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TA #: 111241

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# How do I connect to my ISP using dynamic IP addressing on SCO OpenServer 5?

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## Keywords

openserver5 v5 505 5.0.5 internet connect route ppp resolv.conf nameserver cache dynamic ip address web allocation morningstar morning star negotiation protocol modem scoadmin netconfig configuration manager /usr/lib/mstppp default mst dns resolv.conf localhost:615/mana/mana freeserve.co.uk troubleshoot isp timeout readlog nolqm echolqm demon

## Release

SCO OpenServer Enterprise System Release 5.0.5  
SCO PPP from Morning Star Release 2.1.3

## Problem

I want to connect my SCO OpenServer 5.0.5 system to an Internet Service Provider (ISP) so I can gain access to the Internet and World Wide Web (WWW). My particular ISP has told me they will dynamically allocate my system an Internet (or IP) address. How do I set up my SCO system?

## Solution

The following example explains the steps necessary to connect to the provider via SCO PPP from Morning Star.

### Background:

In order to connect out to the Internet your system has to become a logical part of the Internet. The ISP in this case provides you with an IP address. Once you use this address you are effectively "seen" on the Internet. You are identified by your IP address and any IP packets addressed to you will be directed to this IP destination. The ISP dynamically allocates you this IP address because there are only a finite number of addresses available worldwide. Most are already allocated to the original sites that went to make

up the Internet network, these are usually companies and institutions rather than individual users. The ISP will have a pool of addresses it can provide to its customers. This saves the customer having to seek their own specifically allocated address. The ISP pool is finite and is recycled between its customers as they connect and disconnect from the Internet. The address is dynamically allocated to you as you connect.

In order to connect SCO OpenServer 5.0.5 to such an ISP, a PPP (or Point-to-Point protocol) connection must be made from the SCO system to the remote ISP system. This is usually over a **modem** connection. The PPP connection will allow the two systems to interact using the TCP/IP transport protocol which will use the allocated IP address.

In this example, the Morning Star PPP (MST PPP) product included with the SCO OpenServer 5.0.5 product package is used for the PPP implementation. This allows the OpenServer 5.0.5 system to handle dynamically allocated IP addresses. The OpenServer 5.0.5 networking stack also contains, by default, the SCO PPP product. In previous versions of OpenServer 5, pre-5.0.4 release, this did not have the facility to use dynamically allocated IP addresses.

The SCO PPP product is configured via the netconfig(adm) interface. It needs to be replaced if SCO PPP from Morning Star is being used. SCO PPP from Morning Star 2.1.3a is available on the SCO OpenServer 5.0.5 "Optional Services" CD-ROM media or from the SCO download website at:

<http://www.sco.com/downloads>

The broad steps involved to set up PPP are:

1. Contact your ISP and obtain details of your account, your login name, password, phone number and an example IP address (and usually a nameserver IP address).
2. Remove SCO PPP.
3. Install MST PPP.
4. Configure MST PPP via the Internet Manager.
5. Test the connection.

**Installation:**

As mentioned previously, by default the OpenServer 5 networking product contains "SCO PPP". This needs to be removed before "Morning Star PPP (MST PPP)" is installed. If you install Morning Star PPP without doing this, you will receive a warning message.

To remove SCO PPP, take these steps:

1. If any SCO Release Supplements such as RS505C have been loaded they

may need to be removed for the moment, otherwise SCOadmin will error.

2. To start the OpenServer Software Manager utility, either double-click on the "System Administration" icon on the SCO Desktop, or log in as the "root" user and type:

```
# scoadmin
```

3. Select "SCO OpenServer Enterprise System", then "Connectivity", then "SCO TCP/IP (version 2.1.1)", then "PPP Runtime Utilities and drivers". Highlight this option and choose "Software", "Remove Software".

4. Reboot the system.

To install MST PPP:

1. Again, in SCOadmin, select "Install New", from the current host.

2. Select the CD-ROM media.

3. Choose "SCO PPP from Morning Star 2.1.3."

Configuration:

After installing PPP, it must be configured to run on the system. While running as the system "root" user, double-click on the SCO Desktop "Internet Configuration" icon (takes you to <http://localhost:615/mana/mana/init.mana>).

If you open your Netscape Communicator Browser and connect to the following URL you will see associated Internet Services:

<http://localhost:615/mana/mana>

Generally, the [netconfig\(ADM\)](#) utility is used to configure the OpenServer network transports, but NOT in the case of Morning Star PPP.

Log in to the Internet Manager by giving the username "admin" and the OpenServer system's "root" user password.

The various services that can be configured should now be presented on the screen. Choose "Net". The manager will then usually show only the system LAN card listed (net 0) and the loopback interface (lo0) on a newly installed system.

Click on:

"PPP Connections"

"Add New Dial out PPP connection"

## Note

Do **NOT** use any **TAB** or **Carriage Return** characters in the interface, move between the fields with the mouse. Also, put "9999" in first as the phone number (because the vtcl interface fails with large phone numbers). If the Internet Manager interface gives errors, such as "Integer too large to represent", go back and start again.

The idea detailed below is that once a basic interface of some form is added, the control files located in the "/usr/lib/mstppp" directory can be edited to the required settings. Set the following:

Input the Local and Remote PPP IP addresses.

Set both Check Boxes on Local and Remote PPP address to "Dynamic".

Set the "Remote" and "Local" addresses to any IP address for the initial connection, for example "197.1.1.1" and "197.1.1.2". These are just dummy addresses, used in the initial handshaking between the two PPP daemons, once the connection is made your IP address will be assigned by your ISP daemon.

Enter the "Remote PPP account login name". (provided by the ISP)

Enter the "Password". (again set by the ISP)

Enter the "Remote phone number" of the ISP (set to "9999").

Set "Connection" as **modem**.

Set "Timeout" to 0 seconds.

Turn off "Dial at boot time".

Set the "Serial port baud rate" as 9600. (you can increase later)

Set the COM port where the **modem** is attached, in this example at "tty2A". Ensure that if the **modem** port is to be "tty2A", that it has been previously configured into the system with [scoadmin\(ADM\)](#). Choose:

Hardware Manager

Highlight "Serial Port"

Double-click and add "IBM-COM2" (for this example).

The system must be relinked and rebooted.

Choose the **"Modem Type"**, for example **"US Robotics Courier V32.bis"**.

Leave ALL the **"PAP/CHAP"** options blank.

Set the **"Netmask for PPP connection"** to **"255.255.255.0"**.

Set the **"Debugging level"** to 5.

Click on **"Create"**.

Once the information given is submitted, the operating system must be rebooted. The new PPP interface (du0) can then be seen via the [netstat\(TC\)](#) utility:

```
# netstat -i

Name  Mtu  Network      Address  Ipkts  Ierrs  Opkts  Oerrs  Coll
...
du0   1500  197.1.1      197.1.1.1  0     0     14     0     0

# ifconfig -a

...
du0: flags=3D4071<UP,POINTOPOINT,WANTIOCTLS,RUNNING,MULTICAST>
mtu 1500 inet 197.1.1.1 --> 197.1.1.2 netmask ffffffff00
perf. params: recv size: 4096; send size: 8192; full-size
frames: 1
```

The system files should now contain the information input via the Internet Manager:

```
(/usr/lib/mstppp/Systems)
197.1.1.2 Any;5 ACU 9600 <phone number> "" "" in:--in:
\d<login name> word: \q<password>
```

Edit the phone number and remember to put in any prefix to get an outside line from your building or international dialing code:

```
(/usr/lib/mstppp/Devices)
```

```

USR-SPORTSTER tty2A 9600

(/usr/lib/mstppp/Autostart)

/usr/lib/mstppp/dialout 197.1.1.1~:197.1.1.2~ auto exec

/usr/lib/mstppp/exec.dialout netmask 255.255.255.0 debug 5

```

### Testing:

In order to test the connection, try to keep your system configuration as simple as possible. In this example, the system had a LAN connection and the PPP connection. Physically disconnect the LAN cable connection in case you inadvertently update your own office nameservers with the wrong information (that is, you could be advertising that the default route to the Internet is through your own system rather than an accepted route). You can also move, by renaming, any `/etc/resolv.conf` resolver file that may be using, for example, a Domain Name service (DNS). The system should equate to a single PC user connecting only to their ISP.

The default route to the Internet is set inside the Internet Manager menus. Choose "Net", then "Network Routing", and then click on the drop down list. It should show the LAN NIC and the PPP connection. Set the PPP Configuration as the default route to the Internet. Also make it a gateway. Click on the box marked "add this route when the system boots". The routes are set in the `/usr/internet/etc/sco_ip/routes` file, they contain for example:

```
net default 197.1.1.2
```

The `"netstat -nr"` command should show it listed as the default route.

At this point, it is wise to check that the **modem** is actually dialing out correctly and that the ISP is replying to us. The call can be tested by manually dialing the ISP telephone number to see what happens. Use the [cu\(C\)](#) utility to connect to the **modem** and dial the ISP number using the Hayes AT command set.

Add the following lines to the relative files so you set up a system called **"modem"**:

Edit the `/usr/lib/uucp/Systems` file and add:

```
modem Any mydialer 9600
```

Edit `/usr/lib/uucp/Devices` and add:

```
mydialer tty2A - 9600
```

Edit `/usr/lib/uucp/Dialers` and add:

```
mydialer "" "" ATZ OK-ATZ-OK ATD\s\T CONNECT
```

The entries above should work with most Hayes compatible **modems** and are fairly basic. If you cannot get a connection with these, there may be a problem with your cabling or **modems**. If you cannot get a working cu connection, there is no chance that you will get a PPP connection working.

Disable the **modem** port, in this case tty2A, with:

```
# disable tty2A

# cu modem
Connected
atdt <telephone number of ISP>
CONNECT 9600/ARQ
```

You should usually be prompted for a login and password, which the ISP has provided beforehand.

```
Login: xyz123
Password:
```

```
PPP session from (<IP address X.Y.Z.Q>) to <IP address A.B.C.D>
beginning..
..~==FF}#=CO!}!!} }4}" } & } } } } }%}& =BC=AF.}'"}({}"=A8m~==FF}#=CO!}!!}=" } =
}4}"&} } } } }%}& =BC=AF.}'"}({}"b=DO~==FF}#=CO!}
```

The PPP chat although unreadable shows there is a process there.

Once you are certain that a PPP daemon is present, you can try pinging the remote side of the PPP connection. The **modem** should ring out; after a pause, you should get the ping acknowledged.

If the ping fails, for example with the error "No route to Host", check your routing again.

Then try pinging a site past the ISP, for example, the SCO ftp site at ftp.sco.com at IP address 209.1.8.6 or the SCO WWW page at 209.1.8.14.

You should then be able to open your Netscape browser and connect to "<http://www.sco.com>" over the PPP connection.

**Debugging:**

You can set the debug level of the connection within the Internet Manager, for example it was set to "5". You can read the log using the command "readlog" in the "/usr/lib/mstppp" directory.

**A typical problem is the chat script or initial handshaking on the connection. Check the log and you should be able to see the sequence of events and characters passed between the sites.**

**As an example, here is an abridged sequence for a connection to the ISP Freeserve.co.uk:**

.. on bootup, we have the next few lines written into the log

```
213:(16:59:26 07/11/00 BST):Compiling /usr/lib/mstppp/Filter...
214:(16:59:26 07/11/00 BST):Filter for 197.1.1.2 from /usr/lib/mstppp/Filter
installed
```

on du0

```
301:(16:59:26 07/11/00 BST):Morning Star PPP OEM
301:(16:59:26 07/11/00 BST):Version 2.0.02 [22-Feb-1999 16:38:40 sco-i386
]
309:(16:59:26 07/11/00 BST):du0: pppd 197.1.1.1~:197.1.1.2~ auto exec
```

```
/usr/lib/mstppp/exec.dialout netmask 255.255.255.0 debug 5
```

.. starting the dialout

```
5000:(17:02:38 07/11/00 BST)::8/0/icmp 197.1.1.1 -> 209.1.8.6 84 bringup
194:(17:02:38 07/11/00 BST):Lock file /usr/spool/uucp/LCK..tty2a created
187:(17:02:38 07/11/00 BST):Dialing 197.1.1.2 (tty2A 9600 <phone number>
USR-SPORTSTER)
197:(17:02:38 07/11/00 BST):abort on (BUSY)
197:(17:02:38 07/11/00 BST):abort on (ERROR)
197:(17:02:38 07/11/00 BST):abort on (NO CARRIER)
197:(17:02:38 07/11/00 BST):abort on (NO DIAL TONE)
197:(17:02:38 07/11/00 BST):abort on (NO ANSWER)
198:(17:02:38 07/11/00 BST):timeout set to 5 seconds
206:(17:02:38 07/11/00 BST):expect ( )
207:(17:02:38 07/11/00 BST):got it
203:(17:02:38 07/11/00 BST):send (AT^M)
206:(17:02:38 07/11/00 BST):expect (OK)
206:(17:02:38 07/11/00 BST):AT^M^M
206:(17:02:38 07/11/00 BST):OKgot it
203:(17:02:38 07/11/00 BST):send (ATDT<phone number>^M)
198:(17:02:39 07/11/00 BST):timeout set to 60 seconds
206:(17:02:39 07/11/00 BST):expect (CONNECT)
206:(17:02:39 07/11/00 BST):^M
206:(17:02:39 07/11/00 BST):ATDT<phone number>^M^M
206:(17:02:55 07/11/00 BST):CONNECTgot it
206:(17:02:55 07/11/00 BST):expect ( )
207:(17:02:55 07/11/00 BST):got it
203:(17:02:55 07/11/00 BST):send (^M)
206:(17:02:55 07/11/00 BST):expect (in:)
206:(17:02:55 07/11/00 BST): 9600/ARQ^M
206:(17:02:55 07/11/00 BST):^M
```

.. starting the login sequence. You may need to experiment with the chat script here, it is a common problem. Check what the remote site is looking for and what you are sending it.

```
206:(17:02:55 07/11/00 BST):login:got it
```

```

203:(17:02:55 07/11/00 BST):send (\d<login name>^M)
203:(17:02:55 07/11/00 BST):delay
206:(17:02:58 07/11/00 BST):expect (word:)
206:(17:02:58 07/11/00 BST): ^M
206:(17:02:58 07/11/00 BST):login: <login name>^M
206:(17:02:58 07/11/00 BST):Password:got it
203:(17:02:58 07/11/00 BST):send (???????)
188:(17:02:58 07/11/00 BST):Chat script succeeded
282:(17:02:58 07/11/00 BST):Set interface MTU to 1500
282:(17:02:58 07/11/00 BST):Set interface Async-Map to 0xFFFFFFFF
288:(17:02:58 07/11/00 BST):Set Protocol-Field-Compression off
287:(17:02:58 07/11/00 BST):Set Address-and-Control-Field-Compression off=

230:(17:02:58 07/11/00 BST):LCP: Sending option Async-Map 0xA0000 (^S,^Q)=

233:(17:02:58 07/11/00 BST):LCP: Sending option Magic-Number 0xBD5274C
234:(17:02:58 07/11/00 BST):LCP: Sending option Quality-Protocol LQM, Rep=
orting-Period =

10.00s
235:(17:02:58 07/11/00 BST):LCP: Sending option Prot-Compression
236:(17:02:58 07/11/00 BST):LCP: Sending option Addr-Ctl-Compression
209:(17:02:58 07/11/00 BST):Sending LCP Configure-Request, ID 101, state =
Starting (1)
172:(17:02:58 07/11/00 BST): ^M
172:(17:02:59 07/11/00 BST):Entering PPP mode.^M
172:(17:02:59 07/11/00 BST):Async interface address is unnumbered (FastEt=
hernet0)^M

.. assigning your IP address

172:(17:02:59 07/11/00 BST):Your IP address is <xxx.xxx.xxx.xxx>. MTU is =
1500 bytes^M
172:(17:02:59 07/11/00 BST):^M
211:(17:02:59 07/11/00 BST):Received LCP Configure-Request, ID 17, state =
Req-Sent (6)
249:(17:02:59 07/11/00 BST):LCP: Received option Async-Map 0xA0000 (^S,^Q=
) (Ack)
251:(17:02:59 07/11/00 BST):LCP: Received option Magic-Number 0x2598DC3E =
(Ack)
253:(17:02:59 07/11/00 BST):LCP: Received option Prot-Compression (Ack)
254:(17:02:59 07/11/00 BST):LCP: Received option Addr-Ctl-Compression (Ac=
k)
255:(17:02:59 07/11/00 BST):LCP: Received option MRRU (Rej)
1215:(17:02:59 07/11/00 BST):LCP: Received unknown option 19 (Rej)
256:(17:02:59 07/11/00 BST):LCP: Replying with Configure-Reject
209:(17:02:59 07/11/00 BST):Sending LCP Configure-Reject, ID 17, state Req-Sent
(6)
211:(17:02:59 07/11/00 BST):Received LCP Configure-Ack, ID 101, state Req-Sent
(6)
211:(17:03:01 07/11/00 BST):Received LCP Configure-Request, ID 18, state
Ack-Rcvd (7)
249:(17:03:01 07/11/00 BST):LCP: Received option Async-Map 0xA0000 (^S,^Q) (Ack)
251:(17:03:01 07/11/00 BST):LCP: Received option Magic-Number 0x2598DC3E (Ack)
253:(17:03:01 07/11/00 BST):LCP: Received option Prot-Compression (Ack)
254:(17:03:01 07/11/00 BST):LCP: Received option Addr-Ctl-Compression (Ack)
255:(17:03:01 07/11/00 BST):LCP: Received option MRRU (Rej)
1215:(17:03:01 07/11/00 BST):LCP: Received unknown option 19 (Rej)
256:(17:03:01 07/11/00 BST):LCP: Replying with Configure-Reject

```

```

209:(17:03:01 07/11/00 BST):Sending LCP Configure-Reject, ID 18, state Ack-Rcvd
(7)
211:(17:03:01 07/11/00 BST):Received LCP Configure-Request, ID 19, state
Ack-Rcvd (7)
249:(17:03:01 07/11/00 BST):LCP: Received option Async-Map 0xA0000 (^S,^Q) (Ack)
251:(17:03:01 07/11/00 BST):LCP: Received option Magic-Number 0x2598DC3E (Ack)
253:(17:03:01 07/11/00 BST):LCP: Received option Prot-Compression (Ack)
254:(17:03:01 07/11/00 BST):LCP: Received option Addr-Ctl-Compression (Ack)
256:(17:03:01 07/11/00 BST):LCP: Replying with Configure-Ack
209:(17:03:01 07/11/00 BST):Sending LCP Configure-Ack, ID 19, state Ack-Rcvd (7)
282:(17:03:01 07/11/00 BST):Set interface Async-Map to 0xA0000 (^S,^Q)
288:(17:03:01 07/11/00 BST):Set Protocol-Field-Compression on
287:(17:03:01 07/11/00 BST):Set Address-and-Control-Field-Compression on
219:(17:03:01 07/11/00 BST):IPCP: Sending option IP-Address 197.1.1.1
220:(17:03:01 07/11/00 BST):IPCP: Sending option IP-Compression-Protocol 0x002D,

```

Max-Slot-ID 15, Comp-Slot-ID 1

```

209:(17:03:01 07/11/00 BST):Sending IPCP Configure-Request, ID 101, state
Starting (1)
211:(17:03:01 07/11/00 BST):Received IPCP Configure-Request, ID 190, state
Req-Sent (6)
223:(17:03:01 07/11/00 BST):IPCP: Received option IP-Address 195.92.65.16: (Ack)
228:(17:03:01 07/11/00 BST):IPCP: Replying with Configure-Ack
209:(17:03:01 07/11/00 BST):Sending IPCP Configure-Ack, ID 190, state Req-Sent
(6)
211:(17:03:01 07/11/00 BST):Received IPCP Configure-Reject, ID 101, state
Ack-Sent (8)
1178:(17:03:01 07/11/00 BST):IPCP: Peer rejected Compression-Type
219:(17:03:01 07/11/00 BST):IPCP: Sending option IP-Address 197.1.1.1
209:(17:03:01 07/11/00 BST):Sending IPCP Configure-Request, ID 102, state
Ack-Sent (8)
211:(17:03:02 07/11/00 BST):Received IPCP Configure-Nak, ID 102, state Ack-Sent
(8)
1168:(17:03:02 07/11/00 BST):IPCP: Received Nak for option IP-Address
62.136.101.164
219:(17:03:02 07/11/00 BST):IPCP: Sending option IP-Address 62.136.101.16 4
209:(17:03:02 07/11/00 BST):Sending IPCP Configure-Request, ID 103, state
Ack-Sent (8)
211:(17:03:02 07/11/00 BST):Received IPCP Configure-Ack, ID 103, state Ack-Sent
(8)
284:(17:03:02 07/11/00 BST):Set interface addresses to local 62.136.101.1 64
destination

```

195.92.65.16

```

286:(17:03:02 07/11/00 BST):Set VJ TCP header compression off for receiving, off
for sending
278:(17:03:02 07/11/00 BST):Set interface up
279:(17:03:02 07/11/00 BST):PPP connected to 195.92.65.16 on du0

```

.. here is some ping/browse traffic

```

261:(17:03:12 07/11/00 BST):LQM: Pkt: 15/41(39) Oct: 1046/3243(3067) LQRs: 1/1
261:(17:03:22 07/11/00 BST):LQM: Pkt: 3/3 Oct: 203/237 LQRs: 2/2
261:(17:03:32 07/11/00 BST):LQM: Pkt: 1/1 Oct: 55/53 LQRs: 3/3
261:(17:03:42 07/11/00 BST):LQM: Pkt: 1/1 Oct: 55/53 LQRs: 4/4
261:(17:03:52 07/11/00 BST):LQM: Pkt: 2/2 Oct: 115/149 LQRs: 5/5

```

## Associated Files:

MST PPP and routing startup files are in:

```
/etc/rc2.d/S85tcp  
/etc/rc2.d/S89mstppp  
/etc/rc2.d/S90iproute  
/etc/default/tcp  
/etc/hosts  
/etc/resolv.conf
```

Also, look at the directories:

```
/usr/internet  
/usr/lib/mstppp
```

## Other Issues:

In this example, the PPP connection is the only network connection on the SCO OpenServer 5 system. The **modem** will dial out automatically on reboot of the system. If the **modem** is switched off, the dial will fail and network routing will not be set up correctly, "netstat -i" will not return anything. The Internet Manager will also not be able to connect. Power on the **modem** and ping the remote host to resume.

The connection by the Internet Manager to "<http://localhost:615>" may also fail, specify the IP address of the system (LAN Card) to gain access. A "site not allowed" error may be shown. See ta105371 for details on how to bypass this.

An idle timeout value of, for example, 600 seconds can be set (if required) by adding "idle 600" to the end of the "Autostart file".

Certain ISP sites require matching LQM (link quality management) values when re-establishing a connection, adding "nolqm echolqm" can bypass this.

If the system is going to be used perhaps for a business connection, providing a gateway for other systems on an internal LAN, routing will need to be addressed (your ISP will usually provide a nameserver facility which you point to by adding "nameserver <IP address> in your "/etc/resolv.conf" file). Static routes to internal networks may need to be added to replace the default route that existed before the new default route to the ISP was added. Other issues such as Web browsing, ftp, mail may also be involved. These topics are beyond the scope of this article.

## Notes

In general, make sure that the OpenServer system also includes the latest

operating system Release and Network Supplements. These are available from the SCO website at URL <http://www.sco.com> or via anonymous ftp from <ftp.sco.com>

The IP addresses used in this TA are for example purposes only.

## See Also

SCO OpenServer 5.0.5 Networking Guide (SCOHelp Online documentation).

Connect to this URL for your SCO system Internet Product documentation:

<http://localhost:457/Internet>

**Technical Article 105371**, "How to enable remote access to the Internet FastStart Internet Manager."

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