



Moving MPE Files To Unix

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Transformix

**Investment Protection for MPE/iX
Applications Through Application
Renovation**

<http://www.xformix.com/>



Introduction

- **Migration Goal - Minimal changes to application sources when migrating applications**
- **Programs written for HFS require very little work in migrating**
- **Session focuses on issues associated in migrating applications that were written for the original MPE file system.**



Session overview

- **Migration approach alternatives**
- **How are files used on MPE vs. UNIX**
- **File related commands and intrinsics**
- **File related programming solutions**



Presentation goal

Goal is to

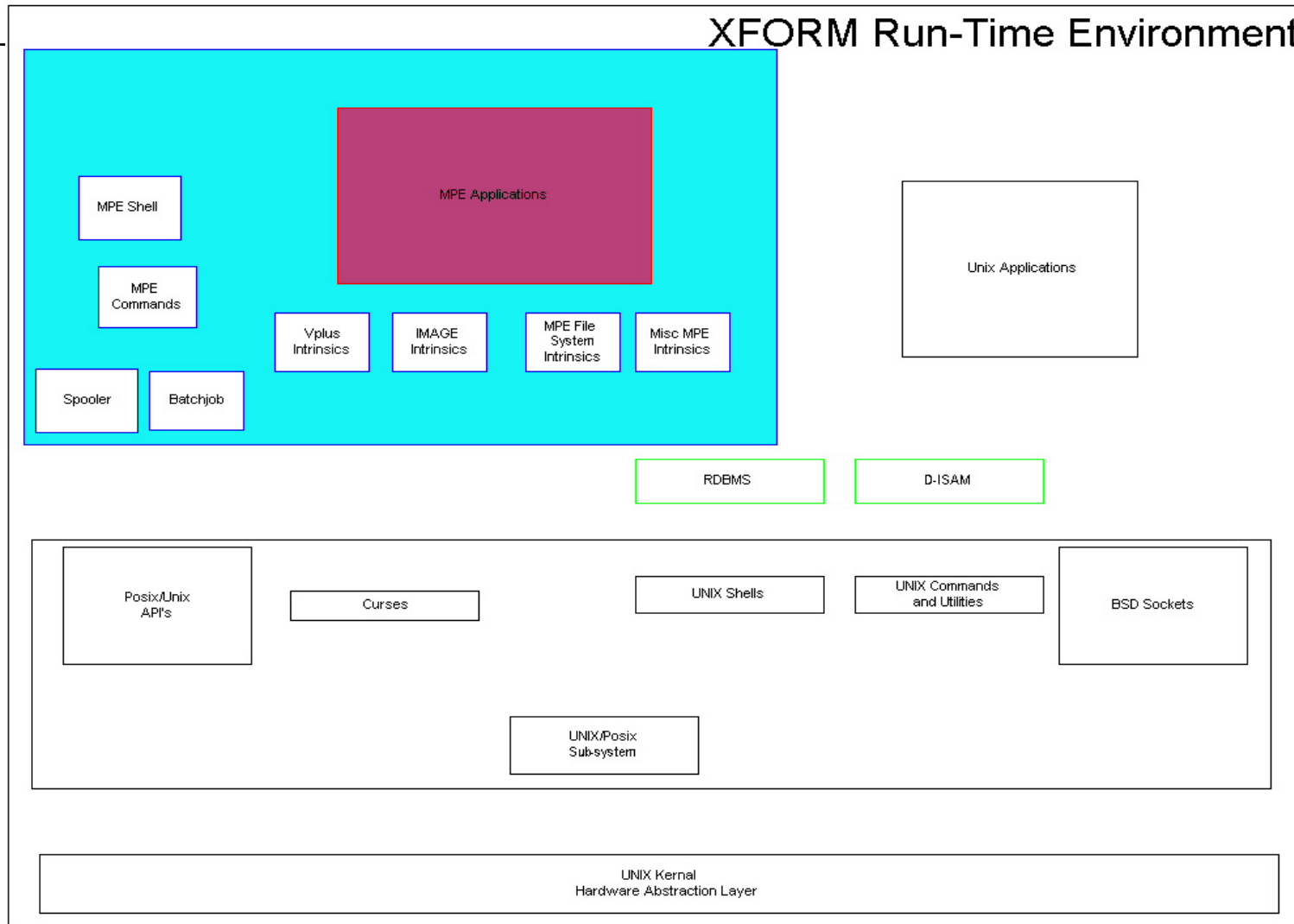
- **Identify issues involved in porting MPE files and the programs that use them to a UNIX environment.**
- **Show a “real world” example of how MPE file related programs can be ported with little or no changes.**



Transformix Computer Corporation

- **Founded in 1982 evolved into Transformix**
- **Consulting and Systems Integration Services**
 - ***Application Re-engineering***
 - ***HP 3000 Porting and Migrations Tools***
 - ***IT Infrastructure Consulting and Services***
- **Primary focus is application renovation and migration related Hewlett Packard 3000 environments**

XFORM Run-Time Environment Overview





Execution (Runtime) Sub-Environment

User Interface The runtime (screens)

- 📁 **VPlus**
- 📁 **Non-HP Screen Handler**
- 📁 **Direct I/O to Screens**
- 📁 **GUI**

Data Management

- 📁 **MPE Flat Files**
- 📁 **KSAM**
- 📁 **IMAGE Clone**
- 📁 **SQL Access**

Transaction Management

Operating System Interfaces

- 📁 **The File System**
- 📁 **System Information**
- 📁 **Process Management**
- 📁 **User Information**
- 📁 **Program Information**
- 📁 **Interprocess Communication**
- 📁 **Process Synchronization**
- 📁 **Miscellaneous OS Interfaces**



The User (Operations) Sub-Environment

Files and Data

- 📁 **MPE File Usage**
- 📁 **Directories**
- 📁 **Tape Files**

Commands

- 📁 **Commands**
- 📁 **Command Files**
- 📁 **UDC's**
- 📁 **Jobs and Job Files**

Operations Control

- 📁 **Production Scheduling**
- 📁 **Output Spooling**

Utilities

- 📁 **Sort/Merge**
- 📁 **Editors**
- 📁 **Mail**



Primary solution alternatives used in migrations

📁 ***Simulated run-time environment.***

📁 ***Eliminate MPE features from code***

📁 ***Complete rewrite***



Simulated run-time environment.

- **Requires the least number of changes to source code.**
- **Changes can usually be almost 100% automated.**
- **Can be done very quickly**
- **Easier to test since results are almost the same as existing system.**
- **Little user retraining.**
- **Little programmer retraining.**
- **Can use existing infrastructure**
- **Testing can begin soon.**
- **Least risky.**



Eliminate MPE features from code

- **Dependent on third party products to leave them requires another port**
- **A lot of code needs to be replaced increasing the probability of errors.**
- **Possibility of a lot of user retraining.**
- **More programmer retraining.**
- **Error handling must be rethought.**
- **Potential need for infrastructure upgrade.**



Complete rewrite

- **Very risky**
- **Takes a long time**
- **\$\$\$\$**



Demonstration

- **Demonstration of a simulated runtime environment shell logon and help**



MPE Files vs. UNIX Files

- **File systems on MPE/iX**
- **Original MPE File System**
- **HFS**



The standard files

- **Stdin <-> stdin**
- **Stdlist <-> stdout**
- **Stderr <-> stderr**



The life of disk files

- **In UNIX file creation and deletion are performed explicitly.**
- **File domains**
 - ***New files***
 - ***Temporary files***
 - ***Permanent files***
- **File sharing**



Formal file designators

- **MPE FILE command**
- **UNIX does not contain the same type of statement**



File structure information

- **BUILD command**
- **UNIX does not store information about the internal structure of the file.**
 - ***Record length***
 - ***Block size***
 - ***Fixed vs. variable length***
 - ***Binary vs. ascii***
- **FILE, BUILD, LISTF demo**



MPE file types

- **UNIX bytestream files**
- **MPE Flat files**
 - ***Bytestream files are the closest thing***
 - ***Does not contain label information***
- **MPE KSAM files**
 - ***C-ISAM or D-ISAM***
- **KSAM is different from C-ISAM or D-ISAM**
 - ***Adapter code is needed to make C-ISAM or D-ISAM work.***



MPE Message files

- **Used for IPC**
 - ***UNIX has various other facilities that are close but not the same***
 - ***Shared memory***
 - ***"Pipes***
 - ***"Sockets***



More – MPE File Types

- **MPE Circular files**
- **MPE Spoolfiles**
 - ***UNIX spoolfiles are totally different***
- **MPE RIO**
- **MPE Batchjob Queue**
 - ***UNIX does not come with this***
- **KSAM file demo**



MPE Directories vs. UNIX Directories

- **UNIX directories**
 - ***Based on a filesystem hierachy***
 - ***Root, directory, file***
- **MPE Directories**
 - ***Account, Group, File***
 - ***Permanent files***
 - ***Temporary files***
- **Directory and temporary file demo**



The UNIX Concept of file systems

- **Root directory**
- **Mounting filesystems**
- **Maximum file sizes**



File name structure

- **UNIX filenames can have suffixes – MPE does not**
- **UNIX filenames can be long**
- **MPE filenames are limited to 8 characters.**
- **MPE three levels**
 - ***Account***
 - ***Group***
 - ***Filename***



File Related Commands and Intrinsic

- **General file information**
 - ***Physical and operational characteristics of a file (defined by device dependencies, a disk file's label, FILE commands, HPFOPEN / FOPEN intrinsic parameters, and file system defaults), as well as access-dependent details about a currently opened file (including EOF and logical record marker locations).***



Commands and intrinsics

- ***Includes***
 - ***LISTF command***
 - ***LISTEQ command***
 - ***[CMD] INFO command***
 - ***FFILEINFO intrinsic***
 - ***FGETINFO intrinsic***
 - ***FLABELINFO intrinsic***
 - ***FRELATE intrinsic***



Error Information

- **Error information covers the intrinsics that are used specifically to handle file system errors--to identify an error and to display error information at the terminal.**



Error Information Intrinsic

○ **Intrinsics described in this section are:**

- ***FCHECK intrinsic***
- ***FERRMSG intrinsic***
- ***PRINTFILEINFO intrinsic***



Source Environment

○ **MPE Intrinsic IO**

Routines

- ***FOPEN***
- ***FREAD***
- ***FWRITE***
- ***FCLOSE***
- ***Example***

○ **COBOL IO**

Routines

- ***OPEN***
- ***READ***
- ***WRITE***
- ***CLOSE***
- ***Example***



Target environment

- **Simulated environment**
 - ***Tools used to make code changes***
 - ***Libraries on target platform used to create MPE illusion***
- **Overview of MPE Intrinsic solution**
- **Overview of MPE COBOL IO Routines using CALLFH**
- **XFORM example**



Target environment

- **Third-party COBOL replacement code**
 - ***Uses standard COBOL IO***
 - ***Microfocus COBOL example***



Target Environment

○ **SQL**

- ***Replaces file IO with SQL statements***
- ***IBM DB2 example***

○ **Reengineering wrapper**

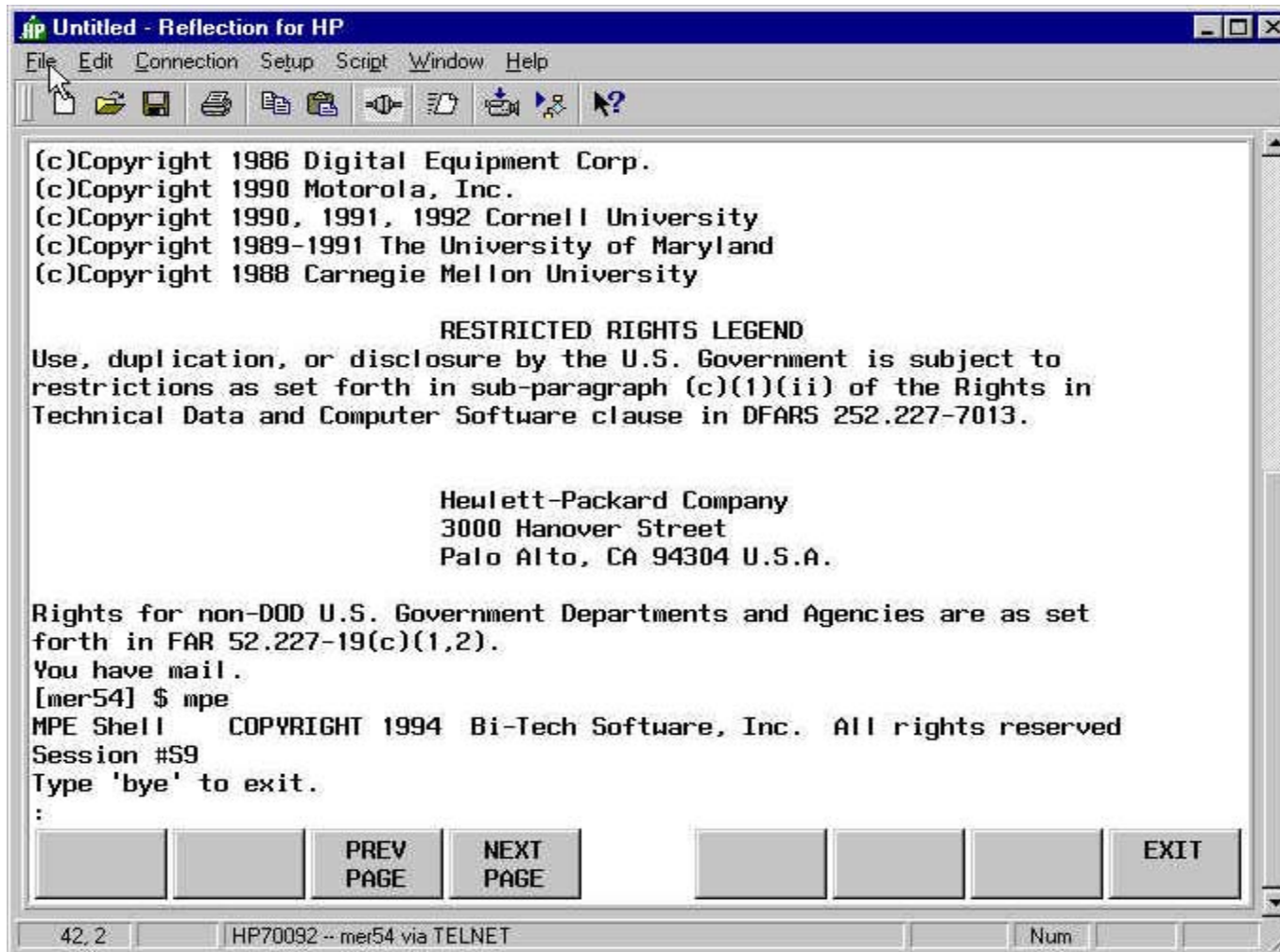
- ***Eliminates MPE features from code***
- ***Relies on third party software***

○ **Example**



Example of a Porting and Migration Toolset

MPE Shell



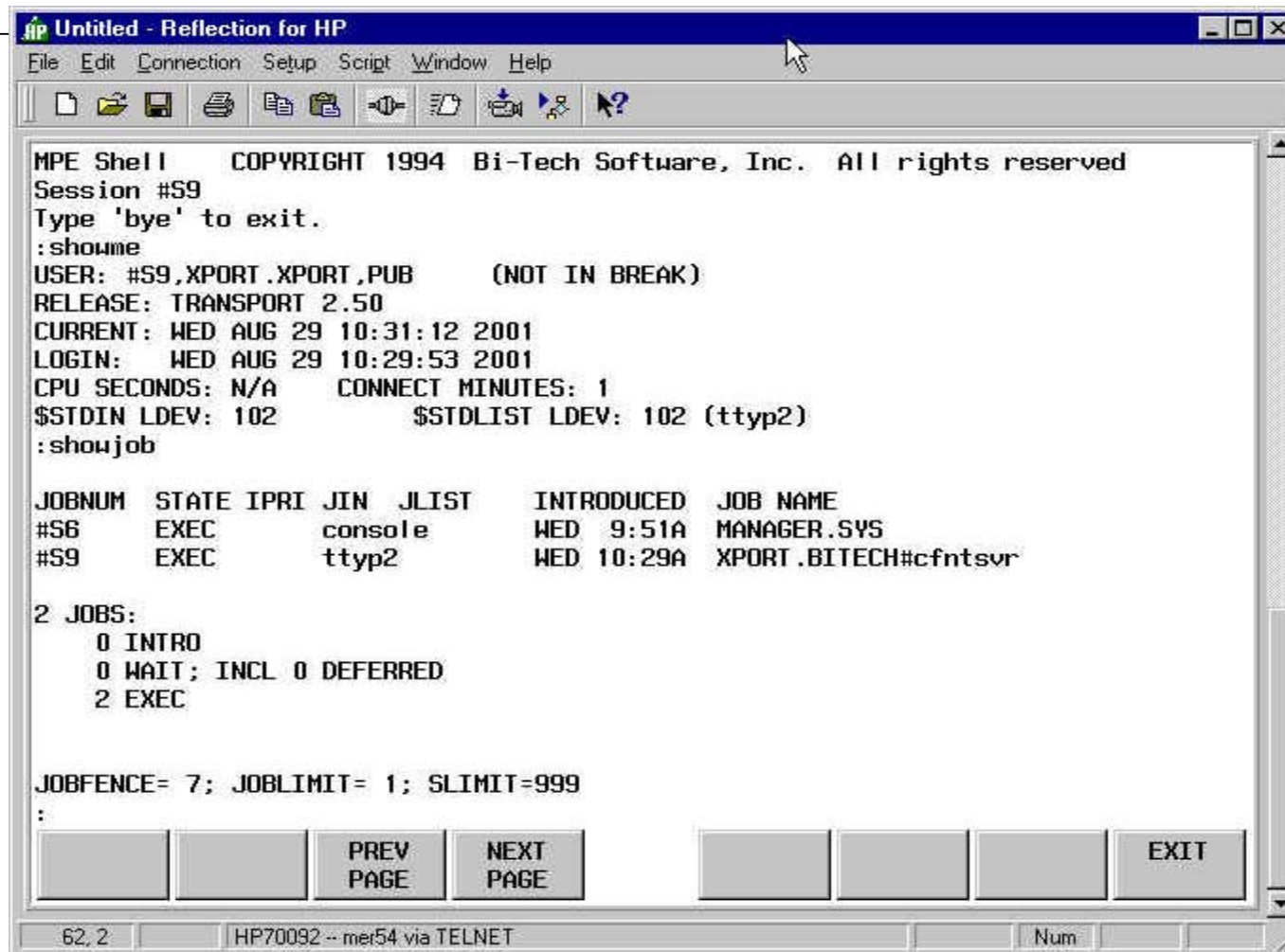
```
HP Untitled - Reflection for HP
File Edit Connection Setup Script Window Help
(c)Copyright 1986 Digital Equipment Corp.
(c)Copyright 1990 Motorola, Inc.
(c)Copyright 1990, 1991, 1992 Cornell University
(c)Copyright 1989-1991 The University of Maryland
(c)Copyright 1988 Carnegie Mellon University

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                Hewlett-Packard Company
                3000 Hanover Street
                Palo Alto, CA 94304 U.S.A.

Rights for non-DOD U.S. Government Departments and Agencies are as set
forth in FAR 52.227-19(c)(1,2).
You have mail.
[mer54] $ mpe
MPE Shell  COPYRIGHT 1994 Bi-Tech Software, Inc. All rights reserved
Session #59
Type 'bye' to exit.
:
PREV PAGE NEXT PAGE EXIT
42,2 HP70092 -- mer54 via TELNET Num
```

MPE Commands



The screenshot shows a terminal window titled "Untitled - Reflection for HP". The window contains the following text:

```
MPE Shell    COPYRIGHT 1994  Bi-Tech Software, Inc.  All rights reserved
Session #S9
Type 'bye' to exit.
:showme
USER: #S9,XPORT.XPORT,PUB      (NOT IN BREAK)
RELEASE: TRANSPORT 2.50
CURRENT: WED AUG 29 10:31:12 2001
LOGIN:   WED AUG 29 10:29:53 2001
CPU SECONDS: N/A      CONNECT MINUTES: 1
$STDIN LDEV: 102      $STDLIST LDEV: 102 (ttyp2)
:showjob

JOBNUM STATE IPRI JIN  JLIST      INTRODUCED  JOB NAME
#S6    EXEC      console  WED  9:51A  MANAGER.SYS
#S9    EXEC      ttyp2    WED 10:29A  XPORT.BITECH#cfntsvr

2 JOBS:
  0 INTRO
  0 WAIT; INCL 0 DEFERRED
  2 EXEC

JOBFENCE= 7; JOBLIMIT= 1; SLIMIT=999
:
```

At the bottom of the window, there are several buttons: "PREV PAGE", "NEXT PAGE", and "EXIT". The status bar at the very bottom shows "62, 2" and "HP70092 -- mer54 via TELNET".

VPlus Form

VIEW/3000 A00.00 Time Management System 08/29/2001
Time Entry

Sub Code : RJC Richard Churchill

D	CInt	Dept	Project	Date	Start	Stop	Elapsed	Status
	DL1	PRJ1	TASK 1	04/03/2000	0800	1030	2.50	
COMMENT LINE 1								
	DL1	PRJ2	TASK 2	04/03/2000	1030	1200	1.50	
COMMENT LINE 2								
	DL1	PRJ2	TASK 2	04/03/2000	1300	1445	1.75	
COMMENT LINE 3								
	DL1	PRJ2	TASK 1	04/03/2000	1500	1700	2.00	
COMMENT LINE 4								

Edit time entries

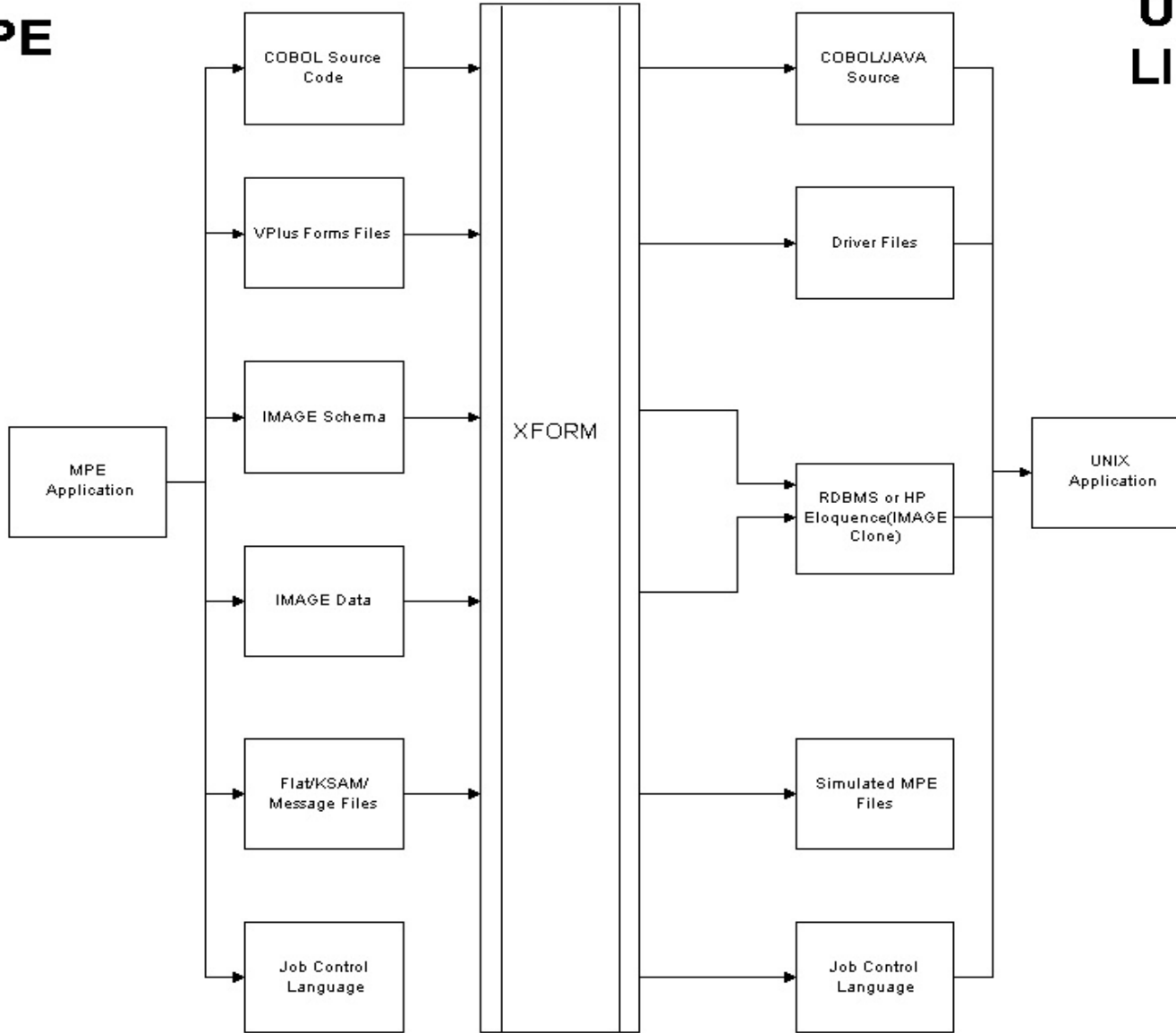
PREV PAGE NEXT PAGE EXIT

5, 23 | HP70092 -- mer54 via TELNET | Num Caps

XFORM Porting Environment Overview

MPE

UNIX-LINUX



Step 3 - API's for NT & UNIX

Replacement of MPE API's

Transformix

XFORM/RT - API Solutions

XFORMIRT - MPE like System Services for UNIX & NT

- **XFORM MPE like Intrinsic Calls**
- **MPE Full Device Control**
- **MPE to UNIX Device & Filename Mapping**

Step 3 - API's for NT & UNIX

Replacement of MPE API's

Growth
Experience
Flexibility
Comfort

Transformix

XFORM/Shell - API Solutions

XFORM/Shell MPE like shell for UNIX & NT

- **User Shell & Application Shells**
- **COPY, RENAME, DELETE, BATCH & PRINT etc.**
- **MPE commands for UNIX and NT**
- **MPE file spec to UNIX file spec translation**
- **Integrated RMS, CI interface**

Step 3 - API's for NT & UNIX

Replacement of MPE API's

Transformix

XFORM/RMS - API Solutions

XFORMIRMS - MPE like RMS for UNIX & NT

- **RELATIVE RECORD, SEQUENTIAL, KEYED**
- **XFORM/RMS is KSAM Compatibility Available**
- **No need for file re-organize**
- **NT, UNIX & MPE record locking compliant**
- **Uses either IBM/Informix C-ISAM or Bytedesigns D-ISAM**
- **Separate Index & Data files**
- **Full MPE RMS return status codes**



Migration of Files

- **Migration of ASCII Flat Files to UNIX**
- **Migration of BINARY Flat Files to UNIX**
- **Migration of Error Catalogs to UNIX**
- **KSAM File Migration**
- **Message File Implementation**



KSAM File Migration

- **Use binary file migration for KSAM FILES**
- **Migrate index and data as separate files**



Message File Implementation

- **Message file 'data' does not need to be migrated to UNIX.**
- **Created from either within the MPE Shell or from the UNIX prompt.**
- **To create a Message file from within the MPE Shell, enter:**
 - ***BUILD [filename];[file characteristics];MSG***



Porting Data



Transferring Sequential Files

- **Transferring Sequential Files**
- **Preparing the File Transfer**
- **MPE Unique File Types**
- **UNIX File Names**

- **File Transfer Methods**
- **TCP/IP File Transfer Protocol**
- **DDS**
- **Diskette**
- **Tape**
- **DLT**



KSAM Files

- **Transferring KSAM Files**
- **Loading the KSAM Data into Your Unix System**



Conclusions

- ***File usage by programs and people involves many dimensions including:***
 - **Program file usage**
 - **Various file types (flat, ksam, message, etc.)**
 - **Domains – temporary vs. permanent**
 - **File related commands**
- ***A complete solution addresses all of these needs***



Conclusions

- ***Programs, data, JCL all need to be ported***
- ***Programs that use MPE files can be ported as is***
- ***Quickest and safest way to port is to port as is***
- ***Trying to replace the MPE calls is complicated***
- ***Port first then change programs and data***