



## Command and Control: Unix Commands for MPE Users

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### Introduction

You may have been an MPE user for many years and you probably hoped to continue being an MPE user for many more. I had my MPE system up and one day when my six-year came in and began randomly hitting keys on the console. Now there are a few combinations that might have caused some problems, but being a solid MPE system I had little to worry, so I let her continue. Had it been my UNIX system I would probably have jumped up and shooed her away from it. Some random combinations of keys can be lethal in UNIX. But the unfortunate truth is we will all have to get used to UNIX (Linux, WINDOWS, etc.) if we plan to stay in Information Technology (November 14<sup>th</sup>, 2001 announced the intended end of the HP 3000 5-years from the date). So as one who has gone before into the netherland of UNIX I give you my best information on using UNIX (principally the variant we know and love, HP-UX).

One thing that will make you feel comfortable as you move from MPE/iX land to UNIX HP-UX land is the appearance of the box. As HP developed the to platforms, the hardware side become more and more similar. I think their strategy was to eventually make MPE/iX a shell that ran under HP-UX. However, all that has changed. Now we must all prepare for HP-UX and beyond! This, of course, not withstanding our own knowledge that MPE/iX is superior to HP-UX in many ways.

This paper will discuss the following three areas:

1. The basic concepts needed to make the change from MPE/iX to UNIX and beyond.
2. The commands needed to accomplish tasks and what the commands relate to on MPE/iX.

3. The UNIX-based tools that will help in making the transition from MPE/iX to UNIX.

## **Basic Concepts**

There are a number of basic concepts that must be understood for the new transfer from MPE/iX to HP-UX. There are however, some important informational pieces of data that will be helpful in talking UNIX. Although the boxes look very similar they are different at the core of their operating system. Some of the basic concepts are:

- Operating System vs. the kernel
- Command Interpreter vs. shell
- MPE/iX Execution Queues vs. HP-UX Scheduler
- Manager.sys vs. root (Superuser)
- Hierarchical Structure vs. Tree Structure
- Scheduling capabilities of Stream vs. cron
- Logon UDC's vs. .profiles and Aliases
- MPE/iX File System vs. HP-UX file systems
- Help vs. Man Pages
- Hello vs. login
- File labels/codes vs. file extension/magic number

## **The Operating System vs. the kernel**

HP-UX relies upon something called the “kernel” as the operating system. The kernel manages the memory, allocates system resources, maintains the file systems, and controls access to the computer. There are many parameters that affect the configuration and the size of the “kernel”. These are called kernel parameters and lead to an area of management called kernel tuning. There used to be parameters to tune within HP MPE/iX but several years ago the design of MPE got ride of much need to make changes to these. Since that time I have only heard of the need to make changes occasionally. The kernel of one system may be quite different from another. You can get a good description of the tunables within HP-UX at [http://www.hp-partners.com/edaweb\\_public/html/technical\\_support/tuning.html](http://www.hp-partners.com/edaweb_public/html/technical_support/tuning.html). Some view the tenability of the kernel issue as a plus and others as a minus.

## **Command Interpreter vs. The UNIX Shell**

Another area of understanding is that of the shell in UNIX. Unlike, MPE/iX there are a number of shells that can be used in HP-UX. The MPE/iX command interpreter is built in. The command interpreter or shell is just another program. A shell is a command language interpreter. The purpose of a shell is to translate command lines typed at a terminal into system actions. MPE/iX has just two “shells” the Command Interpreter and the POSIX shell. With HP-UX there are a number of “shells” that can be used: sh – bourne shell, ksh – korn shell, csh – C shell, etc. Some confusion can be caused from the

multiplicity of shells because some commands may be specific to the shell. A number of commands are really programs unto themselves and will not be shell specific. In order to check for the likelihood of problems with shell specific commands you can check for a man page. These will exist for a program but will be documented under the shell if they are shell specific.

Here is a little more information on the various shells in HP-UX:

### **Sh – Bourne shell**

The Bourne shell – This has a default prompt of "\$". It is the oldest of the shells and is found on every UNIX system. The Bourne shell is the oldest and exists on every UNIX system. The Bourne shell is the default shell assigned to root, and is commonly used for writing command files or "scripts".

Developed by Steven Bourne of AT&T Labs.

Note: On HP-UX 10.X, sh runs the POSIX shell by default.

### **ksh - the korn shell**

The Korn shell is a powerful interactive command language that is also noted as a high-level programming language. One of its strengths is its compatibility with the Bourne shell and its many features like the "C" shell. Features of the Korn shell include command history editing, line editing, filename completion, command aliasing, and job control.

This is the most MPE-like of the shells.

Developed by David G. Korn at AT&T Bell Laboratories.

### **csh - the C shell**

The C shell The C shell has a default prompt of "%". It was developed at Berkeley and has lots of tricky features.

Developed by Bill Joy at the University of California.

### **T-C Shell**

This is basically the c shell with a simple command-line editing.

### **Posix shell**

POSIX or Portable Operating System Interface for Computer Environments is an international standard for operating systems. POSIX is a *standard* aimed at portability of applications, at the source level, across many systems. The POSIX shell on MPE/iX is the UNIX type shell available for use invoked via the 'sh'.

## **Switching Between Shells**

The shell is set in the users .profile file and set at login. To try out another shell, simply type the shell's name at the command line and press **Enter**. For example, to switch to the Korn Shell, you could type **ksh** at the command prompt. By doing this you actually create a sub-shell (a shell running within another shell).

The Bourne shell is sh.

The Korn shell is ksh.

The C shell is csh. Located in /usr/bin/csh.

To permanently change shells, type chsh at the command line. You must enter your password and then the new shell name. For example, /bin/tcsh. The changes will take effect the next time you login. The form 'chsh username /pathtoshell' changes the default shell. Example:

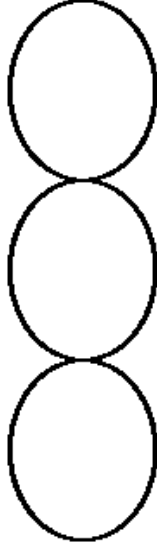
```
'chsh jeffk /usr/bin/csh'
```

## **MPE/iX Execution Queues vs. HP-UX Scheduler**

Another area of interest for the new HP-UX user is the area of the method used to decide who gets the CPU and for how long. In MPE/iX we called this Queuing and the 5 default queues (and any others that you might create if you had the Work Load Manager) were called Execution Queues. Under HP-UX we have a different scheduling scheme that is called:

## **MPE/iX Scheduling**

MPE/iX used the following scheduling plan:

		30	
	A	99	
		100	
	B	150	
		152	
Interactive Users	C	200	
		202	
Hi-Pri Batch	D	238	
		240	
Lo-Pri Batch	E	253	

## MPE Process Priority Default Configuration

MPE users have benefited from the very handy distinction made between processes that were interactive and those that were batch.

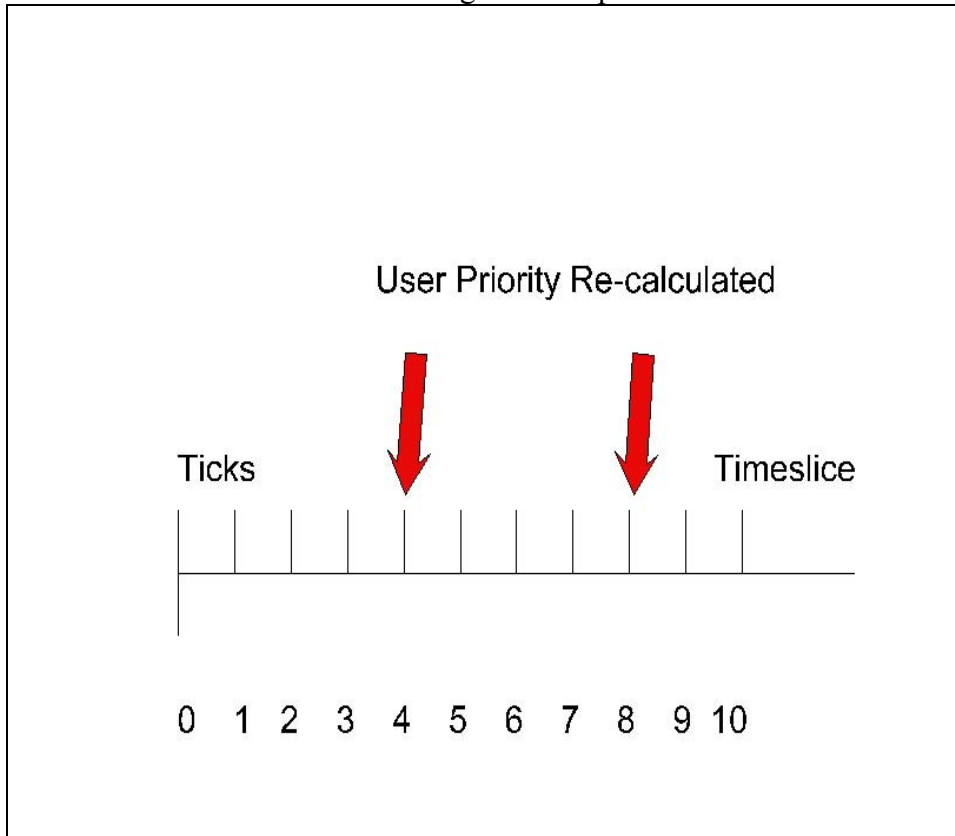
### HP-UX Scheduling

HP-UX uses a different set of scheduling rules. Although HP-UX uses the same 0 to 255 numeric range for scheduling priorities there are basically two ranges that processes can run in, Real-Time and Time-Share. For Real-Time processes you have the following rules:

- Real-Time execute at highest priority.
- Real-Time processes are the most important system processes.
- Real-Time preempts any lower priority process
- Real-Time processes run until they sleep

Time-Share Processes have the following rules:

- Time-Share are time sliced 1/10 second. They use the following illustration to determine when Time slicing can take place:



### HP-UX Process Priority Recalculation

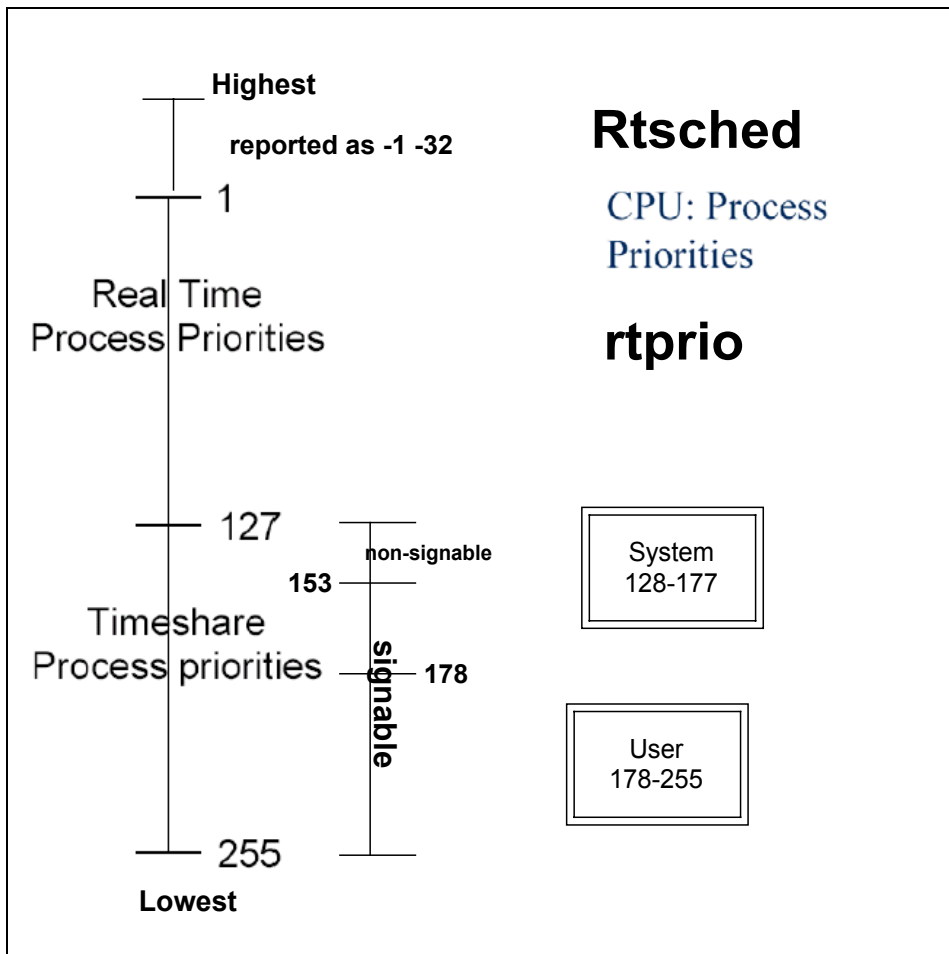
- Time-Share are made up of system and user processes
- In Time-Share a higher priority process, that is ready for CPU, will pre-empt a lower priority process
- In Time-Share, processes of equal priority will use Round Robin scheduling
- In Time-Share priorities are recalculated dynamically
- Nice values can be used to adjust priority calculations
- The statdaemon recalculates process priorities

### Scheduling Synopsis:

Real Time are given a priority from 1 to 127. These are 1 wide and the highest priority process preempts all others. This highest priority will run until it sleeps or exits or is preempted by a higher or equal real-time process.

Equal process real-time priorities run in a round robin fashion until completed or this state of equality does not exist anymore.

The `rtprio` command can change a process to a real-time process.



## HP-UX Process Priorities

The priority of a process is a dynamically recalculated (by the statdaemon) value assigned initially into different groupings based on whether the process is a highly important system process or a user process. The Scheduler gives a process, by default a 1/10 of a second. It divides this into ten ticks and calculates the user priority every 4 ticks according to this equation:  $Newpri = ((\text{"recent CPU usage"} / \text{a constant}) + \text{basepri} + \text{nice value})$ .

Nice - These are values (NOT NICE) that can be given to process to either increase the processes ability to compete for CPU or to decrease the processes ability to compete for CPU (the NICE value influences the calculation of the priority). A process with a 0 nice value has a priority of 178. A process with a 0 to 19 nice value will have its priority moved up (a 19 nice value would cause the process to begin with a priority of 159). And

a process with a nice value of 39 has a priority of 197 ( $178 + (39 - 20) = 197$ ). The NICE value is taken into account in the dynamic recalculation of priority.

Time-shared processes lose value in terms of priority as they execute. They regain priority as they wait their turn. This rate of decay is linear while the rate of regain for a processes priority is exponential. When the CPU load is high the exponential rate is decreased. When the CPU load is low this will be increased.

A child process is initially assigned the same priority as the parent.

When processes sleep, they are given a system priority. Therefore, a process set to sleep by the sleep() system call, is assigned a priority of 168, by PSPLEP (this explains an observation made while on-site of a SPECTRUM process sitting at 168).

B3692A GlancePlus C.03.35.00 14:25:03 13000 9000/800 Current Avg High										
CPU Util	S							1%	1%	12%
Disk Util	FF							3%	5%	99%
Mem Util	S		SU UB				B	80%	80%	81%
Swap Util	U			UR R				58%	57%	58%
PROCESS LIST										
Process Name	PID	PPID	Pri	User Name	CPU Util ( 400% max)	Cum CPU	Disk IO Rate	RSS	Users=	Thd Cnt
scopeux	2153	1	127	root	1.0/ 0.1	696.3	2.8/ 0.0	9.3mb	48	1
midaemon	2142	1	-16	root	0.4/ 0.3	3935.8	0.0/ 0.0	12.2mb		3
glance	7537	5914	154	jeffk	0.4/ 0.5	7.8	0.0/ 0.0	4.6mb		1
dtterm	7214	7213	154	ddemaree	0.2/ 0.2	4.8	0.0/ 0.0	1.1mb		1
dtterm	21986	21977	154	jared	0.2/ 0.0	39.9	0.0/ 0.0	3.8mb		1
vxfsd	36	0	138	root	0.0/ 0.2	3243.5	1.5/ 1.9	9.4mb		29
spectrum	7622	7588	168	saml	0.0/ 0.1	1.2	0.0/ 6.0	24.1mb		1
java	19897	1	168	dennis	0.0/ 0.1	908.2	0.0/ 0.0	22.6mb		16

### SPECTRUM Process Priority

Some processes are said to be non-signable, that is they can't be interrupted during its operation. This can happen to processes during I/O operations when the process should not be interrupted until the I/O operation is completed.

In order to help ensure that the vitally important Spectrum processes can get the required CPU Options:

- Execute the Spectrum commands with a NOT NICE values (something between 1 and 19), or a "Nasty" value, causing its dynamic re-calculation.
- Execute process with the rtprio command. The rtprio command executes the process with a real-time priority.
- Execute the process with the rtsched command. The **Rtsched** executes *command* with POSIX or HP-UX real-time priority, or changes the real-time priority of currently executing process *pid*.



The usage of the NICE value to help or hinder processes in their demand for CPU is in some use. The use of rtprio or rtsched is rarely used due to possible performance implications to some users.

Of the rt\* options (rtprio or rtsched), the rtsched command is the preferred command because it keeps within the overriding rule of maintaining POSIX compliancy.

### **Sample usage for options**

#### **Nice**

```
'nice commandname'
```

Or

```
'nice -10 commandname'
```

Executes the program with a nice value of 30

Or

```
'nice --14 commandname'
```

Executes the program with a nice value of 6

#### **Rtprio**

```
'rtprio 127 commandname'
```

#### **Rtsched**

```
'rtsched -s SCHED_RTPRIO -p 127 commandname'
```

Note: The user running the rtsched command needs to have real-time scheduling privilege granted through setprivgrp(1M) [which I would set by editing /etc/privgroup because you need to preserve the global privilege of CHOWN)].

### **Additional Options**

HP markets a product called the Process Resource Manager (PRM) that may have some helpful aspects. The PRM provides a different mechanism for scheduling, based upon the FAIR SHARE SCHEDULER. PRM gives the CPU to groups of processes based on percentage allocations assigned by the system administrator.

### **Manager.Sys vs. Root (SUPERUSER)**

The 'Superuser' in MPE/iX is the MANAGER.SYS logon. The System Manager could kill runaway processes, purge files, reset passwords, remove users from the system, etc. With HP-UX and UNIX the 'Superuser' is root. One problem with UNIX has always been that root circumvents all security checks and has free and total reign of the system. Root can delete any file, modify any programs, or change any user's password without an audit trail being left behind. The root 'Superuser' is the

Because of the extreme power of root (and the fact that UNIX doesn't prompt you to confirm your actions) a good practice is for the system manager to only log on as root when absolutely required. One mistake is all it will take to prove this point (try accidentally `rm *` in an important directory to demonstrate). An alternative is to logon as a regular user, and then use the `su` command to switch to root when needed.

## **Hierarchical Structure vs. Tree Structure**

MPE/iX uses a very flat accounting structure called a Hierarchical Structure. HP-UX uses a Tree Structure. While MPE/iX has Accounts with many (at least one) group, HP-UX begins with the `/` directory and builds everything off this base directory in a tree structure (like DOS).

## **Scheduling Capabilities of Stream vs. cron**

The scheduling capability of HP-UX is one area that it may excel over what MPE/iX offers within the commands offered. MPE/iX has the ability to schedule in a rudimentary fashion using options on the `STREAM` command. With the `STREAM` command you can set a date, day of the week and time that you want something streamed. With HP-UX there is the `cron` command. This command allows for the scheduling of actions via a file that allows for the date, the time. Regularly scheduled commands can be specified according to instructions placed in crontab files. Users can submit their own crontab files with a `crontab` command (see [crontab\(1\)](#)). Users can submit commands that are to be executed only once with an `at` or `batch` command.

## **Logon UDC's vs. .profiles and Aliases**

What if you want to set up a specific environment or execute some set of commands upon logon? With the MPE/iX operating system you could set up a UDC (User Defined Command) that could consist of basic commands, other UDC's or command files, MPEX commands (an extension of MPE commands). This basically allowed the for the building of commands. The commands could be executed upon logon taking the user to a program or simply setting up the environment. With HP-UX a similar capability exists for setting up the environment using initialization files like the `.profile` file. Commands within this file are executed upon logon. Other files may exist that will also tailor the environment. There are two main files that are executed when you log on to UNIX, in this order:

**.cshrc** -- This file is read when C Shell starts up and when it is invoked from the initial login shell. For example, when you "escape" from Mail or run a shell script this file is source; `.cshrc` contains aliases and shell (non-environment) variables.

**.login** -- This file is read once, only when you first login; it contains commands and defines variables that only need to be executed at the beginning of the session: environment variables, terminal settings, commands such as new mail, etc. Sourcing this file will prompt the computer to call a new login screen.

In order create custom commands within HP-UX the user can create an alias. An Alias provides a means of shortening the name of a command or sequence of commands -- this is a feature you type an alias on the command line the C Shell replaces it with the command sequence to which it refers. The user can abbreviate or alter commands using an alias. An alias is usually setup in a .cshrc file so that they can be put into use at login. Form of the command is: 'alias newname command'

'alias dir ls -al'

will substitute the command ls -al when you type dir at the prompt.

## MPE/iX File System vs. HP-UX file systems

MPE/iX has one file system. HP-UX has several. The oldest is the HFS file system. The HFS (High Performance Filesystem) predates others and is fast but is not as fast to recover as the Journaled File System (JFS). JFS or the VxFS you will see under HP-UX is the safest file system. New tuning parameters make it just as fast as HFS and maintain the safety of the data.

Here are some of the major directories used under HP-UX:

### *Major HP-UX Directories*

<b>Path</b>	<b>Purpose</b>
/	Root directory
/bin	Basic commands
/usr/bin	More commands and executables
/usr/etc	System administration commands
/usr/adm	Accounting files, system administration data files
/usr/spool	Spooling directories
/etc	Startup and configuration and some administration commands
/lib	C libraries
/dev	Device files directory
/tmp	World-writable storage for temporary files

## Major HP-UX Directories

### Help vs. Man Pages

MPE/iX users have become very familiar with the very user-friendly HELP command name syntax used. However, in HP-UX the man page becomes the substitute for the HELP command. The man command in conjunction with the command name will show a page of help information. Man does have the ability to search commands for keywords which is very helpful:

'man -k file'

## Hello vs. login

The polite Hello user.account logon method for MPE/iX is replaced now with the simple logon name. The logon process is still one of the most expensive steps taken against the CPU resources. In MPE/iX the logon Hello would check the logon name, the passwords, check the session limit to see that it was not exceeded, display the welcome message, and run the option logon UDC's (to set variables, JCW's, file equations, and start applications). In HP-UX the logon does: a check to see that Daemon security is passed, checks the login name and password, checks for a trusted system, security configurations, checks disk quotas, executes shell initialization, and executes scripts (set variables, displays message of the day, displays copywrite, checks for mail status, checks for news status, sets umask and mesg, starts application or menu). MPE/iX uses NS/VT to connect while HP-UX uses telnet.

## Practicing UNIX commands on MPE/iX

If you are on 5.0 and later, you have the POSIX shell (getting it setup correctly is an exercise in itself on 5.0 and 5.5 but supposed to run OK out of the box on 6.0 and above). If you do a

```
:setcatalog hppxudc.pub.sys;append  
or :setcatalog hppxudc.pub.sys;system;append (by the system manager)
```

you have the :sh command defined which invokes the shell. Otherwise you can :sh.hpbin.sys -L to invoke it. Inside the shell you are pretty much posix/unix-like and you can pipe. Traditional MPE commands, such as :print, have to be invoked via a wrapper:

```
posix/ix> callci 'print filename'|more
```

Because the shell doesn't know about the MPE print (MPE commands are by-and-large not simply executables in the current path; they are instead like 'internal' shell commands to the CI).

## Basic Command Sets

The commands needed to accomplish tasks and what the commands relate to on MPE/iX  
The basic command set in MPE/iX consists of HELLO, LISTF, SHOWJOB, SETVAR, SHOWME, STREAM, COPY, RENAME, CHGROUP, PURGE, PRINT, FILE, BUILD, and ABORTJOB.

The next level of commands is for more important users: ALTACCT, PURGEACCT, DELETESPOOLFILE, etc.

The basic command set HP-UX consists of a one word user name to logon, ls, ps, ll, cp, whoami, cd, mv, rm, echo, export, stty, PATH, kill,

The next level of commands is for more powerful users: `chmod`, `chown`, `su`, `rmdir`, `mkdir`, etc.

## Differing form for use in commands

A command can be just the straight command or the command plus some modifier. Both MPE/iX and HP-UX act this way regarding commands. In HP-UX there are optional parameters that can be added to most commands. When optional commands are used they can be prefaced by a '-' (hyphen). Therefore the command

```
'ls'
```

will list the file in the current working directory. The addition of the `-s` option will show the size option, and

```
'ls -s'
```

commands can also be strung together as

```
'ls -s; ps ; ll'
```

With this arrangement, each command is executed in sequence.

## Piping

However, HP-UX supports something called 'piping' that MPE/iX, at least in the Command Interpreter format does not support. Piping or pipelines allows the user to string several commands together to make one hybrid command. Most commands in HP-UX will read from the previous input. Therefore a command can be constructed like

```
'ls -s | sort -n'
```

This command accomplishes an 'ls' and sorts it by a numeric sort rather than an alpha sort. The '|' is called a pipe mechanism. Any commands separated by the pipe mechanism are strung together in the shell. The standard output from each command is run into the standard input of the next command. The beginning command gets its standard input from the terminal and the last command will put its standard output on the terminal.

## File labels/codes vs. file extension/magic number

The File command takes a completely different form in HP-UX. In MPE/iX it performed the function of defining attributes for a file when built or on what device it was built or to redefine a file as being another file. The LISTF command with a ,2 would show the file type and any file codes.

With HP-UX the file command attempts to print a file after determining its file type. Without file labels or file codes (like MPE/iX) this is somewhat difficult. HP-UX looks at the file extension and at a magic number at the beginning of the file to check its type. There are no file labels or codes in HP-UX. A Magic Number is special data located at the beginning of a binary data file to indicate its type to a utility. Under Unix, the system and various applications programs (especially the linker) distinguish between types of executable files by looking for a magic number.

The file command also provided the capability to point the program about to be run to another file. On HP-UX this capability does not exist as it did in MPE/iX. However, the link command can point the file location in a specific directory to another location. “On UNIX the closest thing to the MPE file command for redirecting files is actually a symbolic link.”

## More on Files

Commands will often need the name of a file as an argument. Pathnames in HP-UX consist of several components separated by a '/'. Each piece is the name of a pathway until the filename is provided as in

```
/etc/motd
```

This finds the file motd in the /etc subdirectory. /etc is a subdirectory of the root directory '/'. When the '/' is used in this manner we are using the 'absolute' pathname. If the '/' is not used in the beginning the search starts from the current directory. By default, this beginning point is the home directory. File names without a directory mean that the file is located in the current directory.

File names consist of a number of alphanumeric characters and/or numeric characters. They can have file extensions past the '.' And multiple '.'s may be used. All characters can be used in a name save that of the '/'. Common file extensions are:

.profile, .ksh, .\* -- Any file with a .filename is likely to be an initialization file. Initialization files are executed upon logon and used to tailor the environment to the users needs.

HP-UX sets up a .cshrc, .exrc, .login, .profile, and .sh-history files upon the creation of a user, in that users home directory.

.c for the source of a C program

.o for the object file

.errs for the errors from the file

.output for the output of the run of the program

.h for

.gzip for

.gz is the Gnu version of zip. It is a compression method developed for use on UNIX systems.

.tar for tar files

The '\*' can be used in place of the '@' for alphanumerics that was used in MPE/iX. The '\*' is a wildcard for any number of alphanumeric characters. The character '?' matches any single character in a filename. Thus the 'll ?' will yield any single character filename. An echo command in the following format

```
'echo ? ?? ???'
```

Will show all single character filenames, all two-character filename and all three-character filenames.

Two other characters worth noting are the '[' and the ']'. These allow for a list of characters placed in between them. In the following 'll ?' any files with j in the first position will be selected.

```
'll [j]'
```

## Finding files

Are you looking for a file? If you know where it is located you can simply cd to the directory. If not you can use the find command. The find command has the following syntax

Find pathname filename argument (this usually -print)  
Eq.

```
'find / -name filename -print'
```

## File Ownership

File ownership is setup by the user ID of the logon who creates the file. The owner can determine who may read, write or change the file, or execute the file. However, the ownership can be changed via the chown command.

The 'ls -al' command will reveal who can read, write or execute a file. The following shows a files ownership and list of access capabilities

```
-rwxrwxrwx 1 root sys 506 May 1 18:48 testfile2
```

The file will allow anyone to 'rwx'. The pattern is repeated three times, on for the owner, the group, and the rest of the systemwide users(all others). The 'r' means that owner, or group or system can read a file, the 'w' can write to the file and the 'x' deals with executing from the respective group.

Initially, a file's owner is identified by the user ID of the person who created the file. The owner of a file determines who may read, write (modify), or execute the file. Ownership can be changed with the 'chown' command.

Every user ID is assigned to a group with a unique group ID. The system manager creates the groups of users when setting up the system. When a file is newly created, the operating system assigns permissions to the user ID that created it, to the group ID containing the file owner, and to a group called others, consisting of all other users. The 'id' command shows your user ID (UID), group ID (GID), and the names of all groups your user belongs to.

In file listings (such as the listings shown by the **li** or **ls** command), the three groups of users are always represented in the following order: user, group, and others. If you need to find out your group name, the **groups** command shows all the groups for a user ID.

```
-root-> id
uid=0(root) gid=3(sys)
Fred-/root/home/root
```

## Output Redirection

Both MPE/iX and HP-UX allow the user to send output from a command to a file. In MPE/iX this is accomplished by:

In HP-UX this is accomplished by:

```
'll > filename'
```

The output from the ll command is written to a file.

## MPE/iX Command vs HP-UX

The following table provides a translation table for the MPE/iX commands you are familiar with to the HP-UX commands you will need.

MPE/iX	HP-UX
•ABORTJOB	•kill, kill -9
•ALTACCT	•chmod, passwd
•ALTGROUP	•chmod
•ALTSEC	•chmod



•BYE	•exit
•CHGROUP	•cd
•CI	•sh, csh, ksh
•COPY	•cp
•EDITOR, QUAD, QEDIT	•vi
•FCOPY	•cp, dd, lp
•FILE	•(implied), ln
•HELLO user.acct	•login user
•HELP	•man
•HPSEARCH, MPEX LISTF	•grep
•LISTF	•ls, find
•LISTGROUP	•ls -l
•LISTREDO	•history, cat sh.history
•NEWACCT	•mkdir
•NEWGROUP	•mkdir
•PRINT	•more , cat, lp
•PURGE	•rm
•REDO	•esc k,
•RELEASE	•chmod 777
•RENAME	•mv
•REPORT	•bdf, du, df

•RESTORE	•tar, frecover, cpio
•RUN	•(implied)
•SETJCW	•=
•SETVAR	•=, csh – setenv, <b>sh, ksh</b> NAME=value; export NAME
•SHOWGROUP	•pwd
•SHOWJCW	•echo
•SHOWJOB	•ps –ef, who, users
•SHOWME	•whoamI
•SHOWOUT	•lpstat –t
•SHOWTIME	•date
•SHOWVAR	•echo, printenv, env, %echo \$NAME
•SHUTDOWN	•shutdown -0 –y, reboot –h
•STORE	•tar, fbackup, cpio
•STREAM	•at, bg, crontab, nohup
•SYSDUMP	•make_recovery
•TELL	•talk, wall, write
•WARN	•talk, wall, write
•WELCOME	•/etc/motd
•Superuser=MANAGER.SYS	•Superuser=root
	•ioscan

	•lvcreate
	•lvextend
	•lvremove
	•mount
	•pvcreate
	•sam
	•swapinfo
	•vgcreate
	•vgextend
	•vgremove
Purgedir	•Rmdir
Store	Cpio, tar, fbackup
	Which
Dscopy	ftp
God(mpex)	Su
Deletespoolfile	Cancel, lprm
Build	Touch
UDC file option logon	<b>sh</b> .profile <b>ksh</b> .profile and file in ENV variable <b>csh</b> .cshrc, .login, and logout

Figure 1 - Command Matrix

For the sake of discussion the discussion of commands is divided into a number of levels. Level 1 is a basic set of commands organized into their functions.

## HP-UX Commands - Level One

There are several helpful things to remember regarding HP-UX commands. The first is that commands are case sensitive. Unlike MPE/iX an 'n' and an 'N' are not the same. When commands are shown they should be entered exactly as they appear.

### Command Descriptions

Logon – unlike MPE/iX no polite :HELLO is required by UNIX. Simply enter your user name (this must be provided to you) followed by your password.

### Getting help

The HELP command, with its variations for showing EXAMPLES and 'man' - like the help page is very useful. Options exist in the man page to search for a key word and print specific portions of the man page. Man is used as the command with the command you want to understand listed following man.

`'man -k keyword'`

will show those commands that have a keyword specified. Generally man is used simply as:

`'man commandname'`

### Moving from directory to directory

Moving from one account and group to another could be accomplished in MPE/iX via a new login or via the CHGROUP command. On HP-UX and UNIX the 'cd' command allows for the moving from one directory to another. The directories are always separate be '/'.

'cd' - change the current working directory. Used in the form `cd intended_directory`. `Cd $HOME` returns the user to their home directory.

### Listing files

It is always important to be able to list files that are being worked with. In MPE/iX the Listf command (and the many additions that could be added to it via the MPEX program) are vital to commands with many helpful variations to show file information. On HP-UX and UNIX the 'ls' and 'll' commands fill this need.

'ls' - listing files contents of directories. Several permutations are `lsf`, `lsr` and `lsx` are used to invoke the ls command with the `-f`, `-r` and `-x` options.

'll' – List the contents of a directory. Common form is `'ll -al'` to show contents plus access options, owner/creator, size and creation date.

## Checking processes

MPE/iX didn't have more than the SHOWJOB to view who was logged on. You had to purchase Glance or SOS to really see what was happening to processes and users. HP-UX and UNIX in general have a number of very helpful commands and utilities that make find out what is happening to a process or user accessible without a purchase of a tool. The 'ps' command is one command that shows what is happening on the system.

'ps', listing processes, Process status report. Common form is 'ps -ef' to show all processes. The 'top' command, however is not similar to anything that MPE/iX users have used without a purchase.

'who' - shows who is on the system.

```
-root-> who
root      ttyt1      Jun 12 11:06
jeffk     ttyt2      Jun 12 05:35
Fred-/root/home/root
```

'top' - displays and updates information about the top processes on the system.

```
System: Fred                               Wed Jun 12 11:07:14 2002
Load averages: 1.07, 1.12, 1.12
86 processes: 85 sleeping, 1 running
Cpu states:
LOAD  USER   NICE    SYS  IDLE  BLOCK  SWAIT  INTR  SSYS
1.07  9.9%   0.0%   4.0% 86.1%  0.0%   0.0%  0.0%  0.0%

Memory: 5600K (3656K) real, 31284K (13424K) virtual, 1716K free Page# 1/7

  TTY  PID USERNAME PRI NI  SIZE  RES STATE  TIME %WCPU %CPU COMMAND
root  1197 root      154 20  500K  592K sleep 29:42  8.85  8.84 dtgreet
root  1185 daemon   154 20 2504K  812K sleep 17:51  5.39  5.38 X
pty/ttyt1 1424 root      179 20  268K   0K run   0:00  7.01  0.34 top
pty/ttyt1 1402 root      158 20  520K  148K sleep 0:00  0.29  0.27 sh
root    3 root      128 20    0K    0K sleep 0:30  0.12  0.12 statdaemon
```

## Checking the environment

Sometimes you just need to check the environment. On MPE/iX you might do a SHOWME to see how you are logged on, or check the file equations with the LISTEQ command. While the ability set file equations does not exist in the same manner on HP-UX does have dynamic linkage available via the ln command. The echo \$PATH shows the path set for the user. Programs to be utilized by the user should normally be in the path (The 'whoami' command shows how the user is logged on, the uname command does a similar function to the SHOWVAR HPSUSAN command in MPE/iX).

'whoami' - prints the effective current user id

'date' - display or set the date and time.

'uname' - This command displays information about computer system. Common form is 'uname -a'.

'echo \$PATH' - this shows the path that has been set for the user.

```
-root-> echo $PATH
/sbin:/usr/bin:/usr/bin/X11:/etc:/usr/contrib/bin:/usr/local/bin:/usr/lib:/opt/robelle/bin:/root/home/root:/root/home/root/bin:.
```

'which' - will locate a program file (including aliases and paths). The 'which' command checks down the \$PATH to find which program is being run.

### **Copying, Moving and Deleting files and directories**

Just as in MPE/iX, files in HP-UX can be copied (instead of the COPY command use cp), renamed (instead of the RENAME command use mv to move the file), removed (instead of the PURGE command use the rm command). As in MPE/iX, accounts and groups can be created and removed. However, instead of NEWACCT and NEWGROUP use mkdir and instead of PURGEACCT and PURGEGROUP use rmdir.

'cp' - copies files and directories.

'mv' - move or rename files and directories.

'rm' - remove files or directories. This command is very dangerous. The root user could wipe out everything with rm \*.\*. {no inquiry is made to double check your intentions}

'mkdir', 'rmdir' - create and remove directories.

### **Making life easier**

One great feature of MPE/iX has always been the ability to see what had been done and then redo the command easily with either the DO command or the REDO command.

With most shells the 'history' command will show the previous commands executed.

The combination of esc k will repeat the previous command.

'history' - in the c shell, the history command shows a list of previously executed commands. This is like the 'listredo' command in MPE/iX. In the **cs**h, **ks**h use history, in the bourne shell use **sh #fc -1**.

esc k - to repeat previous command. Repeating or redoing commands differs depending upon the shell you are utilizing.

Redoing commands - The redo command varies slightly from shell to shell. In the **ks**h use the \$r, in the c shell use the **cs**h %!, **sh** none

**ks**h ESC, then vi commands such as k (up), j (down), i (ins),

0 (home), \$ (end), x (delchar), a (append), then Return.

Redoing the c shell summary:

**cs**h !\$ anywhere means *last thing from last command*

**cs**h !:5\* means *argument 5 thru last of last cmd*

**cs**h !\* is short for !:1\*, *all the arguments of last cmd*

**cs**h ^li^il *replaces li with il in last command*

'sort' - Allow for the sorting of files, etc. This is often used in conjunction with other commands.

Jobs can also be schedule in batch to begin at a latter time.

at, batch - execute batched commands immediately or at a later time.

### **Printing files to the screen**

The PRINT command is not available, as it is in MPE/iX. However, on HP-UX and UNIX there are a number of commands to print files.

'cat' - will display files or join them together.

'head' - this shows the first few lines.

'tail' - this shows the last few lines.

'echo' - echo (print) arguments.

### **Looking for things**

Finding the location of needed files could be done in MPE/iX via the LISTF command. In HP-UX one way to find files is the 'find' command. Strings could be searched for in MPE/iX via an extension of MPEX. That command was 'PRINT

@.@.@;search=cl{caseless}"string" {the string that is being looked for}.

'find' - finds files. Common form is 'find /{this brings you to the root directory} -name {looks for the file name} filename -print {to print the results to the terminal}'. An interesting note about 'find' is that it will drop into the system mode for some of its processing.

'grep' - the grep command is often used in conjunction with other commands. One example is to look within a set of files.

### **Fixing the Environment**

Sometimes things don't work. In MPE/iX the SHOWVAR command, LISTEQ, could be used to help debug the issue. In HP-UX the 'printenv' command shows the variables that are set in the environment. The 'export'

'printenv' - this command prints out the environment variables.

'setenv' - In the c shell this command sets a variable. Used in the form 'setenv jeff 1'.

'export' - Used in conjunction with the form 'variable name = xx' the 'export' puts this into effect.

'chmod' - change file mode access permissions. 'chmod 777 filename' gives everything to everyone. Be careful of this! 'chmod' can be used to effect the addition or subtraction of capabilities in the form,

'kill' - terminate a process. 'kill -9' terminates everything about a process.

### **Setting up the terminal**

Setting up the terminal environment is a key component to getting things working properly. Also, setting the correct PATH is a critical piece of getting an application to run. In MPE/iX there wasn't much that needed to be done except ensure that the terminal emulator was set up properly. In HP-UX the .profile file probably contains a line setting up the terminal for proper erasing of characters, back space, etc. A line such as 'stty erase "^H" kill "^U" intr "^C" eof "^D"' will set up the terminal keys.

'stty' - set the options for a terminal port

PATH - this sets the path for the programs and files that may be accessed easily along the path. Use 'echo \$PATH' to see what is set for the path user is set to.

### **Commands to help with the Transition**

The UNIX-based tools that will help in making the transition from MPE/iX to UNIX Configuration Tools

Sam - System Administration Manager. The SAM application will do almost any maintenance and configuration function required on HP-UX.

## Editors on HP-UX

VI – is the Universal Editor on UNIX and on HP-UX. VI is not as friendly as other editors you might find but it is universal in its availability on UNIX. Just as EDITOR is universally available on MPE/iX and therefore a wise thing to learn, VI is also a wise thing to know. Once you do you may want to get something a bit easier. Robelle's fine editor QEDIT exists on HP-UX (as does SUPRTOOL for ORACLE and ELOQUENCE databases).

In order to run "VI" simply type 'VI' and the file name you wish to work on:

```
'vi jeffsfile'
```

## Some Simple VI Commands

Here is a simple set of commands to get a beginning VI user started. There are many other convenient commands, which will be discussed in later sections.

a - enter *insert* mode, the characters typed in will be inserted after the current cursor position. If you specify a count, all the text that had been inserted will be repeated that many times.

h - move the cursor to the left one character position.

i - enter *insert* mode, the characters typed in will be inserted before the current cursor position. If you specify a count, all the text that had been inserted will be repeated that many times.

j - move the cursor down one line.

k - move the cursor up one line.

l - move the cursor to the right one character position.

r - replace one character under the cursor. Specify *count* to replace a number of characters

u - undo the last change to the file. Typing u again will re-do the change.

x - delete character under the cursor. *Count* specifies how many characters to delete. The characters will be deleted after the cursor.

## Scripts

One of the most powerful aspects of HP-UX and UNIX is the ability to create Scripts to perform complex or repeated tasks. This is also a capability within MPE/iX. The following is a sample Script from

This is my typical Unix shell script skeleton:

```
#!/bin/sh
```

```
# First line in the script, the script now runs with Bourne shell
```

```
# Name: demo.sh
```

```
# File name for the script. I use *.sh for Bourne shell scripts,
```

```
# *.csh for C-shell scripts, etc.
```



```

# Purpose of the script, just few lines, with references to
# documents

# Created: JRK, 17-JUL-2001 at 16:10

# Who wrote this and when, also short update history and exact
# time when the script was last changed.

cd $HOME/RunMyScript

# Directory where the script is to be run. $HOME is a shell
# variable containing a part of the full path, you can use
# full absolute path instead of variable, like /user/local/MyScript

echo `date` " Script _demo.sh_ started " > sam_script.summary
echo `date` " Script _demo.sh_ started " > sam_sh.log
echo `date` " Script _demo.sh_ started " >> sam_cumulative_sh.log

# Now this script created or overwrote two files, sam_script.summary
# and sam_sh.log and added one line to file sam_cumulative_sh.log

# The purpose of *.summary is to collect messages for the
# script users.

# The purpose of *.log is to collect technical information for this
# run in order to help fix possible problems.

# The last file contains the whole history of runs with this script.
# Remember to empty (delete) this cumulative log now and then.

# --- Do the real work here ---

# --- Send results and run reports ---

# FTP

# mail

# --- End ---

# End of demo.sh script

# It is quite useful to indicate the real end of the script !

```

## **Conclusion**

The new HP-UX user coming to the platform from MPE/iX can have a very positive experience when moving to HP-UX. One caveat I would note is that UNIX has more complexity in it simply because of the many hands that have been involved in its development. It has many ways to do things and those vary from the shell you are using to the UNIX platform. HP-UX users are more accepting of questions realizing that not any one person can get their arms around all of the information. The new users will note more books on the shelf of an HP-UX user. There will be more working together on problems and more consulting of manuals than I have seen in MPE/iX. Basically, once you achieved a certain level of knowledge you could often finger out sticky problems in MPE/iX by reading HELP, and looking around. HP-UX, takes longer to arrive at that level and one may never get to the same grasp they thought they had of MPE/iX. My suggestion is to do your best to cover what you can learn and then keep your mind open to learn new things and new ways of doing things on a daily basis. Good luck and have fun!!

## **References**

HP Documentation Archive:

<http://docs.hp.com>

Robelle Documentation:

<http://www.robelle.com/library/smugbook/mpe2unix.html>