio, the AS/400 Softcopy Library, and the AS/400 home page.

How to send your comments

Your feedback is important in helping to provide the most accurate and high-quality information. If you have any comments about this book or any other AS/400 documentation, fill out the readers' comment form at the back of this book.

- If you prefer to send comments by mail, use the readers' comment form with the address that is printed on the back. If you are mailing a readers' comment form from a country other than the United States, you can give the form to the local IBM branch office or IBM representative for postage-paid mailing.
- If you prefer to send comments by FAX, use either of the following numbers:
  - United States and Canada: 1-800-937-3430
  - Other countries: 1-507-253-5192
- If you prefer to send comments electronically, use this network ID:
  - IBMMAIL, to IBMMAIL(USIB56RZ)
  - RCHCLERK@us.ibm.com

Be sure to include the following:

- The name of the book.
- The publication number of the book.
- The page number or topic to which your comment applies.

Chapter 1. Windows server on AS/400

Using AS/400 Integration for Windows Server is easy and only a little different than running Windows NT 4.0 or Windows 2000 on a PC. It provides some advantages, such as allowing you to use AS/400 disk storage, the AS/400 CD-ROM drive, and AS/400 tape drives. It also gives you the benefits of AS/400 administration. The AS/400 Information Center version of this information tells you how running Windows server on AS/400 on an Integrated Netfinity Server is different than running it on a standalone PC server. The AS/400 Information Center comes on CD-ROM with your AS/400. You can also access the AS/400 Information Center at this Web address:

`http://as400.ibm.com/infocenter`

To use Windows server on AS/400, you need:
- The licensed program AS/400 Integration for Windows Server, and either option 1 (for Windows NT 4.0) or option 2 (for Windows 2000). This program comes on the Operating System/400 bonus pack CD-ROM, and there is no extra charge for it. For more information, see "Software requirements for running Windows server on AS/400" on page 8.
- An Integrated Netfinity Server for AS/400. For more information, see "Hardware requirements for running Windows server on AS/400" on page 7 and "Integrated Netfinity Server for AS/400 CCIN and feature code numbers" on page 7. The *AS/400 Information Center* version of this information includes a description of an Integrated Netfinity Server.
- Licenses for Windows server that you purchase from your Microsoft reseller.

Get up and running.
- Install and configure the integration software and a supported version of Windows 2000 or Windows NT 4.0 on your AS/400. Apply code fixes, upgrade your software, migrate to new hardware, and install and remove network adapters. Refer to "Chapter 3. Installation and configuration of AS/400 Integration for Windows Server" on page 5.
- Once you have installed the software, read how to start and stop your Windows server. Refer to "Chapter 4. Starting and stopping Windows server on an Integrated Netfinity Server for AS/400" on page 59 and "Chapter 5. Avoiding data loss when powering down AS/400" on page 63.
- Back up the storage spaces that are associated with your server. Refer to "Chapter 6. Backup of the NWSD and storage space objects associated with Windows server on AS/400" on page 65. Read about other options for backing up your Windows server, including the new file-level backup function, in the AS/400 Information Center.
- Refer to the topic "Windows server on AS/400" under "Network Operating Systems" in the AS/400 Information Center for information about these topics:
  - Creating NWSD configuration files
  - Managing your server from AS/400 and running Windows server commands from AS/400
  - Managing storage
  - Administering Windows server users from AS/400
  - Sharing devices between Windows server and AS/400
  - Backing up and recovering your Windows server files
  - Troubleshooting Windows server on AS/400

– Uninstalling Windows server from Integrated Netfinity Server

Chapter 2. What's new for V4R5

Changes for this release include:

- New Pentium III model 2890 Integrated Netfinity Server hardware is available (see "Integrated Netfinity Server for AS/400 CCIN and feature code numbers" on page 7 for Integrated Netfinity Server cards that work with Windows servers).
- You can save and restore individual Windows server files from AS/400. See the topic "Backing up individual files and directories" in the Information Center.
- Support for Windows 2000 Server.
- AS/400 now creates the boot and system drives as network server storage spaces instead of server storage spaces, which affects how you back up your drives. Refer to "Chapter 6. Backup of the NWSD and storage space objects associated with Windows server on AS/400" on page 65.
- AS/400 Integration for Windows Server is now a licensed program instead of OS/400 option 29. Upgrading to V4R5 removes the old option 29 from your system and installs the base code for the new version of AS/400 Integration for Windows Server. However, you need to install your choice of options. For more information, see "Installing AS/400 Integration for Windows Server" on page 22.
- The default installation drive for newly created Windows servers is the C drive instead of the E drive.
- Previous releases of AS/400 Integration for Windows Server included a customized version of the hardware abstraction layer (HAL), which IBM shipped and maintained as part of the product. For V4R5, IBM redesigned the device drivers that ship with this product to function with the HAL that Microsoft ships and maintains. It is therefore necessary to copy the HAL from the appropriate Microsoft media during the upgrade process. For more information, see "Upgrade and migration considerations for AS/400 Integration for Windows Server and Integrated Netfinity Server" on page 9.
- Integrated Netfinity Server management through Operations Navigator.

Chapter 3. Installation and configuration of AS/400 Integration for Windows Server

Installing Windows server on an Integrated Netfinity Server involves installing two separate pieces of software: AS/400 Integration for Windows Server from IBM and the Windows server software from Microsoft.

If you use logical partitions on your AS/400:
- Install the AS/400 Integration for Windows Server base licensed program and either option 1 or 2 on each logical partition that will have Windows server installed. 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.
- You need to install Windows server only on the logical partition that you will use to vary on the server.

To get AS/400 Integration for Windows Server installed and running:
1. Complete the preliminary steps in the planning section ("Planning for AS/400 Integration for Windows Server installation"), including printing and filling out the work sheet.
2. Install the integration software from IBM. Refer to "Installing AS/400 Integration for Windows Server" on page 22.
3. Install the Windows server software from Microsoft. Refer to "Installing Windows server on the Integrated Netfinity Server" on page 23.
4. A few configuration tasks complete the installation. Refer to "Completing the installation of Windows server on AS/400" on page 35.

Other setup tasks that you might want to do with your Integrated Netfinity Server include:
- "Using code fixes for AS/400 Integration for Windows Server" on page 37.
- "Upgrading AS/400 Integration for Windows Server" on page 42.
- "Migrating to new 2890 Integrated Netfinity Server hardware" on page 48.

Planning for AS/400 Integration for Windows Server installation

Before you install AS/400 Integration for Windows Server, you need to be aware of what hardware and software you need. For information, see "Hardware requirements for running Windows server on AS/400" on page 7 and "Software requirements for running Windows server on AS/400" on page 8. If you are upgrading your version of OS/400 to V4R5 and also upgrading to the Pentium III 2890 Integrated Netfinity Server, first read "Upgrade and migration considerations for AS/400 Integration for Windows Server and Integrated Netfinity Server" on page 9.

If you want to run both Windows NT 4.0 and Windows 2000, you can install both options of AS/400 Integration for Windows Server on an AS/400 or partition. When you install a network server description (NWSD) on AS/400 to describe your server, you specify the version of Windows and the hardware resource. It is possible to install multiple NWSDs per hardware resource. However, you can have only one varied on (running) at any given time.

Once you have set up TCP/IP on your AS/400, decide how many Windows servers and subnets you need for your particular business. One larger model of AS/400 can hold up to 16 individual Windows servers.

For Windows NT 4.0 only:

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 Netfinity 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.

For Windows 2000 only:
- Make the first Windows 2000 Server 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 allows you to promote a server to a domain controller without reinstalling the server.

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 AS/400, you might be able to use the same values your AS/400 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. Be aware that this does not apply to disk mirroring or an uninterruptible power supply that you have on your AS/400.

The installation requires basic AS/400 operational skills and a knowledge of Windows NT 4.0 or Windows 2000 and network administration.

The "Preinstallation checklist for AS/400 Integration for Windows Server" on page 11 takes you through preliminary steps you need to take to get ready for the installation.

Hardware requirements for running Windows server on AS/400

To run AS/400 Integration for Windows Server, you need the following hardware:
- Any 64–bit RISC AS/400.
- Integrated Netfinity Server for AS/400 that is compatible with your model of AS/400:
  - Attached SVGA compatible monitor
  - Attached mouse or other pointing device
  - At least 64 MB of random access memory (RAM)
  - Attached keyboard
- You need free AS/400 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 750 MB up to 9050 MB.
- 45 MB of free AS/400 disk space for the code of the AS/400 Integration for Windows Server licensed program.
- One or more approved PCI LAN adapters:
  - 100 Mbit Ethernet (CMNxx 2838)
  - 10 Mbit Ethernet (CMNxx 2723)
  - 4/16 Mbit token-ring (CMNxx 2724)
  - 100/16/4 MB token-ring (CMNxx 2744) (that is supported only on the 2890 Integrated Netfinity Server)
- LAN adapter cables that are connected to the LAN adapters in the Integrated Netfinity Server

Note: The Integrated Netfinity Server cannot share its external LAN adapters with AS/400 (you cannot define AS/400 line descriptions for the external LAN adapters) under these conditions:
- It is a new model 2890 Integrated Netfinity Server.
- The IP forwarding function is enabled on Windows server.
- The Integrated Netfinity hardware was migrated to a 50xx Migration Tower.

AS/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 Netfinity 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 Netfinity Servers enables one set of devices to control multiple integrated Windows servers.

You can go back to "Planning for AS/400 Integration for Windows Server installation" on page 5 or read about software requirements. You might also want to read "Upgrade and migration considerations for AS/400 Integration for Windows Server and Integrated Netfinity Server" on page 9.

Integrated Netfinity Server for AS/400 CCIN and feature code numbers

The Integrated Netfinity Server for AS/400 hardware that you need to install Windows server on your AS/400 is identified by a feature code and a custom card identification number (CCIN). This table shows the relationship between those numbers and which Integrated Netfinity Server card you can use for your model of AS/400.

Feature Code	System Model	CCIN Numbers	Description
#2852	150	2850-011	Pentium Pro Integrated Netfinity Server
		285A-003	Windows server bridge
#2854	600/620/S10/S20	2850-001	Pentium Pro Integrated Netfinity Server
		285A-003	Windows server bridge
#2857	170	2850-001	Pentium Pro Integrated Netfinity Server
		285A-003	Windows server bridge
#2865	600/620 S10/S20 720/730/740	2850-012	Pentium II Integrated Netfinity Server
		285A-003	Windows server bridge
#2866	170	2850-012	Pentium II Integrated Netfinity Server
		285A-003	Windows server bridge
#2868	150	2850-012	Pentium II Integrated Netfinity Server
		285A-003	Windows server bridge
#2790	820/830/840	2890-001	**Pentium III Integrated Netfinity Server
#2890	270	2890-001	**Pentium III Integrated Netfinity Server
#6617	All RISC systems with Book Packages	6617–001	Pentium Pro Integrated Netfinity Server
#6618	All RISC systems with Book Packages	6617-012	Pentium II Integrated Netfinity Server

Notes:

1. **These Integrated Netfinity Server for AS/400 models cannot serve as an external host LAN for your AS/400.

2. Any Integrated Netfinity Server migrated to a 50xx Migration Tower cannot serve as an External Host LAN for your AS/400.

3. The 2790 and 2890 models of the Integrated Netfinity Server consist of the same hardware. Any statements made concerning the 2890 model also apply to the 2790.

Software requirements for running Windows server on AS/400

To run Windows server on AS/400, you need this software:

For Windows 2000:
- Operating System/400 (5769-SS1), Version 4, Release 5 or later. To check your release level:
  1. On the on AS/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 AS/400 Integration for Windows Server 5769-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 AS/400 (5769-TC1)
- Windows 2000 Server from Microsoft.

- Any required Microsoft service packs. For the latest information about available Windows server service packs that IBM has tested with AS/400 Integration for Windows Server, refer to the Applications topic on the AS/400 Integration for Windows Server World Wide Web site:

  `http://www.as400.ibm.com/NT`
- Any Program Temporary Fixes (PTFs) that IBM has issued since the initial release of AS/400 Integration for Windows Server. Refer to the Service Information topic on the AS/400 Integration for Windows Server World Wide Web site:

  `http://www.as400.ibm.com/NT`

For Windows NT 4.0, Server or Terminal Server Edition:
- Operating System/400 (5769-SS1), Version 4, Release 2 or later. To check your release level:
  1. On the on AS/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.)
- For V4R5, IBM AS/400 Integration for Windows Server 5769-WSV (the base licensed program and option 1). For earlier releases, the integration software is option 29 of OS/400. 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 AS/400 (5769-TC1)
- 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:

  `http://www.citrix.com/`
- Any required Microsoft Windows NT 4.0 service packs. For the latest information about available Windows server service packs that IBM has tested with AS/400 Integration for Windows Server, refer to the Applications topic on the AS/400 Integration for Windows Server World Wide Web site:

  `http://www.as400.ibm.com/NT`
- Any Program Temporary Fixes (PTFs) that IBM has issued since the initial release of AS/400 Integration for Windows Server. Refer to the Service Information topic on the AS/400 Integration for Windows Server World Wide Web site:

  `http://www.as400.ibm.com/NT`

For additional information about the installation of required software, see the book *Software Installation*, SC41-5120-04 .

You can go back to "Planning for AS/400 Integration for Windows Server installation" on page 5 or read about hardware requirements. You might also want to read "Upgrade and migration considerations for AS/400 Integration for Windows Server and Integrated Netfinity Server".

Upgrade and migration considerations for AS/400 Integration for Windows Server and Integrated Netfinity Server

For V4R5, IBM redesigned the device drivers that ship with AS/400 Integration for Windows Server to function with the hardware abstraction layer (HAL) that Microsoft ships and maintains. It is therefore necessary to copy the HAL from the appropriate Microsoft media during the upgrade process. Failure to do so, or copying from the wrong media, could result in irreparable damage to your

network server description. To upgrade to V4R5, you must know what Microsoft Service Pack is currently installed on your network server description and have that Service Pack CD-ROM available.

If you are upgrading from V4R2 of AS/400 Integration for Windows Server and did not install PTF MF18124, which eliminates placeholder drives, you need to do a few additional preliminary tasks. For previously installed servers, the change in drive letters may affect applications or data that refer to these drives. You can either reinstall your applications and data or return the drives to their original state after you upgrade. Both options require you to do some tasks before installing the new version of AS/400 Integration for Windows Server. If this is your situation, refer to "Troubleshooting drive letter changes when upgrading AS/400 from V4R2" in the Information Center for information about what you can do.

To upgrade your system to V4R5 and also migrate to the new Pentium III 2890 Integrated Netfinity Server, you must complete the steps in the correct order to avoid losing access to your data. Refer to "Migrating to new 2890 Integrated Netfinity Server hardware" on page 48 and be careful to complete the steps in this order:

1. First install the new version of OS/400 and Integration for Windows Server on your AS/400. Follow the instructions in the book *Software Installation*, SC41-5120-04 and refer to "Upgrading OS/400 and AS/400 Integration for Windows Server" on page 43. The installation process deletes the old option 29 and installs the new WSV base code for Integration for Windows Server on your AS/400.

2. Install your choice of options from the bonus pack CD-ROM: option 1 for Windows NT 4.0, option 2 for Windows 2000, or both. "Installing AS/400 Integration for Windows Server" on page 22 has information about installing these options.

3. If you are migrating to new Integrated Netfinity 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 Netfinity Server hardware. Refer to "Migrating to new 2890 Integrated Netfinity Server hardware" on page 48.

   If you have been using your Integrated Netfinity Server as an external host LAN for your AS/400, be aware that the new 2790 and 2890 Integrated Netfinity 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 new 2890 Integrated Netfinity Server, you need to install the Savage 4 Video Driver for Windows NT 4.0. The 2890 Integrated Netfinity 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.

5. If you are installing Windows NT 4.0 Server on the new 2890 Integrated Netfinity Server with 2 GB or more 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 and apply SP3 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 installations are not affected.

Preinstallation checklist for AS/400 Integration for Windows Server

Performing a few preliminary tasks before installing Windows server on AS/400 should make the installation go smoothly. Before you begin installing the software, do this:

1. Verify that you have the necessary authority to perform the installation. To set up Windows server on an Integrated Netfinity Server, you must have *IOSYSCFG, *ALLOBJ, and *JOBCTL special authority on AS/400. An administrator with *SECADM special authority must perform step 9 of this checklist. For information about special authorities, refer to the book Security - Reference, SC41-5302-02 .

2. Also verify that you have enough memory allocated to the machine pool (see "Machine pool size requirements for AS/400 Integration for Windows Server" on page 12).

3. When you use AS/400 Integration for Windows Server, the OS/400 license manager counts it. You may need to increase your OS/400 usage limit to allow for the additional usage. Use the Work with License Information (WRKLICINF) command on AS/400 to display the usage limit for licensed program 5769-WSV. Contact your software provider if you need to increase the authorized usage limit.

4. If the Integrated Netfinity 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 2 on page 35).

5. To ensure that time synchronization will work, verify that the AS/400 QUTCOFFSET system value is correctly set.

6. Print and fill out the "Work sheets for installing Windows server on AS/400" on page 14.

7. Configure TCP/IP and add your gateway address.

8. Decide whether you want to use Client Access Express, which allows you to use Operations Navigator and run Open Database Connectivity (ODBC) as a Windows server service. See the comparison of AS/400 NetServer with Client Access in the Information Center.

9. Enable AS/400 NetServer and set up a guest user profile, 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 configuration file to modify the default values in the Windows NT unattended install setup script file (unattend.txt). You can find information about creating NWSD configuration files in the Information Center. (Expand **Network Operating Systems** —> **Windows Server on AS/400** —> **Installation and configuration of . . .** —> **Completing the installation . . .** —> **Network server description configuration files**.)

When you have finished the preinstallation tasks, you are ready for "Installing AS/400 Integration for Windows Server" on page 22.

Machine pool size requirements for AS/400 Integration for Windows Server

Machine pool size requirements for AS/400 Integration for Windows Server depend on which type of Integrated Netfinity Server you have:

Integrated Netfinity Server	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 Netfinity Server.
2850	1800 KB	1800 KB for each 2838, 2723, or 2724 network adapter card that you install with the Integrated Netfinity Server.
2890	856 KB	You do not need to consider network adapter cards that you install with this model Integrated Netfinity Server because they cannot serve as shared external host LAN adapters for AS/400.

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 AS/400 Integration for Windows Server" on page 11.

Internal and external local area networks of Windows server on AS/400

When you install Windows server on an Integrated Netfinity Server, you must plan and configure a TCP/IP network interface for the internal local area network (LAN) as well as a network interface to link AS/400 with other systems on the network.

Internal LAN

An integrated Windows server can communicate with AS/400 through an internal, or virtual, local area network (LAN). This is a "virtual LAN" because it uses the AS/400 system bus for communication instead of external network adapters or cables. Data sent over this LAN is secure because it never leaves your AS/400.

AS/400 Integration for Windows Server uses the TCP/IP protocol to communicate through the internal LAN. The internal 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 Netfinity 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 Netfinity 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 Netfinity 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 AS/400, giving AS/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 AS/400 models 8xx or 270. IBM recommends that you use a separate adapter to connect AS/400 to the external LAN to avoid losing your connection when Windows server shuts down. Figure 2 on page 14 shows the relationship between the two LANs, AS/400, and the Integrated Netfinity Server.

OS/400

AS/400

IP Address

Internal LAN

Integrated
Netfinity Server

IP Address

Windows
Server

External LAN

RV4P050-1
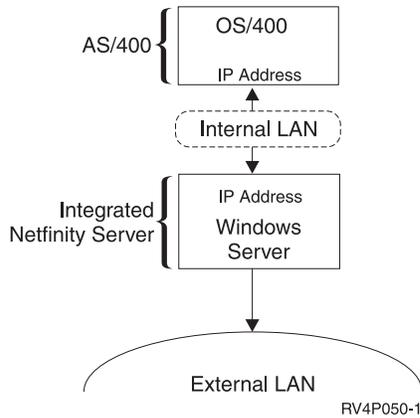
Figure 2. Internal and external LANs

Go back to "Preinstallation checklist for AS/400 Integration for Windows Server"
on page 11.

Verifying that AS/400 time zone is set

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

1. On AS/400, type the command `WRKSYSVAL QUTCOFFSET` 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 QUTCOFFSET system value is not correct, type 2 in the `Opt` field next to the QUTCOFFSET system value. Then type the correct value and press Enter.

Go back to "Preinstallation checklist for AS/400 Integration for Windows Server"
on page 11.

Work sheets for installing Windows server on AS/400

Fill in these work sheets before you install Windows NT 4.0 or Windows 2000 on AS/400. If you are viewing this information online, you should print out copies of the work sheets.

Table 1. Installation work sheet for AS/400 parameters

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 AS/400" on page 30 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.	

Table 1. Installation work sheet for AS/400 parameters (continued)

Field	Description and Instructions	Value
Resource name	Identifies the Windows server hardware. To determine the name, enter DSPHDWRSC *CMN at the AS/400 command line. If you have a 2850 or 2890 model Integrated Netfinity Server, look for a name in the format LINxx, in which xx is a number. The text associated with this name should indicate that the resource is a File Server IOA. If you have a 6617 model Integrated Netfinity Server, look for a name in the form CCxx, in which xx is a number. The text associated with this name should indicate that the resource is a File Server IOP. ***Tip** "Tip: Finding resource names when you have multiple Integrated Netfinity Servers" on page 21	

Domain role	Specifies the role performed by this network server:
	*DMNCTL
	        This network server is a domain controller, managing user access between servers and clients.
	Windows 2000
	        To complete the installation of a *DMNCTL, you must promote the server using the `DCPROMO` command once the INSWNTSVR command has completed.
	*BKUCTL
	        If you are installing Windows NT 4.0, you can designate this network server as a backup domain controller. Windows 2000 does not have backup domain controllers.
	*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.
	
	        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 running multiple servers, 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.
	
	        For Windows 2000: To change the domain role to or from *SERVER, you promote or demote the server. You do not need to reinstall Windows 2000.	

Table 1. Installation work sheet for AS/400 parameters (continued)

Field	Description and Instructions	Value
TCP/IP port configuration	Use this parameter if you are installing Windows 2000 and you do not want AS/400 to share access with the PCI LAN adapters on the Integrated Netfinity 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 AS/400 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).	• Port 1 – IP address – Subnet mask – Gateway • Port 2 – IP address – Subnet mask – Gateway • Port 3 – IP address – Subnet mask – Gateway
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 AS/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 AS/400 system 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.	
Server message queue and library	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 AS/400, and severe errors are sent to QSYSOPR.	Queue: Library:
Event log	Specifies whether or not AS/400 receives event log messages from the Windows server. The choices are all, system, security, application, or none: ***ALL** AS/400 receives all event log messages. ***NONE** No event log messages are received. ***SYS** AS/400 receives system event log messages. ***SEC** AS/400 receives security event log messages. ***APP** AS/400 receives application event log messages. **Note:** If you propagate the security log (by specifying *ALL or *SEC), be sure to set up the message queue with the proper security.	

Table 1. Installation work sheet for AS/400 parameters (continued)

Field	Description and Instructions	Value
Installation source and system drive sizes and auxiliary storage pool (ASP)	Specify the size of the network server storage spaces for the installation source and system drives and in which ASP (1–16) you want them. 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 AS/400 Integration for Windows Server code. The system drive (Drive C) must be large enough to hold the Windows server operating system. It can be from 500 to 8000 megabytes. Consider these factors: • 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 AS/400 creates and links the drive as a FAT or NTFS network server storage space, depending on the size. For more information about these drives, see the Information Center. **Note:** When deciding the size of each drive, allow room for future needs such as new applications or upgrades to the Windows server product.	Installation source drive: Size ASP System drive: Size ASP

Table 1. Installation work sheet for AS/400 parameters (continued)

Field	Description and Instructions	Value

License Mode	Determines the license mode to install the Window server.
	
	 *PERSEAT
	     Indicates that a client license has been purchased for each computer that accesses the server.
	
	 *PERSERVER
	     Indicates that client licenses have been purchased for the server to allow a certain number of concurrent connections to the server.
	
	 *NONE
	     Indicates that no client licenses are installed. *NONE must be specified when *PERSEAT is specified.
	
	     number-client-licenses: Specifies the number of client licenses purchased for the server being installed.
	
	     Element 3: Desktop licenses.
	
	 *NONE
	     There are no Terminal Server desktop licenses for this server.
	
	     number-desktop-licenses: Specifies the number of Terminal Server desktop licenses purchased for the server being installed. The valid range is 5 to 9999. Note: This value only applies to Windows Terminal Server and will be ignored by versions of Windows that do not support it. For Windows 2000, a value specified for the number of desktop licenses will automatically install the Terminal Services and the Terminal Services licensing.	

Restricted device resources	Restricts AS/400 tape and optical devices from being used by the Windows server.
	
	 *NONE
	     Restricts no tape or optical devices from being used by the network server.
	
	 *ALL Restricts all tape and optical devices from being used by the network server.
	
	 *ALLTAPE
	     Restricts all tape resources from being used by the network server.
	
	 *ALLOPT
	     Restricts all optical resources from being used by the network server.
	
	 restricted-device
	     Specify up to 10 device resources that you do not want the network server to use.	

Table 1. Installation work sheet for AS/400 parameters (continued)

Field	Description and Instructions	Value
Time zone	(Optional) record AS/400 offset from Greenwich Mean Time for use in the Windows server phase of installation. (See "Verifying that AS/400 time zone is set" on page 14.)	
(For Windows NT 4.0 only) Internal LAN port	An internal LAN (also called the virtual LAN) exists between AS/400 and Windows server. Both the AS/400 side and the Windows server side of this LAN have IP addresses and subnet masks. **Note:** By default, the INSWNTSVR command sets up these addresses automatically. **Note: Windows 2000** automatically handles the Windows server configuration during the installation, and you do not need to record anything here. **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 AS/400 screen. (If you miss it there, you can also find it in the joblog.) From that information, you can infer the AS/400-side information. The fourth octet of the AS/400-side internal IP address is always 1 less than the fourth octet of the Windows server internal IP address. 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 AS/400. Use the `Internal LAN port` parameter under additional parameters of the INSWNTSVR command. The subnet mask is always 255.255.255.0.	**AS/400-side** IP address: **Windows server-side** IP address:
Configuration file	You can create and specify during the installation a customized NWSD configuration file (described in the AS/400 Information Center). 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).	

Table 2. 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 new Pentium III- based model 2890 and hardware migrated to 50xx Migration Tower do not). • You plan to use the LAN adapters installed in models of the Integrated Netfinity Server as external host LAN for your AS/400. LAN adapters are referred to as "ports" on AS/400.		
Item	**Description and Instructions**	**Value**
Line Type	Identifies the type of network adapter that is installed in the Integrated Netfinity Server and that will be shared by AS/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 your AS/400. The values you can specify depend on the line type. Ethernet lines use values between 020000000000 and 7EFFFFFFFFFF. The second character must be 2, 6, A, or E. Token-ring lines use values between 400000000000 and 7EFFFFFFFFFF. 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:
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:
AS/400 Internet address	Specify the AS/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.	AS/400 Port 1 AS/400 Port 2
AS/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.	AS/400 Port 1 AS/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 AS/400 Integration for Windows Server" on page 11.

Tip: Finding resource names when you have multiple Integrated Netfinity Servers

You can have multiple Integrated Netfinity Servers of the same type installed on your AS/400. If so, you may not be able to tell them apart on the `Display Communication Resources` display.

To find out which Integrated Netfinity 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 AS/400. 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 Netfinity Server to which the resource name refers.

Go back to "Work sheets for installing Windows server on AS/400" on page 14.

Configuring AS/400 TCP/IP for Windows server on AS/400

When you install Windows server on AS/400, you have the option of using values that you specified in the AS/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 AS/400 Integration for Windows Server. You also need to add your gateway address to AS/400. You can find additional information on configuring TCP/IP in the Information Center topic "TCP/IP configuration fastpath".

If you have Operations Navigator installed, you can use it to configure your TCP/IP connections. The Operations Navigator online help tells you how to configure TCP/IP. If you do not have Operations Navigator installed, follow these steps:
1. On the AS/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 "Work sheets for installing Windows server on AS/400" on page 14.
4. In the `Domain name server` field, specify up to 3 Internet addresses from "Work sheets for installing Windows server on AS/400" on page 14; then press Enter.
To add your gateway address to AS/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 "Preinstallation checklist for AS/400 Integration for Windows Server" on page 11.

Enabling AS/400 NetServer

AS/400 NetServer enables Windows clients to connect to AS/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 AS/400 NetServer and set up a guest user profile.

If you plan to use AS/400 NetServer only to apply service packs, you can set it up without Operations Navigator. In that case, you can use the quickstart method. If you want the full capabilities of AS/400 NetServer, you need Operations Navigator, which requires setting up AS/400 Client Access on a PC that you use for administration. Once you have set up either version, you need to set up a guest user profile (described in "Creating a guest user profile for AS/400 NetServer").

Creating a guest user profile for AS/400 NetServer

Before you can apply code fixes and system upgrades to AS/400 Integration for Windows Server, you must set up a guest user profile for AS/400 NetServer. You must have *SECADM special authority to perform this task.

If you have Operations Navigator on your system, you can use graphical interfaces to set up a guest user profile for AS/400 NetServer with no special authorities and no password:
1. Define the user name as a guest user ("guest") for NetServer.
2. Right-click **Network** and then **Servers**.
3. Right-click **NetServer** and select **Properties**.
4. In the Guest user profile field, enter the user profile that you just created.
5. Stop and restart AS/400 NetServer.
6. Right-click **Network** and then **Servers**.
7. Right-click AS/400 NetServer.
8. Select **Stop** to end AS/400 NetServer.
9. Repeat the first two steps and select **Start** to restart AS/400 NetServer.

If you do not have Operations Navigator, follow these steps to set up a guest user profile for AS/400 NetServer:
1. On AS/400, create a user profile with no special authorities and no password:

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

   Note: See the book *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 AS/400 NetServer, enter the following command:

   ```
   ENDTCPSVR SERVER(*NETSVR)
   ```
4. To restart AS/400 NetServer, enter the following command:

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

You can go back to "Enabling AS/400 NetServer" or to "Preinstallation checklist for AS/400 Integration for Windows Server" on page 11.

Installing AS/400 Integration for Windows Server

Before you install the Windows server software from Microsoft, you need to install the AS/400 Integration for Windows Server base code and Option 1 for Windows NT 4.0 or Option 2 for Windows 2000. Install both options if you plan to run both Windows NT 4.0 and Windows 2000 on Integrated Netfinity Servers on your

AS/400. Be sure to first complete the "Preinstallation checklist for AS/400 Integration for Windows Server" on page 11. If you are upgrading from an earlier version of AS/400 Integration for Windows Server, be sure to first read "Upgrade and migration considerations for AS/400 Integration for Windows Server and Integrated Netfinity Server" on page 9.

To install the AS/400 Integration for Windows Server licensed program, perform these steps on AS/400:

1. Insert the OS/400 bonus pack CD-ROM.
2. Type `GO 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 to V4R5 from an earlier version of this product, enter a 1 in the `Option` field to the left of the base program. If you are upgrading, you need to install only your choice of options, not the base code.
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.
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 AS/400 Integration for Windows Server, install the latest cumulative program temporary fix (PTF) from IBM when there are no users on your AS/400. If your system uses logical partitions, load the PTFs on the secondary partitions on which you are installing AS/400 Integration for Windows Server and set them for apply delay. Then load them on the primary partition. Refer to Installing program temporary fixes on a system with logical partitions. To install the latest PTF, do this:
    a. On the AS/400 command line, type `GO 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.

    You can find more information about OS/400 PTFs in the book Basic System Operation, Administration, and Problem Handling, SC41–5206.
12. If you are upgrading to a new version of OS/400 support for Integrated Netfinity Server, you need to upgrade any existing Windows servers to the new level. Find out how to do that in "Upgrading Windows servers when you upgrade AS/400 Integration for Windows Server" on page 44. That article also tells you where to find information about upgrading to a new version of Windows server from Microsoft.
13. Next you need to install Windows server.

Installing Windows server on the Integrated Netfinity Server

After installing the integration software from IBM, you are ready to install the Windows server software.

What you need:

- A CD-ROM that contains the Windows NT 4.0 or Windows 2000 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 work sheet for each server

What to do:
1. Start installing Windows server from your AS/400 console.
2. Continue the installation from your Windows NT 4.0 or Windows 2000 server console.

Then go to "Completing the installation of Windows server on AS/400" on page 35.

Starting the Windows server installation from the AS/400 console

To install Windows server on AS/400, 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 Microsoft Windows server installation CD in the CD-ROM drive (unless you plan to use an image of the installation CD).

   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. At that time, insert the non-upgrade Windows server CD and press Enter to continue the installation.

2. At the AS/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 Table 1 on page 14; press Enter.
4. In the Resource Name and Domain Role fields, type the information that you filled out in Table 1 on page 14.
5. Choose the Windows server version you want to install.
6. Press F10 to see more parameters.
7. 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.
8. In the Install option field, use the default *INSTALL unless you are upgrading your server from Windows NT 4.0 to Windows 2000.
9. Press F10 for additional parameters. If you are installing Windows 2000, go to "Installing Windows 2000" on page 25. If you are installing Windows NT 4.0, go to "Installing Windows NT 4.0" on page 27.

Installing Windows 2000

```
                    Install Windows Server (INSWNTSVR)

 Type choices, press Enter.

 Network server description . . .    WINSVR1       Name
 Resource name  . . . . . . . . .    LIN05         Name
 Domain role  . . . . . . . . . .    *DMNCTL       *DMNCTL, *BKUCTL, *SERVER
 Windows server version . . . . .    *WIN2000      *NT40, *WIN2000
 Windows source directory . . . .    *DFT
_____
 Install option . . . . . . . . .    *INSTALL      *INSTALL, *UPGRADE
 TCP/IP port configuration:   _
   Port . . . . . . . . . . . . .    *NONE         *NONE, 1, 2, 3
   Windows internet address . . .    _____
   Windows subnet mask  . . . . .    _____
   Windows gateway address  . . .    _____
            + for more values  _
 TCP/IP local domain name . . . .    *SYS
_____

                                                             More...
 F3=Exit   F4=Prompt   F5=Refresh   F10=Additional parameters   F12=Cancel
 F13=How to use this display       F24=More keys
```

Figure 3. Installing Windows 2000 (OS/400 display 1)

10. If you want Windows server to access the PCI LAN adapters on the Integrated Netfinity Server, specify the Windows TCP/IP configuration values from Table 1 on page 14. Otherwise, skip this step and use the default value *NONE.
11. Type the value from Table 1 on page 14 for the TCP/IP local domain name.
12. Page down to see the second installation display.

```
                    Install Windows Server (INSWNTSVR)

 Type choices, press Enter.

 TCP/IP name server system  . . .   *SYS
            + for more values
 Server message queue . . . . . .   *JOBLOG       Name, *JOBLOG, *NONE
   Library  . . . . . . . . . . .                 Name, *LIBL, *CURLIB
 Event Log  . . . . . . . . . . .   *ALL          *ALL, *NONE, *SYS, *SEC, *APP
            + for more values
 Server storage space sizes:
   Install source size  . . . . .   400           200-2047
   System size  . . . . . . . . .   1023          500-8000, *CALC
 Storage space ASP  . . . . . . .   1             1-16
   Install source ASP . . . . . .   1             1-16
   System ASP . . . . . . . . . .   1             1-16
 Convert to NTFS  . . . . . . . .   *NO           *NO, *YES
 To workgroup . . . . . . . . . .   ____
 To domain  . . . . . . . . . . .   ____

                                                             More...
 F3=Exit   F4=Prompt   F5=Refresh   F10=Additional parameters   F12=Cancel
 F13=How to use this display       F24=More keys
```

Figure 4. Installing Windows 2000 (OS/400 Display 2)

13. Type the values from Table 1 on page 14 in these fields:

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- TCP/IP name server system
- Server message queue
- Library
- In the `Event log` field, specify which event log messages you want AS/400 to receive from the server.
- In the fields for `Server storage space sizes`, type the values from Table 1 on page 14. Increase the install source size from the default to at least 400 MB to hold the Windows 2000 CD-ROM image. AS/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 *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 29. AS/400 automatically formats system drives larger than 2047 MB as NTFS.

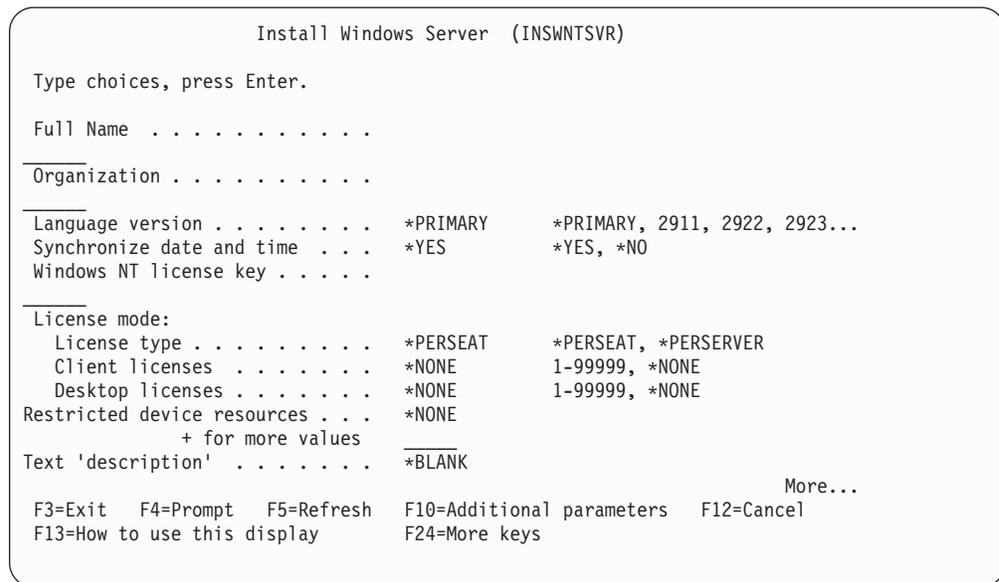14. Page down to see the third installation display.

```
                    Install Windows Server   (INSWNTSVR)

 Type choices, press Enter.

 Full Name  . . . . . . . . . . .
 _____
 Organization . . . . . . . . . .
 _____
 Language version . . . . . . . .   *PRIMARY       *PRIMARY, 2911, 2922, 2923...
 Synchronize date and time  . . .   *YES           *YES, *NO
 Windows NT license key . . . . .
 _____
 License mode:
    License type . . . . . . . . .   *PERSEAT      *PERSEAT, *PERSERVER
    Client licenses  . . . . . . .   *NONE         1-99999, *NONE
    Desktop licenses . . . . . . .   *NONE         1-99999, *NONE
 Restricted device resources . . .   *NONE
                + for more values    _____
 Text 'description'  . . . . . . .   *BLANK
                                                                       More...
  F3=Exit   F4=Prompt   F5=Refresh   F10=Additional parameters   F12=Cancel
  F13=How to use this display       F24=More keys
```

Figure 5. Installing Windows 2000 (OS/400 display 3)

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 AS/400 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 30.
18. In the `Synchronize date and time` field, specify *YES to have AS/400 synchronize the date and time with Windows server every 30 minutes. If you want AS/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 NT license key` field, specify the CD key that Microsoft has provided. 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 Table 1 on page 14.
23. Press F10 to see additional parameters 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 internal LAN.
    - Use an NWSD configuration file (described in the AS/400 Information Center).
    - Use the Integrated Netfinity Server as an external host LAN (not supported for the model 2890 Integrated Netfinity Server).

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

Windows 2000 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 aproximately 1 hour, depending on your hardware configuration. See continue the installation from the Windows server console for more information.

Installing Windows NT 4.0

```
                   Install Windows Server (INSWNTSVR)

 Type choices, press Enter.

 Network server description . . .   NTSVR1       Name
 Resource name  . . . . . . . . .   LIN06        Name
 Domain role  . . . . . . . . . .   *DMNCTL      *DMNCTL, *BKUCTL, *SERVER
 Windows server version . . . . .   *NT40      *NT40, *WIN2000
 Windows source directory . . . .   *DFT
 _____
 Install option . . . . . . . . .   *INSTALL     *INSTALL, *UPGRADE
 TCP/IP local domain name . . . .   *SYS
 _____
 TCP/IP name server system  . . .   *SYS
             + for more values
 Server message queue . . . . . .   *JOBLOG      Name, *JOBLOG, *NONE
   Library  . . . . . . . . . . .                Name, *LIBL, *CURLIB
 Event Log  . . . . . . . . . . .   *ALL         *ALL, *NONE, *SYS, *SEC, *APP
             + for more values


                                                              More...
 F3=Exit   F4=Prompt   F5=Refresh   F10=Additional parameters   F12=Cancel
 F13=How to use this display       F24=More keys
```

Figure 6. Installing Windows NT 4.0 (OS/400 display 1)

1. Type the values from Table 1 on page 14 in these fields:
   - `TCP/IP local domain name`
   - `TCP/IP name server system`

- Server message queue
- Library

2. In the Event log field, specify which event log messages you want AS/400 to receive from the server.
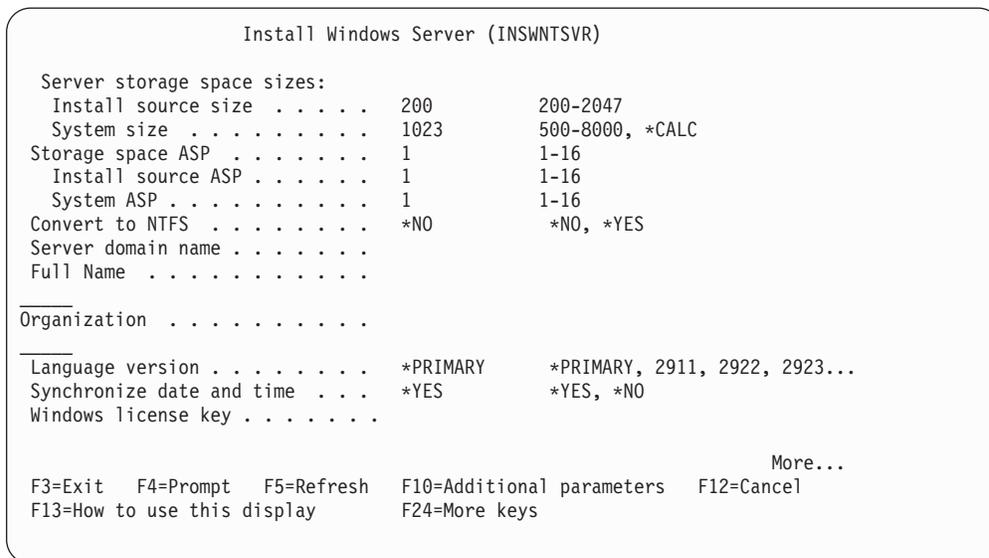3. Page down to see the second installation display.

```
                   Install Windows Server (INSWNTSVR)

  Server storage space sizes:
    Install source size  . . . . .   200          200-2047
    System size  . . . . . . . . .   1023         500-8000, *CALC
  Storage space ASP  . . . . . . .   1            1-16
    Install source ASP . . . . . .   1            1-16
    System ASP . . . . . . . . . .   1            1-16
  Convert to NTFS  . . . . . . . .   *NO           *NO, *YES
  Server domain name . . . . . . .
  Full Name  . . . . . . . . . . .
  ____
  Organization . . . . . . . . . .
  ____
  Language version . . . . . . . .   *PRIMARY      *PRIMARY, 2911, 2922, 2923...
  Synchronize date and time  . . .   *YES          *YES, *NO
  Windows license key . . . . . . .

                                                             More...
  F3=Exit   F4=Prompt   F5=Refresh   F10=Additional parameters   F12=Cancel
  F13=How to use this display        F24=More keys
```

Figure 7. Installing Windows NT 4.0 (OS/400 display 2)

4. In the fields for Server storage space sizes, type the values from Table 1 on page 14. AS/400 creates and links the drives as network server storage spaces.
5. If you want to choose a different auxiliary storage pool for the source and system drives, specify it in the Storage space ASP fields.
6. 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 29. AS/400 automatically formats system drives larger than 2047 MB as NTFS.
7. If your server is a domain controller, type the Server domain name from Table 1 on page 14; otherwise, specify values in the To workgroup or To domain fields.
8. In the Full Name field, specify the name of the user who holds the Windows server license you are installing.
9. In the Organization field, specify the name of the organization that holds the Windows server license you are installing.
10. In the Language version field, specify *PRIMARY to have AS/400 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 30.
11. In the Synchronize date and time field, specify *YES to have AS/400 synchronize the date and time with Windows server every 30 minutes. If you want AS/400 to synchronize the date and time with Windows server only when you vary on the network description for Windows server, type *NO.

12. In the `Windows NT license key` field, specify the CD key that Microsoft has provided. In most cases, you can find this CD key printed on the back of the Windows server CD-ROM jewel case.
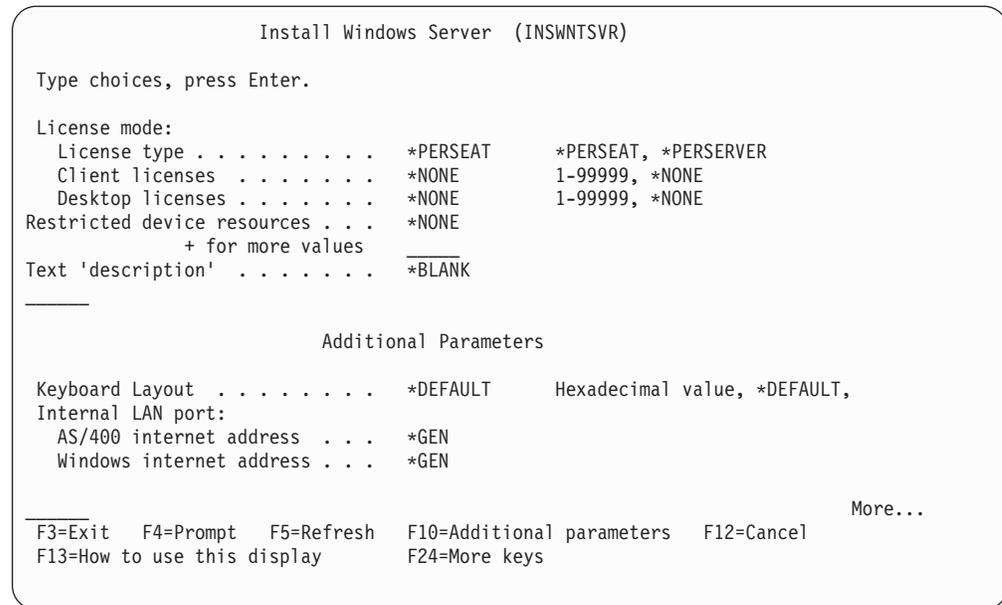13. Page down to see the third installation display.

```
                    Install Windows Server   (INSWNTSVR)

 Type choices, press Enter.

 License mode:
   License type . . . . . . . . .   *PERSEAT      *PERSEAT, *PERSERVER
   Client licenses  . . . . . . .   *NONE         1-99999, *NONE
   Desktop licenses . . . . . . .   *NONE         1-99999, *NONE
Restricted device resources . . .   *NONE
             + for more values      _____
Text 'description'  . . . . . . .   *BLANK
_____

                        Additional Parameters

 Keyboard Layout  . . . . . . . .   *DEFAULT      Hexadecimal value, *DEFAULT,
 Internal LAN port:
   AS/400 internet address  . . .   *GEN
   Windows internet address . . .   *GEN


 _____                                                              More...
 F3=Exit   F4=Prompt   F5=Refresh   F10=Additional parameters   F12=Cancel
 F13=How to use this display        F24=More keys
```

Figure 8. Installing Windows NT 4.0 (OS/400 display 3)

14. In the `License type` field, specify the type of Windows server license that you purchased.
15. If you specified `*PERSERVER` in the `License type` field, specify the number of client or desktop licenses that you purchased.
16. In the `Restricted device resources` field, type the value from Table 1 on page 14.
17. 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 NT installation source.)
    - Use your own IP addresses for the internal LAN.
    - Use an NWSD configuration file (described in the AS/400 Information Center).
    - Use the Integrated Netfinity Server as an external host LAN (not supported for the model 2890 Integrated Netfinity 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, AS/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 Netfinity Server starts. Continue the installation from the Windows server console.

Comparison of FAT, FAT32, and NTFS file systems
Windows NT 4.0 allows FAT or NTFS file systems. Windows 2000 Server allows you to choose between NTFS, FAT, and, for larger disks, FAT32. AS/400 Integration

for Windows Server installs your system drives as FAT or NTFS. The installation command gives you the option of converting FAT drives to NTFS (but not FAT32). **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 Active Directory	Does not support Windows 2000 Active Directory	Required to use Windows 2000 Active Directory
Allows access to files on the hard disk with MS-DOS for both Windows NT 4.0 and Windows 2000	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 AS/400

Network server descriptions (NWSDs) represent a Windows server on AS/400. The INSWNTSVR command automatically creates an NWSD for each Windows server that you install. The NWSD 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 AS/400
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

LNGVER	National Language
2939	German MNCS
2940	French MNCS
2942	Italian MNCS
2950	English uppercase
2962	Japanse DBCS
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

AS/400 Integration for Windows Server supports Windows 2000 Multi-Language
User Interface.

Continuing the Windows NT 4.0 installation from the Windows server console

When the AS/400 phase of the Windows NT 4.0 installation completes, the
Integrated Netfinity 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 AS/400 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 AS/400 screen (and in
   the joblog). If you allowed the command to generate addresses, record this

information in Table 1 on page 14. You will need it later. The console screen that is attached to the Integrated Netfinity Server for AS/400 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 **AS/400 Virtual Token Ring Adapter**.

b. In the **IP Address** and **Subnet Mask** fields for the Internal LAN, enter the values that you recorded in Table 1 on page 14 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 Table 2 on page 20.
   3) Fill in the correct value in the **Default Gateway** field.
   4) If you have a second adapter card, repeat steps 5c1 to 5c3 for that card.

   Note: If you have only one card of a particular type, go to step 6 on page 33. 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 AS/400 and Windows server, verify the network addresses for each adapter after the installation (see "Completing the installation of Windows server on AS/400" on page 35). 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".

7. On the Date/Time Properties screen:
   a. Select the time zone that matches your offset from Greenwich Mean Time (recorded on Table 1 on page 14).
   b. If you are in an area that observes Daylight Savings Time, leave the **Automatically adjust clock** box checked. Note that the QUTCOFFSET on AS/400 must match the Windows server offset and that you must manually adjust AS/400 for Daylight Savings Time.

      If you know for sure that you do not need to manually adjust the QUTCOFFSET on AS/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 Netfinity Server for AS/400.

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 Netfinity Server for AS/400.

Note: Windows server may require certain fixes before it can run reliably on the Integrated Netfinity Server for AS/400. 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 AS/400 Integration for Windows Server code (see "Using code fixes for AS/400 Integration for Windows Server" on page 37 for details). For the latest information about available Windows server service packs that IBM has tested with AS/400 Integration for Windows Server, refer to the AS/400 Integration for Windows Server World Wide Web page .

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 the Information Center for information about backing up these drives.

   Now you should perform just a few steps in "Completing the installation of Windows server on AS/400" on page 35.

Responding to error messages during installation
The Windows server phase of the installation flags missing information that you did not provide during the AS/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 Netfinity 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 Netfinity 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 NT 4.0) **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 NT Server` display on AS/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 member of a domain or a workgroup.

Continuing the Windows 2000 installation from the Windows server console

When the AS/400 phase of the Windows 2000 installation completes, the Integrated Netfinity Server starts. The Windows server phase of the installation begins. Your having completed the tasks in "Preinstallation checklist for AS/400 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 prompts you again for the non-upgrade CD-ROM, just press Enter.
2. In the **License Agreement** step (in Windows 2000 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 33.
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 time zone is correct and matches your AS/400 offset from Greenwich Mean Time (the QUTCOFFSET system value recorded on Table 1 on page 14).
   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 AS/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 2000 Setup Wizard** panel, click **Finish**.
7. On the **Windows 2000 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, 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.

Completing the installation of Windows server on AS/400

Performing a few final tasks after installing the Windows server software on AS/400 verifies that Windows server is correctly installed and ready. After installing Windows server, do these tasks:
1. If you want Windows server to automatically vary on when you start TCP/IP, see "Setting Windows server to automatically vary on with TCP/IP" on page 37.
2. If you disconnected a LAN adapter before the installation (in step 4 on page 11), reconnect it now by plugging in the cable.
3. Changing the QRETSVRSEC system value on AS/400 to ensure that AS/400 keeps passwords (this avoids delays when users sign on):
   • On the AS/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.
4. You can prevent the CD-ROM drive from changing drive letters whenever you link a user storage space to the server. Use **Disk Administrator** (for Windows NT 4.0) or **Disk Management** (for Windows 2000) to assign the Windows server CD-ROM drive letter. (For example, you could make it drive X.)
5. **For Windows NT 4.0 only**: If the Integrated Netfinity 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 AS/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.
6. **For Windows 2000 only:** Verify that the Internal LAN IP Address was configured and that the default DHCP is not being used. If during the install the Internal 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 AS/400 Internal 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 AS/400 console is displayed, you do not need to proceed any further. If the DHCP is selected, continue with the next step.
   g. Select the radio button: **Use the Following IP Address**.
   h. Type the Internal LAN Address from the AS/400 console.
   i. Click OK.
   j. Click OK.
   k. Click Close.

   The process is complete and the Internal 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 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 firewall topic in the Information Center at
`http://publib.boulder.ibm.com/html/as400/infocenter.html`.

Now that you have installed Windows server on an Integrated Netfinity Server, you need to know how to do some everyday tasks from AS/400. This setup book tells you how to start and stop your server (see "Chapter 4. Starting and stopping

Windows server on an Integrated Netfinity Server for AS/400" on page 59). For additional information on managing your server from AS/400, see the AS/400 Information Center.

Setting 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 AS/400, 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 internal LAN line description for the server, and press Enter.

> **Note:** The internal LAN line description has a name that consists of the network server description (NWSD) name followed by 00. For example, if the NWSD name is MYSVR, then the internal 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.

Using code fixes for AS/400 Integration for Windows Server

AS/400 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 AS/400 Integration for Windows Server. AS/400 Integration for Windows Server code fixes update the code that enables Windows server to run on the Integrated Netfinity Server. They are separate from the service packs for Windows server itself, which you must get from Microsoft. For more conceptual information about code fixes, see "Types of AS/400 Integration for Windows Server code fixes".

To work with code fixes, you need administrator authority on Windows server.

To use code fixes with AS/400 Integration for Windows Server, you can perform these tasks:
- "Checking AS/400 Integration for Windows Server service pack levels" on page 38
- "Installing AS/400 Integration for Windows Server service packs" on page 38
- "Removing AS/400 Integration for Windows Server service packs" on page 41

Types of AS/400 Integration for Windows Server code fixes

AS/400 Integration for Windows Server code fixes come in two types: code fixes to the AS/400 side and code fixes to the Windows server side. IBM distributes both types in OS/400 Program Temporary Fixes (PTFs). You can find information about OS/400 PTFs in the book Basic System Operation, Administration, and Problem Handling, SC41-5206 .

An OS/400 PTF that contains a code fix to the AS/400 side is a "regular" PTF. Because it applies to AS/400-side code, installing it on AS/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". After you install a service pack PTF to AS/400, you must take additional steps to install that service pack PTF to each Windows server. "Installing AS/400 Integration for Windows Server service packs" tells you how to install service packs to Windows servers.

Service packs are cumulative; the most recent service pack contains all of the fixes from prior service packs in addition to new fixes. Each new service pack has a higher number than a previous service pack. The number of a service pack is the number of the OS/400 service pack PTF in which it is distributed. The format of the numbers is SF*nnnnn*. SF00000 is a special case that indicates that no service pack is available or installed.

Checking AS/400 Integration for Windows Server service pack levels

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

To run this application, you must first enable AS/400 NetServer and create a guest user profile to allow Level Check to see the AS/400.

To start the Level Check application from the Windows server **Start** menu, choose **Programs**, then **AS400 Windows Server**, then **Level Check**.

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

The following fields show service pack status:
* In the **AS/400 System** box, the **Service Pack Available** field indicates the latest service pack available for installation from AS/400.
* In the **Windows Server** box, the **Service Pack** field indicates what service pack you have installed on Windows server.

If a newer service pack is available than the one you have installed, you should install the newer service pack.

Installing AS/400 Integration for Windows Server service packs

Installing service packs gives you the newest AS/400 Integration for Windows Server code and corrects problems that existed in previous code. You can apply an Operating System/400 program temporary fix (PTF) with a service pack in it. After you install a service pack PTF to AS/400, you must take additional steps to install that service pack PTF to each Windows server. If you have multiple Windows servers, you might want to apply service packs to those servers remotely with the lvlsync command from AS/400.

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 Level Check command to install service packs, you must be a Windows server system administrator. To install AS/400 Integration for Windows Server service packs on a Windows server, follow these steps:

1. 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.
2. From the **Start** menu, choose **Programs**, then **AS400 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 AS/400, Level Check starts automatically.
3. From the **Install Action** drop down box, choose **Install available service pack from AS/400**.
4. Click **OK**.
5. Follow the on-screen instructions to complete installation of the service pack.

Installing and uninstalling service packs with the lvlsync command

For V4R3 and later releases, the character-based lvlsync command provides another way to install and uninstall AS/400 Integration for Windows Server service packs or reinstall the base code. You can run it remotely from AS/400 to upgrade to a new release or apply service packs to multiple Windows servers on multiple remote AS/400s. You can also manually run this command from a command prompt in Windows server to accomplish the same tasks that you can perform with the Windows-based Level Check application (described in "Installing AS/400 Integration for Windows Server service packs" on page 38).

For V4R5 and later releases, AS/400 Integration for Windows Server no longer includes a customized version of the Windows server hardware abstraction layer (HAL). If you choose to perform the upgrade process remotely from AS/400, 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 AS/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 AS/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 AS/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 AS/400, use the Submit network server
command (SBMNWSCMD). Use the lvlsync command for the command parameter,
and identify the server as *WINDOWSNT. TheInformation Center explains how to
use the Submit network server command (SBMNWSCMD).

Refer to these sources of information about the lvlsync command:
- Table 3 has a complete listing of tasks and their program calls.
- Table 4 shows the error codes that lvlsync can return.

If you have not yet upgraded your version of AS/400 Integration for Windows
Server, refer to "Upgrading Windows servers when you upgrade AS/400
Integration for Windows Server" on page 44.

Table 3. lvlsync tasks and syntax

Task	Windows server syntax	AS/400 syntax
Getting syntax help	lvlsync /?	not supported
Installing the currently available service pack from AS/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 AS/400 Integration for Windows Server base code using current language[1]	lvlsync /release	SBMNWSCMD CMD('lvlsync /release') SVRTYPE(*WINDOWSNT) SERVER(servername)
Reinstalling AS/400 Integration for Windows Server base code using language MRI29*nn*	lvlsync /release /lang mri29*nn*	SBMNWSCMD CMD('lvlsync /release /lang mri29*nn*') SVRTYPE(*WINDOWSNT) SERVER(servername)

Notes:

1. [1]When you upgrade from releases prior to V4R5, you must first replace the customized hal.dll file before running this command. "Installing and uninstalling service packs with the lvlsync command" on page 39 tells you how.
2. When using lvlsync from Windows server, you can abbreviate the parameters.
3. In the AS/400 syntax, servername is the name of the Windows server where you want to run lvlsync.

Table 4. lvlsync error codes

Error Code	Error
0	No errors
01	Must be an administrator to run lvlsync

Table 4. lvlsync error codes (continued)

02	Release level on Windows server higher than on AS/400
03	Service pack level on Windows server higher than on AS/400
04	Cannot install release from AS/400 - language files not on AS/400
05	Syntax not valid
06	Cannot access service pack information on AS/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 AS/400
11	NWSD not found
13	NWSD not active
20	No service pack available on AS/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.

Removing AS/400 Integration for Windows Server service packs

If you need to, you can use the Level Check application to remove an AS/400 Integration for Windows Server service pack from your system. 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 pack level, see "Details: Removing AS/400 Integration for Windows Server service packs" on page 42.

To use the Level Check command, you must be a Windows server system administrator.

Note: You cannot use Level Check to revert back to a previous version level of AS/400 Integration for Windows Server.

To remove an AS/400 Integration for Windows Server service pack, follow these steps:
1. 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 automatically restarts after completion of the installation.
2. 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 service pack available on AS/400 is different from the service pack installed on Windows server.
3. In the **Install Action** drop down box, choose **Uninstall current service pack on Windows server**.
4. Click **OK**.

After you remove a service pack, back up the predefined system and source drives (server storage spaces). See "Backing up predefined storage spaces for Windows servers created on V4R5 and later AS/400 systems" on page 66 for information about backing up these drives.

Details: Removing AS/400 Integration for Windows Server service packs

AS/400 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 SF00300, then SF00301, and then SF00302, you can uninstall SF00302, and you will still have SF00301 installed. You cannot then uninstall SF00301.

To revert back more than one service pack level, you must reinstall the base code of AS/400 Integration for Windows Server. You then can install the desired service pack from AS/400.

Note: You cannot revert back to a previous version level of AS/400 Integration for Windows Server.

To reinstall the base code, choose **Install release from AS/400** from the **Install Action** drop down box, then Click **OK**.

Upgrading AS/400 Integration for Windows Server

You need to upgrade your existing Windows servers when you install:
* A new version of OS/400 and AS/400 Integration for Windows Server from IBM.

  For V4R5, the installation process deletes the old option 29 and installs the new 5769-WSV base code for Integration for Windows Server on your AS/400. Before upgrading your servers, you need to install your choice of options from the bonus pack CD-ROM: option 1 for Windows NT 4.0, option 2 for Windows 2000, or both. "Installing AS/400 Integration for Windows Server" on page 22 has information about installing these options as well as installing the base code.

  For information about using the Windows server Level Check command to upgrade your existing Windows servers, see "Upgrading Windows servers when you upgrade AS/400 Integration for Windows Server" on page 44. For information about upgrading multiple Windows servers remotely from AS/400 with the lvlsync command, see "Installing and uninstalling service packs with the lvlsync command" on page 39.
* A new version of Windows server from Microsoft:
  1. Upgrade the primary domain controller (PDC) before upgrading any other machines. To upgrade your servers from Windows NT 4.0 to Windows 2000, see "Upgrading your server from Windows NT 4.0 to Windows 2000" on page 46.
  2. If the PDC is a stand-alone machine (not your Integrated Netfinity Server), then you need to run QCONVGRP on all the servers connected to this domain. If the PDC is an Integrated Netfinity 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 of OS/400, and also upgrading your model of Integrated Netfinity Server, see the topic "Migrating to new 2890 Integrated Netfinity Server hardware" on page 48.

Upgrading OS/400 and AS/400 Integration for Windows Server

If you are upgrading OS/400 and AS/400 Integration for Windows Server to V4R5, you need the bonus pack CD-ROM. If you also plan to install new Integrated Netfinity Server hardware, make sure you complete this software installation first. As you follow the upgrade procedure in the book *Software Installation*, take these additional steps:

Preparing to upgrade:
1. Ensure that you have installed the latest code fixes on on all your existing Windows servers, as well as on your AS/400. For information about installing code fixes, refer to "Using code fixes for AS/400 Integration for Windows Server" on page 37.
2. Ensure that you have a system backup available that includes the storage allocated to your Windows servers. You can find information about backing up your system in the book *Backup and Recovery*, SC41-5304-04 or online in the topic Backup, Recovery, and Availability in the AS/400 Information Center at
   `http://www.as400.ibm.com/infocenter`
3. As a precaution, record the associated resources for your hardware:
   a. On the AS/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 AS/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. The type column has the CCIN number for the Integrated Netfinity Server hardware, and the text description should be `File Server IOP` or `File Server IOA`.
   h. If you have multiple Integrated Netfinity Servers of the same type installed on your AS/400, 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 AS/400. 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 Netfinity 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 (vary off) all your network servers.

To install the new version of OS/400 on your AS/400, return to the procedure in *Software Installation*, SC41-5120-04. The installation process deletes the old AS/400 Integration with Windows NT Server option 29 and installs the new 5769–WSV base code for Integration for Windows Server on your AS/400. However, you need to install your choice of options. Consequently, after you complete the OS/400 installation, return here for some additional steps.

After upgrading OS/400, complete these additional steps:
1. Install your choice of options for product 5769-WSV from the bonus pack CD-ROM: option 1 for Windows NT 4.0, option 2 for Windows 2000, or both. "Installing AS/400 Integration for Windows Server" on page 22 has information about installing these options.

2. Vary on the Integrated Netfinity Server and verify that it has the same resource name:
   a. On the AS/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 on page 43. 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 AS/400 now associates with this Integrated Netfinity Server hardware. Press F12 to back out of this command.
      3) On the AS/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.
3. Install the latest code fixes on your existing Windows servers.

If you are also installing new Integrated Netfinity Server hardware, see "Migrating to new 2890 Integrated Netfinity Server hardware" on page 48.

Upgrading Windows servers when you upgrade AS/400 Integration for Windows Server

When you install a new version of AS/400 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 AS/400. "Installing and uninstalling service packs with the lvlsync command" on page 39 has information about how to do that.)

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

For V4R5 and later releases, AS/400 Integration for Windows Server no longer includes a customized version of the Windows server hardware abstraction layer (HAL). During an upgrade to V4R5, 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 **AS400 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 AS/400**.
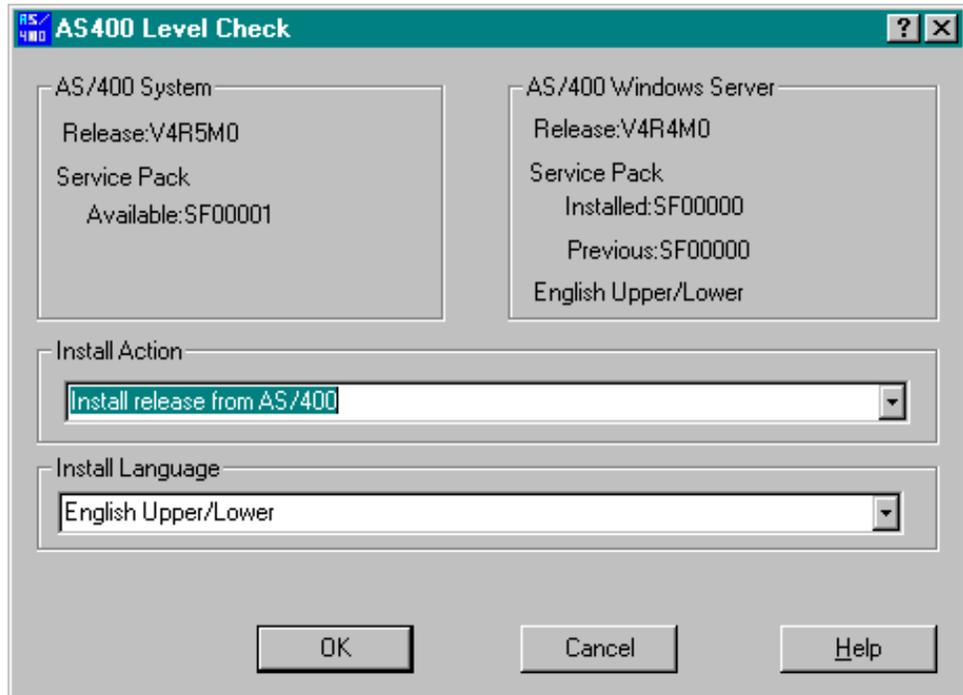
5. Click **OK**.
6. A message appears that says, "If you continue, you will eventually be asked to reboot. Do you want to continue?' Click **OK** to confirm that you want to continue.
7. Follow the on-screen instructions to complete installation of the new base code. Be especially careful when you enter 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.
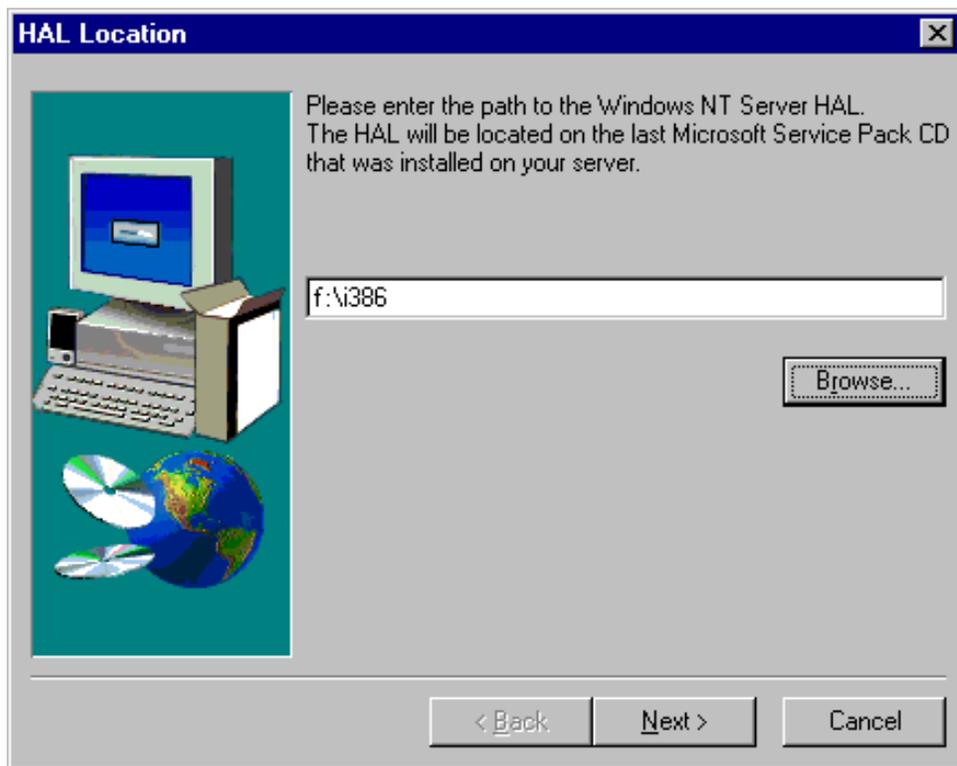
Click **Next**. AS/400 copies the correct `Hal.dll` file to replace the customized version of the HAL that is currently running in the WINNT/System32 directory.

8. **Tip:** After installing new base code, back up the predefined installation and system drives for this server. "Backing up predefined storage spaces for Windows servers created on pre-V4R5 AS/400 systems" on page 66 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 "Backing up user-defined storage spaces for Windows server" on page 67).

Upgrading your server from Windows NT 4.0 to Windows 2000

The process for upgrading your Integrated Netfinity Server from Windows NT 4.0 to Windows 2000 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 AS/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, 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. From the AS/400 command line, type WRKCFGSTS *NWS and press Enter. The Work with Configuration Status display that appears shows the status of the network server description (NWSD) for your Windows server. If necessary, vary off the server (see "Shutting down Windows server from AS/400" on page 60).
4. Place the Microsoft Windows 2000 installation CD-ROM 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 AS/400 command line, type INSWNTSVR and press F4.
6. In the Network Server Description field, type the name for the server that you are upgrading and press Enter. Upgrade your primary domain controller first. AS/400 retrieves NWSD information about the existing server, and the Install Windows server display appears:

```
                   Install Windows Server (INSWNTSVR)

 Type choices, press Enter.

 Network server description . . .   WINSVR1        Name
 Resource name  . . . . . . . . .   LIN05          Name
 Domain role  . . . . . . . . . .   *DMNCTL        *DMNCTL, *BKUCTL, *SERVER
 Windows server version . . . . .   *WIN2000       *NT40, *WIN2000
 Windows source directory . . . .   *DFT
 _____
 Install option . . . . . . . . .   *UPGRADE       *INSTALL, *UPGRADE
 TCP/IP port configuration:  _
   Port . . . . . . . . . . . .    *NONE          *NONE, 1, 2, 3
   Windows internet address . . .   2
   Windows subnet mask  . . . . .   '9.5.3.195     '
   Windows gateway address  . . .   '255.255.255.0 '
               + for more values _
 Server storage space sizes:
   Install source size  . . . . .   410            200-2047
   System size  . . . . . . . . .   2047           500-8000, *CALC
                                                                More...
 F3=Exit   F4=Prompt   F5=Refresh   F10=Additional parameters   F12=Cancel
 F13=How to use this display        F24=More keys
```

   Note: If you are upgrading from a Windows NT 4.0 Backup Domain Controller, AS/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 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. Change the install source size from the default to at least 400.
10. You **cannot** change the size for the system server storage space during an upgrade. If your system drive is not large enough to hold Windows 2000, 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.
11. Page down to see the second installation display.

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

    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 AS/400 upgrade your server.
14. A message appears: `Waiting for reply to message on message queue QSYSOPR.` To view the message, press the SYSREQ key; then select option 6 to display system operator messages. Respond `G` to the inquiry message to have AS/400 continue with the upgrade or `C` to cancel it.
15. When AS/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 2000 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. (Terminal Services are installed automatically if you specified a value for Desktop licenses on the License mode parameter of the INSWNTSVR command.)
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**.

Migrating to new 2890 Integrated Netfinity Server hardware

Before migrating to new 2890 Integrated Netfinity Server hardware, ensure that you have first completed upgrading your version of OS/400 and Integration for Windows Server (described in "Upgrading OS/400 and AS/400 Integration for Windows Server" on page 43). Also ensure that you have installed the latest code fixes (described in "Using code fixes for AS/400 Integration for Windows Server" on page 37) on your AS/400 and on all your existing Windows servers.

Attention: If you were using your Integrated Netfinity Server as an external host LAN for your AS/400, be aware that the new 2890 Integrated Netfinity 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 Netfinity 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 Netfinity Server hardware during the software installation, do this now:
   a. On the AS/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 Netfinity Servers of the same type installed on your AS/400, refer to "Tip: Finding resource names when you have multiple Integrated Netfinity Servers" on page 21.
   d. On the AS/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 AS/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 AS/400 HostLAN Bridge Driver:
   On Windows 2000, do this:

   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, do this:
   a. Click on **Start**, then **Settings**, then **Control Panel**.
   b. Open the **Network** application.
   c. Click the **Protocols** tab.
   d. Click on **AS/400 HostLAN Bridge Driver 1 (or 2)**. You may see AS/400 HostLAN Bridge Driver 1 or AS/400 HostLAN Bridge Driver 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. Remove all adapters except the AS/400 Virtual Token-ring adapter (described in "Removing network adapters from Windows server on AS/400" on page 56.
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. Enter the WRKLIND command.
7. Page down until you see the line description that you noted for the adapter you are removing.
8. Place a 4 in the OPT field to the left of the line description and press Enter.
9. Shut down (vary off) all your network servers. This step is not necessary if a full system save is done prior to the hardware upgrade.
10. If the new 2890 Integrated Netfinity Server hardware is not already installed, follow the directions that come with the hardware to install it.
11. Restore your network server descriptions and their associated storage objects on the new Integrated Netfinity Server hardware (described in "Chapter 7. Restoring the NWSD and storage spaces for Windows server on AS/400" on page 71). To have AS/400 automatically relink restored storage spaces in the integrated file system to the appropriate NWSD, restore those storage spaces before you restore the NWSD.
12. Restore the line description:
    a. To restore the line description, type RSTCFG on the AS/400 command line again and press F4.
    b. In the Objects field, specify the name of the line description.
13. Supply a TCP/IP interface to allow AS/400 to communicate with the new Integrated Netfinity Server:
    a. On the AS/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 on page 49.
    d. In the Line description field, specify the name of the line description that you restored in step 12a.
    e. For the subnet mask, specify 255.255.255.0. Press Enter to complete the command.
14. Use the Work with Hardware Resources (WRKHDWRSC) command to determine the CCIN number of the new Integrated Netfinity Server hardware and find the resource name:
    a. On the AS/400 command line, type WRKHDWRSC TYPE(*CMN) and press Enter.
    b. The 2890 Integrated Netfinity 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 Netfinity Server in the Type column. ("Integrated Netfinity Server for AS/400 CCIN and feature code numbers" on page 7 lists CCIN numbers for Integrated Netfinity Servers.)
    c. Note the resource name for that Integrated Netfinity Server (in the form LINxx).
15. 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 Netfinity Server:
    a. On the AS/400 command line, type CHGNWSD NWSD(nwsdname) and press F4.
    b. In the Resource name field, specify the resource name for the new Integrated Netfinity Server hardware that you identified in the previous step; press Enter.
16. Create a guest user profile for AS/400 NetServer.

17. Vary on the NWSD. A message appears to alert you to the possible need for manual intervention:

Look for information and follow any directions you find at the AS/400 Integration for Windows Server Web site: `http://www.as400.ibm.com/NT`.
18. On Windows server, add the new adapters (described in "Adding new network adapters to Windows server on AS/400" on page 52).
19. Only if you are running Windows NT 4.0 on the 2890 Integrated Netfinity Server, you need to install the Savage 4 Video Driver for Windows NT 4.0.

Installing the Savage 4 Video Driver for Windows NT 4.0 on the 2890 Integrated Netfinity Server

The 2890 Integrated Netfinity 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.

Migrating to 50xx Migration Tower

If you are using your Integrated Netfinity Server as an External Host LAN for your AS/400, 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 AS/400 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 **AS/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 AS/400, refer to "Removing network adapters from Windows server on AS/400" on page 56.

Adding new network adapters to Windows server on AS/400

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. Although the Pentium III 2890 model does not, older models of Integrated Netfinity Server allow you to share the adapter between AS/400 and Windows server.

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

To set up a new shared network adapter on Integrated Netfinity Server models that support external host LAN, perform these tasks:
1. "Creating line descriptions for network adapters shared between AS/400 and Windows server on AS/400" on page 53
2. "Adding a TCP interface for a new shared network adapter" on page 53
3. "Updating network server descriptions for new network adapters shared between AS/400 and Windows server" on page 54
4. "Installing network adapter drivers and adding adapter address information to Windows server" on page 54

To remove a network adapter, see "Removing network adapters from Windows server on AS/400" on page 56.

Creating line descriptions for network adapters shared between AS/400 and Windows server on AS/400

Creating a line description is the first step in configuring a new network adapter for sharing between AS/400 and Windows server on Integrated Netfinity Servers that support external host LAN. The new 2790 and 2890 Integrated Netfinity Server and any NWSD migrated to the 50xx Migration Tower does not support this function.

To create a line description, follow these steps:
1. On AS/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 AS/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.
12. (Optional) In the `Text 'description'` field, write a brief description of the line description.
13. Press Enter.

Next you need to add a TCP interface for the new adapter.

Adding a TCP interface for a new shared network adapter

You can install a new network adapter card to share between AS/400 and Windows server on the Integrated Netfinity 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 created a line description for the port.

To add a TCP interface, follow these steps:
1. On AS/400 enter the command `ADDTCPIFC` and press Enter.
2. In the `Internet address` field, enter the AS/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 AS/400 and an NWSD called NTSVR, the line description name is NTSVR01.
4. In the `Subnet mask` field, enter the AS/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 AS/400 uses. To do this, set a TCP route with the Add TCP/IP Route (ADDTCPRTE) command. See the book *TCP/IP Configuration and Reference* for more information about TCP routes.

You also need to update the network server description for your new shared adapters.

Updating network server descriptions for new network adapters shared between AS/400 and Windows server

You add the Windows server side networking information for a new shared network adapter by updating the server's network server description (NWSD) on AS/400.

To add the new networking information for the new network adapter to your NWSD, follow these steps:
1. Enter the AS/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.

Installing 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.

For Windows 2000, do this:

The adapters and device drivers under Windows 2000 support Plug-n-Play. Once an adapter has been physically installed, reboot NT for the adapters to become available. 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,remove the old adapter before adding the new one. Windows 2000 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.

   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 Netfinity Server that supports external host LAN and want to share the new adapter with AS/400, perform steps 18 to 26.

For Windows NT 4.0, do this:
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 Netfinity Server, enter

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

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

     `d:\i386\$oem$\net\amdpciet`
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 AS/400, perform steps 18 to 26.
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 AS/400 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 amtch the corresponding AS/400 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 AS/400 Integration for Windows Server service pack. You do not need to reinstall the service pack after installing the port.

Installing AS/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 Prototcols for the type of network to install and click the Add button.
7. Select the IBM AS/400 Mulit-Port Protocol and click the OK button.
8. Click Close

Notes:

1. External Host LAN is not supported on the new 2790 and 2890 Integrated Netfinity Server and any NWSD migrated to the50xx Migration Tower.
2. It is required that the Network Address, Speed, and Duplex match between the shared Connection and the AS/400 Line Description.

Removing network adapters from Windows server on AS/400

Before you remove a network adapter card from an Integrated Netfinity Server, you need to uninstall it from Windows server. If Windows server shares the network adapter card with AS/400, you also need to uninstall it from AS/400. You also need to remove shared adapters if you are migrating to a 2890 Integrated Netfinity Server, which does not support external host LAN.

Note: If you want to stop sharing an adapter with AS/400, but do not want to uninstall it from Windows server, proceed directly to step 8 on page 57.

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

For Windows 2000:
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 is a Plug and Play operating system, you must either physically remove the adapter from AS/400 or disable it before restarting the server. If you restart Windows 2000 with the adapter still plugged into the Integrated Netfinity Server, Windows 2000 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 AS/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 Netfinity Server hardware, you need to remove all but the AS/400 Virtual Token-ring 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 AS/400, then do not restart Windows server yet. Instead, proceed with step 8.

Removing a shared adapter from AS/400:
8. To record needed information and vary off the network server description (NWSD) for the Windows server, type WRKCFGSTS *NWS and press Enter. The Work with Configuration Status display appears.

```
                     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
```

Figure 9. Work with Configuration Status display example

While you have the Work with Configuration Status display, do the following:
   a. Type a 2 in the 0pt 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 *nwsdname*00 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 AS/400-side IP address for the adapter. You recorded this value in Table 2 on page 20 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 AS/400" on page 59).

Chapter 4. Starting and stopping Windows server on an Integrated Netfinity Server for AS/400

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

Note: Be careful to stop the server **before** powering down your AS/400 or installing applications that would cause it to power down automatically. Corruption of the server or network server storage spaces is possible if AS/400 powers down before Windows server shuts down completely.

To start and stop your Windows server from AS/400, see:
* "Starting Windows server from AS/400"
* "Starting Windows server without starting the external host LAN" on page 60
* "Shutting down Windows server from AS/400" on page 60
* "Shutting down Windows server on AS/400 from Windows server" on page 62
* "Restarting Windows server on AS/400 from Windows server" on page 62

Starting Windows server from AS/400

If you shut down a Windows server from AS/400, you should also start the server from AS/400. To restart Windows server on AS/400, you can use either the Operations Navigator interface or the command line interface. If you shut down a server from the Windows server environment, you can restart the Windows server from either that environment (see "Restarting Windows server on AS/400 from Windows server" on page 62) or from AS/400. To start the Windows server from AS/400 in this situation, first shut down (vary off) the server on AS/400; then restart it (vary it on). (See "Shutting down Windows server from AS/400" on page 60 for how to vary off the server.)

Using AS/400 Operations Navigator:

To start an Integrated Netfinity Server by using Operations Navigator, do this:
1. Expand **Network**.
2. Expand **Windows Administration**.
3. Expand **Integrated Netfinity 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 Netfinity 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 AS/400 Operations Navigator toolbar.

Using the command line:

To start an Integrated Netfinity Server by using the command line, vary on the network server description (NWSD) that is associated with it:
1. You must vary the network server description (NWSD) that is associated with it back on. At the AS/400 command line, type WRKCFGSTS *NWS and press Enter.
2. Type a 1 in the Opt field to the left of the network server description you want to vary on.
3. Press Enter. The Windows server starts.

If you have NWS storage in user auxiliary storage pools, AS/400 automatically mounts that file system (and logs a message to QSYSOPR).

Note: Do not vary off the server immediately after varying it on. 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 the page "Troubleshooting vary on failures . . ." in the Information Center.

Starting Windows server without starting the external host LAN

If you are using an earlier model of the Integrated Netfinity 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 AS/400 or Windows server maintenance, such as applying PTFs. To start Windows server without starting the external host LAN, do this:
1. On the AS/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. AS/400 starts the server you specified without starting the external host LAN.

Shutting down Windows server from AS/400

To shut down Windows server on AS/400, you can use either the Operations Navigator interface or the command line interface. When you shut down the server from AS/400, you are varying off the network server description (NWSD) for the server. If you shut down the server from AS/400, you must restart the server from AS/400 in order to vary the NWSD back on.

Using AS/400 Operations Navigator:

If you want to shut down an Integrated Netfinity Server by using Operations Navigator, follow these steps:
1. Expand **Network**.
2. Expand **Windows Administration**.
3. Expand **Integrated Netfinity 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 Netfinity 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 AS/400 Operations Navigator toolbar.

Using the command line:

You shut down Windows server from the command line by varying off the network server description (NWSD) for the server on AS/400. To vary off Windows server, follow these steps:
1. At the AS/400 command line, type WRKCFGSTS *NWS.
2. Press Enter.
3. Type a 2 in the `Opt` field to the left of the network server description you want to vary off.

4. Press F4 and specify *YES in the `Force vary off` field. (Forcing the vary off prevents your having to first end any external LAN interfaces for this server.)
5. Press Enter. The Windows server shuts down.

Attention: Be careful to stop the server **before** powering down your AS/400 or installing applications that would cause it to power down automatically. Corruption of the server or network server storage spaces is possible if AS/400 powers down before the Windows server shuts down completely.

Details: Varying off a Windows server NWSD when AS/400 is sharing LAN adapters on the Integrated Netfinity Server

If AS/400 is sharing the LAN adapters on the Integrated Netfinity Server, you must either:
- End the external LAN interfaces that are running on AS/400 before you vary off the network server description (NWSD).
- Force the vary off.
- Use Operations 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 AS/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 AS/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

      Internet          Subnet              Line        Line
 Opt  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 AS/400 command line, type: VRYCFG CFGOBJ(IT) CFGTYPE(*NWS) STATUS(*OFF) FRCVRYOFF(*YES)Specifying *YES causes AS/400 to end active jobs without issuing inquiry messages.

Then go back to "Shutting down Windows server from AS/400" on page 60.

If you have problems trying to vary the server off, see the troubleshooting article on troubleshooting vary off failures.

Shutting down Windows server on AS/400 from Windows server

You can shut down Windows server from the Windows server environment. 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 AS/400 after shutting down with this method, you must first vary off the NWSD as described in "Shutting down Windows server from AS/400" on page 60.

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 AS/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**.

Restarting Windows server on AS/400 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 AS/400, then you must restart it from AS/400. See "Starting Windows server from AS/400" on page 59 for instructions on starting a Windows server from AS/400.

To start Windows server from the Windows server environment, do this:
- For Windows NT 4.0, click the **Restart** button. For Windows 2000, select **Restart** from the drop-down box.

   Note: The **Restart** option appears only after you shut down Windows server from the Windows server environment.

If you have problems with starting the server, see the page on troubleshooting start problems.

Chapter 5. Avoiding data loss when powering down AS/400

When you are running Windows server on an Integrated Netfinity Server in your AS/400, always shut down Windows server before powering down AS/400. If you do not, you risk losing Windows server data. Using the command PWRDWNSYS *IMMED will not vary off NWSDs. The command PWRDWNSYS *CNTRLD 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 AS/400 powers down before the Windows server shuts down completely. For information about shutting down Windows server on AS/400, see "Shutting down Windows server from AS/400" on page 60.

Chapter 6. Backup of the NWSD and storage space objects associated with Windows server on AS/400

When you install the Windows server on AS/400, AS/400 creates a network server description and storage spaces for your server that you need to back up. Some of the storage spaces 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 storage spaces 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 Netfinity Server for AS/400 allows you to save and restore these drives as AS/400 storage space objects. These objects are saved as part of the AS/400 system when you perform a full AS/400 system backup. You can also specifically save the network server description and storage spaces that are associated with Windows server on AS/400. 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 file-level backup 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 storage space objects that are associated with Windows server on AS/400, see these topics:
- "Backing up NWSDs for Windows server on AS/400".
- "Backing up predefined storage spaces for Windows servers created on V4R5 and later AS/400 systems" on page 66.
- "Backing up predefined storage spaces for Windows servers created on pre-V4R5 AS/400 systems" on page 66.
- "Backing up user-defined storage spaces for Windows server" on page 67.
- You can see a table of user objects and system objects that you should save.

Backing up NWSDs for Windows server on AS/400

When you save the storage space objects that are associated with Windows server on AS/400, 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 AS/400 command line, type SAVCFG.
2. In the Device field, specify the device name if you are saving to media. If you are saving to a save file, specify *SAVF and identify the name and library for the save file in the appropriate fields.
3. Press Enter to have AS/400 save the NWSD configuration.

Backing up predefined storage spaces for Windows servers created on V4R5 and later AS/400 systems

When you install Windows server on V4R5 and later systems, AS/400 creates the system and installation source (C and D) drives as storage spaces that you need to save. (You can find information about predefined and user-defined storage spaces for Windows server on AS/400 in the Information Center. Expand Network Operating Systems –> Windows server on AS/400–> Managing storage.)

Note: Treat a network server description (NWSD) of type *WINDOWSNT, its predefined storage spaces, and any user-defined network storage spaces 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 network server storage spaces that are in the system ASP on AS/400, do this:

1. If you are saving to tape, ensure that you have mounted a tape that is formatted for AS/400.
2. To prevent users from updating files during the backup, shut down the Windows server by varying off the network server description (described in "Shutting down Windows server from AS/400" on page 60).
3. On the AS/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/`*nwsdname*`1`. To save the D drive, use `/QFPNWSSTG/`*nwsdname*`2`.
6. Specify values for any other parameters that you want and press Enter to save the storage space.
7. Vary on the Windows server (described in "Starting Windows server from AS/400" on page 59).

Backing up predefined storage spaces for Windows servers created on pre-V4R5 AS/400 systems

Windows servers created on pre-V4R5 systems have C, D, and E as predefined drives. Server storage spaces 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 storage spaces, and any user-defined network storage spaces 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 server storage spaces for these NWSDs, you use the Save Object (SAVOBJ) command:

1. If you are saving to tape, ensure that you have mounted a tape that is formatted for AS/400.
2. To prevent users from updating files during the backup, shut down the Windows server by varying off the network server description (described in "Shutting down Windows server from AS/400" on page 60).
3. On the AS/400 command line, type SAVOBJ 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 AS/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. Vary on the Windows server (described in "Starting Windows server from AS/400" on page 59).

Backing up user-defined storage spaces for Windows server

The network server storage spaces that you create for your Windows servers are in the integrated file system. To save these storage spaces from the user auxiliary storage pool (ASP) on AS/400, you use the Save (SAV) command.

Note: Treat a network server description (NWSD) of type *WINDOWSNT, its predefined storage spaces, and any user-defined network storage spaces 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 network server storage spaces in a user ASP on AS/400, do this:

1. If you are saving to tape, ensure that you have mounted a tape that is formatted for AS/400.
2. To prevent users from updating files during the backup, shut down the Windows server by varying off the network server description (described in "Shutting down Windows server from AS/400" on page 60).
3. On the AS/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.) Otherwise, use the name of your device (for example, TAP01).
5. 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 ASP.
6. Specify values for any other parameters that you want and press Enter to save the storage space.
7. Vary on the Windows server (described in "Starting Windows server from AS/400" on page 59).

You can find more information about backing up system objects and the appropriate save commands in the topic Backup, Recovery, and Availability in the Information Center.

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 file-level backup function that V4R5 provides.

What objects to save and their location on AS/400

Many objects are created as a result of installing AS/400 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 AS/400 GO SAVE command. Option 21 saves the entire system. Option 22 saves system data (which includes objects in QUSRSYS). Option 23 saves all user data (which includes objects in QFPNWSSTG).

If you want to save a particular object, use this table to see the location of that object on AS/400 and the command to use. You can find more information about using the save commands in the Information Center topic "Backup, Recovery, and Availability". In addition to saving the entire drive (storage space), you can also save and restore individual Windows server files. Refer to "Backing up individual Windows server files and directories" in the Information Center.

Table 5. Objects to save

Object content	Object name	Object location	Object type	Save command
For Windows servers created on V4R5 and later systems				

Table 5. Objects to save (continued)

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 ASP	GO SAVE, option 21 or 23
				SAV OBJ('/QFPNWSSTG/nwsdname1') DEV('/QSYS.LIB/*TAP01*.DEVD')
			Predefined network server storage spaces in user ASP	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 ASP	GO SAVE, option 21 or 23
				SAV OBJ('/QFPNWSSTG/nwsdname2') DEV('/QSYS.LIB/*TAP01*.DEVD')
			Predefined network server storage spaces in user ASP	GO SAVE, option 21 or 23
				SAV OBJ(('/QFPNWSSTG/stgspc') ('/dev/QASPnn/stgspc.UDFS')) DEV('/QSYS.LIB/*TAP01*.DEVD')
For Windows servers created on pre-V4R5 systems				
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				
User data and applications	Various	/QFPNWSSTG	User-defined network server storage spaces in system ASP	GO SAVE, option 21 or 23 SAV OBJ('/QFPNWSSTG/stgspc') DEV('/QSYS.LIB/*TAP01*.DEVD')
			User-defined network server storage spaces in user ASP	GO SAVE, option 21 or 23 SAV OBJ('/QFPNWSSTG/stgspc') ('/dev/QASPnn/stgspc.UDFS')) DEV('/QSYS.LIB/*TAP01*.DEVD')

Table 5. Objects to save (continued)

Object content	Object name	Object location	Object type	Save command
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)
AS/400 config objects for Windows server	Various	QSYS	Device config objects	GO SAVE, option 21, 22, or 23
				SAVCFG DEV(TAP01)
Various	Various	All QUSRSYS	Various	GO SAVE, option 21 or 23
				SAVLIB LIB(*NONSYS) or LIB(*ALLUSR)
AS/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

Chapter 7. Restoring the NWSD and storage spaces for Windows server on AS/400

One method of restoring your Windows server data is to restore the network server description and storage spaces that AS/400 associates with that server. On pre-V4R5 systems, this is your primary AS/400 recovery option. It remains the faster method for restoring large amounts of data. For Windows servers running on V4R5 and later systems, if you used file-level backup, you can also restore specific Windows server files. You can find information about that procedure in the AS/400 Information Center.

When you restore saved objects from AS/400, you need to be aware of these considerations:

Notes:

1. Treat a network server description (NWSD) of type *WINDOWSNT, its predefined storage spaces, and any user-defined network storage spaces 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 AS/400 automatically relink restored storage spaces in the integrated file system to the appropriate NWSD, restore the NWSD after you restore the storage spaces.
3. If you restore an NWSD of type *WINDOWSNT before restoring the predefined and user-defined storage spaces in the integrated file system, you need to relink those storage spaces. You can do this by using the Add Network Server Storage Link (ADDNWSSTGL) command for each storage space 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. Follow normal Windows server procedures to do this and refer to documentation from Microsoft as necessary.

To restore the the NWSD and storage spaces for Windows server on AS/400, refer to these pages:

- "Restoring predefined storage spaces for Windows servers created on V4R5 and later systems"
- "Restoring predefined storage spaces for Windows servers created on pre-V4R5 systems" on page 72
- "Restoring user-defined storage spaces for Windows servers on AS/400" on page 73
- "Restoring NWSDs for Windows server on AS/400" on page 73

Restoring predefined storage spaces for Windows servers created on V4R5 and later systems

For Windows servers that you create on V4R5 or later systems, storage spaces that contain the Windows server operating system and registry are in the integrated file system. You restore these predefined network server storage spaces just as you do user-defined storage spaces. To restore network server storage spaces in the integrated file system on AS/400, use the Restore (RST) command:

1. If you are restoring from save media, ensure that you have mounted your media.
2. If no 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 server storage spaces that you saved beneath that directory. To create the /QFPNWSSTG directory, complete these steps:
   a. On the AS/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 auxiliary storage pool (ASP).
   d. Press Enter to create the storage space. AS/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/*nwsdname*1. To restore the D drive, use /QFPNWSSTG/*nwsdname*2.
6. Specify values for any other parameters that you want and press Enter to restore the storage space.

Restoring predefined storage spaces for Windows servers created on pre-V4R5 systems

Earlier versions of AS/400 Integration for Windows Server created server storage spaces for the C, D, and E drives in the system auxiliary storage pool. Those storage spaces 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 AS/400 created them unless you reinstall Windows server. You restore those server storage spaces with the Restore Object (RSTOBJ) command. System drives that are larger than 1007 megabytes also have data in a user storage space that you need to restore.

To restore the server storage spaces, you use the Restore Object (RSTOBJ) command:
1. On the AS/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.

Restoring user-defined storage spaces for Windows servers on AS/400

To restore network server storage spaces in the integrated file system, do this:

1. If you are restoring from save media, ensure that you have mounted your media.
2. If no 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 server storage spaces that you saved beneath that directory. To create the /QFPNWSSTG directory, complete these steps:
   a. On the AS/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 ASP.
   d. Press Enter to create the storage space. AS/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 ASP.
5. Specify values for any other parameters that you want and press Enter to restore the storage space.

Restoring NWSDs for Windows server on AS/400

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 Netfinity Server hardware, you need to specifically restore the NWSD. To have AS/400 automatically relink storage spaces within the integrated file system to the restored NWSD, restore those storage spaces first. To restore the NWSD, you use the Restore Configuration (RSTCFG) command:

1. On the AS/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 AS/400 restore the NWSD.

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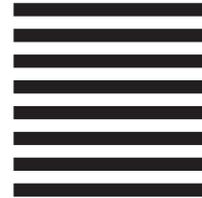Fold and Tape   **Please do not staple**   Fold and Tape

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