

## *Port Share*

### *User Manual*

Rev: 1.2

February 9<sup>th</sup> 2010

Opengear's serial port sharing software (*PortShare*) delivers the virtual serial port technology your Windows and Linux applications need to open remote serial ports and read the data from serial devices that are connected to your *console server*.

*PortShare* is supplied free with each *console server* and you are licensed to install *PortShare* on one or more computers for accessing any serial device connected to any Opengear *console server* port. So one user can access multiple remote serial devices in multiple locations; and multiple users can access the same remote serial device.

## Publishing history

Date	Revision	Update details
Oct 2009	1.0	Initial release of PortShare (Windows)
Dec 2009	1.1	Linux driver documentation added
Feb 2010	1.2	License agreements included

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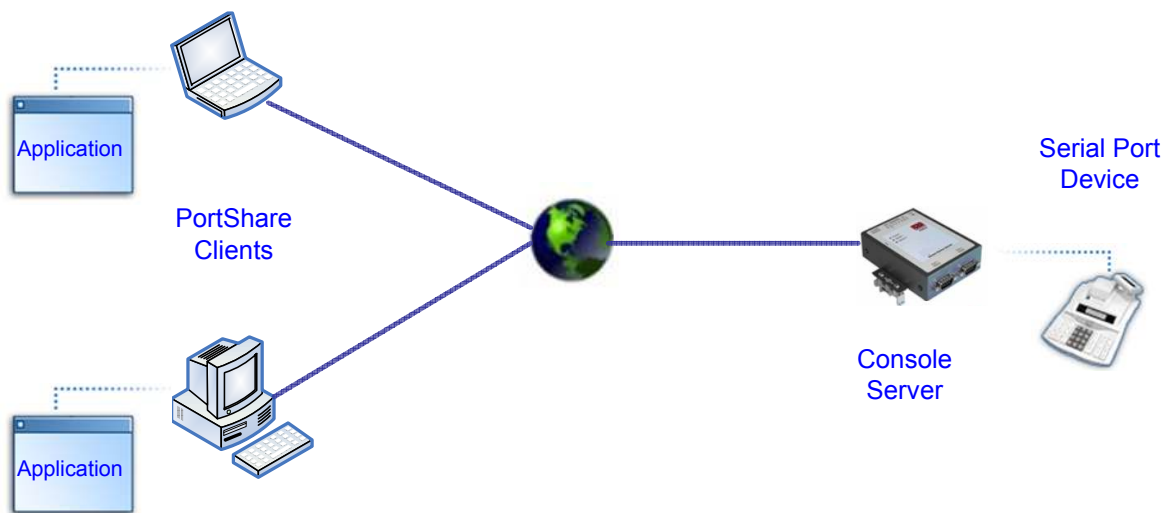
## 1. PortShare for Windows

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*PortShare* establishes secure client-server connections between the serial ports on remote *console servers* and applications on your Windows PC or server servicing COM ports.

Once connection is established, all data sent to the nominated COM port on the Windows computer will be immediately redirected and delivered out the corresponding serial port on the console server. Similarly incoming data on the console server serial port is redirected to the virtual COM port on the Windows computer where it can be processed further.

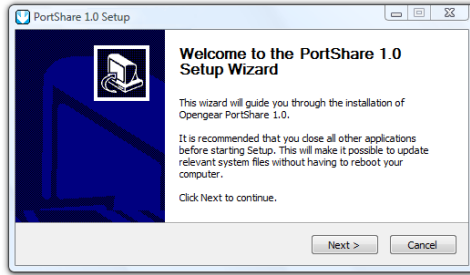
You are licensed to install *PortShare* on one or more computers for accessing any serial device connected to any Opengear *console server* port.



### 1.1 Install the *PortShare* client

Port Share is fully compatible with 32 bit and 64 bit versions of Windows NT 4.x, Windows XP, Windows 2000, Windows 2003, Windows 2008, Windows Vista and Windows 7. The license agreement is included in Chapter 3.

- The *portshare\_setup.exe* program is included on the CD supplied with your *console server* (or a copy can be freely downloaded from the ftp site.) Double click the *portshare\_setup.exe* file to start installation process

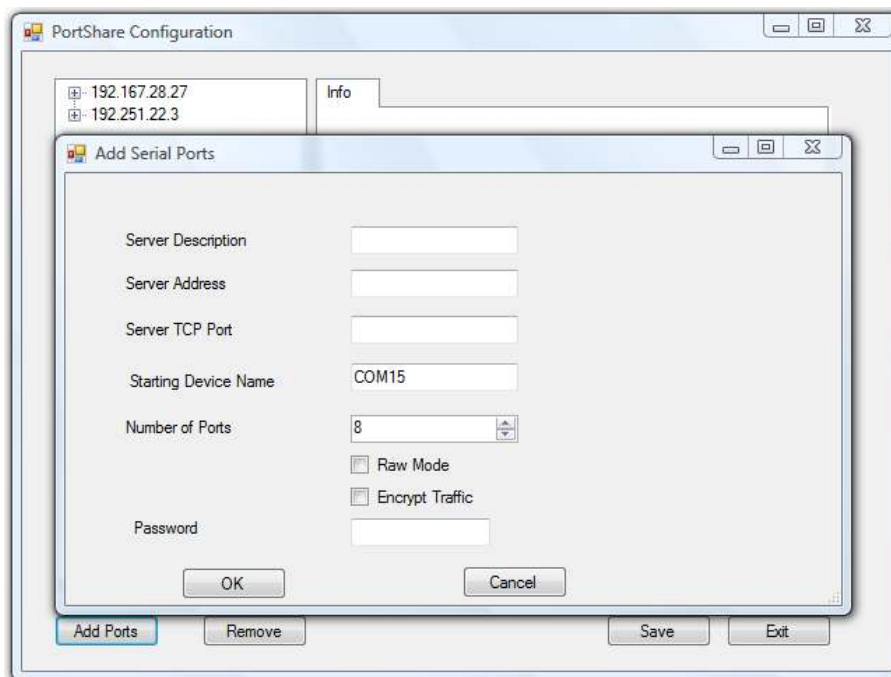


- Read the License Agreement then follow the prompts to select the destination path and choose shortcuts you wish to create. Once the installer completes you will have a working *PortShare* client installed on your machine and an icon on your desktop.
- Click the *PortShare* icon on your desktop to start the client.

## 1.2 Configure the PortShare client

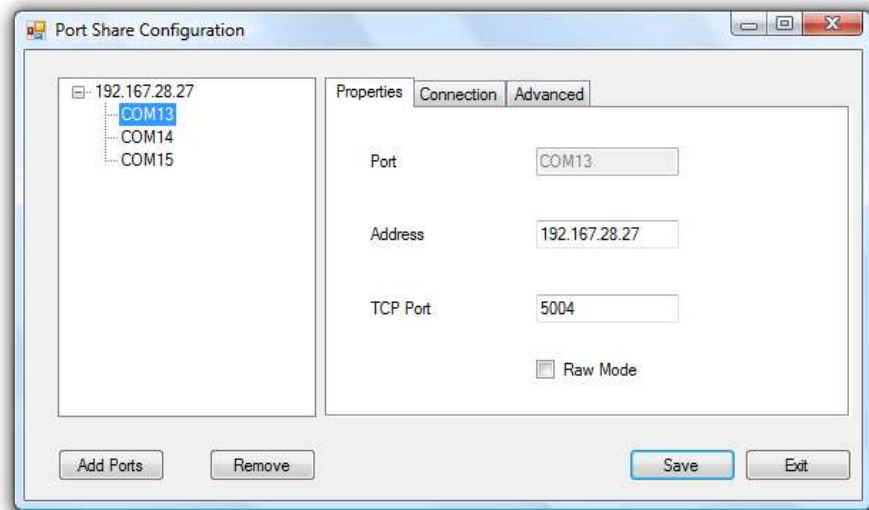
Creating the PortShare client connection will initiate a virtual serial port data redirection to the remote *console server* using TCP/IP protocol.

- Click on *Add Ports*
- Specify a name to identify this connection in the "Server Description" tab.

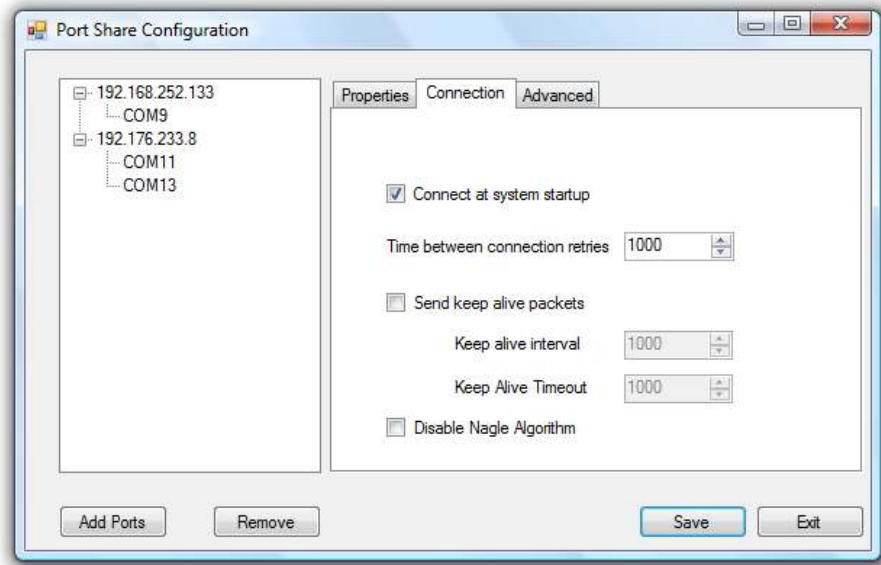


- Enter the *console server's* IP address (or network name)

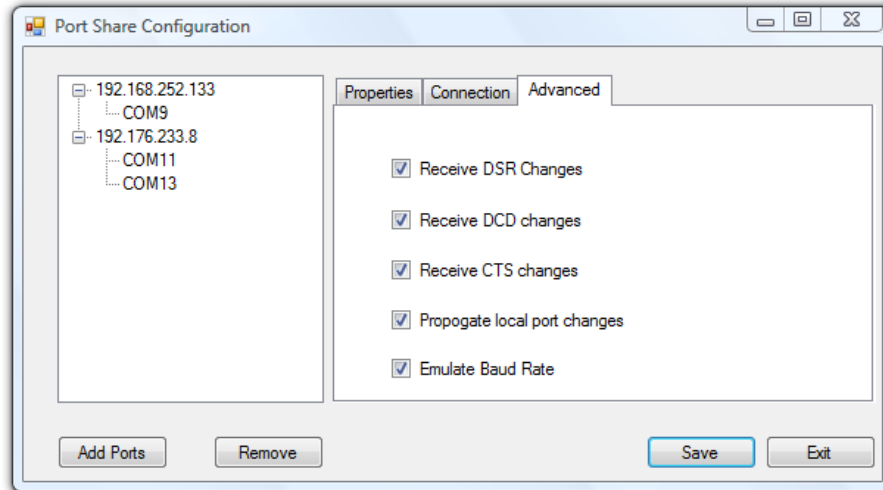
- Enter the *Server TCP Port* number that matches the port you have configured for the serial device on the remote *console server*. Ensure this port isn't blocked by firewall
  - Telnet *RFC2217* mode is configured by default so the range of port numbers available on a 16 port console server would be 5001-5016
  - Alternately check *RAW* mode (4001- 4048 on a 48 port console server)
  - Select *Encrypted* to enable SSL/TLS encryption of the data going to the port. You will need to enter a *Password*
- Select the starting COM port (COM1 to COM4096)
- Specify the number of ports you want to add. Sequential port numbers will be assigned automatically however if a COM port # is already being used by other applications that # will be skipped
- Click **OK** to add the specified COM ports



- To configure a COM port you have created simply click on the desired COMx label in the left hand menu tree
- In the Properties window you can edit the IP Address or TCP Port to be used to connect to that COM port
- You can then configure the COM port in the *Connection* and *Advanced* windows:



- *Connect at system startup*—When enabled *PortShare* will try to connect to the *console server* when the *PortShare* service starts (as opposed to waiting for the application to open the serial port before initiating the connection to the *console server*)
- The *Time between connection retries* 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 and *PortShare* will continue attempting to reconnect forever to the *console server* at this interval)
- The *Send keep alive packets* option tests if the TCP connection is still up when no data has been sent for a while by sending keep-alive messages. Select this option and specify period of time (in milliseconds) after which *Port Share* sends a command to remote *console server* end in order to verify connection's integrity and keep the connection alive
- The *Keep Alive Interval* specifies the number of seconds to wait on an idle connection before sending a keep-alive message. The default is 1 second. The *Keep Alive Timeout* specifies how long *Port Share* should wait for a keep alive response before timing out the connection.
- *Disable Nagle Algorithm* — the Nagle Algorithm is enabled by default and it reduces the number of small packets sent by *PortShare* across the network

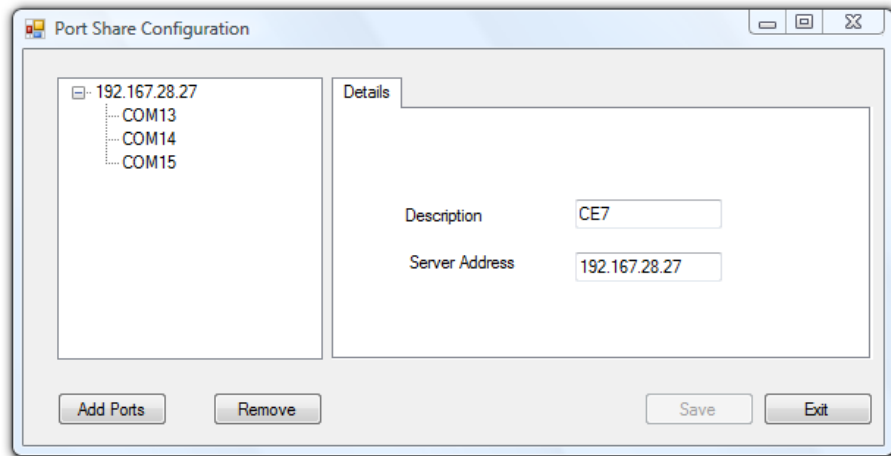


- Check *Receive DSR/DCD/CTS changes* if the flow control signal status from the physical serial port on *console server* is to be reflected back to the Windows COM port driver (as some serial communications applications prefer to run without any hardware flow control i.e. in “two wire” mode)
- The *Propagate local port changes* allows complete serial device control by the Windows application so it operates exactly like a directly connected serial COM port. It provides a complete COM port interface between the attached serial device and the network, providing hardware and software flow control. So the baud rate etc of the remote serial port is controlled by the settings for that COM port on Windows computer. If not selected then the port serial configuration parameters are set on the console server.
- With the *Emulate Baud Rate* selected *PortShare* will only send data out at the baud rate configured by the local Application using the COM port

### 1.3 To remove a configured port

At any stage you can delete a single configured COM port, or delete the *console server* connection (and all the COM ports configured on that *console server*)

- Select the console server or Com port on the left hand menu and click the *Remove* button



## 1.4 Configure the remote serial device connection

Ensure the remote serial device is connected to your remote *console server*. Then configure the serial port as detailed in the User Guide

- Set the RS232 Common Settings (e.g. baud rate)
- Select *Console server* mode and specify the appropriate protocol to be used:
  - *RAW TCP* allows connections directly to a TCP socket and the default TCP port address is 4000 + serial port # (i.e. the address of the second serial port is *IP Address \_ 4002*)
  - *RFC2217* enables serial port redirection on that port and the default port address is *IP Address \_ Port* (5000 + serial port #) i.e. 5001 – 5048 on a 48 port *console server*
  - *PortShare Secure* mode enables encrypted communication

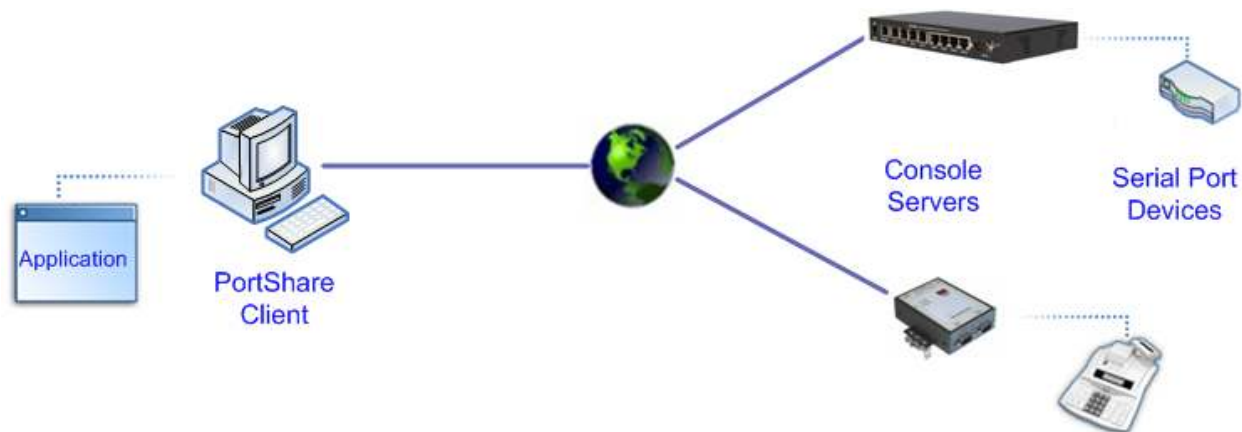
## 2. PortShare for Linux

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The *PortShare* driver for Linux maps the console server serial port to a host *tty* port.

OpenGear has released the ***portshare-serial-client*** as an open source utility for Linux, AIX, HPUX, SCO, Solaris and UnixWare. The GPL license agreement is included in Chapter 3 and the utility can be freely downloaded from the ftp site.

This PortShare serial port redirector allows you to use a serial device connected to the remote *console server* as if it were connected to your local serial port. The *portshare-serial-client* creates a pseudo *tty* port, connects the serial application to the pseudo *tty* port, receives data from the pseudo *tty* port, transmits it to the *console server* through network and receives data from the *console server* through network and transmits it to the pseudo-*tty* port.



So using this driver you can use a remote console serial port as a local *tty* port and control remote serial devices as though they were attached locally to the Linux host. The driver can run under Linux kernel 2.4.x (supporting IPv4 only) and Linux kernel 2.6.x) (supporting IPv4 and IPv6)

To map a console server serial port to a host *tty* port you first need to setup the console server and attach and configure the serial port device:

- ensure the console server IP configuration is ok and that you can access the unit (ping, telnet...)
- configure the console server serial port to RAW or RFC2217 mode

Then you will install driver files into the host as detailed in 2.1 below.

### 2.1 Install the *PortShare* Linux driver

These simple installation instructions point to the appropriate config files and man pages:

**2.1.1** To build and install the PortShare package (as root):

```
$. /configure && make && make install
```

Note that the `--prefix=` option is ignored by configure.

**2.1.2** Configure the devices by editing `/etc/portshare-devices`. There are sample configurations in there, and the format is documented at the top of the file, or in the `portshare-devices` man page.

**2.1.3** Start the portshare devices:

```
/usr/local/sbin/portshare-serial-client start
```

(man `portshare-serial-client` for more information)

**2.1.4** Useful commands:

```
portshare-stty
```

Used like 'stty', but applies the settings to the remote serial port correctly. A normal stty on `/dev/ttyXX` will not set the parameters on the port correctly, since it is just a pseudo-tty

**2.1.4** Caveats

The local unix tty devices setup are just symlinks to pseudo-tty devices, so settings on those devices do not get set on the *console server*. To do this, use `'portshare-stty'`.

This also means that applications that rely on setting tty parameters such as baud rate, modem signals, etc will not work unless they are started with the `libportshare-ser-cli.so` library preloaded.

```
e.g. LD_PRELOAD=/usr/local/lib/libportshare-ser-cli.so stty -a < /dev/tty01
```

Use `/usr/local/sbin/portshare-stty` as a template for running your application with the library preloaded.

## **2.2 PortShare command man pages**

`portshare-devices.txt` is the man page for the portshare-devices configuration file. It is the more formal explanation without examples

`portshare-ser-cli` is the man page for the binary .c program, or backend which does the actual work

`portshare-serial-client` is the man page for a script. This script acts as the front end, or interface into the portshare-ser-cli binary.

### **2.2.1 portshare-serial-client(8)**

NAME

**portshare-serial-client** Serial Port Interface for *console servers*

SYNOPSIS

*portshare-serial-client (start | stop | restart | status) [devname]*

DESCRIPTION

For each physical port listed in *portshare-devices* file, *portshare-serial-client* controls the status of the corresponding *portshare-ser-cli* interface

OPTIONS

*portshare-serial-client* must be invoked with one of the (*start*, *stop*, *restart* or *status*), and optionally with a argument associated to a specific device. In this case, the action specified as the option will be performed only for this device.

If this argument was not supplied, the action will be performed for all devices listed in *portshare-devices* file. The mandatory options are:

*start* - Starts the *portshare-ser-cli* program, using parameters supplied in the *portshare-devices* file. If this program is already running, a message will be displayed, and no additional copy will be started.

*stop* - Stops the *portshare-ser-cli* program(s), by issuing a SIGTERM signal.

*restart* - Simulates a hang-up to *portshare-ser-cli* program(s), by issuing a SIGUSR1 signal.

*status* - Checks the status of *portshare-ser-cli* programs(s).

EXAMPLE

Assuming the following *portshare-devices* file configuration:

```
/dev/tty01:pr3k:1:rtelnet: /dev/tty02:pr3k:2:socket:
```

1. Start all devices: *portshare-serial-client start* Messages: "Starting */dev/tty01 <==> pr3k:1 interface*" "Starting */dev/tty02 <==> pr3k:2 interface*"
2. Try to start them again: *portshare-serial-client start* Messages: "portshare-serial-client : */dev/tty01 already active*" "portshare-serial-client : */dev/tty02 already active*"
3. Stop only */dev/tty01* device: *portshare-serial-client stop /dev/tty01* Messages: "Stopping */dev/tty01 <==> pr3k:2 interface*"
4. Checking status: *portshare-serial-client status* Messages: "*/dev/tty01 (rtelnet at pr3k:1) is inactive*" "*/dev/tty02 ( socket at pr3k:2) active, pid 2983*"
5. Start a non-valid device *portshare-serial-client start /dev/tty01* Messages: "portshare-serial-client : device */dev/tty01* does not exist"

## 2.2.2 portshare-ser-cli(8)

### NAME

**portshare-ser-cli** Serial Port Interface for *console servers*

### SYNOPSIS

*portshare-ser-cli [options] devname rasname physport*

### DESCRIPTION

The portshare-ser-cli program connects a Unix device file devname to a physical port physport of an OpenGear Console Server rasname. portshare-ser-cli provides the I/O interface between the device file and the physical port, running as an user-mode device driver.

If physport is assigned to 0, then rasname is used as the IP address on an IP-based serial port addressing.

### OPTIONS

portshare-ser-cli may be started with the following options:

-u ptiosize

Sets the internal device I/O size to ptiosize (maximum 4096 bytes, default 1024 bytes)

-n netiosize

Sets the internal socket I/O size to netiosize (maximum 512 bytes, default 128 bytes)

-i retrydelay

Delay in seconds between connection requests (default: 60)

-r retries

Number of connection request retries before exiting. (default: infinity)

-s Use the Socket Server protocol for talking to the server, this means just piping all the data down a TCP connection with no control information, so it's impossible to change the port speed etc. The default is to use the RFC2217 protocol.

-m modem handling

The default is 0 which means to check DCD state, 1 means to ignore DCD.

-c close mode

Last close handling; the default is 0 which means to hangup the modem, 1 means not to hangup.

-p start port

TCP base port of servers at console server side (defaults: 5000 for RFC2217 Server). Note: if physport is assigned to zero, this option has no effect, the Telnet Server standard port (23) is used.

-d debug level

The default is debug level 0 (little debugging), level 1 debugs internal state changes, level 2 debugs events, and level 3 debugs IO calls.

-f Run in foreground, this is suitable for running from init.

- x Console mode: normally all messages are sent to `syslogd` (using `local2` facility). With this option, all messages will be sent to `stdout` and `portshare-ser-cli` runs in the foreground. This implies `-f`
- P Specify a TCP port to connect to. If this option is present, it will override most other options in the `/etc/portshare-devices` file. `portshare-ser-cli` will use this TCP port instead of deriving it from `-p` and `physport`. This option is useful when connecting to a local TCP port, which is connected to an `ssh` tunnel.

## USE

Every instance of `portshare-ser-cli` will have a virtual serial device which is a sym-link to a pseudo-tty. A terminal program can then talk to the virtual serial device and its data transfers will be redirected across the network. Each virtual serial device will be accompanied by a UNIX domain socket with the same name with the addition of `".control"`. So if `portshare-ser-cli` provides the virtual device named `"/dev/modem"` then it will have a control socket named `"/dev/modem.control"`. There is a shared object named `libportshare-ser-cli.so` which intercepts calls to the `tcsetattr()` and `tcsendbreak()`. This shared object then sends the relevant data to the `portshare-ser-cli` server via the control socket. To recognize a virtual modem device it has to read `/etc/portshare-devices`.

The `libportshare-ser-cli.so` shared object can be loaded per-application through the `LD_PRELOAD` environment variable, or for the entire system through the system shared object configuration (see the OS documentation). Note that the `LD_PRELOAD` environment variable has to have the fully qualified path of the object; otherwise an application which changes its current directory may fail.

## BUGS

In Solaris `libportshare-ser-cli.so` does not work with the `stty` program. `stty` uses a different interface to this and requires some extra coding.

In Solaris `libportshare-ser-cli.so` conflicts with some system programs such as `ps` for unknown reasons. Just don't load it for those programs; it has no such problems with any serial comms programs.

## Example.

Start an interface between `/dev/prt1` device and a serial port number 10 of a *console server* named `pr01`, without hang-up at last close:

```
portshare-ser-cli -c 1 /dev/prt1 pr01 10
```

In general use do not start `portshare-ser-cli` from the command line start it through the `portshare-serial-client` script or from `init`.

### 2.2.3 portshare-devices(5)

#### NAME

**portshare-devices** - tables for driving portshare-serial-client

## DESCRIPTION

The portshare-devices file supplies all mapping between Unix device files (/dev/\*) and the addresses of serial ports of *console servers*. It contains one entry for each serial port, with the following format:

*device:rastype:rasname:physport:type:options*

Note: A # character at beginning of line indicates a comment

The entry fields are:

### *devname*

- A full pathname of the file that will be associated to the serial port. It must start with a "/dev/" prefix. Two naming schemes may be used here:
  - devname does not exist, and will be linked to a free pseudo-tty. This is the default behavior of portshare-ser-cli.
  - devname is the name of a valid slave pseudo-tty. In this case, the "t 1" option must be assigned in options field. (Note: this option is not supported by this release).

### *rastype*

- Console server type:
  - cm4001, for Opendgear CM4001
  - cm4008, for Opendgear CM4008
  - cm4116, for Opendgear CM4116
  - cm4148, for Opendgear CM4148.
  - sd4002, for Opendgear SD4002
  - sd4008, for Opendgear SD4008
  - im4208, for Opendgear IM4208
  - im4216, for Opendgear IM4216
  - im4248, for Opendgear IM4248
  - img4004, for Opendgear IMG4004
  - acm5002, for Opendgear ACM5002
  - acm5003, for Opendgear ACM5003
  - acm5004, for Opendgear ACM5004

### *rasname*

- Host Name or IP Address of the *console server* where the serial port resides.

### *physport*

- Number of physical port in the *console server*. If treated as the IP address associated with this port, in a IP-based addressing scheme.

### *type*

- Server type that will be contacted to handle the serial port:
  - rfc2217, for RFC2217 serial support
  - rtelnet, for Remote Telnet Server - socket, for Raw TCP Socket Server

### *options*

- Per-port specific options, passed to portshare-ser-cli program.

Secure SSH connections

To connect via a secure ssh tunnel, use the "-P" parameter as part of "opts", and give the TCP port number used for the local end of the tunnel. e.g. "-P 22222" will attempt to connect to local TCP port 22222. Also set the rasname to "localhost". The ssh tunnel must already be setup for this to work.

#### Example 1.

Device on a CM4008 console server 192.168.0.1 Port 1, accessed through /dev/otty01 device file name, using RFC2217 protocol:

```
/dev/otty01:cm4008:192.168.0.1:1:rfc2217:
```

#### Example 2.

Device on a CM4148 console server 192.168.0.2 Port 2, accessed through /dev/otty02 device file name, using RFC2217 protocol:

```
/dev/otty02:cm4148:192.168.0.2:2:rfc2217:
```

#### FILES

*/etc/portshare-devices*

## 2.3 Some PortShare application examples

These examples show the actual virtual port configuration and explain how the configuration should be done, using examples:

### ***/etc/portshare-devices***

Entry Syntax:

```
devname:cmtype:cmname:physport:type:options
```

where :

*devname* -> Device full pathname

*rastype* -> Console Server type (cm4008 or CM4116 or CM4148)

*rasname* -> Console Server host name or IP address

*physport* -> Physical port number on Console Server

*type* -> Server type : rfc2217 or socket (raw TCP)

*opts* -> per-port interface options (optional)

To connect via a secure ssh tunnel, use the '-P' parameter as part of "opts", and give the TCP port number used for the local end of the tunnel. e.g. "-P 22222" will attempt to connect to local TC port 22222. Also set the rasname to "localhost". (Note: The ssh tunnel must already be setup for this to work).

Example 1.

Connect to port 1 on a 48 port *console server* at IP address 10.111.254.1, using RFC2217:

```
/dev/otty01:cm4148:10.111.254.1:1:rfc2217
```

Example 2.

Connect to port 8 on a CM4008 console server at IP address 10.111.254.2, using RFC2217:

```
/dev/otty02:cm4008:10.111.254.2:8:rfc2217
```

Example 3.

Create an ssh tunnel from localhost to *console server*. This tunnel connects to serial port 3 on the *console server* and uses rfc2217. Assume the rfc2217 TCP port base on the *console server* is set to the alternate value of 9000 (whereas by default it would be 5000). The local TCP port used for the tunnel is 12345:

```
ssh -L 12345:10.111.254.3:9003 <username>@10.111.254.3 -N
```

Now use this tunnel to make the connection:

```
/dev/otty03:cm4008:localhost:3:rfc2217:-P 12345
```

## 3. PortShare License Agreements

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### 3.1 End User License Agreement -PortShare for Windows

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