Chapter 11
-
Network Connectivity

INDEX

General Changes

lanadmin is used with PPA number instead of NMID

With UX 10.X one needed to specify the **NMID** (Network Management ID) of an interface card when using lanadmin. At UX 11.X the **PPA** number is used.

Example 10.X:

```
# lanscan
Hardware Station        Crd Hardware Net-Interface   NM  MAC    HP DLPI Mjr
Path     Address        In# State    NameUnit State  ID  Type   Support Num
0/1/0    0x0060B07A221D 0   UP     lan0              1   ETHER     Yes  119
0/2/0    0x0060B0C4217E 3   UP     lan3              2   ETHER     Yes  119
6/2/0    0x0060B0580F09 2   UP     lan2              3   FDDI      Yes  119
6/0/0    0x0060B0830611 0   DOWN   atm0              6   ATM       No   163
```

Example 11.X:

```
# lanscan
Hardware Station        Crd Hdw   Net-Interface  NM  MAC       HP-DLPI DLPI
Path     Address        In# State NamePPA        ID  Type      Support Mjr#
0/1/0    0x0060B07A221D 0   UP    lan0 snap0     1   ETHER     Yes     119
0/2/0    0x0060B0C4217E 3   UP    lan3 snap3     2   ETHER     Yes     119
6/2/0    0x0060B0580F09 2   UP    lan2           3   FDDI      Yes     119
6/0/0    0x0060B0830611 0   DOWN  atm0           6   ATM       No      163
```

nettune becomes ndd

As of UX 11.00 the **nettune** command for network tuning (i.e. switching off ip_forwarding) from 10.X has changed to **ndd**. ndd has the advantage of using the config file `/etc/rc.config.d/nddconf` in order to make modifications permanent across reboots. You do not need to use individual scripts anymore.

For each ndd tunable you needto specify the following variables:

`TRANSPORT_NAME`:	Name of transport component, valid names are: ip, tcp, udp, rawip, and arp.
`NDD_NAME`:	Name of ndd tunable parameter.
`NDD_VALUE`:	Value for ndd tunable parameter.

Refer to the examples given in `/etc/rc.config.d/nddconf` for details.

Find a list of all tunable parameters at http://wtec.cup.hp.com/~netux/NDD (HP internal)

netstat

As of UX 11.00

- the netstat -m option does not exist anymore.
- the **netstat -i** option does not report errors anymore. To look for errors you will have to use **lanadmin**.

ifalias has been integrated into ifconfig

As of UX 11.00 the ifalias command to assign a second IP address to a network card has been integrated into the `ifconfig` command.
Multiple IP addresses assigned to the same interface may be in different subnets. An example of an interface name without an IP index number is `lan0`. An example of an interface name with an IP index number is `lan0:1`.

NOTE: Specifying `lan0:0` is equivalent to `lan0`.

Example:

1st IP address: `ifconfig lan0:0 inet <ip-address> netmask <netmask> up`
2nd IP address: `ifconfig lan0:1 inet <ip-address> netmask <netmask> up`

Unified btlan driver

As of UX 11.11 PCI and HSC-based Fast Ethernet Network and I/O Cards have a single, unified driver.
The drivers `btlan`, `btlan3`, `btlan4`, `btlan5` and `btlan6` have been combined into the **`btlan`** driver.

PCI and HSC-based Fast Ethernet Network and I/O Cards installation and upgrade is now simplified.
This new driver is pre-installed as part of the kernel with every operating environment.
The btlan driver works seamlessly with existing HP LAN link administrative commands such as: lanadmin(1m), lanscan(1m), linkloop(1m), and nettl(1m).
Any user scripts that refer to the old drivers must be updated to use the new btlan driver.

```
# ioscan -fnkC lan
Class     I  H/W Path  Driver S/W State   H/W Type     Description
===================================================================
lan       0  0/0/0/0   btlan CLAIMED     INTERFACE    HP PCI 10/100Base-TX
Core
                       /dev/diag/lan0  /dev/ether0     /dev/lan0
lan       1  0/2/0/0   btlan CLAIMED     INTERFACE    HP A5230A/B5509BA PCI
10/100Base-TX Addon
lan       2  0/10/0/0  btlan CLAIMED     INTERFACE    HP A5230A/B5509BA PCI
10/100Base-TX Addon
                       /dev/diag/lan2  /dev/ether2     /dev/lan2
lan       3  1/12/0/0  gelan CLAIMED     INTERFACE    HP A4926A PCI
1000Base-SX Adapter
```

Only one startup script:for all 100BT-cards: `/sbin/init.d/hpbtlan`.
The single configuration file is `/etc/rc.config.d/hpbtlanconf`.
`Only one patch : PHNE_  (UX 11.11)`

Basic Summary

Networking Startup / Kill Scripts

run level	Script name	relevant config file	configuration variables / comments
1	/sbin/init.d/**hostname**	/etc/rc.config.d/**netconf**	HOSTNAME="hp827n1"
2	/sbin/init.d/**nettl**	/etc/rc.config.d/**nettl** /etc/**nettlgen.conf**	NETTL=1 NETTL_CONSOLE=1
2	/sbin/init.d/hpether	/etc/rc.config.d/hpetherconf	uses lanadmin to change station addr.
2	/sbin/init.d/**net**	/etc/rc.config.d/**netconf**	INTERFACE_NAME[0]="lan0" IP_ADDRESS[0]="192.6.16.2" SUBNET_MASK[0]="255.255.255.0" LANCONFIG_ARGS[0]="ether ieee" LOOPBACK_ADDRESS="127.0.0.1" ROUTE_DESTINATION[0]="default " ROUTE_GATEWAY[0]="192.6.16.1" ROUTE_COUNT[0]="1"
2	/sbin/init.d/**named**	/etc/rc.config.d/**namesvrs** /etc/**named.boot** /etc/nsswitch /etc/resolv.conf	NAMED=1 optional. Used by clients and server.
2	/sbin/init.d/**nfs.core**		starts /usr/sbin/portmap
2	/sbin/init.d/**nis.server** /sbin/init.d/**nis.client**	/etc/rc.config.d/**namesvrs**	NIS_MASTER_SERVER=1 NIS_SLAVE_SERVER=0 NIS_DOMAIN="joker" NIS_CLIENT=1
2	/sbin/init.d/**nfs.client**	/etc/rc.config.d/**nfsconf** /etc/**fstab**	NFS_CLIENT=1
2	/sbin/init.d/**inetd**	/etc/**inetd.conf** /etc/services /var/adm/inetd.sec	
2	/sbin/init.d/**gated**	 /etc/rc.config.d/**netconf** /etc/**gated.conf**	GATED=1 Supports RIP and OSPF.
2	/sbin/init.d/rdpd	/etc/rc.config.d/**netconf**	RDPD=1 daemon that listen to ICMP router advertisements.
2	/sbin/init.d/rwhod	/etc/rc.config.d/netdaemons	RWHOD=1
2	/sbin/init.d/**sendmail**	/etc/rc.config.d/mailservrs /etc/mail/sendmail.cf /etc/mail/aliases	SENDMAIL_SERVER=1
2	/sbin/init.d/**ddfa**	/etc/rc.config.d/netdaemons /etc/ddfa/dp	DDFA=1
2	/sbin/init.d/dce /sbin/init.d/dfs		starts /opt/dce/sbin/rpcd
2	/sbin/init.d/ncs		starts /usr/sbin/ncs/glbd
2	/sbin/init.d/**rbootd**	/etc/rc.config.d/**netdaemons** /etc/**boottab** /etc/opt/dtcmgr/map802 /opt/dtcmgr/map802	START_RBOOTD=1 RBOOTD_DEVICES= set up by dtcmgr
2	/sbin/init.d/vt	/etc/rc.config.d/ptydaemon	PTYDAEMON_START=1

		/etc/rc.config.d/vt	VTDAEMON_START=1 this is the old 9K vt service. Nothing to do with the 3K vt.
2	/sbin/init.d/**xntpd**	/etc/rc.config.d/**netdaemons** /etc/ntp.conf	XNTPD=1 time distribution service.
3	/sbin/init.d/**nfs.server**	/etc/rc.config.d/**nfsconf** /etc/exports	NFS_SERVER=1 starts rpc.mountd and nfsd

Configuration examples for named (Bind), ddfa, gated, nsswitch, xntpd can be found under **/usr/examples.** Original configuration files like inetd.conf, hosts, nettlgen.conf,... can be found under **/usr/newconfig**/etc

For backward compatibility, some symbolic links may exist under /etc, like /etc/checklist who is linked to /etc/fstab.

/usr/sbin/**hostname**	hostname iago hostname iago.training.hp.com	
/etc/**eisa_config**		
/usr/sbin/**ifconfig**	ifconfig lan0 `hostname` up ifconfig lan1 131.6.17.5 netmask 255.255.255.0 up lanconfig lan0 ether ieee	
/usr/sbin/**lanconfig** **(only HP-UX 10.20)** => lanadmin	lanconfig lan1 -rif	Disable Source Routing on Token Ring card lan1
/usr/sbin/**route**	route add net 192.6.17.0 131.6.16.9 1 route add net default `hostname` 0	Route to network 192.6.17 Only if a Proxy Arp Server is available (Router)
/usr/sbin/**lanadmin**	lanadmin -A 0x1000909c8ee5 -M 512 -S 16000000 **5**	Change MAC addr., MTU and speed of token ring card **NetMgmt ID** 5
/usr/contrib/bin\ /**nettune** **(only HP-UX 10.20)** => ndd	nettune -h |more nettune –l	Dynamically modify Kernel Network variables. This tool is reserved to network experts.

set_parms Options

/sbin/set_parms **hostname**	To change the hostname
/sbin/set_parms **ip_address**	To change the IP address of lan0
/sbin/set_parms **addl_netwrk**	To set up default gateway, declare DNS server, local ARPA Domain Name, NIS Domain

Configuration commands

The ifconfig, lanconfig, route commands are done by **/sbin/init.d/net start**, using **/etc/rc.config.d/netconf** during the boot phase.

Configuration files

/etc/**hosts**	IP to name resolution. Not used if **DNS** or **NIS**
/etc/**resolv.conf**	domain name and DNS servers IP @
/etc/**named.boot**	named boot file (DNS server)
/etc/**services**	maps services to UDP/TCP ports. Not used if **NIS**
/etc/**inetd.conf**	list of services controlled by inetd
/etc/**gated.conf**	gated config file (dynamic routing)
/etc/**mail/sendmail.cf**	for sendmail
/etc/rc.config.d/**netconf**	hostname, IP addresses, routing,..
/etc/rc.config.d/**hpetherconf**	we can change the station address
/etc/rc.config.d/**tokenconf**	station address, MTU, speed of Token Ring card.
/etc/rc.config.d/**nameservrs**	DNS and NIS declarations variables
/etc/rc.config.d/**netdaemons**	rbootd, xntp, ddfa declaration variables
/etc/rc.config.d/**nfsconf**	NFS declaration variables

Security files

/etc/**hosts**	IP to Name resolution for underneath files, unless DNS or NIS are used.
/var/adm/**inetd.sec**	for services controlled by inetd.
/etc/**exports**	for NFS
/etc/**netgroup**	for NFS, unless NIS is used.
/etc/**hosts.equiv**	for remsh, rcp, rlogin
$HOME/**.rhosts**	for remsh, rcp, rlogin
/etc/**ftpusers**	for ftp

all the above files apply to servers.

Log files

/etc/rc.log	log of /etc/rc activities
/var/adm/syslog/syslog.log	general system logging
/var/adm/nettl.LOG*	network logging. use netfmt to read
/var/adm/sw/*log	software install logging.
/var/adm/*.log	various logs
/var/sam/log/samlog	SAM logging
/.sh_history	user root commands history
/var/spool/mqueue/syslog	sendmail logging.
typescript	terminal hardcopy done by **script**

note: most of the daemons have a logging capability. see the man pages (ex: man rbootd)

Diagnostics

/usr/sbin/**ioscan -f**	Shows the I/O stucture with the Instance numbers and Drivers. The Card Instance Numbers are shown, as well as the Device Instance Numbers. From a practical point of view, Device Instance numbers are of no use.

usr/sbin/**lanadmin**	-shows **status** and **statistics** of the lan interface. -You can change the Station Address of a LAN interface, plus the MTU and the speed of a Token Ring card (700 only). -you can perform a **reset** of a DOWN card -you may have to specify the **Network Management ID** number (**NM ID**) of the lan card. Use /usr/sbin/**lanscan** to get it. -check the ratio of transmitted/received frames against **collisions**
/usr/sbin/**lanscan**	check Hardware State (UP or DOWN)
/usr/sbin/**suplicen** /usr/sbin/**sysdiag** DUI> **landad**	provide the password Starts DUI> DUI>help landad sections DUI>run landad pdev=4
/usr/sbin/**netstat -i**	Check for ratio of Ipkts (inbound packets) against Ierrs (inbound errors) and do the same for outbound, check also Coll (collisions). This data should tie up with landiag. Collisions >3% of the traffic: Performance degradation.

Loopback Tests

/usr/sbin/**linkloop**	This is a level 2 test to check connectivity between nodes using the hardware (MAC) address. An example would be: **/etc/linkloop -i 4 -n5 -v 0x080009123456** Where the NetMgmt ID is 4, and the remote nodes hardware address is 080009123456. This can be obtained using **lanscan**. cannot cross IP gateways. Do not use on local host. Over token rings, the RIF must be supplied with option -r to cross Source Routing Bridges.
/usr/sbin/**ping** 15.6.7.1 1457	test level 3 connectivity. Can cross gateways if the routing tables are configured. The default ping packet size of 64 is increased to **1457**. Other options: **-o** to **record route** **-i** to test IP multicast membership (ping -i 15.2.3.4 224.1.2.3) **-p** to test the Path MTU Discovery capability of a gateway / router, i. e. if a returned ICMP message "Datagram is too big" contains the next possible MTU. Must be used with option **-v** and a large packet size.
/usr/sbin/ping **hostname**	Same as before, but ping will resolve the hostname from the host directory (/etc/hosts, NIS or DNS). use nslookup if problem.

The loopback tests do not access the LAN when the target host is the local one
Use **netstat -rn** to verify the routing table.

Configuration and Verification Tools

/usr/sbin/**lanscan**	Check the interface state (UP or DOWN) and ensure that the state and encapsulation methods are correct: **IEEE** may be necessary. Check as well the **Card Instance** numbers. The Card Instance number 0 (interface name "lan0") will get another Crd In# (and interface name) if

	it is moved to an other slot.. This will not affect the services, but will affect all daemons and diagnostics using /dev/lan0 which points to the Crd In# 0. To modify a Crd In# attached to an I/O path: **/usr/sbin/rmsf -H path** (old and new path) **/usr/sbin/insf -H path -I instance**
/usr/sbin/**ifconfig** lan0	Check UP, RUNNING and that the IP address and netmask are correct. Repeat for additional cards (i.e. /usr/sbin/ifconfig lan1). A failure indicates bad hardware, or /etc/rc.config.d/**netconf** miss-configured.
/usr/sbin/**hostname**	Check that this returns the correct Arpa hostname. The hostname is defined by the **HOSTNAME** variable in /etc/rc.config.d/**netconf**, and set up by the script /sbin/init.d/hostname. You can use /sbin/**set_parms**. to change it.
/usr/sbin/**netstat**	**-rn** Check routing tables. Any **local** network interface using the IP protocol must have one entry with the **U** flag. the local loopback interface **lo0** (127.0.0.1) is required. Normal routes through **gateways** must have **UG** flags.
	-rs Shows routing errors.
	-s Check for high ratio of bad packets (different to -rs).
	-a Check for inetd **listen** sockets. (tcp ...*.telnet...*.*..listen)
	-m Shows network memory usage.
	-g Shows IP multicast addresses usage
/usr/sbin/**arp -a**	This will display the IP to MAC translation table that the system has cached .(useful for duplicate IP addresses).
/usr/bin/**nslookup** hosta nslookup 15.2.6.9	resolve name to IP using /etc/hosts, or NIS, or DNS. resolve IP to name using /etc/hosts, or NIS, or DNS:

Tracing

Commands

On 9000's wecan trace up to level 4 i.e. TCP-UDP and filter from port level down to the SAPs in the IEEE frames and types in ethernet frames. Tracing commands/usr/sbin/**nettl –status**	provides status information
/usr/sbin/**nettl –start**	enables the tracing start network logging done in /etc/rc.config.d/nettl
/usr/sbin/**nettl -tn pduin pduout -e ns_ls_driver -f /tmp/myfile**	starts network tracing at the Lan driver level, for incoming and outgoing traffic, for all the subsystems, and write the binary data to the disc file. Use the option **-tm** to increase max trace size.
/usr/sbin/**nettl -tf -e all**	turns tracing off:
/usr/sbin/**netfmt -N -l -f /tmp/myfile.TRC0 > /tmp/trace TRC1**	format the trace and save it in file. -**N**ice option formats headers. **-f** option specify trace file name. **-l** option removes inverse video. Usefull for remote support and prints.

	The filter $HOME/**.netfmtrc** is used if it exist, unless you specify the option: **-c** my_filter

on-the-fly trace formatting

```
/usr/sbin/nettl -tn pduin pduout -e ns_ls_driver | netfmt -F -1 -c filter -
T -N | tee file
# kill to stop
/usr/sbin/nettl -tf -e ns_ls_driver      # after kill
```

will format 1 frame per line. Very usefull for TCP connections. The **tee** command is used to save the trace while reading it on the display.

Filter Format

The filter file is by default `$HOME/.netfmtrc`. It contains Filters which are used to exclude frames while using **netfmt**. The multiples filters are logically **OR**ed at a given layer, and logically **AND**ed between the different filter layers.

filter dest 090009-000001 filter dest 090009-000002 filter dest 090009-000004 filter dest !FFFFFF-FFFFFF **filter source** 080009-10BD46 **filter dest** 080009-10BD56	HP Probe name HP Probe Proxy HP Lan Boot exclude Ethernet Broadcasts a particular Lan Interface	**MAC** filters **level 1**
 filter type * filter type !* **filter type 0x806** **filter type 0x800** filter type 0x8005 filter type 0x8137 ..... filter dsap !* **filter dsap 6** **filter dsap 0xf8** **filter dsap 0xfc**	All (this is implicit, so useless) No ether types (=IEEE only) **ARP** **IP** HP Probe over Ethernet Novell ..... No dsaps (=Ethernet only) **IP** XSAP HP extension cluster boot: XDSAP=0x608 XSSAP=0x609 XSAP HP extension probe name: XSAP=0x503 DTC probe: XSAP=0x0965	**ETHERNET** filters **level 2** ..... **IEEE 802** filters **level 2**
 filter ip_saddr 192.1.1.2 **filter ip_daddr 192.1.1.2**	 All traffic to and from system **IP** 192.6.1.2	**IP** filters **level 3**
filter tcp_dport 23 **filter tcp_sport 23** filter tcp_sport telnet filter udp_dport !*	telnet traffic to a server telnet traffic from a server exclude all UDP frames	**TCP/UDP** filters **level 4** Port numbers are found in **/etc/services**
filter connection 192.6.16.5:1476 192.6.25.2:23 This is an outgoing telnet connection. The dynamically allocated client source port 1476 can be obtained with netstat -a during the connection, or by a pre-read of the formatted trace.		filter for a particular **TCP connection**

WARNING for level 4 filters:
If **IP fragmentation** is being used, level 4 filters will exclude all IP fragments except the first one which contains the TCP or UDP header matching the filter.

Well known ports

/etc/services

```
ftp-data      20/tcp        # File Transfer Protocol (Data)
ftp           21/tcp        # File Transfer Protocol (Control)
telnet        23/tcp        # Virtual Terminal Protocol
smtp          25/tcp        # Simple Mail Transfer Protocol
domain        53/tcp        # Domain Name Service for big transfers
domain        53/udp        #Domain Name Service
bootps        67/udp        # Bootstrap Protocol Server
bootpc        68/udp        # Bootstrap Protocol Client for diagnostics
tftp          69/udp        # Trivial File Transfer Protocol
portmap       111/udp       # SUN Remote Procedure Call
portmap       111/tcp       #
uucp-path     117/tcp       # UUCP Path Service
snmp          161/udp       # Simple Network Management Protocol Agent
snmp-trap     162/udp       # Simple Network Management Protocol Traps

# UNIX services
exec          512/tcp       # remote execution, passwd required
login         513/tcp       # remote login
who           513/udp       # remote who and uptime
shell         514/tcp       # remote command, no passwd used
printer       515/tcp       # remote print spooling

# Other HP-UX services
rlb           1260/tcp      # remote loopback diagnostic
nft           1536/tcp      # NS network file transfer (dscopy)
nfsd          2049/udp      # NFS remote file system
netdist       2106/tcp      # update(1m) network distribution service
lanmgrx       5696/tcp      # LAN Manager/X for B.00.00 OfficeShare
uucp          540/tcp       #Unix to Unix CoPy via asynchronous serial lines.
```

Network Logging

Formatting

```
/usr/sbin/netfmt -f /var/adm/nettl.LOG??
```

Formats the network logging file to your terminal. `??` can be **`00`**, `01`, `02`, ...

Configuration

The network logging subsystem is configured in the file `/etc/nettlgen.conf`.
This file contains the various log records that will determine what events are logged and with there associated subsytem. This file is updated when the networking subsystems are installed. After a software install, `nettlconf` is run to update the logging data base.

You will find **3** entries in the `nettlgen.conf` file:

- **static information** such as where is the log file
- **subsystems** you are logging events for,
- **formatter entry** which must not be removed.

Basic **logging types** for subsystems:

Class	Code
Disaster	8.00
Error	4.00
Warning	2.00
Info	1.00

Subsystem log entry format is

```
SS:10:NS_LS_PROBE:12:K:NULL:NULL:NULL::LAN/X.25 NETWORKING
```

SS	subsystem
10	subsystem ID
NS_LS_PROBE	subsystem name
12	logging level (= 8+4=disaster + error)

DTC

DTC configuration (J2120A)

PSP: http://wwwpsp.atl.hp.com/lmx_mount/supplan/psp/2/psp2785.htm (HP internal)

this software is supported on **800 series** only.
This page **does not apply to the DTC16RX,**
If a DNS server is available, it is possible to use "DTC> C *host_name*" in place of "DTC>C *ip_address*".

swinstall	DTCMGR	intstall the DTC filesets tail /var/adm/sw/swagent.log to check.
cd /etc/rc.config.d **vi netdaemons** **vi dtcmgr**	START_RBOOTD=1 START_DTCMGR=1 LOG_LEVEL=1	/sbin/init.d/rbootd starts **rbootd** which capture the DTC **boot request.** /sbin/init.d/dtcmgr starts **dtcnmp** which performs the DTC **management**. Logging level up to 3. Log file are: /var/opt/dtcmgr/log/dtcnmd.log /var/opt/dtcmgr/log/dtcnmp.log
vi netconf	LANCONFIG_ARGS= \ "ieee ether"	
cd /opt/dtcmgr/sbin **./dtcconfig**	DTC **name** **station address** **IP address**	rbootd and dtcnmd must run. Either reboot or start them manually. dtcconfig will dynamically scan the DTC to get

	NS nodename DNS server IP Router IP	its hardware configuration. optional. allows to use hostname instead of IP addresses. optional. enables to call a host over this gateway. Subnet mask mandatory, as it is default to a class A one.

Most of the configuration modifications done with dtcconfig are dynamically downloaded to the DTC. Use **dtcreset** for the others.
If a TAC or SNP cards are installed in the DTC, only a PC with **openview dtcmgr** can configure and manage it.

Verifing the DTC config:

```
/opt/dtcmgr/sbin/dtclist -c              # this lists all the DTCs
/opt/dtcmgr/sbin/dtclist -c dtc_name
```

DTC 16RX configuration (J2496A)

PSP: http://wwwpsp.atl.hp.com/lmx_mount/supplan/psp/5/psp5816.htm (HP internal)

This software is provided on the application CDs. It is supported on both 700 and 800 series.
Note that the conversion kit J2043A allows the conversion of a DTC 16IX/TN/MX
to a DTC 16RX.
J2496A offers ARPA (telnet) and HP3000-XL (AFCP) + routable AFCP connectivity.

This new DTC do not need to be downloaded. It "explodes" it's code from compressed firmware.
The network parameters (IP address,etc..) are configured directly in the DTC, as well as it' s **dtcname** and the "**network manager**" IP address through the DTC off-line menu..
The configuration, done with **rdtcadd** and **rdtcmodify**, is transfered from the "network manager" by the routable protocol **tftp**. The directory under witch the config is found is given by the dtcname.
As the autoconfiguration feature have been removed, any configuration missmatch (port types) will result in a failure.So, you must run rdtcmodify after rdtcadd.
You cannot use dtcconfig (J2120A) for a DTC RX.
rdtcadd (J2496A) can only configure a DTC RX.

DTC Troubleshooting

If the DTC does not download:
offline diagnostics on the DTC, status indicator
linkloop -n 10 **-i** 4 **-v** 0x080009xxxxxx (this is the hardware address of the DTC).

When the DTC is dowloaded:
ping

```
PATH=$PATH:/opt/dtcmgr/sbin
```

dtcdiag -s dtcname **c**	This gives the **CPU status** and all the lan stats
dtcdiag **-s** dtcname **0 0**	This will show the **status** of board 0 **port** 0.
dtcdiag **-i 20** dtcname **0 1**	20 Internal **loopback** tests on board 0, port1

dtcdiag **-r** dtcname **1 1**	**reset** board 1, port 1

ls /opt/dtcmgr/sbin/dtc* to see all the available commands. Use the Man pages for options.
Note: the processes **dtcnmd** and **dtcnmp** are needed to run dtcdiag
some dtcdiag options are specific to given DTC types (16TN, 48, etc..)

Printers: DDFA

Introduction

This software is bundled with the ARPA file set.
It is supported for 700, 800 series, with host-based or pc-based DTC configurations.
The ocd daemon will established a telnet connection with the dtc port when it receives data through the attached printer device file, which is a pty.

Configuration

mkdir /etc/ddfa	
cp /usr/examples/ddfa/dp /etc/ddfa/dp	
cp /usr/examples/ddfa/pcf /etc/ddfa/pcf	
vi /etc/ddfa/pcf	(if necessary)
vi /etc/ddfa/dp	# DTC PRINTER # <DTC IP > <board>/<port> <device file name> <port config> **192.101.23.45 03/02 /dev/dtc1b3p2 /etc/ddfa/pcf** # If an specific IP address is given to a DTC port, it can be specified in # place of the DTC IP. Use in this case xx/xx for the board/port address. # The printer device file is created by the **dpp** command. # note: DTC16 TN and DTC16RX are always **board 1**.
	# NAILED TERMINAL # <DTC IP > <board>/<port> <device file name> **192.101.23.45 03/04 /dev/dtc1b3p4** #The nailed terminal device file is created/removed by **telnetd**.
cd /etc/**rc.config.d** **vi /netdaemons** **/etc/dpp ...**	DDFA=1 **/etc/dpp /etc/ddfa/dp -k** start manually the above command so as to create the printer device file. This starts as well the **ocd** (Outbount Connection Daemon). Test with **cat ascii_file> /dev/dtc1b3p2**. This does not use the spooler.
sam	Printers and plotters Action: Add **Local** Printer Add Printer Requiring **Non-standard Device File**

DTC physical port to TCP port translation table

(only for outbound calls)

By doing a telnet to the DTC IP address and TCP port number, i.e:

```
telnet 192.6.16.2 9495     #for DTC physical Board 1 Port 4
```

you can verify the connectivity up to a **DTC printer** or terminal port, independantly from the

ddfa software. The port must not be engaged to be able to do a telnet to it.
If you hit CR on a DTC terminal, release the port by. doing a **DTC>Logout** .
TCP dest.port = (Board*32 + Port +1)*256 +23

	Board 0	Board 1 **16TN 16RX**	Board 2	Board 3	Board 4	Board 5
Port 0	279	8471	16663	24855	33047	41239
Port 1	535	8727	16919	25111	33303	41495
Port 2	791	8983	17175	25367	33559	41751
Port 3	1047	9239	17431	25623	33815	42007
Port 4	1303	9495	17687	25879	34071	42263
Port 5	1559	9751	17943	26135	34327	42519
Port 6	1815	10007	18199	26391	34583	42775
Port 7	2071	10263	18455	26647	34839	43031
Port 8	1559	10519	18711	26903		
Port 9	1815	10775	18967	27159		
Port 10	2071	11031	19223	27415		
Port 11	2327	11287	19479	27671		
Port 12	1815	11543	19735	27927		
Port 13	2071	11799	19991	28183		
Port 14	2327	12055	20247	28439		
Port 15	2583	12311	20503	28695		
Port 16	2071	12567	20759	28951		
Port 17	2327	12823	21015	29207		
Port 18	2583	13079	21271	29463		
Port 19	2839	13335	21527	29719		
Port 20	2327	13591	21783	29975		
Port 21	2583	13847	22039	30231		
Port 22	2839	14103	22295	30487		
Port 23	3095	14359	22551	30743		

NOTE: Boards and ports available depends on the DTC type

Additional Information

WTEC HP-UX Networking Lan Links (Products, Patches, Tools):
http://wtec.cup.hp.com/~netux/lanlinks/link_index.html (HP internal)

WTEC TIO & WAN Links (Products, Patches, Tools):
http://wtec.cup.hp.com/~tiowan (HP internal)

100BT Configuration:
http://wtec.cup.hp.com/~netux/lanlinks/100BT/100bt_configuration.html (HP internal)