Configuring TCP/IP Networking

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Note: TCP/IP should already be installed. If it is not, it must be installed from the VMS binaries CD.

TCP/IP Configuration

TCPIP$CONFIG

1.1) Remove all other users.

1.2) Login as SYSTEM

1.3) Type Command line: `@sys$manager:tcpip$config`

Then the following menu will be displayed:

```
HP TCP/IP Services for OpenVMS Configuration Menu

Configuration options

1 - Core environment
```

```
2 - Client components
3 - Server components
4 - Optional components
5 - Shutdown HP TCP/IP Services for OpenVMS
6 - Startup HP TCP/IP Services for OpenVMS
7 - Run tests
A - Configure options 1 - 4

[E] - Exit configuration procedure

Enter configuration option:
```

‘Core Environment’

Options 2, 3 & 4 must be configured. Options 1 and 5 are optional.

Option 1 ‘Core Environment’.

```
HP TCP/IP Services for OpenVMS Core Environment Configuration Menu
Configuration options:
1 - Domain
2 - Interfaces
3 - Routing
4 - BIND Resolver
5 - Time Zone
A - Configure options 1 - 5

[E] - Exit menu

Enter configuration option:
```

Select Option 2 ‘Interfaces’

> **Note:** On Itanium Servers and Alpha Server DS10 model there are two ethernet ports, WE0 and WE1. At this stage only WE0 should be configured.

The following question will be asked:

```
WE0 is the Ethernet device EWA0:


WE0 has not been configured


HP TCP/IP Services for OpenVMS Interface WE0 Configuration Menu


Configuration options:


1 - Configure interface manually
2 - Let DHCP configure interface


[E] - Exit menu (Do not configure interface WE0)


Enter configuration option:
```

Configure interface manually

Under most circumstances, the interface should be configured manually to use a static IP address, by selecting option 1.

You will be prompted for the following information (ask the local system adminstrator to provide this information):

```
Enter fully qualified host name:
```

Enter the full host name for the system. This should include the domain name, if appropriate. eg. system1.iptest.com

```
Enter Internet address for system1.iptest.com:
```

Enter the full "dotted-quad" IP address that has been assigned to this system. e.g.: 192.168.10.23

```
Enter Internet network mask for system1.iptest.com [255.255.0.0]:
```

Enter the network mask for the system. The default option will usually be correct, but check with the local system adminstrator.

```
Enter broadcast mask for system1.iptest.com [192.168.255.255]:
```

Enter Broadcast mask for the system. The default option will usually be correct.

```
The following parameters will be used to define the
Internet interface WE0:


Host name: system1.iptest.com
Internet address: 192.168.10.23
Network mask: 255.255.0.0
Broadcast mask: 192.168.255.255


* Is the above correct [YES]:
```

If the details are correct, enter "Yes" and press return. Otherwise enter "No" and make corrections.

On Itanium models that are fitted with two network interfaces, you will be prompted to configure the second interface, WE1, now. Unless specfically required at the local site, this should not be configured.

Use DHCP to configure interface

If the local network uses DHCP auto-configuration, and it is required for this host, select option 2. If you do this, you may be presented with the "DHCP_Client Configuration" options. You should select option 2 "Enable and Start service on this node".

Please note that it is not always appropriate to use DHCP. Review the intended role of the host and ensure that dynamic addressing is suitable before enabling this option.

On Itanium models that are fitted with two network interfaces, you will be prompted to configure the second interface, WE1, now. Unless specfically required at the local site, this should not be configured.

After configuring the interfaces, you will be asked which interface is the Primary DHCP Interface. Specify the first interface (WE0) to be the Primary DHCP interface.

The procedure will now return to the "Core Environment" menu.

Select Option 2 'Domain'

```
Enter Internet domain:
```

Enter the domain suffix for the local site. eg. iptest.com

The procedure will now return to the "Core Environment" menu.

The procedure will now return to the "Core Environment" menu.

If necessary, select Option 3 ‘Routing'. This will be necessary if the Itanium requires a "Default Gateway" or "Default Route" to access other systems on the network.

```
* Do you want to configure dynamic ROUTED or GATED routing [NO]:
```

Answer "No".

```
* Do you want to configure a default route [YES]:
```

If the system adminstrator has provided an IP or host address for a Default Gateway or Default Route, answer "Yes".

```
Enter your Default Gateway host name or address:
```

Enter the "dotted-quad" IP address of the Default Gateway. eg: 192.169.10.254

```
192.168.10.254 is not in the local host database.
If you want to enter the default gateway in the local host
database, enter its host name. Otherwise, enter <CR>.

Enter the Default Gateway host name []:
```

If the system adminstrator has provided a host name that corresponds to the Default Gateway, enter it now. Otherwise, just press return.

The procedure will now return to the "Core Environment" menu.

Enter "E" to return to the main TCP/IP Services menu.

The TCP/IP network environment is now configured. If specific TCP/IP client or server components are required, refer to Appendix F1.3 and F1.4 for documentation on configuring those services.

From the TCP/IP Services menu, select option 6 to start TCP/IP networking.

To enable TCP/IP networking to start automatically when the Itanium is booted, edit the main VMS startup file:

```
$ edit sys$login:systartup_vms.com
```

Locate the following line in this text file:

```
$!$ @SYS$STARTUP:TCPIP$STARTUP.COM
```

Remove the comment marker ($!) from the start of the line.

Locate the following section, and add comment markers ($!) at the start of each line:

```
$ SCSNODE = F$EDIT(F$GETSYI("SCSNODE"),"COMPRESS,TRIM")
$ DEFINE/SYSTEM TCPIP$INET_HOST 'SCSNODE'
$ DEFINE/SYSTEM TCPIP$INET_HOST 'SCSNODE'
```

Now save and exit from the file.

BIND Resolver Configuration

If the local network provide a DNS name resolution service. Use the BIND Resolver utility to configure your DNS details.

To use the BIND resolver utility open a terminal window and login as "system".

Once the terminal has loaded enter:

```
$ @tcpip$config
```

Once the menu has appeared select option 1 - Core Environment, followed by option 4 - BIND Resolver.

If you have not used the BIND Resolver utility before you will be prompted to:

```
Enter your BIND server name:
```

Enter the internet address of the local BIND (DNS) server. e.g.: 192.168.10.10

Next you will be asked to:

```
Enter remote BIND server name:
```

This can be skipped by pressing enter.

You will be then prompted to:

```
Enter next BIND server name:
```

This can also be skipped by pressing enter to continue.

You will be returned back to the menu and if you select option 4 again it should now display your new BIND resolver configurations. To return back to the menu. Answer with NO and press enter.

To ensure the configurations are setup. While in the menu screen, selected option 5 - Shutdown HP TCP/IP Services for OpenVMS, followed by option 6 - Startup HP TCP/IP Services for OpenVMS

To test that the BIND configurations are working you can run a ping command via terminal and see if a successful communication is established. For example:

```
$ tcpip ping 192.168.10.10
```

Client Components

From the main TCP/IP Menu, Select Option 2 ‘Client Components’.

> **Note:** See glossary for acronyms.

```
HP TCP/IP Services for OpenVMS Client Components Configuration Menu


Configuration options:


1 - FTP              Disabled Stopped
2 - NFS Client       Disabled Stopped
3 - REXEC and RSH    Disabled Stopped
4 - RLOGIN           Disabled Stopped
5 - SMTP             Disabled Stopped
6 - TELNET           Disabled Stopped
7 - DHCP             Disabled Stopped
8 - Telnetsym        Disabled Stopped
```

```
A - Configure options 1 - 8

[E] - Exit menu


Enter configuration option:
```

Each component can be configured, and then enabled and started. Enable only the components that are necessary for the local site.

Server Components

From the main TCP/IP Menu, Select Option 3 ‘Server Components’ – This is optional.

Enable the necessary server services, further services should be enabled as required.

```
HP TCP/IP Services for OpenVMS Server Components Configuration Menu


Configuration options:


 1 - BIND         Disabled Stopped    12 - NTP          Disabled Stopped
 2 - BOOTP        Disabled Stopped    13 - PC-NFS       Disabled Stopped
 3 - DHCP         Disabled Stopped    14 - POP          Disabled Stopped
 4 - FINGER       Disabled Stopped    15 - PORTMAPPER   Disabled Stopped
 5 - FTP          Disabled Stopped    16 - RLOGIN       Disabled Stopped
 6 - IMAP         Disabled Stopped    17 - RMT          Disabled Stopped
 7 - LBROKER      Disabled Stopped    18 - SNMP         Disabled Stopped
 8 - LPR/LPD      Disabled Stopped    19 - TELNET       Disabled Stopped
 9 - METRIC       Disabled Stopped    20 - TFTP         Disabled Stopped
10 - NFS          Disabled Stopped    21 - XDM          Disabled Stopped
11 - LOCKD/STATD  Disabled Stopped

A - Configure options 1 - 21
[E] - Exit menu

Enter configuration option:
```

Each component can be configured from this menu, then enabled and started. Enable only those components that are necessary for the local site.

See glossary for acronyms.

Testing

From the TCPIP$CONFIG main menu, select option 7 (Run Tests) to confirm the configuration. From the Run Tests menu choose option 1 (Internet IVP) only. This tests the configuration of TCP/IP on the local machine only. Do NOT run option 2 (SNMP IVP).

To test communication between the local Itanium and another TCP/IP-enabled computer, enter the following command at the DCL prompt:

```
$ tcpip
```

This enters the TCPIP command mode. You can now test TCP/IP network using the "ping" and "traceroute" commands. For example:

```
TCPIP> ping 192.168.10.20
PING 192.168.10.20 (192.168.10.20): 56 data bytes
64 bytes from 192.168.10.20: icmp_seq=0 ttl=128 time=0 ms
64 bytes from 192.168.10.20: icmp_seq=1 ttl=128 time=0 ms
64 bytes from 192.168.10.20: icmp_seq=2 ttl=128 time=0 ms
64 bytes from 192.168.10.20: icmp_seq=3 ttl=128 time=0 ms

----192.168.10.20 PING Statistics----
4 packets transmitted, 4 packets received, 0% packet loss
round-trip (ms) min/avg/max = 0/0/0 ms
```

Changing IP Address or Hostname

Rerun `TCPIP$CONFIG` and select "Core Environment". Select "Interfaces" from the next menu. Then change the IP address and/or Hostname as required. The system will ask if multiple IP addresses are required on this system, answer NO.

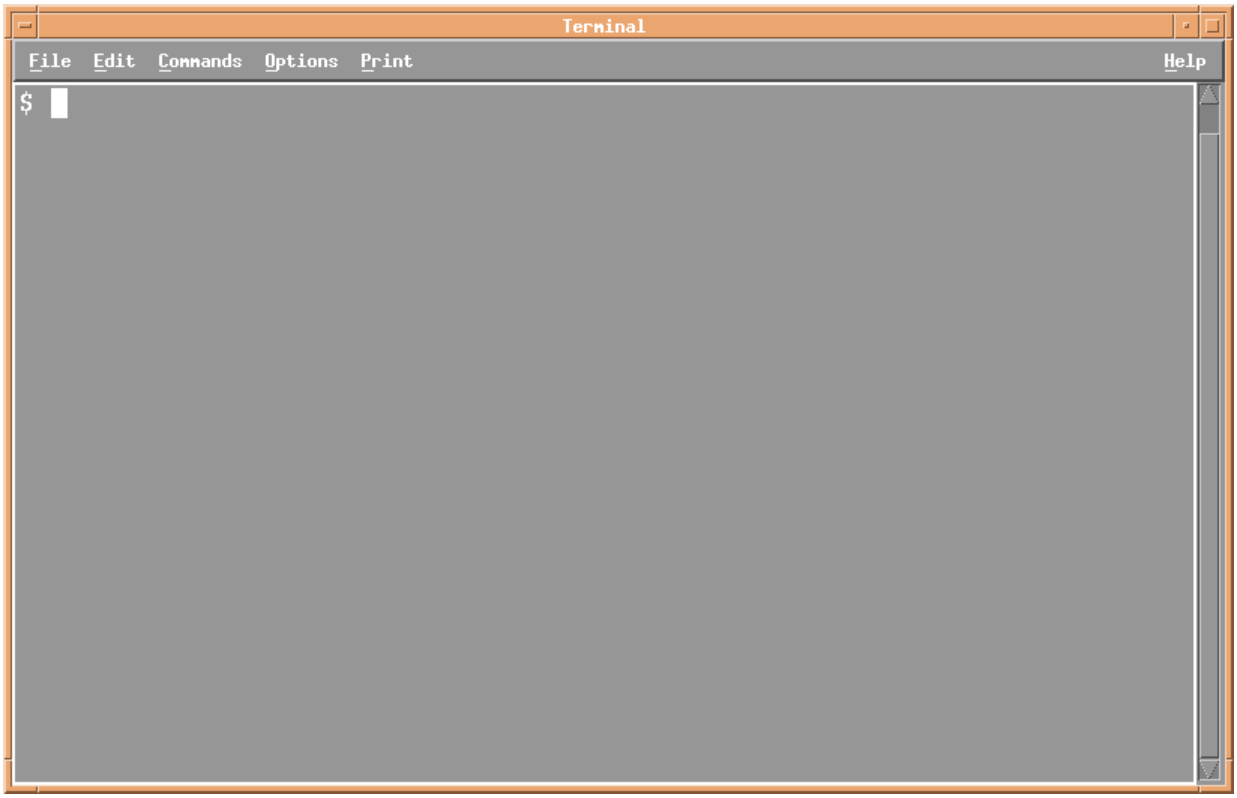
NTP Setup

NTP (Network Time Protocol) synchronises the time on the TESTER to another specified server(s), which has an NTP Server configured on it. This allows for a TESTER to match the local timezone and be inline with other equipment in the factory.

Timezone Adjustment

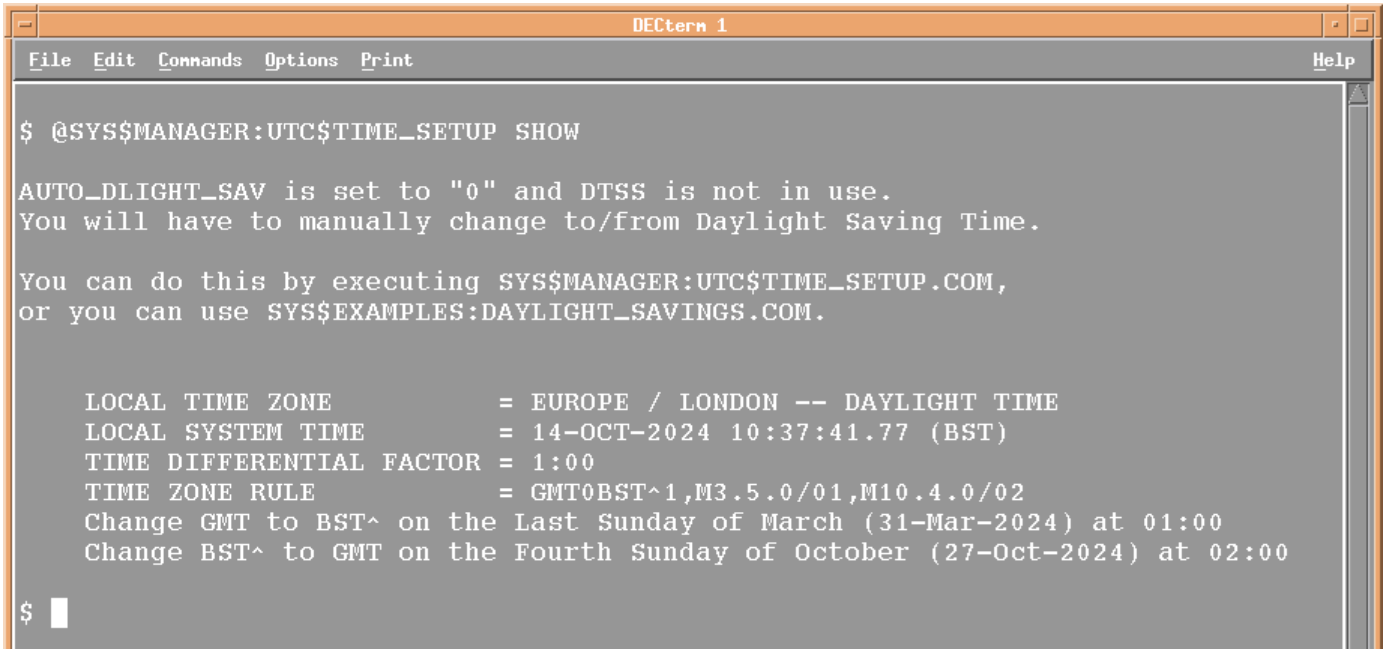
By default a TESTER will likely have been set to the UK Timezone during its initial setup. As a first step it is recommended to configure the OpenVMS Controller to its new local timezone as a backup solution if the OpenVMS Controllers connection to an NTP server is suddenly lost.

To update the timezone settings on an OpenVMS Controller, first login to the `SYSTEM` account and open a Terminal Window.



Once the Terminal Window has launched, executing the following command:

```
$ @SYS$MANAGER:UTC$TIME_SETUP SHOW
```



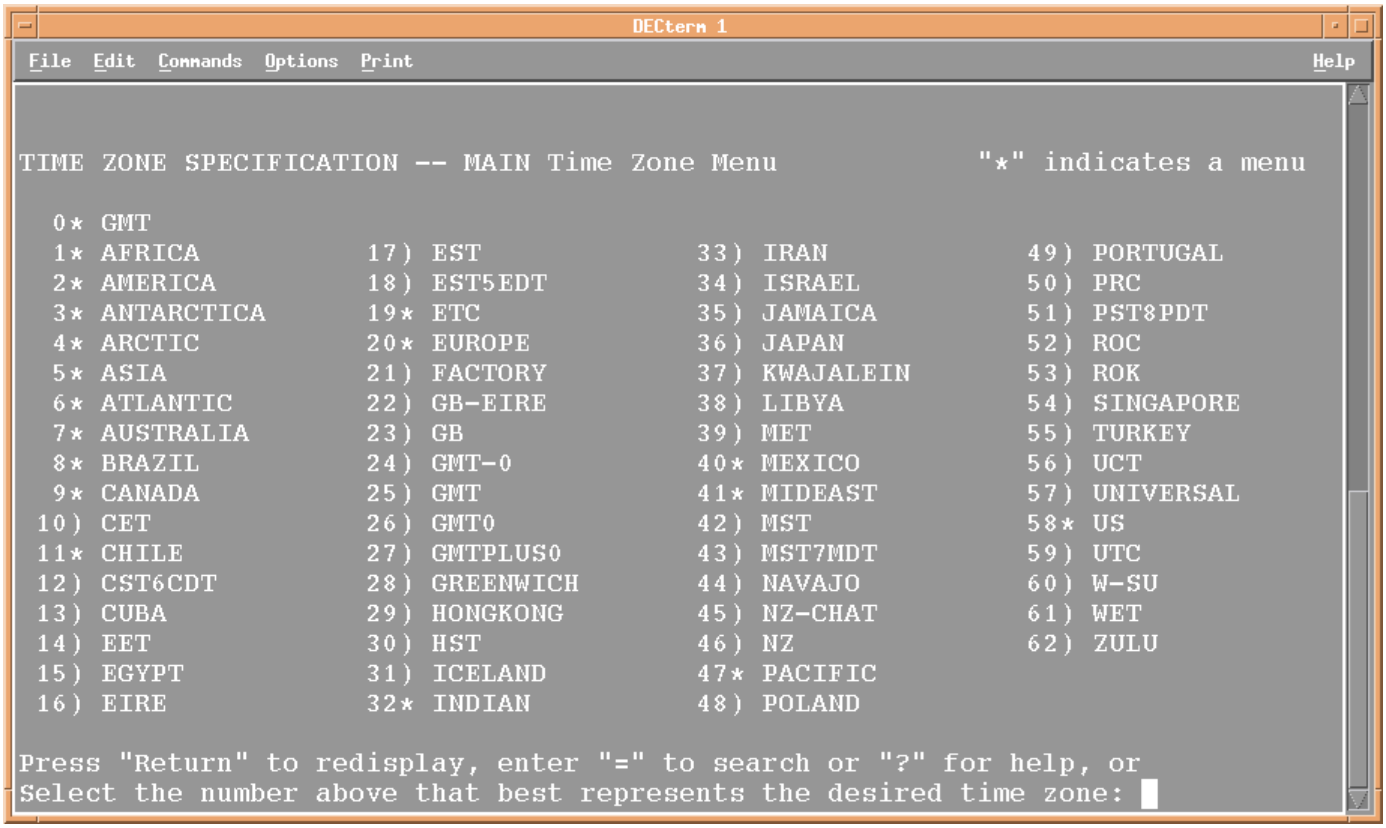
After executing the above command, you should be able to see what timezone has been set on the OpenVMS Controller.

If the timezone on the OpenVMS Controller is not set to the desired region then execute the following command:

```
$ @SYS$MANAGER:UTC$TIME_SETUP
```

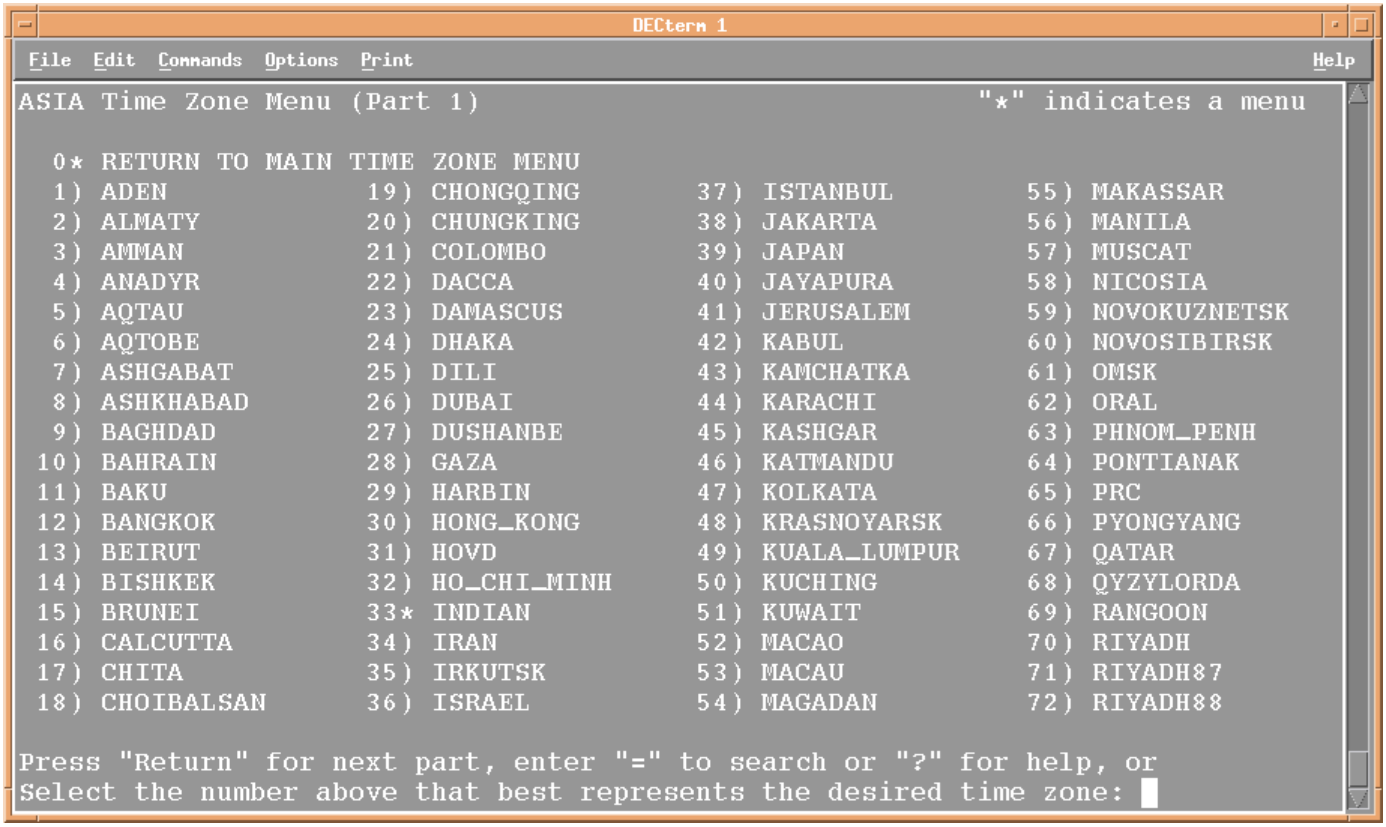
> **NOTE:** The following is an alternative command to use for identifying the current timezone:
> `$ TYPE SYS$SYSDEVICE:[VMS$COMMON.SYSEXE]SYS$TIMEZONE_SRC.DAT`

After executing the above command, you will be presented with the following menu:



Please select the option most applicable to the desired location. For some of the options you will see an asterisk (*), this means there are more options available.

In this example we will update the current OpenVMS Controller timezone to Malaysia. To do this, please select `option 5`. Which will give the following options:

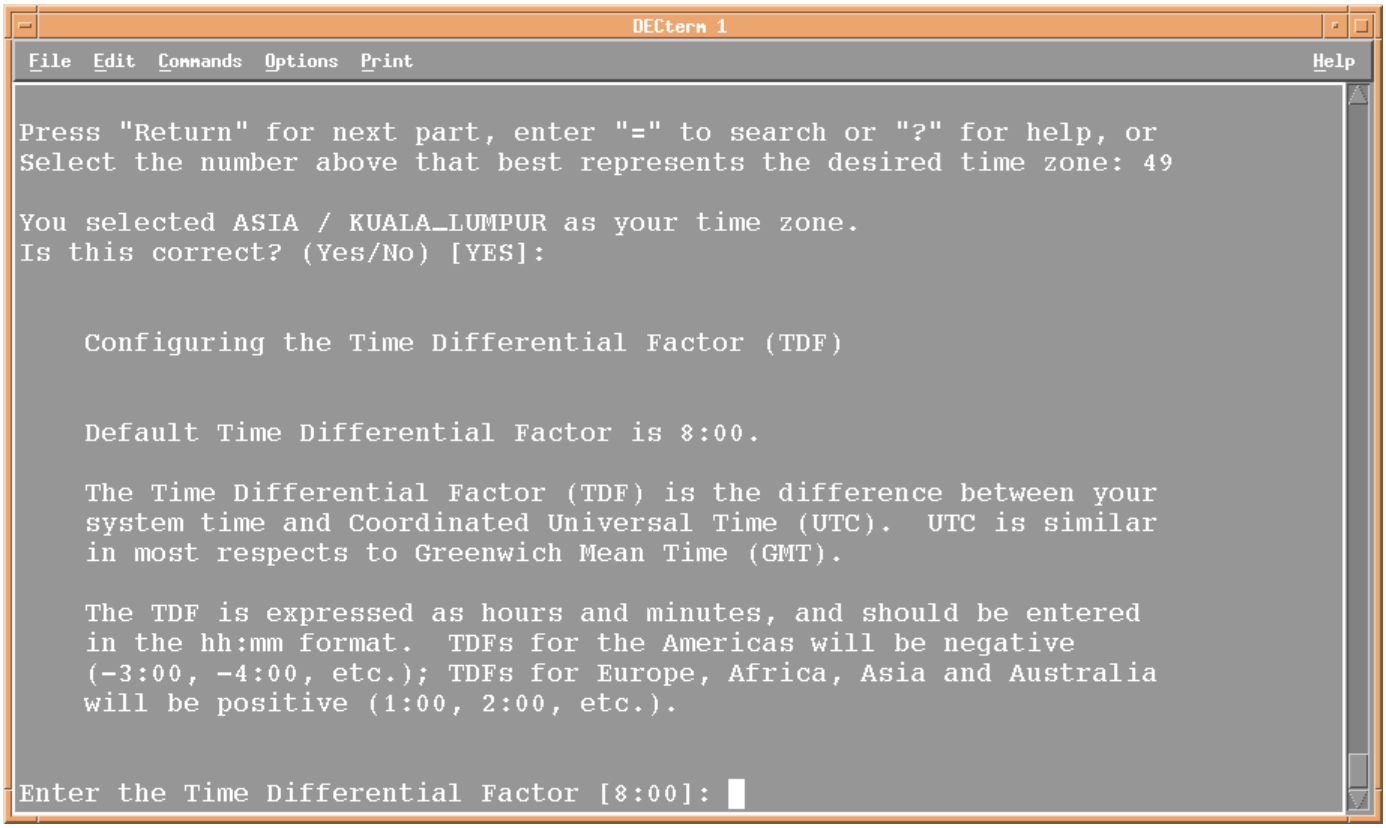


In the new set of menu options, enter `49` to select `Kuala_Lumpur` as the desired timezone. You will then be prompted to confirm your input, please select the Enter key to continue.

```
Press "Return" for next part, enter "=" to search or "?" for help, or
Select the number above that best represents the desired time zone: 49

You selected ASIA / KUALA_LUMPUR as your time zone.
Is this correct? (Yes/No) [YES]:
```

You will then be asked to confirm the timezone difference, the default is set to `8:00` hour difference, if this is correct, select the Enter key to continue:



You will then be asked to confirm if you have a seasonal time change in effect, for example day light savings, if not, then simply press the Enter key to continue.

```
Enter the Time Differential Factor [8:00]:

    If this is a seasonal time change, it may also be necessary to
    modify the system time.  Generally, seasonal time changes result
    in adding 1:00 hour, or adding -1:00 hour to the system time.

Do you wish to modify the local system time [N]:
```

Then be asked to confirm if the settings are correct, if so, press the Enter key to continue.

```
Do you wish to modify the local system time [N]:

    NEW SYSTEM TIME DIFFERENTIAL FACTOR = 8:00

Is this correct? [Y]:
```

NTP Server Sync Setup

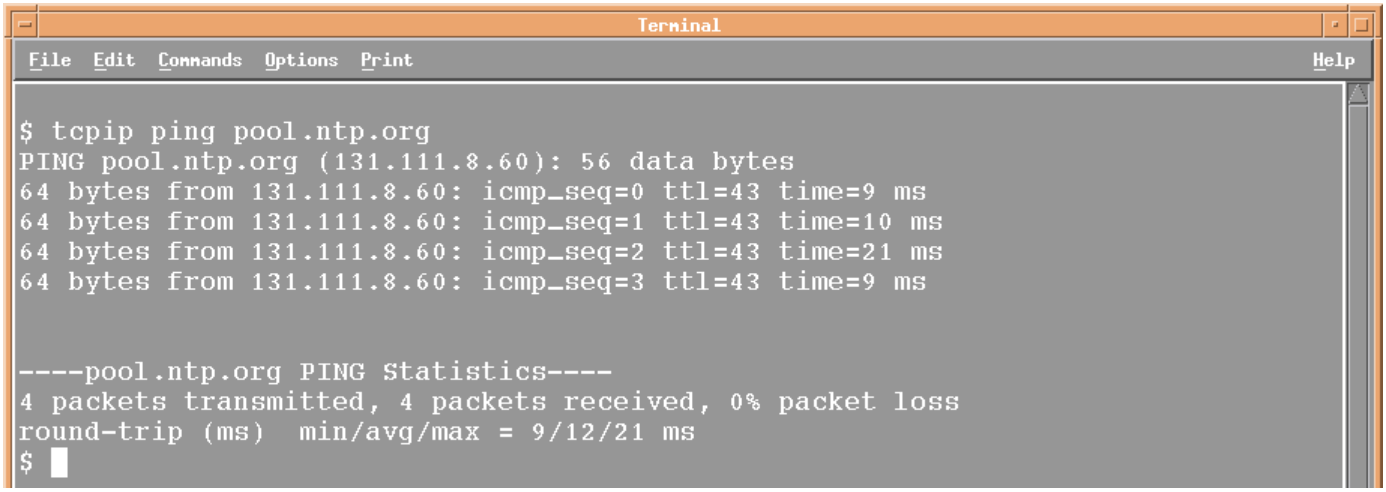
If your factory has an NTP Server and you know the address, it is first recommended to confirm the OpenVMS Controller can communicate with it before moving onto the steps listed in this section.

First login to the `SYSTEM` account and open a Terminal Window. In this example we will be using the hostname `pool.ntp.org` for our UK NTP server.

In the Terminal Window, please execute the following command:

```
$ TCPIP PING POOL.NTP.ORG
```

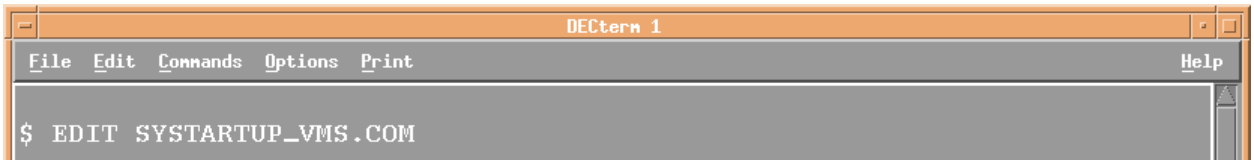
If there is a successful communication between the OpenVMS Controller and the NTP Server, the Terminal Will output messages like what is shown below:



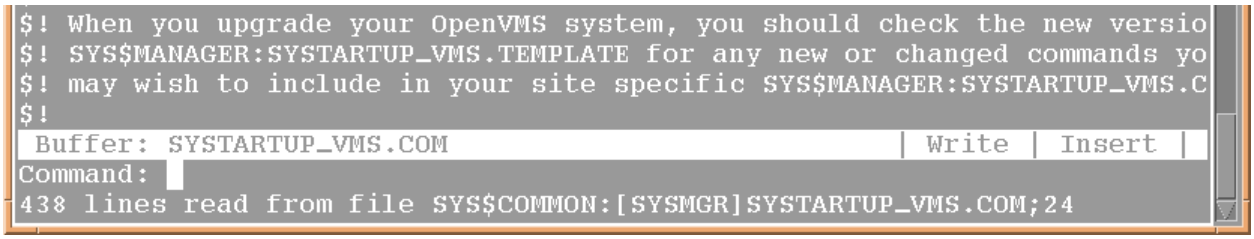
After confirming your OpenVMS Controller can communicate with the NTP Server, for your OpenVMS Controller to keep your timezone continuously in sync you will need to add an entry into the `SYSTARTUP_VMS.COM` file.

While still logged into the `SYSTEM` account. Execute the following command to start editing the `SYSTARTUP_VMS.COM` file.

```
$ EDIT SYSTARTUP_VMS.COM
```

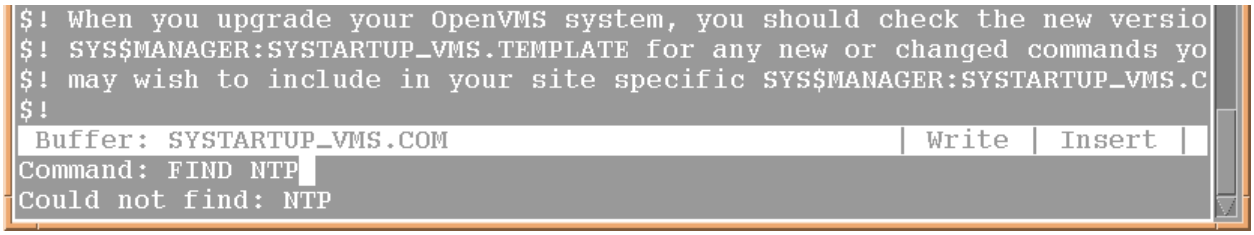


After executing the above command. It is recommended to do a search just to be sure there are no NTP settings already present in the `SYSTARTUP_VMS.COM` file. Select the `DO` key on your OpenVMS Keyboard, or the `F10` on the PC Keyboard and a `Command:` prompt should appear.



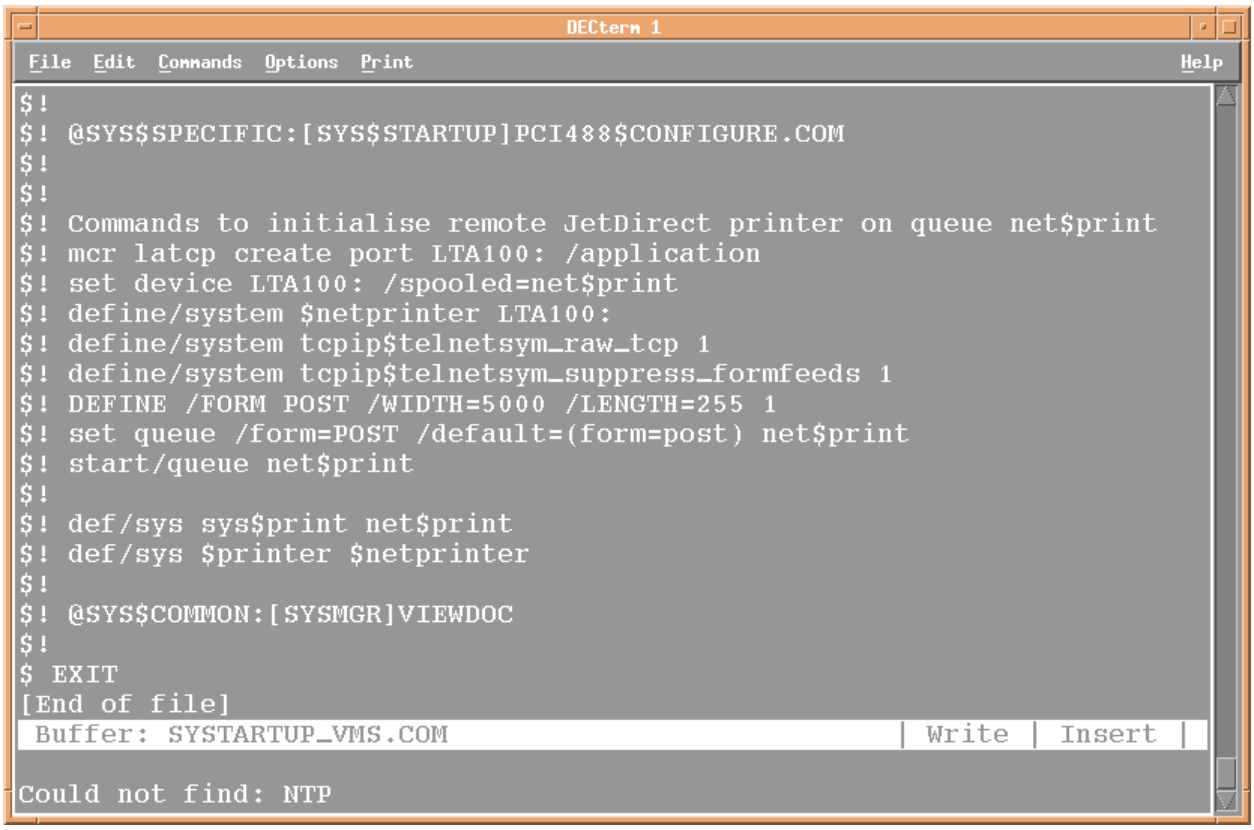
In the `Command:` prompt, enter the following and then press the Enter key:

```
Command: FIND NTP
```



If there are no results found a message will appear confirming that there were no results for the word `NTP`.

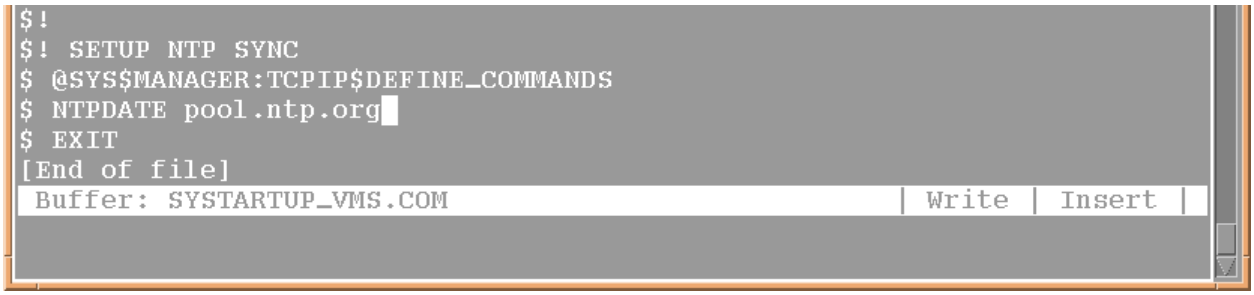
After confirming there are no existing records to `NTP` in the `SYSTARTUP_VMS.COM` file, scroll down the Terminal Window until you reach the bottom of the file.



Once at the bottom of the file, enter the following just above the `$ EXIT` line:

```
$! SETUP NTP SYNC
$ @SYS$MANAGER:TCPIP$DEFINE_COMMANDS
$ NTPDATE pool.ntp.org
```

NOTE: It is important that the line: `@SYS$MANAGER:TCPIP$DEFINE_COMMANDS` is above `NTPDATE...` else the command will not work.



After inputting the above information into the `SYSTARTUP_VMS.COM` file, the changes can be saved. To do this, press the `DO` or `F10` key on your Keyboard and in the `Command:` prompt, enter: `EXIT` followed by the Enter key.

If the editor was successfully exited from the Terminal Window, you will see a message appear confirming that changes have been written to the `SYSTARTUP_VMS.COM` file.

The setup is complete and now whenever the OpenVMS Controller is restarted, a timezone sync will be performed as part of the boot process.

NOTE: It is recommended to perform a single restart after completing this section of the MANUALS, just to confirm the OpenVMS Controllers can successfully reboot.

NTPDATE UTILITY

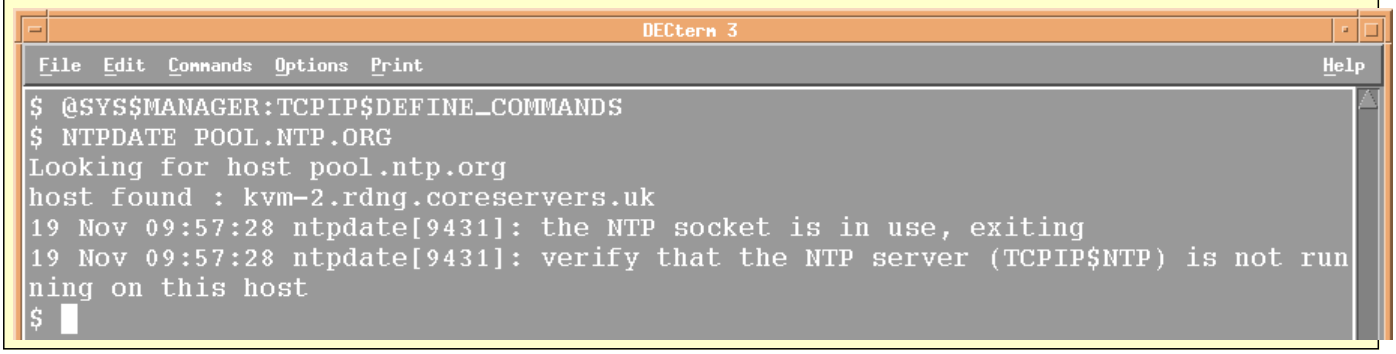
This utility will help you to perform an on-demand sync of the OpenVMS Controller local time with an NTP server:

Open a Terminal Window and execute the following commands. In this example we will use `pool.ntp.org` as the NTP server.

```
@SYS$MANAGER:TCPIP$DEFINE_COMMANDS
NTPDATE  nnn.nnn.nnn.nnn
SHOW TIME
```

> **NOTE:**Where `nnn.nnn.nnn.nnn` is the TCP/IP address of the server you want to sync to, if using an IP Address instead of a hostname.

> **Note:** The NTP Server service must **NOT** be running otherwise the NTPDATE will give an in use error. Like the one shown below:



If you want to confirm what the OpenVMS Controller time has now been set to, execute the following command:

```
$ SHOW TIME
```

NTP Server

Enabling NTP server will keep the time updated. Configure NTP as follows:

> **Note:** NTP will not update the time unless it is approximately correct first

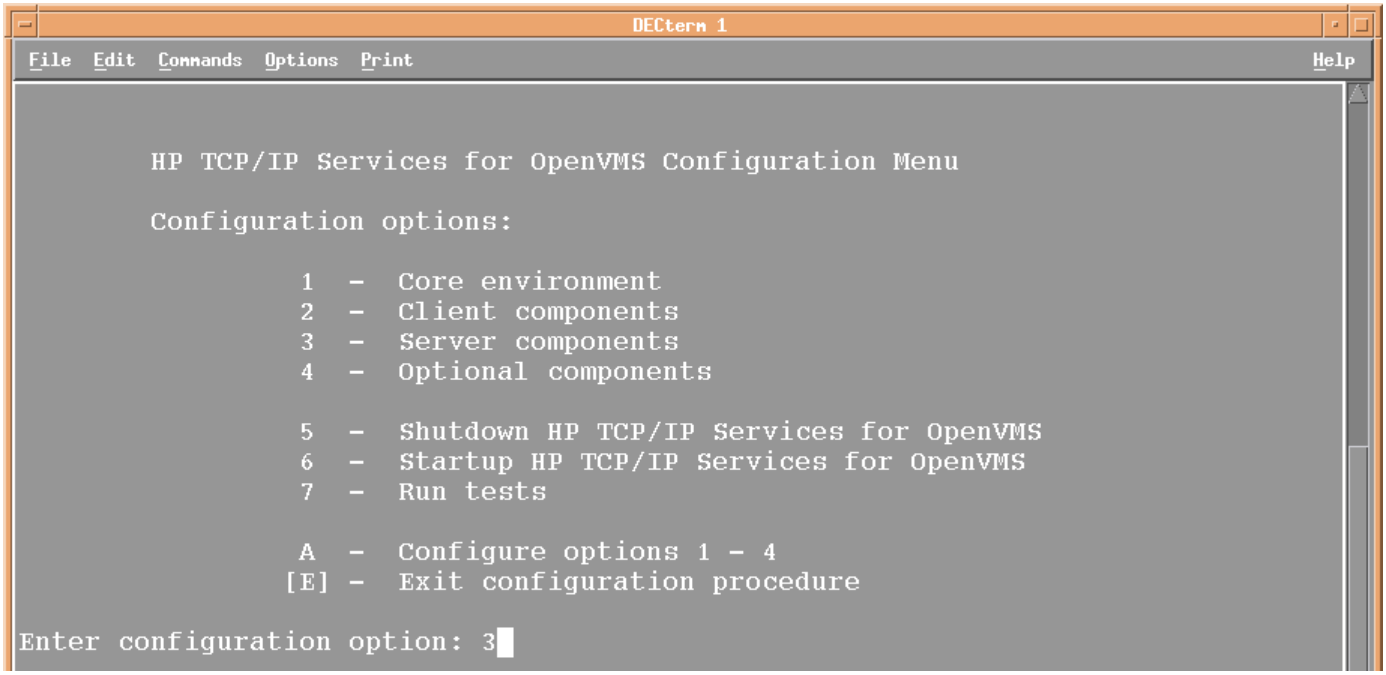
```
SET DEF SYS$SPECIFIC:[TCPIP$NTP]
COPY  TCPIP$NTP.TEMPLATE  TCPIP$NTP.CONF  /PROT=W:WRED
ED TCPIP$NTP.CONF
```

Then add the line: `server nnn.nnn.nnn.nnnn`

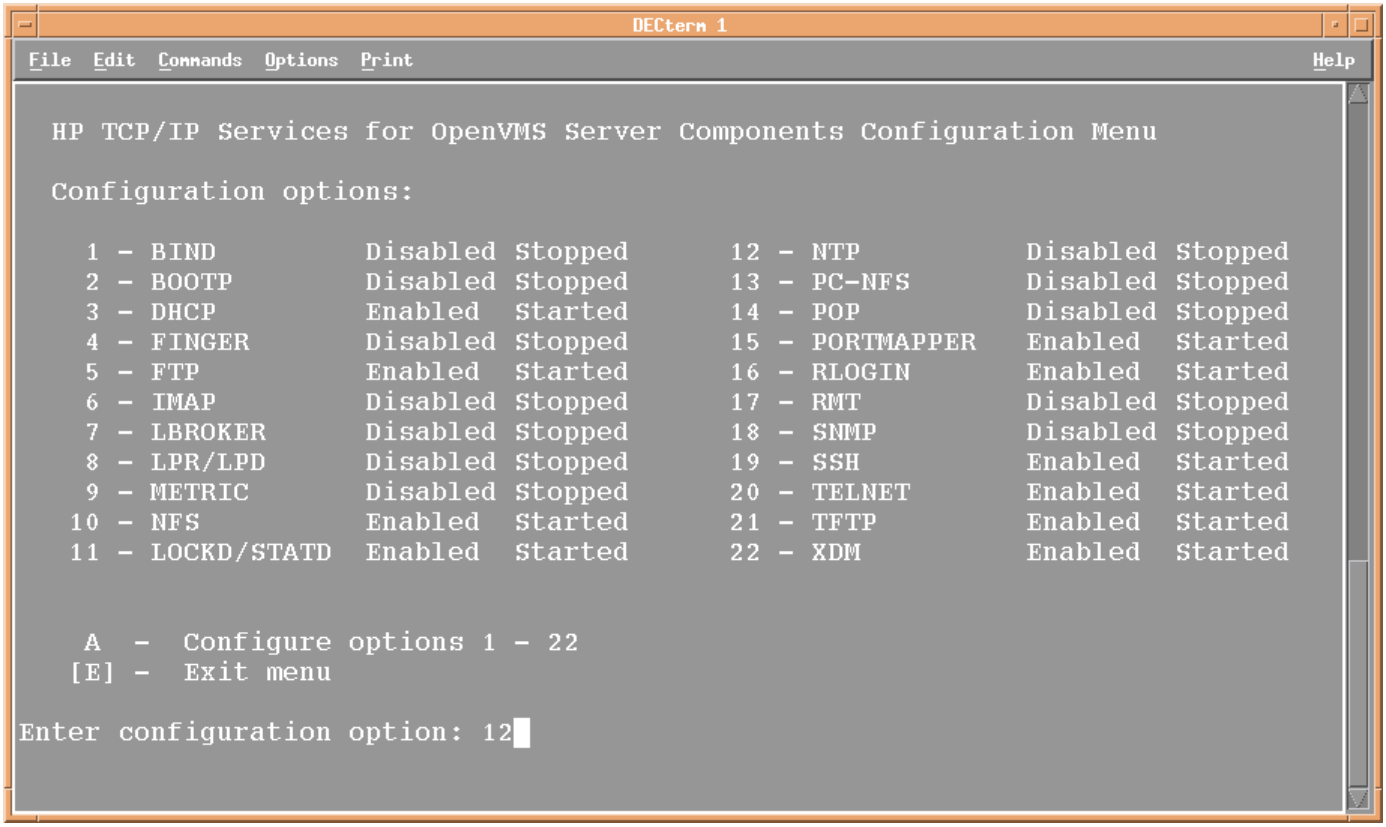
Where `nnn.nnn.nnn.nnn` is the TCP/IP address of the server you want to sync to. All other lines should be commented out with `#` except for the line that starts with `driftfile`. After saving the changes to the file execute the following commands:

```
SET  DEF  SYS$LOGIN
@TCPIP$CONFIG
```

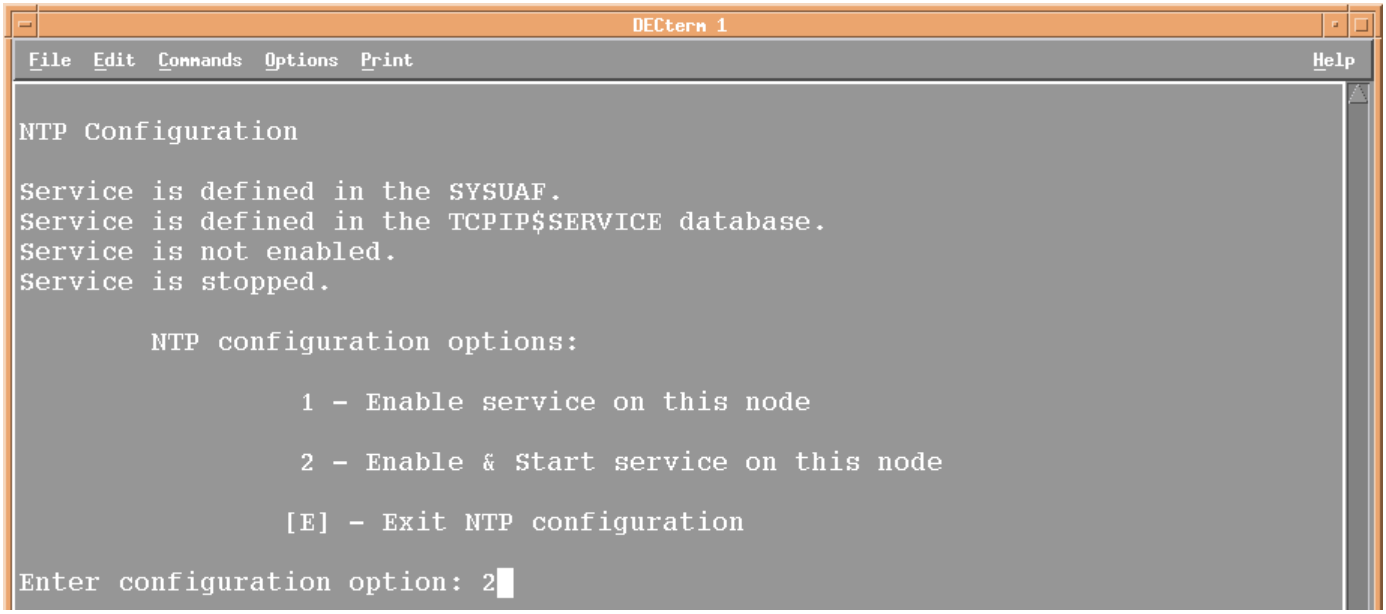
Once in the HP TCP/IP Services menu, select option `3 - Server components`.



In the next menu, select option: `12 - NTP`



Then in the final menu, select option: `2` to Start and Enable the NTP Server Service.



After selecting option: `2` and pressing the Enter key, some additional messages will appear, like shown below:

If you see `...startup completed` in the list of output messages then the NTP Server Service has been started successfully.

Press the Enter key to continue. Then press the `E` key twice to close the TCP/IP Services menu.

To check the operation of NTP look in the log file located at `SYS$SPECIFIC:[TCPIP$NTP]TCPIP$NTP_RUN.LOG`

NFS setup

Pre-Requisites

Both the server and client must have TCP/IP installed.

Both the server and client must have the TCPIP startup line in the SYSTARTUP_VMS.COM uncommented and TCPIP running, for example:

```
$ @tcpip$startup:tcpip$startup.com
```

Check that the services NFS, BIND and PORTMAPPER have been configured on the server.

```
tcpip
```

Service	Port	Proto	Process	Address	State
BIND	53	TCP/UDP	TCPIP$BIND	0.0.0.0	Enabled
. . .					
MOUNT	10	UDP	TCPIP$NFS_M	0.0.0.0	Enabled
NFS	2049	UDP	TCPIP$NFS	0.0.0.0	Enabled
PORTMAPPER	111	TCP/UDP	TCPIP$PORTM	0.0.0.0	Enabled

(If services are not enabled see section 4).

Shutdown and Restart TCP/IP

Example Server Setup

NB: Configuring NFS is a potentially complex project. The following section is intended as an outline guide only. For more information, consult the HP TCP/IP Services for OpenVMS (Management) documentation (HP part number: AA-LU50M-TE).

Example server is an OpenVMS system called IPALPH, with TCP/IP address 159.75.55.92
Example client is an OpenVMS system called IPBETA, with TCP/IP address 159.75.55.93

On the server, add the client host to the local table of known hosts:

```
TCPIP> set host "ipbeta" /address=159.55.75.93 /alias=ipbeta
```

> **Note:** Alias name should be different – use lower case and upper case.

Setup a mapping for the OpenVMS disk device you wish to export (eg "DKA0:") to a Unix style pathname. (e.g. "/mydisk"):

```
TCPIP> map "/mydisk" dka0:
```

Save the mapping configuration to the configuration database:

```
TCPIP> set configuration map "/mydisk" dka0:
```

Add the directories that you wish to share to the export database using Unix style pathnames.

Example 1: to share the whole of disk DKA0:

```
TCPIP> add export "/mydisk/000000" /host=ipbeta
```

Example 2: to share just the TESTER directory on DKA0:

```
TCPIP> add export "/mydisk/000000/tester" /host=ipbeta
```

> **Note:** The /HOST parameter specifies the client that will have access to the shared directory.

For each user on the client that needs to access the shared directory, add an NFS proxy. If the server needs to be accessible to a UNIX client, you should also create NFS proxies for the standard UNIX users (known as "root" and "nobody"):

```
TCPIP> add proxy tester /uid=100 /gid=15 /host=ipbeta
TCPIP> add proxy tcpip$nfs /uid=0 /gid=0 /host=ipbeta
TCPIP> add proxy tcpip$nobody /uid=-2 /gid=-2 /host=ipbeta
```

Example Client Setup

NB: Configuring NFS is a potentially complex project. The following section is intended as an outline guide only. For more information, consult the HP TCP/IP Services for OpenVMS (Management) documentation (HP part number: AA-LU50M-TE).

Example server is an OpenVMS system called IPALPH, with TCP/IP address 159.75.55.92
Example client is an OpenVMS system called IPBETA, with TCP/IP address 159.75.55.93

On the client, add the server information to the table of known hosts:

```
TCPIP> set host "ipalph" /address=159.55.75.92 /alias=ipalph
```

Add NFS proxies for the client users that will be accessing the shared directory. This must match the proxies set up on the server:

```
TCPIP> add proxy tester /uid=100 /gid=15 /host=ipalph
```

(If the server is a UNIX system, the UID and GID of the user must match the UID and GID of the user in the UNIX "password" file.)

Issue a mount command like these examples (this command MUST be issued by a user that has either a NFS proxy entry, or a UNIX password file entry).

Example 1: to mount the shared directory "/mydisk/000000" from server IPALPH on the client IPBETA:

```
TCPIP> mount dnfs1: /host="ipalph" /path="/mydisk/000000"
```

Example 2: to mount the shared directory "/mydisk/000000/tester" from the server IPALPH on the client IPBETA:

```
TCPIP> mount dnfs1: /host="ipalph" /path="/mydisk/000000/tester"
```

Add the appropriate "mount" command the the system startup file (or the user's login.com file) to ensure that the shared directory is re-mounted after a reboot.

> **Note:** The /NOADF qualifier with the MOUNT command may be needed with some NFS servers otherwise a 'Device Timeout' error is returned. This disables the ADF files that store the VMS attributes of each file (eg: if binary or text).These attributes are restored automatically when using the ipTEST server S/W.

SAMBA

Samba allows a PC running MS Windows to map a drive to a tester.

TCP/IP must be installed for this to run.

Note: Before doing the install it is first advisable to do an Image Backup of the system disk

To install Samba you must load the latest distribution set (+ any VMS patches) from the HP website and FTP it onto the Itanium (put them into the root of hard disk and follow instructions below)

Note: For users on versions of VMS from V8.4-1H1 and above supplied by VSI and not HP Samba comes as a layered product on the VMS Installation DVD and the HP kit will fail to install. However it has been found that installing directly from the VMS DVD failed to create the necessary Samba accounts so the kit must be copied off the installation DVD first.

Login as system and `set def sys$sysdevice:[000000]` and type:

```
RUN HP-I64VMS-SAMBA-T0101--1.PCSI_SFX_I64EXE

PRODUCT INSTALL *
```

Then select Samba and install. After installation is completed type:

```
@SYS$STARTUP:SAMBA$DEFINE_ROOT
@SAMBA$ROOT:[BIN]SAMBA$DEFINE_COMMANDS
```

Now Samba needs to be configured:

```
@SAMBA$ROOT:[BIN]SAMBA$CONFIG
```

This will give the menu:

```
        HP OpenVMS CIFS Main Configuration Options Menu

Configuration options:

        1  - Core environment
        2  - Generic options
        3  - System specific setup
        A  - Configure options 1 - 3
       [E] - Exit Menu

Enter configuration option:
```

Use the 'A' option. Change the `Domain/Workgroup name` to your name and set `WINDBIND` to 'yes' and when asked use example range of IDs when asked. Set the 'Server type' to `Standalone` and leave 'Security Mode' set to `User`. The Core parameters should the like this:

```
        1. Enable WINBIND mapping: yes
           1A. UIC Group number range: 1000-2000
           1B. POSIX Group IDentifier range: 5000-10000
        2. Passdb backend: tdbsam
        3. Domain/Workgroup name: IPTESTLTD
        4. Server role: STANDALONE
        5. Server computer/netbios name: S0437
```

If using the second network port it may be necessary to set `Restrict Network interface` to 'yes' and enter the TCP/IP address set on this port

The default account for Samba is `CIFSADMIN` To add the tester account (and similarly any other accounts):

```
@SAMBA$ROOT:[BIN]SAMBA$MANAGE_CIFS
```

This will give the menu:

```
        HP OpenVMS CIFS Server Management Main Menu

        Management options:

                  1  - Manage Shares
                  2  - Manage Groups
                  3  - Manage Users
                  4  - Manage Account Policies
                  5  - Manage Trusts
                 [E] - Exit
Enter CIFS Server management option:
```

As well as allowing mapping to individual accounts shares may created. Do this from option 1 and set Share name, Share Path and enable 'Guest Access'.

Alternatively the `PDBEDIT` utility can be used:

```
PDBEDIT -A TESTER

and type the password (probably use 'iptester' unless it's been changed)
```

To start samba type:

```
@SYS$STARTUP:SAMBA$STARTUP.COM
```

Samba uses the SMDB process. If this fails to start type:

```
@samba$root:[bin]samba$smbd_setup_tcpip
```

To shutdown samba type:

```
@SYS$STARTUP:SAMBA$SHUTDOWN.COM
```

Note: To run the Samba configuration utility Samba must be shutdown

Edit the system startup file by typing:

```
ED SYSTARTUP_VMS.COM

and add the following at the end (before the EXIT line if there is one)

$ @SYS$STARTUP:SAMBA$DEFINE_ROOT.COM
$ @SAMBA$ROOT:[BIN]SAMBA$DEFINE_COMMANDS
$ @SYS$STARTUP:SAMBA$STARTUP.COM

and type EXIT to save.
```

Now reboot.When rebooted you should now be able to map a drive from the PC from `My Computer->Tools->Map Network Drive` and entering `\\s0428\tester` and then the name and password of tester and iptester when asked. (also click reconnect at login)

Any further customisation is done in the Samba configuration file (SMB.CONF) in the `samba$root:[lib]` directory.

Note: Note this can be done manually or using a front end tool called SWAT. See the Samba website for more detal

For example:

```
# Samba config file created using SWAT
# from 159.75.55.144 (159.75.55.144)
# Date: 2008/04/21 13:06:09

[global]
        workgroup = IPTESTLTD
        server string = Samba %v running on %h (OpenVMS)
        passdb backend = tdbsam
        log file = /samba$root/var/log_%h.%m
        domain logins = Yes
        domain master = Yes
        ldap ssl = no
        create mask = 0755

[homes]
        comment = Home Directories
        read only = No
        create mask = 0750
        vfs objects = varvfc

[tester]
        comment = tester read-write
        path = DKA0:[TESTER]
        write list = allwright, johna
        read only = No
        vfs objects = varvfc
```

TCP/IP Multihoming

About Multihoming

The term 'multihoming' means using more than one IP address, usually on physically separate networks, to point to the same physical computer. This requires multiple network cards (one per IP address you want to use). For example, the Tester System could be connected to a device handler via a TCP/IP network, and it may also be required to connect it to a separate factory network to allow remote control of the Itanium workstation. This would require multihoming.

Procedure

This procedure assumes that TCP/IP has already been configured on the first port (See Appendix F1) and that you have been provided with a valid TCP/IP network address to use on the second port.

Log out all users

Log in as SYSTEM.

Connect a network cable into the second ethernet port (WE1) and connect the other end to the required network.

Start the TCP/IP Config program

```
      $ SET DEF SYS$LOGIN
      $ @tcpip$CONFIG
```

At the menu press 1 to enter the CORE ENVIRONMENT MENU

In the CORE ENVIRONMENT MENU press 4 to configure the interfaces

You will be shown the current configuration of WE0 (port A) and be asked "Do you want to reconfigure WE0"
Respond 'NO'

You will be asked "Do you want to reconfigure WE1" (port B)
Respond 'YES'

You will then be asked "Enter Unqualified Host Name"
Enter the Hostname (eg S0XXX)

You will then be asked "Enter internet address"
Enter the IP address provided by the site

You will then be asked "Enter internet network mask"
Enter the Network mask provided by the site

You will then be asked "Enter broadcast mask"
Enter the Broadcast mask provided by the site

You will then be asked "is the above correct"
Review the settings and if they are correct respond 'YES'

Press 'E' to return to the main menu

Press '5' to Shutdown TCP/IP services

When you are returned to the main menu press '6' to start the TCP/IP services with the changes you just made

Once the network has started Press 'E' to exit the config program

To test both connections type

```
$ tcpip
tcpip> PING [Address of machine on first network]
tcpip> PING [Address of machine on second network]
```

Assuming both addresses respond, multihoming is now configured.

DECnet over TCP/IP

By default the DECnet installed is DECnet phase IV. As this is a different network protocol it may be blocked by routers. By upgrading to DECnet plus it is possible to configure the DECnet protocol to be sent as TCP/IP packets. Upgrade as follows:

Upgrading Decnet Phase IV to Decnet Plus

1. First CLISYMTBL must be increased for decnet plus to be able to run

Login as system and get to the $ prompt

```
$ run sys$system:sysgen
Sysgen> use active
Sysgen> set clisymtbl 750
Sysgen> write active
Sysgen> write current
Sysgen> exit
```

2. Remove DECNET Phase IV and install DECNET Plus

Shut down and boot from the correct binaries CD/DVD for the system.

The following information was collect from VMS8.3-1H1, other versions may vary especially the menu listings so be careful that menu entries are for the correct item. A complete list of all text displayed on screen is given in appendix 1

When the menu appears select ï¿½Remove installed Productsï¿½

```
Enter device name for target disk: [DKA0:] (? for choices) dka0

Do you always want detailed descriptions? (Yes/No) [No] no

Choose one or more items from the menu: 4 (DECNET PHASE IV)

Do you want to continue? [YES] yes

Do you want to continue? [YES] yes

When the menu appears select ï¿½ï¿½Install or upgrade layered products

Enter device name for target disk: [DKA0:] (? for choices) dka0

Do you always want detailed descriptions? (Yes/No) [No] no

Choose one or more items from the menu: 7 (DECNET PLUS)

Do you want to continue? [YES] yes

Do you want the defaults for all options? [YES] yes

Do you want to review the options? [NO] no

When the menu appears select ï¿½Shut down this systemï¿½
```

3. Configuring Decnet plus

Boot the computer from the hard disk.

Login as system and get to the $ prompt.

```
$ @sys$manager:net$configure

 A complete list of all text displayed on screen is given in appendix 2

* Do you want the fast default configuration?          [YES] : yes

* Enter PhaseIV Address                              [50.222] : 50.xxx
where xxx is the serial number of the tester.

* Do you want to apply this configuration?             [YES] : yes

* Do you want to start the network?                    [YES] : yes
```

4. Alter tcpip to work with Decnet Plus

```
@sys$manger:tcpip$config

Enter configuration option: 4 (Optional components)

Enter configuration option: 1 (Configure PWIP driver)

Enter configuration option: 1 (Enable service on this node)

Exit out of the TCPIP configuration and reboot the computer
```

5. Install iptest software V5.00 or later

Appendix 1

```
    ************************************************************

    You can install or upgrade the OpenVMS I64 operating system
    or you can install or upgrade layered products that are included
    on the OpenVMS I64 distribution media (CD/DVD).

    You can also execute DCL commands and procedures to perform
```

```
    "standalone" tasks, such as backing up the system disk.

    Please choose one of the following:

        1)  Upgrade, install or reconfigure OpenVMS I64 Version V8.3-1H1
        2)  Display layered products that this procedure can install
        3)  Install or upgrade layered products
        4)  Show installed products
        5)  Reconfigure installed products
        6)  Remove installed products
        7)  Find, Install or Undo patches; Show or Delete Recovery Data
        8)  Execute DCL commands and procedures
        9)  Shut down this system

Enter CHOICE or ? for help: (1/2/3/4/5/6/7/8/9/?) 6

    ************************************************************

    This procedure will ask a series of questions.

          () - encloses acceptable answers
          [] - encloses default answers

    Type your response and press the  key.  Type:

          ? - to repeat an explanation
          ^ - to change prior input (not always possible)
          Ctrl/Y - to exit the installation procedure


    You must enter the device name for the target disk on which
    the operation will be performed.

Enter device name for target disk: [DKA0:] (? for choices) dka0

    DKA0: is labeled I64SYS.


    The remove operation can provide brief or detailed descriptions.
    In either case, you can request the detailed descriptions by typing ?.

Do you always want detailed descriptions? (Yes/No) [No]

   1 - HP I64VMS AVAIL_MAN_BASE V8.3-1H1   Layered Product
   2 - HP I64VMS CDSA V2.3-306             Layered Product
   3 - HP I64VMS CSWB V1.7-13              Layered Product
   4 - HP I64VMS DECNET_PHASE_IV V8.3-1H1  Layered Product
   5 - HP I64VMS DWMOTIF V1.6              Layered Product
   6 - HP I64VMS DWMOTIF_SUPPORT V8.3-1H1  Layered Product
   7 - HP I64VMS KERBEROS V3.1-152         Layered Product
   8 - HP I64VMS OPENVMS V8.3-1H1          Platform (product suite)
   9 - HP I64VMS SAMBA T1.1                Layered Product
  10 - HP I64VMS SSL V1.3-284              Layered Product
  11 - HP I64VMS TCPIP V5.6-9ECO2          Layered Product
  12 - HP I64VMS TDC_RT V2.3-1             Layered Product
  13 - HP I64VMS VMS V8.3-1H1              Operating System
  14 - HP I64VMS WBEMCIM V2.61-A070728     Layered Product
  15 - HP I64VMS WBEMPROVIDERS V1.5-31     Layered Product
  16 - All products listed above
   ? - Help
   E - Exit

Choose one or more items from the menu: 4

The following product has been selected:
    HP I64VMS DECNET_PHASE_IV V8.3-1H1     Layered Product

Do you want to continue? [YES]

%PCSI-W-OPTREF, product HP I64VMS DECNET_PHASE_IV V8.3-1H1 is referenced by HP I
64VMS OPENVMS V8.3-1H1

    This software dependency is expressed in a configuration option that
    was selected for the referencing product.  If you decide to override
    the recommendation to terminate the operation, the referenced product
    will be removed, but an optional component of the referencing product
    may no longer function correctly because of the unsatisfied dependency.
```

```
    Please review the referencing product's documentation on configuration
    requirements.  Consider using PRODUCT RECONFIGURE to deselect the option.

    Answer YES to the following question to terminate the PRODUCT command.
    However, if you are sure you want to remove the referenced product then
    answer NO to continue the operation.

Do you want to continue? [YES]

The following product will be removed from destination:
    HP I64VMS DECNET_PHASE_IV V8.3-1H1     DISK$I64SYS:[VMS$COMMON.]

Portion done: 0%...10%...20%...30%...40%...50%...60%...70%...80%...100%

The following product has been removed:
    HP I64VMS DECNET_PHASE_IV V8.3-1H1     Layered Product
%PCSIUI-I-COMPWERR, operation completed after explicit continuation from errors



    The remove operation is now complete.


  Process I64VMS_INST_LP logged out at  1-JUN-2011 11:55:18.93

Press Return to continue...

    ************************************************************

    You can install or upgrade the OpenVMS I64 operating system
    or you can install or upgrade layered products that are included
    on the OpenVMS I64 distribution media (CD/DVD).

    You can also execute DCL commands and procedures to perform
    "standalone" tasks, such as backing up the system disk.

    Please choose one of the following:

        1)  Upgrade, install or reconfigure OpenVMS I64 Version V8.3-1H1
        2)  Display layered products that this procedure can install
        3)  Install or upgrade layered products
        4)  Show installed products
        5)  Reconfigure installed products
        6)  Remove installed products
        7)  Find, Install or Undo patches; Show or Delete Recovery Data
        8)  Execute DCL commands and procedures
        9)  Shut down this system

Enter CHOICE or ? for help: (1/2/3/4/5/6/7/8/9/?) 3

    ********************************************************

    This procedure will ask a series of questions.

          () - encloses acceptable answers
          [] - encloses default answers

    Type your response and press the  key.  Type:

          ? - to repeat an explanation
          ^ - to change prior input (not always possible)
          Ctrl/Y - to exit the installation procedure

Do you want to INSTALL or REGISTER? (INSTALL/REGISTER/?) [INSTALL]
   ********************************************************

    If you choose to install or upgrade DECwindows Motif,
    please note the following:

      o If you did not select OpenVMS DECwindows server support and
        the workstation files options, DECwindows Motif will not run.
        Use the "Install or upgrade layered products" menu option to
        install the DWMOTIF_SUPPORT kit; this kit provides DECwindows
        server support and the workstation files options.

    If you choose to install or upgrade DECnet-Plus or DECnet Phase IV,
    please note the following:
```

```
      o If you did not select the OpenVMS DECNET option, neither version
        of DECnet will run.  You must add this option to use DECnet.

    If you want to install a patch kit, please use main menu option 7.

Press Return to continue...


    You must enter the device name for the target disk on which
    the operation will be performed.

Enter device name for target disk: [DKA0:] (? for choices) dka0

    DKA0: is labeled I64SYS.


    The install operation can provide brief or detailed descriptions.
    In either case, you can request the detailed descriptions by typing ?.

Do you always want detailed descriptions? (Yes/No) [No]

   1 - HP I64VMS AVAIL_MAN_ANA_SRVR V3.0-1 Layered Product
   2 - HP I64VMS AVAIL_MAN_BASE V8.3-1H1   Layered Product
   3 - HP I64VMS CDSA V2.3-306             Layered Product
   4 - HP I64VMS DCE V3.2                  Layered Product
   5 - HP I64VMS DCPS V2.6                 Layered Product
   6 - HP I64VMS DECNET_PHASE_IV V8.3-1H1  Layered Product
   7 - HP I64VMS DECNET_PLUS V8.3-1H1      Layered Product
   8 - HP I64VMS DWMOTIF V1.6              Layered Product
   9 - HP I64VMS DWMOTIF_SUPPORT V8.3-1H1  Layered Product
  10 - HP I64VMS FTAM V4.1-A               Layered Product
  11 - HP I64VMS IDESERVER V1.1-1          Layered Product
  12 - HP I64VMS KERBEROS V3.1-152         Layered Product
  13 - HP I64VMS MGAGPAT V3.4-2            Patch (remedial update)
  14 - HP I64VMS MGMTAGENTS V3.4-1         Layered Product
  15 - HP I64VMS OSAK V3.0-V               Layered Product
  16 - HP I64VMS OVPA V4.0-31              Layered Product
  17 - HP I64VMS PPU V8.0                  Layered Product
  18 - HP I64VMS RTR V5.1-423              Layered Product
  19 - HP I64VMS SSL V1.3-284              Layered Product
  20 - HP I64VMS TCPIP V5.6-9ECO2          Layered Product
  21 - HP I64VMS TDC_RT V2.3-1             Layered Product
  22 - HP I64VMS VMSI18N V8.3-1            Layered Product
  23 - HP I64VMS VT V2.1-K                 Layered Product
  24 - HP I64VMS WBEMCIM V2.61-A070728     Layered Product
  25 - HP I64VMS WBEMPROVIDERS V1.5-31     Layered Product
  26 - HP IA64VMS WSIT V1.2                Layered Product
  27 - HP VMS AVAIL_MAN_COL V3.0-1         Layered Product
  28 - HP VMS TDC V2.3-1                   Layered Product
  29 - NETBEANS I64VMS NETBEANS36 V3.6     Layered Product
   ? - Help
   E - Exit

Choose one or more items from the menu: 7

Performing product kit validation of signed kits ...
%PCSI-I-VALPASSED, validation of DQA0:[KITS.DECNET_PLUS_I640831H1_KIT]HP-I64VMS-
DECNET_PLUS-V0803-1H1-1.PCSI$COMPRESSED;1 succeeded

The following product has been selected:
    HP I64VMS DECNET_PLUS V8.3-1H1         Layered Product

Do you want to continue? [YES]

Configuration phase starting ...

You will be asked to choose options, if any, for each selected product and for
any products that may be installed to satisfy software dependency requirements.

HP I64VMS DECNET_PLUS V8.3-1H1: DECnet-Plus V8.3-1H1 for OpenVMS I64

    Copyright 2007 Hewlett-Packard Development Company, L.P.

    Hewlett-Packard Company

    This product requires one of two PAKs: DVNETEND or DVNETEXT.
```

```
Do you want the defaults for all options? [YES]

Do you want to review the options? [NO]

Execution phase starting ...

The following product will be installed to destination:
    HP I64VMS DECNET_PLUS V8.3-1H1         DISK$I64SYS:[VMS$COMMON.]

Portion done: 0%...10%...20%...30%...40%...50%...80%...90%...100%

The following product has been installed:
    HP I64VMS DECNET_PLUS V8.3-1H1         Layered Product



    The install operation is now complete.


  Process I64VMS_INST_LP logged out at  1-JUN-2011 12:03:34.01

Press Return to continue...

    ****************************************************************

    You can install or upgrade the OpenVMS I64 operating system
    or you can install or upgrade layered products that are included
    on the OpenVMS I64 distribution media (CD/DVD).

    You can also execute DCL commands and procedures to perform
    "standalone" tasks, such as backing up the system disk.

    Please choose one of the following:

        1)  Upgrade, install or reconfigure OpenVMS I64 Version V8.3-1H1
        2)  Display layered products that this procedure can install
        3)  Install or upgrade layered products
        4)  Show installed products
        5)  Reconfigure installed products
        6)  Remove installed products
        7)  Find, Install or Undo patches; Show or Delete Recovery Data
        8)  Execute DCL commands and procedures
        9)  Shut down this system

Enter CHOICE or ? for help: (1/2/3/4/5/6/7/8/9/?) 9
```

Appendix 2

```
$ @sys$manager:net$configure
Copyright 2007 Hewlett-Packard Development Company, L.P.

        DECnet-Plus for OpenVMS network configuration procedure

    This procedure will help you create or modify the management scripts
    needed to operate DECnet on this machine. You may receive help about
    most questions by answering with a question mark '?'.

%NET$CONFIGURE-I-SETUPNEW, setting up for new configuration
%NET$CONFIGURE-I-PHASEIVDATA, Phase IV DECnet database found


                    FAST CONFIGURATION OPTION

     *** Not supported on cluster nodes.

     You have the option of using the existing Phase IV information
     to quickly configure DECnet-Plus. This provides full network access
     and uses a local file to hold naming information. Very few questions
     will be asked.

     If you want to use the fast configuration option, answer YES to the next
     question.

     If you are running a DNS Server on this system, or plan to run a DNS
     Server on this system, you *must* answer NO to the next question.
```

```
     If you want more flexibility when configuring DECnet-Plus, also answer
     NO.

     Answering NO will cause some additional questions to be asked
     regarding configuration.

* Do you want the fast default configuration?          [YES] :
%NET$CONFIGURE-I-PHASEIVCOMPL, Phase IV database conversion complete

     A DECnet-Plus system may or may not use a DECnet Phase IV-style node
     address.  A node address of 0.0 indicates that this DECnet-Plus system
     will be communicating with OSI systems only.  If your network contains
     some systems running DECnet Phase IV, you may want to specify a compatible
     address in order to communicate with them.  If your network consists
     solely of OSI systems, this is not required.

     The DECnet Phase IV node address consists of an area number (between 1
     and 63), and a node number within the area (between 1 and 1023).

* Enter PhaseIV Address                               [50.222] :

       NET$CONFIGURE has determined that you have multiple broadcast circuits.
       Your system has been configured to enable Phase IV addressing on only
       one of those circuits.  When Phase IV addressing is enabled, the
       datalink MAC address is set according to Phase IV addressing rules
       (i.e. AA-00-04-00-nn-nn).

       It is undesirable (and invalid) for more than one circuit using
       Phase IV addressing to be connected to the same LAN.  However, if
       your circuits are on distinct and separate LANs, and the Phase IV
       style MAC address is desired on more circuits, you may edit the
       SYS$MANAGER:NET$ROUTING_STARTUP.NCL script prior to starting your
       network.  For example, you would change the following command:

       SET NODE 0 ROUTING CIRCUIT SVA-1 ENABLE PHASEIV ADDRESS = FALSE



%NET$CONFIGURE-W-NOPWIP, DECnet over IP requires the PWIP driver to be enabled
%NET$CONFIGURE-W-NODOMAIN, DECnet over IP requires DOMAIN in the directory servi
ces list
%NET$CONFIGURE-I-CREDEFOSITEMPLATE, created default OSI templates
%NET$CONFIGURE-I-EVDDEFAULT, providing default Event Dispatcher configuration
%NET$CONFIGURE-I-MAKEACCOUNT, this procedure creates user account CML$SERVER

        Summary of Configuration

 Node Information:

        Directory Services Chosen:      LOCAL
        Primary Directory Service:      LOCAL
        Node Synonym:                   S0222
        Phase IV Address:               50.222
        Phase IV Prefix:                49::
        Session Control Address Update Interval:        10
        Routing Node Type:              ENDNODE
        Autoconfiguration of Network Addresses: Enabled
        Routing ESHello Timer:  600
        Routing ES Cache Size:  512

 Device Information:

        Device: EIB (EI/82558):
                Data Link name: EIA-1
                Routing Circuit Name:   EIA-1

        Device: EIA (EI/82558):
                Data Link name: EIA-0
                Routing Circuit Name:   EIA-0

 Transport Information:

        NSP Transport:                    Configured
           Maximum number of logical links:     200
           Maximum Transmit and Receive Window: 20
           Maximum Receive Buffers:             4000
           Flow Control Policy:                 Segment Flow Control
```

```
       OSI Transport:                    Configured
          Maximum number of logical links:     200
          Maximum Transmit and Receive Window: 20
          Maximum Receive Buffers:             4000
          Flow Control Policy:                 Segment Flow Control

       OSI Transport:                    Configured
          Maximum number of logical links:     200
          Maximum Transmit and Receive Window: 20
          Maximum Receive Buffers:             4000
          OSI applications over TCP/IP:        Enabled
          DECnet applications over TCP/IP:     Enabled
          DECnet/OSI over TCP/IP interface(s): ALL

       Congestion Avoidance Disabled

 Event Dispatcher Configuration:

       Sinks:            local_sink
       Outbound Streams: local_stream
       Phase IV Relay:   Enabled

* Do you want to apply this configuration?             [YES] : yes
%NET$CONFIGURE-I-CHECKSUM, checksumming NCL management scripts
* Do you want to start the network?                   [YES] : yes
```

Appendix 3

```
$ @sys$manager:tcpip$config

                TCP/IP Network Configuration Procedure

       This procedure helps you define the parameters required
       to run HP TCP/IP Services for OpenVMS on this system.


       Checking TCP/IP Services for OpenVMS configuration database files.




       HP TCP/IP Services for OpenVMS Configuration Menu

       Configuration options:

                1  -  Core environment
                2  -  Client components
                3  -  Server components
                4  -  Optional components

                5  -  Shutdown HP TCP/IP Services for OpenVMS
                6  -  Startup HP TCP/IP Services for OpenVMS
                7  -  Run tests

                A  -  Configure options 1 - 4
               [E] -  Exit configuration procedure

Enter configuration option: 4




   HP TCP/IP Services for OpenVMS Optional Components Configuration Menu

       Configuration options:

                1  -  Configure PWIP Driver (for DECnet-Plus and PATHWORKS)
                2  -  Configure SRI QIO Interface (INET Driver)
                3  -  Set up Anonymous FTP Account and Directories
                4  -  Configure Kerberos Applications
                5  -  Configure failSAFE IP

                A  -  Configure options 1 - 5
```

```
                [E] -  Exit menu

Enter configuration option: 1









TCPIP Transport for DECnet and Pathworks Service Configuration

Service is enabled on specific node.
Service is started.

        TCPIP Transport for DECnet and Pathworks Service configuration options:

                 1 - Enable service on this node

                 2 - Start service on this node
                 3 - Disable & Stop service on this node

                [E] - Exit PWIP_DRIVER configuration

Enter configuration option:









    HP TCP/IP Services for OpenVMS Optional Components Configuration Menu

        Configuration options:

                 1  -  Configure PWIP Driver (for DECnet-Plus and PATHWORKS)
                 2  -  Configure SRI QIO Interface (INET Driver)
                 3  -  Set up Anonymous FTP Account and Directories
                 4  -  Configure Kerberos Applications
                 5  -  Configure failSAFE IP

                 A  -  Configure options 1 - 5
                [E] -  Exit menu

Enter configuration option: e









        HP TCP/IP Services for OpenVMS Configuration Menu

        Configuration options:

                 1  -  Core environment
                 2  -  Client components
                 3  -  Server components
                 4  -  Optional components

                 5  -  Shutdown HP TCP/IP Services for OpenVMS
                 6  -  Startup HP TCP/IP Services for OpenVMS
                 7  -  Run tests

                 A  -  Configure options 1 - 4
                [E] -  Exit configuration procedure
```

```
Enter configuration option: e
$
```

Glossary of Acronyms

Acronym	Expansion	Explanation
BIND	**B**erkeley **I**nternet **N**aming **D**aemon	Used to resolve IP addresses to human-readable computer names.
BOOTP	**Boot**strap **P**rotocol	Used to assign IP addresses to computers automatically at boot time.
DHCP	**D**ynamic **H**ost **C**onfiguration **P**rotocol	Used to configure TCP/IP networking options dynamically. This is a more modern and comprehensive version of BOOTP.
FTP	**F**ile **T**ransfer **P**rotocol	Cross-platform IP protocol for transferring files between computers.
LPR	**L**ine **Pr**inter Protocol	Originally from UNIX, a printer control protocol.
LPD	**L**ine **P**rinter **D**aemon	Originally from UNIX, a mechanism for controlling a local printer.
NFS	**N**etwork **F**ile **S**ystem	Developed by SUN Microsystems, a cross-platform protocol for sharing directories and files between computers.
NTP	**N**etwork **T**ime **P**rotocol	A protocol for co-ordinating the clock time of computers.
REXEC	**R**emote **Exec**utive	A mechanism for executing programs on a remote computer.
RLOGIN	**R**emote **Login**	A mechanism for logging into a remote computer.
RSH	**R**emote **Sh**ell	Used with RLOGIN (and REXEC) to execute commands on a remote computer.
SMTP	**S**imple **M**ail **T**ransfer **P**rotocol	The backbone protocol behind E-Mail.
SNMP	**S**imple **N**etwork **M**anagament **P**rotocol	A systems-management protocol for remote management of any compatible hardware.
TFTP	**T**rivial **F**ile **T**ransfer **P**rotocol	A simple file transfer protocol, usually used for booting diskless workstations and terminal devices.

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