

POSIX Freeware

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Before you can really begin to explore and use the POSIX freeware, it would help to familiarize yourself with POSIX.

What Is POSIX?

To keep things simple, POSIX is a set of standards based on UNIX. There are three major areas covered by the standards: an end-user shell, a set of utilities, and a collection of programming functions. This paper will get you started with the shell and utilities. When I talk about "POSIX", I'll generally be referring only to the shell and utilities.

What Is A POSIX File?

The POSIX standards require a "hierarchical file system", like the on UNIX and MSDOS/WINDOWS PC's. HP added a hierarchical file system (usually referred to as the HFS) to MPE with version 4.5.

If you have never used UNIX or a PC (or even if you have), you can learn more about the HFS by logging on to your MPE system and typing

```
:XEQ POSIXCBT.LSN.SYS
```

This runs an on-line tutorial about the HFS.

POSIX also requires that filenames be case-sensitive (i.e. "FOOBAR" and "FooBar" are two different files).

These two things (the HFS and the case-sensitive filenames) create much of the confusion about "POSIX files", but here's the secret: There really isn't any such thing as a "POSIX file" or a "non-POSIX file"! A file is a file is a file. Some files reside in what we now call "the MPE namespace" (just another way of saying the file resides in an MPE group, which of course is in an MPE account, and conforms to the old MPE filename rules), and some files don't.

Just keep the following things in mind:

- 1) All files in the "MPE namespace" are also in the HFS (the "MPE namespace" is a proper subset of the HFS namespace).
- 2) While program files can be outside the MPE namespace, only program files that are within the MPE namespace can have special capabilities (like PM).
- 3) MPE groups and accounts are also POSIX directories. The group "PUB.SYS" can also be referred to as "/SYS/PUB", and the file "SPL.PUB.SYS" can also be referred to as "/SYS/PUB/SPL".
- 4) Files that are not part of the MPE namespace can be under MPE groups or accounts; "/SYS/myposixfile" and "/SYS/PUB/myposixfile" are both valid filenames.

Glossary

(Yes, the glossary normally goes at the end, but by then it's too late).

POSIX: a set of standards derived from Unix, describing a shell, some utilities, and some libraries (API's).

HFS: the Hierarchical File System, similar to DOS and Unix, now on MPE.

MPE Namespace: MPE accounts and groups, and files that conform to the old MPE naming rules and reside under MPE groups.

SH: the POSIX shell.

CI: the MPE Command Interpreter.

It's Not On My System

POSIX was introduced with MPE/iX 4.5, so if you are still using MPE/iX 4.0 you won't have it (and you aren't on an officially supported release of MPE any more, either). If you are using MPE/iX 4.5, you haven't been on a supported release for quite some time -- 4.5 was a short-term version intended to give 3rd part vendors an early look at some of the POSIX extensions.

So you're on MPE/iX 5.0. Guess what? I've seen a number of 5.0 sites that, for some as yet unknown reason, don't have the POSIX files, either! To check your system, type the following commands:

```
:LISTF @.HPBIN.SYS
:LISTFILE /bin
```

The first command should produce a list something like this:

AR	ASA	AWK	BANNER	BASENAME	BC
BDIFF	C	C89	CALENDAR	CALLCI	CAT
CD	CHDIR	CHGRP	CHMOD	CHOWN	CI
CKSUM	CMP	CO	COMM	COMMAND	COMPRESS
CP	CPIO	CSPLIT	CTAGS	CUT	DATE
DC	DD	DEROFF	DIFF	DIFF3	DIFFB
DIFFH	DIRNAME	DU	ECHO	ED	EGREP
ENV	EX	EXPAND	EXPR	FALSE	FGREP
FILE	FIND	FMT	FOLD	FROMBYTE	GETCONF
GETOPT	GETOPTS	GREP	HDB	HEAD	HELP
ID	IDENT	IPCRM	IPCS	JOIN	KILL
LC	LEX	LINE	LN	LOGNAME	LS
MAILX	MAKE	MAN	MERGE	MESG	MKDIR
MKFIFO	MKNOD	MORE	MOVER	MV	NICE
NL	OD	PACK	PASTE	PATCH	PATHCHK
PAX	PCAT	PR	PRINTF	PS	PWD
RCS	RCSCLEAN	RCSDIFF	RCSMERGE	READ	RED
RENICE	REV	RLOG	RM	RMDIR	RSH
SCCS2RCS	SED	SH	SLEEP	SORT	SPLIT
STRINGS	STRIP	STTY	SUM	SVIPC	SVIPCUTL
TABS	TAIL	TAR	TEE	TEST	TIC
TIME	TOBYTE	TOUCH	TPUT	TR	TRUE
TSMAIL	TTY	UIL	UMASK	UNAME	UNCOMPRES
UNEXPAND	UNIQ	UNPACK	UNTIC	UPTIME	UUDECODE
UUENCODE	VI	WAIT	WALL	WC	WHICH
WHO	WRITE	X	XARGS	YACC	ZCAT

The second command should produce a list something like this:

ar	asa	awk	banner	basename	bc
bdiff	c	c89	calendar	callci	cat
cc	cd	chgrp	chmod	chown	ci
cksum	cmp	co	comm	command	compress
cp	cpio	cs	cs.hwhence	csplit	ctags
cut	date	dc	dd	diff	diff3
diffb	diffh	dirname	du	echo	ed
egrep	env	ex	expand	expr	false
fgrep	file	find	fmt	fold	frombyte
ftp	getconf	getopt	getopts	grep	head
help	id	ident	join	kill	lc
lex	line	ln	logname	ls	mailx
make	man	merge	msg	mkdir	mkfifo
mknod	more	mount	mover	mv	nl
od	pack	paste	patch	pathchk	pax
pcat	pr	printf	ps	pwd	r
rcsclean	rcsdiff	rcsm	read	red	rev
rlog	rm	rmail	rmdir	rsh	sccs2rcs
sed	sh	sleep	sort	split	strings
strip	stty	sum	tabs	tail	tar
tee	test	tic	time	tobyte	touch
tput	tr	true	tsmail	tty	umask
umount	uname	uncompress	uncompress	unexpand	uniq
unpack	untic	uptime	uudecode	uencode	vi
wait	wall	wc	which	who	write
xargs	yacc	zcat	zzz	zzzz	

Note: don't worry if you don't have exactly the same files I listed above.

If you don't have any files in either group, you need to contact the HP response center. They can tell you how to restore the missing files from your FOS installation tape.

Accessing HFS files from the MPE Command Interpreter

Many MPE commands now accept HFS filenames, using the "/" syntax. Here are some examples of a few of the more important ones:

```
:BUILD ./myposixfile
:PRINT ./myposixfile
:PURGE ./myposixfile
:LISTFILE ./myposixfile,2
```

(Notice that you have to use ":LISTFILE" instead of ":LISTF".)

Since all files are part of the HFS, you can refer to files in the MPE namespace using the "/" syntax, also:

```
:PRINT FOOBAR    or    :PRINT ./FOOBAR
:PRINT FOOBAR.PUB.HENSLEY    or    :PRINT /HENSLEY/PUB/FOOBAR
```

Here are a few important ":LISTFILE" examples:

To see all of the files in your current group, and any HFS sub-directories under your current group:

```
:LISTFILE ./
```

To see all of the files in your current group, but not in sub-directories under your current group:

```
:LISTFILE ./@
```

To see all of the files in your account, include all sub-directories:

```
:LISTFILE ../@
```

(The "." we've been using means "your current directory"; the ".." above means "the parent directory of your current directory" -- just like DOS and Unix!)

And Now, On To The Freeware

First, please be aware that by the time you read this, any version information would be out of date. The freeware development efforts are moving along at a very rapid pace!

If you use the freeware tape, installation is much easier and cleaner. All of the groups contain an "install" command file, that either completely installs the product for you or tells you what to do (in some future version of the tape -- maybe even by the time of HPWORLD '97 -- all of the "install" command files will do the complete installation). Originally much of the software was distributed as "tar", "lzw", or "mover" files; however, some kind of bug on MPE/iX 5.0 affects all of these compression programs, so that tape contains most of the files in an uncompressed form.

Important note: before you execute any of the command files in the FREEWARE account, you must stream BULDJOB1.PUB.FREEWARE to set the correct access and capabilities for the FREEWARE account.

Web Servers

The FREEWARE tape includes two web servers: APACHE and NCSAWEB. Both are ports of widely available Unix freeware web servers.

Even if you don't allow Internet access to your HP3000(s), a web server can be a great way to share information on the HP3000(s) with users on your local network (lately called your "Intranet"). Report files can be viewed, and even on-line interaction is possible via CGI (or other methods).

The web servers require you to have the TCP/IP protocol installed and running on your HP3000. While setting up TCP/IP is beyond the scope of this paper, it's pretty easy to do (and documented in your MPE reference manuals).

You'll also need to learn enough HTML (the language web pages are written in) to get by. Some third-party utilities have started providing some level of support for HTML, notably (and first) Robelle's SUPRTOOL.

Both of the servers can serve web pages, graphics, java applets, CGI scrips, the works!

Important note: you can only run one web server per machine at a time (well, unless you configure one or the other to use a non-standard port, but that's mostly useful for testing).

NCSAWEB

NCSA was the first to be made available, and the package include LYNX, a text-mode web browser. It is installed into an account named WEB, and a group named WEB.SYS. After the installation script and jobs complete, simply:

```
:STREAM HTTPJ.WEB.SYS
```

Next, run whatever web browser you like to use and point it at your HP3000, and you'll see the default example page provided with the server!

To try out LYNX (the text mode browser):

```
:HELLO CLIENT.WEB
:RUN LYNXP.WEB.SYS
```

Your web pages go in the DOC.WEB group.

APACHE

The APACHE web server is the most widely used on the Internet. Some of the advantages include extensibility and security. You can set up password-protected pages that only users to whom you give the password have access to.

After installing APACHE, you start it via:

```
:STREAM JHTTPD.PUB.APACHE
```

Run Netscape Navigator, MS Internet Explorer, or whatever other web browser you have to see if your server is properly installed and running.

APACHE works "right out of the box", but configuring it can be quite complicated (you don't get all of that power with no effort!). Fortunately, since it is the most widely used server on the Internet, there is a lot of help available.

To start with, you should visit "<http://www.apache.org>" (the official APACHE web site). Check what version of APACHE you have (1.2b11 as of this writing) so you know what information on the web site is relevant to you.

Next (or maybe even first), visit "<http://www.cccd.edu/~markb/apacheix.html>"; this is the official site for the MPE port of APACHE.

FREEMAIL

3k Associates sells a great email server for the HP3000 called NetMail. FREEMAIL is a free version of NetMail, but with only 2 mailboxes. What good is that? I think one of the most interesting uses would be to give batch jobs the ability to send email to the operator and/or the system manager, either on the HP3000 or to your mailbox on your regular e-mail server.

The Scripting Languages

There are two scripting languages on the FREEWARE tape: PERL and PYTHON. Why would you want to learn/use another scripting language, if you already know the MPE CI and/or VESOFT's MPEX? One good reason is portability. Not only will many of the scripts you write in, say, PERL be runnable on other operating systems (Unix, WinNT, and DOS all have versions of PERL available), but even more important, the skills you acquire will be useful on multiple operating systems, and the knowledge and experience others have gained will be at your disposal.

PERL

The most widely used language for writing CGI scripts (for interactive web pages and forms), PERL stands for "Practical Extraction and Report Language" (so why isn't the acronym/name "PEARL?").

One very good way to learn PERL is the book "Learning Perl" by Randal L. Schwartz, available from O'Reilly & Associates, Inc. Just ignore the words "Unix Programming" on the cover. You should also visit "<http://perl.guru.org>" and "<http://www.perl.com/perl/>".

Since PERL is distributed as part of the GNU stuff (more later), you have to install GNUCORE before installing GNUPERL.

PYTHON

The second scripting language available on the FREEWARE tape, PYTHON is not quite as well-known as PERL (partially because PERL is the most widely used language for CGI scripts).

To quote from the official web site, "<http://www.python.org>",

"Python is an interpreted, interactive, object-oriented programming language. It is often compared to Tcl, Perl, Scheme or Java."

Python combines remarkable power with very clear syntax. It has modules, classes, exceptions, very high level dynamic data types, and dynamic typing. There are interfaces to many system calls and libraries, as well as to various windowing systems (X11, Motif, Tk, Mac, MFC, STDWIN). New built-in modules are easily written in C or C++. Python is also usable as an extension language for applications that need a programmable interface.

The Python implementation is portable: it runs on many brands of UNIX, on Windows, DOS, OS/2, Mac, Amiga... If your favorite system isn't listed here, it may still be supported, if there's a C compiler for it. Ask around on `comp.lang.python` -- or just try compiling Python yourself.

SAMBA

What is SAMBA? Basically, SAMBA is a network file sharing service, similar to NFS. It allows you to "mount" accounts on your HP3000 as if they were disks on your PC (or Unix) system. You can then access the HP3000 files using, for a really stupid example, EDLIN in MSDOS!

SAMBA also lets the HP3000 view files on PC's (and Unix boxes, and anything else it has been ported to) as if they were local HP3000 files!

The version currently available (as of this writing) is still somewhat experimental, but it works amazingly well. A few future enhancements to POSIX (should they get done) will make it even more useful. Most of the problems remaining stem from PC applications insistence on attempting to create filenames that aren't legal on MPE (even with the more flexible HFS filenames).

GNU

GNU (which stands for "Gnu's Not Unix" -- really!) is a project of the Free Software Foundation (see "<http://www.gnu.org>"). The original goal, in 1984, was to create a complete, free, Unix-like operating system. Linux (a freeware version of Unix) is based on the GNU project.

The GNU distribution on the FREEWARE tape contains many utilities and libraries, PERL, and most importantly GCC (the GNU replacement for C/C++). This gives you a very good C/C++ compiler on the HP3000, much cheaper (free) than the MPE C/iX compiler which doesn't even include C++.

The GNU GCC compiler was used to port the APACHE web server, JAVA (HPC wouldn't work), and much more. All of the GNU tools, including GCC itself, are compiled using GCC. GROFF is actually written in C++ (not just C).

By the time you read this, the GNU symbolic debugger GDB may be done, also!

JAVA

Much excitement and hype has been generated by Java relating to the World Wide Web. However, especially for MPE users, Java's greatest importance is as an application development language. Java provides the power of object oriented programming without the confusion of C++.

The JAVA distribution consists of 2 parts: the Java Virtual Machine (used to execute Java applications on your HP3000), and the Java Developer's Kit (used to develop Java applications).

Because Java provides such a high degree of portability, one good way to learn Java is to buy a copy of Symantec's Cafe (for MS Windows) (visit "<http://cafe.symantec.com>"). You can actually write, compile, test, and debug your application on the PC, then move the compiled program to the HP3000 and run it there!

For up-to-date information on the state of Java on MPE, see "<http://jazz.external.hp.com/src/java/>"

After installing the Java VM and the JDK, you can compile and run Java programs either from the MPE CI or from the POSIX shell!

Examples are available on how to access MPE Ininsics from Java code, and how to access IMAGE databases.

As you can see, the advent of POSIX on MPE has opened up a whole new world (insert music from Disney's "Aladdin" here) of applications and utilities to MPE users! This marriage of the reliability of MPE with the power of (mostly) Unix software opens the door to a very bright future (mix in a few more metaphors, and shake well -- "shaken, not stirred").