SCO Driver Installation

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

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SCO OpenServer Driver Installation

Overview

This addendum explains how to install the PCI ATM driver in an endstation running SCO® OpenServer™ version 5.0 or later. 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:

- Eight 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

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 **SCO** 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
- Install the ATM driver
- Initialize the network interfaces for the clients
- Enable and configure the clients with CellView™

Driver Requirements

The endstation must meet the following minimum requirements:

- Intel® x86 or Pentium® system with PCI bus
- SCO OpenServer version 5.0
- Patches and upgrades
  - Release Supplement rs500d
  - Networking Supplement net100
  - ahs5.2.0
  - oss437A if SMP installed
- System memory:
  - 16 MB minimum
  - 24 MB minimum with multiple clients and LAN services enabled
- CD-ROM drive
- A hard disk with free space consisting of
  - 5MB in the **/root** partition
  - 1MB in the **/usr** partition
- Superuser login
- The appropriate IP address, broadcast address, netmask, and **ifconfig** options for each client being initialized

Installing the Driver

The CD-ROM included with the adapter contains all of the files required to install 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.

CAUTION

Before installing the driver, make sure the patches and upgrades are installed in the host machine. These must be installed in the order: *rs500d*, *net100*, and *ahs520*. If the machine is running SMP (Symmetric Multiprocessing), make sure the patch *oss437a* is installed. This is an MP lock time-out/ STREAMS patch. These can be downloaded from SCO's FTP site.

To install the driver for SCO OpenServer, do the following:

1. Log in as **root**.
2. Switch the system to single-user mode by entering:

   ```
   init S
   ```

3. Double click the Software Manager.

   All installed packages are displayed in the Software Manager dialog.

NOTE

If you are running the CCS (Custom Configuration Script) and receive a *cannot open* error or a *not found* error for the file SX00337.C00, ignore the error and continue the custom installation to get the driver into the kernel.

4. If an earlier version of the driver exists on the machine, such as **Interphase 5515/5525/5515X PCI ATM Software**, remove it as follows:

a. From the Software menu, select **Remove Software.**

b. Select the package to be removed and select **OK**.

The de-installation may take a few minutes.

c. Reboot the machine

d. Log in as **root,** switch to single-user mode, and come back to the Software Manager.

5. Copy and run the media image as follows:

a. Insert the installation CD-ROM.

b. Mount the CD-ROM with the command,

`mount -r /dev/cd0 <mount_point>`

where <*mount_point*> is the mounting point for your CD-ROM.

c. From the **SCO** directory on the CD-ROM, copy the media image **VOL.000.000** to a temporary directory on your hard disk, such as **/tmp/iphase**.

d. From the Software menu, select **Install New**.

The Select Media dialog appears.

e. Select **Media Images** and enter the full path to the temporary directory.

f. Select **OK**.

The installation may take several minutes to complete and includes several prompts.

6. Enter number of adapters to configure.

A maximum of eight (8) PCI ATM adapters are allowed per endstation. Press Enter to accept the default of one (1) adapter, or enter the number of adapters (**1 – 8**) installed (or to be installed) in the machine.

7. Enter number of LECs for Adapter<*x*>

A maximum of four (4) LECs are allowed per adapter. An option to enter a zero (0) is provided in case you **do not** want any LECs on the adapter and intend to initialize an IP over ATM client in a later step. Press **Enter** to accept the default of one (1) client, or enter the actual quantity **(0 – 4)**.

8. If the entry in the previous step is for one or more LECs, you are prompted for the **ifconfig** information.

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.

a. Enter hostname for interface **li**<n>.

This is the hostname (**sco-atm**<*n*> for example) for the IP interface **li**<*n*>, where <*n*> ranges from 0 – 31 and represents the IP interface number of the LEC. Clients are mapped to the IP interface with the formula:

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

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
...
li31 = adapter 7, LEC 3

b. Enter the IP address for interface **li**<*n*>.

For example, a network address of 123.234.xxx.yyy, where xxx is the segment number and yyy is the station number could be of form **123.234.100.010**.

c. Enter the netmask for interface **li**<*n*>.

The default for this entry is **255.255.255.0**

d. Enter the broadcast address for interface **li**<n>.

The default is built from the IP address entered in substep **b** above.

For example **123.234.100.255**.

e. The prompts continue to loop through step **8**, incrementing the <n> variable for each client until all LECs are configured.

9. Enter number of IP over ATM clients for Adapter<*x*>.

You can initialize only one IP over ATM client per adapter. Press **Enter** (default = 0) to disable the client, or enter **1** (one) to initialize the client.

10. If the IP over ATM client is initialized in the previous step, you are prompted for the **ifconfig** information.

a. Enter hostname for interface **li**<n>.

The variable <*n*> for IP over ATM clients is the adapter number + 32. For example, the IP interface number for the IP over ATM client on Adapter 0 is 32, Adapter 1 is 33, and so forth.

The next three prompts concern the remaining **ifconfig** information for the IP over ATM client. If needed, see step **8** for details.

b. Enter the IP address for interface **li**<*n*>.

c. Enter the netmask for interface **li**<*n*>.

d. Enter the broadcast address for interface **li**<n>.

11. If multiple adapters are being installed, the prompts in step **7** through step **10** are repeated for each adapter.

12. Remove the CD-ROM when installation is complete.

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. Use the command:

```
shutdown -y -i0 -g0
```

See *Hardware Installation* in the *Users Guide* for instructions.

2. If not done in the previous step, reboot the machine by entering:

```
shutdown -y -i6 -g0
```

3. Configure the adapter(s) to the network with the Interphase CellView utility by adding **/bin** to your path, then 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 section.

   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 **8** on page 6).

   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 and reboot the machine with the command:

```
shutdown -y -i6 -g0
```

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

If you wish to verify the installation, see *Verifying Driver Installation* on page 13.

CAUTION

All configuration data 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.

Adding Clients after Driver is Installed

There are two ways to add clients after the driver is installed. One is to completely remove and reinstall the driver as presented in *Installing the Driver* on page 3. The other is to edit two system files and add the network interface for each additional client. The latter procedure is discussed in this section. You may need to review both techniques to determine which is the most efficient for your situation.

To create a new LEC or a new IP over ATM client by editing the system files, do the following:

1. Assign an IP address to the additional client.
   a. Open the file **/etc/atm/ifconfig_atm** for edit.
   b. Look for a line or lines with the following format in the file which contain the **li** interface information for existing clients.

   li:*(IP_interface)*:*(IP_address)*:*(mask)*: \
   (broadcast):**-trailers:1516**

   For example, the lines configuring LEC0 and LEC1 on Adapter 0 with network addresses **123.234.100.106** and **123.234.101.078** respectively, would be similar to

```
li:0:123.234.100.106:255.255.255.0:123.234.100.255:-trailers:1516
li:1:123.234.101.078:255.255.255.0:123.234.101.255:-trailers:1516
```

c. Add a line of exact format to the file for each new client you wish to initialize.

If you need help in determining the *IP-Interface* number for an additional LEC, see step **8** on page 6. For the numbering of IP over ATM clients, see step **10** on page 7.

d. Save the edits and exit the file when lines for all additional clients are complete.

2. Open the file **/etc/atm/strcf_atm** for edit.

a. Look for a **configure** function similar to the following.

```
configure {
   cenetb $1 /dev/li li 0
   cenetb $1 /dev/li li 1
}
```

b. Add a line for each client where the rightmost number in the line represents the *IP_Interface* number for the client.

c. Save the edits and exit the file when the **configure** function contains lines for all additional clients.

3. Reboot the machine by entering:

```
shutdown -y -i6 -g0
```

4. Configure the additional clients to the network with the Interphase CellView utility by entering the command:

```
cellview
```

See *CellView Utility in* the *Users Guide* for instructions to enable and configure the LECs and the IP over ATM clients to the network.

5. When complete, exit the CellView utility and reboot the machine.

The installation of additional clients 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. If signalling is up and running,

   – 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.

   If the adapter is communicating properly,

   – 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.

      If the LEC is communicating properly,

– 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.

If the client is communicating properly,

– 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.

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