



Migrating MPE Applications To Unix and NT

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Transformix

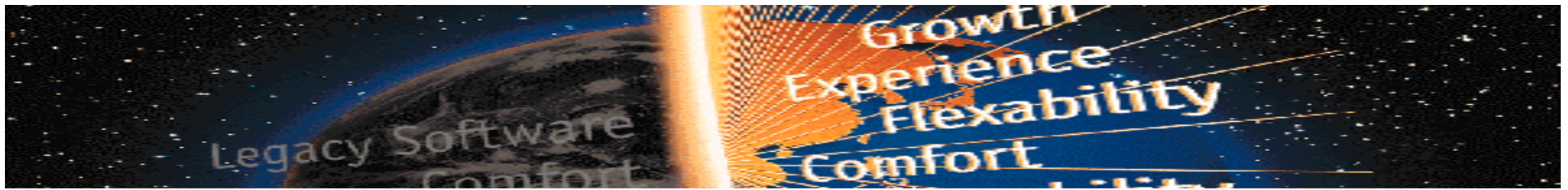
**Investment Protection for MPE/iX
Applications Through Application
Renovation**

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



Introduction and Definitions

- **General comments**
- **Terminology**
- **Paper subject**
- **Goal**
- **Audience**
- **Presentation focus**



Presentation Outline

- *Section I, Introduction and description of what needs to be done to port applications that run in an MPE/iX source environments to target computer operating environments.*
- *Section II, Example of XFORM, an MPE Porting and Migration Toolset*
- *Section III, Third-Party Porting Tools*

The models developed in Section I will be used as a framework to describe some real-world tools that are available to assist in the porting of HP MPE applications to UNIX and/or NT.



General comments

- **Porting and/or migrating may seem overwhelming at first**
- **With the right planning and the right tools can be least expensive option**



Terminology

- **The terms porting, migrating, converting, reengineering and rearchitecting are sometimes incorrectly used interchangeably.**
- **This can lead to confusion.**



Paper subject

**This paper is about porting in the sense that an end-user who is experienced in using the application in the source environment should be able to use the application in the target environment with little or no retraining.
minimal changes to source program logic.**



Presentation goal

Goal is to provide an understanding of why porting can be challenging and to help the reader understand the key tools and techniques needed to effectively port an application from one computing environment to another.



Transformix Computer Corporation

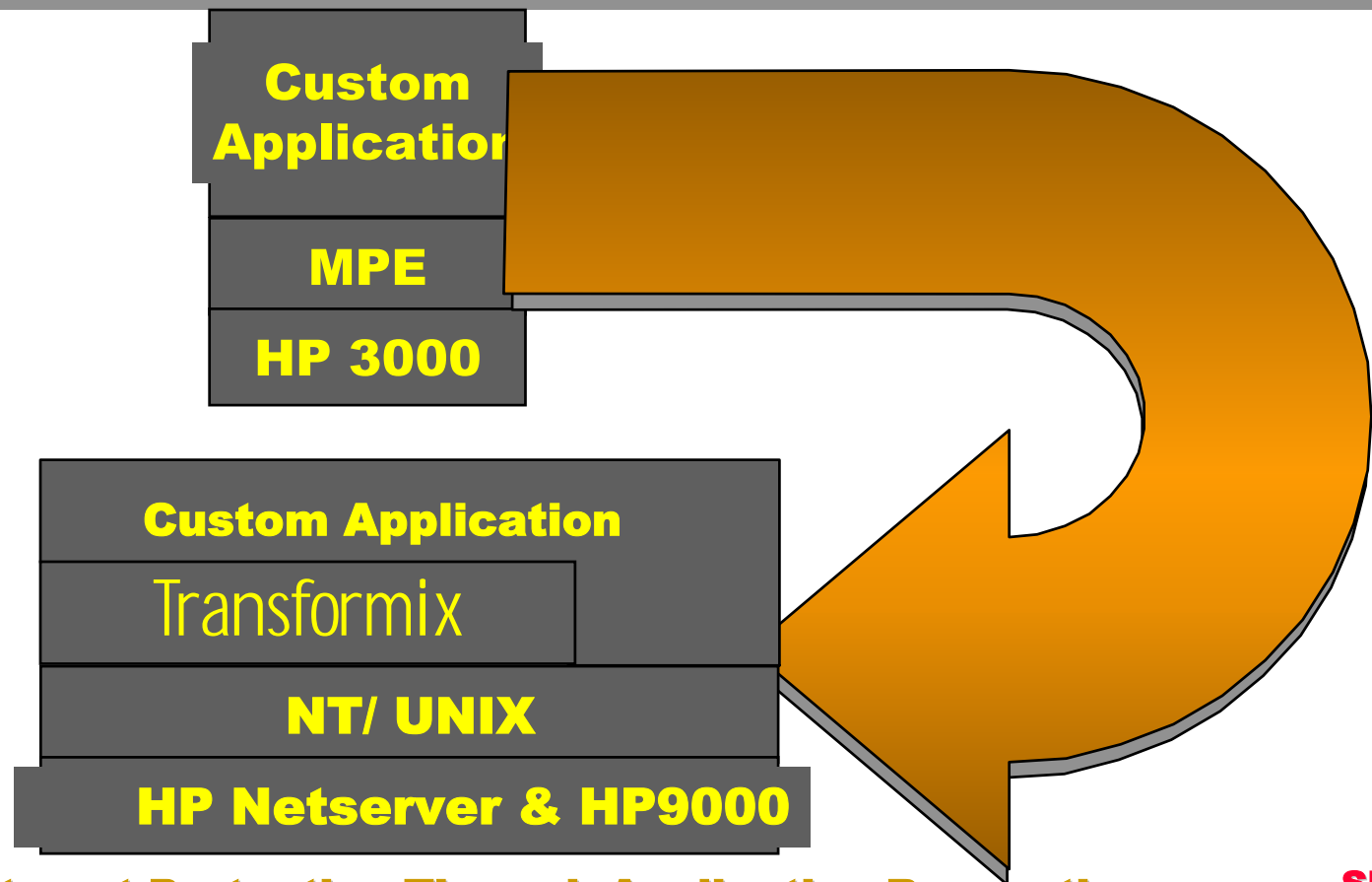
- **Founded in 1982 as ConAm Corporation evolved into Transformix**
- **Consulting and Systems Integration Services**
 - ***Application Re-engineering***
 - ***HP 3000 Porting and Migrations Tools***
 - ***IT Infrastructure Consulting and Services***
- **Primary focus on Hewlett Packard environments**

The Process

Legacy Software
Comfort

Growth
Experience
Flexibility
Comfort

The Successful Migration Achieved through Transformix's Five Step Process





Application Renovation

User Interface Change

GUI

Web User Interface

Web Database Access

SQL Access

RDBMS

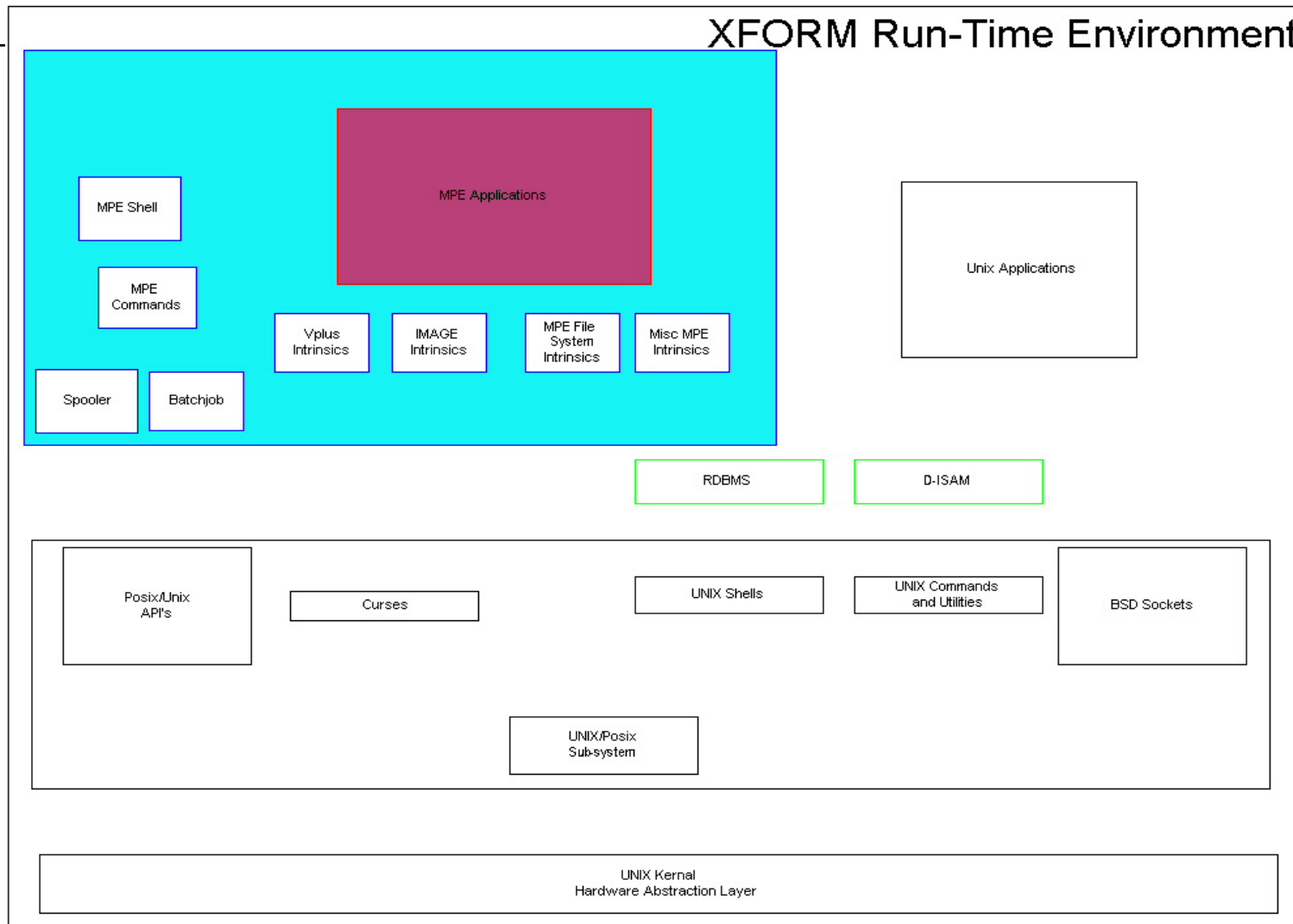


Porting

Translation - restructuring the code to be compatible with the run-time environment compilers, system calls, etc.

Emulation - providing run-time compatibility with the source environment on the target platform by pretending to be the source environment.

XFORM Run-Time Environment





Preserving Legacies: Application Renovation vs. Porting

- ***There is sometimes a need to renovate applications***
- ***There is sometimes a business need to port and migrate***
- ***Applications software is increasingly recognized a valuable asset***



Paper Audience

It is intended to be a primer directed at a user who has applications software that now runs on the HP MPE operating system who is considering porting that application to either UNIX or NT.



Paper focus

- **Third-generation languages such as COBOL, FORTRAN or C.**
- **The 4GL many of the same issues only less so.**
- **Particularly true when the 4GL vendor supports both the source and target environments.**



Section I:

The Porting and Migration Challenge



Porting and Migration Introduction

- **Introduction**
- **The Porting and Migration Challenge**
- **Downsizing As Part of Your Information Technology Strategy**
- **One Step At a Time**
- **Selecting the Right Applications**



Understanding the Landscape: Overview of Requirements for a Migration Toolset (XFORM)

- ***Execution (Runtime) Sub-Environment***
- ***The User (Operations) Sub-Environment***
- ***The Development Sub-Environment***
- ***The Administration Sub-Environment***



General Porting Design Objectives

- **General Porting Design Objectives**
For all sub-environments of the mpa environment the following are our objectives:
- *They are complementary and should not interact in a way other way than is consistent with normal behavior on the MPEIIX operating system,*
- *Any used UNIX or NT device or other feature should be left in state that is consistent with how a native program would leave it and therefore it should be accessible for the rest of the UNIX or NT system,*
- *No other UNIX or NT operation should be disturbed or impacted other than what is expected, i.e. no unwanted side effects are allowed,*
- *In any situation where the needs of MPE and those of UNIX or NT conflict to the point where the functioning of UNIX or NT might be impaired, the requirements of the UNIX or NT environment take precedence*
- *any features not specified within MPE operating system should be made to conform to the POSIX and other standards on which UNIX or NT platform is based.*

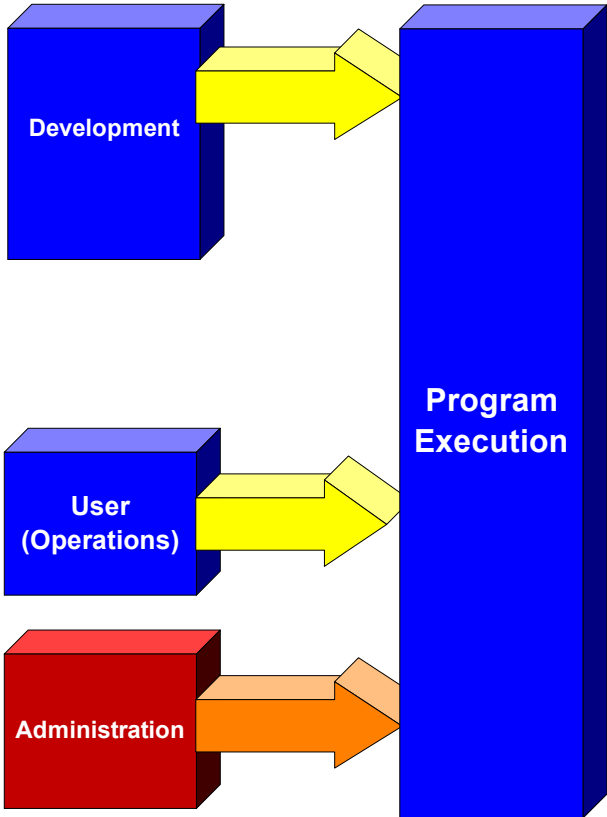


General Porting Steps

- **Analyze Source Environment -The first goal of porting is to first identify what features are provided to programs, programmers and computer users in the source MPE environment.**
- **Determine Target Environment Requirements -The next step is to somehow make the source and target versions of the application sources behave the same from an end-user and an executing program point of view.**
 - ***One way to do this is to find either exact or functionally compatible replacement functions in the target environment.***
 - ***A second way to make the source and target versions compatible is to translate from one to the other.***



Computing Environment Anatomy





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**



The Development Sub-Environment

Editing

3rd GL Compiling

📁 **FORTRAN**

📁 **ANSI/C**

4GL Development

Linking Programs



The Administration Sub-Environment

Backup

Security



Elements of a Porting Tool Chest



Emulation Tools

- **System Calls - Intrinsics**
- **Command Interpreter**
- **JCL**
- **Vplus**
- **Data Management Calls – IMAGE, KSAM and Flat Files**



Translation Tools

- **Translation Tools**
- **Language Differences**
- **Custom Translators**
- **Required Skills**



File and Data Conversion Tools

- **File and Data Conversion Tools**
- **Set up a Link to the HP 3000**
- **Interface between UNIX and MPE**



MPE|UNIX|INT Interoperability

- **SAMBA**
- **NFS**
- **Telnet**
- **ODBC**
- **JDBC**
- **Client/Server**



Required Skills

- **Systems Software, Hardware and Infrastructure**
- **Compilers**
- **Job Management**
- **Networking**
- **Terminal Interfaces**



Project Management and Methods

- **Project Management and Methods**
- **Required Skills**



Professional Services

- **Professional Services**
- **Required Skills**
- **Document Changes**



Opportunities for Incompatibility

- **VPlus,**
- **TurboIMAGE and**
- **MPE Intrinsic**
- **All unique, proprietary aspects of MPE.**



Transformix Methodology for Matching Source to Target

Goal of Methodology

Our goal is to create a checklist of functions needed in UNIX and/or NT that will allow our originally MPE-based applications to run on the target environment with little or no modification.



Porting Data Management Sources



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**



Migrating TURBOIMAGE

- **Migrating TURBOIMAGE**
- **HP Eloquence**
- **Relational Databases**
- **Database Definitions**
- **Table Definitions**
- **View Definitions**
- **Index Definitions**
- **Procedure Definitions**



Converting and Transferring TURBOIMAGE Databases

- **Bridges or gateways**
- **Unload/Reload**



KSAM Files

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



Porting User Access and System Management Pieces



Terminal Access

- **Terminal Access**
- **Functions Supported**
- **Functions Not Supported**
- **VPlus**
- **Non-VPlus**
- **GUI**



Batch Jobs

- **Batch Jobs**
- **Setting Up a Batch Queue**
- **Change the Application Code to Produce Script Commands**
- **Job Scheduling Systems**
- **Transformix Job Scheduler for UNIX**
- **UNIX Cron Facility**



Printing

- **Printing**
- **Print Transaction Started on a Printer**
- **Level**
- **Writing to the Spooler**



Programming Language Porting and Migration Methodology



Migrating COBOL Programs

- **Source Language and Compiler Considerations**
- **COBOL Migration Restrictions**
- **VPLUS Migration Restrictions**
- **Setting Up the COBOL Run-Time System**
- **Compiling COBOL Programs**

- **Problems Encountered**
- **Database and SQL Differences**
- **Restrictions**
- **Precompiler**
- **Testing Your Application**
- **COBOL Source Level Debugger**
- **COBOL Program Caching**



Migrating FORTRAN Programs

- **Source Language and Compiler Considerations**
- **FORTRAN Migration Restrictions**
- **VPlus Migration Restrictions**
- **Setting Up the FORTRAN Run-Time System**

- **Compiling FORTRAN Programs**
- **Problems Encountered**
- **Database and SQL Differences**
- **Restrictions**
- **Precompiler**
- **Testing Your Application**
- **Execution Diagnostic Facility**



Migrating C/XL Programs

- **Source Language and Compiler Considerations**
- **C/XL Migration Restrictions**
- **VPlus Migration Restrictions**
- **Setting Up the C/XL Run-Time System**

- **Compiling C/XL Programs**
- **Problems Encountered**
- **Restrictions**
- **Precompiler**
- **Testing Your Application**
- **Execution Diagnostic Facility**



Migrating SPL Programs

- **Source Language and Compiler Considerations**
- **SPL Migration Restrictions**
- **VPlus Migration Restrictions**

- **SPLASH Compiler Options**
- **Compiling SPL Programs**
- **Problems Encountered**
- **Restrictions**
- **Precompiler**
- **Testing Your Application**
- **Execution Diagnostic Facility**



Migrating PASCAL Programs

- **Source Language and Compiler Considerations**
- **PASCAL Migration Restrictions**
- **VPlus Migration Restrictions**

- **Setting Up the PASCAL Run-Time System**
- **Compiling PASCAL Programs**
- **Problems Encountered**
- **Precompiler**
- **Testing Your Application**
- **Execution Diagnostic Facility**



Migrating 4GL Programs

- **Source Language and Compiler Considerations**
- **SPEEDWARE AND POWERHOUSE Migration Restrictions**
- **Screens Migration Restrictions**

- **Setting Up the SPEEDWARE AND POWERHOUSE Run-Time System**
 - **Compiling SPEEDWARE AND POWERHOUSE Programs**
 - **Problems Encountered**
 - **Database and SQL Differences**
- Restrictions**
- **Precompiler**
 - **Testing Your Application**
 - **Execution Diagnostic Facility**



Migrating RPG Programs

- **Source Language and Compiler Considerations**
- **RPG II Migration Restrictions**
- **VPlus Migration Restriction**
- **Setting Up the RPG II Run-Time System**

- **Compiling RPG II Programs**
- **Problems Encountered**
- **Database and SQL Differences**
- **Restrictions**
- **Precompiler**
- **Testing Your Application**
- **Execution Diagnostic Facility**



Migrating BASIC And Business BASIC Programs

- **Source Language and Compiler Considerations**
- **BASIC AND BUSINESS BASIC Migration Restrictions**
- **VPLUS Migration Restrictions**

- **Setting Up the BASIC AND BUSINESS BASIC Run-Time System**
- **Compiling BASIC AND BUSINESS BASIC Programs**
- **Problems Encountered**
- **Database and SQL Differences**
- **Restrictions**
- **Precompiler**
- **Testing Your Application**
- **Execution Diagnostic Facility**



Migrating Other Language Programs

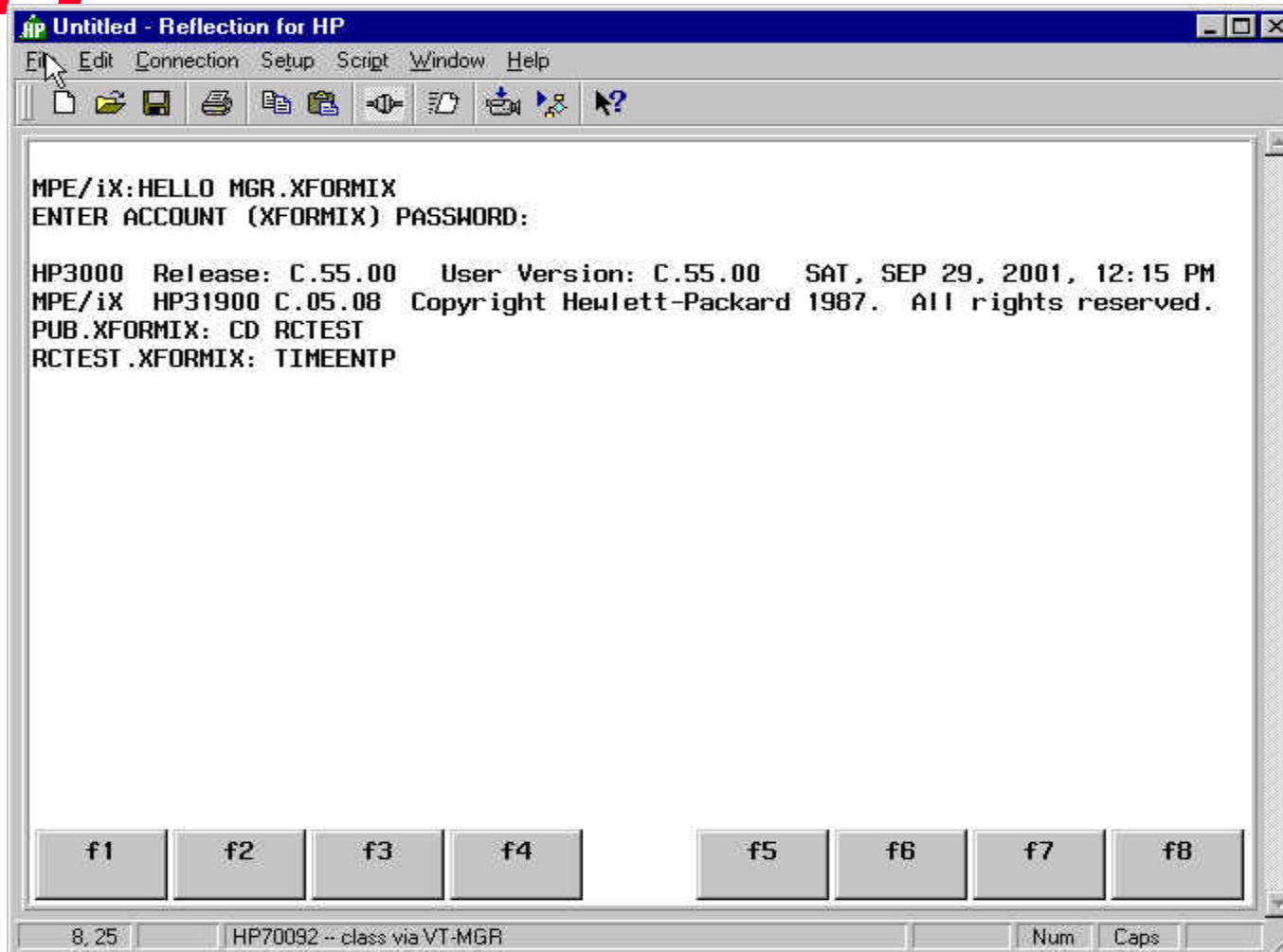
- **Source Language and Compiler Considerations**
- **OTHER LANGUAGES Migration Restrictions**

- **VPLUS Migration Restrictions**
- **Translation Options**



Section II: Example of a Porting and Migration Toolset

Logon MPE and Run Application

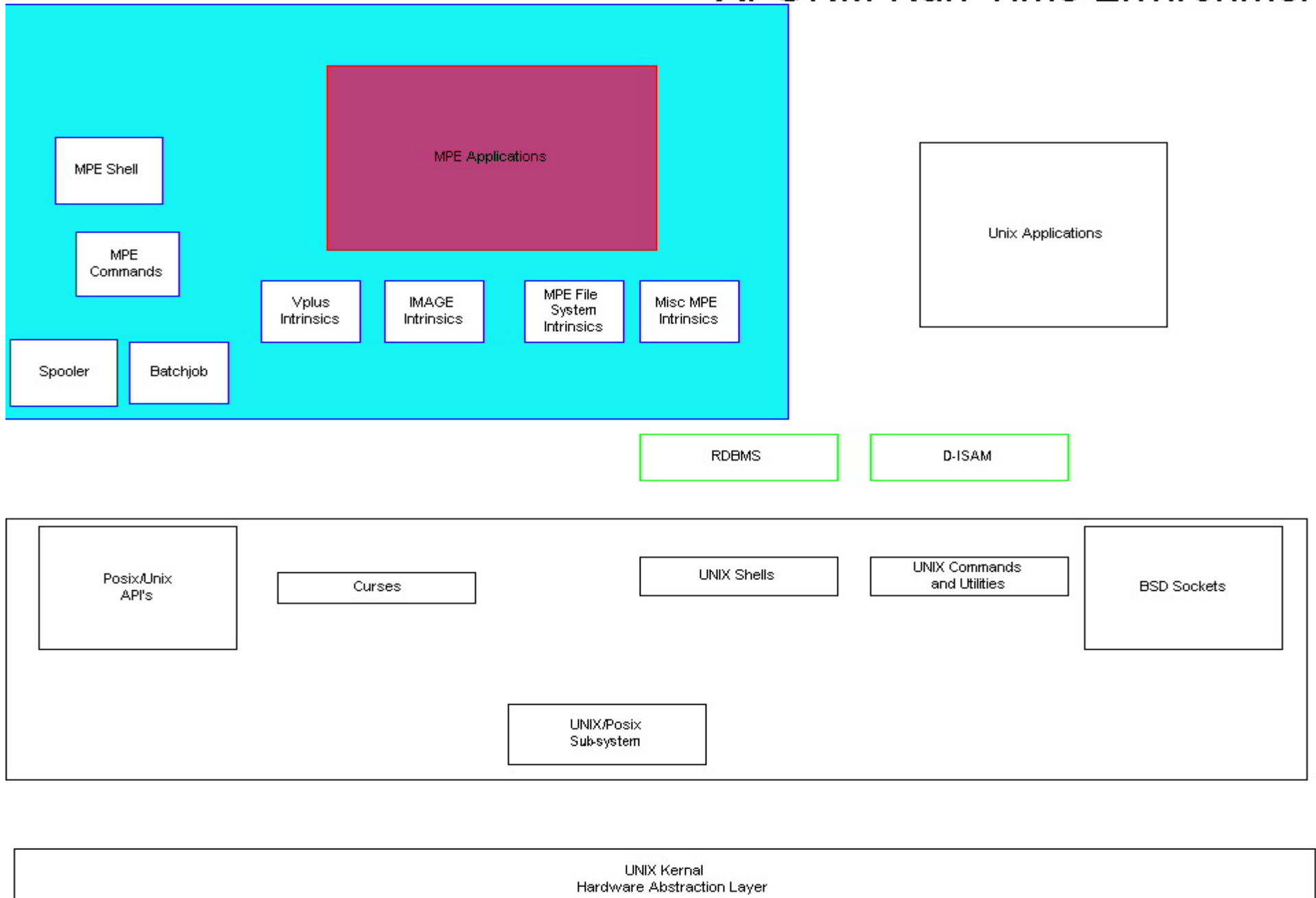


Vplus Form

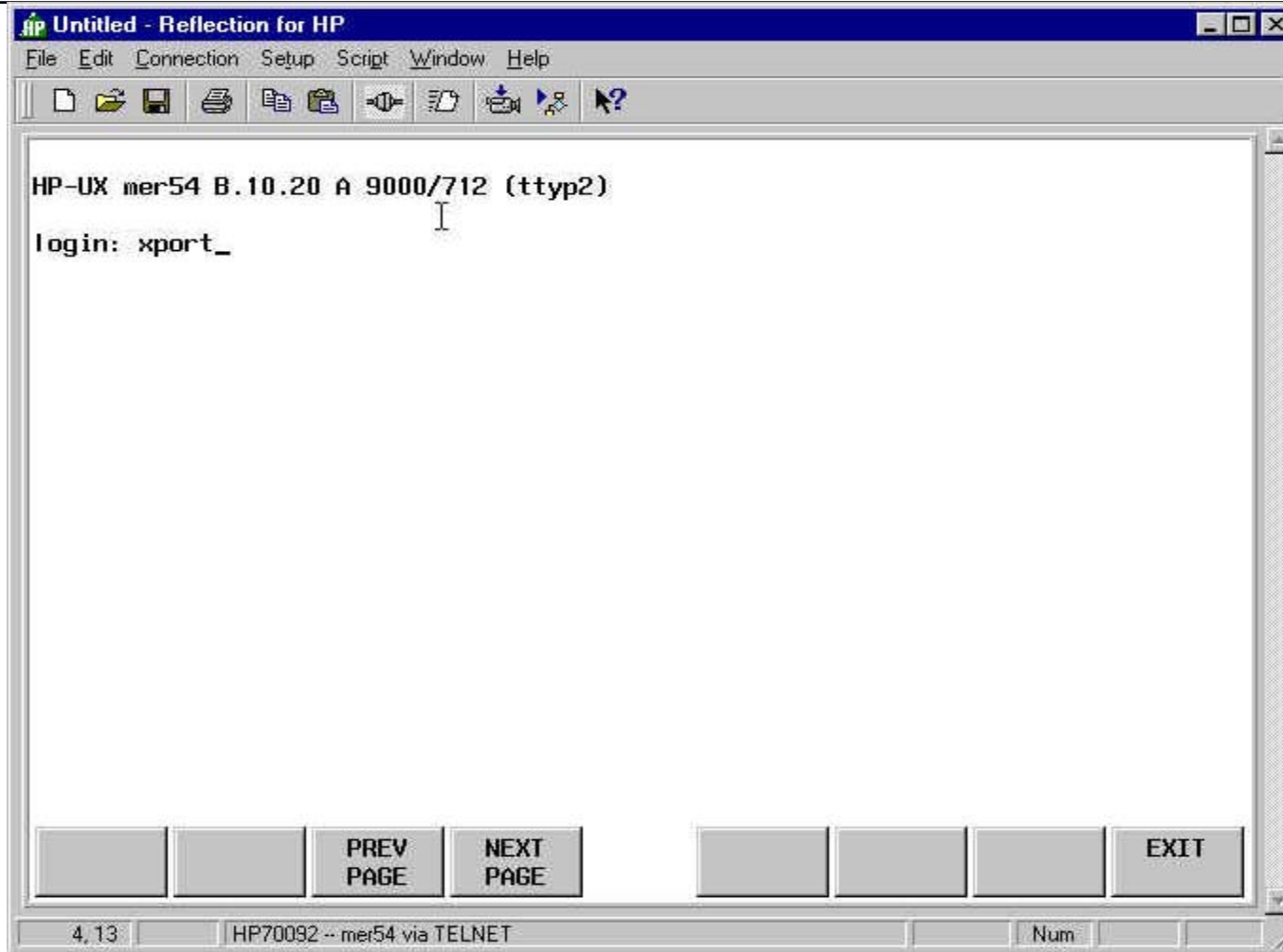
The screenshot shows a window titled "Untitled - Reflection for HP" with a menu bar (File, Edit, Connection, Setup, Script, Window, Help) and a toolbar. The main content area displays a form for "VIEW/3000 A00.00 Time Management System" dated "09/29/2001". The form includes a "Sub Code" field with the value "RJC Richard Churchill". Below this is a table of time entries with columns for D, CInt, Dept, Project, Date, Start, Stop, Elapsed, and Status. The table contains four rows of data, each followed by a "COMMENT LINE" field. At the bottom, there is an "Edit time entries" section with "PREV PAGE", "NEXT PAGE", and "EXIT" buttons. The status bar at the very bottom shows "5, 23 | HP70092 -- class via VT-MGR | Num Caps".

D	CInt	Dept	Project	Date	Start	Stop	Elapsed	Status
	CL1	PRJ1	TASK 1	04/03/2000	0800	1030	2.50	
COMMENT LINE 1								
	CL1	PRJ2	TASK 2	04/03/2000	1030	1200	1.50	
COMMENT LINE 2								
	CL1	PRJ2	TASK 2	04/03/2000	1300	1445	1.75	
COMMENT LINE 3								
	CL1	PRJ2	TASK 1	04/03/2000	1500	1700	2.00	
COMMENT LINE 4								

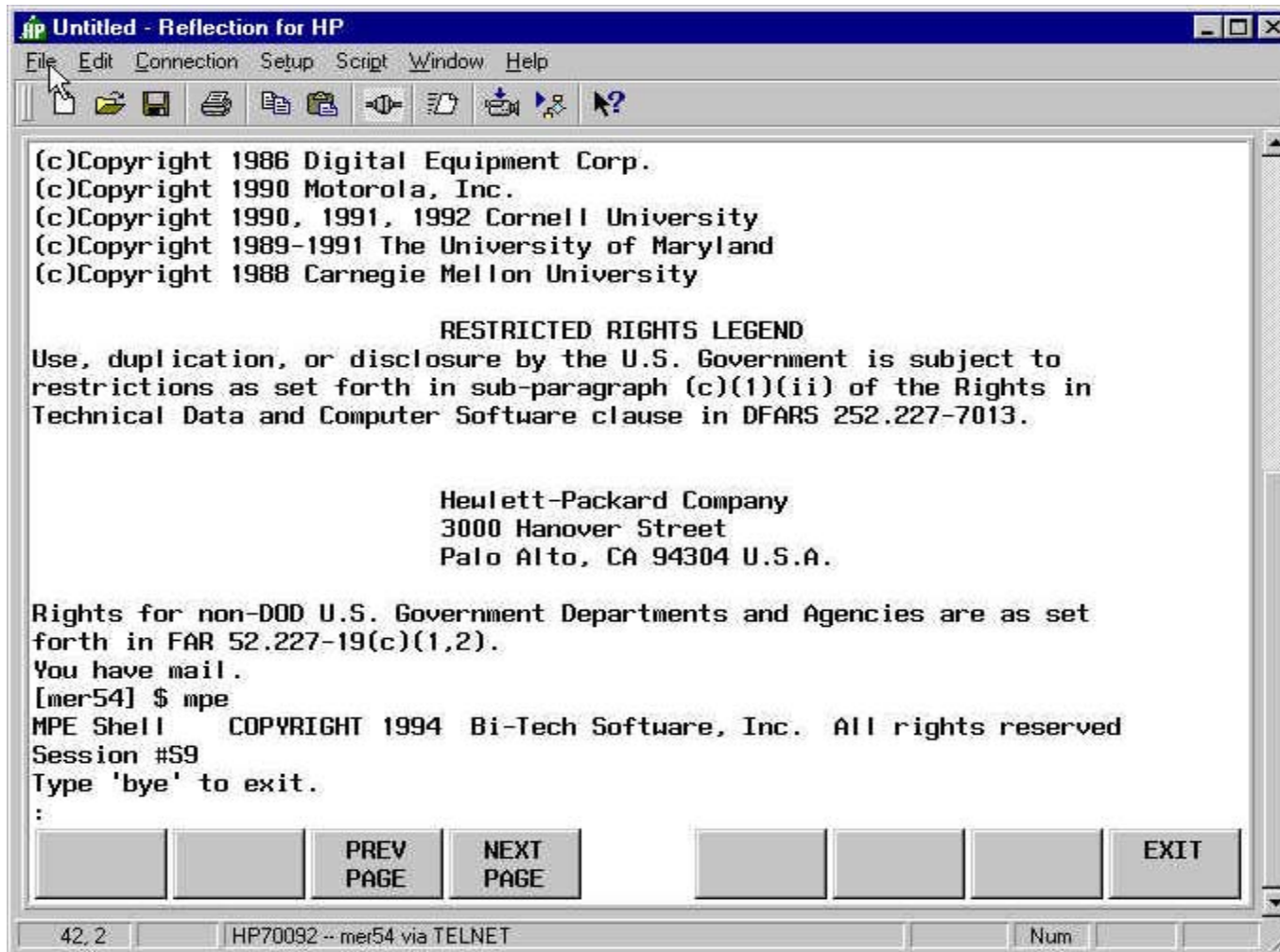
XFORM RUN-TIME ENVIRONMENT



Unix Login



MPE Shell



HP Untitled - Reflection for HP

File Edit Connection Setup Script Window Help

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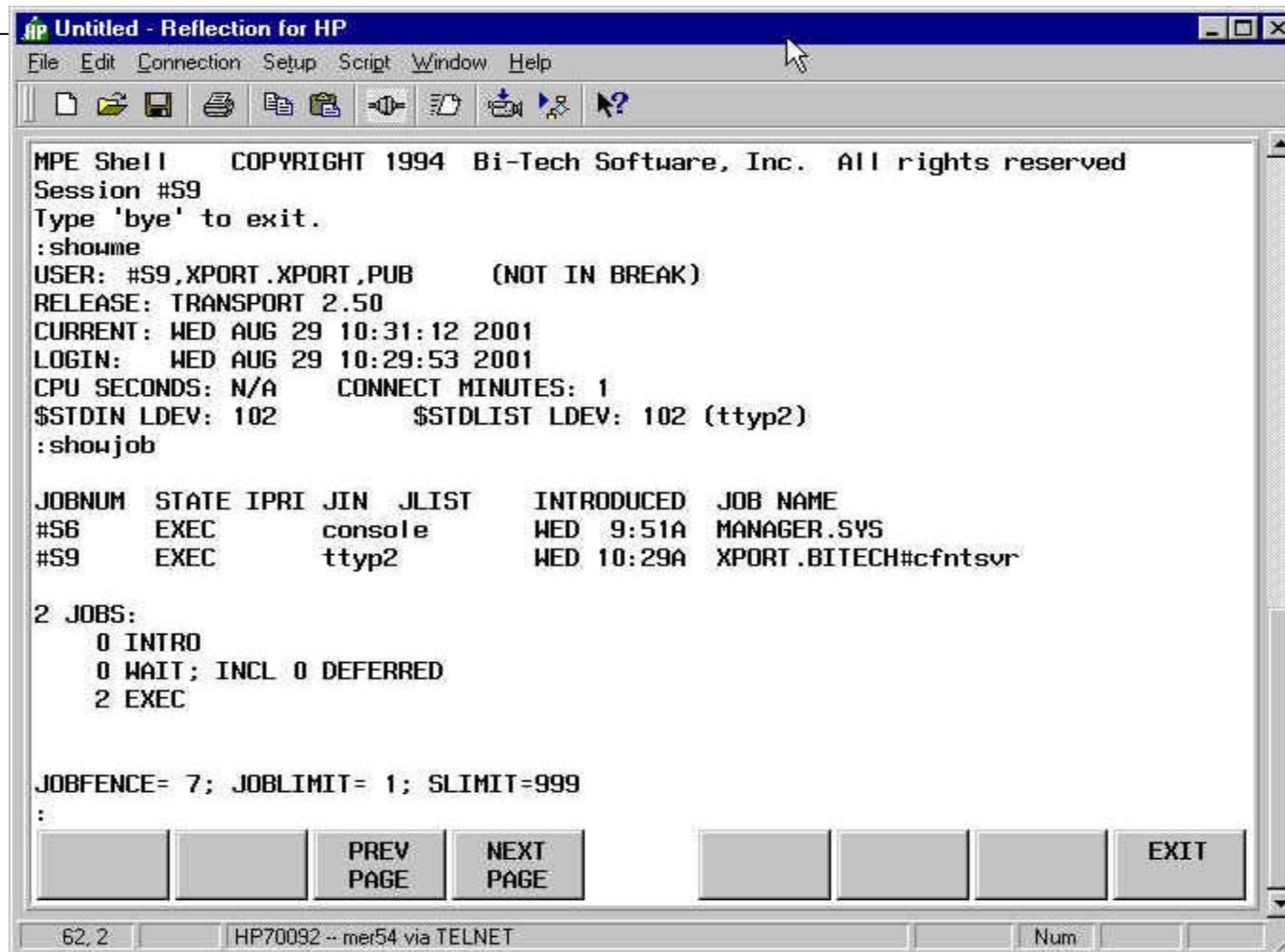
Hewlett-Packard Company
3000 Hanover Street
Palo Alto, CA 94304 U.S.A.

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

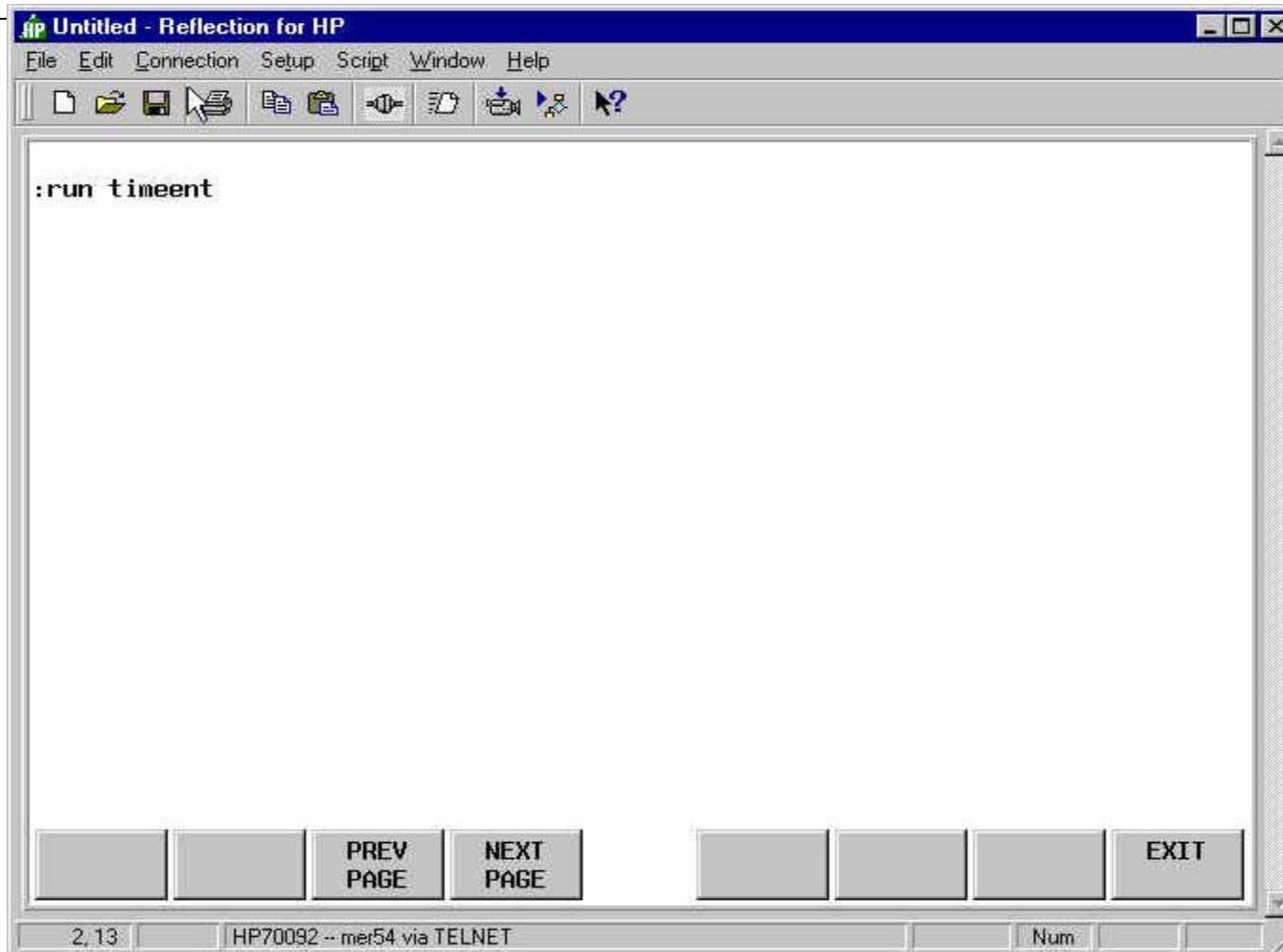
JOBNUM STATE IPRI JIN  JLIST      INTRODUCED  JOB NAME
#S6    EXEC      console  WED 9:51A  MANAGER.SYS
#S9    EXEC      ttyp2    WED 10:29A  XPORT.BITECH#cfntsvr

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

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

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

Run Application



Application First Screen

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

Sub Code :

D	CInt	Dept	Project	Date	Start	Stop	Elapsed	Status
<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>

Enter Sub Code

PREV PAGE NEXT PAGE EXIT

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

Data Entry

hp Untitled - Reflection for HP

File Edit Connection Setup Script Window Help

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

Exit XFORM MPE Shell

The screenshot shows a terminal window titled "Untitled - Reflection for HP". The menu bar includes File, Edit, Connection, Setup, Script, Window, and Help. The toolbar contains various icons for file operations and navigation. The main text area displays the following output:

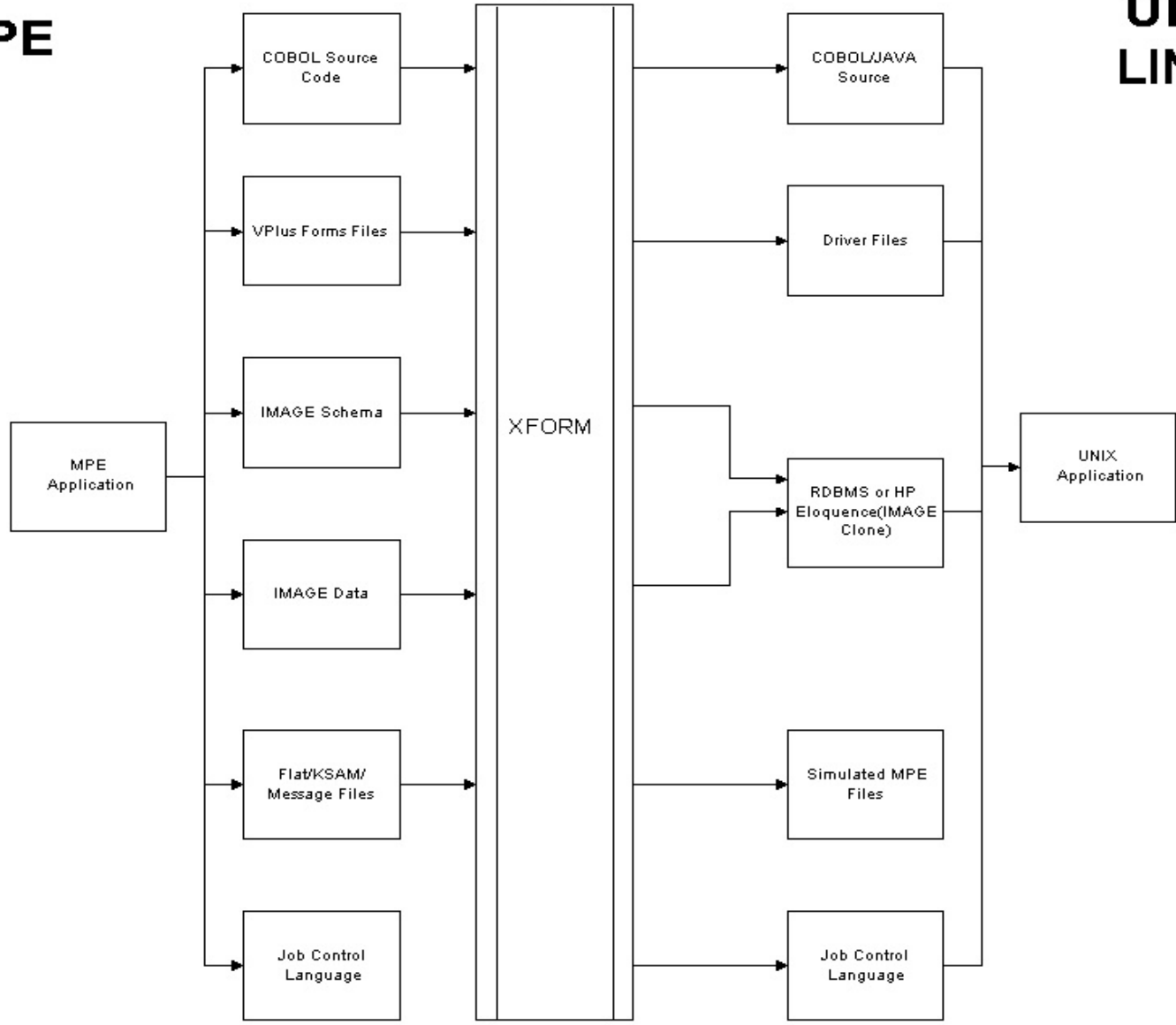
```
STOPPING TIMEENT A00.00  
:EXIT  
[mer54] $
```

At the bottom of the window, there is a control bar with several buttons: "PREV PAGE", "NEXT PAGE", and "EXIT". The status bar at the very bottom shows "4, 11", "HP70092 -- mer54 via TELNET", and "Num".

XFORM Porting Environment Overview

MPE

UNIX-LINUX





Porting Process Steps Overview

- **Migrate COBOL Copy Libraries**
- **Migrate COBOL SL/XL programs.**
- **Migrate COBOL (non SL/XL) programs.**
- **Migrate VPLUS forms files**
- **Migrate IMAGE databases.**
- **Migrate IMAGE data**
- **Migrate ASCII Flat Files.**
- **Migrate BINARY Flat Files.**
- **Migrate Error Catalogs.**
- **Build Message (MSG) Files (if required).**

“Process” Commands

- **Type XCOBOL to convert COBOL**
- **Type XVIEW to convert VFORM files**
- **Type XMACRO to expand Macros within Cobol files/libraries**



Utilities

- **Type XCOPY to copy filesets**
- **Type XSCAN to scan a fileset for a particular string**
- **Type XPURGE to purge filesets**

HP3000 XFORM Support Files

- **Used by XCOBOL during the migration process.**
 - ***DONTPORT.README.UNIX*** - names of the programs/files, which are not to be ported.
 - ***INTRINSI.README.UNIX*** - list of the intrinsics, their status and parameters which are currently supported by XFORM.
 - ***Reserved.README.UNIX*** - the reserved word list which is used during the conversion process to determine the end of parameters etc.



HP3000 XFORM Support Files

- ***LPNAMES.README.UNIX*** - *list of available printer device filenames (mnemonics) that are used in the SELECT statements of the application being migrated.*
- ***Notes.Pub.UNIX*** -*any errors which are encountered during the XCOBOL process are returned to this file.*

UNIX XFORM Utilities

- **Tar - used to read/write to tape.**
- **MPE - 'front end' to command intrinsics to allow supported MPE commands.**
- **Dbutil - indicates activity on the Informix database created.**



UNIX XFORM Utilities

- **Makecat - convert a migrated MPE file into a catalog.**
- **Xsql - invokes the SQL interface.**
- **Remlabel - send files to other applications outside the XFORM environment. It is used to remove file labels from the beginning of a file.**



Primary Resource Porting Groups

- **Migration of COBOL code, copy libraries and error catalogs**
- **Migration of IMAGE schemas and data**
- **Migration of VPLUS forms files**
- **Migration of supporting flat files**



Translation Overall Structure

- **Cleansing of MPE source files or data files on HP 3000.**
- **Transfer of the cleansed files from the MPE to the UNIX environment.**
- **Recompilation of the migrated code or reformatting and translation of data under the UNIX environment.**



COBOL Porting

- **Migration of Copy Libraries to UNIX**
- **Migration of COBOL (non-SL/XL) programs to UNIX**
- **Migration of COBOL SL/XL programs to UNIX**



IMAGE Migration

- **Migration of IMAGE Schemas to UNIX**
- **Migration of IMAGE data to UNIX**



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

- **'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***



Run-Time Environment Utilities

- **XPORTRC**
- **BATCHJOB**
- **ILOCK**
- **MPESPOOLER**



BATCHJOB

- **XFORM provides a daemon named 'batchjob' to facilitate background processing in the same manner as MPE. The format of the command is:**

batchjob [-d] [-c console] [-q] [-l limit] [-g tmpgroup] [-p printcommand] [-f fence]



MPESPooler

- **XFORM provides a daemon named 'mpespooler' to facilitate spooler processing in the same manner as MPE. This daemon should be launched via the 'etc/rc' script**



Commands supported by 'mpespooler'

- **SHOWOUT**
- **OUTFENCE num[;DEV=device name]**
- **STARTSPOOL <device name>**
- **STOPSPPOOL <device name>**
- **ALTSPPOOLFILE**
- **DELETESPOOLFILE**
- **MPELP [-p priority] [-d device name] [-n copies] filename**



Section III:

Third-Party Porting Tools



Code Restructuring

- - Using Common Compilers***
 - Using Similar Compilers***
 - Using 4th Generation Languages***
 - Hardware Architecture Migration Issues***
- **Tools-Based Migration**
 - Emulation***
 - Translation (i.e. BASIC to C)***
- **Professional Migration Services**



Introduction

- **Run-Time Library and System Services Emulation**
- **Description of an MPE to HP-UX and NT Porting Toolset**
 - *The Execution Sub-Environment*
 - *The User (Operations) Sub-Environment*
 - *The Development Sub-Environment*
 - *The Administration Sub-Environment*
 - *Detailed Description of Porting Tool*
 - *Requirements and Examples*



Run-Time Library and System Services Emulation



Description of an MPE to HP-UX and NT Porting Toolset

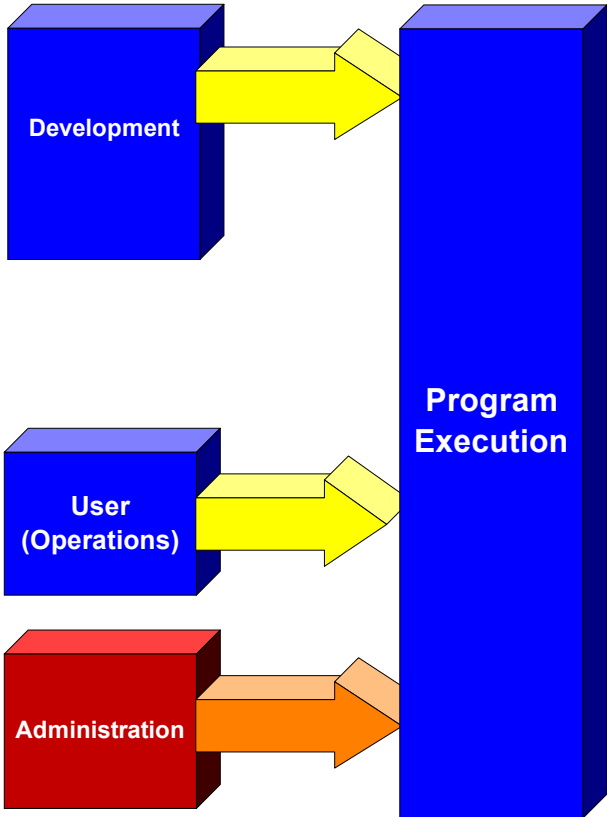
- **The Execution Sub-Environment**
The User (Operations) Sub-Environment
The Development Sub-Environment
The Administration Sub-Environment



Detailed Description of Porting Tool Requirements and Examples



Computing Environment Anatomy





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

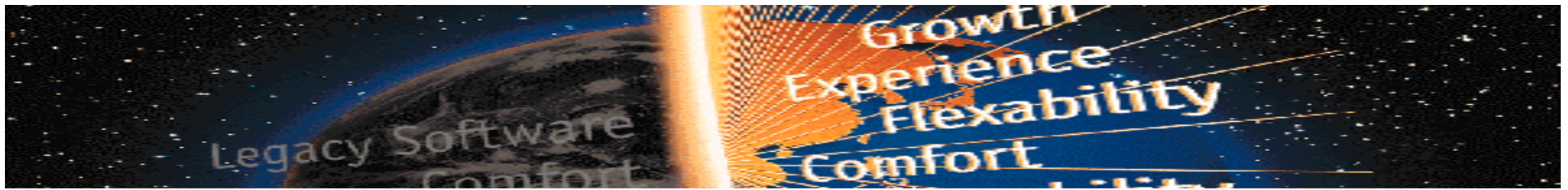
- 📁 **Commands**
- 📁 **Command Files**
- 📁 **UDC's**
- 📁 **Jobs and Job Files**

Operations Control

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

Utilities

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



The Development Sub-Environment

Editing

3rd GL Compiling

📁 **FORTRAN**

📁 **ANSI/C**

4GL Development

Linking Programs



The Administration Sub-Environment

Backup
Security

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

Transformix

XFORM/ViewEmulator - API Solutions

XFORM/ViewEmulator - MPE like VPlus for UNIX & NT

- **Identical programming interface as VPlus**
- **Identical functionality as Vplus**
- **Full HP compatible terminal or terminal emulator required for most apps**
- **Full HP 3000 forms functionality**
- **Adaptable to emulate HP VPlus Library functionality**
- **Full HP 3000 MPE FMS API implementation**

Step 3 - API's for NT & UNIX

Replacement of MPE API's

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

Growth
Experience
Flexibility
Comfort

Transformix

XFORM/JSP Solutions

XFORMIJSP - MPE like BATCH & PRINT spooler

- **Use of Batchjob batch spooling and job management**
- **Use of MPE Spool for print spooling**

Step 3 - API's for NT & UNIX

Replacement of MPE API's

Transformix

XFORM/ReFace - **API Solutions**

***XFORM/ReFace* - VPlus GUI for UNIX & NT**

- **Identical interface as VPlus**
- **Identical functionality as VPlus**
- **Needs HP 3000 style terminal capability list**
- **Extended keyboard required for most apps**
- **Client Server ReFace for Windows + Extensions**

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**

API's for NT & UNIX

Replacement of MPE API's

Growth
Experience
Flexibility
Comfort

Transformix

HP-Eloquence - API Solutions

HP Eloquence - MPE like IMAGE for UNIX & NT

- **Identical record access services to TurboIMAGE**
- **Functionally Compatible with TurboIMAGE**
- **Balances B+ tree, very fast record access**
- **No need for file re-organize**
- **NT, UNIX & MPE record locking compliant**
- **Remote NT client / server file systems**
- **Separate Index & Data files**
- **Full MPE IMAGE return status codes**
- **ODBC Available**
- **Different API from TurboIMAGE**

API's for NT & UNIX

Replacement of MPE API's

Growth
Experience
Flexibility
Comfort

Transformix

*XFORM/MPE Extension - API
Solutions*

HP Eloquence Add-on for UNIX & NT

- Implements IMAGE API for HP Eloquence
- Needed because to maintain HP Eloquence installed base compatibility
- Not an HP product
- Platform independent

Porting Tools

Legacy Software
Comfort

Growth
Experience
Flexibility
Comfort

Services

Solutions

Project Management

Assessment

In-house Migration

Complete Migration

Tool Sets for UNIX and NT

XFORM/RT **MPE like System Services**

XFORM/RMS **MPE like RMS**

XFORM/CL **MPE like Commands (CL)**

XFORM/ViewEmulator **VPlus replacement**

XFORM/ReFace **GUI VPlus**

HP-Eloquence **TurboIMAGE Clone**

XFORM/ODBC **ODBC for Eloquence**

XFORM/DB **IMAGE to RDBMS**

XFORM/COBOL

Convert HP 3000 COBOL to

ANSI

XFORM/BASIC **MPE BASIC Compiler & C**

XFORM/FPT **Convert HP 3000 FORTRAN to**

ANSI

XFORM/Cpp **Convert HP 3000 to ANSI C**

XFORM/ViewEmulator **VPlus to NT Client**

Editor Qedit **Robelle Qedit**

Job Management **Batchjob**

Spool Management **MPESpool**

The Process

Legacy Software
Comfort

Growth
Experience
Flexibility
Comfort

The Process

**HP 3000/MP
Solution**

Assessment

Planning

Porting

Validation

Productization

**Open Systems
Solution**

Assessment

- Project Size and Scope

Planning

- Measurable and Tangible Milestones

Porting

- A Working System

Validation

- Testing

Productization

- Open Systems Solution



Strategy

Recommendation



Most Desirable Path To Rehost MPE Applications

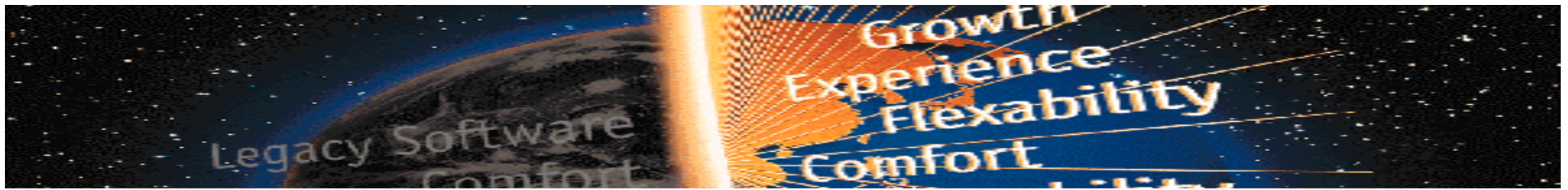
Migrate to target computer with minimal changes

Get system operational as soon as possible

Postpone User Interface changes until system is on target platform

Postpone file system and IMAGE/RDBMS changes until system has been ported

Reduce migration complexity



Conclusions

Rehosting is practical if done in small steps

Tools are available to help you port applications to UNIX or NT with few changes use them

The most difficult aspects of migrations are testing and project management be realistic about those tasks and hire help if you need it