IRIX Driver Installation

Addendum to
5515/5525/5575 PCI ATM Adapter
Users Guide

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ADDENDUM: IRIX Driver Installation

IRIX Driver Installation

Overview

This addendum contains the procedures for installing the PCI ATM driver for IRIX™ version 6.4. The driver provides broadcast/multicast addressing, allowing you to run legacy LAN (Ethernet®, Token Ring, and FDDI) applications and protocols over an ATM network. Multiple emulated LANs (ELANs) are supported in that a single board can join up to four different ELANs and one IP over ATM segment simultaneously.

All references to *Users Guide* in this addendum are referring you to the *5515/5525/5575 PCI ATM Adapter Users Guide*.

The Interphase software supports the following:

- Three PCI ATM adapters per system
- User-Network Interface (UNI) 3.0/3.1 signalling specification for Switched Virtual Circuits (SVCs)
- Permanent Virtual Circuits (PVCs) based on RFC-1483
- ATM Forum LAN Emulation specification version 1.0
- Up to four LECs (LAN Emulation Clients) per adapter using both SVC and PVC communications
- One IP over ATM client (based on RFC-1577) per adapter using both SVC and PVC communications
- Optional Network Services per adapter
  - One LECS (LAN Emulation Configuration Server)
  - Up to eight LESs (LAN Emulation Servers)
  - One IP over ATM ARP server
- STM-1 European mode

CAUTION

Your ATM switch must be capable of supporting the UNI 3.0/3.1 signalling standard for SVCs. Some switch vendors allow the mixing of the two standards. Some vendors require that all ports be set to either UNI 3.0 or UNI 3.1. Check your switch documentation for the proper settings. The default setting for the PCI ATM adapter is UNI 3.0.

Before You Start

If any *Read Me First* documentation is in your installation kit, review it before installing the driver. It contains any changes and updates to this addendum since the printing date. Also, check for a **readme** file in the **IRIX_64bit** directory on the installation CD-ROM. If you are not thoroughly familiar with ATM networking, read the tutorial *ATM Technology Overview* in the *Users Guide*.

If you have any questions about the installation that are not answered in this addendum or in the *Users Guide* and supporting documentation, contact Interphase Customer Support. See the assistance information at the front of this addendum.

The basic procedures for installing the driver are:

- Verify driver requirements
- Initialize the network interfaces for the clients
- Install the ATM driver
- Enable and configure the clients with CellView™
- Automate the startup and shutdown

Driver Requirements

Installing the driver requires a system with the following:

- IRIX 6.4 (64 bit kernel only) operating system
- Root password
- 1.0 MB space in **/(root)** file system
- 6.0 MB space in **/usr** file system
- CD-ROM drive
- IP address, IP name, broadcast address, and netmask for each client to be enabled

In addition, the following information must exist:

- Major device number for the **ia** hardware driver. The default setting is 60.
- Major device number for the **li** software driver. The default setting is 61.

Configuring the Network Interface

It is recommended that the IRIX network interface be configured prior to running the Interphase install script. The configuration procedures in this section are specific to the IRIX operating system and not to the Interphase driver. The instructions are generic in nature, and your particular setup may vary slightly. This addendum assumes the person installing the driver is somewhat familiar with the administration of IRIX networking.

All the clients do not have to be initialized. You only need to configure the actual clients which are going to be used on the network. Additional clients, if needed, can be configured at a

later date without reinstalling the driver. For example, if you are going to use one LEC and the IP over ATM client, only two clients need to be initialized at this time.

To configure the IRIX network interface for the clients, do the following:

1. For each client being initialized (up to four LECs and one IP over ATM client per adapter), add the <*IP name*> and <*IP address*> to the hostname database file **/etc/hosts**.

   For example, a client with an IP address of *123.234.100.055* and an associated hostname of *irix-atm* is entered in the file as follows:

   ```
   123.234.100.055 irix-atm
   ```

CAUTION

When other IP nodes reside on the host system (Ethernet for example), the IP address used for each ATM client must be a totally separate network segment. If the same segment is used, then routing and broadcast problems will occur as the network layer will assume that both devices are physically on the same segment. Also, do not assign more than one ATM client for an adapter to the same network segment.

2. Add the interfaces to the kernel by editing the file **/etc/config/netif.options.**

   Follow the directions provided in the file.

   The mappings used by the ATM driver are as follows:

   LECs:

   *IP interface = (adapter number * 4) + client number*

IP over ATM clients:

IP interface = adapter number + 32

For example,

li0 = adapter 0, LEC 0
li1 = adapter 0, LEC 1
li2 = adapter 0, LEC 2
li3 = adapter 0, LEC 3
li4 = adapter 1, LEC 0
li5 = adapter 1, LEC 1
...
li11 = adapter 2, LEC 3
li32 = adapter 0, IP over ATM client
li33 = adapter 1, IP over ATM client
li34 = adapter 2, IP over ATM client

Each client represents an individual entity which must be added to the system. For example, when editing the **/etc/config/netif.options** file, look for blank *if<number>* variables such as:

```
:if<X>name=
```

```
:if<X>addr=
```

where <*X*> is the next available interface number.

Set the variables to their network interface values, then uncomment the lines by removing the colon, as shown in the following example:

```
if1name=li0
```

```
if1addr=irix-atm
```

where *li0* is from the above list of interface names for clients, and the *irix-atm* name is mapped to an IP address in the **/etc/hosts** file, edited in step **1**.

3. Create the interface configuration file.

The system boot procedure performs an **ifconfig** on all network interfaces specified in the

/etc/config/netif.options file. This config uses command-line options contained in the file **/etc/config/ifconfig-<*X*>.options** where <***X***> is the interface number used in step **2**.

For example to create an ifconfig file for **if1**, the file name is **/etc/config/ifconfig-1.options** with the content your network requires, such as:

```
broadcast 123.234.100.0 \
   netmask 0xffffff00 up
```

4. Repeat step **1** through step **3** for each network interface to be supported by the driver.

When the network interface is complete for all the needed clients, continue with the next section.

Installing the Driver

The driver can be installed prior to installing the adapter(s). Where feasible, however, it is recommended the adapter(s) be installed first. The CD-ROM included with the adapter contains all of the files required to install the driver. With the network interface completed as explained in the previous section, install the driver as follows:

1. Log in as **root**.

   You must know the current password.

2. Check the available disk space by entering

   ```
   df -k
   ```

   There must be at least 1.0 MB of free space in the **/root** file system, and at least 6.0 MB of free space in the **/usr** partition.

3. If you are not sure which operating system is installed on your machine, enter the command,

   ```
   uname -sr
   ```

   The machine must be running IRIX version 6.4. with a 64-bit kernel.

4. Determine whether you need to change the defaults for the installation script.

   The variables are as follows:

Variable	Command	Description	Default
BINDIR	**-b** *(path)*	Directory for binaries	`/usr/sbin`
CFGDIR	**-c** *(path)*	Directory for config files	`/etc/config`
MANDIR	**-m** *(path)*	Directory for man pages	`/usr/share/catman/a_man/catl`
IAMAJ	**-i** *(num)*	Major device number for ia hardware driver	60
LIMAG	**-l** *(num)*	Major device number for li software driver	61
IUSR	**`-u usr`**	Install ‘user’	`root`
IGRP	**`-g grp`**	Install ‘group’	`sys`

You can change the defaults in either of two ways:

– Permanently change the value of a variable by editing the **inatm** installation script.

– Temporarily override the default for one or more variables by using command-line options.

For example, if you want to change the install script permanently to place the binary utility files in **/bin** instead of the default **/usr/sbin**, you have to edit the BINDIR variable in the install script to read:

```
BINDIR = /bin
```

To override the same default as a one-time substitution during the current installation, use the command-line option

```
inatm -b /bin
```

Additional options are separated with a space. For example, if a value of 80 is needed for the IAMAJ variable, in addition to the BINDIR setting above, the multiple commands would be

```
inatm -b /bin -i 80
```

5. Insert the CD-ROM in the local drive and enter,

```
cd /CDROM/IRIX_64bit
```

6. Run the installation script to install the driver.

a. Enter the command:

```
./inatm [option(s)]
```

where **[options(s)]** is the command-line options, if needed, as explained in step **4** on page 7.

b. If an existing PCI ATM driver is detected on your machine, the installation script detects it and prompts you to remove it.

Enter **yes** if this occurs.

c. You are prompted to confirm the parameters for installing the driver.

Enter **yes** at the prompt. Otherwise, enter **no** and repeat this procedure beginning with step **4** on page 7.

The installation script begins to execute and should run to completion without any interrupts. When complete, a prompt appears to reboot the machine.

7. Enter **yes** at the prompt.

Continue the installation with the procedures in the next section.

Configuring the Adapter to the Network

The Interphase CellView utility is used to enable and configure the clients to the network. See *CellView Utility* in the *Users Guide* for details on how to use the utility.

With the driver installed as described in the previous section, do the following:

1. If the adapter(s) are not installed, halt the machine and install the adapters at this time.
2. If not done in the previous step, reboot the machine.
3. Configure the adapter(s) to the network with the Interphase CellView utility by entering the command:

   `cellview`

   The main CellView dialog appears with a listing for each PCI ATM adapter installed in the machine.
4. If more than one adapter is installed in the machine, move the highlight to the adapter to be configured.
5. Select **Setup** and check the Signalling parameters.

   All settings must conform to the capabilities of your ATM switch.

6. Enable and configure the clients that were initialized in the previous sections.

   a. From the Setup dialog, select the **LEC** tab and configure the LECs.

      Clarification Note: The CellView utility denotes the four LECs on an adapter as LEC 1 – LEC 4. During installation of the driver, the four clients are denoted as LEC 0 – LEC 3 (see step **2** on page 4).

   b. From the Setup dialog select the **1577** tab, if needed, to configure the IP over ATM client and the ARP server (optional).

7. If the LECS and the LESs are to be on this machine, enable the LECS and the quantity of LESs as required.

   At initial installation, the dialogs for the servers are disabled and their tabs do not appear in the Setup or Statistics menus. To activate the dialogs,

   a. From the main CellView dialog, select **Global.**

      The Application dialog appears.

   b. Turn on Enable Advanced Settings by clicking the adjacent box or button, whichever is available in your dialog.

      The feature is enabled when a check mark appears in the box or when the button is depressed.

   c. Select **OK**.

   The tabs for the LECS and the LESs should now be visible in the Setup and Statistics routines.

8. When complete, exit the CellView utility.

Continue the installation with the procedures in the next section.

CAUTION

All configuration data for CellView is stored in the file */etc/atm/cvconf* for which an on-line man page is available. You are strongly encouraged to use the CellView utility to modify the parameters instead of editing them manually. If the parameters get out of sync, the driver may not work properly.

If for some reason the CellView utility will not run on your system, there are command-line utilities (such as *lec*, *les*, and *lecs*) which can modify the software currently running. However, these commands do not change the permanent settings in the *cvconf* file. The effects of these commands are lost when the machine is turned off or restarted. Whatever the case, do not mix the running of command-line and CellView utilities. Use one method consistently or unpredictable results may occur.

Automating Startup and Shutdown

The UNI signalling application must be started after the hardware device drivers have been loaded by the kernel. The application can be started manually after bootup, or the start procedure can be automated using the startup script provided with the installation software. You can add both startup and shutdown commands to the **/etc/init.d/network** file.

To automate the startup and shutdown, edit the **/etc/init.d/network** file as follows:

1. Set the LEC startup by adding the following script ahead of the double semicolon (;;) that terminates the case **start** statement:

```
# ATM/LEC startup
if $IS_ON atmcv && test -x /usr/sbin/cvconf; then
/usr/sbin/cvconf
fi
```

NOTE

The paths to the `lec`, `sigd_start`, and `iadump` files referred to in this section must match the paths specified during the driver installation (the `-b` command-line option). The paths to `lec`, `signald`, and `iadump`, if changed from the install script's default (`/usr/sbin/`), must be changed in the following examples, and also in the scripts: `sigd_start` and `sigd_stop`.

The **inatm** install script creates the **/etc/config/atmcv** file with the contents set to **on**. This file is used by the $IS_ON test created above. To disable the configuration of the LANE clients at boot time, change the contents of the file to **off.** This change mandates that you configure each client manually after every boot or reboot.

2. Set the **signald** startup by adding the following command lines to the end of the case **start** statement:

```
# ATM/SIGD startup
if $IS_ON atmsigd && test -x /usr/sbin/sigd_start; then
/usr/sbin/sigd_start
fi
```

The **inatm** install script creates the **/etc/config/atmsigd** file with the contents set to **on**. This file is used by the $IS_ON test created above. To disable startup of the signalling application at boot time, change the contents of the file to **off**. This change mandates that you start the **signald** application manually after every boot or reboot.

3. Shut down the system.

   Most systems do not provide a hardware reset during a reboot. If the hardware is not reset during a reboot, the board remains active, and the kernel PANICs on receipt of the first packet.

   You can provide this hardware reset by adding the following script ahead of the double semicolon (;;) that terminates the case **stop** statement:

```
# ATM/LANE shutdown
if $IS_ON atmdown && test -x /usr/sbin/iadump; then
/usr/sbin/iadump shutdown
fi
```

CAUTION

If you do not add a shutdown command and the *Kernel PANIC* occurs, the only way to bring the workstation back up is to turn the power off, and then back on again.

   The **lane** install script creates the **/etc/config/atmdown** file with the contents set to **on**. This file is used by the $IS_ON test created above. To disable this hardware reset during shutdown, change the contents of the file to **off**. This change mandates that you reset the hardware manually prior to a reboot (or requires a power cycle before booting).

4. Reboot the system.

   To activate the adapter and driver, do the following:

   a. Click the desktop manager's System Restart function, or enter

   `/etc/reboot`

b. Watch the console for messages and/or errors starting with **IASG** as the system reboots.

These messages are copied to the system log file **/var/adm/SYSLOG**, where you can access them if needed.

The installation of the driver for the PCI ATM adapter is complete.

See the next section if you wish to verify the installation.

Verifying Driver Installation

For a client to have any form of communication with a server,

- The switch must be configured correctly
- The client must be enabled and configured correctly
- Signalling must be up and running
- The adapter must be assigned a network prefix
- At least one LES must be present on the network

An application program does not have to be running in order to check these items. At bootup of the endstation, certain systems communications must take place between the client and the server (through the switch) in order for the client to log on to the network. Use the Statistics routines in the Interphase CellView utility to monitor this traffic as well as for checking a few other essential items.

If you find an item in error, or you suspect something is wrong with your setup, see *Troubleshooting* in the *Users Guide*. If you cannot resolve the problem with the information in the *Users Guide* and supporting documentation, contact Interphase Customer Support at the nearest location listed in the front of this addendum.

To perform a quick check of the operating statistics for an adapter, do the following:

1. Run the CellView utility by entering the command:

   `cellview`

   See *CellView Utility in* the *Users Guide* for detail operating instructions.

2. When the main CellView dialog appears, select an adapter in the listbox; that is, if more than one adapter is installed in the machine.

3. Select **Stats**.

   The Signalling dialog appears for the selected adapter.

   – All three graphical LEDs in the Signalling State box should be green in color

   – The three text fields in the State Detail box should read similar to:

   ILMI: **ILMI Registered**

   QSAAL: **Data transfer ready**

   Signalling: **Signalling Ready**

   – There should be some traffic numbers in the Signalling Statistics box for both Frames In and Frames Out

4. Select the **AAL5** tab.

   – All six graphical LEDs in the SONET box should be green in color

   – There should be some traffic numbers in the AAL5 Statistics box

5. If at least one LEC on the adapter is enabled, select the **LEC** tab.

   a. Select the tab for an enabled LEC.

- The LEC graphical LED should be green in color
- There should be some traffic numbers in the Tx Packets and Rx Packets fields of the display boxes

b. Repeat the above step for all enabled LECs.

6. If the IP over ATM client is enabled, select the **1577** tab.

- The **1577** graphical LED should be green in color
- There should be some traffic numbers in the **1577** Statistics fields

7. If more than one adapter is installed in the machine, repeat step **2** through step **6** for each additional adapter.

When complete, exit the CellView utility.

Setting the European STM-1 mode

To configure the adapter for European STM-1 mode edit the file **/var/sysgen/master.d/li** as follows:

1. Locate the line

```
int ia_stm = 0;
```

2. Set the *ia_stm* variable to 1 instead of zero:

```
int ia_stm = 1;
```

3. Run the command,

```
/etc/autoconfig
```

4. Reboot the system.

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