TruePort for Solaris User Guide

This document provides the procedure for installing and using TruePort on Solaris Sparc and Intel.

What is TruePort?

You use Trueport when you want to connect extra terminals to a server using a Device Server rather than a multi-port serial card; it is a tty device redirector. TruePort is especially useful when you want to improve data security, as you can create an SSL/TLS connection between the TruePort host port and the Device Server, which will encrypt the data between the two points.

TruePort Full Mode vs Lite Mode

You can configure TruePort on Solaris in either Full Mode or Lite Mode. When you start TruePort in Full Mode, the serial configuration parameters are set on the TruePort host. When you start TruePort in Lite Mode, the serial configuration parameters are set on the device/terminal server. On Solaris, serial configuration parameters consist of bits per second (baud rate speed), data bits, parity, stop bits, flow control, and any other standard stty I/O parameters. In either mode, the data is passed in raw format, although you can enable the SSL/TLS connection option to encrypt the data going through a port.

Full Mode

This mode allows complete device control and operates exactly like a directly connected serial port. It provides a complete tty device interface between the attached serial device and the network, providing hardware and software flow control.

The port serial configuration parameters set on the TruePort host must match the serial configuration parameters set on the device (in this example, to the Card Reader), as shown below:
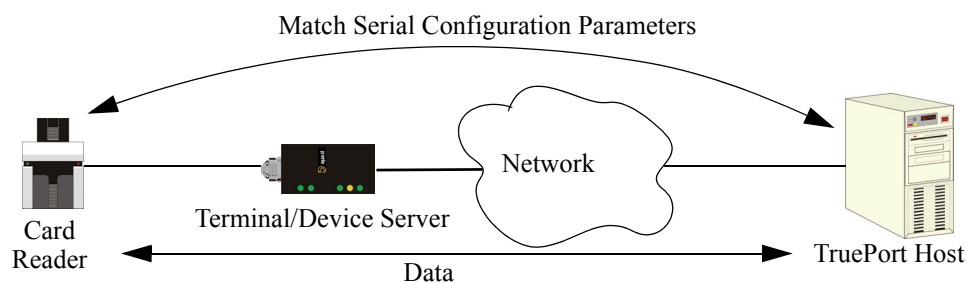
Lite Mode

This mode provides a simple raw data interface between the device and the network. Although the port will still operate as a tty device, control signals are ignored. In this mode, the serial communications parameters are configured on the terminal/device server and must match those configured on the device (in this example, a Card Reader), as shown below:
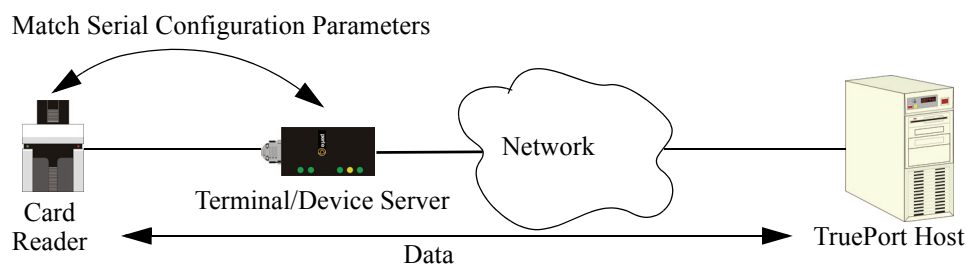
TruePort I/O Access Options

Modbus ASCII/RTU Mode

If you have a Modbus serial application running on a PC that is connected to a network, you can use TruePort as a virtual serial connection to communicate with the Device Server over the network to access I/O data. You also have the option of enabling SSL as a security option to encrypt the data that is communicated between the Device Server and the host machine (SSL/TLS must be configured on both the Device Server and in TruePort).
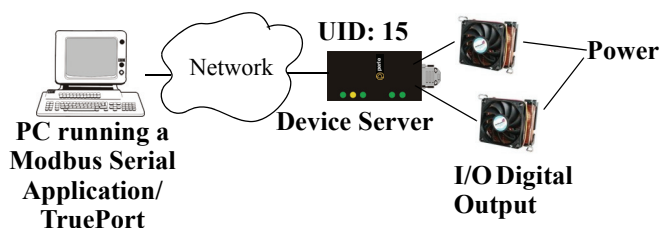
I/O Signal Mode

If you have a custom application that talks to a serial port, you can use TruePort as a virtual serial port to communicate with the Device Server over the network to access I/O data. You also have the option of enabling SSL as a security option to encrypt the data that is communicated between the Device Server and the host machine (SSL/TLS must be configured on both the Device Server and in TruePort).
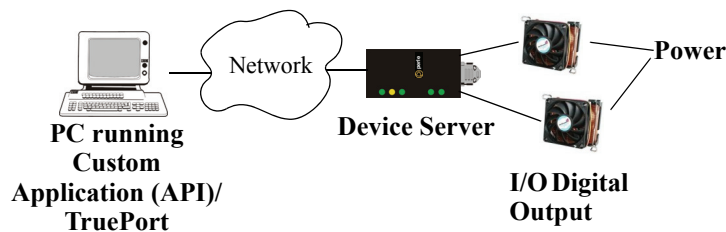
Uninstalling TruePort

If you have an existing version of TruePort on your Solaris system, you should uninstall it by doing the following:

1. Log in to the UNIX server as **root** user. The UNIX prompt for login is now displayed.

2. At the UNIX prompt, type **pkgrm trueport**.

You can now install the new version of TruePort.

Installing TruePort

To install TruePort (this installs both Full and Lite mode) under Solaris, do the following:

1. Log in to the UNIX server as root user and change the directory to the **/tmp** directory.

2. At the UNIX prompt, copy the supplied TruePort package file **tpsol-<version>.<arch>.pkg.Z** (where *<arch>* is **sparc** or **i386**, depending on your platform) onto your system into the **/tmp** directory.

3. At the prompt, type **uncompress tpsol-<version>.<arch>.pkg.Z**. This will uncompress the file and rename it to **tpsol-<version>.<arch>.pkg**.

4. At the UNIX prompt, type **pkgadd -d /tmp/tpsol-<version>.<arch>.pkg** (where *<arch>* is **sparc** or **i386**, depending on your platform).

The installation now creates the TruePort home directory and installs TruePort and the TruePort Administration Tools (for easy editing of the **config.tp** file) in the **/etc/trueport** directory.

Configuring TruePort on a Terminal/Device Server

When you add a port, you need to configure the port(s) on the host running TruePort and you also need to configure the port(s) on the terminal server.

> Only IOLAN DS Family software version 3.0 or higher supports the **TruePort Line Service**.

Server-Initiated Mode

When you configure TruePort for server-initiated mode, the terminal/device server will initiate communication to the TruePort host.

To configure a terminal/device server for server-initiated mode (which is the default mode), you need to set the **Line Service** to **Silent Raw** or **TruePort** and assign the port number to be the same port number configured on the TruePort host (by default, this number starts at 10000).

> **Note:** All versions of the JetStream 4000 and 8500, LanStream 2000, and IOLAN DS Family software support TruePort Full Mode operation. However, the JetStream 6x series software version must be 4.03 or greater.

On a JetStream\LanStream

The following instructions provide an example of how to set up four ports on the JetStream terminal server for TruePort.

1. Connect to the JetStream (for example, via Telnet).

2. Log in to the JetStream as the **admin** user.

3. Add the host running TruePort to the host table using the add host command as shown in the following example:

```
add host solaris50 192.152.247.61
```

You are now ready to configure the ports that will connect to the TruePort host.

4. To configure the ports, enter each of the following commands:

```
set line 1 service silent raw solaris50 10000
kill line 1
set line 2 service silent raw solaris50 10001
kill line 2
set line 3 service silent raw solaris50 10002
kill line 3
set line 4 service silent raw solaris50 10003
kill line 4
```

5. At the command prompt, type **save** and press **Enter**.

6. At the command prompt, type **logout** and press **Enter**.

The configuration of JetStream terminal server ports is now complete.

On an IOLAN DS Family Device Server

Configuring an IOLAN DS Family Device Server using the CLI is almost same as the JetStream CLI. You will set the **Line Service** to **TruePort** and on 1-port model you won't specify a line number.

Client-Initiated Mode

Client-Initiated mode is available on IOLAN DS Family models with firmware 3.0 or higher.

When you configure TruePort for Client-Initiated mode, the TruePort host will initiate communication with the Device Server.

To configure a Device Server for Client-Initiated mode, you need to set the **Line Service** to **TruePort**, enable the **Client Initiated** option, and assign the port number to be the same port number configured on the client initiated configured TruePort host (by default, this number starts at 10001).

The following instructions provide an example of how to set up 4 ports on a IOLAN Device Server for TruePort client initiated mode.

1. Connect to the IOLAN DS (for example, via Telnet).

2. Log in to the IOLAN DS as the **admin** user.

3. To configure the ports, enter each of the following commands:

```
set line service trueport client-initiated on 10001
set line service trueport client-initiated on 10002
set line service trueport client-initiated on 10003
set line service trueport client-initiated on 10004
kill line 1-4
```

The configuration of the IOLAN DS is now complete.

Client I/O Access Mode

Client I/O access mode allows a Modbus RTU/ASCII serial application running on a TruePort host to access Device Server I/O. You can also access Device Server I/O using the Perle API in this mode. To configure a terminal/device server for Client I/O Access mode, you need to enable **I/O TruePort Services**, enable **I/O Modbus Slave**, assign a Modbus slave UID to match the configured UID on the Modbus RTU serial application, and assign the port number to be the same port number configured on the client I/O Access configured TruePort host (by default, this number is 33816).

On a IOLAN DS Family

The following instructions provide an example of how to set up an IOLAN device server for TruePort I/O Access.

1. Connect to the IOLAN DS (for example, via Telnet).

2. Log in to the IOLAN DS as the admin user.

3. To enable the I/O TruePort service, enter following command:

```
set io trueport mode on listen 33816
```

4. 3. To enable I/O Modbus slave, enter following command:

```
set io modbus mode on uid 1
```

5. Reboot the IOLAN DS by entering the following command:

```
reboot
```

The configuration of the IOLAN DS is now complete.

Configuring Ports on the TruePort Host

After you have configured the ports on the terminal/device server, you need to configure corresponding ports on the TruePort host. TruePort administrative files and utilities are installed in the **/etc/trueport** directory.

TruePort Device Names

The TruePort installation installs 64 minor node devices (ports), however you must enable these devices (ports) before they can be used.

Each installed tty is assigned a name by the operating system, this will be in the range 0-63 if you have no previous multi-port serial installation. You may link these names to your own tty names if you require. When run in Client-Initiated or Full Mode, the device nodes used are **/dev/term/0** - **/dev/term/63** and **/dev/cua/0** - **/dev/cua/63**.

When run in Server-Initiated Lite Mode, TruePort uses the built in pseudo-terminal drivers in Solaris. The Server-Initiated and Lite Mode ports are **/dev/term/X0** - **/dev/term/X63**.

When run as an auxiliary printer, TruePort ports are **/dev/term/X*n*p**.

Configuration Methods

After you have configured the ports on the terminal/device server, you have to configure the same port numbers on the TruePort host. The TruePort Host can be configured in the following ways:

1. Use the **addports** script, which will automatically start each port as it is configured. See *TruePort addports Script Options* on page 8 for more information.

2. Use the **addports** script to create the total range of TTY ports you required and then use **tpadm** administration tool. See *Using the Admintool Utility* on page 24 to remove/add ports to the **config.tp** file using **tpadm**.

3. Use the **addports** script to create the total range of TTY ports and then edit the **/etc/trueport/config.tp** file (see *config.tp File Syntax* on page 13), the **/etc/trueport/sslcfg.tp** file (see *sslcfg.tp File Format* on page 20), and the **/etc/trueport/pktfwdcfg.tp** file (see *pktfwdcfg.tp File Format* on page 17).

Once the software is installed and configured you can add login sessions using the Solaris Admintool utility (*Using the Admintool Utility* on page 24), Solaris Management Console, or the **tplogin** utility (*Using the tplogin Script* on page 22).

TruePort addports Script Options

The **addports** script allows you to add a range of ports to the **config.tp** file and automatically start them, without having to use the **tpadm** utility. You can run **addports** after the TruePort host software is installed. The addports options are as follows:

> The order of the **addports** parameters must be as shown below.

For Server Mode:

```
addports [-l] [-hup] [-ssl] [-pf] [-server <host>] [-trace <level>] <firstport>
 <lastport>
```

For Client Initiated Mode:

```
addports [-l] [-hup] [-ssl] [-pf]  -client <host>[:<TCP-port>] [-nodisc]
[-retrytime <time>] [-retrynum <number>] [-io mb_ascii|mb_rtu|io_api]
[-trace <level>] <firstport> <lastport>
```

Parameter	Description
-l	(lower case L) Specifies that the TruePort port will be started in Lite mode. **addports** will configure TruePort for Full mode by default.
-hup	Causes the tty device to automatically close or hang-up when the TCP connection is closed.
-ssl	Enables SSL/TLS on the port. You will automatically be prompted by the SSL/TLS configuration script. For more information see *Configuring SSL/TLS* on page 18.
-pf	Enables packet forwarding on the port. You will automatically be prompted by the packet forwarding configuration script. For more information see *Configuring Packet Forwarding* on page 15.
-server *<host>*	You can optionally supply the remote host name or IP address that a connection request will be accepted from. The default is to accept connections from any host. The host can be an IPv4 address or a resolvable host name.
-client *<host>*[:*<TCP-port>*]	Specifies a client-initiated connection (meaning that the TruePort host will initiate the connection). You can optionally supply the starting destination TCP port for the connection (the default is 10001, see *<firstport>* option below). The host can be an IPv4 address or a resolvable host name.
-nodisc	Does not drop the TCP connection for a client-initiated connection when the application closes the slave TTY port.
-retrytime *<time>*	Specifies the number of seconds between TCP connection retries after a client-initiated connection failure. Valid values are 1-255. The default is 1 second.
-retrynum *<number>*	Specifies the number of retry attempts for a client-initiated connection. Valid values are 0-255. If this option is set to 0 (zero), TruePort will not try to recover a TCP connection. The default is 5 retries.

Parameter	Description
-io mb_ascii **-io mb_rtu** **-io io_api**	Enables client I/O access for this client-initiated session for one of the following: ● A serial Modbus application configured for either the ASCII or RTU protocol will be using this port. ● A custom serial application using the Perle I/O Access API will be using this port. If you did not specify the *:TCP-port* option with **-client**, the **-io** option will make the destination TCP port default to 33816 (the default value of the TruePort client in the Device Server).
-trace *<level>*	The trace level for debugging purposes. The default is 1. The trace file for each port can be found under **/etc/trueport/trace.** *<tty-name>*, where *<tty-name>* is either tpm*n* or X*n*, where *n* the TTY port number.
<firstport>	The first TTY to add starting at 0 (added as port 10001 for a client-initiated (TruePort) connection or port 10000 for a server (terminal/device server) initiated connection).
<lastport>	The last TTY to add.

Examples

Adding Server Mode Ports

The following **addports** command will create 4 ports configured for Server mode which will listen for connections from host **myjetstream** on TCP ports 10000 to 10003, while running in TruePort Full mode.

```
addports -server myjetstream 0 3
```

Adding Client Initiated Ports

The following **addports** command will create 4 ports configured for Client Initiated mode which will connect to host **myiolansds4** on TCP ports 10001 to 10004, while running in TruePort Lite mode.

```
addports -l -client myiolansds4 0 3
```

Adding Client I/O Access Ports

The following **addports** command will create a single port configured for Client I/O Access mode which will connect to host **myiolaniods1** on TCP port 33816 and will support a serial Modbus RTU application.

```
addports -client myiolaniods1 -io mb_rtu 0 0
```

TruePort Administration Tool (tpadm) Commands

This section describes the commands and syntax for the TruePort Administration tool.

Syntax

Description   You can use the `tpadm` utility to add, list, start, and delete ports.

Syntax
```
tpadm -a <new_portnumber> [-m|-n]
 [-e|-F|-e -F [-c [<existing_host>:]<existing_portnumber>
 [-C <host> [-r <seconds>] [-R <retries>] [-o]
   [-I mb_ascii|mb_rtu|io_api]]
 [-S <host>] [-T <level>] [-h] -p <ttyname> [-k <seconds>]
 [-t <termtype>]

tpadm -l <portnumber>|<host>:|<host>:<TCP_number>|ALL

tpadm -s <portnumber>|<host>:|<host>:<TCP_number>|ALL

tpadm -d <portnumber>|<host>:|<host>:<TCP_number>
```

Options   **-a** `<new_portnumber>`

The TCP/IP port number configured for the port on the remote device or terminal server. We recommend that you use the range 10000+.

-m

Adds a terminal in TruePort Full Mode (not Lite Mode) for full device control. This is the default.

-n

Adds a terminal in TruePort Lite Mode (not Full Mode) for terminal/device server device control.

-e

Enables SSL/TLS for the port. You will automatically be prompted for the SSL/TLS configuration information when you use this command line option. See *Configuring SSL/TLS* on page 18 for more information.

-F

Enables packet forwarding for this port. You will automatically be prompted for the Packet Forwarding configuration information when you use this command line option. See *Configuring Packet Forwarding* on page 15 for more information.

-c [`<existing_host>`**:]**`<existing_portnumber>`

Copies the specified SSL/TLS and/or packet forwarding configuration data from the specified entry to the new port entry being created

-C `<host>`

Enables a client-initiated connection (by the TruePort host) for this session and will connect to the specified host and port number.

-r `<seconds>`

Sets the number of seconds between TCP connection retries. The default is 1 second.

-R `<retries>`

Sets the number of retry attempts for TCP connection retries. The default is 5 retries.

-o

Keeps the client-initiated TCP connection open even when the application closes the slave TTY port.

-I mb_ascii|mb_rtu|io_app

Enables client I/O access for this client-initiated session.

-S <*host*>

Specifies the remote host name or IP address that a connection request will be accepted from in Server mode. The default is to accept connections from any host.

-T <*level*>

Sets the trace level for debugging. The default is 1.

-h

Causes the tty device to automatically be closed when the TCP connection is closed.

-p <*ttyname*>

The tty name for the port. Use X*n* for Server-Initiated Lite Mode ports and use m*n* for Client-Initiated or Full Mode ports, where *n* is the port number.

-k <*seconds*>

The time, in seconds, to wait on an idle connection before sending a keep-alive message.

-t <*termtype*>

A terminal type listed in the file **printcap.tp**. This option turns on auxiliary printing; you must specify the type of terminal that is connected to the printer. This option cannot be used in conjunction with the I/O Access option (-I).

-l <*portnumber*>**|**<*host*>**:|**<*host*>**:**<*TCP_number*>**|ALL**

Displays specific or all port entries in the **config.tp** file.

-d <*portnumber*>**|**<*host*>**:|**<*host*>**:**<*TCP_number*>

Deletes the specified port entry from the **config.tp** file.

-s <*portnumber*>**|**<*host*>**:|**<*host*>**:**<*TCP_number*>**|ALL**

Starts specific or all port entries in the **config.tp** file.

Examples

Adding a Port

To add a Server-Initiate port in Lite Mode with SSL/TLS enabled, use the following command:

```
tpadm -a 10000 -n -e -p X0
```

To add a Client Initiated port to connect to host **myiolansds4** on remote port 10001 with packet forwarding enabled, use the following command:

```
tpadm -a 10001 -F -p m2 -C myiolansds4
```

To add a I/O Access port to connect to host **myiolaniods1** on port 33816 to us a serial Modbus RTU application with a keep alive time of 3 minutes, use the following command:

```
tpadm -a 33816 -p m3 -C myiolaniods1 -I mb_rtu - k 180
```

Deleting a Port

To delete port 10000, use the following command:

```
tpadm -d 10000
```

To delete port 10001 on host **myiolands** use the following command:

```
tpadm -d  myiolands:10000
```

> The <*host*>:<*port*> combination you use must exist in the **config.tp** configuration file.
>
> When you remove a terminal using this command, it does not stop the software running, it just deletes the entry for this terminal in the **config.tp** configuration file. You must then kill the TruePort daemon process.

Displaying Port Entries

To displays the ports configured in the config.tp file, use the following command:

```
tpadm -l all
```

To display all the ports for a specific host in the config.tp file, use the following command:

```
tpadm -l myiolands:
```

To display a specific port for a specific host in the configuration file, use the following command:

```
tpadm -l myiolands:10002
```

Starting the TruePort Daemon

To start port number 10000, use the following command:

```
tpadm -s 10000
```

To start all configured ports, use the following command:

```
tpadm -s ALL
```

To start port number 10001 on host 172.16.45.8, use the following command:

```
tpadm -s  172.16.45.8:10001
```

To start all configured port on host **myjetstream**, use the following command:

```
tpadm -s myjetstream:
```

config.tp File Syntax

> If you use **addports** to enable TruePort you do not need to use the **tpadm** utility.

An entry in the **config.tp** configuration file used to control a terminal in server Full Mode with all the options enabled looks like this:

```
tpd -trueport -ssl -pf -hup -tty /dev/tpm0 -port 10000 -server myjetstream
    -ka 30 -trace 4 -aux /dev/term/X0p -term vt100
```

An entry in the **config.tp** configuration file used to control a terminal/device server in Full Mode via Client Initiated mode and all options enabled looks like this:

```
tpd -trueport -ssl -pf -hup -tty /dev/tpm0 -port 10001 -client myiolansds4
    -ka 30 -trace 4 -aux /dev/term/X0p -term wy60
```

The **config.tp** port parameter options are:

-trueport	Enables TruePort Full Mode (not TruePort Lite) for full device control.
-ssl	Enables SSL/TLS on the port.
-hup	Causes the tty device to automatically close or hang up when the TCP connection is closed. This option is not supported in Server-Initiated Lite Mode.
-tty *<ttyname>*	*<ttyname>* is the tty name for the port. This must be the complete path name. Use /**dev/term/X***n* for Server-Initiated Lite Mode ports or use **/dev/tpm/***n* for Client-Initiated or Full Mode ports, where *n* is the port number.
-port *<port_number>*	For a server-initiated connection (terminal/device server), the TCP port number the TruePort daemon will listen on for connection requests. For a client-initiated connection (TruePort host), the Device Server TCP port number (**DS Port**) the TruePort daemon will attempt to connect to. We recommend that you use the range 10000+.
-ka *<seconds>*	*<seconds>* is the number of seconds to wait on an idle connection before sending a keep-alive message.
-trace **<1-4>**	<1-4> is the trace level for debugging purposes, the default is **1**.
-aux *<auxdevname>*	Sets the auxiliary printer device name.
-term *<type>*	Sets the terminal type of terminal that the auxiliary printer is attached to.
-client *<host>*	Indicates a client-initiated connection. The *<host>* can be an IPv4 address or a resolvable host name.
-retrytime *<seconds>*	For client-initiated connections, the number of seconds between TCP connection retries. The default is 1 second.
-retrynum *<number>*	For client-initiated connections, the number of retry attempts for a TCP connection. The default is 5 retries.
-nodisc	For client-initiated connections, does not close the TCP connection when the application closes the slave TTY port.
-io mb_ascii| mb_rtu| io_api	For client-initiated connections, enables I/O access for the session. • A serial Modbus application configured for either the ASCII or RTU protocol will be using this port. • A custom serial application using the Perle I/O Access API will be using this port. If you did not specify the **:TCP-port** option with **-client**, the **-io** option will make the destination TCP port default to 33816 (the default listen TCP port number of the I/O TruePort services in the IOLAN Device Server).

-server *\<host>*	Specifies the remote host name or IP address that a connection request will be accepted from in Server mode. The default is to accept connections from any host. The *\<host>* can be an IPv4 address or a resolvable host name.
-nagleoff	For client-initiated connections, turn off the TCP Nagle Algorithm, which inserts a short delay so that each character is not sent individually, but sent in small packets instead. The default is On.

Managing Ports on the TruePort Host

Starting TruePort

A TruePort daemon needs to be run for each port configured. There are three ways to start TruePort daemons:

- Use the **addports** script, which will automatically starts each port as it is configured.

- Run a the startup script called **s79tpadm**, which can be found in the **/etc/rc2.d** directory. The **s79tpadm** script will automatically start all configured TruePort daemons every time the host boots up.

- Enter the **tpadm -s** command to start specific individual ports or all the ports at one time; see for the command syntax.

As a Transparent Printer

The **addports** script does not support adding a transparent print port so, so you must manually edit the **config.tp** file.

In Full Mode

1. An example of a Server-Initiated Full Mode port entry is:

```
tpd -trueport -tty /dev/tpm0 -port 10000 -ka 30
```

2. To configure that entry as a transparent print port (aux port), you need to add:

```
tpd -trueport -tty /dev/tpm0 -port 10000 -ka 30 -aux /dev/term/X0p
    -term vt100
```

where the transparent printer port is called **/dev/term/X0p** and the term type is **vt100** (this is required).

In Lite Mode

1. An example of a Server-Initiated Lite Mode port entry is:

```
tpd -tty /dev/term/X0 -port 10000 -ka 30
```

2. To configure that entry as a transparent print port (aux port), you need to add:

```
tpd -tty /dev/term/X0 -port 10000 -ka 30 -aux /dev/term/X0p -term vt100
```

where the transparent printer port is called **/dev/term/X0p** and the term type is **vt100** (this is required).

Deleting a Single Port

To delete serial ports, do the following:

1. In the **/etc/trueport** directory, use an editor to delete the port entry in the **config.tp** file or type the following command:

   tpadm -d <*portnumber*>|<*host*>:|<*host*>:<*portnumber*>

2. You must then kill the TruePort daemon process.

3. If you had configured a login for this port, you should remove it using the Solaris command **pmadm -r** (see system man pages for more information) or use the supplied **tplogin -r** command (see *Using the tplogin Script* on page 22 for more information).

Deleting All Ports

There is a script you can run called **cleanports** that will kill all the TruePort daemon processes and delete all entries in the **config.tp**, **sslcfg.tp**, and **pktfwdcfg.tp** files, with the exception of any lines that have been commented out.

Configuring Packet Forwarding

The Packet Forwarding feature allows you to control how the data written by a Solaris application to the slave TTY port is packetized before forwarding the packet onto the LAN network.

Configuration Script

When you specify the packet forwarding option, a configuration script is automatically launched as follows:

```
Enable Packet Definition (y/n): y
Packet Size [0] ( 1 - 1024):
Idle Time ([0] - 65535):
Force Transmit Time ([0] - 65535):
Enable End Trigger1 (y/n): y
End Trigger1 Character ([0] - ff):
Enable End Trigger2 (y/n):
End Trigger2 Character ([0] - ff):
Enter the Forwarding Rule ([trigger], trigger+1, trigger+2, strip-trigger):


Enable Packet Definition (y/n): n
Enable Frame Definition (y/n): y
SOF1 Character ([0] - ff):
Enable SOF2 (y/n):
SOF2 Character ([0] - ff):
Transmit SOF Character(s) ([on]/off):
EOF1 Character ([0] - ff):
Enable EOF2 (y/n):
EOF2 Character ([0] - ff):
Enter the Forwarding Rule ([trigger], trigger+1, trigger+2, strip-trigger):
```

The following table describes the options:

Packet Definition	This section allows you to set a variety of packet definition options. The first criteria that is met causes the packet to be transmitted. For example, if you set a **Force Transmit Timer** of **1000** ms and a **Packet Size** of **100** bytes, whichever criteria is met first is what will cause the packet to be transmitted.

Packet Size
The number of byte that must be written by the application before the packet is transmitted to the network. A value of zero (0) ignores this parameter. Valid values are 0-1024 bytes. The default is 0.

Idle Time
The amount of time, in milliseconds, that must elapse between characters before the packet is transmitted to the network. A value of zero (0) ignores this parameter. Valid values are 0-65535 ms. The default is 0.

Force Transmit Timer
When the specified amount of time, in milliseconds, elapses after the first character is written by the application, the packet is transmitted. A value of zero (0) ignores this parameter. Valid values are 0-65535 ms. The default is 0.

End Trigger1 Character
When enabled, specifies the character that when written by the application will define when the packet is ready for transmission. The actual transmission of the packet is based on the Trigger Forwarding Rule. Valid values are in hex 0-FF. The default is 0.

End Trigger2 Character
When enabled, creates a sequence of characters that must be written by the application to specify when the packet is ready for transmission (if the End Trigger1 character is not immediately followed by the End Trigger2 character, TruePort waits for another End Trigger1 character to start the End Trigger1/End Trigger2 character sequence). The actual transmission of the packet is based on the Trigger Forwarding Rule. Valid values are in hex 0-FF. The default is 0.

Frame Definition
This section allows you to control the frame that is transmitted by defining the start and end of frame character(s). If the internal buffer (1024 bytes) is full before the EOF character(s) are received, the packet will be transmitted and the EOF character(s) search will continue. The default frame definition is SOF=00 and EOF=00.

SOF1 Character
When enabled, the Start of Frame character defines the first character of the frame, any character(s) received before the Start of Frame character is ignored. Valid values are in hex 0-FF. The default is 0.

SOF2 Character
When enabled, creates a sequence of characters that must be received to create the start of the frame (if the SOF1 character is not immediately followed by the SOF2 character, TruePort waits for another SOF1 character to start the SOF1/SOF2 character sequence). Valid values are in hex 0-FF. The default is 0.

Transmit SOF Character(s)
When enabled, the SOF1 or SOF1/SOF2 characters will be transmitted with the frame. If not enabled, the SOF1 or SOF1/SOF2 characters will be stripped from the transmission.

EOF1 Character
Specifies the End of Frame character, which defines when the frame is ready to be transmitted. The actual transmission of the frame is based on the Trigger Forwarding Rule. Valid values are in hex 0-FF. The default is 0.

EOF2 Character	When enabled, creates a sequence of characters that must be received to define the end of the frame (if the EOF1 character is not immediately followed by the EOF2 character, TruePort waits for another EOF1 character to start the EOF1/EOF2 character sequence), which defines when the frame is ready to be transmitted. The actual transmission of the frame is based on the Trigger Forwarding Rule. Valid values are in hex 0-FF. The default is 0.
Trigger Forwarding Rule	Determines what is included in the Frame (based on the EOF1 or EOF1/EOF2) or Packet (based on Trigger1 or Trigger1/Trigger2). Choose one of the following options:

- **Strip-Trigger**—Strips out the EOF1, EOF1/EOF2, Trigger1, or Trigger1/Trigger2, depending on your settings.
- **Trigger**—Includes the EOF1, EOF1/EOF2, Trigger1, or Trigger1/Trigger2, depending on your settings.
- **Trigger+1**—Includes the EOF1, EOF1/EOF2, Trigger1, or Trigger1/Trigger2, depending on your settings, plus the first byte that follows the trigger.
- **Trigger+2**—Includes the EOF1, EOF1/EOF2, Trigger1, or Trigger1/Trigger2, depending on your settings, plus the next two bytes received after the trigger.

pktfwdcfg.tp File Format

The packet forwarding configuration file is called **pktfwdcfg.tp** and is broken up into ports and their defined values as shown in the example below:

```
[10001]
packet_size = 1
idle_time = 2
force_transmit_time = 3
[mysds:10002]
SOF1_char = aa
SOF2_char = bb
transmit_SOF_chars = off
EOF1_char = cc
EOF2_char = dd
trigger_forwarding_rule = trigger
[yoursds:10003]
packet_size = 1000
idle_time = 99
force_transmit_time = 10000
end_trigger1_char = aa
end_trigger2_char = bb
trigger_forwarding_rule = trigger
[172.16.44.21:10004]
packet_size = 1000
idle_time = 99
force_transmit_time = 10000
end_trigger1_char = aa
end_trigger2_char = bb
trigger_forwarding_rule = trigger
```

Configuring SSL/TLS

The SSL/TLS feature is designed to work with the IOLAN Family SDS Device Server models. When TruePort is used with the Device Server, the cipher specified by the Device Server will be used for the TruePort connection. Also, if the Device Server is set for **SSL/TLS Type Server**, then you need to set the **TruePort SSL type** to **client**, and vice versa.

SSL/TLS Configuration Information

SSL/TLS is configured using the **`addports`** or **`tpadm`** utilities. If SSL/TLS is enabled, the following prompts will ask for the SSL/TLS configuration information:

```
Certificate file name (full path and file name): /etc/trueport/sslcert.pem
SSL type (client or server): client
SSL/TLS version (any, TLSv1, or SSLv3]: any
Perform peer verification (y/n): y
```

The next section is asked only if peer verification is performed. If you press **Enter** instead of entering a value, the parameter will not appear in the **`sslcfg.tp`** file for peer validation.

> The values that you enter here are case sensitive, so the peer certificate must match exactly or the connection will fail.

```
CA file name (full path and file name): /etc/trueport/ca.pem
Country (2 letter code): CA
State or Province: Ontario
Locality (e.g. city): Markham
Organisation (e.g. company): Acme Software
Organisation Unit (e.g. section): Engineering
Common Name (e.g. your name or your server's hostname): solaris50
Email Address: engineering@acme.com
```

The following section provides more information about the SSL/TLS configuration parameters:

Certificate file name The full path and file name of the certificate file. If you press **Enter**, the default path, **`/etc/trueport/sslcert.pem`**, will be used.

SSL type Specify whether the TruePort daemon will act as an SSL/TLS client or server.

SSL/TLS version Specify whether you want to use:
- **Any**—The TruePort daemon will try a TLSv1 connection first. If that fails, it will try an SSLv3 connection. If that fails, it will try an SSLv2 connection.
- **TLSv1**—The connection will use only TLSv1.
- **SSLv3**—The connection will use only SSLv3.

Perform peer validation The certificate received from the peer will be verified against the CA list, along with any values entered in the validation criteria, for an SSL connection; any fields left blank will not be validated against the peer certificate.

CA file name The full path and file name of the CA (certificate authority) file. If you press **Enter**, the default path, **`/etc/trueport/ca.pem`**, will be used.

Country A two character country code; for example, US.

State or Province	Up to a 128 character entry for the state/province; for example, IL.
Locality	Up to a 128 character entry for the location; for example, a city.
Organisation	Up to a 64 character entry for the organisation; for example, Acme Software.
Organisation Unit	Up to a 64 character entry for the unit in the organisation; for example, Payroll.
Common Name	Up to a 64 character entry for common name; for example, the host name or fully qualified domain name.
Email Address	Up to a 64 character entry for an email address; for example, acct@anycompany.com.

SSL/TLS Support Files

When you enable the SSL/TLS option for a port, you need to make sure the TruePort host and Device Server have the appropriate support files: certificates/private keys and/or the CA list file. The IOLAN DS Family SDS model CD-ROM contains a self-signed RSA certificate named `samplecert.pem`. The `samplecert.pem` file can be used for both the certificate file on the SSL/TLS server and the CA list file on the SSL/TLS client.

TruePort Port Configured as SSL/TLS Server

When the TruePort port is configured as an SSL/TLS server, the SSL/TLS private key and certificate is required for all key exchange methods except ADH (Anonymous Diffie-Hellman). The private key cannot be encrypted since TruePort on Solaris does not support the configuration of an SSL/TLS passphrase. The private key needs to be appended to the certificate file, to create one certificate/private key file. This can be done using the Solaris command `cat myprivatekey.pem >> mycert.pem`. This certificate/private key file then becomes the TruePort certificate. Copy the TruePort certificate file to the directory you specified in the SSL/TLS configuration.

If the TruePort SSL/TLS server is configured to verify an SSL client, a CA list file is also required. The CA list file is a certificate, or list of certificates, of the Certificate Authorities (CA) who created and signed the peer certificates (the peer certificate(s) must be downloaded to the Device Server).

TruePort Port Configured as SSL/TLS Client

When the TruePort port is configured as an SSL/TLS client and peer verification is configured, a CA list file is required. The CA list file is a certificate, or list of certificates, of the Certificate Authorities (CA) who created and signed the peer certificates (the peer certificate(s) must be downloaded to the Device Server). This CA list file should be copied to the TruePort host directory specified in the SSL/TLS configuration.

Pseudo Random Number Generator

If you want to use the SSL/TLS encryption on a TruePort connection you must install Random
Number Generator software on the host system. This is available from Sun for each of the following
Solaris versions:

- Solaris 2.6, Sparc and Intel platforms: Install **SUNWski** package, available on the Solaris Easy
  Access CDs in the Sun Webserver product.

- Solaris 7, Sparc and Intel platforms: Install **SUNWski** package, available on the Solaris Easy
  Access CDs in the Sun Webserver product.

- Solaris 8, Sparc platform: Install Patch **112438** available from Sun:
  http://sunsolve.sun.com/pub-cgi/show.pl?target=patchpage.

- Solaris 8, Intel platform: Install Patch **112439** available from Sun:
  http://sunsolve.sun.com/pub-cgi/show.pl?target=patchpage.

- Solaris 9, Sparc and Intel platforms: Support built-in.

- Solaris 10, Sparc and Intel platforms: Support built-in.

sslcfg.tp File Format

The `sslcfg.tp` file is created in the following format:

```
[10001]
certificate-file = /etc/trueport/sslcert.pem
ssl-type = server
ssl-version = any
verify-peer = yes
CA-file = /etc/trueport/ca.pem
country = CA
state-province = Ontario
locality = Markham
organisation = Acme Software
organisation-unit = Engineering
common-name = solaris50
email = engineering@acme.com
[yoursds:10002]
certificate-file = /etc/trueport/sslcert.pem
ssl-type = client
ssl-version = TLSv1
verify-peer = yes
CA-file = /etc/trueport/ca.pem
country = UK
locality = London
common-name = solarisuk
```

The [10001] specifies the port for which the SSL/TLS configuration parameters are configured.

SSL/TLS Trouble Shooting

If you are experiencing problems obtaining a successful SSL/TLS connection, you can add the `-trace 4` option at the end of the appropriate port entry in the `config.tp` file. After editing the `config.tp` file, you will have to kill the TruePort daemon process for the port and restart it again. Adding the `-trace` option will create a trace file called **/etc/trueport/trace.*xxxxx***, where ***xxxxx*** is the TCP/IP port number; for example, **/etc/trueport/trace.10000**.

Could not obtain peer's certificate

Reason 1	User has selected a cipher key exchange of ADH (anonymous Diffie-Hellman) and enabled Peer verification. ADH does not use certificates so they will not be sent in an SSL/TLS handshake.
Solution 1	Disable Peer Verification or change to a cipher suite that uses certificates.
Reason 2	User has selected Peer Verification on the configured SSL/TLS server and has not configured a certificate for the client.
Solution 2	Either disable peer verification on the SSL/TLS server or configure a certificate for the SSL/TLS client.

SSL_accept failed on the SSL/TLS server device.

Reason	The device has failed to accept an SSL/TLS connection on top of a TCP connection that has just been established. This could indicate that the peer from which TruePort is trying to accept a connection from is not configured for SSL/TLS.
Solution	Verify that the peer has been configured for an SSL/TLS client connection.

Certificate did not match configuration

Reason	The message is displayed when **Verify Peer Certificate** has been enabled, but the configured **Validation Criteria** does not match the corresponding data in the certificate received from the peer.
Solution	The data configured must match exactly to the data in the certificate. The data is also case sensitive.

Encrypted private keys are not supported in TruePort

Reason	This message is displayed by the TruePort daemon when the user has created a certificate with an encrypted private key for TruePort. This applies to either **Client** mode or **Server** mode with configured peer validation criteria.
Solution	Create a certificate with a private key that is not encrypted.

unknown protocol message when trying to make an SSL/TLS connection

Reason 1	This will be displayed when both sides of the TCP connection are configured as SSL/TLS clients.
Solution 1	Change one of the end points to act as an SSL/TLS server.
Reason 2	One of the endpoints is not configured for SSL/TLS.
Solution 2	Make sure both endpoints are configured for SSL/TLS, verify that one is a client and the other is a server.

tlsv1 alert handshake failure or **sslv3 alert handshake failure**

Reason	The remote site has an SSL/TLS error and is sending this message with an alert message.
Solution	Look at the error messages on the remote end and fix the problem indicated.

Certificate verify failed.

Reason 1	TruePort has been configured to verify the peer certificate and there is a mismatch between the peer's certificate and the TruePort CA list.
Solution 1	Make sure the CA lists contains the certificate of the CA which signed the peer's certificate.
Reason 2	The peer's certificate or the CA certificate might have expired. Each certificate is created with a valid date interval.
Solution 2	Make sure the certificate of the peer and CA are up to date. Also verify that the host has the correct date/time. If the date configured on the host is not correct, it can make it look like the certificate is invalid.

Managing Logins

Using the tplogin Script

The **tplogin** script adds, enables, disables or removes a login for a TruePort port.

Syntax

Description Uses the system's `pmadm` and `ttyadm` commands to add, enable, disable or remove a login for a TruePort port.

When added, login entries will be set up to push modules **ldterm** and **ttcompat** for Client-Initiated or Full Mode ports. Server-Initiated Lite Mode entries will be set up to push **ptem** in addition to **ldterm** and **ttcompat**.

The port monitor **zsmon** will be used for all logins.

Syntax
```
tplogin -a device_node [tty_label] [id]

tplogin -e device_node

tplogin -d device_node

tplogin -r device_node

tplogin -l
```

Options **-a**
Adds the port.
-e
Enables a port.
-d
Disables a port.
-r
Removes a port

-l

Lists all ports.

device_node

The device node, not including the path.

Use **X***n* for Server-Initiated Lite mode ports and use **m***n* for Client-Initiated or Full mode ports, where *n* is the port number. The service tag, for the `pmadm -s` switch, will by `tty` with the device node appended (for example, `ttyX1`).

tty_label

The `ttydefs` label for the `ttyadm -l` switch. If not provided or null, the default will be **9600**.

id

The identity for the `pmadm -i` switch. If not provided or null, the default will be `root`.

Examples

tplogin -a 10 19200

This example adds a login for device **/dev/term/10** at 19200 baud.

tplogin -a X21

This example adds a login for device **/dev/term/X21** (a Lite mode port).

tplogin -r 10

This example removes the login for **/dev/term/10** created in the first example.

tplogin -d X21

This example disables the login for **/dev/term/X21**, but does not remove it.

Using the Admintool Utility

Because the Admintool utility is not supported in Solaris 10 or higher, you will need to use the Solaris Management Console if you are using Solaris 10 or higher.

> Solaris Management Console does not support an option for changing the list of streams modules. Therefore, for Server-Initiated Lite Mode device nodes YOU MUST use the tplogin utility (see *Using the tplogin Script* on page 22).
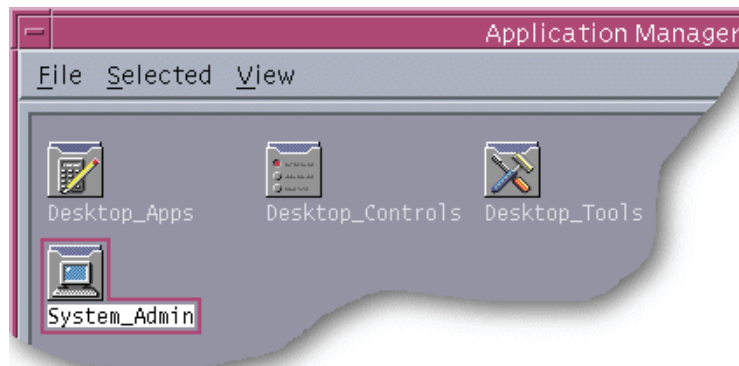
Adding Logins to Serial Ports

You can add a login on a serial port, using the Solaris Admintool as follows:

> **Note:** The following example assumes you are using the Sun 9.x graphical user interface.

1. In the Solaris desktop, click on the **Application Manager** toolbar icon shown in the next picture.
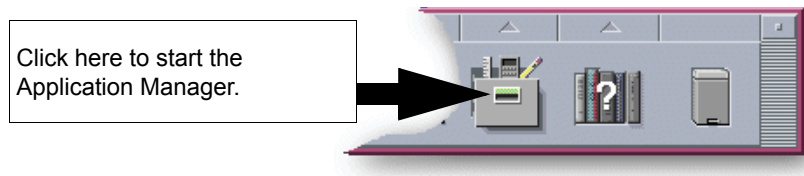
The Application Manager window is now displayed.

2. In the Application Manager window, double click on the **System_Admin** folder to display the System_Admin window.
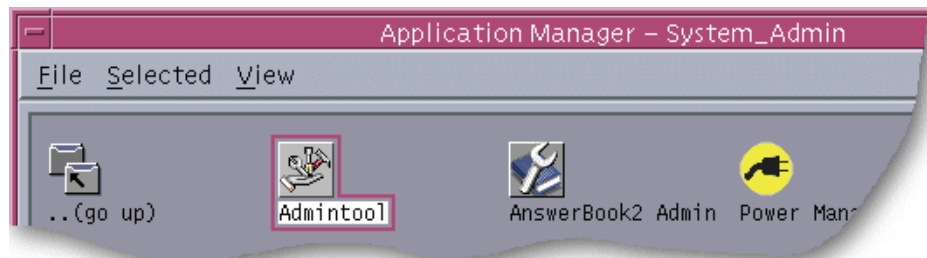
3. In the System_Admin window, double click on the **Admintool** icon to display the main Admintool window.
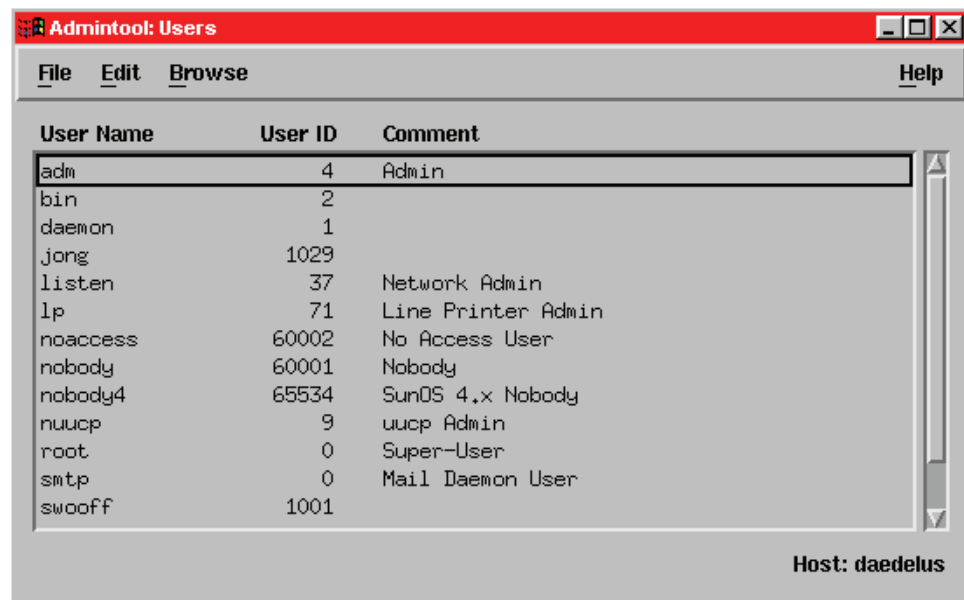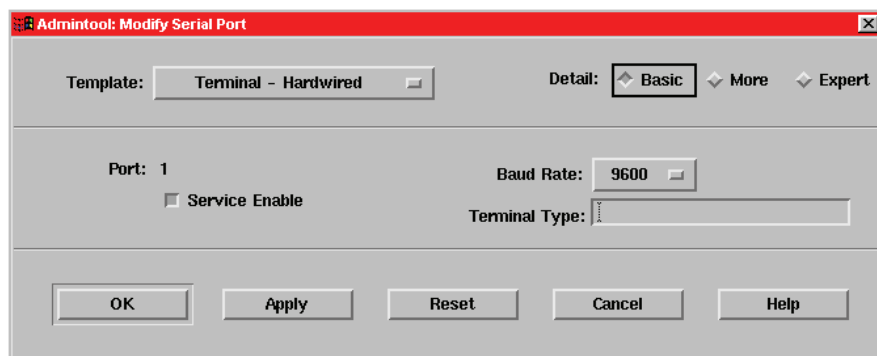

4. In the Admintool menu, select **Browse**, **Serial Ports** to display the Serial Ports window.
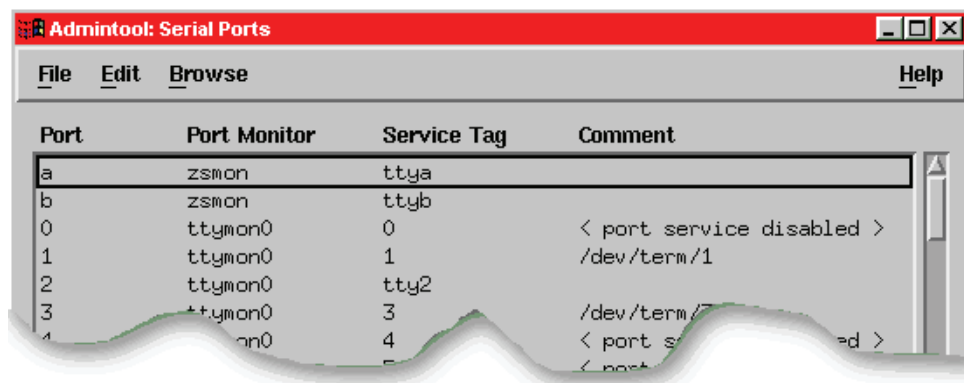
5. In the Serial Ports window, double-click the serial port you want to modify. Or, click on the port to highlight it, then select **Edit**, **Modify**.

6. In the Modify Serial Port window, display basic information only by clicking the **Basic** button in the **Detail** field.

> If you want to configure the login to a Server-Initiated Lite Mode terminal, click the **Expert** button and then edit the **List of Stream Modules** so that they include the ptem, ldterm, and ttcompat stream modules, in this order.

7. In the Modify Serial Port window, click the **Template** selector and choose the type of device you want to connect to the currently selected serial port. For example, to attach a terminal to the serial port, select **Terminal-Hardwired**.

Note: For details of the parameters in this field, click on the help button to invoke the Solaris online help about this window.

8. In the Modify Serial Port window, check the **Service Enable** checkbox to enable the currently selected serial port.

9. In the Modify Serial Port window, click the **Baud Rate** selector and choose the baud rate you want. For example, 9600.

Note: Because the system does not support the selection of baud rates above 38.4 kbps, TruePort has permanently remapped some of the lower baud rates to support higher card speeds (see remapping chart below).

| Original Speed (bps)	Is Mapped To (Kbps)
50	57.6
110	115.2
134	230.4

Recent versions of Solaris do not provide these lower baud rates in the **/etc/ttydefs** file that is used by port monitors and the Admintools Utility. These baud rates will be added, if not already present, using the system's **sttydefs** command, during the TruePort package installation. These added values are not removed when the TruePort package is removed, in case they already existed or have been subsequently utilized for other purposes.

10. In the **Terminal Type** field, enter the terminal type you want.

Note: The terminal type you enter must be a valid terminal type as defined by the **termcap** file. See the Solaris user documentation or online help for further details.

**11.** In the Modify Serial Port window, click **OK**.

The currently selected serial port now has a terminal session enabled at the specified baud rate, even parity, 7 data bits and 1 stop bit. The Serial Ports window is now updated to show this as shown in the next picture. Do this for every login you want to add.
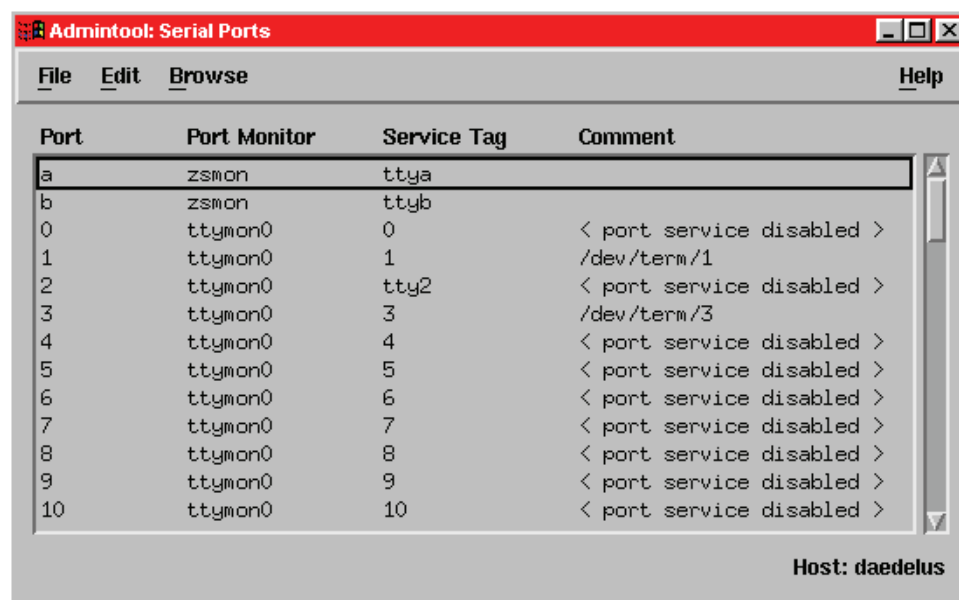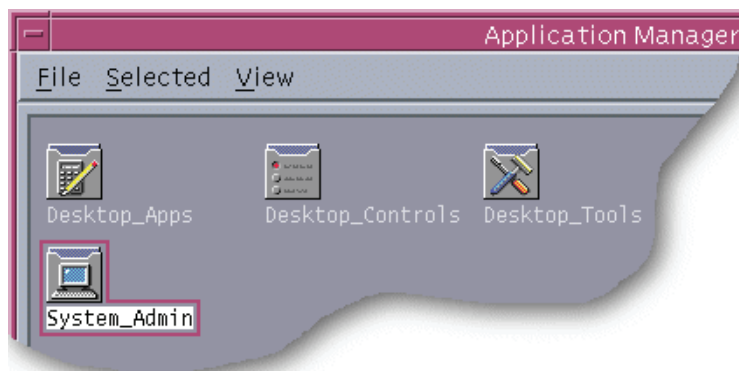

Removing Terminals

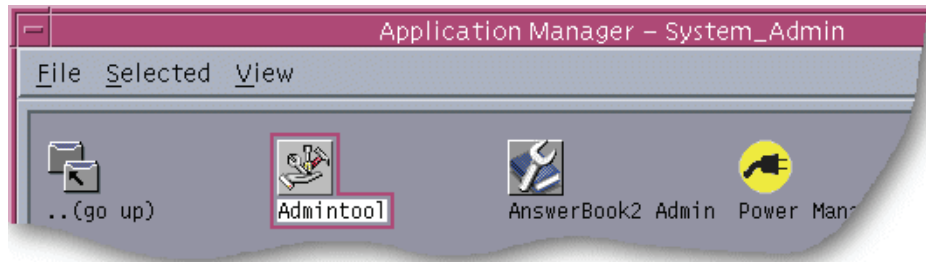To remove any TruePort serial ports configured as terminals, do the following:

1. In the Solaris desktop, click on the **Application Manager** toolbar icon shown in the next picture.
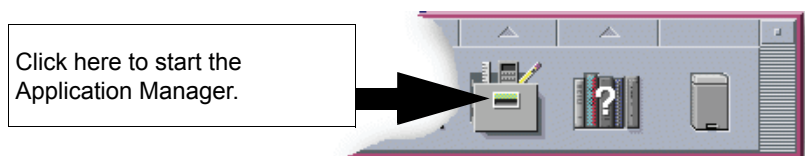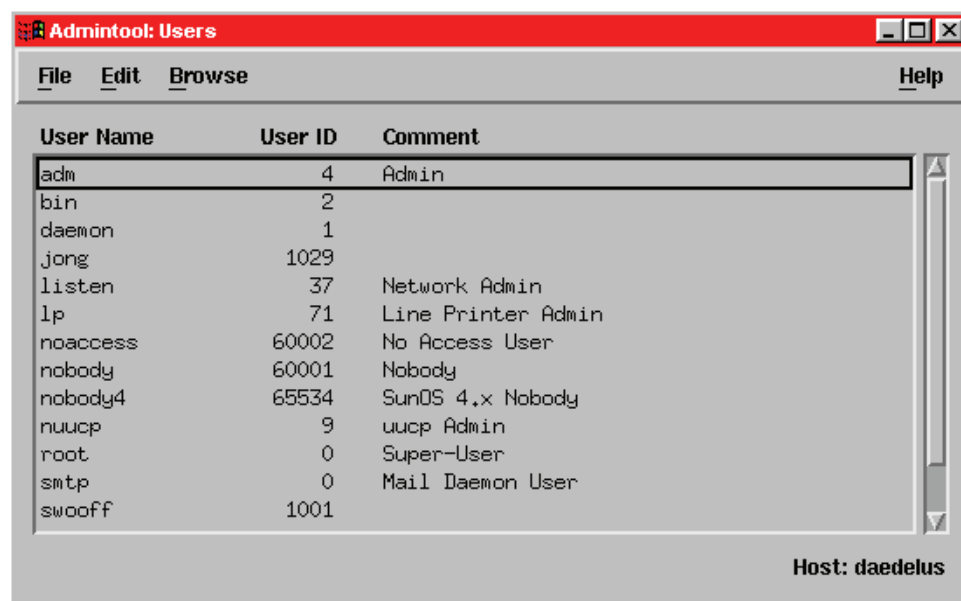

The Application Manager window is now displayed.

2. In the Application Manager window, click on the **System_Admin** folder to display the System_Admin window.

3. In the System_Admin window, double-click the **Admintool** icon to display the main Admintool window.

4. Select **Browse**, **Serial Ports**. The Admintool window is now updated to show the serial ports available on the system.
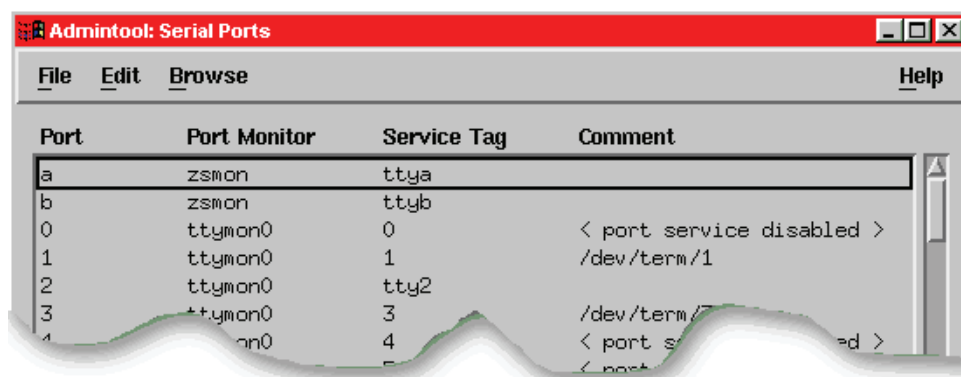
5. In the Admintool window, click the terminal you want to remove.

6. Select on **Edit**, **Delete**. The terminal entry for the serial port is now deleted and the Admintool window updated. Do this for every terminal entry you want to delete.