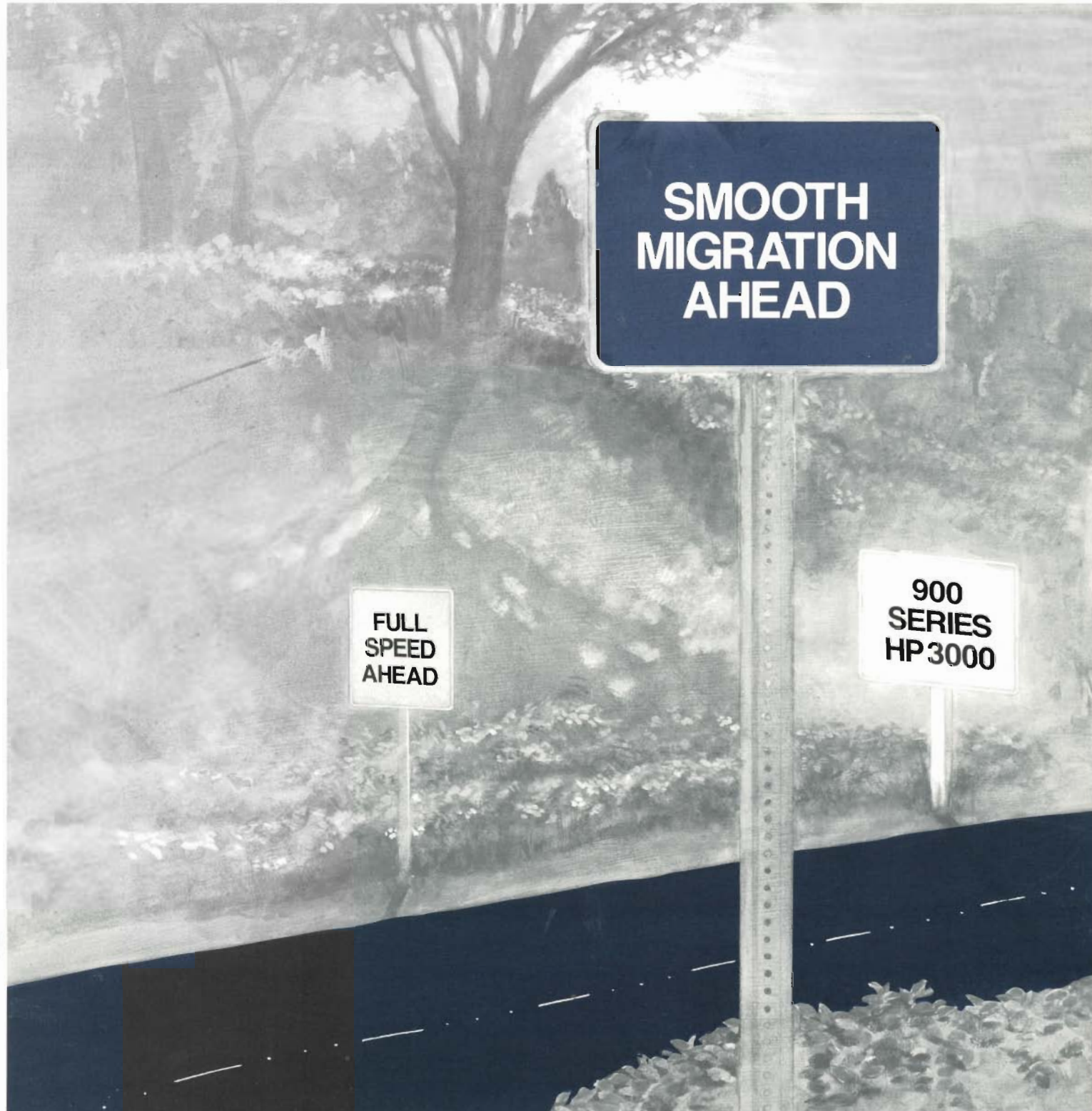


HEWLETT-PACKARD

900 Series

HP 3000 Computer Systems

Migration Planning Guide



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900 Series

HP 3000 Computer Systems

Migration Planning Guide



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Preface

Purpose of this Manual

The purpose of this manual is to present an overview of migration from MPE V-based HP 3000 systems to MPE XL-based 900 Series HP 3000 systems. This includes information on HP software, documentation, and consulting services for migration.

This manual is intended for the reader who has a basic understanding of MPE V-based HP 3000 computer systems and is interested in migrating to MPE XL-based systems.

HP 3000 Product Naming Conventions

Hewlett-Packard has instituted a new naming convention for HP 3000 software products. It consists of adding either the suffix `"/V"` or `"/XL"` to a product name.

Software products that previously had the suffix `"/3000"` now have the suffix `"/V"`. For instance, TurboIMAGE/3000 is now called TurboIMAGE/V, and COBOL II/3000 is now COBOL II/V.

Software products with the `"/V"` suffix are designed for use with MPE V. They may also be run in Compatibility Mode on MPE XL systems (when supported).

Software products with the `"/XL"` suffix are designed for use on 900 Series systems.

Compilers with the suffix `"/XL"` (such as COBOL II/XL) generate object code that runs in Native Mode on 900 Series systems. Compilers with the suffix `"/V"` (such as RPG/V) generate object code that runs under MPE V and in Compatibility Mode under MPE XL.

This naming convention lets you see easily which software versions are appropriate for the MPE V-based systems and the MPE XL-based systems.



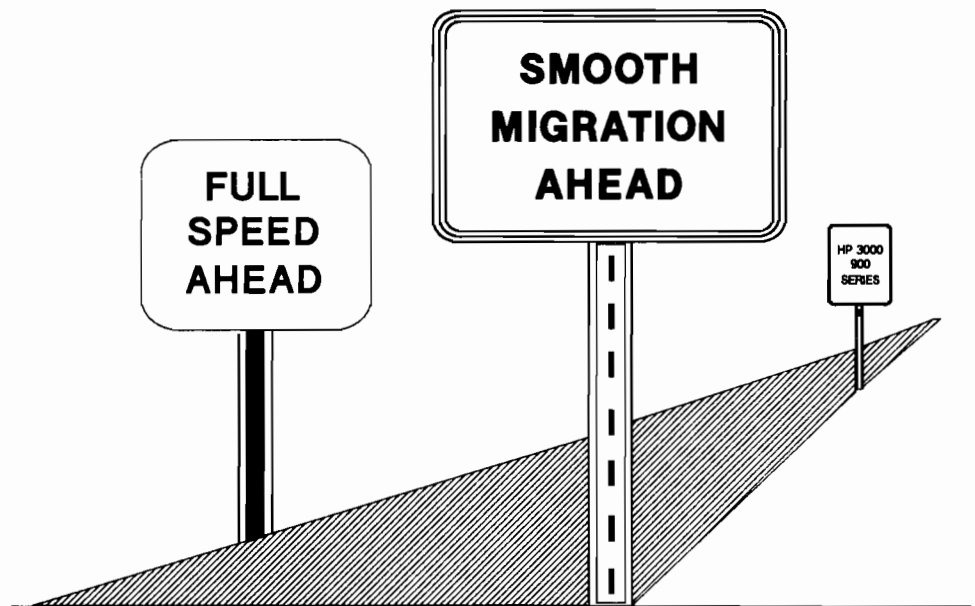
Migration Overview

Compatibility Protects Your Investment

Compatibility is one of the most important elements in the HP 3000 strategy. HP has made a significant effort to ensure that the 900 Series systems are compatible with the rest of the HP 3000 family. Our migration path allows you to benefit quickly from the performance and capabilities of the new 900 Series systems. With the tools, documentation, and services we provide, you can migrate to the 900 Series in stages, as your schedule permits, without interrupting operations. The result is the smoothest path to next-generation systems ever offered in the computer industry.

This migration strategy protects your investment in HP 3000 systems. It means you can continue to use existing HP 3000s and know that upgrading to a 900 Series system in the future will be nearly as easy as upgrading HP 3000s has been in the past.

HP also protects your investment in people or training by providing a consistent, familiar user interface. At the same time, we've introduced new features that improve productivity.



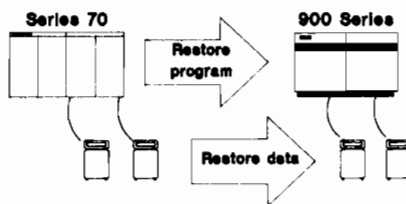
Migration Goals

In planning for migration from MPE V-based HP 3000 systems to MPE XL-based (900 Series) systems, we had four goals in mind:

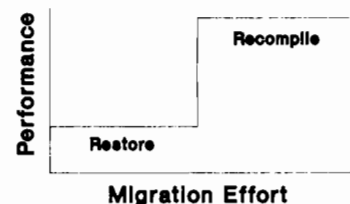
1. Allow you to run existing applications without changes.
2. Give you the best performance that the HP Precision Architecture can provide.
3. Enable the 900 Series systems to fit transparently into existing networks.
4. Provide users with the same operating environment.

Easy Migration

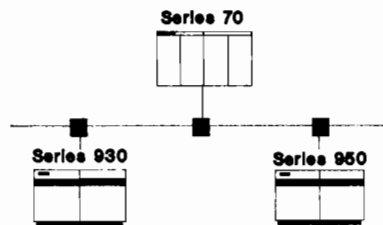
1) No changes required!



2) Top performance Minimum effort!



3) Transparent communications!



4) Minimum user retraining!



Components of Migration

Object Code Compatibility in Compatibility Mode

It is very simple to move applications developed on MPE V-based HP 3000s to 900 Series HP 3000 systems. By using a simple store/restore procedure, you can run your applications on an MPE XL-based system in Compatibility Mode without making any changes.

Compatibility Mode supports the MPE V/E HP 3000 machine instruction set, so applications compiled on an MPE V/E-based HP 3000 system can run on a 900 Series system. Compatibility Mode emulates the MPE V HP 3000 faithfully. It works like microcode running on top of the HP Precision Architecture, making it an MPE V-based machine.

The same capabilities and limitations that apply to programs that run on MPE V/E systems apply to programs that run in Compatibility Mode on 900 Series systems. MPE V/E callable intrinsics are also supported in Compatibility Mode.

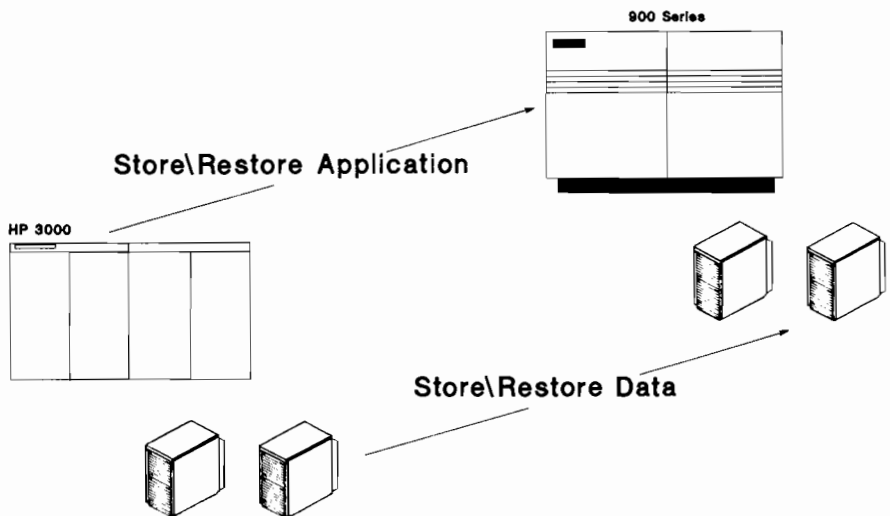
Compatibility Mode is useful as an intermediate step in a phased migration to Native Mode. It also allows you to run programs for which no source code is available and programs written in an older language for which there is no Native Mode compiler.

Exceptions

As has always been the case, Hewlett-Packard cannot guarantee compatibility for Privileged Mode applications between different versions of MPE. This is because Privileged Mode uses operating system internals that may change between versions of MPE.

Also, some intrinsics are not supported or are slightly different on MPE XL. An example is the FCARD intrinsic, which supports a card reader. Since we do not support any card reader on 900 Series systems, the FCARD intrinsic is not supported. For more information on these exceptions, see the MPE XL intrinsics list in the Migration Checklist (p/n 5954-9350).

Object Code Compatibility



Source Code Compatibility in Native Mode

The key to maintaining source code compatibility with MPE V systems is the new MPE XL compilers. These compilers implement the latest in optimizing compiler technology on the HP Precision Architecture.

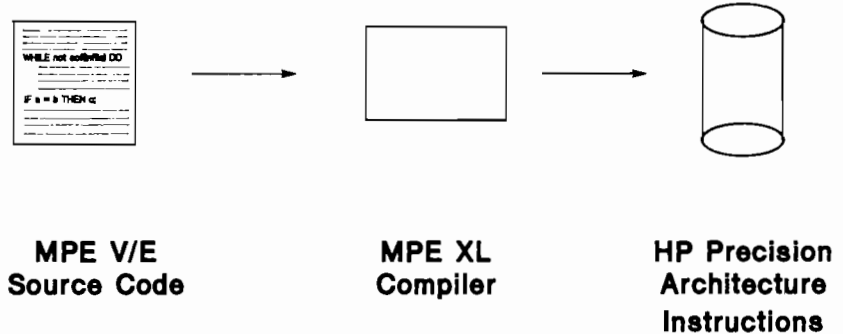
In general, programs should be recompiled into Native Mode to get the best performance. By simply recompiling an application with one of the new MPE XL compilers, you can produce a Native Mode program that efficiently accesses the power of the HP Precision Architecture. Native Mode is the most efficient means of accessing the advanced architecture of the 900 Series systems. Native Mode programs execute HP Precision Architecture instructions directly and access the large virtual-address space of the 900 Series.

To provide true source code compatibility, the MPE V/E intrinsics that are supported in Compatibility Mode are also supported in Native Mode.

Exceptions

There are a few exceptions to source code compatibility. In most cases, these incompatibilities result from the need to provide access to the significantly larger address space of the HP Precision Architecture. An example is the increase in Pascal pointer size from 16 bits to 32 bits (or, optionally, 64 bits). (These exceptions are documented in the language migration guide described in Section 3.)

Source Code Compatibility



Mode Switching Allows Migration in Phases

Many applications written in high-level languages call System Programming Language (SPL) procedures that perform low-level utility functions. These procedures are normally grouped together in Segmented Libraries (SLs). The MPE XL switch subsystem has been designed to allow cross-mode procedure calls, so high-level-language applications can be recompiled in Native Mode and still call procedures that reside in Compatibility Mode SLs.

For example, an application written in COBOL II that calls procedures written in SPL can be moved to Native Mode in phases. The COBOL II program can be recompiled into Native Mode with the new COBOL II/XL compiler. The MPE XL switch subsystem can then be used to call the SPL procedures, which continue to execute in Compatibility Mode. You can recode the SPL procedures in Pascal or C later, if you want top performance.

The advantage of this strategy is that you can quickly achieve increased performance of the main program without having to change any of the application code or rewrite the SPL procedures.

Some effort is required for this method of operation. The switch subsystem needs some information, supplied by a new MPE XL intrinsic, so it can find the Compatibility Mode procedure and call it. We will provide a tool that will generate an HP Pascal procedure to help in using the switch subsystem.

Database Compatibility

TurboIMAGE

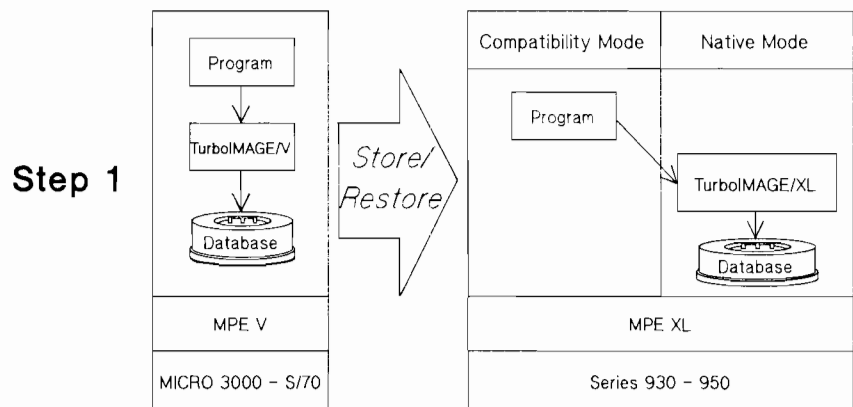
A Native Mode version of the TurboIMAGE database management system, called TurboIMAGE/XL, is provided on all 900 Series HP 3000 systems. Applications running in Compatibility Mode and Native Mode can access TurboIMAGE/XL databases with Native Mode performance.

A simple store/restore procedure is all that is required to move a TurboIMAGE database from an MPE V-based system to an MPE XL-based system. When a TurboIMAGE/V database is moved to an MPE XL-based system, it operates immediately in Native Mode. No database conversion is necessary.

HPSQL

HPSQL/V databases can be moved to an MPE XL system, but a conversion utility, which will be provided by HP, must be run before the database can be accessed. Once this conversion procedure is complete, the database is accessed via HPSQL/XL code that executes in Native Mode, providing Native Mode performance for applications running in Compatibility Mode or Native Mode. An MPE V/E program that uses HPSQL must be recompiled when restored to Compatibility Mode to use the latest HPSQL preprocessor.

TURBOIMAGE MIGRATION



Operational Compatibility

The key to operational compatibility is a compatible user interface. The MPE V/E command set is used on MPE XL systems, so users do not require retraining. Operators and system managers interact with 900 Series systems in almost exactly the same way as they do with MPE V/E systems. The MPE XL user interface also provides some new features and capabilities that can be learned gradually.

One new feature that provides greater ease of use is the new SYSGEN utility, which replaces the SYSDUMP utility that is used to configure MPE V systems. This utility provides a powerful command-driven user interface. As an example of its greater capability, while SYSDUMP requires terminals with the same basic configuration to be added to the system one at a time, SYSGEN allows any number of like terminals to be added with a single command.

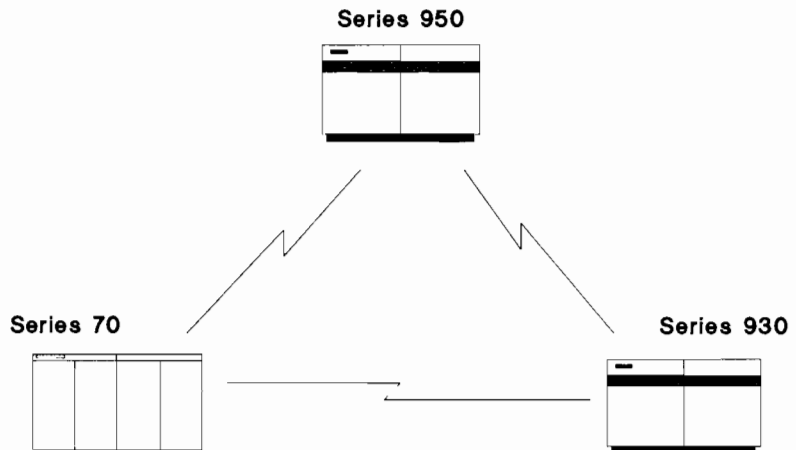
Network Compatibility

Network Services/3000 software is supported on MPE XL, so 900 Series systems can be added to existing networks of HP 3000 systems. MPE XL systems can communicate with other MPE XL systems and with MPE V systems via NS3000/XL.

Exception

There is one special situation. Communication with other HP 3000 systems is provided via Network Services/3000. Because Network Services/3000 is not supported on MPE V/R systems (Series II, III, 30, & 33), communication with those systems must be done through an MPE V/E system acting as a gateway.

Network Compatibility



Migration Process

Stages of Migration

Performing migration in stages allows you to get applications up and running as quickly as possible and lets you take advantage of the higher performance and new features of the 900 Series systems. The goal in planning migration is to break the process down into a series of simple steps that can be performed over time.

Process Overview

The migration process consists of six stages. They are:

Education. Learning about the migration stages and the migration tools and services that Hewlett-Packard provides. This document is one of the sources of information that should be reviewed during this stage.

Analysis and Planning. Detailed analysis of language, database, and network migration and their relationship to each application will result in a migration plan for your system.

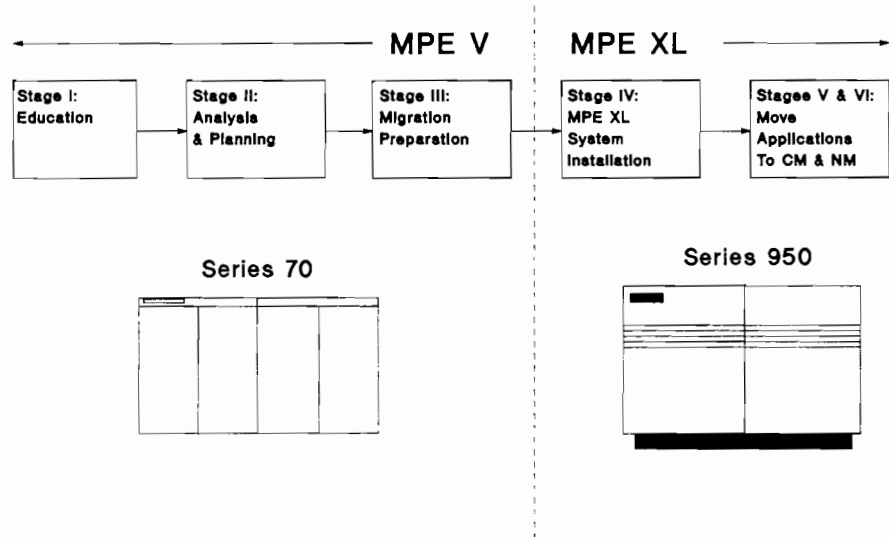
Preparation. Getting ready for installation of the 900 Series system. You begin to implement the migration plan by performing the steps that can be done on an existing HP 3000 system prior to installation of the 900 Series system.

System Installation. Steps that are taken upon delivery and installation of a 900 Series system. In this stage, you will use a new migration tool that duplicates the existing HP 3000 operational environment on a 900 Series system.

Compatibility Mode and Native Mode Operation. The fifth and sixth stages, in which you begin to run applications on your new system. In Compatibility Mode operation, you will run programs and use data from existing HP 3000 systems without modification or recompilation. In Native Mode operation, programs are recompiled with the new optimizing Native Mode compilers. These stages may overlap, so you may run some programs in Compatibility Mode and others in Native Mode at the same time.

The following descriptions of these stages are general, because the specific steps in the migration of a given application depend upon the application's characteristics.

The Migration Process



Education

Your goal in the education stage is to learn about the migration process, tools, and services and about the new products offered on the 900 Series systems. You will use this information in developing migration plans for the system and for individual applications.

A migration manual set will be provided with your 900 Series system. This self-paced training program includes manuals that give system managers, programmers, and general users information about the differences between MPE V and MPE XL systems and about significant new features. This manual set also includes a migration process guide that explains the migration process in detail. (A more detailed description of the migration manual set is provided in Section 3: Migration Services.)

Hewlett-Packard also has a number of other documents that will provide information about the migration process. They include:

Migration Data Sheet. A brief overview of migration from MPE V- to MPE XL-based systems, including the tools, services, and documentation that are available to aid migration.

900 Series General Information Manual. An overview of the 900 Series hardware, software, and architecture.

HP 3000 Configuration Guide. Information on configuration of the Series 930 and 950.

User group papers and presentations. Information from past and ongoing Interex and regional user group conferences concerning migration and the 900 Series systems and software.

You will find it very useful to review the documents described above and other information on MPE XL before you begin the analysis and planning stage.

Analysis and Planning

The goal of the analysis and planning stage is to produce a detailed plan for the migration of each application and for the system as a whole. For applications, this plan may include short-term and long-term goals. For example, if you have a segmented library of SPL procedures, you might have a short-term goal to start using the procedures in Compatibility Mode and a long-term goal to rewrite them in a language supported in Native Mode.

The Migration Toolset

We've done everything possible to make MPE XL compatible with MPE V, but you may encounter some incompatibilities. For instance, if you have used Privileged Mode, there is no guarantee of compatibility, just as there is no guarantee of compatibility for Privileged Mode applications between versions of MPE V. HP provides tools to help identify such incompatibilities.

The Migration Toolset (p/n 32428A), which runs on MPE V-based HP 3000s, identifies incompatibilities in applications. The toolset provides an automated way of finding incompatibilities, eliminating the need to manually search through source code. The PTAPE intrinsic, which reads a paper tape reader, is an example of an incompatibility that would be identified by the toolset. (The paper tape reader and the intrinsics are not supported on MPE XL-based systems.)

The toolset includes an Object Code Analyzer and a Run Time Monitor. The Object Code Analyzer scans programs and SLs (individually or in groups) and identifies incompatibilities. The Run Time Monitor identifies incompatibilities in applications as they execute. This tool interrogates parameters passed to intrinsics and logs detected incompatibilities for later reporting.

Planning For Operations

As with the installation of any new system, you need to prepare the facilities. The system migration plan should include revisions to network configurations, computer room planning, and plans for installation of communication lines and the Distributed Terminal Controllers (DTCs) as needed. For multi-system sites, you must also decide which system each group of users will use.

Your plan should take into account the availability of Hewlett-Packard and third-party software for the MPE XL system. Some users may have to remain on the MPE V system until software is available for the MPE XL system. Your sales representative will have information on product availability.

An application migration plan should be developed for each application. For large multi-language applications, this plan might call for a phased migration of the application, as in this example:

Phase one — convert to the latest version of the languages used in the application while still on an MPE V system. (Assuming Native Mode execution is the ultimate goal.)

Phase two — move the application and data to the 900 Series system and run in Compatibility Mode. (This could be the end of the migration plan.)

Phase three — recompile the main portion of the application into Native Mode. Run low-level procedures in Compatibility Mode with access via the switch subsystem. (This also could be the end of the migration plan.)

Phase four — rewrite the low-level Compatibility Mode routines in a Native Mode language and recompile them so that the entire application executes in Native Mode.

Preparation

The first implementation step in a migration plan is preparation. During this stage, you should do everything you can on your existing MPE V/E-based HP 3000 to prepare for installation of the 900 Series system.

Move To Native Mode Languages

Programs that are slated for migration to Native Mode should be recompiled or converted to a language supplied in Native Mode. Since a Native Mode SPL compiler is not available, we recommend recoding SPL code to Pascal or C if you want Native Mode execution speed. You should also convert Basic/V to HP Business Basic and FORTRAN 66 to FORTRAN 77 if you want Native Mode execution for programs written in these languages. Conversion aids are included with the HP Business Basic/V and HP FORTRAN 77/V compilers.

Move To Recommended Subsystems and Operating System Version

The currently recommended release of the MPE operating system should be installed on the MPE V/E system to maintain the highest degree of compatibility with the target MPE XL system. IMAGE/V databases should be converted to TurboIMAGE/V, since TurboIMAGE is the version of IMAGE that is supported on MPE XL systems. DS3000/V communications should be updated to the NS3000/V version of the HP 3000 software.

Address Incompatibilities

If the Migration Toolset revealed any incompatibilities in the applications, they should be isolated and, if possible, recoded on the MPE V/E system. For instance, if a call to SETDUMP is made at the beginning of an application to set the area of the stack to be dumped on program abort, this call should be isolated in a single procedure. You will need to change only that procedure when the program is moved to the 900 Series. The Migration Manual Series, provided with the 900 Series system, will assist you in making these changes.

System Installation

Duplicating MPE V/E Environment On MPE XL

The system installation stage begins with the arrival of the 900 Series system. The primary goal of this stage is to duplicate the existing HP 3000 operational environment on the 900 Series system. HP provides tools that will help you move the existing HP 3000 environment to the 900 Series system, as well as tools to increase functionality and make it easy to maintain the operational environment.

A directory migration tool, called DIRMIG, will help you move the operating environment. This tool will move an MPE V/E accounting structure to an MPE XL-based system. It will also move the resource identification number (RIN) table, user logging IDs, the UDC environment, and private volume information.

By mounting an MPE V/E SYSDUMP tape, a system manager can quickly and automatically duplicate most of the information concerning the MPE V/E system. (The information that is not duplicated is not needed because it does not apply to MPE XL systems.) The manager then runs the directory migration tool with the MPE V/E SYSDUMP tape mounted on the MPE XL-based system.

STORE/RESTORE Compatibility

The default MPE XL store/restore tape format has been changed from the MPE V tape format so that more features can be provided in the future. At the same time, it is critical that compatibility between MPE V and MPE XL tape formats be maintained so that programs and data can be exchanged during the system installation stage and to maintain ongoing operation of MPE V and MPE XL systems.

To provide increased functionality and compatibility, a new "transport" option has been added to MPE XL STORE. When the "transport" option is appended to the MPE XL STORE command, an MPE V-formatted tape is created on an MPE XL-based system. When an MPE V-formatted tape is mounted on a 900 Series system, MPE XL automatically recognizes the tape format.

Compatibility Mode

Emulating MPE V Object Code

An instruction set emulator provides object code compatibility with MPE V/E systems in Compatibility Mode. The emulator operates like a Basic interpreter in that it fetches the MPE V/E HP 3000 instructions and decodes them into the equivalent 900 Series instructions as the program executes.

Another way to look at the emulator is that it is much like the microcode on an MPE V/E-based system, which translates machine instructions into microinstructions that are hardwired on the MPE V-based system.

Increased Performance In Compatibility Mode

To increase performance in Compatibility Mode, HP provides an object code translator. While the emulator is analogous to an interpreter, the object code translator is analogous to a compiler. The object code translator translates the MPE V HP 3000 instructions in a program or segmented library into 900 Series instructions, optimizes the code, and appends the 900 Series instructions to the program or SL. The instructions then do not need to be decoded at run time.

The object code translator is not as efficient as a Native Mode compiler because it starts with object code instead of source code. However, the object code translator will be very valuable for programs written in older languages, for programs without source code, and for programs that will not be recompiled into Native Mode for any other reason.

Accessing Native Mode

Compatibility Mode is not the most efficient means of accessing the HP Precision Architecture. However, much of the time, a Compatibility Mode program calls pieces of code that run in Native Mode. For instance, a Compatibility Mode application will switch to Native Mode whenever the MPE file system is used to access disc files and when the operating system is performing operations on behalf of the application. Operating system tasks that are performed on behalf of user code include memory management, dispatching, and other forms of resource management as well as use of the MPE XL I/O system.

When MPE XL operating system intrinsics, TurboIMAGE/XL intrinsics, or any MPE XL subsystem intrinsic is called, any mode switching that is required is transparent to the calling program.

MPE V Compilers Provide Compatibility

The SPL/V, HP Business Basic/V, COBOL II/V, Pascal/V, FORTRAN 77/V, FORTRAN 66/V, Basic/V, and RPG/V compilers will all be available in Compatibility Mode. These compilers will allow continued development of MPE V applications as well as cross-development of MPE V applications on MPE XL-based systems.

Native Mode

Native Mode provides access to all of the features and performance of the HP Precision Architecture, which is the foundation of the 900 Series systems.

An existing MPE V application can be recompiled easily to Native Mode by one of the new MPE XL optimizing compilers. These compilers have been designed to provide source code compatibility with the rest of the HP 3000 family. First-release compilers include COBOL II/XL, HP Pascal/XL, and FORTRAN 77/XL. Native Mode compilers planned for future release include HP C/XL, HP RPG/XL, HP Business Basic/XL, and Transact/XL.

IEEE Floating Point Format

To meet requests for support of more international standards and to provide a single standard among HP computer systems, the HP Precision Architecture machines support the IEEE standard for floating-point numbers. Converting HP 3000 floating-point numbers to the IEEE format is optional. However, if a floating-point coprocessor is installed, the best floating-point performance will result when IEEE numbers are used in Native Mode, because the floating-point coprocessor supports the IEEE standard.

To convert numbers from the MPE V HP 3000 floating-point format to the IEEE format, a new floating-point conversion intrinsic will be provided.

Mixing Execution Modes

HP supports mixed-mode applications, which execute in both Compatibility Mode and Native Mode. This feature is provided by the MPE XL switch subsystem, which allows Native Mode programs to call procedures which reside in Compatibility Mode SLs.

This capability is useful for Native Mode programs that need to call Compatibility Mode routines. An example is a COBOL II program that has been recompiled into Native Mode and still needs to call an SPL routine in Compatibility Mode. This provides a smooth migration from Compatibility Mode to Native Mode but requires some additional programming to make cross-mode calls to user-written routines.

Hewlett-Packard will provide a switch assist tool that will make using the switch subsystem significantly easier. The switch assist tool will allow you to enter information about the procedure that needs to be called, and then it will generate the HP Pascal source code that makes the call to the proper switch subsystem intrinsic.





Migration Programs

To ensure that migration from MPE V-based HP 3000 systems to MPE XL-based HP 3000 systems is as smooth as possible, Hewlett-Packard has developed several programs which specifically address migration to 900 Series systems.

Third-Party Programs

Third-party software plays a significant role in providing solutions on MPE systems. To support migration of third-party software to 900 Series systems, Hewlett-Packard has created the Software Evaluation and Migration Centers (SEMC).

The migration centers provide third parties access to 900 Series systems and related software prior to general release of those systems. This program gives third parties the opportunity to move their software to 900 Series systems before the systems are released. Thus, new versions of the software will be ready by the time the 900 Series systems are generally available.

The initial Software Evaluation and Migration Center is located next to the HP facilities in Cupertino, CA. Other migration centers are being established throughout the United States, Europe, the Far East, and Australia.

Early Information

In the first phase of a third-party migration, "Early Information," Hewlett-Packard shares documentation with the third party and discusses how to prepare for migration. HP collects information on migration requirements of the software to determine the best implementation. A detailed migration plan is written by the third party with consultation from HP.

Early Access

A possible second phase is the Early Access program, which gives third parties early access to 900 Series systems. It is during the Early Access phase that the actual migration of software takes place at one of the migration centers. The initial access occurs at the Software Evaluation and Migration Center in Cupertino, while follow-up visits may take place at the closest field migration center.

Consulting Services

FastLane 3000

To provide the fastest and most productive migration possible, Hewlett-Packard offers FastLane 3000, a consulting service that has been developed to assist with migration planning. A systems engineer trained in the migration process will analyze specific applications and the HP 3000 environment and recommend a migration strategy that will make the most efficient use of time and resources. FastLane 3000 lets you take advantage of Hewlett-Packard's migration expertise to come up with the most efficient migration process.

FastLane 3000 will be particularly valuable for migration processes that are more technically involved. It will also be useful to customers whose staff is too busy on other projects to handle the migration process, or who need help in technical areas.

The FastLane 3000 consulting service is divided into two modules, which may be purchased together or individually. These modules are System Planning and Application Planning.

System Planning

System Planning starts with an orientation to the migration process for the HP Precision Architecture, MPE XL, and subsystems. It includes an overview of the migration options available for a specific HP 3000 environment. The migration orientation is tailored to the needs of the customer, and only those topics that are relevant to the HP 3000 environment being analyzed are addressed.

A system-level analysis is then performed. Migration tools are used to analyze the entire environment, including job streams and UDCs, to determine if any changes are required. Based upon this analysis, and taking into account performance trade-offs, the HP systems engineer offers recommendations concerning the effort and phasing of application migration. A preliminary attempt is made to identify the application that should be moved to the 900 Series first.

The result is a system-level view of the migration of applications running on a specific HP 3000.

Application Planning

The application planning module of FastLane 3000 focuses on the development of a complete migration plan for a specific application. The first step in application planning is to choose the application to be moved.

Once the application is chosen, a migration strategy is developed. The results of the analysis done with the migration tools during system planning are used to pinpoint any migration problems in the application to be moved.

The complete migration plan includes a project schedule with resources required (i.e. people, training, documentation, facilities, hardware and software), tasks to be accomplished, and milestones to be reached. The final plan combines Hewlett-Packard's expertise in the 900 Series and the migration process with the migration team's knowledge of their environment and application. Your HP Sales Representative can give you more information.

Other Migration Services

Migration From MPE V/R-Based HP 3000s

Direct migration from MPE V/R systems to MPE XL systems is not advised without HP assistance. A consulting service will be available to provide Series II/III/30/33 customers with a system engineer and an MPE V/E system that can be used as the intermediate step to an MPE XL system.

Migration Implementation Services

If you want help in the actual migration of an application to an MPE XL system, project center consulting will be available on a time and materials basis. For example, this work could include making changes to a Privileged Mode application that are needed for Compatibility Mode execution or recoding an application to take advantage of the performance of MPE XL mapped files in Native Mode.

Extended Return Allows Parallel Operation

The extended return program allows all HP 3000 upgrade customers to keep their MPE V system for 90 days after the 900 Series system is installed. Delaying the return of the upgraded SPU provides plenty of time to complete migration activities. Beyond the 90-day extended return period, Series 68 and 70 customers can rent their systems for less than half of the normal rental fee.

Communication Servers

Communication servers for the 900 Series provide an interim solution for wide-area networking or IBM system communication until host-resident communication services are available for the 900 Series. Two servers are available. The Basic Communication Server consists of a MICRO 3000XE, which will support up to three lines. The larger Communication Server/58 supports up to seven lines.

You can rent a 900 Series communication server for a 12-month period and enjoy all of the advantages of a fully configured system with a limited financial commitment. The rental rate for both communication servers is well below the industry standard, and a portion of each payment may be applied for later purchase. Contact your HP Sales Representative for details.

Migration Documentation and Training

Migration Manual Series

With general release of the Series 930, a migration manual series will be available. This series of manuals is written specifically for the experienced HP 3000 user. The manuals included in this series are:

- Migration Process Guide

Provides an in-depth review of the migration process. Also includes descriptions of the Migration Toolset components and a comprehensive list of incompatibilities.

- General User's Skills Migration

- System Administrator's Skills Migration

- Programmer's Skills Migration

These manuals provide complete and concise information on the changes and enhancements that relate to tasks performed by a specific type of user.

- COBOL II Migration Guide

- Pascal Migration Guide

- FORTRAN 77 Migration Guide

These manuals provide information about the changes and enhancements between the MPE V and MPE XL Native Mode versions of a specific language.

With this set of manuals, the experienced HP 3000 user can quickly learn any differences and new features that relate to his or her job.

Other Information

The following data sheets are available from your HP sales representative:

- Migration to the 900 Series HP 3000 system

- MPE XL Operating System

- HP Precision Architecture

- Series 930 Data Sheet

- Series 950 Data Sheet

The 900 Series HP 3000 Computer Systems General Information Manual (p/n 5954-7448) provides a broad overview of 900 Series systems of the HP 3000 family. The HP 3000 System Configuration Guide (p/n 5953-7573) provides detailed hardware configuration information for the family of HP 3000 systems. Both of these documents can be obtained from HP sales offices or from HP's direct marketing division. For a complete list of migration related information refer to the Migration Checklist (p/n 5954-9350).

Product-Specific Migration

MPE XL

MPE XL (Multiprogramming Executive with Extended Large Addressing) is the operating system for the 900 Series of HP 3000 computers. MPE XL provides a superset of MPE V functions while maintaining compatibility with MPE V.

There are two primary means of communicating with the MPE operating system. The first is via commands, which can be embedded in job streams or entered from a terminal. The second is via system-callable procedures, called intrinsics, which may be called from within programs. Therefore, for the MPE V and MPE XL operating systems to be compatible, the commands and intrinsics must be compatible.

Commands

The user interface and system management operations of the MPE XL and the MPE V are nearly identical. Consequently, system managers, operators, and users who are familiar with MPE V will require little training to take advantage of the additional features and functionality of MPE XL.

There are a few exceptions to compatibility in the MPE XL commands. One example is the PTAPE command, which is not supported because the paper tape reader is not supported. A list of all of the known differences between the MPE V and MPE XL commands is contained in Migration Checklist (p/n 5954-9350).

Intrinsics

Program access to the MPE V and MPE XL operating systems is provided via system intrinsics. MPE XL supports MPE V intrinsics to provide object code compatibility. At the same time, the MPE XL intrinsic set gives the user access to the new features of MPE XL and the HP Precision Architecture.

Because program access to MPE sometimes entails the use of architecture-dependent features, and because some peripherals have become obsolete, there are a few minor incompatibilities. For example, the PTAPE and FCARD intrinsics are not supported because the paper tape and card readers are no longer supported. With the extended 32- and 64-bit addressing capabilities of the HP Precision Architecture, a few intrinsics have changed from 16-bit pointers to 32-bit pointers when called from Native Mode. A list of all of the currently known differences between the MPE V and MPE XL intrinsics is contained in the Migration Checklist (p/n 5954-9350).

Language Migration

Run-Time Libraries

In order for MPE V programs to run on MPE XL systems, each language's run-time library must be present. The run-time libraries for each supported language have been included with every HP 3000 system regardless of the compilers that have been purchased for that system. This means, for example, that a program written in FORTRAN 66/V on one system will run on another HP 3000 even if it does not have the FORTRAN 66/V compiler.

Support of the MPE V run-time libraries will continue in Compatibility Mode on MPE XL systems. Thus, a FORTRAN 66/V program written five years ago on an MPE system will continue to work today on a 900 Series system in Compatibility Mode without being recompiled.

Compatibility Mode Compilers

Compatibility Mode allows you to cross-develop applications between MPE V and MPE XL systems. To this end, HP will phase in support of the MPE V compilers on MPE XL systems.

The COBOL II/V, Pascal/V, HP FORTRAN 77/V, FORTRAN 66/V, HP Business Basic/V, RPG/V, and SPL/V compilers will be supported in Compatibility Mode.

Native Mode Compilers

HP has developed new optimizing Native Mode compilers that take full advantage of the features, simplicity, and uniformity of the machine instruction set of the HP Precision Architecture.

These compilers provide processing efficiency in several ways. For example, they analyze program behavior on a global basis and schedule instructions to fully utilize the advanced pipelining capabilities of the 900 Series. They also allocate the processor's registers very efficiently so that memory references are minimized. In addition, these compilers can compensate for some inefficiencies in source code. For instance, they can eliminate duplicate computations and unused code.

First-release Native Mode compilers include COBOL II/XL, HP Pascal/XL, and HP FORTRAN 77/XL. Future support for HP C/XL, HP Business Basic/XL, and RPG/XL in Native Mode is planned.

Source Code Compatibility

One of the main requirements of the Native Mode MPE XL compilers is to maintain source code compatibility with their MPE V counterparts. As would be expected, to take advantage of new features and addressability of the HP Precision Architecture, 100-percent compatibility is not possible. Manuals that describe incompatibilities and changes that may be required will be available for each of the Native Mode compilers.

A list of known incompatibilities between the first-release Native Mode MPE XL compilers and their MPE V counterparts is provided in the Migration Checklist (p/n 5954-9350).

SPL Migration

There are currently no plans for release of an HP Native Mode SPL compiler since SPL/V is an architecture-dependent language. We encourage you to code programs in Pascal or C, because those languages are more machine-independent. However, SPL/V programs can run in Compatibility Mode and can be modified and recompiled using the SPL/V compiler in Compatibility Mode.

Database Migration

TurboIMAGE/XL

TurboIMAGE/XL will be included with MPE XL-based computer systems. A TurboIMAGE/V database can be stored on tape on an MPE V system, moved to an MPE XL system, and accessed immediately as a Native Mode TurboIMAGE/XL database. That can be done without any changes to the database or to the programs that access the database.

Note that IMAGE/3000 databases can also be moved to TurboIMAGE/XL, but they will have to be converted to TurboIMAGE format before they can be accessed. The DBCONV database conversion utility is provided on MPE V/E systems for this purpose.

Remote Access to TurboIMAGE Databases

A 900 Series Native Mode or Compatibility Mode application can access a remote TurboIMAGE database. The remote TurboIMAGE database can be on either a remote MPE V- or MPE XL-based system. This allows the 900 Series to fit smoothly into a network where applications are using remote database access (RDBA).

ALLBASE/XL

ALLBASE/XL is Hewlett-Packard's new DBMS offering on the 900 Series HP 3000 computer systems. It is the result of a revolutionary design concept in database management systems. The ALLBASE/XL DBMS has both a network interface and a relational interface built on top of a common database core that controls and coordinates the access and storage of data.

HPSQL

The HPSQL portion of the ALLBASE/XL DBMS is a fully relational database management system that is based on SQL (Structured Query Language). This non-procedural language is rapidly becoming the industry standard for relational databases. The HPSQL portion of ALLBASE/XL is available today on MPE V systems, and migration from HPSQL/V to HPSQL/XL is simple and straightforward. MPE V programs that use HPSQL/V do not require any HPSQL-related changes to run on MPE XL systems.

HPIMAGE

With the introduction of TurboIMAGE in Native Mode, HPIMAGE has been re-scheduled for a future release. HPIMAGE offers expanded functionality that is not currently available in TurboIMAGE.

Data Communication Migration

The 900 Series has been designed to communicate transparently with other HP 3000s. Consequently, you can move a new 900 Series system into an existing network of other HP 3000s with minimal impact on the network.

Using Network Services

The 900 Series communicates easily with other HP 3000 systems running network services over an IEEE 802.3 local area network. DS network services is not supported on the 900 Series. You must upgrade from DS to NS 3000/V network services before you connect a 900 Series system to an existing network.

NS 3000/V network services are a superset of DS. Most applications currently running under DS will run with minimum modification under NS. While a network can contain a mixture of nodes running NS 3000/V and DS network services, DS and NS links (e.g., point-to-point) cannot communicate directly with one another due to incompatible network transport architectures. DS and NS links can coexist on a network or node. Connectivity is accomplished by configuring one or more MPE V/E nodes with both an NS and DS link (each with a dedicated INP) and routing network traffic through these nodes.

NS 3000/V network services capabilities, except for program-to-program communication, will be supported at first release of 900 Series systems.

Series II/III/30/33 Communications

Even these discontinued systems will be able to communicate with 900 Series systems through any MPE V-based system. They will not, however, be supported as direct connections to 900 Series systems because they do not support NS3000/V.

Remote Communications

With the first release of the 900 Series, customers who need to communicate with remotely located HP 3000s will have to communicate through a local MPE V-based HP 3000. A future release of MPE XL will support remote communication on the 900 Series.

IBM Communications

At first release, 900 Series systems can use an intermediate MPE V-based HP 3000 to communicate with IBM systems. Direct communication with IBM hosts will be supported on a future release.

