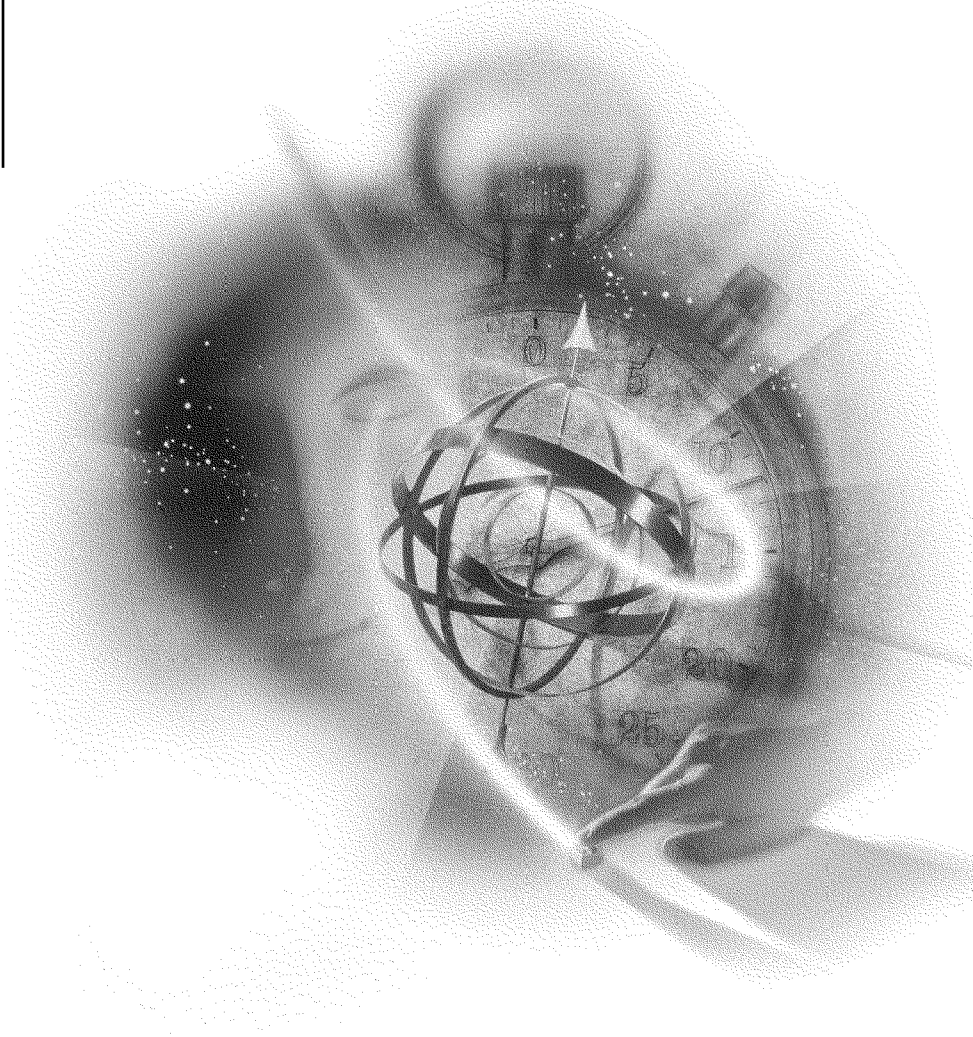


**Interface Boards**



**Connectivity Services**

**Novell®**

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# About This Guide

This guide provides the information you need to configure and manage interface boards for Novell Internet Access Server 4.1. In addition to planning information, this guide provides troubleshooting tips, techniques, and tools, as well as the symptoms of and solutions to commonly occurring problems for Novell Internet Access Server 4.1 interface boards.





# 1

## Planning

This section describes how to determine whether you should configure your interface boards beyond the basic configuration.

### Configuration Decisions

For most boards, you only need to perform the basic board configuration described in “[How to Configure a LAN or WAN Board.](#)” However, there are four scenarios that require more than just the basic board configuration. Whether you need to configure additional information depends on the following decisions:

- ◆ **Whether you are configuring the ATM LEC**

If you are configuring the ATM LEC (Asynchronous Transfer Mode LAN Emulation Client) software, you must perform the steps described in “[Configuring a Logical Adapter Board for ATM LEC.](#)”

ATM LEC software emulates existing LAN services, making the ATM network appear connectionless, such as an Ethernet or token ring network. ATM LEC configurations allow existing network protocols to run over ATM without modification, and they allow interoperability between software applications residing on ATM-attached end systems and traditional LAN end systems.

- ◆ **Whether you will be using NetWare Link/ATM™ software**

If you decide to use NetWare Link/ATM, you must perform the steps described in “[Configuring Logical Adapter Boards for NetWare Link/ATM.](#)”

NetWare Link/ATM is used to transfer data over Asynchronous Transfer Mode (ATM) networks that use cell switching based on a 53-byte cell to

provide low-latency, scalable virtual-circuit-multiplexed WAN connectivity.

- ◆ **Whether you will be running PPP over ISDN**

If you decide to use PPP over ISDN, you must perform the steps described in “[Configuring Boards for Running PPP over ISDN.](#)”

PPP over ISDN is used only in dial-up situations. ISDN lines have the advantage of being faster and more efficient than PPP dial-up analog lines, resulting in a lower cost to transfer the same amount of data. Synchronous on-demand connections over ISDN lines provide 5 to 10 times the bandwidth of analog connections at significantly lower error rates.

- ◆ **Whether you will be running PPP over asynchronous ports**

If you decide to use PPP over asynchronous ports, you must perform the steps described in “[Configuring Boards for Running PPP over Asynchronous Ports.](#)”

Asynchronous ports are used when only low-speed connections are required. They also have the advantage of a low cost. You can use one of your PC's existing COM ports, a low-cost third-party asynchronous board, or a high-performance third-party asynchronous board. For more information about the advantages and disadvantages of using asynchronous ports, contact the Novell® Labs™ group or refer to the Novell Labs WWW location [http://labs.novell.com/infosys/mastr\\_06.htm](http://labs.novell.com/infosys/mastr_06.htm).

- ◆ **Whether you will be using PPTP**

If you decide to use PPTP, you must perform the steps described in “[How to Configure Boards for Point-to-Point Tunneling Protocol \(PPTP\).](#)”

PPTP enables the Point-to-Point Protocol (PPP) to be tunneled through an IP network. PPTP is most commonly used for ISP connections. The use of a TCP connection for call control and management enables the server to control dial-in access from remote PPP clients and to initiate outbound calls.

# 2

## Setting Up

This section describes how to configure interface board parameters.

### Configuring a LAN or WAN Board

Configuring, or reconfiguring, a board involves choosing a driver for the board, assigning a name to the board, and specifying values for the board parameters.

When you select and configure a LAN board, you are actually configuring one or more physical interfaces that correspond to individual connections over which packets are routed. Configuring a board causes the driver associated with the board to load each time you initialize the router.

Most drivers that are compatible with NetWare software have a *driver description file* that defines the hardware parameters necessary for the driver to operate with the board you select. This file—sometimes called the *.LDI file*—also specifies the valid range of values for each parameter. If a driver has an *.LDI file*, the parameters associated with that driver are presented in the Board Configuration menu; you simply choose a value for each parameter. If a driver has no *.LDI file*, you must enter the required values in the Board Parameters field.

For information about selecting a WAN board and about the most current Novell-certified boards and drivers, refer to the Novell Labs WWW location [http://labs.novell.com/infosys/mastr\\_06.htm](http://labs.novell.com/infosys/mastr_06.htm).

### How to Configure a LAN or WAN Board

To configure a board, complete the following steps:

- 1 Load NIASCFG, then select the following parameter path:

Select Configure NIAS > Protocols and Routing > Boards

**2** Do one of the following:

**If you are configuring a new board:**

- ◆ Press **Ins** to display the list of available drivers.
- ◆ Scroll through the list of available drivers and select the driver that corresponds to the type of new LAN board you are installing in your system. If the driver you need is not in the list, refer to [“Adding a New Board Driver or NLM File to Your System.”](#)

**If you are changing an existing board configuration, select that board.**

**3** The Configured Boards screen is displayed.

**NOTE:** If you are doing a new configuration, no existing boards are shown. Otherwise, boards that have already been configured are shown.

The Configured Boards screen displays a list of configured boards with some or all of the following information:

- ◆ Board Name —Name you assign to the board.
- ◆ Driver —Name of the driver associated with the board.
- ◆ Int —Interrupt request level (IRQ) used by the board.
- ◆ IOAddr —Base input/output port address for the board.
- ◆ MemAddr —Base memory address used by the board.
- ◆ Slot —Number of the slot where the board is installed.
- ◆ Status —Status of the board, which is Enabled by default.
- ◆ Comment —Any comments that you enter about the board or its configuration.

**NOTE:** Not every board-driver configuration requires all this information; in fact, some configurations require other, link-specific parameters that are not shown in the Configured Boards screen. These parameters are displayed in the Board Configuration menu, as described in the following steps.

If the board driver has an .LDI file, the parameters you need to configure for the board are displayed as separate fields in the menu.

If the board driver has no .LDI file, only the Board Name , Board Parameters , and Comment fields are provided as a means for entering the parameters manually.

- 4 Enter a name in the Board Name field; or, if needed, change the name of an existing board.

You can use up to 10 alphanumeric characters for the board name.

- 5 Specify the board parameters by doing one of the following:

If the driver selected has a description file, the parameters are listed as separate fields. You must highlight each field one at a time and select the appropriate value for the parameter from the displayed list.

**HINT:** Use the context-sensitive help text if you need an explanation of any parameter. Highlight the parameter and press F1 to display the help text. Press Esc to exit the help screen. When in doubt, accept the default values.

If the driver selected does not have a description file, the Board Configuration Without A Driver Description File menu is displayed. You must type the parameters in the Board Parameters field; use the following as an example:

```
PORT=300 INT=3
```

These parameters are appended to the **LOAD** <driver> line.

**WARNING:** NIASCFG automatically manages frame types. Do not put a frame= option in the Board Parameters field.

- 6 Press Esc to return to the Configured Boards screen; save your changes when prompted.

The Configured Boards screen now shows the board you just configured. Note that the board status is Enabled ; you can use the Tab key to toggle between Enabled and Disabled. To ensure that the board is loaded, continue with the next step.

- 7 Press Esc to return to the Internetworking Configuration menu; save your changes when prompted.

- 8 If you want these changes to take effect immediately, perform the following actions.

LAN boards with a single network interface need no further configuration; however, an enabled driver is not loaded unless a protocol is bound to it.

WAN boards also require that a data-link protocol be assigned and configured for each required port. This is done by selecting Network Interfaces in NIASCFG. Refer to the appropriate data-link protocol configuration section for information about configuring network interfaces.

After a data-link protocol has been associated with the board, select `Reinitialize System` or restart the router to make the changes take effect. If there are any conflicts with the hardware parameters of other boards, one or more messages describe them. You must determine whether the conflicts are acceptable or whether they interfere with the operation of the router and, if necessary, resolve them.

## Adding a New Board Driver or NLM File to Your System

For a list of board drivers that are certified for use with the Novell Internet Access Server 4.1 routing software, refer to the Novell Labs WWW location at <http://labs.novell.com/infosys/bulletin.htm>.

To add a new board driver or NetWare Loadable Module™ (NLM™) file, complete the following steps:

- 1** Load NIASCFG, then select the following parameter path:

Select `Configure NIAS > Protocols and Routing > Boards`

- 2** Press `Ins` to display the list of available drivers.

- 3** Press `Ins` again.

The `New Driver` screen is displayed. You must now tell the system where to copy the driver from.

- 4** Enter the full pathname of the driver at the console prompt, then press `Enter`.

If NIASCFG cannot find the driver file you enter, the message `Driver file not found` is displayed.

**NOTE:** You can also use this screen for copying drivers and NLM files from a floppy diskette to the `SYS:/SYSTEM` directory.

To add a driver to the list of available drivers, insert the diskette containing the driver in one of the disk drives, specify the complete path and filename of the driver (for example, `A:\NEWDRV\DRIVER`), then press `Enter`. The driver and its description file, if any, are copied into the `SYS:/SYSTEM` directory. (Note that the file extension is not required.)

- 5** Configure the new board as described in the appropriate section in this section.

# Configuring a Logical Adapter Board for ATM LEC

Before you begin, you must configure a physical ATM board as described in [“Configuring a LAN or WAN Board.”](#)

If you configure ATM LEC before configuring the physical adapter board, the LEC software will not load. ATM LEC requires an ATM adapter to be loaded and connected to an ATM switch prior to configuring the logical adapter board.

To configure a logical adapter board, complete the following steps:

**NOTE:** Refer to [Table 1 on page 16](#) for LAN Emulation parameter descriptions.

**1** Load NIASCFG, then select the following parameter path:

Select Configure NIAS > Protocols and Routing > Boards

**2** Do one of the following:

**If you are configuring a new board, press `Ins` to display the list of available drivers.**

- ◆ Select ATMELEC for Ethernet emulation.
- ◆ Select ATMTRLEC for token ring emulation.

**If you are changing an existing board configuration, you must delete the board configuration and return to the beginning of this step to add a new board.**

**3** Select Board Name and enter a unique name.

**4** Select ATM HSM Board Name and enter the name of the ATM HSM™ (Hardware Specific Module™) board. Multiple emulated LANs can share the same physical ATM adapter. Input in this field is required.

**5** Select ELAN Name and specify the name of the emulated LAN. This name, if specified, must match the LES (LAN Emulation Server) name. If no name is specified the LECS (LAN Emulation Configuration Server) will determine the default. Use double quotation marks if the name contains lowercase letters (for example, `\elan1\`).

**6** Select Node Override and specify a node address to override the default if it has already been used for another emulated LAN.

**7** Select LECS and specify the ATM address of the LECS.

**8** Select LES and specify the address of the LES.

**9** Select **LSB (canonical)** for a token ring LEC.

The default is noncanonical Most Significant Bit (MSB) mode.

**10** Select **Comment** and enter a descriptive comment, if desired.

**11** Select **Board Status** and indicate whether the board is loaded.

- ◆ **Enabled** —Indicates whether the board is loaded.
- ◆ **Disabled** —indicates that no driver load lines or protocol bind commands are created for the board.
- ◆ **Force** —Loads all LAN driver frame types.

**12** Press **Esc** to return to the Internetworking Configuration menu; save your changes when prompted.

## LAN Emulation Command Parameters

**Table 1** describes the parameters used for ATM LEC board configuration.

**Table 1 LAN Emulation Command Parameters**

Parameter Name	Description
NAME	Logical board to which the protocol stacks can bind.
ELAN	<p>The name of the emulated LAN (ELAN) to which you want this LAN port to join. This parameter is sent in a LAN Emulation Configuration Server (LECS) configuration request to obtain other parameter values associated with the ELAN from the LECS. If this parameter is not specified and the LECS address is specified in the load line, then the LECS configuration request will contain a NULL value for the ELAN. This allows the LECS to optionally assign the LAN Emulation Client (LEC) to a default ELAN and supply the default ELAN's configuration parameters to the LEC.</p> <p>Place the ELAN name in double quotation marks if the name contains lowercase letters (for example, ELAN NAME: \elan1\).</p>
NODE	The 6-byte MAC address for the ELAN port. If this parameter is not specified, the primary End Station Identifier (ESI) value (registered by the ATM adapter) is chosen as the MAC address, unless it has already been assigned to another instance of the ELAN. The NODE value should be unique within the ELAN. Otherwise, the LAN Emulation Server (LES) rejects the address and the LEC is terminated. The NODE value should not have the multicast bit on and should be a local address. Otherwise, the LEC rejects the address and is terminated.



Parameter Name	Description
LECS	<p>Full 20-byte address of the LAN Emulation Configuration Server (LECS). The format for this address is 20 bytes with no separators. If the LECS is connected to the same switch as the LEC, only the last 7 bytes of the LECS address must be entered. This parameter is optional.</p> <p>If neither the LES nor LECS address is specified, by default, the LEC tries to access the LECS by using its well-known unicast address.</p>
LES	<p>Full 20-byte address of the LAN Emulation Server (LES). The format for the address is 20 bytes with no separators. If the LES is connected to the same switch as the LEC, only the last 7 bytes of the LES address must be entered. This parameter is optional.</p>
LSB	<p>This parameter is required only for token ring LEC when the LEC needs to handle the MAC address in the Least Significant Bit (LSB) mode (canonical mode). If this parameter is not specified, the LEC uses the default, the Most Significant Bit (MSB) mode.</p>
ATMBOARD	<p>Name of the ATM interface (up to 17 bytes long) that the ELAN uses. If this parameter is not specified, the first available ATM board is chosen. To avoid having an undesired board chosen, this parameter should be specified when multiple ATM boards are present.</p>

## Configuring Logical Adapter Boards for NetWare Link/ATM

NetWare Link/ATM recognizes only a *logical* interface adapter board. This means that you must first configure a physical adapter board and driver on the server and then configure a corresponding logical interface board using the NetWare Link/ATM driver (ATMWAA). The logical interface board name is the network interface used when you bind protocols.

For information about configuring NetWare Link/ATM network interfaces and WAN call destinations, refer to **Setting Up** in the *NetWare Link/ATM* documentation.

### How to Configure a Logical Adapter Board for NetWare Link/ATM

Before you begin, you must configure a physical ATM board.

To configure a logical adapter board, complete the following steps:

- 1 Load NIASCFG, then select the following parameter path:

Select Configure NIAS > Protocols and Routing > Boards

**2** Do one of the following:

**If you are configuring a new board:**

- ◆ Press **Ins** to display the list of available drivers.
- ◆ Select **ATMWAA** from the list of drivers.

**If you are changing an existing board configuration, you must delete the existing board configuration and return to the beginning of this step to add a new board.**

**3** In the **Board Name** field, enter a unique name.

**4** In the **Comment** field, type a descriptive comment, if desired.

**5** Press **Esc** to return to the Internetworking Configuration menu; save your changes when prompted.

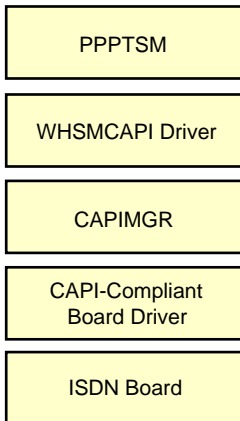
**6** If you want these changes to take effect immediately, you must first configure the network interface for this board as described in **Setting Up** in the *NetWare Link/ATM* documentation.

After configuring the network interface, you can make the changes take effect by restarting the router or selecting **Reinitialize System**. If you want to configure other parameters, do so now, then restart the router or reinitialize the system when you are finished.

## Configuring Boards for Running PPP over ISDN

To run the Point-to-Point Protocol (PPP) over Integrated Services Digital Network (ISDN) on a Novell router, you must use an ISDN board driver that is compliant with the Common Application Program Interface (CAPI) standard. A CAPI-compliant driver is able to communicate with CAPIMGR, which then communicates with the WHSMCAPI driver. The WHSMCAPI driver converts CAPI ISDN signaling into PPP signaling. Finally, the WHSMCAPI driver provides a WHSM (WAN Hardware Specific Module™) interface with the PPP Data-Link layer (PPPTSM.NLM). The relationship of these modules is shown in **Figure 1**.

**Figure 1** Modules Required to Run PPP over ISDN



Because the structure shown in **Figure 1** contains two separate drivers, two boards must be configured, one for the CAPI-compliant driver and one for the WHSMCAPI driver. This section does not explain how to configure a board for the CAPI-compliant driver, because it is configured just like any other physical WAN board. However, the WHSMCAPI board is not a physical board. Instead, it is a software entity that is used to represent one or more CAPI ports as one or more WHSM interfaces. The WHSMCAPI driver can also be applied to many different physical ISDN boards using different CAPI-compliant drivers. With NIASCFG, you can configure several ports that have the same parameter settings using just one screen. However, each port's configuration is shown as a separate board under Network Interfaces.

Refer to the Novell Labs WWW location [http://labs.novell.com/infosys/mastr\\_06.htm](http://labs.novell.com/infosys/mastr_06.htm). for more information about the following topics:

- ◆ Selecting WAN hardware based on performance
- ◆ Determining whether to run PPP over a CAPI-compliant WAN interface
- ◆ Understanding the advantages and disadvantages of running PPP over ISDN
- ◆ Getting the most current Novell-certified boards and drivers

## **How to Configure Boards for Running PPP over ISDN**

Before you begin, you must configure a physical WAN board.

To configure a WHSMCAPI board, complete the following steps:

**1** Load NIASCFG, then select the following parameter path:  
Select Configure NIAS > Protocols and Routing > Boards

**2** Do one of the following:

**If you are configuring a new WHSMCAPI board:**

- ◆ Press `Ins` to display the list of available drivers.
- ◆ Select the WHSMCAPI driver.
- ◆ Enter a name for the new board.

The WHSMCAPI Configuration menu appears.

**If you are changing an existing WHSMCAPI board configuration, select that board.**

**3** Select CAPI Board Options.

If you are configuring a new board, the following message appears:

```
Should NIASCFG automatically load the CAPI driver?
```

If you are changing the configuration of a CAPI board that was previously configured with NIASCFG, a screen containing configuration information for that board only is displayed. To reconfigure the board, proceed to **Step 3c**.

**3a** Select Yes or No.

**NOTE:** If possible, always select Yes to load the CAPI driver using INECTFG.

**Select No** if your system has a CAPI board that has already been configured for another product using `LOAD` commands in the `AUTOEXEC.NCF` file. A screen containing information about all available CAPI boards is displayed. Select the board you want to use.

This screen displays the following information for each board: CAPI controller name, number of ports, port speed, manufacturer, and version. Select a board that is likely to have some ports available for use by PPP. This board does not necessarily have to be currently used by another product. If no drivers are displayed, you must load the board driver at the console or restart the router.

**Select Yes** if you want to use a CAPI board that will be configured for the first time through NIASCFG. A list of available CAPI drivers is displayed. Select the driver that you want to use.

When a driver is selected, a screen showing the associated board's hardware configuration is displayed.

**3b** Press Esc after configuring the hardware parameters to return to the WHSMCAPI Board Configuration menu.

**3c** Enter a value for the Number of CAPI Ports parameter.

This number indicates the number of ports that will be made available to PPP on this controller.

**3d** If you are using a third-party driver that has its own configuration utility, select Driver-Specific Configuration to start the utility.

A menu with driver-specific parameters is displayed. Configure these parameters as needed. If the driver configuration requires a board name, use the name entered in [Step 2 on page 20](#).

Refer to the online help or the documentation included with your interface board for information about the configuration of driver-specific parameters. For information about the Eicon\* driver-specific parameters, refer to the README files included on the Novell product CDs.

**3e** Press Esc until you return to the Internetworking Configuration menu; save your changes when prompted.

**3f** If you want these changes to take effect immediately, you must first configure a PPP network interface for this board as described in [Setting Up](#) in the *NetWare Link/PPP* documentation.

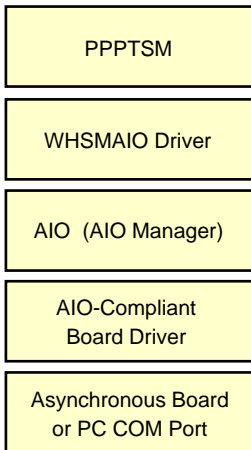
After configuring a network interface, you can make the changes take effect by restarting the router or selecting Reinitialize System. If you want to configure other parameters, do so now, then restart the router or reinitialize the system when you are finished.

## Configuring Boards for Running PPP over Asynchronous Ports

To run PPP over asynchronous ports, such as your PC's COM ports, you must use a board driver that is compliant with the AIO standard. An AIO-compliant driver is able to communicate with the AIO Manager (AIO.NLM), which then communicates with the WHSMAIO driver. The WHSMAIO driver converts the AIO character stream into the asynchronous HDLC framing service required by the NetWare Link/PPP™ software. WHSMAIO also converts PPP asynchronous HDLC frames into an AIO character stream. Finally, the

WHSMAIO driver provides a WHSM interface with the PPP Data-Link layer (PPPTSM.NLM). The relationship of these modules is shown in **Figure 2**.

**Figure 2** Modules Required to Run PPP over Asynchronous Ports



Because the structure shown in **Figure 2** contains two separate drivers, two boards must be configured, one for the AIO-compliant driver and one for the WHSMAIO driver. This section does not explain how to configure a board for the AIO-compliant driver because this board is configured just like any other physical WAN board. However, the WHSMAIO board is not a physical board. Instead, it is a software entity that is used to represent one or more AIO ports as one or more WHSM interfaces. The WHSMAIO driver can also be applied to many different physical AIO boards using different AIO-compliant drivers. With NIASCFG, you can configure several ports that have the same parameter settings using just one screen. However, each port's configuration is shown as a separate board under Network Interfaces.

The Novell Internet Access Server 4.1 routing software includes an AIO-compliant driver, AIOCOMX, that runs over your PC's COM ports.

Refer to the Novell Labs WWW location [http://labs.novell.com/infosys/mastr\\_06.htm](http://labs.novell.com/infosys/mastr_06.htm) for more information about the following topics:

- ♦ Selecting WAN hardware based on performance
- ♦ Determining whether to run PPP over an asynchronous or synchronous port

- ◆ Understanding the advantages and disadvantages of running PPP over your PC's COM ports
- ◆ Getting the most current Novell-certified boards and drivers

## Sharing AIO Ports with Novell Internet Access Server 4.1 Routing Software

The Novell Internet Access Server 4.1 routing and remote access components can coexist on a single server and can share serial interfaces provided by AIO drivers. However, the following information should be taken into consideration.

The AIO ports for Novell Internet Access Server 4.1 routing software are configured under the Protocols and Routing option in NIASCFG, whereas the AIO ports for the remote access software are configured under the Remote Access option. Typically, AIO ports used by the WHSMAIO driver do not require configuration by the remote access software. However, when both products are enabled, you can reserve all AIO ports for the exclusive use of the remote access product. This causes the WHSMAIO driver to fail with the following error message:

```
Fatal Error: Unable to initialize the AIO board.
```

To correct this problem, use NIASCFG to enable the WHSMAIO driver access to the specified AIO ports.

To configure an AIO port for use by the WHSMAIO driver, complete the following steps:

- 1** If Novell Internet Access Server 4.1 remote access software is running, stop the remote access software by entering the following command at the NetWare console prompt:

```
NWCSTOP
```

- 2** Load NIASCFG, then select the following parameter path:

```
Select Configure NIAS > Remote Access > Set Up... > Select Remote Access Ports
```

- 3** Select any listed remote access ports that you want to be dedicated to WHSMAIO and press Del.

Repeat this step on each port to be dedicated to WHSMAIO.

- 4** Start the remote access software by entering the following command at the NetWare console prompt:

## NWCSTART

- 5 From this point, use *only* the path NIAS Options > Protocols and Routing to configure Novell Internet Access Server 4.1 routing ports. Use *only* the path NIAS Options > Remote Access to configure remote access ports.

The following NIASCFG remote access options should not be used for AIO ports that use the WHSMAIO driver:

- ◆ Manage Ports
- ◆ Reset Port
- ◆ Unconditional Reset Port

If you use any of these options, the port becomes inoperative. If this occurs, unload the WHSMAIO driver and enter the REINITIALIZE SYSTEM command to restore normal operation.

## How to Configure Boards for Running PPP over Asynchronous Ports

Before you begin, you must configure a physical WAN board.

To configure a WHSMAIO board, complete the following steps:

- 1 Load NIASCFG, then select the following parameter path:  
Select Configure NIAS > Protocols and Routing > Boards
- 2 Do one of the following:

### **If you are configuring a new WHSMAIO board:**

- ◆ Press `Ins` to display the list of available drivers.
- ◆ Select the WHSMAIO driver.
- ◆ Enter a name for the new board.

The WHSMAIO Configuration menu appears.

### **If you are changing an existing WHSMAIO board configuration, select that board.**

- 3 Select AIO Board Options.

If you are configuring a new AIO board, the following message appears:

```
Should NIASCFG automatically load the AIO driver?
```

If you are configuring an existing board, a message is displayed that explains that you can change only the configuration of the board that was previously configured with NIASCFG. You cannot select another AIO



board unless you delete the existing WHSMAIO board and add a new one. To reconfigure the existing board, press Enter and proceed to [Step 5](#).

**4** Select Yes or No.

**NOTE:** If possible, always select Yes to load the AIO driver using NIASCFG.

**Select No** *if your system has an AIO board that has already been configured for another product using LOAD commands in the AUTOEXEC.NCF file. A screen containing information about all available AIO boards is displayed. Select the board you want to use.*

This screen displays the following information for each AIO board: AIO board name, number of ports, port speed, manufacturer, and version. Select a board that is likely to have some ports available for use by PPP. This board does not necessarily have to be currently used by another product. If no drivers are displayed, you must load the board driver at the console or restart the router.

**Select Yes** *if you are using a board that is being configured for the first time through NIASCFG. A list of AIO drivers is displayed. Select a driver from the list. A menu with driver-specific parameters is displayed. Enter the appropriate values for these parameters.*

These parameters are vendor-specific and vary depending on which third-party AIO driver is being used. Parameters that are commonly displayed include Interrupt , I/O Base , and Memory Base. Refer to the documentation supplied with the third-party driver for more information about the displayed parameters.

Some AIO drivers have interface speed limits that prevent you from configuring the interface to a speed above the default limit. If a console error message indicates that the WHSMAIO port configured in [Step 5](#) failed to load because the default speed limit has been exceeded, you might be able to increase the AIO driver speed limit. Refer to the documentation supplied with the third-party driver for more information about the parameter to configure to increase this speed limit.

**5** Enter a value for the First AIO Port Number parameter.

Enter the number of the first port that is available for use by PPP. The reason is to distinguish the ports available for use by PPP from the other ports on this board that are being used by another product.

**6** Enter a value for the Number of AIO Ports parameter.

This number is used in conjunction with the previous parameter to determine the total number of ports, starting with the first port, that are available for use by PPP.

- 7** Press Esc to return to the Internetworking Configuration menu; save your changes when prompted.
- 8** If you want these changes to take effect immediately, you must first configure a PPP network interface for this board as described in [Setting Up](#) in the *NetWare Link/PPP* documentation.

After configuring a network interface, you can make the changes take effect by restarting the router or selecting Reinitialize System. If you want to configure other parameters, do so now, then restart the router or reinitialize the system when you are finished.

The AIOCOMX.NLM and AIO.NLM files are used by many Novell products. If you install another product that uses the COM ports on the server running Novell Internet Access Server 4.1 routing software, check the versions of these files before and after the installation of the new product. If problems occur with the WHSMAIO ports after the installation of a new product that uses the AIOCOMX.NLM and AIO.NLM files, try using the versions of these files that are supplied with the Novell Internet Access Server 4.1 software.

## How to Configure Boards for Point-to-Point Tunneling Protocol (PPTP)

To configure a board for PPTP, complete the following steps:

- 1** Configure a WHAMAIO board as described in [“How to Configure Boards for Running PPP over Asynchronous Ports”](#) on page 24 except select AIOPTTP for the driver in [Step 4](#) on page 25.
- 2** Select the Number of AIOPTTP Ports parameter and select a value.  

This number is used in conjunction with the First AIO Port Number parameter to determine the total number of ports, starting with the first port, that are available for use by PPTP.

Valid values range from 4 to 256.
- 3** Press Esc to return to the Internetworking Configuration menu; save your changes when prompted.

- 4 If you want these changes to take effect immediately, you must first configure a PPP network interface for this board as described in [Setting Up](#) in the *NetWare Link/PPP* documentation.

After configuring a network interface, you can make the changes take effect by restarting the router or selecting Reinitialize System. If you want to configure other parameters, do so now, then restart the router or reinitialize the system when you are finished.

## Enabling or Disabling a LAN or WAN Board

To enable or disable a LAN or WAN board, complete the following steps:

- 1 Load NIASCFG, then select the following parameter path:

Select Configure NIAS > Protocols and Routing > Boards

- 2 Select the board you want to enable or disable, then press Tab.

The screen displays the board's new status (Enabled or Disabled).

**IMPORTANT:** If you disable a board that uses an AIO or CAPI driver and you reinitialize the system, then all other boards that use the same driver will also be disabled. If this happens, you must restart the server to reload all instances of the driver that were loaded for another product in AUTOEXEC.NCF (without NIASCFG). As an example, if you have two WHSMAIO boards defined for AIOCOMX ports, one loaded automatically by NIASCFG and the other loaded in AUTOEXEC.NCF, disabling the board configured in NIASCFG and reinitializing the system unloads WHSMAIO and AIOCOMX and disables both boards. The board loaded by NIASCFG can be reloaded by enabling the board in NIASCFG and reinitializing the system. However, the board loaded in AUTOEXEC.NCF will remain inoperable until you restart the server or until you enter the LOAD command at the console and reinitialize the system. To avoid this problem, use NIASCFG to load both drivers.

- 3 Press Esc to return to the Internetworking Configuration menu.

## Deleting a LAN or WAN Board

To delete a LAN or WAN board, complete the following steps:

- 1 Load NIASCFG, then select the following parameter path:

Select Configure NIAS > Protocols and Routing > Boards

- 2 Select the board you want to delete, then press Del.

A message is displayed indicating that deleting the board also deletes all existing binds to the board's interfaces.

If WAN call destinations are configured, another message is displayed asking whether you want to delete WAN call destinations that refer to this board. If you answer No, the WAN call destinations remain even though the board is deleted.

**3** When prompted, select Yes to delete the board.

The board is removed from the list of configured boards.

**4** Press Esc to return to the Internetworking Configuration menu.

# 3

## Managing

This section describes the diagnostic utilities used to manage interfaces with the Novell<sup>®</sup> Internet Access Server 4.1 software. These utilities enable you to manage, optimize, and troubleshoot the product and its connections.

### Viewing the Hardware Configuration of a LAN or WAN Interface

To find out the hardware configuration information for a LAN or WAN interface, load MONITOR and follow this path:

Select LAN/WAN Information > interface you want to view

When you examine the displayed window, you will see all of the available information about that interface including the following information:

- ◆ Interface name
- ◆ Node address
- ◆ Frame type
- ◆ Generic statistics
- ◆ Custom statistics

**NOTE:** If more than one frame type is used on an interface, MONITOR shows a separate entry for each frame type used on the same interface. You can view each entry for that interface to find out all the frame types being used.

# Viewing Binding Configuration for a LAN or WAN Interface

You can find out which network protocols are bound to an interface and which are currently operational by using one of the following methods:

- ◆ Typing **CONFIG** at the command line of the NetWare® server console.
- ◆ Loading **MONITOR** and selecting the following path:

Select LAN/WAN Information > desired interface's information

Look at the Protocols window to see the network protocols that are bound to that interface.

**NOTE:** If more than one frame type is used on an interface, **MONITOR** shows a separate entry for each frame type used on the same interface. You can view each entry for that interface to find all the protocols bound to the interface.

You can look at the state of **ATCP**, **BRIDGECP**, **IPCP**, and **IPXCP**. Protocols with the value of 9 (Opened) or 2 (Listening) are bound to this interface. Protocols currently in operation stay in the Opened state. It is possible for multiple protocols to be bound to the same interface and to operate concurrently.

- ◆ Loading **NIASCFG** and following this path:

Select Configure **NIAS** > Protocols and Routing > Bindings

Select the interface you want to view and press Enter.

## Determining Whether a LAN or PPP WAN Link Is Active

To determine whether a link is active, load **MONITOR** and follow this path:

Select LAN/WAN Information > interface you want to view

Under Generic Statistics, look at the Total Packets Sent and Total Packets Received counters. The link is active if these counters are increasing.

# 4 Troubleshooting

This section contains general troubleshooting information for interface boards.

## Troubleshooting Tips

The following list contains suggestions for solving problems with interface boards.

- ◆ Use boards that are certified by the Novell Labs™ group. Novell Labs bulletins are available at the WWW location <http://support.novell.com> and on the Novell Support Connection CD-ROM.
- ◆ If you are using IBM\* token ring boards, a shared RAM size of 16 KB is recommended.
- ◆ In most cases, the router-associated LAN and WAN boards can be installed with the Video Memory Addressing set to the factory default settings. However, the default settings for some boards might conflict with already installed VGA/EGA boards. To eliminate the conflict, reconfigure either the VGA/EGA board or the network interface board.
- ◆ If you are routing on an Ethernet board, set the maximum physical receive packet size to at least 1524 in the STARTUP.NCF file. If you are routing on a token ring board, set the value to at least 4540. These values include 10 bytes for PPP overhead.
- ◆ Before you install a LAN or WAN board, make sure that you check all the available interrupts, I/O base addresses, and memory map addresses for all boards. To avoid conflicts between board parameter settings, verify that the same values are not being used by multiple boards. For reference, the values typically used by a PC are as follows:

COM1 uses IRQ-4, port=3F8-3FF

COM2 uses IRQ-3, port=2F8-2FF

LPT1 uses IRQ-7, port=378-37F

LPT2 uses IRQ-5, port=278-27F

To determine valid settings for IRQ, I/O base, and memory locations, refer to the hardware documentation for each device. As you configure the router and WAN links, record this information on a worksheet to avoid any conflicts.

- ◆ The Novell NW2000 and Synchronous/+ boards have switches for changing only the I/O base address. The interrupt and memory are software-driven. When you use the Novell Internet Access Server Configuration utility (NIASCFG) to configure WAN boards, you can configure the I/O base address, interrupt, and memory map address. Verify that the NIASCFG I/O base settings match the jumper settings on the board.

The Synchronous/+ and NW2000 boards use a shared memory interface to the PC. Multiple Synchronous/+ boards can share the same memory address and multiple NW2000 boards can share the same memory address; however, different types of boards cannot be assigned the same address. When assigned an address below 1 MB, a Synchronous/+ board uses 64 KB of shared memory and an NW2000 board uses 16 KB of shared memory. When assigned an address above 1 MB, a Synchronous/+ board uses 512 KB of shared memory and an NW2000 board uses 256 KB of shared memory.

- ◆ When a command is issued to unload a board driver, all instances of that driver are unloaded. For example, if two Synchronous/+ boards are loaded, an UNLOAD SYNCPLUS command unloads both boards and all calls on these boards are terminated.

## Network Interface Board Self-Diagnostics

Standalone test programs (DOS or NetWare version) might be supplied by a WAN board manufacturer for component and board level self-diagnostics.

A board diagnostic utility called SD.EXE is included with the Synchronous/+ board package. This utility can be used for troubleshooting when board problems occur. For more information about the SD diagnostic utility, refer to the *Synchronous/+ Adapter Installation Guide*.



A diagnostic program called WANDIAG.EXE is also provided on the distribution diskette received with the NW2000 board. WANDIAG.EXE is run from the DOS prompt and uses five different tests to test up to two boards.

If data is not sent, run the available hardware diagnostic tests on the WAN board. Change any settings and ensure that the board passes the hardware diagnostic tests.



# A

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