



AS/400 Advanced Series

SA41-4154-01

**AS/400 Planning
for PowerPC Technology**

Version 3

Take Note!

Before using this information and the product it supports, be sure to read the general information under "Notices" on page xiii.

Second Edition (December 1995)

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About AS/400 Planning for PowerPC Technology (SA41-4154)

As you consider moving your AS/400 system to PowerPC AS architecture, you have many decisions to make. This book can help you make these decisions by providing answers to questions such as the following:

- What does moving to PowerPC Technology involve?
- What hardware changes must occur?
- What software changes must occur?
- Will my applications be supported after the upgrade?
- Is there more than one way to perform this upgrade?
- What are the benefits of each upgrade method?
- What services and tools are provided to assist me?
- What are my responsibilities and what actions will be performed by my service representative?
- Approximately how long will my system be unavailable when the upgrade is in progress?
- How do I plan for the upgrade?

This book assists you in the use of the Upgrade Assistant for OS/400 to perform an initial analysis of your system. The checklist and information provided in this book assist you in determining which upgrade method is best suited to the needs of your system. When you have finished this book, you should be ready to place the order for your PowerPC AS Processor and Version 3 Release 6 Modification 0 software.

This book does *not* contain detailed preparation information or specific instructions to perform your upgrade. This type of information is provided in the *AS/400 Road Map for Changing to PowerPC Technology* book, SA41-4150. After you place an order for your PowerPC AS processor, the *AS/400 Road Map for Changing to PowerPC Technology* book is shipped to you approximately 30 days before your order is shipped. If you need the *AS/400 Road Map for Changing to PowerPC Technology* book earlier, you can order it by using the information provided in the inside front cover of this book.

For information about other AS/400 publications, see either of the following:

- The *Publications Reference* book, SC41-4003, in the AS/400 Softcopy Library.
- The *AS/400 Information Directory*, a unique, multimedia interface to a searchable database containing descriptions of titles available from IBM or from selected other publishers. The *AS/400 Information Directory* is shipped with your system at no charge.

For a list of related publications, see the Bibliography.

Who Should Use This Book

This book is intended for the information services manager and technical support personnel who are responsible for evaluating and purchasing capital equipment.

You should already know how to do the following:

- Evaluate the affect of changing hardware such as, but not limited to, disk units, tape units, and input/output processor (IOP) devices
- Assess your system resources and identify potential risks within a defined set of actions
- Perform risk and cost analyses for proposed system changes
- Perform save and restore operations
- Plan for and perform software installation procedures
- Work with disk units and storage allocations

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Refer to the "Summary of Changes to AS/400 Planning for PowerPC Technology" on page xv for a summary of changes made to this publication.

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Summary of Changes to AS/400 Planning for PowerPC Technology

This edition of *AS/400 Planning for PowerPC Technology* contains significant technical and organizational changes since the previous edition.

Changes to Organization: Changes are made to organization so that the chapters are presented in the most efficient way to analyze your existing system.

Changes to Content: More information is provided to help you in the tasks of analyzing your existing system, choosing an upgrade method, and estimating the time required to prepare for and perform the upgrade. Technical corrections and clarifications are included in these changes.

Two new appendixes are added. Appendix B, "Licensed Program Information" includes a variety of information about V3R6M0 licensed programs and their optional parts. Appendix C, "Examples" contains several examples that may be useful when you determine your system downtime estimate.

General Information

Chapter 1. AS/400 with PowerPC Technology—Introduction

AS/400 Advanced Series using PowerPC technology provides a new, more powerful hardware and software foundation for your AS/400 applications:

- The AS/400 PowerPC AS processors are implementations of the 64-bit PowerPC architecture with extensions to support commercial applications for multiple users.
- An object-oriented version of the Licensed Internal Code takes advantage of PowerPC AS architecture.
- A new release (Version 3 Release 6 Modification 0) of Operating System/400 and other licensed programs provides the functions of Version 3 Release 1 Modification 0. V3R6M0 runs only on PowerPC AS processors and the new version of the Licensed Internal Code.
- AS/400 applications can run without change. The system automatically converts them to take advantage of the new instruction set (provided the program objects have observability. See “What Is Observability?” on page 1-3).

Why the Time Is Right for AS/400 with PowerPC Technology

You might ask yourself why IBM is doing this and why now? Because of recent advances in technology, PowerPC AS architecture now provides the best way to achieve significant price-performance improvements and to position the AS/400 system for the future.

In general, two methods are available for improving processor performance:

- You can increase the amount of work that the processor accomplishes when it performs an instruction. This is the philosophy of Complex Instruction Set Computing (CISC) architecture and the internal microprogrammed instruction (IMPI) processor. A CISC processor has a large set of instructions that are designed to perform specific tasks. The processor may take several cycles to perform a single instruction. AS/400 IMPI processors are CISC processors. (All AS/400 processors prior to PowerPC AS processors are IMPI processors.)
- You can reduce the number of processor cycles that are required to perform an instruction. This is the philosophy of Reduced Instruction Set Computing (RISC) architecture. A RISC processor has a simpler instruction set than a CISC processor. In many cases, an instruction can be performed in a single processor cycle. In some cases, the processor can perform more than one instruction in the same cycle. A RISC processor often uses several instructions to perform the work that is done by a single instruction in a CISC processor. PowerPC AS processors are RISC processors.

With new advances in processor technology, it is possible to improve cycle times dramatically. This has brought RISC architecture to the forefront as a means to achieve advances in price-performance. A RISC processor can run more instructions faster and at less cost than a CISC processor can.

Up until now, the AS/400 system, like most commercial systems, has been based on CISC architecture. The PowerPC architecture represents the third generation of

RISC processors. The 64-bit PowerPC architecture was developed jointly by Apple**, Motorola**, and IBM.

Earlier versions of RISC architecture were based on 32-bit processors. They were not powerful enough to support the kind of highly integrated, robust commercial applications that are common on AS/400 systems today. Nor could they take advantage of the AS/400 system's 64-bit addressing scheme.

Now, with the availability of the PowerPC architecture, the time is right for AS/400. The PowerPC AS processors provide the power that is required for emerging and future applications. They will fuel unprecedented price-performance growth.

How Your Current System Investment Is Protected

AS/400 with PowerPC technology represents evolutionary growth. It provides a significant improvement in price-performance while preserving your current investment in hardware and software. It positions you to exploit the use of new technologies for commercial applications.

Your Hardware Investment

You may choose to upgrade an existing AS/400 processor or you may want to purchase a new processor. When you upgrade your existing system by making modifications to it (instead of ordering a new system), this is called a **miscellaneous equipment specification (MES)** order. An MES is often referred to as a hardware upgrade. Whether you order a new system or place an MES order depends on several factors:

- Your current processor model (AS/400 B models cannot be upgraded with an MES order).
- Costs.
- Your system availability requirements.

The information in this book helps you determine what is right for your situation.

Most current devices that attach to AS/400 IMPI processors are also supported on PowerPC AS processors. A few devices, however, such as some disk subsystems and some attachment features, are not supported. "How to Identify Unsupported Hardware Devices" on page 6-13 describes how to determine whether your system has devices that are not supported on PowerPC AS processors.

Your Software Investment

The AS/400 Advanced Application Architecture has been designed for change. Major hardware and software components on the system can change without affecting your applications. The PowerPC AS processor and the new Licensed Internal Code are fundamentally different from earlier versions. Yet, they appear the same to your applications. Version 3 Release 6 Modification 0 of the OS/400 licensed program is functionally equivalent to V3R1M0. If your applications run successfully on V3R1M0 or earlier versions, they will run on V3R6M0, provided they have observability.

You do not need to change your AS/400 application programs or recompile them to run on AS/400 with PowerPC technology. The system automatically converts pro-

grams (when you first run them or when you restore them) to use the new PowerPC AS instruction set. For the system to convert a program object, the program object must have observability.

What Is Observability? When you compile an AS/400 source program, the system goes through a two-step process. The system first creates a **program template**. The program template is independent of the instruction set that is used by the processor. The system then uses the program template to create the set of machine instructions that are used to run the program. This step is a type of **object conversion**.

The program template is stored with the program. The program template is also referred to as **observable information** or **observability** because the information in the program template can be used to “observe” (debug) the program while it is running. The system can convert the same program template into PowerPC AS instructions or into CISC instructions. Because of this capability of the AS/400 architecture, you do not have to recompile programs when you move them between AS/400 systems with IMPI processors and AS/400 systems with PowerPC AS processors.

All supported functions in your program convert. No function is lost, which has occurred with some other systems that have converted to a RISC processor. In fact, when the system converts a program template, it optimizes the program for the target instruction set. Your program takes advantage of the performance improvements you get from the new processor technology, just as if you recompiled it.

Notes:

1. Some installations use the Change Program command to remove observable information from their program objects. Usually this is done to reduce the amount of disk space that is required to store program objects. If you or your application provider deleted observability for a program, you must get a copy of the program that can run on a PowerPC AS processor by doing one of the following:
 - Recompile the program so that it can be converted to the PowerPC AS instruction set
 - Get an observable version of the application from your application provider.
 - Get a V3R6 version of the program from your application provider.

When you delete observability, you delete the program template.

2. A few infrequently used AS/400 object types are not supported by AS/400 with PowerPC technology. If your system uses these object types, you will need to make arrangements to handle them. This is described later in this book (“How to Identify and Handle Unsupported Objects” on page 5-6).

Application Environments on the AS/400 with PowerPC Technology

AS/400 Advanced Series using PowerPC technology provides several environments for applications. Figure 1-1 on page 1-4 shows which environments provide the best upgrade path for existing IBM commercial systems. The topics that follow briefly describe the environments.

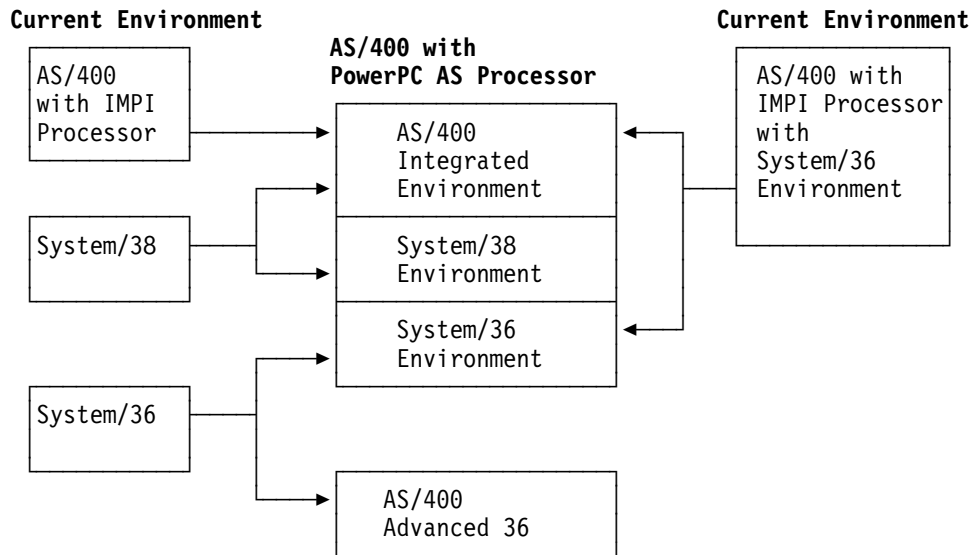


Figure 1-1. Application Environments on AS/400 with PowerPC Technology

AS/400 Integrated Environment

Applications that run in the AS/400 integrated environment have access to the full scope of OS/400 functions and features. Applications that have been developed specifically for the AS/400 system run in this environment. From the perspective of a user or a programmer, the integrated environment on an AS/400 system with an IMPI processor is just like the integrated environment on an AS/400 with PowerPC technology.

System/38 Environment

When the AS/400 system was originally developed, it combined the strengths of its two precursors:

- The advanced architecture of the System/38
- The ease-of-use of the System/36

Most System/38 applications can run on the AS/400 architecture with very few changes. The System/38 environment bridges the gap between some System/38 functions and similar AS/400 functions. If you currently have a System/38, you can migrate to an AS/400 system with PowerPC Technology just as you would to an AS/400 system with an IMPI processor. You can use the AS/400 System/38 Migration Aid licensed program to help you with this type of migration. IBM and IBM business partners offer services to assist with this type of migration.

System/36 Environment

The AS/400 system has an object-based architecture. The System/36 does not. When you run applications in the System/36 environment on an AS/400 system, they have the look and feel of System/36 applications, but they use AS/400 objects.

If you use the System/36 environment on your current AS/400 system, those applications can make use of the System/36 environment on AS/400 with PowerPC technology. If you currently have a System/36, a migration aid is available to help you move your applications to the System/36 environment on the AS/400 system. IBM and IBM business partners offer services to assist with this type of migration.

AS/400 Advanced 36 System

The AS/400 Advanced 36 system provides a full emulator environment. It translates System/36 instructions into PowerPC AS instructions and then runs them. System/36 programs can be run unchanged, and all such programs run. The AS/400 Advanced 36 supports the System/36 System Support Program (SSP) and all its function. It provides dramatic performance improvement over the System/36. The *General Information for SSP Operating System Release 7.1* book provides general information about the AS/400 Advanced 36.

What Upgrade and Migration Methods Are Available?

In this book, **upgrade** and **transition** refer to the entire process of changing an existing (IMPI) AS/400 system to AS/400 with PowerPC technology. This includes changing the hardware, the Licensed Internal Code, and the operating system. **Migration** refers to moving from a different system platform (System/36 or System/38) to AS/400 with PowerPC technology.

The following methods are available to upgrade or migrate from your current IBM commercial system to AS/400 with PowerPC technology:

Upgrading from AS/400 with IMPI Processor: Three methods are available for changing from an AS/400 system with an IMPI processor to AS/400 with PowerPC technology:

Unload/reload method

When you use this method, you save your information to tape (unload) before you upgrade or replace your hardware. You restore your information from tape (reload) after the hardware upgrade process.

Replacing-a-release method

When you use this method, you prepare your data for a new disk format before the hardware upgrade process. The hardware service representative converts your disk storage during the upgrade process. You do not have to reload data.

Side-by-side method

When you use this method, you install an entirely new system (with a PowerPC AS processor) in parallel with your existing system. Usually, you run the two systems in parallel during a transition period. When you are satisfied with object conversion and testing, you resynchronize the data on the test system (AS/400 with PowerPC technology) and move it into production.

These methods are described in “Overview of the Upgrade Methods” on page 7-1. “Tools and Services to Help with Changing to AS/400 with PowerPC Technology” on page 2-2 describes services that are available from IBM to help you in all phases of the transition. Chapter 3 includes a checklist and work sheets to help you plan your order.

Migration from System/38: If you currently have a System/38, you can migrate to AS/400 with PowerPC technology just as you would to an AS/400 system with an IMPI processor. The *System/38 to AS/400 Migration Aid User's Guide and Reference* describes this process. You will need to convert program objects when you move them to the new (PowerPC AS architecture) system, either during the restore operation or by running a procedure later.

Migration from System/36: If you currently have a System/36, you can use the System/36 Environment for your existing applications. The *System/36 to AS/400 Migration Aid User's Guide* book describes the procedure for moving your applications to this environment. You may choose to use the System/36 environment as the migration path for your System/36 rather than the AS/400 Advanced 36 system because you also want to access the integrated AS/400 environment.

Chapter 2. Changing to PowerPC Technology—Overview

At the lowest levels, the architecture of AS/400 with PowerPC technology is fundamentally different from the architecture of AS/400 with an IMPI processor. The hardware, the Licensed Internal Code, and the machine instruction set are all different. The new version of the OS/400 licensed program (Version 3 Release 6 Modification 0) cannot run on an IMPI processor. Older versions of the OS/400 licensed program (such as Version 3 Release 1 Modification 0) cannot run on the PowerPC AS processors. Therefore, changing to AS/400 Advanced Series using PowerPC technology requires that you change your hardware and your software at the same time.

Tasks for Changing to PowerPC Technology—Overview

To change your current system to AS/400 with PowerPC technology, you need to perform the tasks that you see in Table 2-1. This book helps you with task 1. The *AS/400 Road Map for Changing to PowerPC Technology* book helps you with task 2 through task 7.

Table 2-1 (Page 1 of 2). Upgrade Process—Basic Tasks

Phase	Tasks
Planning	1. Plan your configuration and order your AS/400 Advanced Series using PowerPC Technology. The topics in “Order Planning” help you do this. Your marketing representative and the IBM Fulfillment Center are available to assist you.
Preparation	2. Prepare your system for the change. If you are upgrading existing hardware, you may be required to perform certain tasks before the hardware service representative begins the upgrade procedure. The Upgrade Assistant for OS/400 and the Performance Tools for OS/400 licensed program can help you perform these tasks. (“Upgrade Assistant for OS/400—Overview” on page 2-4 provides more information about Upgrade Assistant.)
Upgrade procedure	3. Install new hardware or upgrade your existing hardware. For some configurations, a hardware service representative performs this task. 4. Install the operating system and the licensed programs. Note: Most new systems and upgrade orders arrive with the Licensed Internal Code already installed on the new load source unit.

Table 2-1 (Page 2 of 2). Upgrade Process—Basic Tasks

Phase	Tasks
Post-upgrade¹	<p>5. For some upgrade methods, you must move user data to the new system, either by restoring it from tape or by sending it over a connection (communications line, LAN, or OptiConnect for OS/400).</p> <p>6. Make your applications ready for the new architecture. The system must convert application programs to the new PowerPC AS instruction set. You can skip this step if you have a new version of your application software (usually from your software provider) that has already been converted to the new instruction set.</p> <p>Program conversion occurs at one of the following times:</p> <ul style="list-style-type: none"> • When you restore the program through the use of a new parameter on the RSTxxx commands. • When you use the program for the first time. This is the default action if you do not take explicit steps to convert a program before it is used for the first time. • When you start a procedure to convert all of the programs in a library by using the Start Object Conversion (STROBJCVN) command or the CHGPGM, CHGMOD, and CHGSRVPGM commands. <p>The system also makes changes to the internal format of database files, either the first time that a database file is referenced or when you run the STROBJCVN command. This change affects only the way that system information about a database file is stored. It does not affect the way that the database file is defined or appears to your applications.</p> <p>7. Verify that your applications run correctly in the new environment.</p>
¹	<p>For critical applications, you will perform tasks 5, 6, and 7 before you make your upgraded system available for your users.</p>

When you have completed this process, your applications look the same to the end users and perform exactly the same functions. Application performance will be better.

Tools and Services to Help with Changing to AS/400 with PowerPC Technology

The process of changing to AS/400 with PowerPC technology has the following main phases:

- Determining what hardware and software to order.
- Planning for the upgrade process.
- Preparing your system for the upgrade.
- Performing the upgrade.

To help you with these phases, IBM has the following tools and services available.

Planning and Order Assistance

The IBM Fulfillment Center in Rochester, Minnesota, is staffed with professionals who can answer your questions and assist you with system configuration options, upgrade questions, and placing your order. You can contact the IBM Fulfillment Center electronically by using the Request Order Assistance (RQSORDAST) command on your AS/400, or you can call the toll-free number 800+289-2426. Currently, the IBM Fulfillment Center is available only to customers in the United States.

You can also send information about your current configuration electronically. Your marketing representative or the IBM Fulfillment Center can use this information to make sure that your MES order is correct. Chapter 8 provides more information about the order assistance that is available.

Before your order is shipped, IBM will conduct a system assurance review. A system assurance review is intended to ensure that the upgrade process is successful by reviewing the following:

- The hardware and software configuration that is ordered.
- Physical planning, such as space and power.
- Customer training.
- Compatibility of all proposed hardware and software.
- Important responsibilities and the responsible parties.
- Other items that may affect the success of the upgrade process.

Currently, a system assurance review is conducted before you begin installation activity for any of the following:

- An upgrade to an AS/400 Advanced Series model, especially models 4xx or 5xx.
- The first installation of a 9404 or a 9406 system unit in an enterprise.
- Other situations, as recommended by IBM.

Contact your marketing representative for information about the system assurance practices in your area.

Performance Tools for OS/400 Support for New Models—Overview

The BEST**/1 Capacity Planning function of the Performance Tools for OS/400 licensed program provides the capability to analyze how a different AS/400 configuration will perform with your current workload. PTFs are available for Performance Tools (V2R3M0, V3R0M5, V3R1M0) that include capacity planning information for the PowerPC AS processor models of the system. You can use Performance Tools to help you determine the proper configuration of processor, main storage, and disk resources to meet your performance requirements.

Order now!

Performance Tools for OS/400 is the best source of information for determining what configuration will meet your performance requirements. You should order the PTF that will update your version of Performance Tools with the PowerPC AS processor models.

Note: If you do not have Performance Tools on your system, you should make arrangements to obtain modeling information in another way, such as by

using consulting services. Modeling the characteristics of your target configuration helps ensure that the configuration will meet your needs.

“Program Temporary Fixes for BEST/1 for the AS/400 Capacity Planner” on page D-4 lists the PTFs that you should order for BEST/1 for the AS/400 Capacity Planner so that you can model your current workloads on PowerPC AS processors.

Upgrade Assistant for OS/400—Overview

Upgrade Assistant for OS/400 (Upgrade Assistant) is available as a no-charge program temporary fix (PTF) for earlier versions (V2R3M0, V3R0M5, V3R1M0) of the OS/400 licensed program. Upgrade Assistant is a new set of programs that has been designed specifically to assist you in moving to AS/400 with PowerPC technology.

Table 2-2 lists the functions of Upgrade Assistant and where those functions are described:

Table 2-2 (Page 1 of 2). Overview of Upgrade Assistant Functions

Menu Option	Description	Command	Where It Is Described
Upgrade Preparation			
10	Submit upgrade preparation job. This menu option gathers information about your current system. The information is used by menu option 11.	STRUPGPRP	“How to Gather System Statistics” on page 4-11.
11	Display upgrade preparation job. This menu option displays different types of information about your system’s readiness for the upgrade process.	DSPUPGPRP *STG	“Displaying Your Disk Storage Requirements” on page 6-7.
		DSPUPGPRP *PRB	“How to Identify Unsupported Hardware Devices” on page 6-13 and “How to Identify and Handle Unsupported Licensed Programs” on page 5-9.
		DSPUPGPRP *OBJ	“How to Identify and Handle Unsupported Objects” on page 5-6 (including programs that do not have observability).
Disk Preparation (Replacing-a-release upgrade method only)			
20	Display disk preparation status. This option calculates the time required to prepare disk units for the replacing-a-release upgrade method.	DSPDSKPRP	“How to Plan Disk Preparation” in the book <i>AS/400 Road Map for Changing to PowerPC Technology</i> .
21	Start disk preparation. This option prepares the information stored on your system to accommodate the new page size.	STRDSKPRP	“How to Prepare Disk Storage for the Replacing-a-Release Method” in the book <i>AS/400 Road Map for Changing to PowerPC Technology</i> .
22	Work with disk preparation jobs. This option displays the status of the disk preparation jobs that you have submitted.		
Save and Restore Preparation			
30	Save system and user information.		“How to Save User Information” in the book <i>AS/400 Road Map for Changing to PowerPC Technology</i> , SA41-4150,

Table 2-2 (Page 2 of 2). Overview of Upgrade Assistant Functions

Menu Option	Description	Command	Where It Is Described
40 ¹	Restore system information		"How to Restore System Information" in the book <i>AS/400 Road Map for Changing to PowerPC Technology</i> , SA41-4150,
411	Restore user information		"How to Restore Libraries, Documents, and Directories" in the book <i>AS/400 Road Map for Changing to PowerPC Technology</i> , SA41-4150,
1	The restore options of Upgrade Assistant are included with V3R6M0 of the OS/400 licensed program.		

Order now!

Upgrade Assistant can help you decide what to do, when to do it, and how to do it. It has the most current information about size and compatibility requirements. If you are thinking about changing to AS/400 with PowerPC technology, order the PTF for Upgrade Assistant now.

For information about how to order, see Appendix D.

AS/400 Transition Services Family of Offerings

A family of Transition Services is available from IBM to assist you with the upgrade process. You may select the Total Project Management offering, in which the IBM specialist handles the overall management of the transition. Or you may select offerings to assist with some phases of the upgrade process. Your marketing representative can provide a Statement of Work that is specific for your particular situation.

Following are the offerings that you can select. The contents of each offering vary and are based on the upgrade method that you have chosen. The Project Planning Offering is a prerequisite for the other offerings.

Project Planning Offering

The IBM specialist works with you to plan the entire transition project.

Upgrade Assistant Offering

Prior to your upgrade order, the IBM specialist will use Upgrade Assistant for OS/400 to analyze your current system and to help you plan your order.

Pre-Installation Offering

After you have placed your order, the IBM specialist will help you plan the upgrade procedure and prepare your system for the upgrade procedure. This may include the following:

- Cleaning up your system
- Saving your system
- Changing your disk configuration (adding new disk units and removing unsupported disk units)
- Running disk preparation (replacing-a-release method only)

Post-Installation Offering

After the hardware upgrade procedure, the IBM specialist will get your system ready for operation by doing the following:

- Installing the operating system, licensed programs, and PTFs.
- Making any necessary changes to your configuration.
- Restoring user information (unload/reload method).
- Verifying your system.
- Converting programs (an optional part of the offering).

Other Service Offerings

IBM has several other service offerings that can help you with parts of the upgrade process:

- The AS/400 Recovery Readiness Examination (RRE) is a service offering that is designed to help you to determine the most cost-effective way to reduce the frequency and duration of unplanned outages on your system. One of the products of RRE is an estimate of how long it will take to restore your entire system. This information can help you if you plan to use the unload/reload method for upgrading.
- The AS/400 support family (U.S. only) offers the following services:
 - AS/400 PerformanceEdge—comprehensive hardware and system maintenance
 - AS/400 Support Line—hot line for AS/400 usage support
 - AS/400 Associate—assigned technical specialist
 - AS/400 Consult Line—telephone access to private consultants
 - PM/400—performance monitoring, trend analysis, and management reports
 - AS/400 Forum—electronic conferences on an AS/400 platform
 - AS/400 Alert—automatic notification of critical program fixes for hardware or software
 - AS/400 VitalSign—comprehensive systems administration assessment
 - AS/400 Recovery Express—entry level disaster recovery
 - AS/400 SiteManager—system and environment monitoring and alert system
 - AS/400 RemoteInstall—software installation performed remotely
 - AS/400 House Call—on-site assistance with AS/400 tasks such as installation
 - AS/400 Support Solutions—customized services

For more information about the AS/400 support family, see the book, *AS/400 Support Family*, G325-0740. You may also call 800+274-0015, option 5 for additional information about the AS/400 support family.

Services similar to the AS/400 support family are available outside the United States. Contact your marketing representative for information about the services that are available in your area.

Order Planning

Chapter 3. Checklist for Order Planning

Use this chapter to help you plan your order for AS/400 with PowerPC technology. This chapter includes a checklist that you can use for order planning. Appendix A contains work sheets that you may also find helpful. Make copies of the checklist and work sheets. Complete them as you read this part of the book.

In this chapter and in the remaining chapters in this book, the following terms are used:

You

This book is written for you, the customer. You are the person who is responsible for performing most of the tasks that are described in this book. You can do them yourself; you can assign them to someone else in your organization; or you can use the services of another organization for some or all of the tasks. “AS/400 Transition Services Family of Offerings” on page 2-5 provides an overview of the services that are available from IBM. Your marketing representative can provide more information about services and assistance.

Marketing representative

An IBM client representative or product specialist, an IBM business partner, or an IBM authorized agent who will be working with you when you order and install your AS/400 with PowerPC technology.

Source system

The system that you are upgrading *from*. The source system is your current AS/400 (IMPI) system.

Target system

The system that you are upgrading *to*. The target system is your new or upgraded AS/400 with PowerPC technology.

Order Planning Tasks–Checklist

This checklist includes a set of tasks that you should perform to determine the following:

- What configuration you should order.
- What method you will use for the upgrade process.

As you complete each task, check it off on the checklist.

You are responsible for determining what you need to order. “Tools and Services to Help with Changing to AS/400 with PowerPC Technology” on page 2-2 describes assistance that is available. Contact your marketing representative for more information about assistance and services that are available for planning or validating your order.

The *AS/400 Advanced Series Handbook*, GA19-5486, provides an overview of AS/400 Advanced Series hardware and software for V3R6M0. You may find it helpful when you are planning your configuration.

If you plan to order an AS/400 Advanced 36, use the *AS/400 Advanced 36 Planning and Reference Handbook* to help you plan your order.

Start your own planning now

Get your project off to a good start by setting up a project notebook now.

Make a copy of this order planning checklist (pages 3-2 through 3-6) and put it in your notebook. Complete it as you read the rest of this book.

Make copies of the work sheets that you will use while you are completing the checklist. They are all in Appendix A.

- Disk capacity planning work sheet (Table A-1).
- IOP configuration work sheet (Table A-2).
- Hardware configuration work sheet (Table A-4).
- Master installation work sheet (Table A-5).
- Application software work sheet (Table A-7).
- Method questionnaire (Table A-9).
- Additional hardware work sheet (Table A-10).

Put these work sheets in your project notebook also.

Table 3-1 (Page 1 of 5). Order Planning Tasks

Task	What to Do	Where to Read More about It
Beginning of task group. <i>The tasks in this group can be done in any sequence.</i>		
___ Task 1	Order and install the PTFs for Upgrade Assistant for OS/400 and for Performance Tools for OS/400.	<ol style="list-style-type: none"> 1. "Upgrade Assistant for OS/400—Overview" on page 2-4. 2. "Performance Tools for OS/400 Support for New Models—Overview" on page 2-3. 3. Appendix D.
___ Task 2	Run system cleanup tasks. When you are planning your order, you must determine how much disk storage you will need on your new system. You should clean up your disk usage before you begin to estimate your disk storage requirements.	"How to Clean Up Your System" on page 4-1.
___ Task 3	Make sure that the system database that defines your hardware configuration matches the actual hardware on your system.	"How to Clean Up Your Hardware Configuration" on page 4-4.
___ Task 4	Run the reclaim storage procedure. Lost or damaged objects can affect how much disk storage your system uses. You should handle lost or damaged objects before you begin to analyze your requirements for disk storage for the new system.	"How to Reclaim Storage" on page 4-6.

Table 3-1 (Page 2 of 5). Order Planning Tasks

Task	What to Do	Where to Read More about It
___ Task 5	Use the reorganize DLO procedure (RGZDLO command) to reduce the space that your system uses for documents and folders. <i>This is a long-running job. You must stop all OfficeVision for OS/400 activity before you run it.</i>	"How to Reorganize Document Library Objects" on page 4-10.
___ Task 6	After you have installed Upgrade Assistant, grant users authority to the Upgrade Assistant commands.	"How to Grant Authority to Upgrade Assistant Commands" on page 4-10.
___ Task 7	Use the Upgrade Assistant to gather information about your current system, such as disk capacity needs and devices that are not supported on a PowerPC AS processor.	"How to Gather System Statistics" on page 4-11.
___ Task 8	Gather performance information about your current system. Choose times when your system has normal-to-heavy activity.	"How to Gather Performance Information" on page 4-13.
Beginning of task group. <i>The tasks in this group should be done in the sequence shown.</i>		
___ Task 9	Determine what software you need to order.	Chapter 5, "How to Assess Your Software Needs." <ol style="list-style-type: none"> 1. "Operating System/400 Release Levels Supported for Upgrading" on page 5-1. 2. "How Conversions Affect Installation" on page 5-2. 3. "How to Identify National Languages" on page 5-2. 4. "How to Identify Your Currently Installed Software" on page 5-3.
___ Task 10	Determine how much space you need to decompress licensed program libraries.	"Compressed Objects and Storage Space" on page 5-5.
___ Task 11	Identify potential software problems, such as programs that do not have observability.	<ol style="list-style-type: none"> 1. "How to Evaluate Existing Applications" on page 5-6. 2. "How to Identify and Handle Unsupported Objects" on page 5-6. 3. "How to Identify and Handle Unsupported Licensed Programs" on page 5-9. 4. "How to Identify Other Unsupported Applications" on page 5-11.
___ Task 12	Determine how much disk space you need for new software and for decompression of existing software.	"How to Determine Additional Software Storage" on page 5-12.

Table 3-1 (Page 3 of 5). Order Planning Tasks

Task	What to Do	Where to Read More about It
___ Task 13	Determine how much disk space is used by software that you will not use on your upgraded system.	“How to Calculate the Storage for Obsolete Software” on page 5-13.
___ Task 14	Make a record of your current disk configuration.	“How to Describe Your Current Disk Configuration” on page 6-2.
___ Task 15	Determine how much growth of disk storage requirements you can expect for your current licensed programs and applications.	<ol style="list-style-type: none"> 1. “How to Determine Your Disk Unit Requirements” on page 6-7. 2. “Displaying Your Disk Storage Requirements” on page 6-7.
___ Task 16	Determine whether you have enough storage on your source system to prepare your disk storage for the replacing-a-release method.	“How to Determine the Storage Requirements for Disk Preparation” on page 6-8.
___ Task 17	If your source system is running an earlier version than V3R1M0, determine the additional space that is required for database cross-reference information.	“How to Calculate the Space Required for Cross-Reference Information” on page 6-9.
___ Task 18	Determine whether you have disk units that are not supported on PowerPC AS processors.	“How to Identify Unsupported Hardware Devices” on page 6-13.
___ Task 19	Evaluate disk protection.	<ol style="list-style-type: none"> 1. “Alternatives for Checksum Protection” on page 6-15. 2. “How to Evaluate Disk Protection Requirements” on page 6-16. 3. See “How to Plan Disk Protection” in the <i>Backup and Recovery – Advanced</i> book.
___ Task 20	Calculate your required disk capacity on your upgraded system.	“How to Determine What Disk Units You Need” on page 6-16.
___ Task 21	Determine whether you have enough IOP slots for the disk units.	“How to Determine Whether You Have Enough Slots” on page 6-17.
___ Task 22	Determine your ASP configuration for your upgraded system.	<ol style="list-style-type: none"> 1. “How to Determine Your Configuration for Auxiliary Storage Pools” on page 6-19. 2. See “Working with Auxiliary Storage Pools” in the book <i>Backup and Recovery – Advanced</i>.
___ Task 23	Determine whether your system can benefit from reformatting disk units during the upgrade procedure. You will use this information when you select your upgrade method.	“How to Evaluate the Benefits of Reformatting Disk Units” on page 6-20.

Table 3-1 (Page 4 of 5). Order Planning Tasks

Task	What to Do	Where to Read More about It
___ Task 24	Determine the processor model and main storage that you need.	<ol style="list-style-type: none"> 1. "How to Select a Processor Model" on page 6-21. 2. "How to Determine Your Main Storage Requirement" on page 6-26. 3. The <i>BEST/1 Capacity Planning Tool</i> book.
___ Task 25	Determine disk models and disk arms that are needed to meet your performance objectives.	<ol style="list-style-type: none"> 1. "How to Determine Your Disk Performance Requirements" on page 6-28. 2. The <i>BEST/1 Capacity Planning Tool</i> book.
___ Task 26	Determine your save and restore requirements.	<ol style="list-style-type: none"> 1. "How to Determine Your Save and Restore Requirements" on page 6-29. 2. "How to Identify Unsupported Hardware Devices" on page 6-13. (tape devices that are not supported). 3. See "Tape Performance Considerations" in the <i>Backup and Recovery – Advanced</i> book.
___ Task 27	Determine other devices and features that you will need.	"How to Identify Unsupported Hardware Devices" on page 6-13.
___ Task 28	Make an initial selection of your upgrade method.	<ol style="list-style-type: none"> 1. Method questionnaire (Table A-9 on page A-17). 2. "Overview of the Upgrade Methods" on page 7-1. 3. "Comparison of the Methods–Overview" on page 7-3. 4. "How to Identify Quick Decision Criteria" on page 7-6. 5. "How to Prioritize Your Analysis" on page 7-7. 6. "How to Get an Approximate Range for Your Upgrade Time" on page 7-8.
___ Task 29	Estimate times for the upgrade process.	<ol style="list-style-type: none"> 1. "How to Estimate Your Upgrade Time" on page 7-16. 2. "Work Sheets for Estimating Downtime" on page A-21.

Table 3-1 (Page 5 of 5). Order Planning Tasks

Task	What to Do	Where to Read More about It
___ Task 30	Select your upgrade method and determine whether you will use the Staged Upgrade Offering.	<ol style="list-style-type: none"> 1. Method questionnaire (Table A-9 on page A-17). 2. "How You Can Influence Downtime" on page 7-14. 3. "Staged Upgrade Offering—Overview" on page 7-37. 4. "Method Comparisons—Supporting Information" on page 7-38.
___ Task 31	If you plan to use the Staged Upgrade Offering, determine any additional features or devices that you will need for the staged upgrade machine.	"How to Plan Additional Hardware for the Staged Upgrade Offering" on page 7-44.
___ Task 32	If you plan to use the side-by-side method, determine any additional features, devices, or software that you will need for the source system.	"How to Plan Additional Hardware for the Side-by-Side Method" on page 7-45.
___ Task 33	Understand what software (if any) is pre-loaded on your upgraded system.	Table 7-9 on page 7-19.
___ Task 34	Work with your marketing representative to place your order.	"Enhanced Upgrade Order Process (U.S. Only)—Overview" on page 8-1.
___ Task 35	Make arrangements for any services that you will need to assist you with the upgrade process.	"AS/400 Transition Services Family of Offerings" on page 2-5.

What Is Next?	You will receive the <i>AS/400 Road Map for Changing to PowerPC Technology</i> approximately 30 days before your upgrade order arrives. When you receive the book, locate the checklist for the upgrade method that you have chosen. Make a copy of the checklist and start with Task 1.
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Chapter 4. How to Prepare and Analyze Your Current System

This chapter describes the following:

- How to establish a good baseline for analyzing your source system, which includes cleaning up your system and capturing performance information.
- How to use the Upgrade Assistant for OS/400 to analyze your source system.

How to Clean Up Your System

Think of upgrading your system as moving from one house or office to another. You need to clean up your disk storage and remove things that you no longer need before you move. When you have unnecessary objects, you increase the time that it takes to perform the upgrade procedure.

Following are suggested steps for cleaning up your system. You may perform these steps in any order. Some of them require information from system users.

___ **Step 1** Run the automatic cleanup function by using the Cleanup Tasks menu. Do the following:

___ **Step a** Type Go Cleanup to display the menu.

___ **Step b** Select option 1 (Change cleanup options). You see the Change Cleanup Options display:

```
Change Cleanup Options                                RCHASDAO
                                                    09/20/95 13:07:49
Type choices below, then press Enter.
Allow automatic cleanup . . . . . Y                Y=Yes, N=No
Time cleanup starts each day . . . . . 22:00:00    00:00:00-
                                                    23:59:59,
                                                    *SCDPWROFF,
                                                    *NONE
Number of days to keep:
User messages . . . . . 7                        1-366, *KEEP
System and workstation messages . . . . . 4        1-366, *KEEP
Job logs and other system output . . . . . 7        1-366, *KEEP
System journals and system logs . . . . . 30       1-366, *KEEP
OfficeVision/400 calendar items . . . . . 30       1-366, *KEEP
```

___ **Step c** Type Y for the *Allow automatic cleanup* field.

___ **Step d** Look at the value of the *Time cleanup starts each day* field. If it has a value other than *NONE, your system is already running automatic cleanup regularly. Continue with step 2 on page 4-2.

___ **Step e** Type values in the fields on the bottom half of the display (*Number of days to keep*). The online help information and the *System Operation* book provide more information about what these options do.

___ **Step f** Do one of the following:

- Set up your system to run automatic cleanup regularly by typing a value in the *Time cleanup starts each day* field.

- Run the automatic cleanup function immediately by doing the following:

___ **Step 1)** Press F3 (Exit) to return to the Cleanup Tasks menu.

___ **Step 2)** Select option 3 (Start cleanup immediately).

Note: You can use the Work with Active Jobs (WRKACTJOB) command to determine when the cleanup jobs have finished. Their names begin with QCLN. Or you can check the QSYSOPR message queue for the message CPCIEID (Cleanup has completed).

___ **Step 2** Have users clean up the objects that are owned by their profiles by doing the following (each user should do this):

___ **Step a.** Sign on and type the following:

WRKOBJOWN

The Work with Objects by Owner display is shown. It lists all of the objects that are owned by the user.

___ **Step b.** Use option 4 (Delete) to delete objects that are no longer needed.

___ **Step 3** Have each user type the following command: WRKSPLF. This lists all the spooled files owned by the user. From the display, the user can delete spooled files that are no longer needed.

___ **Step 4** Remove licensed programs that you no longer use by doing the following:

___ **Step a.** Create a list of all the software resources that are on your system by typing DSPSFWRSC OUTPUT(*PRINT) to create a spooled file. Print the list according to your normal print procedures. You will use this printout more than once. Be sure to keep it with the rest of your upgrade planning material.

Note: If you use the Print key to print the displays, you will not have all the information you need. The Print key output only shows columns from the current view of the display.

___ **Step b.** On the printout, mark any licensed programs that you want to delete. Be certain that you do not need the licensed program before you delete.

___ **Step c.** Type GO LICPGM to display the Work with Licensed Programs menu.

___ **Step d.** Save the licensed programs that you plan to delete by selecting option 13 (Save licensed programs). You see the Save Licensed Programs display.

- ___ **Step 12** Delete any user profiles that you no longer need. Do not delete any IBM-supplied user profiles (profiles that start with the letter Q). To delete user profiles, do the following:
 - ___ **Step a.** Type G0 SETUP. You see the Customize Your System, Users, and Devices display.
 - ___ **Step b.** Select option 10 (Work with user enrollment). You see the Work with User Enrollment display. If you see the Work with User Profiles display, press F21 and select basic assistance level.
 - ___ **Step c.** Type a 4 (Remove) in the Opt (option) column next to any user profile that you want to remove. You see the Remove User display.
 - ___ **Step d.** Select the correct option for objects that are owned by the user profile and press the Enter key. The system deletes the user's enrollment in the distribution directory and deletes the user profile.
- ___ **Step 13** If you have not already done so, delete from OfficeVision for OS/400 the enrollment for any user who is no longer with your organization or is no longer using office functions. Also, delete old mail, calendars, documents, and folders that you no longer need. For information about how to do these things, see the *Managing OfficeVision/400* book.
- ___ **Step 14** Clean up private authorities for deleted objects and deleted user profiles. "Cleaning Up Private Authorities—Scenario" on page C-7 provides sample programs for doing this.

How to Clean Up Your Hardware Configuration

The system resource management (SRM) information provides a link between the hardware on your system and the software descriptions of that hardware (the configuration). Sometimes the SRM information gets out of sync with the hardware that is on your system. You should correct the SRM information before you begin to analyze your system for the upgrade. Do the following:

- ___ **Step 1** Type WRKHDWRSC TYPE(*CMN) and press the Enter key. You are shown the Work with Communications Resources display.
- ___ **Step 2** Press F11 (Display resource addresses/statuses).
- ___ **Step 3** For any resource that has a status of *Not detected*, type a 4 (Remove) in the Option column. Do this only if the hardware is not physically on the system. You may need to check with your hardware service representative to determine this.
- ___ **Step 4** Press F12 (Cancel).
- ___ **Step 5** Repeat steps 1 through 4 for resource type *LWS. You will see the Work with Local Work Station Resources display.
- ___ **Step 6** If you are running an earlier version than V3R1M0, continue with step 16 on page 4-5.

- ___ **Step 7** Type WRKHDWRSC TYPE(*STG) and press the Enter key. You are shown the Work with Storage Resources display.
- ___ **Step 8** For any resource that has a status of *Not detected*, type a 4 (Remove) in the Option column. Do this only if the hardware is not physically on the system. You may need to check with your hardware service representative to determine this.
- ___ **Step 9** Press F12 (Cancel).
- ___ **Step 10** Repeat steps 7 through 9 for resource type *PRC.
Note: For resource type *PRC, do not delete the resource CEC01, even if its status is *Not detected*.
- ___ **Step 11** Type WRKCFGSTS TYPE(*CSA) and press the Enter key. You are shown the Work with Coupled Resources display.
- ___ **Step 12** Press F11 (Display resource addresses/statuses).
- ___ **Step 13** For any resource that has a status of *Not detected*, type a 4 (Remove) in the Option column. Do this only if the hardware is not physically on the system. You may need to check with your hardware service representative to determine this.
- ___ **Step 14** Press F12 (Cancel).
- ___ **Step 15** Continue with step 27 on page 4-6.
- ___ **Step 16** Type WRKHDWRSC TYPE(*TRA) and press the Enter key. You are shown the Work with Token Ring Adapters display.
Note: If you do not have a particular resource type defined on your system, you receive a message on the display.
- ___ **Step 17** For any resource that has a status of *Not detected*, type a 4 (Remove) in the Option column. Do this only if the hardware is not physically on the system. You may need to check with your hardware service representative to determine this.
- ___ **Step 18** Press F12 (Cancel).
- ___ **Step 19** Repeat steps 16 through 18 for resource type *PRC.
Note: For resource type *PRC, do not delete the resource CEC01, even if its status is *Not detected*.
- ___ **Step 20** Type WRKHDWRSC TYPE(*STG) and press the Enter key. You are shown the Work with Storage Resources display.
- ___ **Step 21** Type a 9 (Work with resource) in the option column next to each IOP that is listed on the display.
- ___ **Step 22** Press the Enter key to work with the first storage resource that you have selected. You see the Work with Storage Controller Resources display.
- ___ **Step 23** Press F11 (Display resource addresses/statuses). The columns on the display change to show the status of each resource.

- ___ **Step 24** For any resource that has a status of *Not detected*, type a 4 (Remove) in the Option column. Do this only if the hardware is not physically on the system. You may need to check with your hardware service representative to determine this.
- ___ **Step 25** Press F12 (Cancel). You return to the Work with Storage Resources display. You see a 9 in the Option column for storage resources that you have not yet displayed.
- ___ **Step 26** If your display still has any 9's in the Option column, repeat steps 22 through 25.
- ___ **Step 27** You have completed cleaning up your hardware configuration.

How to Reclaim Storage

The purpose of the reclaim storage procedure is to recover addressability to objects that have been damaged or lost on the system. Usually, this loss or damage occurs because active jobs on the system have ended abnormally. This can be caused by a power failure or by ending subsystems without letting the system end the jobs.

When you run the reclaim storage procedure, you can identify lost or damaged objects and make decisions about how to handle them. The reclaim storage (RCLSTG) procedure is a long-running job that requires a dedicated system. You should plan to run it on a weekend.

To run the reclaim storage procedure, do the following:

- ___ **Step 1** Sign on the system with a user profile that is authorized to the RCLSTG command. Either sign on at the console or use the Transfer Job (TFRJOB) command to transfer your job to the controlling subsystem.
- ___ **Step 2** Type `DSPSYSVAL QALWUSRDMN`. If the current value does not include the QRCL (Reclaim Storage) library or does not specify *ALL, use the `CHGSYSVAL` command to add QRCL to the list of libraries for this system value. Make sure you keep a record of your original setting for this system value.
- ___ **Step 3** Ensure your system is in a restricted state. Do the following to put your system in a restricted state:
 - ___ **Step a** Before putting your system in a restricted state, ensure that all users are signed off and all jobs are ended.
 - ___ **Step b** To receive notification that the subsystems have ended, type the following and press the Enter key:

```
CHGMSGQ MSGQ(QSYSOPR) DLVRY(*BREAK)
SEV(60)
```
 - ___ **Step c** To end all subsystems, type the following:

```
ENDSBS SBS(*ALL) OPTION(*CNTRLD) DELAY(600)
```

Note: For the delay parameter, specify a number of seconds that allows your system time to bring most jobs to a normal end. On a large, busy system, you may need a longer delay.

A message is sent that indicates that the procedure for ending subsystems is in progress. Press the Enter key when you receive this message. A final message is sent when the system is in a restricted state.

___ **Step 4** Start the reclaim storage process by typing:

RCLSTG

___ **Step 5** Use the CHGSYSVAL command to set the QALWUSRDMN system value back to its original setting.

___ **Step 6** When the reclaim storage procedure finishes, use the Start Subsystem (STRSBS) command to start the subsystems on your system.

What Happens When You Reclaim Storage: The purpose of the RCLSTG command is to ensure the following:

- Objects that reside permanently in auxiliary storage can be accessed.
- All auxiliary storage either is used properly or is available for use.

The system checks every object that resides permanently in auxiliary storage for loss or damage. It does the following:

Note: Directories and the associated commands are available only in V3R1M0 and later versions.

- If an object does not address a library or directory, it is placed in an IBM-supplied library or directory based on the object type. The system may not be able to retrieve description information for the object, such as:
 - Program temporary fix (PTF) status.
 - Save and restore information.
 - Object attributes and text description.
- For objects that normally reside in libraries (the QSYS.LIB file system), the system does the following:
 - If a lost object with the same name and object type is already in the Recovery (QRCL) library, the system gives the object that it has just encountered a new name. The name has the format QRCLnnnnnn, where *nnnnnn* is a unique number. The original object name is placed in the text description for the object in the QRCL library.

Note: You cannot rename journals and journal receivers. If the system encounters two journals (or journal receivers) with the same name and they both need to be placed in the QRCL library, the system renames one of them. You cannot rename that journal or journal receiver back to its original name. You must restore a previous version with the correct name or re-create the journal or journal receiver. For this reason, you should use a naming convention for journals and journal receivers that is unique for the entire system, not just for a library.

- If data exists for a lost or damaged physical file, the system attempts to rebuild the file and place it in the QRCL library. The text description for the object in the QRCL library indicates that it has been rebuilt.
 To use the physical file, create it again in the correct library with the correct attributes. Then copy the data from the rebuilt file in the QRCL library to the new physical file. The data in the file may not be complete because the RCLSTG procedure cannot recover from all types of damage.
- A user domain object can be placed in the QRCL library only if the QALWUSRDMN system value includes QRCL or specifies *ALL. Otherwise, a lost user domain object is deleted. Most objects are system domain objects. User domain objects have type *USRSPC, *USRIDX, or *USRQ.
- If an object does not have an owner, it is assigned to an IBM-supplied user profile based on the object type. Most objects are assigned to the QDFTOWN user profile.
- If descriptions for objects in a library cannot be accessed, the library is rebuilt.
- If an object is secured by a damaged authorization list or authority holder, the system makes QRCLAUTL the authorization list for the object. You can use the Display Authorization List Objects (DSPAUTLOBJ) command to determine which objects are secured by the QRCLAUTL authorization list.
- The following applies to systems that are running V3R1M0 or a later version of the OS/400 licensed program:
 - If a lost object was in the *Root* file system, the object is placed in the /QReclaim directory.
 - If a lost object was in the QOpenSys file system, the object is placed in the /QOpenSys/QReclaim directory.
 - For objects in the *Root* file system and the QOpenSys file system, the system takes actions for duplicate names or for unidentified object owners similar to the actions taken for objects in the QSYS.LIB file system.

What To Do After Running the RCLSTG Procedure

- ___ **Step 1** Do the following to determine what the system has done:
 - ___ **Step a.** Display the QSYSOPR message queue by using the Display Message (DSPMSG) command.
Note: You may see a message indicating that objects were deleted by the reclaim storage procedure. These are internal system objects that are no longer needed.
 - ___ **Step b.** Display the history (QHST) log by using the Display Log (DSPLOG) command.
 - ___ **Step c.** Display the QRCL library by using the Display Library (DSPLIB) command.
Note: If the reclaim storage procedure did not place any objects in the QRCL library, you may receive a message that the library is not

found. Ignore the message and continue with the next step.

- ___ **Step d.** Display the /QReclaim directory by using the Display Link (DSPLNK) command. (V3R1M0 only).

Note: If the reclaim storage procedure did not place any objects in the /QReclaim directory, you may receive a message that the object is not found. Ignore the message and continue with the next step.

- ___ **Step e.** Display the /QOpenSys/QReclaim directory by using the Display Link (DSPLNK) command. (V3R1M0 only).

Note: If the reclaim storage procedure did not place any objects in the /QOpenSys/QReclaim directory, you may receive a message that the object is not found. Ignore the message and continue with the next step.

- ___ **Step f.** Display objects owned by the QDFTOWN user profile by using the Work with Objects by Owner (WRKOBJOWN) command.

Note: If you have a large number of DLOs that are owned by the QDFTOWN profile and you are running V3R1M0, you can run the Reclaim Document Library Object (RCLDLO) command to attempt to correct the ownership problems.

- ___ **Step g.** Display objects secured by the QRCLAUTL authorization list by using the Display Authorization List Objects (DSPAUTOBJ) command.

Note: If the reclaim storage procedure did not assign any objects to the QRCLAUTL authorization list, you may receive a message that the authorization list is not found. Ignore the message and continue with the next step.

- ___ **Step 2** Do the following to restore your system to normal:

- ___ **Step a.** Delete unusable objects by using the appropriate DLTxxx command. Restore them by using the Restore Object (RSTOBJ) command.

- ___ **Step b.** Move objects from the QRCL library to the correct library by using the Move Object (MOV OBJ) command.

- ___ **Step c.** Move objects from the /QReclaim directory or the /QOpenSys/QReclaim directory to the correct directory by using the Move (MOV) command. Rename the objects if necessary by using the Rename Object (RNMOBJ) command or the Rename (RNM) command. (V3R1M0 only).

- ___ **Step d.** Transfer ownership of objects by using the Work with Objects by Owner (WRKOBJOWN) command.

- ___ **Step e.** Correct the authority for objects, if necessary, by using the Edit Object Authority (EDTOBJAUT) command.
- ___ **Step f.** Copy data from rebuilt files to new files by using the Copy File (CPYF) command.
- ___ **Step 3** If IBM-supplied objects are in the QRCL library, contact software support for assistance.

How to Reorganize Document Library Objects

You can use the Reorganize Document Library Object (RGZDLO) command to reduce the amount of space that is used for DLOs. When a user edits a document (adds, changes, or deletes information), the new version of the document contains some unused space. The RGZDLO procedure compresses each document that you specify to remove unused space from the document. If your system contains many documents that are edited frequently, the space gained by running the RGZDLO command can be significant.

To reorganize all of the documents that are on your system, type the following and press the Enter key:

```
RGZDLO DLO(*ALL) FLR(*ANY) MAIL(*YES)
```

Notes:

1. This is a long-running job that uses a significant amount of system resources. Consider submitting this as a batch job that runs during non-peak hours.
2. To reorganize all documents, you must stop all OfficeVision for OS/400 activity. You can do this by ending subsystems in which office runs or by placing your system in a restricted state.
3. Online information and the *CL Reference* book describe the options that are available for the RGZDLO command.

How to Grant Authority to Upgrade Assistant Commands

When you install the PTF for Upgrade Assistant for OS/400, all the commands have their public authority set to *EXCLUDE for the following reasons:

- Some of these commands start long-running jobs that can affect your system performance.
- Some of these commands display information that you may consider to be confidential, such as program names.
- The STRDSKPRP command powers down the system.

Your security administrator should give authority to users who need to use these commands by doing the following:

- ___ **Step 1** Review the description of the STRUPGPRP command in Table 2-2 on page 2-4.
- ___ **Step 2** Make a list of the users who need to use the command. You will need their user profile names.

Note: You may not need to use some commands at all. For example, if you do not plan to use the replacing-a-release method, you do not need the STRDSKPRP command.

___ **Step 3** To give the users authority to use the command, type the following. For (*USER1 USER2 USER3*), substitute the user profile names that you listed in step 2 on page 4-10.

```
GRTOBJAUT OBJ(command-name) OBJTYPE(*CMD)
USER(USER1 USER2 USER3) AUT(*USE)
```

___ **Step 4** Repeat steps 1 through 3 for each of the following commands:

___ DSPUPGPRP

___ DSPDSKPRP

___ STRDSKPRP

___ **Step 5** The STRUPGPRP command and the STRDSKPRP command also require *USE authority to the QSYSNOMAX job queue in the QSYS library (if you want to run these commands in batch).

How to Gather System Statistics

Before you can upgrade to AS/400 with PowerPC technology, you need to do the following:

- Gather statistics about what objects currently exist on your system.
- Identify what hardware may not work and what software is not supported.
- Determine what other potential problems exist on your system that could prevent the upgrade from completing successfully.
- Verify that you have sufficient disk capacity to contain your additional storage needs.

The Upgrade Assistant for OS/400 is used to gather these statistics about your system. It also assists you in planning for the upgrade to AS/400 with PowerPC technology. The Upgrade Assistant is available only through a temporarily applied program temporary fix (PTF). Please refer to Appendix D, “Program Temporary Fix Information” for information regarding the installation process and the requirements to use the PTF for the Upgrade Assistant.

Please Note

The Upgrade Assistant for OS/400 contains several functions that can affect system performance, change how your disk storage is used, and power down your system. *When you use an Upgrade Assistant for OS/400 function, make sure that you understand what that option does.*

When you install the Upgrade Assistant PTFs, you perform an IPL on side B. Your system must remain on side B to perform some Upgrade Assistant functions.

This book describes all of the options and when it is appropriate to use them.

To gather system statistics and submit the command to batch, do the following

- ___ **Step 1** Type GO UPGRADE. You are shown the Upgrade Assistant for OS/400 display.

```

UPGRADE                               Upgrade Assistant for OS/400

Select one of the following:

Upgrade Preparation
  10. Submit upgrade preparation job
  11. Display upgrade preparation

Disk Preparation
  20. Display disk preparation status
  21. Start disk preparation
  22. Work with disk preparation jobs

Save and Restore Preparation
  30. Save system and user information
  
```

- ___ **Step 2** Select option 10 (Submit upgrade preparation job). You are shown the Submit Job (SBMJOB) display:

```

                               Submit Job (SBMJOB)

Type choices, press Enter.

Command to run . . . . . > STRUPGPRP TGTRLS(V3R6M0)

-----
-----
-----
-----
-----
Job description . . . . . > QIZAJOBD      Name, *USRPRF
Library . . . . . > *LIBL                Name, *LIBL, *CURLIB

                               Additional Parameters

Schedule date . . . . . > *CURRENT      Date, *CURRENT, *MONTHSTR...
Schedule time . . . . . > *CURRENT      Time, *CURRENT

                               Bottom
F3=Exit  F4=Prompt  F5=Refresh  F12=Cancel  F13=How to use this display
F24=More keys
  
```

- ___ **Step 3** Type the date and time that you want your job to run. You should schedule the job for a date and time that is not during peak work hours because this job will affect your system performance.

Note: The QIZAJOB job description is provided with the Upgrade Assistant for OS/400 PTF.

- ___ **Step 4** Press the Enter key.

The system will submit the job to gather statistics. When this job completes, you can evaluate your system statistics.

Notes:

1. You can use the Work with Submitted Jobs (WRKSBMJOB) command to determine when the job is finished.
2. The system places the output in a file called QAIZADSK in the QUSRSYS library.

How to Gather Performance Information

Gathering performance data before installing this release gives you a base with which to compare your system's performance after the installation is complete. You can gather the information by using the Start Performance Monitor (STRPFRMON) command or the Work with Performance Collection (WRKPFRCOL) command.

If you use the STRPFRMON command or WRKPFRCOL command, you should collect two sets of data.

The first set should be an overview for a 24-hour period. Collect two 24-hour periods of data on days when the system load is normal to heavy.

```
Start Performance Monitor (STRPFRMON)

Type choices, press Enter.

Member . . . . . *GEN      Name, *GEN
Library . . . . . QPFRDATA  Name
Text 'description' . . . . . *SAME

Time interval (in minutes) . . . 15      5, 10, 15, 20, 25, 30, 35...
Stops data collection . . . . . *ELAPSED *ELAPSED, *TIME, *NOMAX
Days from current day . . . . . 0      0-9
Hour . . . . . 24      0-999
Minutes . . . . . 0      0-99
Data type . . . . . *ALL      *ALL, *SYS
Trace type . . . . . *NONE     *NONE, *ALL
Dump the trace . . . . . *YES     *YES, *NO
Job trace interval . . . . . .5     .5 - 9.9 seconds
Job types . . . . . *DFT      *NONE, *DFT, *ASJ, *BCH...
      + for more values

More...
F3=Exit  F4=Prompt  F5=Refresh  F10=Additional parameters  F12=Cancel
F13=How to use this display  F24=More keys
```

Set these fields as follows:

Time interval (in minutes) 15
Hour 24

The second set of performance data should be detailed for a 1-hour period. Collect the data over several periods while the system is used interactively and in batch at moderate to heavy use. Collect the data at the same time every day.

```

                                Start Performance Monitor (STRPFRMON)

Type choices, press Enter.

Member . . . . . *GEN          Name, *GEN
Library . . . . . QPFRDATA     Name
Text 'description' . . . . . *SAME

Time interval (in minutes) . . . 5          5, 10, 15, 20, 25, 30, 35...
Stops data collection . . . . . *ELAPSED   *ELAPSED, *TIME, *NOMAX
Days from current day . . . . . 0          0-9
Hour . . . . . 1              0-999
Minutes . . . . . 0           0-99
Data type . . . . . *ALL       *ALL, *SYS
Trace type . . . . . *ALL      *NONE, *ALL
Dump the trace . . . . . *YES   *YES, *NO
Job trace interval . . . . . .5   .5 - 9.9 seconds
Job types . . . . . *DFT       *NONE, *DFT, *ASJ, *BCH...
                                + for more values

                                More...
F3=Exit   F4=Prompt   F5=Refresh   F10=Additional parameters   F12=Cancel
F13=How to use this display   F24=More keys

```

Set these fields as follows:

```

Time interval (in minutes)  5
Hour                        1
Trace type                  *all

```

Note: If you use Performance Management Offerings and Services (PM400*), there is more than one method to analyze the data collected. For currently installed releases, (V2R3M0, V3R0M5, V3R1M0) the Programming Request for Price Quotation (PRPQ) 5799-MPG collects performance data and sends it to IBM to be analyzed. In V3R6M0, this PRPQ becomes licensed program 5716-PM1, IBM Performance Management/400 Version 3. If you install this licensed program, you will need to convert the data collected on your current system before you can analyze it using the 5716-PM1 licensed program.

Chapter 5. How to Assess Your Software Needs

This chapter helps you evaluate your software and applications in preparation for working with your marketing representative to place your order. As part of your preparation, you may need to contact both IBM and independent software suppliers. Questions that you will consider in this chapter include:

- What software releases are supported for the upgrade?
- Will you need to install an intermediate release before you can begin your upgrade?
- Are all of your current applications supported in Version 3 Release 6 Modification 0?
- How do you determine if an application will not function in Version 3 Release 6 Modification 0?
- What do you do if you require an application that will not be functional?

The release level of the operating system that you currently have installed can affect the length of time that your system is not available for use while you are performing the upgrade procedures. The nature of your existing applications can affect the quantity of preparation work that you must perform.

Operating System/400 Release Levels Supported for Upgrading

You can upgrade directly to Version 3 Release 6 Modification 0 from any of these supported releases:

- Version 2 Release 3 Modification 0
- Version 3 Release 0 Modification 5
- Version 3 Release 1 Modification 0

If your currently installed release is not one of these, you have two options:

- You can install one of the supported releases before you upgrade to AS/400 with PowerPC technology. You should install Version 3 Release 1 Modification 0 or the highest supported release level that you can install. (V3R1M0 is your best choice because you will reduce your V3R6M0 installation time by minimizing the number of security and database conversions that occur during the installation of V3R6M0.) Plan to do this at least a month before you start to prepare for upgrading to V3R6M0.
- You can contact your software service provider. Inquire about special services for upgrading from unsupported releases.

Additional Requirements for V2R3M0

V2R3M0 systems require a program temporary fix (PTF) be loaded and applied to OS/400 before starting the upgrade process. The necessary PTF changes the Work with Hardware Products (WRKHDWPRD) command in a way that allows your service representative to label cables and devices according to the system configuration. This labeling is a required step in the upgrade process. When you order the PTF for Upgrade Assistant for V2R3M0, you will also receive this PTF (PTF SF21363).

How Conversions Affect Installation

As part of the upgrade to Version 3 Release 6 Modification 0, objects are converted to a PowerPC AS format. These conversions occur regardless of your currently installed release.

If you upgrade from Version 2 Release 3 Modification 0 or Version 3 Release 0 Modification 5, the security and database conversions that are part of the intermediate releases will also occur. Intermediate releases are the supported releases between your currently installed release and Version 3 Release 6 Modification 0. The additional conversions in the intermediate releases add time and complexity to your upgrade. For example, if you have V2R3M0 currently installed, the additional conversions in the intermediate releases (V3R0M5 and V3R1M0) also occur when V3R6M0 installs.

Planning Tip

If you do not plan to upgrade to V3R6M0 for several months, you can reduce the total time needed for the upgrade to AS/400 with PowerPC technology if you upgrade to V3R1M0 first. With V3R1M0 as your currently installed release, you have the following advantages:

- The quantity and complexity of conversions that occur during the upgrade to V3R6M0 are minimized. Having fewer conversions means less time spent waiting for post-installation processes to complete.
- If you have PC Support/400, when you upgrade to Client Access for OS/400 (V3R1M0) you must update all PC Support workstations. You can reduce the time that PC Support workstations are unavailable to users for the V3R6M0 upgrade by upgrading to Client Access for OS/400 (V3R1M0) first.

How to Identify National Languages

Do the following to determine the feature number for the national language version (NLV) for your system's primary language and any installed secondary languages.

___ **Step 1** Type the following command on any command line:

```
GO LICPGM
```

Press the Enter key.

The Work with Licensed Programs display is shown.

___ **Step 2** Type **20** (Display secondary languages).

Press the Enter key.

___ **Step 3** The Display Installed Secondary Languages display is shown. This display shows the primary language you have installed on your system. It also shows a list of the secondary languages, if you have any installed.

Write these feature codes in the *Currently Installed* column in Table A-5 on page A-7.

___ **Step 4** Press the F3 (Exit) key.

How to Identify Your Currently Installed Software

For Your Information

A complete list of your currently installed software is the base from which to start your software planning. The master installation list that you begin here is completed and used throughout your planning, preparation, and upgrade procedures.

Table A-6 is preprinted with a specific subset of V3R6M0 products. The preprinted products include the following:

- Licensed Internal Code
- OS/400 and its optionally installable parts (both charged and no-charge features)
- Licensed programs that are shipped with all orders at no additional charge
- The Client Access licensed programs and optional parts you receive when you order IBM Client Access for OS/400 Version 3 (5716-XA1)

Step 1 If possible, get the list of installed software resources that was created during the system cleanup (task 4a on page 4-2) in the “Order Planning Tasks–Checklist.” The list should be included with other upgrade planning material. If the list was not saved, type the command `DSPSFWRSC OUTPUT(*PRINT)` to create a spooled file. Print the spooled file using your normal print procedures.

Step 2 Identify the release level of Licensed Internal Code and OS/400 that is currently installed. The first two entries in the printout of software resources are for Licensed Internal Code and Operating System/400.

- Write the values shown for the release on your printout into the *Currently Installed* column of Table A-5.
- Place a check mark in the *Currently Installed* column for the Licensed Internal Code and base Operating System/400 in Table A-6.
- As a reference, write the resource ID shown on your printout for these entries below the value that is preprinted in the *Option* column of Table A-6 on page A-7. (The preprinted value indicates the V3R6M0 product.)

Step 3 Determine which optionally installable parts of OS/400 you have installed. Compare the OS/400 options on your printout with the preprinted list in the work sheet. (Your printout shows more than one entry for most options. You do not need to be concerned by this.) For each OS/400 option on the printout, put a check mark in the *Currently Installed* column of the work sheet next to that option. Be sure to check for both “no-charge” and priced features of OS/400.

The OS/400 libraries QGPL and QUSRSYS do not appear in your printout even though they are installed. Check these libraries as installed.

Step 4 Determine if you have earlier releases of the V3R6M0 “no-charge” licensed programs installed. The work sheet has preprinted entries

for 5716-PM1 and 5716-TC1, which are shipped with all V3R6M0 software orders at no charge to you. Check your printout to see if you have resource entries for 5738-TC1, 5763-TC1, 5799-MPG, or 5763-PM1. If any of these products appear in your printout, write the resource ID in the *Option* column and fill in the value for the *Currently Installed Release* column of your work sheet.

- **Step 5** Determine which Client Access licensed programs and options you have installed. The work sheet is preprinted with the licensed programs and options you receive when you order the V3R6M0 release of Client Access for OS/400 (5716-XA1). (Some of these licensed programs appear on the work sheet with 5763-xx product IDs because these licensed programs are actually at a V3R1Mx level and are compatible with V3R6M0 OS/400.)
- If the currently installed release is V2R3M0 and you have 5738-PC1 installed, use the information in “Mapping PC Support to Client Access” on page B-12 to determine which Client Access licensed programs and options provide equivalent function. Locate OS/400 option 12 (OS/400 - Host Servers) on the work sheet and write “PC1” in the *Currently Installed Release* column. For each PC Support/400 option you have installed, locate the equivalent Client Access entry on the work sheet and write the option number in the *Currently Installed Release* column. For example, if you have option 1 of PC Support/400 installed, locate 5763-XL1 and write “PC1” in the *Currently Installed Release* column next to the base and option 1 of 5763-XL1.
 - If the currently installed release is V3R0M5 or V3R1M0, check your printout for entries having resource IDs ending with the characters XA1, XB1, XC1, XF1, XG1, or XL1. For each option you find on your printout, write the release value shown into the *Currently Installed Release* column in the work sheet. For example, if your printout showed a Client Access option with a release of V3R1M1, write V3R1M1 in the *Currently Installed Release* column next to that option on the work sheet.

- **Step 6** Determine the remaining software you have installed. In the blanks provided in the work sheet, create one entry for each unique option of the remaining resources shown on your printout. For each entry, include the following:
- Resource ID
 - Option
 - Description
 - Release (write the value in the *Currently Installed Release* column)

Your printout may have entries near the bottom for Licensed Internal Code in library ##MACH#B. You do not need to create entries in the work sheet for these.

It is important that you write the Resource ID as it is shown in your printout. V2R3M0 licensed program products from IBM have resource IDs beginning with 5738. V3R1M0 licensed program products have IDs beginning with 5763. V3R0M5 licensed program

products have a mix of 5738 and 5763 resource IDs. Other types of software products from IBM (such as PRPQs) and products from other software providers have resource IDs that begin with other characters.

Compressed Objects and Storage Space

All of the licensed programs and some objects of the operating system are shipped in a compressed form which requires less storage space on your system. They are automatically decompressed by system jobs (QDCPOBJx, where x is a number) during the installation process if your system has sufficient unused disk storage. If not enough storage space is available, the objects are decompressed when you use them, which could affect the performance of the system.

Objects are decompressed based on the following:

- Greater than 750 MB available storage

The jobs are submitted to decompress all system objects just installed.

- 250-750 MB available storage

Only frequently-used objects are automatically decompressed. Object usage information (the number of days an object has been used and the last-used date) is used to identify frequently used objects. Any object that had been used at least 5 times and the last use was within the last 14 days is decompressed. The remaining low-use objects are left in compressed form.

- This does not include decompression of objects shipped in the base operating system and in library QSYS. Usage information for those objects is reset during the installation process. For all other licensed programs, the object usage information is retained during the installation process.
- A call to a system program does not update its usage information; programs are not automatically decompressed in constrained storage mode. However, high-use programs are shipped in decompressed form and are not considered compressible.

- Less than 250 MB available storage

The jobs are not submitted and the objects are decompressed as they are used.

Note: The QDCPOBJx system jobs may run for some time after the installation process completes. More information about compressing and decompressing objects is available in the book *CL Programming*, SC41-4721.

Write the amount of disk that you want to allow for decompression of licensed program libraries in item 12 on the work sheet (Table A-1 on page A-1). If the system does not have enough storage to run the automatic decompression jobs, the system performance is affected.

How to Evaluate Existing Applications

Most applications from your current system will run unchanged on AS/400 with PowerPC technology and Version 3 Release 6 Modification 0 of the operating system. However, you may have some application programs that will not run, either because they do not have observability or because they use object types or functions that are not supported on V3R6M0. For example, a software application could have been created with a compiler that is no longer supported at Version 3 Release 6 Modification 0.

The following topic describes how to determine whether you have unsupported objects on your system and what courses of action are available. Record any problems you identify and your course of action in Table A-6 on page A-7 and Table A-7 on page A-14.

How to Identify and Handle Unsupported Objects

You can identify those objects that are not supported on the V3R6M0 system by using the Upgrade Assistant for OS/400. "How to Gather System Statistics" on page 4-11 describes how to gather information about the objects on your system. Make sure that you complete the job for gathering statistics before you begin this procedure.

For evaluation and preliminary planning only!

This topic is intended to help you identify potential application problems and to determine how those problems might be solved. You may need to make some preliminary application decisions or do some research with your application providers before you place your order. The *AS/400 Road Map for Changing to PowerPC Technology* book provides more information about the procedures for solving application problems.

To display the software objects on your system that are not supported on V3R6M0, do the following:

- ___ **Step 1** Type G0 UPGRADE. You see the Upgrade Assistant for OS/400 display.
- ___ **Step 2** Select option 11 (Display Upgrade Preparation). You see the Display Upgrade Preparation display.
- ___ **Step 3** Type the value *OBJ for the *Type of information* field.
- ___ **Step 4** Press the Enter key. You see the Display Unsupported Objects display:

```

                                Display Unsupported Objects

Target release . . . . . : V3R6M0
Date collected . . . . . : 05/12/95
Status . . . . . : Complete

Type options, press Enter.
5=Display details

  Opt  Object      Type      Library  Attribute  Reason
  --  -
  -   ACSPPGM    *PGM     CCL      CSPAE      Unsupported compiler
  -   QIZADDTL   *PGM     CRW      CRW        Non-observable program
  -   ACLPCR     *PGM     CRW      CLP        Non-observable program
  -   NAMGMP     *PGM     TALLY    PAS        Alternate compiler suppor
  -   SHAPGM     *PGM     TALLY    RMC        Unusable program

```

This display shows software objects on your system that are not supported on V3R6M0.

Note: For a complete list of software objects that are not supported on V3R6M0, see Appendix F, “IBM Software Objects Not Supported on AS/400 with PowerPC Technology.” For information about unsupported compilers, see “Programming Languages That Are Now PRPQs” on page F-3.

You can use option 5 (Display details) to see more information about an object:

```

                                Display Unsupported Object Details

Object . . . : NAMGMP           Attribute . . : RMC
Library . . . : TALLY          Owner . . . . : QSYS
Type . . . . : *PGM:

Text . . . . . :
Licensed program . . :
Reason . . . . . : Unusable program

Object creation information:
Source file . . . . . :
Library . . . . . :
Source member . . . . . :
Source member existence . . . . :

```

PRPQ Users Take Note!

Because of the number of different PRPQs that have been distributed for various releases of OS/400, Upgrade Assistant may not highlight all PRPQs that are no longer available. If you have PRPQs installed on your system, do the following:

1. Check Table F-4 on page F-3.
2. Contact your marketing representative to find out whether the PRPQ is available for V3R6M0.

You need to assess how great an impact it is to you to update or to replace these objects. The topics that follow describe types of unsupported objects and possible solutions.

How to Handle a Non-Observable Program: If the list of unsupported software objects contains a program that is non-observable, the program template has been deleted for this object (perhaps to conserve disk storage). If you need to use this program on your target system, you need to do one of the following:

- Regain observability for the program by recompiling it and specifying that observability information should be saved.

Notes:

1. If you have programs that were created from the source members that are provided in the QUSRTOOL library, these programs probably do not have observability. If you use the QUSRTOOL instructions to create a tool, the default is not to save observability. (This was done to conserve disk space.) You will need to recompile those programs.
 2. If you are using programs from the QUSRTOOL library, you should be aware that defect and usage support for those programs is no longer available from IBM beginning with V3R6M0. You may recompile the programs to provide observability, and you may continue to use them on an “as is” basis.
- Obtain a copy of the program for use at Version 3 Release 6 Modification 0.
 - If the program was supplied by a software provider, check with the provider to determine your best course of action:
 - The provider may have an updated version of the program that can be used at Version 3 Release 6 Modification 0.
 - If an updated version is not available (or the updated version does not suit your needs), then you need to discuss with your provider what alternatives might exist. For example, if the source code of the pre-V3R6M0 program is available, perhaps you could use that to create the program template again.

In each case, careful discussion with your software provider is necessary to determine your best option.

If the non-observable programs are part of an application that you do not need on your upgraded system, you should delete the programs before you upgrade. “Deleting Non-Observable Programs–Scenario” on page C-4 provides a sample query and program for automating this process.

How to Handle a Program That Uses an Unsupported Compiler: If you have a program written for a compiler that is not supported on V3R6M0, this means that run-time support is available but that the compiler is no longer supported. The program should still run on V3R6M0, but you will be unable to update it. If you will never have to update the program on your target system, you do not need to make changes to this program. If you feel you might have to update this program on the target system, you need to rewrite the program in a language that uses a supported compiler.

Notes:

1. Refer to “Unsupported Licensed Programs” on page F-2 to identify unsupported licensed programs.

Integrated Language Environment COBOL for OS/400 and Integrated Language Environment RPG for OS/400 are special cases. Options 3 and 4 of both of these licensed programs are removed from V3R6M0, but equivalent function is provided in the V3R6M0 products. Refer to the notes in Table B-1 on page B-3 for more information about these optional parts.

2. If you have critical applications that have only run-time support (no supported compiler) on V3R6M0, you should try to run object conversion and test those application programs before the upgrade procedure. Do one of the following:
 - Use the side-by-side method.
 - Use the Staged Upgrade Offering.
 - Arrange to convert and test the application on a PowerPC AS processor at another location.

How to Handle Alternative Compiler Support: When Upgrade Assistant identifies a compiler that has alternative support, this usually means that the compiler is available for V3R6M0 as a PRPQ. Usually, this means that the function of the compiler is stabilized and will not be enhanced in the future. If you have critical applications that use this type of compiler, you should consider developing a long-term plan to migrate them to another programming language and compiler.

“Programming Languages That Are Now PRPQs” on page F-3 provides a list of these compilers and the associated PRPQ numbers.

How to Handle an Unusable Program: If you have a program that is unusable, this program cannot be run on the V3R6M0 system. If you need to use this program on your target system, you need to rewrite the program in a language that uses a supported compiler.

How to Handle an Unsupported Object Type: If you have an object that is not supported on the V3R6M0 system, it cannot be used when you upgrade your system. After you have determined how you will replace the function that is provided by the object, delete it so that it will not use disk storage.

What to Do When the System Cannot Determine Observability: If you saved a program and specified STG(*FREE) on the SAVxxx command, the system will not be able to determine whether the observable information is available for the program. You need to either restore the object or compile it again.

How to Identify and Handle Unsupported Licensed Programs

You could also have licensed programs on your system that are not supported at the next release. “Unsupported Licensed Programs” on page F-2 shows the licensed programs that are not supported at Version 3 Release 6 Modification 0. If you have licensed programs installed on your current AS/400 system that are not supported, you will not be able to use them when you upgrade.

To identify the unsupported licensed programs that are on your system, do the following:

Note: Be sure that the job for gathering statistics (option 10) has completed processing before you begin.

- ___ **Step 1** Type G0 UPGRADE. You are shown the Upgrade Assistant for OS/400 display.
- ___ **Step 2** Select option 11 (Display Upgrade Preparation). You are shown the Display Upgrade Preparation display.
- ___ **Step 3** Type the value *PRB for the Type of information field.

___ **Step 4** Press the Enter key. The Display Potential Problems display is shown:

```

                                Display Potential Problems

Target release . . . . . : V3R6M0

Type options, press Enter.
  5=Display details

Opt Problem Description
  - System value QIPLTYPE not set to 2.
  - System value QAUTOCFG not set to 0.
  - Delete unwanted licensed programs.
  - Licensed program 5738SS1 option 3 is not supported.
  - Licensed program 5738FT1 option *ALL is not supported.
  - Licensed program 5738MC1 option *ALL is not supported.
  - Support for licensed program 5738PS1 option *ALL moved.
  - Support for licensed program 5738PL1 option *ALL moved.
  - Comm Adapter type 6152 is not supported.
  - V.24 Port type 6152 is not supported.
  - Resource type 6136 is not supported.

                                                                    More...

Press Enter to continue.

F3=Exit  F9=Command line  F12=Cancel
```

Figure 5-1. DSPUGPRP TYPE(*PRB) Command

If unsupported licensed programs remain on your system after V3R6M0 is installed, they could be difficult to fully delete and could leave objects on the system that cannot be used. Deleting the unsupported licensed programs from the system before upgrading ensures that all objects associated with the products are deleted and more disk storage is available.

The following topics describe alternatives for handling licensed programs:

How to Handle Unwanted Licensed Programs: The list of potential problems contains a reminder to you to delete unwanted licensed programs. You may have licensed programs installed on your system that you no longer use and do not need. If you have unwanted licensed programs, you should delete them to free additional storage space before you determine the disk storage requirements using Upgrade Assistant. You can use option 12 (Delete Licensed Programs) on the Work with Licensed Programs (LICPGM) menu or the Delete Licensed Program (DLTLICPGM) command to delete unwanted licensed programs.

You need to delete unwanted licensed programs before starting the upgrade procedures.

How to Handle an Unsupported Licensed Program: If you have a licensed program that is not supported, the licensed program or the optional parts of the licensed program cannot be used in V3R6M0. If this unsupported licensed program remains on your system after Version 3 Release 6 is installed, it will not function. You need to delete it before starting the upgrade procedures.

If you need support for this licensed program, contact your software provider to discuss your available alternatives.

If you have any of the following products installed, you need to get more information before deleting them:

- 5733-SA1, Network Extensions for OS/400
- 5733-SA2, Integration Services for FSIOP
- 5733-SA3, OS/400 Integration for Novell Netware**

These products provide support for IPX** communications and Novell Netware. This function is not available in V3R6M0. If you have any of these products installed, get Information APAR II08907 for more details on upgrading to V3R6M0. Your checklist will direct you when to delete these products.

How to Handle a Licensed Program Whose Support Has Moved: Options of Integrated Language Environment COBOL for OS/400 and Integrated Language Environment RPG for OS/400 have been removed in V3R6M0, but equivalent function remains in the V3R6M0 product.

Options 3 and 4 of the 5738-CB1, 5763-CB1, 5738-RG1, and 5763-RG1 licensed programs are removed. Options 1 and 5 of the V3R6M0 licensed programs provide equivalent function, and support *CUR and *PRV (V2R3M0 and V3R1M0) values for a target release. You need to delete options 3 and 4 of these licensed programs before you start the upgrade procedures.

The following compilers are being replaced by PRPQs in V3R6M0:

Compiler	PRPQ
5763-BA1	5799-FPK
5763-PL1	5799-FPJ
5763-PS1	5799-FRJ

If you still need these compilers, you need to order the PRPQs. You also need to remove these compilers immediately before the upgrade procedure. (The upgrade checklist instructs you to do this at the appropriate time).

Note: You may be still using these options and compilers. Wait to delete them until you are preparing the system for the upgrade.

How to Identify Other Unsupported Applications

If you have software on your system that was supplied by a provider other than IBM, you need to contact that provider to ensure the software will continue to function when your system is upgraded to Version 3 Release 6 Modification 0. If you plan to keep any applications that are currently not supported in Version 3 Release 6 Modification 0, you need to obtain replacement software that is supported.

Before you continue...

On the work sheets (Table A-6 on page A-7 and Table A-7 on page A-14), record any problems you have identified and your course of action.

How to Determine Additional Software Storage

The Upgrade Assistant for OS/400 calculates how much more disk storage your existing applications will need on AS/400 with PowerPC technology. However, you may be adding applications or installing the softcopy library for the first time. You need to determine how these changes affect your disk requirements. Do the following:

- **Step 1** If you plan to add new applications or licensed programs, gather information about their disk requirements. You can use “Licensed Program Sizes” on page B-1 for new licensed programs. Contact your software providers for other applications.

Write the information in item 7 and item 8 on the work sheet (Table A-1 on page A-1).

- **Step 2** If you plan to merge AS/400 and AS/400 Advanced 36, use the *AS/400 Advanced 36 Planning and Reference Handbook* to calculate the storage requirements for AS/400 Advanced 36 SSP and applications.

Write the storage for AS/400 Advanced 36 in item 9 on the work sheet (Table A-1 on page A-1).

- **Step 3** If you plan to install the softcopy library and you do not have it installed on your source system, determine the disk requirements for the bookshelves that you plan to install. The *AS/400 Softcopy Library* book can help you determine this. The storage requirement depends on how you structure your bookshelves. The typical disk storage requirement for installation of the softcopy library is 44MB.

Write the information in item 10 on the work sheet.

- **Step 4** If you have applications that are stored in a compressed format, the system will decompress these applications when you convert them on your target system. You need to allow enough working space for the decompressed objects.

Usually, applications are compressed for archive purposes or for distribution to other sites. Applications that you use regularly are not compressed.

If you are not sure whether you have compressed applications, you can use the DSPOBJD command to build an output file that you can query. The value of the ODCPRS (Compression status) field is Y if an object is compressed.

To estimate the space that you need when these programs are decompressed on your target system, you need to decompress them (DCPOBJ command) on your source system. Then run Upgrade Assistant again (option 10 and option 11) to estimate your disk storage.

If necessary, update item 6 on the work sheet.

How to Calculate the Storage for Obsolete Software

Your source system may have applications that you do not plan to use on your AS/400 with PowerPC technology. Perhaps the applications do not have observability and you plan to obtain a new version from another source. Perhaps you have a PRPQ that has been replaced by a licensed program or a licensed program that has been replaced by a PRPQ.

The software that you plan to replace is taking space on your system. If that space is significant, you should subtract it when you calculating your disk storage requirements for your upgraded system.

To determine the amount of space to subtract, do the following:

- ___ **Step 1** If you have not already done so, make a copy of the work sheet (Table A-8 on page A-15).
- ___ **Step 2** For each application that you plan to remove, determine its current size on your system by using one of the following methods:
 - If the application uses its own library or libraries, you can use the Display Library (DSPLIB) command to find the size of the library. For example, to find the size of the APP1LIB library, do the following:
 - ___ **Step a.** Type the following:

```
DSPLIB LIB(APP1LIB) OUTPUT(*PRINT)
```
 - ___ **Step b.** Use the WRKSPLF command to locate the spooled file.
 - ___ **Step c.** From the Work with Spooled File display, use option 5 (Display) to display the spooled file.
 - ___ **Step d.** Page to the bottom of the display to see the total size for the objects in the library.
 - If the application is a licensed program, you can consult the *Software Installation* book for the release that you are running to determine its size.
- ___ **Step 3** Write the application name, the libraries, and their sizes on the work sheet.
- ___ **Step 4** You can use a query tool against the QAIZADSK database file to determine the estimated size that Upgrade Assistant calculated for the application. Following is an example using Query for OS/400.
- ___ **Step 5** Type WRKQRY and press the Enter key.
- ___ **Step 6** On the Work with Queries display, assign a name to your query and press the Enter key.
- ___ **Step 7** On the Define the Query display, select the options that appear in the following display and press the Enter key:

```

                                Define the Query
Query . . . . . : QAIZADSK          Option . . . . . : CREATE
Library . . . . : JCHEIDEL        CCSID . . . . . : 65535

Type options, press Enter.  Press F21 to select all.
1=Select

Opt  Query Definition Option
 1   Specify file selections
     Define result fields
 1   Select and sequence fields
 1   Select records
     Select sort fields
     Select collating sequence
     Specify report column formatting
 1   Select report summary functions
     Define report breaks
     Select output type and output form
     Specify processing options

```

___ **Step 8** On the Specify File Selections display, type the following:

- QAIZADSK for the *File* prompt.
- QUSRSYS for the *Library* prompt.

___ **Step 9** Press the Enter key to confirm your selection.

___ **Step 10** Complete the Select and Sequence Fields display as shown:

Note: If your display does not show the text descriptions for fields, press F11.

```

                                Select and Sequence Fields

Type sequence number (0-9999) for the names of up to 500 fields to
appear in the report, press Enter.

Seq  Field          Text
 50  DIOBLI          Object Library
 10  DIOBNM          Object
 20  DIOBTP          Object Type
     DIOBAT          Object Attribute
 30  DIOBSZ          Object Size
 40  DINOSZ          New Object Size
     DIOBTX          Text Description

```

___ **Step 11** Press the Enter key.

___ **Step 12** Press the Enter key again to confirm your choices.

___ **Step 13** On the Select Records display, select the records for the library that you are analyzing. The example shows library APP1LIB:

```

                                Select Records

Type comparisons, press Enter.  Specify OR to start each new group.
Tests:  EQ, NE, LE, GE, LT, GT, RANGE, LIST, LIKE, IS, ISNOT...

AND/OR  Field          Test  Value (Field, Number, 'Characters', or ...)
        DIOBLI          EQ    'APP1LIB'

```

Note: If you are removing objects from more than one library, you can modify this query to select more than one library.

___ **Step 14** On the Select Report Summary Functions display, specify totals for the object size and the new object size:

```

                                Select Report Summary Functions
Type options, press Enter.
  1=Total  2=Average  3=Minimum  4=Maximum  5=Count
---Options---  Field          Text
                DIOBLI       Object Library
                DIOBNM       Object
                DIOBTP       Object Type
1              DIOBSZ       Object Size
1              DINOSZ       New Object Size

```

- ___ **Step 15** Press the Enter key to return to the Define the Query display.
- ___ **Step 16** Press F5 (Run) to run the query.
- ___ **Step 17** Write the total from the *New Object Size* column on your work sheet (Table A-8 on page A-15).
- ___ **Step 18** Press F3 to exit the query, or repeat steps 6 through 17 for another library.
- ___ **Step 19** Total the *Estimated Size* column on your work sheet.
- ___ **Step 20** Write the amount in item 11 on the disk capacity work sheet (Table A-1 on page A-1).

Chapter 6. How to Assess Your Hardware Needs

This chapter helps you to determine what your final configuration should be for your AS/400 with PowerPC technology. Following are other sources to help you determine your configuration:

- The IBM Fulfillment Center (U.S. only).
- The Upgrade Assistant for OS/400 (for disk capacity and unsupported hardware)
- Best/1 capacity planner (for modeling your performance requirements)
- Assistance from your marketing representative or business partner
- IBM service offerings

In later chapters, you will determine what you need to order to get from your existing configuration to your final configuration. What you need to order depends on the method that you choose for changing to AS/400 with PowerPC technology. For example, if you plan to use the side-by-side method, you need to order a complete configuration. If you plan to use the Staged Upgrade Offering with either the unload/reload method or the replacing-a-release method, you may need to order additional equipment to meet your testing plans.

Components of Your Hardware Requirements: To determine your hardware requirements, you need to consider these areas:

- Disk storage (total capacity and number of arms)
- Disk protection
- Processor model
- Main storage
- Save and restore devices
- Peripheral devices
- Hardware on your current system that is not supported on AS/400 with PowerPC technology

When you plan a configuration, you need to look at all aspects and how they relate to each other. For example, you plan disk capacity to meet your storage needs. You also need to consider how many disk arms your system needs to meet your performance requirements.

Keep Hardware Requirements in Perspective: As you work through the instructions in this chapter to determine your configuration, do not be overwhelmed by the numbers, such as how much main storage (memory) you need on your new system compared to how much main storage your existing system has. Think about the PC that sits on your desk. How much memory and disk storage does your PC have compared to the first computer that you ever used? Now think about how the prices compare.

AS/400 with PowerPC technology has a different architecture and, thus, different requirements for main storage and disk storage to run the same workload as your IMPI processor. However, the cost per megabyte of main storage and disk storage is also significantly lower. What is important is the cost to run your applications, not the amount of disk storage and main storage that you need. As you make your

decision, consider the total cost for the performance that you expect to achieve and how your system will be positioned for the future.

— **Have you ordered PTFs?** —

The Upgrade Assistant for OS/400 provides the best and easiest source of information for some of the tasks in this chapter.

The Best/1 capacity planner provides the best way to determine what configuration will meet your performance requirements. PTFs are available that include modeling information for the PowerPC AS processors. (Performance Tools with Best/1 capacity planner is an optional licensed program.)

If you have not yet ordered the PTFs for these tools, use your normal method for ordering PTFs to order them.

Assumptions Used for Planning: The hardware planning information provided in this chapter assumes that you are planning to move your entire workload from your existing IMPI processor to a PowerPC AS processor. If you are planning to add additional applications or users, you must increase the size requirements. If you are planning to move only a subset of your applications and workload, you must estimate the portion of capacity that the reduced workload will require.

How to Describe Your Current Disk Configuration

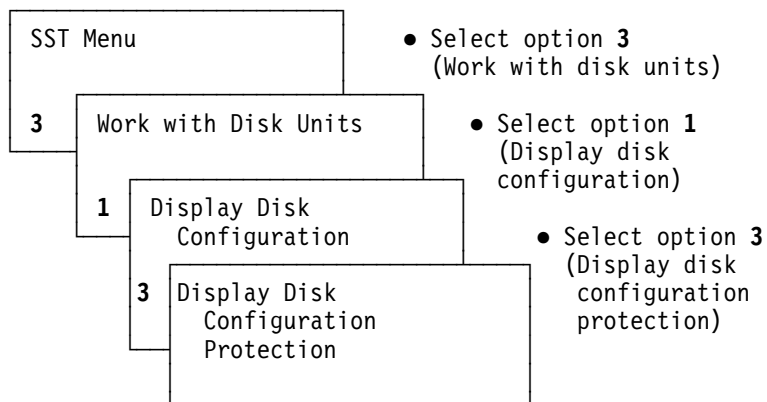
Before you can determine what your disk configuration should be on your upgraded system, you need to make a record of what your disk configuration looks like now. Do the following:

- **Step 1** Type WRKHDWRSC *STG and press the Enter key. You see the Work with Storage Resources display.
- **Step 2** Press F6 (Print). The system prints combined information from both versions of this display.
- **Step 3** Retrieve the printout from the printer. Your printout should look similar to Figure 6-1 on page 6-3:

Work with Hardware Resources							
5763SS1 V3R1M0 940909							
Storage Resources List							
Resource	Type	Status	Serial Number	Frame ID	EIA Location	Card Position	Text
CMB01	2615	Operational	10-3240068	A	13	1	Combined function IOP
DC12	2800	Operational	1 00-0362665	A	13	23	Disk Storage Controller
DC13	2800	Operational	00-0356403	A	13	23	Disk Storage Controller
DC40	2802	Operational	00-64558	A	13	25	Disk Storage Controller
DC41	2802	Operational	00-69268	A	13	25	Disk Storage Controller
DC42	6366	Operational	00-0000000	A	26		Tape Controller
SI01	2621	Operational	42-1748023	A	13	2	Storage Controller
DC06	9348	Operational	00-0000000	A	22		Tape Controller
SI02	6112	Operational	10-1568014	A	13	5	Storage Controller
DC07	9331	Operational	53-0000000	A	31		Diskette Controller
SI09	2621	Operational	10-4454066	A	13	6	Storage Controller
DC43	6369	Operational	00-09695				Tape Controller
DC44	6369	Operational	00-09702				Tape Controller
SI07	6501	Operational	10-3212010	B	11	3	Storage Controller
DC39	9337	Operational	2 00-00086	B	32		Disk Storage Control
SI08	6501	Operational	10-0000000	B	11	8	Storage Controller
DC38	9337	Operational	00-01096	B	22		Disk Storage Controller
SI06	6501	Not detected	10-0000000	B	11	10	Storage Controller

Figure 6-1. Printed Version of Work with Hardware Resources

- ___ **Step 4** Check your printout for 9337 disk storage controllers, such as **2**. For each 9337 disk controller, you need a detailed printout of the disk units. Do the following:
 - ___ **Step a** On the Work with Storage Resources display, type 9 (Work with resource) in the option column in front of the disk storage controller. You see the Work with Storage Controller Resources display.
 - ___ **Step b** If the display shows more than one disk unit attached to the disk storage controller, press F6 (Print) to print the information on the display.
 - ___ **Step c** Press F12 (Cancel) to return to the Work with Storage Resources display.
 - ___ **Step d** Repeat steps 4a through 4c for other Disk Storage Controllers.
 - ___ **Step e** Retrieve the printouts from the printer.
- ___ **Step 5** Press F3 to return to a display that has a command line.
- ___ **Step 6** Type STRSST and press the Enter key.
- ___ **Step 7** From the System Service Tools menu, do the following:



You see the Display Disk Configuration Protection display:

Display Disk Configuration Protection						
ASP	Unit	Serial Number	Type	Model	Address	Protection
1						Unprotected
	3	2				4
	1	00-0362665	2800	001	0010-0100FFFF	Unprotected
	2	00-0356403	2800	001	0010-0200FFFF	Unprotected
	3	00-0069268	2802	001	0010-0400FFFF	Unprotected
	4	00-0064558	2802	001	0010-0300FFFF	Unprotected
	5	00-1000086	9337	222	0230-0100FFFF	Device Parity
	6	00-2000086	9337	223	0230-0101FFFF	Device Parity
	7	00-3000086	9337	222	0230-0102FFFF	Device Parity
	8	00-1001096	9337	221	0320-0100FFFF	Unprotected
	9	00-3001096	9337	221	0320-0102FFFF	Unprotected
	10	00-5001096	9337	221	0320-0104FFFF	Unprotected
	11	00-4000086	9337	223	0230-0103FFFF	Device Parity
	12	00-5000086	9337	222	0230-0104FFFF	Device Parity
	13	00-6000086	9337	223	0230-0105FFFF	Device Parity

- Step 8** Do the following for each disk unit on your system:
- Step a.** Locate the corresponding serial number on the display **2** and on your printout **1** (Figure 6-1).
 - Step b.** On the printout, write the unit number **3** that the system has assigned for that serial number. If you have mirrored protection, mirrored pairs are assigned the same unit number.
 - Step c.** Mark unit 1 (or both units that are unit 1) with an asterisk (*). This is your load source unit.
 - Step d.** If the disk unit is not in the system ASP (ASP 1), write the ASP number on the printout.
 - Step e.** On the printout, write the disk protection **4** that is active for that disk unit.
 - Step f.** Check to see if the disk unit type and model appears in Table 6-1 on page 6-5:

Table 6-1. Disk Units That Support Two Formats

Type	Model
66xx	030
66xx	040
2802	001

- ___ **Step g.** If the combination of type and model appears in the table and the disk unit will be attached to a 65xx (6502, 6512, 6530) controller, write RF next to the disk unit (because these disk units may need to be re-formatted later).
- ___ **Step 9** Press F12 (Cancel) to return to the Display Disk Configuration menu.
- ___ **Step 10** Select option 2 (Display disk configuration capacity). You see the Display Disk Configuration Capacity display:

Display Disk Configuration Capacity									
ASP	Unit	Type	Model	Threshold	Overflow	--Protected--		--Unprotected--	
						Size	%Used	Size	%Used
1				97%	No	5825	93.80%	6587	94.02%
	5	1	2800	001		0	0.00%	6	320 99.61%
		2	2800	001		0	0.00%		320 97.19%
		3	2802	001		0	0.00%		1031 93.55%
		4	2802	001		0	0.00%		1031 93.45%
		5	9337	222		7	728 94.54%		0 0.00%
		6	9337	223		970	93.50%		0 0.00%
		7	9337	222		728	94.09%		0 0.00%
		8	9337	221		0	0.00%	970	93.66%
		9	9337	221		0	0.00%	970	93.49%
		10	9337	221		0	0.00%	970	93.67%
		11	9337	223		970	93.48%		0 0.00%
		12	9337	222		728	93.95%		0 0.00%
		13	9337	223		970	93.46%		0 0.00%

More

Press Enter to continue.

- ___ **Step 11** Do the following for each disk unit on your system:
 - ___ **Step a.** Match the unit number on the display **5** with the unit number that you wrote on your printout in step 8b on page 6-4.
 - ___ **Step b.** On the printout, write the capacity for that disk unit (**6** or **7**).
 - ___ **Step c.** Write the capacity of the largest disk unit on your system here: _____ You will use this information later when you are estimating how long the upgrade procedure will take.
- ___ **Step 12** Your printout should now look like Figure 6-2 on page 6-6. It contains the information that you will need about your current disk configuration to help you plan your upgraded configuration. It also contains information that your hardware service representative will need during the upgrade. Keep this printout with the other forms that are using to plan your order.

Work with Hardware Resources									
5763SS1 V3R1M0 940909									
Storage Resources List									
Resource	Type	Status	Unit #/ Capacity	Serial Number	Frame ID	EIA Location	Card Position	Text	
CMB01	2615	Operational		10-3240068	A	13	1	Combined function IOP	
DC12	2800	Operational	1/320	00-0362665	A	13	23	Disk Storage Controller	
DC13	2800	Operational	2/320	00-0356403	A	13	23	Disk Storage Controller	
RF DC40	2802	Operational	3/1031	00-64558	A	13	25	Disk Storage Controller	
DC41	2802	Operational	4/1031	00-69268	A	13	25	Disk Storage Controller	
DC42	6366	Operational		00-0000000	A	26		Tape Controller	
SI01	2621	Operational		42-1748023	A	13	2	Storage Controller	
DC06	9348	Operational		00-0000000	A	22		Tape Controller	
SI02	6112	Operational		10-1568014	A	13	5	Storage Controller	
DC07	9331	Operational		53-0000000	A	31		Diskette Controller	
SI09	2621	Operational		10-4454066	A	13	6	Storage Controller	
DC43	6369	Operational		00-09695				Tape Controller	
DC44	6369	Operational		00-09702				Tape Controller	
SI07	6501	Operational		10-3212010	B	11	3	Storage Controller	
DC39	9337	Operational	detail	00-00086	B	32		Disk Storage Controller	
SI08	6501	Operational		10-0000000	B	11	8	Storage Controller	
DC38	9337	Operational		00-01096	B	22		Disk Storage Controller	
SI06	6501	Not detected		10-0000000	B	11	10	Storage Controller	

Figure 6-2. Annotated Version of Work with Hardware Resources

In Figure 6-3, the disk protection is written over the status information. You might use color-coded highlighting for your printout.

Work with Hardware Resources									
5763SS1 V3R1M0 940909									
Storage Controller Resources List									
Resource	Type-Model	Status	Unit #/ Capacity	Serial Number	Address	Frame ID	EIA Location	Card Position	Device Position
DC39	9337-222	Operational		00-00086	0230-01FFFFFF	B	32		
DD035	9337-222	DPY	5/728	00-1000086	0230-0100FFFF	B	32		
DD036	9337-223	DPY	6/920	00-2000086	0230-0101FFFF	B	32		2
DD037	9337-222	DPY	7/728	00-3000086	0230-0102FFFF	B	32		
DD038	9337-223	DPY	11/970	00-4000086	0230-0103FFFF	B	32		4
DD039	9337-222	DPY	12/728	00-5000086	0230-0104FFFF	B	32		
DD040	9337-223	DPY	13/970	00-6000086	0230-0105FFFF	B	32		6
DD041	9337-222	Operational		00-7000086	0230-0106FFFF	B	32		

Figure 6-3. Detailed Version of Work with Hardware Resources

- ___ **Step 13** Press F12 (Cancel) to return to the Display Disk Configuration menu.
- ___ **Step 14** Select option 1 (Display disk configuration status).
- ___ **Step 15** On the Display Disk Configuration Status display, check for any problems with your disk units, such as a status of *Suspended* or *Failed*. You should correct these problems before upgrading.
- ___ **Step 16** Press F3 (Exit) until you see the Exit System Service Tools display.
- ___ **Step 17** Press the Enter key to exit System Service Tools.

How to Determine Your Disk Unit Requirements

AS/400 with PowerPC technology requires more disk capacity to store the information that is on your current AS/400 system. To increase the efficiency of moving information to and from main storage, the page size is larger. The larger page size reduces the total number of disk operations, but it increases the disk storage requirement somewhat. In addition, the PowerPC AS version of a program requires more disk space than the CISC version of the same program because of the difference between the instruction sets. Therefore, the application libraries that contain programs may require significantly more auxiliary storage.

If you have not already done so, make a copy of the work sheet for planning disk capacity (Table A-1 on page A-1). Complete the work sheet as you read the next topics.

Displaying Your Disk Storage Requirements

To display your estimated storage requirements, do the following:

- ___ **Step 1** Type GO UPGRADE. You see the Upgrade Assistant for OS/400 display.
- ___ **Step 2** Select option 10 (Submit upgrade preparation job) only if you have done either of the following since the last time that you ran option 10:
 - Made changes to your configuration, such as adding or removing disk units.
 - Performed significant cleanup activities on your system.
- ___ **Step 3** Make sure that the upgrade preparation job (option 10) has completed by using the Work with Submitted Jobs (WRKSBMJOB) command.
- ___ **Step 4** Select option 11 (Display upgrade preparation). You are shown the Display Upgrade Preparation display.
- ___ **Step 5** Type the value *STG for the *Type of information* field.
- ___ **Step 6** Press the Enter key. The Estimated Storage Requirements display is shown:

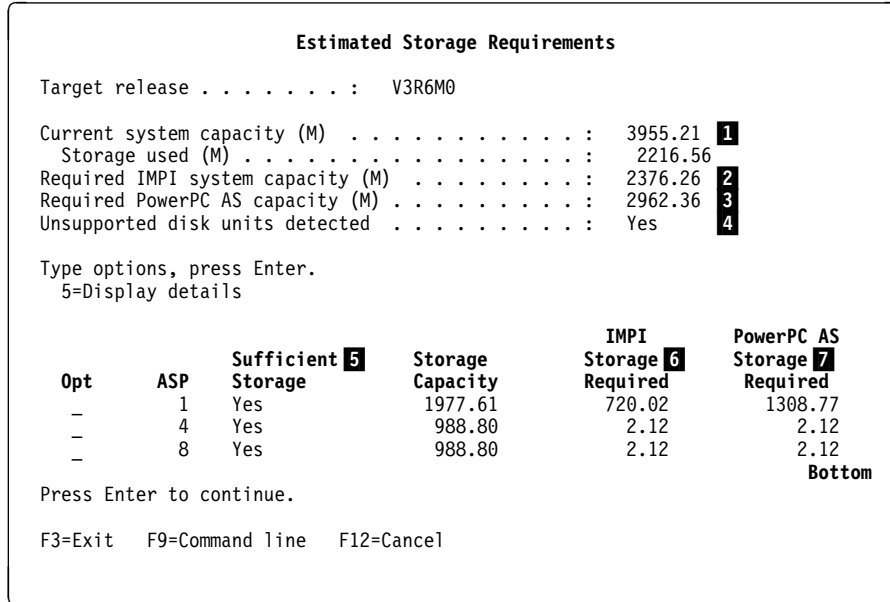


Figure 6-4. Estimated Storage Requirements Display

— **Step 7** The display shows your current system disk storage capacity **1**. Write this amount in Item 1 on the work sheet.

— **Step 8** The display also shows the amount of disk storage required on your system after the upgrade has been performed **3**. It is the sum of the following:

- OS/400 growth
- Licensed program growth
- Growth due to conversions of user objects
- Growth due to changing to the larger page size for disk storage.

Write this amount in Item 6 on the work sheet.

How to Determine the Storage Requirements for Disk Preparation

If you plan to use the replacing-a-release upgrade method, determine if you have enough storage to prepare the disk storage on your system. If you are not sure which method you plan to use, determine whether you have enough storage for disk preparation. This will help you to choose your upgrade method. Do the following:

— **Step 1** Verify that the value of the *Required IMPI system capacity (M)* field **2** is less than the value of the *Current system capacity (M)* field **1**. The *Required IMPI system capacity (M)* field shows the amount of storage that your system needs to perform disk preparation before your system is actually upgraded.

— **Step 2** If you do not have enough capacity to prepare your system, either you need to add additional disk units to your system before the upgrade or you cannot use the replacing-a-release method to upgrade.

- ___ **Step 3** Write your decision in Part 2 of the method questionnaire (Table A-9 on page A-17).

Note: You determine your upgrade method in Chapter 7.

How to Calculate the Space Required for Cross-Reference Information

Beginning with V3R1M0, the system provides more cross-reference information about the definitions of your database fields. If you are upgrading from an earlier version than V3R1M0 and you have many database files with many fields, this new information might have a noticeable effect on your disk space requirements.

If your source system is running a version earlier than V3R1M0, calculate the space required for the increase in database cross-reference information by doing the following:

Note: Some of the steps in this procedure create large work files. Make sure that you are signed on with a user profile that has the storage limit set to *NOMAX and that your system is not critically short on disk storage.

- ___ **Step 1** Type DSPFD QADBDEP and press the Enter key. You are shown the Display Spooled File display,
- ___ **Step 2** In the *Control* field at the top of the display, type *B0T and press the Enter key.
- ___ **Step 3** Locate the field that is called *Total records* on the display.
- ___ **Step 4** Write the total number of records here: _____
- ___ **Step 5** Press F12 (Cancel).
- ___ **Step 6** Type DSPFD QADBREF and press the Enter key. You are shown the Display Spooled File display,
- ___ **Step 7** In the *Control* field at the top of the display, type *B0T and press the Enter key.
- ___ **Step 8** Locate the field that is called *Total records* on the display.
- ___ **Step 9** Write the total number of records here: _____
- ___ **Step 10** Press F12 (Cancel).
- ___ **Step 11** Type DSP0BJD QADBXFIL *FILE and press the Enter key.
- ___ **Step 12** On the Display Object Description display, locate the value in the *Size* column for the file. This is the size in bytes of the QADBXFIL file.
- ___ **Step 13** Write the size in bytes here: _____
- ___ **Step 14** Calculate the size increase for the cross-reference information:

512000
+ (amount from step 4 + 40)
+ (amount from step 9 × 70)
+ (amount from step 13 × 2.7)

- ___ **Step 15** Write the calculated amount here: _____
- ___ **Step 16** Press F12 (Cancel).
- ___ **Step 17** Create an output file for the DSPFD command by typing the following:

```
CRTDUPOBJ OBJ(QADSPFFD) FROMLIB(QSYS) OBJTYPE(*FILE)
          TOLIB(QGPL) NEWOBJ(DSPFFD0)
```
- ___ **Step 18** Set the size limit for the output file to *NOMAX by typing the following:

```
CHGPF FILE(QGPL/DSPFFD0) SIZE(*NOMAX)
```
- ___ **Step 19** Submit a job to count the number of database file fields on your system. This is a long-running job. Type the following:

```
SBMJOB CMD(DSPFFD FILE(*ALL/*ALL)
          OUTPUT(*OUTFILE) SYSTEM(*LCL)
          OUTFILE(QGPL/DSPFFD0))
```
- ___ **Step 20** When the job has finished, use a query tool to count the number of records in the output file that have the WHFTYP field equal to P or L. This is the number of database file fields that are defined on your system.

Note: You can use the Work with Submitted Jobs (WRKSBMJOB) command to determine when the job has finished.

Steps 21 through 33 provide an example of the displays to create a query by using Query for OS/400:
- ___ **Step 21** Type WRKQRY and press the Enter key.
- ___ **Step 22** On the Work with Queries display, select option 1 (Create) and assign a name for your query:

```

                                     Work with Queries
Type choices, press Enter.
Option . . . . . 1                    1=Create, 2=Change, 3=Copy, 4=Delete
                                         5=Display, 6=Print definition
                                         8=Run in batch, 9=Run
Query . . . . . grow1                 Name, F4 for list
Library . . . . . qgp1                Name, *LIBL, F4 for list
```

- ___ **Step 23** On the Define Query display, select the following options:

```

                                Define the Query
Query . . . . . : GROW1          Option
Library . . . . : QGPL          CCSID .

Type options, press Enter. Press F21 to select
1=Select

Opt  Query Definition Option
 1   Specify file selections
     Define result fields
     Select and sequence fields
 1   Select records
     Select sort fields
     Select collating sequence
     Specify report column formatting
     Select report summary functions
     Define report breaks
 1   Select output type and output form
     Specify processing options

```

___ **Step 24** On the Specify File Selections display, type the name of the output file that you created in step 17 on page 6-10:

```

                                Specify File Selections

Type choices, press Enter. Press F9 to specify an additional
file selection.

File . . . . . DSPFFDO          Name, F4 for list
Library . . . . QGPL          Name, *LIBL, F4 for list
Member . . . . *FIRST        Name, *FIRST, F4 for list
Format . . . . *FIRST        Name, *FIRST, F4 for list

```

___ **Step 25** Press the Enter key to confirm your selection.

___ **Step 26** Complete the Select Records display as shown:

```

                                Select Records

Type comparisons, press Enter. Specify OR to start each new group.
Tests: EQ, NE, LE, GE, LT, GT, RANGE, LIST, LIKE, IS, ISNOT...

AND/OR  Field          Test  Value (Field, Number, 'Characters', or ...)
OR      WHFTYP         EQ    'P'
        WHFTYP         EQ    'L'

```

___ **Step 27** Press the Enter key.

___ **Step 28** On the Select Output Type and Output Form display, specify the following:

- 2 (Printer) for the *Output type* field.
- 2 (Summary only) for the *Form of output* field.

```

                                Select Output Type and Output Form
Type choices, press Enter.

Output type . . . . . 2      1=Display
                                2=Printer
                                3=Database file

Form of output . . . . . 2      1=Detail
                                2=Summary only

Line wrapping . . . . . N      Y=Yes, N=No
Wrapping width . . . . .      Blank, 1-378
Record on one page . . . . . N      Y=Yes, N=No

```

- ___ **Step 29** Press the Enter key.
- ___ **Step 30** You are shown several displays to define how your printed output should look. You can accept the default values on each display by pressing the Enter key.
You return to the Define the Query display.
- ___ **Step 31** Press F3 (Exit). You are shown the Exit this Query display.
- ___ **Step 32** If you have many database files on your system, this may be a long-running query. Consider submitting the job to run in batch and directing the output to a printer. You can use the *Run option* field on the Exit this Query display.
- ___ **Step 33** Your query output shows the number of database fields on your system:

```

                                Display Report
Query . . . : QGPL/GROW1
Position to line . . . . .
Line . . .+ . . .+ . . .+
000001 FINAL TOTALS
000002 COUNT 4,860

```

- ___ **Step 34** Write the number of fields (the count from your query) here: _____
- ___ **Step 35** Delete the output file by typing the following:
DLTF FILE(QGPL/DSPFFD0)
- ___ **Step 36** Create an output file for the DSPFD command by typing the following:
CRTDUPOBJ OBJ(QAFDACC) FROMLIB(QSYS) OBJTYPE(*FILE)
TOLIB(QGPL) NEWOBJ(ACCPH0)
- ___ **Step 37** Set the size limit for the output file to *NOMAX by typing the following:
CHGPF FILE(QGPL/ACCPH0) SIZE(*NOMAX)
- ___ **Step 38** Submit a job to count the number of keyed database file fields on your system. This is a long-running job. Type the following:
SBMJOB CMD(DSPFD FILE(*ALL/*ALL) TYPE(*ACCPH)
FILEATR(*LF *PF) OUTPUT(*OUTFILE) SYSTEM(*LCL)
OUTFILE(QGPL/ACCPH0))

- ___ **Step 39** Use a query tool to count the number of records in the output file that have the APACCP field equal to K. This is the number of keyed fields for database files that are defined on your system.
- Use steps 21 through 33 as an example. When you are shown the Select Records display, complete it as shown:

AND/OR	Field	Test	Value (Field, Number, 'Characters', or ...)
	APACCP	EQ	'K'

This is a long-running query. Consider submitting it to batch.

- ___ **Step 40** Write the number of keyed fields here: _____
- ___ **Step 41** Calculate the size of the new cross-reference file for database fields:
- (amount from step 34 * 440)
+ (amount from step 40 * 145)
- ___ **Step 42** Write the calculated amount here: _____
- ___ **Step 43** Delete the output file by typing the following:
DLTF FILE(QGPL/ACCPHO)
- ___ **Step 44** Add the amount in step 15 on page 6-10 and the amount in step 42.
- ___ **Step 45** Divide the amount in step 44 by 1 000 000 to convert the amount to megabytes.
- Write this amount in item 14 of the work sheet.

How to Identify Unsupported Hardware Devices

If you plan to move hardware devices from an IMPI processor to a PowerPC AS processor, you must make sure all of the devices that you are moving are supported on the PowerPC AS processor. If some of the devices you planned to move are not supported on the PowerPC AS processor, you need to replace them with equivalent devices that are supported. For example, the Estimated Storage Requirements display may have indicated that you have unsupported disk units **4** (in Figure 6-4 on page 6-8).

To display the hardware on your system that is not supported on PowerPC AS processors, do the following:

- ___ **Step 1** Type G0 UPGRADE. You see the Upgrade Assistant for OS/400 display.
- ___ **Step 2** Select option 10 (Submit upgrade preparation job) only if you have done either of the following since the last time that you ran option 10:
- Made changes to your configuration, such as adding or removing disk units.
 - Performed significant cleanup activities on your system.

- ___ **Step 3** Make sure that the upgrade preparation job (option 10) has completed by using the Work with Submitted Jobs (WRKSBJOB) command.
- ___ **Step 4** Select option 11 (Display Upgrade Preparation). You are shown the Display Upgrade Preparation display.
- ___ **Step 5** Type the value *PRB for the Type of information field.
- ___ **Step 6** Press the Enter key. The Display Potential Problems display is shown:

```

                                Display Potential Problems

Target release . . . . . :   V3R6M0

Type options, press Enter.
  5=Display details

Opt Problem Description
  - Support for licensed program 5738PL1 option *ALL moved.
  - Disk Storage Controller type 6100 is not supported.
  5 Disk Unit type 6100 is not supported.
  - Diskette Unit type 6132 is not supported.
  - Comm Adapter type 6152 is not supported.
  - V.24 Port type 6152 is not supported.

```

The display shows potential problems to upgrading that exist on your system. Included in this list are those hardware devices on your system that are not supported on the PowerPC AS processor. If you need the capacity or function that is provided by any of these unsupported devices from your current AS/400 system, you need to replace them with equivalent devices.

- ___ **Step 7** For each disk unit that appears on the display, do the following:
 - ___ **Step a.** Enter 5 (Display details) next to a hardware device.
 - ___ **Step b.** Press the Enter key. The Additional Message Information display is shown:

```

                                Additional Message Information

Message ID . . . . . :   CPIA964      Severity . . . . . :   40
Message type . . . . . :   Information

Message . . . . . :   Disk Unit is not supported.
Cause . . . . . :   Disk Unit, resource type 6100, model 015, with serial
                    number 00-0104018 8 is not supported in release V3R6M0 of OS/400.
Recovery . . . . . :   This resource must be removed or replaced before upgrading
                    OS/400 to release V3R6M0.

```

- ___ **Step c.** Use the serial number **8** from the display to locate the disk unit on the printout that you worked with in “How to Describe Your Current Disk Configuration” on page 6-2.
- ___ **Step d.** On the printout, mark the disk unit as not supported.

- ___ **Step 8** On your printout, add the total capacities of all the disk units that you marked as unsupported.
- ___ **Step 9** Write this amount (the total capacities that you calculated in step 8) in item 4 on the disk capacity work sheet (Table A-1 on page A-1).
- ___ **Step 10** For devices that are not disk units, use option 5 (Display details) to display more information about why the device is not supported.
- ___ **Step 11** Decide what you will do to replace the function that is provided by unsupported devices.

Alternatives for Checksum Protection

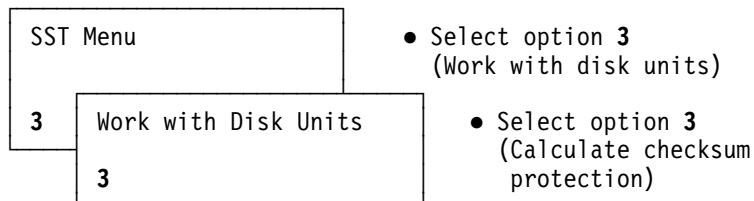
Checksum protection is not available on AS/400 with PowerPC technology. If your source system uses checksum protection, you must decide how to replace that protection: with mirrored protection, device parity protection, or a combination. Both device parity protection and mirrored protection provide equal or better protection than checksum protection with better overall system performance. However, you may need to purchase additional disk units to use a different method of disk protection. Device parity protection requires specific disk units and IOPs that are RAID-capable. Mirrored protection requires more disk storage than checksum protection.

If you do not set up an alternative to checksum protection on your upgraded system, your new system will not have the same level of availability protection.

Note: If your system has checksum protection, it is indicated on the Display Disk Configuration Protection display (see “How to Describe Your Current Disk Configuration” on page 6-2). You should have it marked on your printout from that topic.

The *Backup and Recovery – Advanced* book provides more information about how to plan disk protection, including which disk units can be protected with device parity protection. Disk units that cannot be protected with device parity protection can be protected with mirrored protection.

How to Display the Storage Amount for Checksum Protection: If your source system has checksum protection, you should subtract the amount of space that is used for checksum data from the disk storage requirements that are calculated by the Upgrade Assistant. You can use the Calculate checksum configuration option in System Service Tools (SST) to determine how much space is used for checksum data:



Locate the *Total redundancy storage* field on the display. Write this amount in Item 3 on the work sheet (Table A-1 on page A-1).

How to Evaluate Disk Protection Requirements

Disk protection functions provide a way to improve your system availability and to decrease the chance that your system will be unavailable because of a disk failure. As you determine your disk capacity needs, you should also evaluate whether to use disk protection functions. As your organization becomes more dependent on system availability, the cost of an unscheduled outage increases. If you fully protect the disk storage on your system by using a combination of device parity protection and mirrored protection, you can decrease the likelihood of a long, unscheduled outage.

For more information about the disk protection options that are available, see “How to Plan Disk Protection” in the *Backup and Recovery – Advanced* book.

If you decide to use disk protection or to expand your use of disk protection, do the following.

- ___ **Step 1** For the disk units that will have device parity protection on your upgraded system and do not have device parity protection today, do the following:
 - a. Add the capacities of the disk units.
 - b. Multiply the total capacity by .25. (If your device parity sets will have more than 4 units, the amount that is used for parity information is less than 25%. If you know how your parity sets will be configured, you can use a smaller number.)
 - c. Write the amount from step 1b in Item 15 on your disk capacity work sheet (Table A-1 on page A-1).

- ___ **Step 2** For the disk units that will have mirrored protection on your upgraded system and do not have mirrored protection today, do the following:
 - a. Add the capacities of the disk units.
 - b. Multiply the total capacity by .50.
 - c. Write the amount from step 2b in Item 16 on your disk capacity work sheet.

How to Determine What Disk Units You Need

To complete your calculation of disk requirements, do the following:

- ___ **Step 1** If your system ASP will not have mirrored protection, write 2GB in Item 2 of the disk capacity work sheet (Table A-1 on page A-1). This is the size of the load source unit that is part of the MES order. (If you ordered a load source unit with 4GB, write 4GB instead of 2GB.)

If your system ASP will have mirrored protection, write 4GB in Item 2 and add 2GB to the value in Item 16 on the work sheet. This is the size of the load source unit and its mirrored pair that are part of the MES order. (If you ordered a load source unit with 4GB, write 8GB instead of 4GB.)

- ___ **Step 2** Calculate the remaining items on the work sheet.

- ___ **Step 3** If Item 20 is a negative number or a very small number relative to your total disk capacity, you need to order additional disk units as part of your upgrade. Do the following:
 - ___ **Step a.** Determine what disk units you will order and include their capacities in Item 2. Your marketing representative can give you information about your options.
 - ___ **Step b.** Add the capacities of the additional disk units to the amount in Item 2 of the work sheet.
 - ___ **Step c.** If the additional disk units will have disk protection, update the amounts in Item 15 and Item 16. (See “How to Evaluate Disk Protection Requirements” on page 6-16.)
 - ___ **Step d.** Recalculate the remaining items on the work sheet.
 - ___ **Step e.** Verify that Item 20 is an acceptable number.

How to Determine Whether You Have Enough Slots

Slots are locations where you can insert cards or features in the system enclosure and the expansion tower. You must make sure that your planned configuration has enough slots in the system enclosure and the expansion tower (if you will have one) of the target system to hold your current internal disk units and any additional disk units, including the new load source unit. Do the following:

- ___ **Step 1** Make a copy of the work sheet for planning your disk configuration (Table A-2 on page A-4).
- ___ **Step 2** Locate your disk configuration printout (from “How to Describe Your Current Disk Configuration” on page 6-2).
- ___ **Step 3** Write an entry (resource name and serial number) on the work sheet for each IOP that has disk units attached.
- ___ **Step 4** Write the total number of slots for each IOP (the number of devices that can be attached). If you are not sure, your marketing representative can give you this information.

In the case of a combined function input/output processor, write the number of slots that are available to attach disk units.

- ___ **Step 5** Write the total number of slots that are currently in use in each IOP.
- ___ **Step 6** If your system ASP does not have mirrored protection, the hardware service representative moves the load source unit and attaches a new load source unit. Write +1 in the *Additions and Subtractions* column for the IOP where you want the hardware service representative to attach the old (IMPI) load source unit.

If your system ASP does have mirrored protection, the hardware service representative moves the load source unit and its mirrored pair. The hardware service representative attaches a new load source unit and mirrored pair. Write +2 in the *Additions and Subtractions* column for the IOP where you want the hardware service

representative to attach the old (IMPI) load source unit and its mirrored pair. (They do not have to be attached to the same IOP.)

- ___ **Step 7** If you have identified disk units that must be removed, enter the appropriate quantity in the *Additions and Subtractions* column for the IOPs where those disk units are attached today.
- ___ **Step 8** If you are ordering additional disk units, enter the appropriate quantity in the *Additions and Subtractions* column for the IOPs where you plan to attach those disk units.
- ___ **Step 9** Calculate the *Slots Used After the Upgrade* column.
- ___ **Step 10** For each IOP, compare the *Slots Used After the Upgrade* column to the *Number of IOP Slots* column. If you plan to use more slots than the IOP has, you must adjust your configuration. If you do not have any available slots in the system enclosure, do one of the following:
 - Remove one of the internal disk units from the system before the upgrade by using the option to remove a disk unit from an ASP. This is described in the *Backup and Recovery – Advanced* book. To do this, you must have sufficient space on the remaining disk units in the ASP to hold all the data without exceeding the ASP threshold. Also, after you have removed the disk unit, use option 10 and option 11 from the Upgrade menu to ensure that you have enough disk storage.
 - Order an Integrated Expansion Unit for the target system to hold one of your current internal disk units.
- ___ **Step 11** To verify that you have accounted for all your disk units, do the following:
 - ___ **Step a.** Add the values in the *Slots Used Before the Upgrade* column. This should equal the total number of disk units on your system today.
 - ___ **Step b.** Add the values in the *Slots Used After the Upgrade* column. This should equal the total number of disk units that you plan to have on your target system.
- ___ **Step 12** Ask your marketing representative to verify your planned disk configuration. Your planned processor may have limitations on attaching disk units with certain characteristics (SCSI). Your marketing representative needs to use the IBM configurator to validate your disk configuration.
- ___ **Step 13** If you discover that you must adjust your disk configuration because of slot constraints, be sure to recalculate your disk capacity information (Table A-1 on page A-1).

**Before you
continue...**

Complete the disk capacity information on the work sheet (Table A-1 on page A-1).

How to Determine Your Configuration for Auxiliary Storage Pools

An **auxiliary storage pool** (ASP) is a logical grouping of disk units on your system. You can use ASPs to divide the disk units on your system into subsets that contain particular types of information. For example, some installations set up a user ASP to contain journal receivers. Other installations set up an ASP to contain history data that is changed infrequently and has different availability requirements.

Many systems have all the disk units assigned to a single ASP (ASP 1), which is called the **system ASP**.

Because newer disk units have more capacity per unit than older models, you may have fewer disk units on your upgraded system. If you have user ASPs on your source system, you may need to reevaluate your ASP configuration. You may find that you will not have enough disk units on your target system to have the same ASP configuration as your source system (even though your target system will have more disk capacity).

Note: The printout that you worked with in “How to Describe Your Current Disk Configuration” on page 6-2 indicates whether you have user ASPs (an ASP other than 1).

You may also find that you no longer need user ASPs. Perhaps you configured user ASPs to help reduce your downtime if a disk failure occurred. On your upgraded system, you may have a fully protected system ASP (device parity protection and mirrored protection) which greatly reduces the chance of downtime due to disk failure.

You can use the ASP configuration work sheet (Table A-3 on page A-5) to describe your plans for user ASPs on your target system. If you do not have user ASPs now and you do not plan to have user ASPs, you do not need to complete the work sheet.

To complete the work sheet, do the following:

- ___ **Step 1** For each user ASP on your system, write the total capacity of that ASP (in the *Storage Allocated* column under *Source System*).
- ___ **Step 2** Write the purpose of the ASP, such as isolating journal receivers or specific libraries.
- ___ **Step 3** Write the contents of the ASP, such as the names of the libraries that it contains or the naming convention for journal receivers. If you are not sure of the contents, refer to the topic in the *Backup and Recovery – Basic* that tells how to determine the contents of an ASP.
- ___ **Step 4** If your source system is running V3R1M0, write the access path recovery time for the ASP. (You can use the DSPRCYAP command to display this.)
- ___ **Step 5** Write the planned capacity for the ASP on your target system (in the *Storage Allocated* column under *Target System*). If you plan to keep the same ASP with the same contents, you will probably need to increase the capacity.
- ___ **Step 6** Write the planned contents for the ASP.

- ___ **Step 7** If you do not want to use the default value, write the access path recovery time for the ASP.
- ___ **Step 8** Write your migration plan if you will be changing the configuration for this ASP. For example, if you plan to add more capacity to the ASP, write which new disk units you will assign. If you plan to eliminate the ASP, write your plans for how to move the data.

If you are using the unload/reload method or the side-by-side method, the default is to restore objects to the same ASP from which they were saved. If that ASP number does not exist at restore time, the objects are restored to the system ASP. You can override this by specifying a RSTASP parameter on the restore command.

If you are using the replacing-a-release method and you plan to change your ASP configuration, you must move data out of an ASP before you remove the ASP. This requires a dedicated system and careful planning. You can do this either before the upgrade procedure or after it, but not during the upgrade procedure.

The *Backup and Recovery – Advanced* book describes the procedure for deleting a user ASP.

How to Evaluate the Benefits of Reformatting Disk Units

If you are considering the replacing-a-release method, you need to evaluate whether you have a significant number of disk units on your current system that will benefit from reformatting when they are attached to a PowerPC AS processor. For the 6502, 6512, and 6530 IOPs, PowerPC AS processors support the following advanced functions:

- Longitudinal Redundancy Checking (LRC) for better error detection.
- Write cache (6502 and 6512 only) for enhanced performance of write operations. The performance gain for accessing data on your disk units can be up to 35%. How this gain affects your overall system performance depends on your application mix and on whether disk access inhibits your system performance.

Some disk units that may be attached to your current system can take advantage of these advanced functions only if the disk units are reformatted. In this topic, you determine whether you have any disk units that may benefit from reformatting. If you have disk units that can be reformatted for optimal performance, you have the following choices:

- Choose the unload/reload method or the side-by-side method for your upgrade procedure. The disk units will automatically be reformatted when you add them to your configuration.
- Choose to reformat the disk units later. If you use the replacing-a-release method, you cannot reformat disk units during the upgrade procedure. To reformat them later requires a dedicated system (no user activity) and may take many hours. A 1GB disk unit takes approximately 1 hour to reformat. A 4GB disk unit takes over 2 hours.
- Leave the disk units in the current format. However, if you choose to do this, you will receive a Disk Warning Report with warning messages every time that

you perform a manual IPL on your upgraded system. The warning message says Disk unit not formatted for optimal performance.

To evaluate the disk unit formats on your system, do the following:

- ___ **Step 1** Locate your printout of the storage resources on your system (Figure 6-1 on page 6-3).
- ___ **Step 2** On the printout, count the number of disk units that you have marked with RF (reformat).
- ___ **Step 3** Write the number here: _____. This is the number of disk units that can benefit from improved performance or error detection if they are reformatted when you move to a PowerPC AS processor.

How to Select a Processor Model

Probably one of the reasons that you are considering a change to AS/400 with PowerPC technology is to improve the overall performance of your system. The best way to predict what processor, main storage, and disk configuration will provide your desired level of performance is to use the BEST/1 for the AS/400 Capacity Planner. The BEST/1 for the AS/400 Capacity Planner is part of the Performance Tools for OS/400 licensed program. You can order a program temporary fix (PTF) for the Performance Tools for OS/400 program that includes the PowerPC AS processor models. See “Performance Tools for OS/400 Support for New Models—Overview” on page 2-3.

The *BEST/1 Capacity Planning Tool* book provides information about how to use the tool and the type of information that the tool provides.

If you are looking for a simple estimate of what PowerPC AS processor you might need, you can use the information in Table 6-2 on page 6-23 through Table 6-6 on page 6-26.

Notes:

1. To determine the model of your current (IMPI) processor, type the following:
WRKHDWRSC *PRC

Your processor is the first resource on the Work with Processor Resources display.
2. If you plan to order AS/400 Advanced 36, use the *AS/400 Advanced 36 Planning and Reference Handbook* to determine your processor configuration.

These tables are intended to provide a starting point, not a final determination of the correct processor model. Following are instructions for reading the tables:

- Along the left side, the tables list the IMPI processor models and the **relative performance rating (RPR)** for each model. The RPR shows how each processor compares to model B10, which has a base performance of 1.0. These numbers may change as more performance information and upgrade experience become available. When you are doing your final modeling to determine the configuration that you should order, use the most recent PTFs for the BEST/1 for the AS/400 Capacity Planner.

- Across the top, the tables show the PowerPC AS processor models and their relative performance ratings.
- For the Advanced Server models (40S, 50S, 53S), the tables show RPR numbers for batch work (server work) and for interactive work. The Advanced Server models are optimized for batch work.
- The Xs in the tables indicate the supported upgrades that can be ordered. An X means that a hardware service representative can use the parts that are shipped with an MES order to convert the IMPI processor model to the PowerPC AS processor model.
- Some IMPI processor models may appear in more than one table because they can be upgraded to more than one type of PowerPC AS processor.
- Some IMPI processor models (model Bxx) cannot be upgraded with an MES order. The upgrades would require such extensive changes that it is more economical and less time-consuming to order an entirely new processor.

If you are replacing a model Bxx, you can use the relative performance ratings in the tables to help you determine PowerPC AS processor models that are appropriate

- Contact your marketing representative or the IBM Fulfillment Center to get more recent performance information and information about which upgrade alternatives provide the most attractive pricing.

Table 6-2. Upgrades to Model 400

Upgrading from:			Upgrading to: ¹			
Model			400	400	400	400
	Processor		2130	2131	2132	2133
	RPR		4.1	6.1	8.7	10.9
B10		1.0				
B20		1.7				
B30		1.4				
B35		1.6				
B40		2.0				
B45		2.3				
B50		3.2				
B60		5.2				
B70		7.0				
C04	2558	1.1	X			
C06	2552	1.3	X	X		
C10	2515	1.3	X	X		
C20	2516	1.8	X	X	X	
C25	2516	2.2	X	X	X	
D02	2525	1.3	X	X		
D04	2554	1.5	X	X		
D06	2553	1.9	X	X	X	
D10	2555	1.9	X	X	X	
D20	2556	2.4	X	X	X	
D25	2557	3.4		X	X	X
E02	2539	1.5	X	X		
E04	2530	1.9	X	X	X	
E06	2413	2.6	X	X	X	
E10	2532	2.6	X	X	X	X
E20	2533	3.5		X	X	X
E25	2534	4.2		X	X	X
F02	2414	1.9	X	X	X	
F04	2586	2.5	X	X	X	X
F06	2582	3.3		X	X	X
F10	2587	3.4		X	X	X
F20	2588	4.2		X	X	X
F25	2583	4.8		X	X	X
200	2030	2.5	X	X	X	
200	2031	4.0		X	X	X
200	2032	6.2			X	X

¹ Use this information as a guideline. The BEST/1 for the AS/400 Capacity Planner is the best way to determine what upgrade configuration will meet your performance requirements.

Table 6-3. Upgrades to Model 500 and Model 510

Upgrading from:			Upgrading to: ¹				
Model			500	500	500	510	510
	Processor		2140	2141	2142	2143	2144
	RPR		6.4	9.3	12.6	21.6	28.5
D10	2555	1.9	X	X			
D20	2556	2.4	X	X			
D25	2557	3.4	X	X	X		
D35	2540	2.6	X	X			
D45	2541	3.7	X	X	X		
D50	2542	4.8	X	X	X		
D60	2543	8.3				X	X
D70	2544	11.2				X	X
E10	2532	2.6	X	X			
E20	2533	3.5	X	X	X		
E25	2534	4.2	X	X	X		
E35	2536	3.4	X	X	X		
E45	2537	4.8	X	X	X		
E50	2559	6.5		X	X		
E60	2560	10.2				X	X
E70	2561	14.2				X	X
F10	2587	3.4	X	X	X		
F20	2588	4.2	X	X	X		
F25	2583	4.8	X	X	X		
F35	2592	4.8	X	X	X		
F45	2593	6.0		X	X		
F50	2594	10.2				X	X
F60	2595	14.7				X	X
300	2040	4.2	X	X	X		
300	2041	6.0		X	X	X	
300	2042	7.5			X	X	X
310	2043	12.0				X	X
310	2044	20.2					X

¹ Use this information as a guideline. The BEST/1 for the AS/400 Capacity Planner is the best way to determine what upgrade configuration will meet your performance requirements.

Table 6-4. Upgrades to Model 530

Upgrading from:			Upgrading to: ¹			
Model			530	530	530	530
	Processor		2150	2151	2152	2153
		RPR	37.4	48.9	74.0	119.2
D80	2523	19.8	X	X	X	
E80	2562	25.2	X	X	X	X
E90	2563	34.4		X	X	X
E95	2568	40.2			X	X
F70	2596	21.0	X	X	X	
F80	2597	36.5		X	X	X
F90	2598	50.5			X	X
F95	2599	59.0			X	X
F97	2528	71.5				X
310	2043	12.0	X	X		
310	2044	20.2	X	X	X	
320	2050	25.7	X	X	X	X
320	2051	45.8			X	X
320	2052	71.5				X

¹ Use this information as a guideline. The BEST/1 for the AS/400 Capacity Planner is the best way to determine what upgrade configuration will meet your performance requirements.

Table 6-5. Upgrades to Model 40S and Model 50S

Upgrading from:			Upgrading to: ¹		
Model			40S	50S	50S
	Processor		2110	2120	2121
		Inter-active RPR	3.8	5.7	8.3
		Non-Interac-tive RPR	10.6	19.7	26.6
100		1.9	5.9	X	
135		3.3	10.9		X
140		4.0	22.5		X
20S	2010	1.9	5.9	X	
30S	2411	3.3	10.9		X
30S	2412	4.0	23.5		X

¹ Use this information as a guideline. The BEST/1 for the AS/400 Capacity Planner is the best way to determine what upgrade configuration will meet your performance requirements.

Table 6-6. Upgrades to Model 53S

Upgrading from:		Upgrading to: ¹		
Model		53S	53S	53S
	Processor	2154	2155	2156
	Inter-active RPR	8.3	8.3	8.3
	Non-Interactive RPR	43.4	66.6	101.4
140	4.0	22.5	X	X
30S	2412 4.0	23.5	X	X

¹ Use this information as a guideline. The BEST/1 for the AS/400 Capacity Planner is the best way to determine what upgrade configuration will meet your performance requirements.

To handle your existing workload with similar performance, find a new PowerPC AS processor model that is a supported upgrade (marked with an X in the tables) from your current processor model.

How to Determine Your Main Storage Requirement

To take full advantage of the performance of the new AS/400 with PowerPC technology, a PowerPC AS processor requires more main storage than a comparable IMPI processor. The base main storage that is shipped with new models is correspondingly larger.

The PowerPC AS architecture requires more main storage for the following reasons:

- A program that is created with the PowerPC AS instruction set has more instructions than the same program when it is created with the IMPI instruction set. In order to take full advantage of the PowerPC AS architecture, the system requires more main storage to hold the program and achieve optimal performance.
- To improve the efficiency of managing dramatically larger amounts of main storage, the page size has increased from 512 bytes on an IMPI processor to 4096 bytes on a PowerPC AS processor. The impact of this increased page size on performance is most noticeable when the system is processing data randomly.

Use Table 6-7 on page 6-27 as an initial guideline in estimating how much main storage you need on your upgraded system:

Table 6-7. Main Storage Guidelines

Main Storage Size on Source System	Main Storage Size on PowerPC AS Processor ^{1,2}
Up to 160MB	(2 * Main Storage on Source System) + 16MB
Greater than 160MB	2 * Main Storage on Source System

1 Use this information as a guideline. The BEST/1 for the AS/400 Capacity Planner is the best way to determine what upgrade configuration will meet your performance requirements.

2 If your planned processor will be significantly larger (higher relative performance rating) than your current processor, you need to increase this main storage amount.

In addition, you should look at the performance characteristics of your existing system. If your current system shows signs of having insufficient main storage, such as high paging rates, you may want to consider additional main storage on your PowerPC AS processor. You can use the Performance Tools for OS/400 program to evaluate how main storage is affecting the performance of your system as it is currently configured. For example, if you are experiencing high paging rates, additional main storage will probably improve performance.

If you plan to use your AS/400 with PowerPC technology primarily for application development, you should consider a minimum of 64MB of main storage. Program optimization in particular requires a large amount of main storage to run efficiently.

When you have estimated the main storage requirement for your PowerPC AS processor, check the information in Table 6-8 on page 6-28. The table shows the base main storage and the maximum main storage for each PowerPC AS processor model:

Table 6-8. Main Storage for PowerPC AS Processor Models

Processor Model	Processor Feature	Base Main Storage	Maximum Main Storage
400	2130	32	160
400	2131	32	224
400	2132	32	224
400	2133	32	224
500	2140	64	768
500	2141	64	768
500	2142	64	1024
510	2143	256	1024
510	2144	256	1024
530	2150	512	4096
530	2151	512	4096
530	2152	512	4096
530	2153	512	4096
40S	2110	32	224
50S	2120	64	1024
50S	2121	64	1024
53S	2154	256	4096
53S	2155	256	4096
53S	2156	256	4096

You may need a larger model because of your main storage requirements. Or you may find that the minimum main storage is more than twice the main storage on your current system, which provides for growth in your workload.

How to Determine Your Disk Performance Requirements

Your disk storage requirement includes how much capacity you need to store your information and how many disk arms you need to provide acceptable performance on your system. The BEST/1 for the AS/400 Capacity Planner is the best way to determine a balanced configuration. Use your initial estimates for processor model, main storage, and disk capacity as a starting point. Then use the modeling capabilities to refine your configuration to meet your performance needs.

Update both disk planning work sheets (Table A-1 on page A-1 and Table A-2 on page A-4) if you need to make changes to your disk configuration to meet your performance requirements.

Before you continue...

Complete the information for processor, main storage, and disk storage on the work sheet (Part 1 and Part 2 of Table A-4 on page A-6).

How to Determine Your Save and Restore Requirements

More disk storage means more megabytes of data to be saved. It may mean more megabytes of data to be restored if you need to perform a recovery. You need to evaluate your backup and recovery strategy, including the procedures that you use and your requirements for devices, such as tape drives. Consider the following:

- Do you have tape drives that are not supported on the PowerPC AS processor? Use Upgrade Assistant to determine whether your tape drives are supported. (See “How to Identify Unsupported Hardware Devices” on page 6-13.)
- How long will it take to perform your normal save operations? For example, look at how many hours it takes you to save your entire system now and how many megabytes of data you are saving (your auxiliary storage usage). Then determine how many minutes the additional megabytes on your new system will add to your save time.

Can you save the increased amount of data within the amount of time that you have for nightly save operations? You may need to consider higher speed tape drives, an additional tape drive, or changes to your save procedures.

Note: If your PowerPC AS processor is faster than your IMPI processor, this may reduce the save time per megabyte.

- What are your media requirements? If you are currently performing unattended save operations, will you be able to perform those same save operations without mounting additional tapes? You may need to consider one or more tape drives to provide additional tape capacity.
- If you order a different tape unit for your upgraded system, have you planned for media compatibility? On your target system, you need to be able to restore data from save tapes that you create on your source system.

If you have unique save and restore or archive requirements, you should work with your marketing representative to verify the support for your current method. Some support may not be currently available, such as the following:

Directly attached optical library
3494 Tape Library Dataserver
Novell NetWare**

**Before you
continue...**

Complete the tape planning information on the work sheet Part 3 of Table A-4 on page A-6.

Chapter 7. How to Choose Your Upgrade Method

Your upgrade method is one of the most important decisions that you need to make. It affects how you order your upgrade, how you prepare for the upgrade, and the procedures that you and your hardware service representative perform during the upgrade.

This chapter contains information to help you choose what method you will use to upgrade to AS/400 with PowerPC technology. Your choice of a method depends on information that you have already collected and on information that is in this chapter. If you have not already done so, make a copy of the work sheets for estimating your downtime (“Work Sheets for Estimating Downtime” on page A-21) and of the questionnaire for selecting your upgrade method (Table A-9 on page A-17). Complete them as you read this chapter.

This chapter includes the following:

- Descriptions of the upgrade methods, including general comparisons of the methods.
- Information that may help you make a quick decision about your upgrade method.
- Instructions for estimating how long your upgrade will take.
- Information about additional hardware and software that you may need (depending on the method you choose).
- Supporting information, such as detailed comparisons of the methods and background material for estimating your upgrade time.

Overview of the Upgrade Methods

When you change to PowerPC technology, you may order a new system to replace your current system or you may place an MES order to upgrade your current hardware. When you upgrade with an MES, your system keeps the same serial number.

To **upgrade** your current hardware without replacing your system, you order a miscellaneous equipment specification (MES). The MES includes the new processor and a disk unit that contains the Licensed Internal Code (the load source unit). The MES also includes new main storage cards, attachment cards, and input/output processors (IOPs). The hardware service representative disassembles your existing system and reassembles it by using the parts and instructions that are provided with the MES. The procedure can take a few hours or an entire day, depending on the extent of the changes.

Three upgrade methods are available to change your current system to PowerPC technology:

- With the **unload/reload method**, you copy all your user data to tape (unload), install your new hardware and operating system, and then reload your data. You can use the unload/reload method for an MES order or for a new (replacement) system.

- With the **replacing-a-release method**, you prepare the data on your disk units for the change in system page size that occurs when you move to PowerPC Technology. Then you install your new hardware and operating system. You do not need to reload user data. You use the replacing-a-release method only with MES orders.
- With the **side-by-side** method, you install a new system next to your existing system. After testing, you switch over to the new system by moving your production applications and possibly by moving hardware to the new system. You use the side-by-side method only with new system orders.

When you order your new system or your MES, use the feature codes in Table 7-1 to indicate which method you will use:

Table 7-1. Feature Codes for Upgrade Methods

Feature Codes	Method	Order Type
0200	Replacing-a-release	MES
0200 and 0202	Replacing-a-release with Staged Upgrade Offering	MES
0201	Unload/reload	MES
0201 and 0202	Unload/reload with Staged Upgrade Offering	MES
0203	Side-by-side Unload/reload	New New
5000 or 5015	This feature code is for new, preloaded systems. It cannot be used with any of the upgrade methods. If you plan to move all user data (in particular, user data in the QUSRSYS and QGPL libraries or licensed program data) to a new AS/400 with PowerPC technology, <u>do not</u> order feature code 5000 or 5015.	New

Notes:

1. A new system ordered with feature code 0203 cannot have any of the following pre-loaded:
 - Optional parts of OS/400
 - Priced features of OS/400
 - Licensed programs
2. Feature code 5000 or 5015 (preloaded software) cannot be ordered in conjunction with feature code 0203 on new system orders.
3. "Staged Upgrade Offering—Overview" on page 7-37 describes the Staged Upgrade Offering.
4. If you change your decision about your upgrade method after you have placed your order, be sure to notify your marketing representative. The feature code that is associated with your order affects how your upgraded system is manufactured and what installation instructions are sent with the system.

When to Order a New, Preloaded System

When you order a preloaded system (feature code 5000), your system arrives with licensed programs and optional parts of OS/400 already on the system. A preloaded system is not in the proper state to merge user data from an IMPI system with new versions of the licensed program files.

When you plan to move data from an IMPI system to a new AS/400 with PowerPC technology, you should almost always order feature code 0203 (not preloaded).

You should order feature code 5000 only if one of the following is true:

- You do not plan to move user data from an IMPI system to the new system.
- You plan to move only limited data from an IMPI system and none of that data is in system-supplied objects in a licensed program library (such as QUSRSYS or QGPL).

Comparison of the Methods—Overview

This topic provides general comparisons of the upgrade methods. For more detailed comparisons, see “Method Comparisons—Supporting Information” on page 7-38.

For all upgrade methods, you must change your hardware and your operating system software at the same time.

With both the unload/reload method and the replacing-a-release method, your system is unavailable from the time that you begin your final save procedure until you have completed the upgrade procedure (hardware, IBM-supplied software, and critical applications).

With the side-by-side method, you complete the installation and testing of your new hardware and software on a new, separate system before you make any changes to your production system. Most of the downtime occurs at the end of the test period during the cutover procedures from your production system to your new system. (You may have some downtime during the test period to create a backup copy of your data for loading to the test system.)

The side-by-side method is particularly applicable for installations with high availability requirements. Because the existing system is not altered, it continues to operate in a production environment while the new system is installed and fully tested. This method provides the most control over system downtime during the upgrade procedure. It also provides the most flexible staging (selective movement of applications) of the transition to the new system.

A Staged Upgrade Offering is available for some upgrade configurations for the unload/reload method and the replacing-a-release method to provide a limited, temporary testing environment and to help reduce downtime. “Staged Upgrade Offering—Overview” on page 7-37 provides more information about the Staged Upgrade Offering.

Upgrade Tasks—Overview

Table 7-2 on page 7-5 provides an overview of the basic tasks for the upgrade methods.

Notes:

1. These tasks are conceptual and do not provide sufficient detail to perform the upgrade procedure successfully. When you are performing your upgrade, use the appropriate upgrade checklist from the *AS/400 Road Map for Changing to PowerPC Technology* book.
2. “How to Estimate Your Upgrade Time” on page 7-16 provides more information about the content of the tasks.
3. The side-by-side method is more flexible than the other methods, and the sequence of tasks may vary for each installation. These tasks are an example for comparison purposes.

Table 7-2 (Page 1 of 2). Overview of the Major Upgrade Tasks

Unload/Reload Method	Replacing-a-Release Method	Side-by-Side Method
Order Planning		
Plan your configuration and place your order.	Plan your configuration and place your order.	Plan your configuration and place your order.
Upgrade Preparation		
Analyze your system and plan for the upgrade procedure.	Analyze your system and plan for the upgrade procedure.	Analyze your system and plan for the upgrade procedure.
Prepare for the upgrade procedure. This task includes general system cleanup tasks and printing system information.	Prepare for the upgrade procedure. This task includes general system cleanup tasks and printing system information.	Prepare for the upgrade procedure. This task includes general system cleanup tasks and printing system information.
	Prepare for disk conversion. AS/400 with PowerPC technology uses a page size of 4096 bytes. AS/400 with an IMPI processor uses a page size of only 512 bytes. Before the upgrade begins, you prepare your disk units by running a procedure that moves data to match the new page size boundaries. Upgrade Assistant for OS/400 provides this function.	
Upgrade Procedure		
Remove your system from production (beginning of upgrade downtime).	Remove your system from production (beginning of upgrade downtime).	
Copy user information (such as files, programs, and system values) to tape.	Copy user information (such as files, programs, and system values) to tape.	
Upgrade your existing hardware to PowerPC AS hardware or install a new system. For some configurations, the hardware service representative performs this task.	Upgrade your existing hardware to PowerPC AS hardware. The hardware service representative performs this task.	Install your new (PowerPC Technology) system. For some configurations, the hardware service representative performs this task. At this point, the new system is a test system. Your current system remains in production.
Install the operating system. (If you order a new system, the base part of OS/400 is already installed but you need to perform an IPL.)	Install the operating system.	Install the operating system. (If you order a new system, the base part of OS/400 is already installed but you need to perform an IPL.)
	The system performs a long IPL to recover addressability to your data.	
		Save user data from the production system.
Reload all user data to your upgraded system.		Load a copy of your user data to your test system.
Install licensed programs.	Install licensed programs.	Install licensed programs.
Run object conversion for critical applications.	Run object conversion for critical applications.	Run object conversion.

Table 7-2 (Page 2 of 2). Overview of the Major Upgrade Tasks

Unload/Reload Method	Replacing-a-Release Method	Side-by-Side Method
Perform final upgrade tasks (update system information, apply PTFs, save system).	Perform final upgrade tasks (update system information, apply PTFs, save system).	Perform final upgrade tasks (update system information, apply PTFs, save system).
Verify your system and your critical applications.	Verify your system and your critical applications.	Perform application testing.
Make your upgraded system available to your users.	Make your upgraded system available to your users.	
Perform post-upgrade tasks (such as additional object conversion and installation of softcopy library)	Perform post-upgrade tasks (such as additional object conversion and installation of softcopy library)	Periodically, resynchronize the data on your production and test systems.
		Perform final synchronization and cut over to your new system. Your production system will be unavailable during this process.
		Perform final system verification.
		Make your new system available to your users.

How to Identify Quick Decision Criteria

Some factors point you very strongly toward a specific upgrade method. Depending on your situation and your configuration, you may be able to choose your upgrade method without a detailed analysis. This topic describes some criteria that may narrow or finalize your decision.

During upgrade testing by IBM and early customers, the minimum downtime for the upgrade procedure (even with careful preparation and management) was 12 to 15 hours. Downtime for larger, more complex systems can be considerably longer. If your organization has availability requirements that make that amount of downtime unacceptable, then you should choose the side-by-side method.

If your system can be unavailable for an “upgrade weekend” and you want to avoid the expense of a completely new system, then you may choose between the unload/reload method and the replacing-a-release method. Your primary decision factor will probably be the downtime, which you will estimate in “How to Estimate Your Upgrade Time” on page 7-16. However, your current configuration may prevent you from using the replacing-a-release method. Check Table 7-3 on page 7-7:

Characteristic	Upgrade Methods That You Can Use		
	Unload/ Reload	Replacing-a-Release	Side-by- Side
You have disk units that are not supported by PowerPC AS processors ¹ .	Yes	No ²	Yes
Your current system is a model Bxx	Yes (new system)	No	Yes
You are moving between an Advanced System model and an Advanced Server model.	Yes (new system)	No	Yes
You are replacing your system with an AS/400 Advanced 36.	Yes (new system)	No	Yes
You are currently running an earlier release than V2R3M0	See note 3	See note 3	See note 3
<p>1 Upgrade Assistant identifies unsupported disk units.</p> <p>2 If you replace the unsupported disk units before you begin the upgrade procedure, you can use the replacing-a-release method.</p> <p>3 Upgrades from earlier versions than V2R3M0 are not supported. Contact a service organization for assistance or upgrade to V2R3M0 before upgrading to PowerPC Technology.</p>			

How to Prioritize Your Analysis

If your system configuration supports both the unload/reload method and the replacing-a-release method, use the information in Table 7-4 on page 7-8 to help you make an initial decision among the methods and options that are available. Table 7-4 on page 7-8 balances the typical time range and complexity of different choices. For each system size, it provides a sequence for considering the upgrade methods. In the table, an entry of 1 in the *Size* column means the method (and option) is the most appropriate for a typical system of that size.

Your analysis should not stop with the information that is in Table 7-4 on page 7-8. Use Table 7-4 on page 7-8 to help you focus your thinking. You should still estimate the upgrade time for your system and evaluate your own tolerance for risk and complexity before making a final decision.

Method	System Size		
	Small (5GB)	Medium (25GB)	Large (50GB)
Unload/reload	1	--	--
Unload/reload minimized ¹	2	2	--
Unload/reload with Staged Upgrade Offering ²	--	3	3
Replacing-a-release	3	1	--
Replacing-a-release minimized ¹	4	2	1
Replacing-a-release with Staged Upgrade Offering ²	--	3	2
1	Minimized means that you use the techniques that are described in “How You Can Influence Downtime” on page 7-14.		
2	The Staged Upgrade Offering is described in “Staged Upgrade Offering—Overview” on page 7-37.		

How to Get an Approximate Range for Your Upgrade Time

You can use this topic to get a general idea of how long your upgrade might take. The time estimates that you find here are composites of different upgrade experiences. In most cases, the amount of disk storage on a system is the single most important factor in determining how long the upgrade procedure will take. However, your own experience may differ **significantly** from these timing estimates if, for example, your system has many more database file members than a typical system of your size or many more source file members.

Use these examples only to help you make an initial selection of your upgrade method. **Do not** rely on them for your upgrade planning. You should use the procedures that are described in “How to Estimate Your Upgrade Time” on page 7-16 to estimate your own upgrade time.

Use Table 7-5 to determine which example to use for your general estimate of your upgrade time. (You can use the Work with System Status (WRKSYSSTS) command to find out how much auxiliary storage you have on your system.)

Table 7-5. Where to Find Approximate Upgrade Time Ranges

Disk Capacity of Your Current System ^{1,2}	Table That Contains the Approximate Time Range
5 GB	Table 7-6 on page 7-9
25 GB	Table 7-7 on page 7-10
50GB	Table 7-8 on page 7-12
1	1 GB (gigabyte) = 1 000 MB (megabyte) or M (millions of bytes)
2	These are composites based on sample system sizes. Choose the size that is closest to your system size, or use the average of the two times if your system capacity falls in between.

Table 7-6 (Page 1 of 2). Approximate Upgrade Time Range for Small Systems (5 GB)

Task	Estimated Time Range (Hours) ¹		Dedicated ²	Minimized ³
	Unload/ Reload Method	Replacing-a-Release Method		
Order Planning				
Perform system cleanup tasks	1 to 3	1 to 3		
Reclaim storage and reorganize DLO	1 to 3	1 to 3	Y	
Perform Upgrade Assistant tasks (gathering and analyzing information about current system)	1 to 3	1 to 3		
Perform general planning	1 to 4 days	1 to 4 days		
Upgrade Preparation Tasks				
Perform general preparation	2 to 14 days elapsed time	2 to 14 days elapsed time		
Perform additional preparation and analysis using Upgrade Assistant	1 to 3	1 to 3		
Save entire system for disaster recovery	See note 4	See note 4	Y	
Run disk preparation	---	2 to 6	Y	
Upgrade Procedures (Downtime)				
Save all non-system information	See note 4	See note 4	Y	Y
Install new hardware	3 to 6	3 to 6	Y	
Configure disks	1	.5 to 1	Y	
Install OS/400	2 to 3	2 to 3	Y	
Recover addressability to existing disk storage (long IPL) ⁵	---	4 to 15	Y	
Restore system information	2	--	Y	
Restore user information	See notes 6 and 7	--	Y	Y
Install licensed programs ⁸	2 to 8	2 to 8	Y	Y
Install cumulative PTF package	4 to 7	4 to 7	Y	Y
Run object conversion ^{9,10}	1 to 5	1 to 7		Y
Update system customization information	1 to 3	1		Y
Save entire system	See note 4	See note 4	Y	Y
Summary of Total Downtime for Upgrade Procedure¹				
Range for total estimated downtime for upgrade procedure	16 to 35 plus save and restore time	17.5 to 48 plus save time		
Range for total estimated downtime when you use the techniques that are described in "How You Can Influence Downtime" on page 7-14.	14 to 30	13 to 30		

Table 7-6 (Page 2 of 2). Approximate Upgrade Time Range for Small Systems (5 GB)				
Task	Estimated Time Range (Hours) ¹		Dedicated ²	Minimized ³
	Unload/ Reload Method	Replacing-a-Release Method		
Notes:				
1	The high end of this time range assumes “worst case” for every line item, which is not typical. For example, your hardware installation may be at the high end because of the complexity of your configuration. But your object conversion time may be at the low end because you have a fast processor, a large amount of main storage, and a relatively small number of programs.			
2	The <i>Dedicated</i> column indicates whether the task requires a dedicated system (no user activity).			
3	The <i>Minimized</i> column indicates whether you can reduce the time for this activity by using the techniques that are described in “How You Can Influence Downtime” on page 7-14.			
4	Use the time that you normally need to save your entire system (option 21 from the save menu).			
5	This includes storage management recovery and authority recovery. The time will be at the high end of this range for a V3R1M0 system with more than 50% disk storage utilization and a large number of documents (DLOs).			
6	As a rough estimate, use twice the time that you normally need to save your entire system (option 21 from the save menu).			
7	The system converts database files during the restore operation.			
8	This represents the average time for installing a typical set of licensed programs.			
9	Object conversion time is shorter for the unload/reload method because the system converts database files during the restore operation.			
10	In general, systems with many program objects will have longer object conversion times than systems with a small number of programs. “Run Object Conversion” on page 7-33 describes how to estimate your object conversion time.			

Table 7-7 (Page 1 of 3). Approximate Upgrade Time Range for Medium Systems (25 GB)				
Task	Estimated Time Range (Hours) ¹		Dedicated ²	Minimized ³
	Unload/ Reload Method	Replacing-a-Release Method		
Order Planning				
Perform system cleanup tasks	1 to 3	1 to 3		
Reclaim storage and reorganize DLO	2 to 8	2 to 8	Y	
Perform Upgrade Assistant tasks (gathering and analyzing information about current system)	2 to 4	2 to 4		
Perform general planning	2 to 5 days	2 to 5 days		
Upgrade Preparation Tasks				
Perform general preparation	2 to 14 days elapsed time	2 to 14 days elapsed time		
Perform additional preparation and analysis using Upgrade Assistant	2 to 4	2 to 4		
Save entire system for disaster recovery	See note 4	See note 4	Y	

Table 7-7 (Page 2 of 3). Approximate Upgrade Time Range for Medium Systems (25 GB)

Task	Estimated Time Range (Hours) ¹		Dedicated ²	Minimized ³
	Unload/ Reload Method	Replacing-a-Release Method		
Run disk preparation	---	3 to 18	Y	
Upgrade Procedures (Downtime)				
Save all non-system information	See note 4	See note 4	Y	Y
Install new hardware	4 to 10	4 to 10	Y	
Configure disks	1 to 2	.5 to 1	Y	
Install OS/400	1.5 to 2.5	1.5 to 2.5	Y	
Recover addressability to existing disk storage (long IPL) ⁵	---	5 to 17	Y	
Restore system information	2	--	Y	
Restore user information	See notes 6 and 7	--	Y	Y
Install licensed programs ⁸	2 to 6	2 to 6	Y	Y
Install cumulative PTF package	3 to 5	3 to 5	Y	Y
Run object conversion ^{9,10}	1 to 10	2 to 13		Y
Update system customization information	1 to 5	1		Y
Save entire system	See note 4	See note 4	Y	Y
Summary of Total Downtime for Upgrade Procedure¹				
Range for total estimated downtime for upgrade procedure	15.5 to 42.5 plus save and restore time	19 to 55.5 plus save time		
Range for total estimated downtime when you use the techniques that are described in "How You Can Influence Downtime" on page 7-14.	24 to 72	12 to 36		

Table 7-7 (Page 3 of 3). Approximate Upgrade Time Range for Medium Systems (25 GB)

Task	Estimated Time Range (Hours) ¹		Dedicated ²	Minimized ³
	Unload/ Reload Method	Replacing-a-Release Method		
Notes:				
1	The high end of this time range assumes “worst case” for every line item, which is not typical. For example, your hardware installation may be at the high end because of the complexity of your configuration. But your object conversion time may be at the low end because you have a fast processor, a large amount of main storage, and a relatively small number of programs.			
2	The <i>Dedicated</i> column indicates whether the task requires a dedicated system (no user activity).			
3	The <i>Minimized</i> column indicates whether you can reduce the time for this activity by using the techniques that are described in “How You Can Influence Downtime” on page 7-14.			
4	Use the time that you normally need to save your entire system (option 21 from the save menu).			
5	This includes storage management recovery and authority recovery. The time will be at the high end of this range for a V3R1M0 system with more than 50% disk storage utilization and a large number of documents (DLOs).			
6	As a rough estimate, use twice the time that you normally need to save your entire system (option 21 from the save menu).			
7	The system converts database files during the restore operation.			
8	This represents the average time for installing a typical set of licensed programs.			
9	Object conversion time is shorter for the unload/reload method because the system converts database files during the restore operation.			
10	In general, systems with many program objects will have longer object conversion times than systems with a small number of programs. “Run Object Conversion” on page 7-33 describes how to estimate your object conversion time.			

Table 7-8 (Page 1 of 3). Approximate Upgrade Time Range for Large Systems (50GB)

Task	Estimated Time Range (Hours) ¹		Dedicated ²	Minimized ³
	Unload/ Reload Method	Replacing-a-Release Method		
Order Planning				
Perform system cleanup tasks	1 to 5	1 to 5		
Reclaim storage and reorganize DLO	3 to 24	3 to 24	Y	
Perform Upgrade Assistant tasks (gathering and analyzing information about current system)	2 to 6	2 to 6		
Perform general planning	3 to 10 days	3 to 10 days		
Upgrade Preparation Tasks				
Perform general preparation	2 to 14 days elapsed time	2 to 14 days elapsed time		
Perform additional preparation and analysis using Upgrade Assistant	2 to 6	2 to 6		
Save entire system for disaster recovery	See note 4	See note 4	Y	

Table 7-8 (Page 2 of 3). Approximate Upgrade Time Range for Large Systems (50GB)

Task	Estimated Time Range (Hours) ¹		Dedicated ²	Minimized ³
	Unload/ Reload Method	Replacing-a-Release Method		
Run disk preparation		3 to 24	Y	
Upgrade Procedures (Downtime)				
Save all non-system information	See note 4	See note 4	Y	Y
Install new hardware	6 to 18	6 to 18	Y	
Configure disks	2 to 4	.5 to 1	Y	
Install OS/400	1 to 2	1 to 2	Y	
Recover addressability to existing disk storage (long IPL) ⁵	---	7 to 19	Y	
Restore system information	2	--	Y	
Restore user information	See notes 6 and 7	--	Y	Y
Install licensed programs ⁸	2 to 6	2 to 6	Y	Y
Install cumulative PTF package	3 to 5	3 to 5	Y	Y
Run object conversion ^{9,10}	3 to 25	4 to 30		Y
Update system customization information	1 to 7	1		Y
Save entire system	See note 4	See note 4	Y	Y
Summary of Total Downtime for Upgrade Procedure¹				
Range for total estimated downtime for upgrade procedure	20 to 69 plus save and restore time	24.5 to 82 plus save time		
Range for total estimated downtime when you use the techniques that are described in "How You Can Influence Downtime" on page 7-14.	More than a weekend	24 to 48		

Table 7-8 (Page 3 of 3). Approximate Upgrade Time Range for Large Systems (50GB)

Task	Estimated Time Range (Hours) ¹		Dedicated ²	Minimized ³
	Unload/ Reload Method	Replacing-a-Release Method		
Notes:				
1	The high end of this time range assumes “worst case” for every line item, which is not typical. For example, your hardware installation may be at the high end because of the complexity of your configuration. But your object conversion time may be at the low end because you have a fast processor, a large amount of main storage, and a relatively small number of programs.			
2	The <i>Dedicated</i> column indicates whether the task requires a dedicated system (no user activity).			
3	The <i>Minimized</i> column indicates whether you can reduce the time for this activity by using the techniques that are described in “How You Can Influence Downtime” on page 7-14.			
4	Use the time that you normally need to save your entire system (option 21 from the save menu).			
5	This includes storage management recovery and authority recovery. The time will be at the high end of this range for a V3R1M0 system with more than 50% disk storage utilization and a large number of documents (DLOs).			
6	As a rough estimate, use twice the time that you normally need to save your entire system (option 21 from the save menu).			
7	The system converts database files during the restore operation.			
8	This represents the average time for installing a typical set of licensed programs.			
9	Object conversion time is shorter for the unload/reload method because the system converts database files during the restore operation.			
10	In general, systems with many program objects will have longer object conversion times than systems with a small number of programs. “Run Object Conversion” on page 7-33 describes how to estimate your object conversion time.			

How You Can Influence Downtime

If you find that your preliminary time range for the upgrade time is too high, following are suggestions on how to reduce your downtime:

Getting experienced assistance

You can consider contracting with a skilled service provider to perform part or all of the upgrade. You may find this helpful if you do not regularly perform system administration activities. See “AS/400 Transition Services Family of Offerings” on page 2-5 for more information.

Cleaning up your current system

The time that you spend during preparation to clean up your system is time used well. If you do not frequently clean up your system, it may have unneeded programs and spooled files, and storage that should be reclaimed. Performing the system cleanup activities reduces the number of objects that are handled during the upgrade, thereby reducing time.

Converting application objects in advance

You can consider getting applications converted before the upgrade weekend. Following are possible methods for doing this:

- Use the Staged Upgrade Offering.
- Contact your application provider to obtain a copy that is converted.

- Load the applications on a system that is already running V3R6M0, convert them, and save them to restore to your system during the upgrade.

Performing your last full save operation in advance

You can perform your last full save operation several days before you start the upgrade. You will need to save changed objects immediately before the upgrade. You will also need to modify the restore procedures to restore changed objects (if you are using the unload/reload method or the side-by-side method). This requires careful planning and increases the complexity of your restore procedures.

Converting objects in parallel

If your system has sufficient resources (main storage), you can save time by running more than one object-conversion job at a time.

Removing program optimization

The system requires significantly more time to convert programs that are optimized. To reduce your program conversion time, you can change programs on your source system so that they are not optimized before you save your program libraries. (Use the CHGPGM, CHGSRVPGM, and CHGMOD commands to change the optimization levels to *NONE.) After you have completed your upgrade and object conversion, you can gradually set optimization levels for your programs again.

Deferring object conversion

You can defer converting libraries that do not contain critical applications until after your system is operational. If users run programs in these libraries, they will be converted, which will impact application performance. You can convert the remaining programs during off-shift hours.

Performing a partial save operation after upgrading

You may choose to perform a partial save operation instead of a full system save operation at the end of the upgrade procedure. Should you need to do a recovery, this would make your recovery process more complex.

Upgrading to V3R1M0 in advance

If your current release of OS/400 is V3R0M5, V2R3M0, or earlier, consider installing V3R1M0 first and using it as your base from which to upgrade. If you are using V3R0M5 or V2R3M0 only consider this if you will not be upgrading to V3R6M0 for several months.) Version 3 Release 1 Modification 0 is significantly larger than previous releases and a large number of conversions occur during installation. If you upgrade from an earlier release, the V3R1M0 conversions also occur during the upgrade. This adds time and complexity to your upgrade.

In addition, if you have PC Support/400, when you upgrade to Client Access for OS/400 (V3R1M0) you must update all PC Support workstations. You can reduce the time that PC Support workstations are unavailable to users for the V3R6M0 upgrade by upgrading to Client Access for OS/400 (V3R1M0) first.

Deferring the restoration of some user libraries

When you are restoring user data (unload/reload method), you can choose to defer restoring some libraries by using the OMITLIB parameter on the RSTLIB display. For example, if you have large libraries that contain history data, you can wait to restore those libraries. Doing this requires a thorough understanding of your system contents and the interaction between applications

and database files. It also requires user education, so that your users will know what will not be available immediately.

Deferring the installation of a secondary language

You may choose to delay adding a secondary language if it is not essential to your organization.

Deferring PTF installation

You may choose to delay installing program temporary fixes (PTFs), although this increases your chances of having problems with your new system.

Upgrading disk configuration in advance

If you need to add new disk units, consider adding them to your current system *before* starting the upgrade if possible. (The load source disk unit cannot be added before the upgrade.) If you add new disk units to your configuration during the upgrade process, you will need an additional 20 to 45 minutes. (The system can add up to 64 disk units at the same time. If you add more than 64 disk units, the time required for the add operation doubles.)

Using the Staged Upgrade Offering

You can use the Staged Upgrade Offering to reduce downtime during the upgrade weekend by doing some or all of the following:

- Applying the V3R6M0 cumulative PTF package.
- Performing object conversion for applications.
- Testing your applications.

“Staged Upgrade Offering—Overview” on page 7-37 provides more information about the Staged Upgrade Offering.

Note: When you are planning your upgrade procedures, the *AS/400 Road Map for Changing to PowerPC Technology* book provides specific suggestions to help you reduce your downtime.

How to Estimate Your Upgrade Time

The topics that follow provide instructions for you to estimate how long it will take you to upgrade your system to PowerPC Technology for both the unload/reload method and the replacing-a-release method.

Make a copy of the work sheet for estimating upgrade time (Table A-11 on page A-21). Complete the work sheet as you read the topics that follow. The topics are in the same sequence as the items that are on the work sheet.

These topics cover the major tasks. Some of the actual upgrade tasks are grouped for estimating purposes (such as “Perform Upgrade Assistant tasks”). These topics and the work sheet are not intended as a step-by-step guide for performing the upgrade procedure.

Although some of these topics use specific information about your system characteristics, you are still creating an **estimate**. Many factors will affect how long your upgrade actually takes, including data characteristics, the performance characteristics of your system (main storage and number of disk units), and your own planning and understanding of the tasks that you perform.

Reclaim Storage and Reorganize Document Library Objects

If you reclaim storage regularly, use the amount of time this operation usually takes. If you have never reclaimed storage or if you do not do so on a regular basis, plan to do this over a weekend. Reclaiming storage can be a long-running procedure. If you use the replacing-a-release method, you will reclaim storage before and after disk preparation.

If you have a large number of document library objects (DLOs), you should also plan to run the RCLDLO procedure on a weekend.

Perform Upgrade Assistant Tasks

When you plan your order and prepare for the upgrade, you need to analyze your current system. Upgrade Assistant for OS/400 includes an upgrade preparation function that gathers information about your system and presents it. During testing, the typical time that was spent working with the information that Upgrade Assistant provides was 2 to 6 hours. It varied based on the number of devices and objects on the system.

Save Entire System

You save your entire system for disaster recovery purposes. (Additional save operations will save partial information, but do not provide a complete copy of your system in the unlikely event that you need to perform disaster recovery procedures.)

Use the amount of time that it took for your last complete system backup (such as option 21 from the Save menu). If you do not know how long it took, you can look at the beginning and ending times in the job log for the save job.

Note: If you save your entire system in advance, you need to save information that has changed since the full system backup. Be sure to allow for the time that you need to save changed objects.

Prepare Disk Storage

Disk preparation is required for the replacing-a-release method. Other methods do not require disk preparation.

To estimate how long disk preparation will take on your system, do the following:

- ___ **Step 1** Sign on with a user profile that has authority to the options on the Upgrade menu.
- ___ **Step 2** Type G0 UPGRADE and press the Enter key.
- ___ **Step 3** If you have already used Upgrade Assistant to gather statistics about your system, skip to 5. Otherwise, select option 10 (Submit upgrade preparation job) from the menu.
- ___ **Step 4** Wait until the upgrade preparation job has finished before you continue.
- ___ **Step 5** From the Upgrade menu, select option 20 (Display disk preparation status) and press the Enter key.

The Display Disk Preparation Status display shows the estimated time (in minutes) that the system needs to prepare your disk units. Write this amount on your work sheet.

Note: Do not start the disk preparation at this time.

___ **Step 6** Press F12 (Cancel).

— Allow more time when planning —

This procedure is valid for estimating your upgrade preparation time. However, your actual time to perform disk preparation may vary significantly from this estimate because of the data and configuration characteristics of your system.

When you are planning your upgrade procedures and developing your project schedule, be sure to allow an extra weekend of buffer between disk preparation and the hardware upgrade in case your disk preparation takes longer than expected.

Save User Information

Upgrade Assistant provides an option to save your entire system except for the operating system. If you are using the unload/reload method or the side-by-side method, you will use these tapes for loading information to your upgraded system. For all upgrade methods, these tapes are important for disaster recovery.

The time that is required for this save procedure will be similar to the time that is required to save your entire system, except that this procedure does not save the QSYS library.

On a typical system, it takes approximately 30 minutes to save the QSYS library. Subtract 30 minutes from your time for a full system save (you estimated this time in "Save Entire System" on page 7-17). This is the estimated time that it will take to save all non-system data (option 30 from the Upgrade menu).

Create Duplicate Tapes

To protect from media error, create a duplicate set of save tapes either by copying the tapes that are described in "Save User Information" or by repeating the steps to create those tapes. Allow time for this process.

Install Hardware

Contact your marketing representative (IBM specialist) for an estimate of how much time the hardware service representative needs for machine downtime and the IPL to DST. This information is available to the marketing representative on the marketing tools (MKTTOOLS) disk as part of the AS400TIM package.

Upgrade the Load Source Unit

For the replacing-a-release method, the hardware service representative runs a utility to upgrade the load source unit from your source system. The estimate for hardware installation time that you receive from your marketing representative does not include this procedure because that estimate is not specific for different upgrade methods.

Allow an hour for this procedure.

Install Base OS/400

The upgrade method that you use determines whether you need to install the base part of OS/400 or simply perform an IPL.

___ **Step 1** Use Table 7-9 to determine if you need to install base OS/400.

___ **Step 2** Use Table 7-10 on page 7-20 to determine the estimated installation time for your model and processor. Use this value as your estimated time for base OS/400 in Table A-11 on page A-21.

Table 7-9. Preloaded Software by Feature Code

Feature Code	Description	Preloaded Software	Software That You Install ¹
0200	Replacing-a-release	Licensed Internal Code	Base OS/400 ²
0201	Unload/reload (MES upgrade)	Licensed Internal Code	Base OS/400 ²
0203	Side-by-side or Unload/reload (new system)	Licensed Internal Code, base OS/400, minimal QGPL and QUSRSYS ³	Perform an IPL ⁴
0202	Staged Upgrade Offering	Licensed Internal Code, base OS/400, minimal QGPL and QUSRSYS (on the temporary machine) ³	Perform an IPL on the temporary machine. ⁴ Install base OS/400 during the final upgrade (when the staged upgrade machine is merged with your source system).

Notes

- 1 For every upgrade method, you must install licensed programs. For installation purposes, optional parts of OS/400 are considered licensed programs. Refer to "Install Licensed Programs" on page 7-29 for more information.
- 2 You want to spread the operating system and licensed programs across all of the available space on all the disk units (old and new) in the system ASP.
- 3 This allows you to move user data from the QUSRSYS library and the QGPL library before you load the optional parts of the operating system and licensed programs.
- 4 There is a small possibility that these preloaded systems could have the wrong primary language. You cannot determine if this is true until you are performing the upgrade. The upgrade procedures direct you how to correct this situation, should it occur. The correction would take approximately 45 to 90 minutes to complete.

Table 7-10. Estimated Installation Time for Base OS/400		
Model	Processor	Installation Time for Base OS/400 (in Minutes)
400	2130	120
	2131	75
	2132	60
	2133	55
40S	2110	55
500	2140	75
	2141	60
	2142	50
50S	2120	45
	2121	45
510	2143	45
	2144	45
530	2150	45
	2151	45
	2152	45
	2153	45
53S	2154	45
	2155	45
	2156	45

Note: These installation times are based on using CD-ROM installation media. If you install from tape (such as for the Staged Upgrade Offering or for DSLO systems), these numbers are not valid. The speed of the CD-ROM is 600 kilobytes per second, which is the same rate as the 6390 tape drive (8mm). The next closest tape speed is 300 kilobytes per second for the new 6380 tape drive (1/4 inch).

These installation times assume that you have applied the PTF that delays conversion of database files with journaled indexes. See "Program Temporary Fixes for Journaled Indexes" on page D-5. If you have not applied this PTF, the IPL during OS/400 installation may be significantly longer.

Perform Storage Management Recovery

Storage recovery occurs automatically during the OS/400 installation procedure. For the replacing-a-release method, this is when the system rebuilds its pointers to all of the data on your existing disk units. (In Table 7-6 on page 7-9 through Table 7-8 on page 7-12, this process is called the "long IPL.")

If you use the replacing-a-release method, you must include the appropriate value from Table 7-11 on page 7-21 in your time estimate.

To calculate the time for storage management recovery, do the following:

- ___ **Step 1** Determine the capacity of the largest disk unit that is attached to your system (and will be attached to your upgraded system). You wrote down the capacity of your largest disk unit in step 11c of "How to Describe Your Current Disk Configuration" on page 6-2.
- ___ **Step 2** Find the capacity of that disk unit in Table 7-11.
- ___ **Step 3** Find the time range for storage management recovery in the table.
- ___ **Step 4** Determine a value within the time range by evaluating the disk utilization. Do this by using the percentage shown in the % *system*

ASP used field on the Work with System Status display. If the value in this field is less than 50%, use a time in the lower end of the range as your time for storage management recovery. If the value in this field is more than 50%, use a time in the higher end of the range as your time for storage management recovery.

For example, if your largest disk unit is 2GB, the time range is 6 to 9 hours. If your disk utilization is 50%, use 6 or 7 hours. If your disk utilization is 80%, use 9 hours.

Table 7-11. Storage Management Recovery during Replacing-a-Release Method

Disk unit capacity	Range for storage management recovery
1GB disk unit	3 - 6 hours
2GB disk unit	6 - 9 hours
4GB disk unit	9 - 12 hours

Perform Authority Recovery

When you use the replacing-a-release method, the system must recover the ownership and authority information for the objects on your system. This process typically takes between 1 and 5 hours. To **estimate** how long the process may take on your system, do the following:

- ___ **Step 1** Use the technique that is described in “How to Determine the Number of Large User Profiles” on page C-1 to gather information about the user profiles on your system. This information is a relative indication of the number of authorities that are stored on your system.
- ___ **Step 2** No formulas are available to calculate authority recovery time. Use the following to estimate where your system will fall within the projected time range (1 to 5 hours):
 - If your system has many profiles (over 1000) or many large profiles (over 200), assume that your authority recovery time will be near the top of the range.
 - If your system has fewer large profiles but the average size is very large (over 200 000 bytes), you can also assume that your authority recovery time will be near the top of the range.
 - If your system has few profiles (less than 200) and very few large profiles (less than 50), you can assume that your authority recovery time will be near the bottom of the range (unless the average size of your large profiles is very large).
- ___ **Step 3** On the work sheet, write your assumption about how long authority recovery will take.

Restore System Information

Allow approximately 30 minutes to 1 hour for this process. If you have a very large number of user profiles and private authorities on your system, you should increase this time estimate.

Reconfigure System Resource Names

During the upgrade, the attachment of some devices on your system changes to a different location. You must correct the system labels for those devices. Allow an hour for this procedure.

Restore Libraries, Documents, and Directories

When you use the unload/reload method or the side-by-side method, you restore all non-system data. Use Table 7-12 to estimate how long it will take you to restore your data. (The steps that follow tell you how to complete the work sheet.)

Table 7-12. Work Sheet for Estimating Restore Time

Item Number	Description					Value
1	Number of megabytes to be restored:					
2	Workload mix selected:					
3		Weighting Factor	Rate	Weighted Rate (Weighting Factor x Rate)	Adjustment ¹	Value (Weighted Rate / Adjustment)
	Mix Name					
	User Environment				1.2	
	Source File				1	
	Large File				1.5	
	DLO				See note 2	
	Logical File				See note 2	
4	Estimated restore rate from table:					
5	Adjusted restore rate:					
6	Estimated restore time:					
1	Use the rate adjustment <u>only</u> if you will have device parity protection on your target system.					
2	The adjustment factors and restore rates for these workloads will be available at a later date in the informational APAR.					

Assumptions for Restore-Time Estimates

- The restore rates assume that your system is in a restricted state during the restore operations.
- The restore rates assume that the target system has sufficient disk devices (access arms) so that the tape device restores at its full rated speed. Following are the minimum disk arms that are required for the tape-unit groups:

Tape Unit Type ¹	Minimum Disk Arms
6380	4
6390	6
9348	6
3490	8
3590	8

¹ Table 7-18 on page 7-27 lists how the tape units are grouped by type.

- The restore rates assume that the disk units (arms) are spread evenly across the system buses to achieve optimal disk response times.

Note: When you use BEST/1 for the AS/400 Capacity Planner to model your proposed configuration, it indicates whether your system will have contention for main storage or disk devices.

- The restore rates assume that optimal choices are made for compaction and compression. Following are the choices that provide optimal restore performance:

Tape Unit Type	Setting for Optimal Restore Performance	
	Hardware Compression	Hardware Compaction
2440	Yes	No
3422	Yes	No
3480	Yes	No
3490E C	Yes	No
3490E E	No	Yes
3590	No	Yes
6378	Yes	No
6379	Yes	No
6380	Yes	No
6390	No	Yes
7208-02	No	Yes
7208-12	No	Yes
9348	Yes	No

- Restore rates do not include time for operator handling, such as for changing tapes.
- Restore rates assume that the configuration has disk units with write/cache if write/cache is typical for that configuration size.
- The restore rates include database conversion time. Table 7-13 on page 7-24 shows how much normal restore rates (saving and restoring to the same release) have been increased to allow for database conversion:

Processor Size	Workload Mix				
	User Environment	Source File	Large File	DLOs	Logical File
Low	---	---	---	---	---
Medium	---	---	---	---	---
High	---	---	---	---	---

Notes about Table 7-13:

1. Data for this table is available in the information APARs (see Table 7-15).
2. Following are the groupings that are used for processor features:

Processor

Group	Processor Feature
Low	2130, 2131, 2140
Medium	2132, 2133, 2141, 2142, 2110
High	All others

3. Table 7-13 assumes that the tape device is typical for the processor feature. Table 7-14 shows the type of tape unit that is considered typical for each processor group:

Processor Group	Tape Group				
	6380	6390	9348	3490	3590
Low	X	X			
Medium		X	X	X	
High				X	X

How to Estimate Your Restore Time

To estimate how long it will take to restore user data, do the following:

- Step 1** Restore rate information was not available at the time that this book was printed. You can get the restore rate information in the informational APARs that are listed in Table 7-15. Information for the DLO and logical file workloads will be available later than information for the other workloads. As more information becomes available for additional workloads (such as the DLO workload), these APARs will be updated.

Order and print the most recent version of the APARs for your current version of OS/400.

OS/400 Release	APAR Numbers
V2R3M0	II09106, II09115
V3R0M5	II09107, II09116
V3R1M0	II09108, II09117

- ___ **Step 2** Estimate how many megabytes of data you will be restoring by doing the following:
- ___ **Step a.** Sign on with a user profile that is enrolled in the system distribution directory.
 - ___ **Step b.** Type GO DISKTASKS and press the Enter key.
 - ___ **Step c.** If you have recently collected disk space information, continue with step 2h.
 - ___ **Step d.** From the Disk Space Tasks menu, select option 1 (Collect disk space information).
 - ___ **Step e.** On the Collect Disk Space Information display, select option 1 (Date/Time) for the *When to collect information* prompt.
 - ___ **Step f.** On the Collect Information Date/Time display, you can either collect information immediately (by specifying *CURRENT) or you can schedule the collection for a time when your system is less busy.
 - ___ **Step g.** When the collection job completes (you receive a message that job QEZDKSPDT has completed normally), continue with step 2h.
 - ___ **Step h.** On the Disk Space Tasks menu, select option 2 (Print disk space information).
 - ___ **Step i.** On the Print Disk Space Information display, type 1 (Select) for the System summary information report. The system submits the report to batch.
 - ___ **Step j.** When the job that creates the report finishes running, display or print the report.
 - ___ **Step k.** To estimate the number of megabytes that you will restore to your target system, add the following sizes from the report:
 - User libraries
 - Folders and documents
 - Other IBM libraries
 - Objects that are not in a library
- Note:** The sizes in the report are in megabytes.
- ___ **Step 3** Write your estimated number of megabytes in item 1 of Table 7-12.
- ___ **Step 4** Table 7-17 uses sample workloads to help you determine what your restore rate will be. Read the information in Table 7-16 to determine which workload is the best match for the information on your system.

Table 7-16. Description of Workload Mixes for Restoring User Data

Workload Name	Description of Workload
User environment	Four libraries (640 objects with a total size of 250MB) are saved with a single SAVLIB command and restored with four consecutive RSTLIB commands. The majority of the total size is represented by 240 files of 1MB each. This combination of data is heavily weighted toward large database files. It is meant to represent a typical daily save of an average customer.
Source file	A single file of 2MB with 200 source members is saved with the SAVOBJ command and restored with the RSTOBJ command. Each member is the same size. This workload represents a worst-case performance scenario because of its large number of very small objects. It is intended to represent an application development system.
Large file	A single file of 200MB is saved with the SAVOBJ command and restored with the RSTOBJ command. This workload is intended to represent systems with very large files.
SAVDLO	<p>1000 documents (9 folders with a combined size of 30MB) are saved with a single SAVDLO command and restored with a single RSTDLO command. All of the documents reside in the first level folder structure.</p> <p>The structure of the documents in the 1000 document workload is that of shared folders function type 1. If the documents were of the shared folders function type 2, they may require up to 50% longer to save and up to 10% longer to restore. The working set size would also increase.</p> <p>This workload does not represent systems with very large DLOs, such as the DLOs that are produced by imaging.</p>
Logical file	A 245MB library consisting of 36 physical files and 115 logical files is saved with the SAVLIB command (ACCPH(*YES)) and restored with the RSTLIB command. This workload is intended to represent complex database networks.

- ___ **Step 5** For most systems, mix 1 (user environment) provides a sufficient representation of the workload for an overall restore-time estimate. If you feel that your system is atypical, you can use a weighted average of the mixes. To use a weighted average, continue with step 8.
- ___ **Step 6** Write your selection for workload mix in item 2 of Table 7-12.
- ___ **Step 7** Continue with step 9.
- ___ **Step 8** In item 3 of the Table 7-12, assign a weighting factor (percentage) to the workload mixes that apply to your system. For example, if you think that 50% of your data is like Mix 1 and 50% is like Mix 3, write .5 in the *Weighting Factor* column next to Mix 1 and Mix 3. The values that you put in the *Weighting Factor* column should add up to 1.

Notes:

- a. You can use the information from the System Summary Information report to help you decide your mix of information (how much disk storage is database files compared to documents and folders).
- b. If you are not sure how many database file members you have, you can use the report that you print when you estimate object-conversion time (“Run Object Conversion” on page 7-33).

___ **Step 9** If you have not already printed the informational APAR that contains restore rates, print it now. Table 7-17 shows an example of the restore-rate table that is available in the informational APAR:

Table 7-17. Estimated Restore Rates (Megabytes per Hour)–Sample

Processor	Tape Device	Workload Mix				
		User Environment	Source File	Large File	DLOs	Logical File
Model 400						
2130	6380	<i>nn.n</i>	<i>nn.n</i>	<i>nn.n</i>	<i>nn.n</i>	<i>nn.n</i>
	6390	<i>nn.n</i>	<i>nn.n</i>	<i>nn.n</i>	<i>nn.n</i>	<i>nn.n</i>
	9348	<i>nn.n</i>	<i>nn.n</i>	<i>nn.n</i>	<i>nn.n</i>	<i>nn.n</i>
	3490	<i>nn.n</i>	<i>nn.n</i>	<i>nn.n</i>	<i>nn.n</i>	<i>nn.n</i>
	3590	<i>nn.n</i>	<i>nn.n</i>	<i>nn.n</i>	<i>nn.n</i>	<i>nn.n</i>

___ **Step 10** In the left-hand column of the table that you printed, locate the processor feature for your target system.

___ **Step 11** Locate the row that shows the combination of your processor feature and the type of tape unit that you will use to restore user data.

The restore-rate table lists representative tape units. If your tape unit is not listed in the table, use the following information to select a tape unit that has equivalent performance:

Table 7-18. Grouping of Tape Units by Type

If your tape unit is this type:	Select the restore rate for this tape unit:
6378	6380
6379	6380
7208-02	6390
7208-12	6390
3422	9348
2440	9348
3480	3490

___ **Step 12** If you are using more than one workload mix (you have assigned percentages in Table 7-12), continue with step 16.

___ **Step 13** Read across the row to the cell (box) that shows the rate for the workload mix that you have selected (item 2 on the work sheet). Write the rate in item 4 on the work sheet.

___ **Step 14** If you will have device parity protection on your target system, adjust (divide) the rate in item 4 by the appropriate value for your workload mix:

User environment	1.2
Source file	1
Large file	1.5

Write the adjusted rate in item 5 on the work sheet. For example, if your rate from the table is 25 and you are using the user-environment workload, your adjusted rate is 20.83 (25 / 1.2).

___ **Step 15** Continue with step 21.

___ **Step 16** Read across the row to the cells (boxes) that show the rates for the workload mixes that you have selected on the work sheet. Write the rates in the *Rate* column of item 3 on the work sheet.

___ **Step 17** For each mix that you are using, multiply the value in the *Weighting Factor* column by the value in the *Rate* column. Write the result in the *Weighted Rate* column.

___ **Step 18** The total of the *Weighted Rate* column should be between the rates for the workloads that you have chosen. Following is an example:

Mix	Weighting Factor	Rate	Weighted Rate	Adjustment	Value
User environment	.5	25	12.5	1.2	10.42
Large file	.5	40	20	1.5	13.33
Total			32.5		23.75

(The value 32.5 is between the rates of 25 and 40.)

___ **Step 19** If you will have device parity protection on your target system, divide the value in the *Weighted Rate* column by the value in the *Adjustment* column. Write the result in the *Value* column.

If you will not have device parity protection on your target system, transfer the values from the *Weighted Rate* column to the *Value* column.

___ **Step 20** Add the results of all the entries in the *Value* column. Write the total in item 5 on the work sheet.

___ **Step 21** Multiply megabytes to be restored (item 1) times the adjusted restore rate (item 5). Write the result in item 6 on Table 7-12. This is your total estimated time to restore user data.

___ **Step 22** Write this time on work sheet for estimating your total upgrade time (Table A-11 on page A-21) also.

Install Licensed Programs

All upgrade methods require that you install licensed programs. For installation purposes, IBM-supplied libraries QGPL and QUSRSYS and optional parts of OS/400 are considered licensed programs.

The size and complexity of a licensed program are primary factors that determine the installation time required. The time needed for the installation of licensed programs is also influenced by the speed of the processor and the speed of the installation device used. The *installation process* used also affects the installation time for licensed programs.

The system determines, based on available system resources, whether licensed programs are installed by the single-process or the multiprocess installation method. A *single-process installation* is when licensed programs are installed one at a time (sequentially). This occurs when you select only one licensed program to install. The single-process method is also used when main storage or auxiliary storage is limited, or when a licensed program exceeds requirements for the multiprocess installation method. A *multiprocess installation* is when the system starts multiple jobs to perform the installation of two or more licensed programs at the same time. For any set of licensed programs, single-process installations take more time.

Note: Because of the unique combination of conditions affecting installation time for your system, it is not possible to provide meaningful estimates for multiprocess installation. When you use Table 7-19 on page 7-30, the result is an estimate of the time needed to install all of your selected products by the single-process method. Such an estimate (based on the single-process method) provides a maximum expected time for installing licensed programs. Since the system attempts to use the multiprocess method whenever possible, your actual installation time should be somewhat less than the value you arrive at by using Table 7-19 on page 7-30.

Use Table 7-19 on page 7-30 to estimate the single-process installation time for the licensed programs you plan to install.

Table 7-19 (Page 1 of 3). Licensed Program Installation Time Work Sheet

Action and What to Include	Value
<p>Step 1. Determine the total base time for the licensed programs that you are <u>replacing</u>.</p> <p>a. Identify the licensed programs and optional parts that are currently installed on your system and that you plan to replace. You can use your completed copy of Table A-6 on page A-7 to assist you with this task. (If you have not yet completed the master installation list, you can still use it to create a preliminary estimate. You should verify your estimate after you complete the master installation list.)</p> <p>Notes:</p> <ol style="list-style-type: none"> 1) If you are replacing all software, be sure to include values for OS/400 libraries QGPL and QUSRSYS. 2) If you plan to use the Staged Upgrade Offering, use this step to determine the time to replace licensed programs during the final upgrade (when the staged upgrade machine is merged with your source system). <p>b. For the licensed programs and optional parts that you identified, add the values shown in the <i>Base Value A</i> column of Table B-4 on page B-19. The sum is your base time in minutes for replaced licensed programs. Write this sum here.</p>	

Table 7-19 (Page 2 of 3). Licensed Program Installation Time Work Sheet

Action and What to Include	Value
<p>Step 2. Determine the total base time for the licensed programs and optional parts that you are <u>adding</u> to your system for the first time.</p> <p>a. Identify the licensed programs and optional parts that you are adding to your system. If you have completed your copy of Table A-6 on page A-7, you can use it to identify these products (you should <u>not</u> have an entry in the <i>Currently Installed Release</i> column of the master installation list). Otherwise, refer to Table B-1 on page B-3.</p> <p>Notes:</p> <p>1) If you are installing a new AS/400 <u>and</u> you are not moving user data from an earlier release of OS/400, include all the licensed programs and optional parts that you plan to install. Be sure to include values for OS/400 libraries QGPL and QUSRSYS.</p> <p>2) If you plan to use the Staged Upgrade Offering, use this step to determine the time needed to install licensed programs on the temporary machine. You do not need to include the time to install licensed programs on the temporary machine as part of your system downtime.</p> <p>b. For the licensed programs and optional parts that you identified, add the values shown in the <i>Base Value B</i> column of Table B-4 on page B-19. The sum is your base time in minutes for added licensed programs. Write this sum here.</p>	
<p>Step 3. Add the base values shown in steps 1 on page 7-30 and 2 on page 7-31.</p>	
<p>Step 4. Use Table 7-20 on page 7-32 to determine the multiplication factor to use for your model and processor. Write the value here.</p>	

Table 7-19 (Page 3 of 3). Licensed Program Installation Time Work Sheet

Action and What to Include	Value
<p>Step 5. Multiply the time shown in step 3 on page 7-31 by the value in step 4 on page 7-31. The result is your estimated maximum value for installing licensed programs (in minutes). Use this value for the licensed program installation time in Table A-11 on page A-21.</p>	
<p>Note:</p> <p>The estimated time that you determine with this work sheet is for a single-process installation. Expect some variation in the value you determine for the licensed programs you estimated in step 1 on page 7-30. CD-ROM is the only valid installation device. These values are not accurate if you install from tape (for DSLO or for Staged Upgrade Offering). The speed of the CD-ROM is 600 kilobytes per second, which is the same rate as the 6390 tape drive (8mm). The next closest tape speed is 300 kilobytes per second for the new 6380 tape drive (1/4 inch).</p>	

Table 7-20. Estimating Licensed Program Installation Time: Multiplication Factor

Model	Processor	Multiplication Factor for Licensed Programs
400	2130	1.19
	2131	1.17
	2132	1.15
	2133	1.14
40S	2110	1.14
500	2140	1.17
	2141	1.15
	2142	1.13
50S	2120	1.08
	2121	1.03
510	2143	1.08
	2144	1.03
530	2150	0.99
	2151	0.92
	2152	0.92
	2153	0.92
53S	2154	0.92
	2155	0.92
	2156	0.92

The following topics provide more information:

- “Conditions That Affect Installation Time” on page B-24.
- “Multiprocess Installation—Overview” on page B-26.
- “Additional Requirements for Multiprocess Installation” on page B-26.

Run Object Conversion

The system must convert database and program objects from IMPI format to PowerPC AS format before you can use the objects on your upgraded system. In most cases, you will run procedures to perform object conversion as part of your upgrade procedures (instead of letting the system convert objects when the objects are first used). This topic describes how to estimate how long object conversion will take on your system.

Note: To use the command for estimating object conversion (ESTOBJCVN), you must have the latest Upgrade Assistant PTFs installed. The object conversion command is included in the following PTF numbers:

Version	PTF Number
V2R3M0	SF27190
V3R0M5	SF27188
V3R1M0	SF27189

Assumptions for Estimating Object Conversion

- The ESTOBJCVN command estimates conversion time for programs in the following high-level languages:

RPG
COBOL
C
CL

If you have observable programs in other high-level languages (such as BASIC or PASCAL), the system will convert those programs. That conversion time is not included in the estimated conversion time for the library.

Note: The *Programs Not Available* column on the ESTOBJCVN report lists the number of programs that are not included in the estimated time, such as programs in BASIC or PASCAL or programs whose attribute is blank.

- The optimization level of programs has a significant impact on the program conversion time. The program that estimates conversion time uses the size of the program and the optimization level. The estimating program assumes that programs on your target system will retain their current optimization level. If you choose to specify OPTIMIZE(*NO) when you use the CHGPGM command (or the CHGSRVPGM and CHGMOD commands), this will reduce your object conversion time.

If you want to estimate the effect of removing optimization, you need to remove optimization on your source system and run the ESTOBJCVN command again.

- Predictions for the time to convert programs and database files are based on running a single-threaded job on a dedicated system. If you choose to run more than one conversion job at the same time, you must make some allowance for the contention for system resources. For example, if the total estimated time to convert all user libraries on a 64MB system is 14 hours, you cannot assume that you can convert the same libraries in 7 hours if you have 2 concurrent jobs with 64MB each.
- When you specify the main storage size of your system, the estimating program assumes that object conversion will run in a storage pool that is large (relative to your overall main storage size). The program assumes the following pool sizes:

Main Storage Size	Pool Size
32MB	16MB
64MB	40MB
128MB	80MB
192MB	160MB

Note: In testing, dedicating more than 192MB to a single object-conversion job did not produce noticeable performance gains.

For example, if you plan to run object conversion in batch, this would be the size of the storage pool for batch jobs (usually the storage pool for the QBATCH subsystem).

- For bound programs, the estimating program determines the optimization level by taking the optimization level used by the majority of the modules in the bound program. If the bound program contains modules that use more than one high-level language, the estimating program uses the language type with the slowest conversion performance.
- The estimated time for database file conversion assumes no conflicting activity in the library during the object conversion process. If the system is rebuilding access paths in a library at the same time that it is converting database files, conversion time for database files will be longer than the estimated time.
- Every database member has one or more underlying internal system objects. The number of internal objects depends on the characteristics of the database member. The estimating program calculates the conversion time for the underlying objects. Therefore, you may see differences in estimated conversion times for the same number of database members in different libraries.
- Conversion time for database files is difficult to predict accurately because of wide variations in data characteristics and in the complexity of file definitions. The estimating program uses a conservative formula to allow for these variations. You may experience database conversion times that are significantly lower than the estimated conversion times on the report.
- For server models, the estimating program assumes that object conversions will be run as batch jobs rather than as interactive jobs.
- On the ESTOBJCVN report, object conversion times for each library are rounded to the nearest minute. If the total conversion time is less than 1 minute, the report shows 1 minute. Internally, the estimating program calculates by using seconds to produce the final total for the *ALLUSR value. Therefore, because of rounding, the total time for *ALLUSR may not equal the total of the times that are printed for each individual library.

How to Estimate Object Conversion Time

To estimate object conversion time, do the following:

- ___ **Step 1** Type SBMJ0B and press F4 (prompt). You see the Submit Job (SBMJ0B) display.
- ___ **Step 2** For the *Command to run* parameter, type ESTOBJCVN and press F4. You see the Estimate Object Conversion (ESTOBJCVN) display.

```

ESTIMATE OBJECT CONVERSION (ESTOBJCVN)

TYPE CHOICES, PRESS ENTER.

LIBRARY . . . . . NAME, *ALLUSR
CPU FEATURE . . . . . 2110, 2120, 2121, 2130...
MAIN STORAGE SIZE . . . . 32, 64, 128, 192

```

Note: Because this command was added as a late PTF to Upgrade Assistant, the display will appear in English, even if the primary language on your system is not English.

___ **Step 3** For the *LIBRARY* parameter, type *ALLUSR.

Note: You can specify an individual library instead of *ALLUSR. For your first estimate, you will probably want to specify *ALLUSR.

___ **Step 4** For the *CPU FEATURE* parameter, type the feature of the processor that you will have on your upgraded system (the processor where you will run object conversion).

___ **Step 5** For the *MAIN STORAGE SIZE* parameter, type the amount of main storage that you will have on your upgraded system. If your system will have more than 192MB, use the value 192.

Note: In testing, dedicating more than 192MB to a single object-conversion job did not produce noticeable performance gains.

___ **Step 6** Press the Enter key. You see the Submit Job (SBMJOB) display again with the parameters filled in for the ESTOBJCVN command.

___ **Step 7** Press the Enter key again. You receive a message that the job has been submitted to batch.

The system runs a job that examines all of the program objects and database objects on your system. It produces a report similar to Figure 7-1:

ESTIMATE OBJECT CONVERSION REPORT						
CPU FEATURE NUMBER : 2130						
MEMORY SIZE: 64						
LIBRARY NAME	NUMBER OF PROGRAMS ESTIMATED	ESTIMATED PROGRAM CONVERSION TIME (HH:MM)	NUMBER OF PROGRAMS EXCLUDED	NUMBER OF DATABASE MEMBERS	ESTIMATED DATABASE CONVERSION TIME (HH:MM)	TOTAL ESTIMATED CONVERSION TIME
ABCLIB	260	1:15	28	146	0:20	1:36
XYZLIB	50	0:28	10	28	0:07	0:35
*ALLUSR	310	1:42	38	154	0:25	2:08

Figure 7-1. Sample Object Conversion Report

___ **Step 8** When you run the report for *ALLUSR, it includes only libraries that are saved when you specify *ALLUSR. If you have user libraries whose names begin with the letter Q, you will need to run the

ESTOBJCVN command individually for those libraries. For example, you might have a library named QUALITY on your system.

To run the report again, repeat steps 1 through 7. For the *LIBRARY* parameter, specify the name of library whose name begins with Q.

- ___ **Step 9** If you are using the unload/reload method or the side-by-side method, use the values from the *Estimated Program Conversion Time* column to estimate your object conversion time. (Database conversion occurs when you restore. It is included in the restore rates in Table 7-17 on page 7-27.)

If you are using the replacing-a-release method, use the values from the *Total Estimated Conversion Time* column.

- ___ **Step 10** If you plan to convert only critical libraries during the upgrade process (and defer converting other libraries until later), calculate the conversion time for those libraries instead of using the *ALLUSR value.

- ___ **Step 11** Add the conversion time for Q libraries that you printed individually to the total time from previous steps.

- ___ **Step 12** Write your estimated conversion time on the work sheet.

Perform an IPL

A normal IPL is required. If you load and apply the cumulative PTF package you do not need to include extra time for this IPL.

Use the time needed to perform an IPL on your current system.

Install the Cumulative PTF Package

The *AS/400 PTF Shipping Information Letter* shipped with your software order contains time estimates for loading the cumulative package. For order planning purposes, use the time needed to load the cumulative package during the last software upgrade on your system.

Note: You will need to update this time estimate when you receive the *AS/400 PTF Shipping Information Letter*.

Save Your Entire Upgrade System

The time needed to save your system after the upgrade could take longer than the time needed on your current system because the objects have grown. Also, if you are using the replacing-a-release method and you have not completed object conversion, the system converts database files during the save operation. This will increase the time for the first save operation.

Perform Post-Installation Tasks

Allow time to perform post-installation tasks. This can include, but is not limited to, installing client access code on workstations, configuring TCP/IP, setting usage limits for licensed programs, and installing the softcopy information library. Your experience is your best guide for what needs to be completed and how long it takes.

Test Your System and Applications

Allow time to test your applications.

Staged Upgrade Offering—Overview

Many times, the parts that are required to upgrade an existing system to PowerPC AS hardware are nearly sufficient to construct a temporary, stand-alone operational system. Because of this, the Staged Upgrade Offering is available for many MES upgrades for an additional charge. IBM's intent with the Staged Upgrade Offering is to provide enough equipment with the MES so that you can construct a limited test environment at minimal additional expense. You will need to purchase or rent some additional equipment, such as disk units, tape attachment features, or a workstation controller, to construct a configuration that is suitable for object conversion and limited testing.

You can use the Staged Upgrade Offering for both the unload/reload method and the replacing-a-release method. Your marketing representative can help you determine whether the Staged Upgrade Offering is available for your configuration and whether it is appropriate for your situation. The Staged Upgrade Offering may reduce the time that your system is unavailable during the upgrade. However, careful planning and technical skills are necessary to use this offering effectively.

With the Staged Upgrade Offering, the hardware service representative uses your MES to install a temporary AS/400 with PowerPC technology (called the **temporary machine**). Installing the temporary machine does not affect your current system unless you choose to move some hardware from your current system to the temporary machine. This temporary machine is limited in size. For example, a standard MES includes the disk unit that contains the load source. Most of this disk unit is required to hold the operating system. You can also attach any additional disk units that you ordered as part of your upgrade.

The temporary machine will not be equivalent in capacity to your existing system, and it is not intended to be used for a complete parallel test. You may want to purchase or rent additional equipment, such as disk units, tape drives, or communications hardware, to increase your test capabilities. If you require a complete parallel test, either you should use the side-by-side method, or you should contract with an organization that has a complete configuration available.

When you order the Staged Upgrade Offering with the unload/reload method or the replacing-a-release method, you can use the temporary machine for up to 21 days. You may not use the temporary machine for any production work. This is a legal and accounting requirement. At the end of the test period, the hardware service representative combines the temporary machine with components from your existing system to create your final configuration.

Staged Upgrade Offering—Purposes

You can use the temporary machine for several purposes:

- You can test one or more sample applications to ensure compatibility.
- You can run object conversion procedures for one or more applications to help you estimate the time that will be required for the actual upgrade.
- You can restore one or more libraries to help you estimate the time that will be required to restore your system (unload/reload method).
- You can convert application programs and save them. After the upgrade, you can restore the converted programs rather than having to convert them again. This can reduce the total time required for the upgrade process.
- You can apply the latest program temporary fixes (PTFs) to the Licensed Internal Code, OS/400, and the other licensed programs that you have ordered. You can then save them to tape and use the tape to load the Licensed Internal Code, OS/400, and licensed programs when you perform the final upgrade. This can reduce the total time that is required for the upgrade process.

Note: To benefit from applying OS/400 PTFs, your staged upgrade machine must have a tape drive that is compatible with the tape drive on your target system.

Staged Upgrade Offering—Other Alternatives

The Staged Upgrade Offering is just one method available to make sure that you are ready to upgrade or to reduce the actual upgrade time. Other options include the following:

- Talking to others who have upgraded to compare their experiences with your expectations and time requirements.
- Using time on another AS/400 with PowerPC technology to convert programs or test applications. The AS/400 with PowerPC technology may be in your organization, or you may rent time from another organization.
- Getting a V3R6M0 copy of your applications from your application provider.
- Using IBM service offerings to handle upgrade planning, project management, and installation.

Method Comparisons—Supporting Information

This topic provides more detailed information about how the different upgrade methods compare. Use it if you are having difficulty in choosing the correct method or if you want more information about the method that you have chosen.

Figure 7-2 on page 7-39 provides a comparison of the upgrade methods and shows the impact of the Staged Upgrade Offering. The figure does not use an accurate numeric scale but is intended to provide a visual image of how the methods compare in different areas.

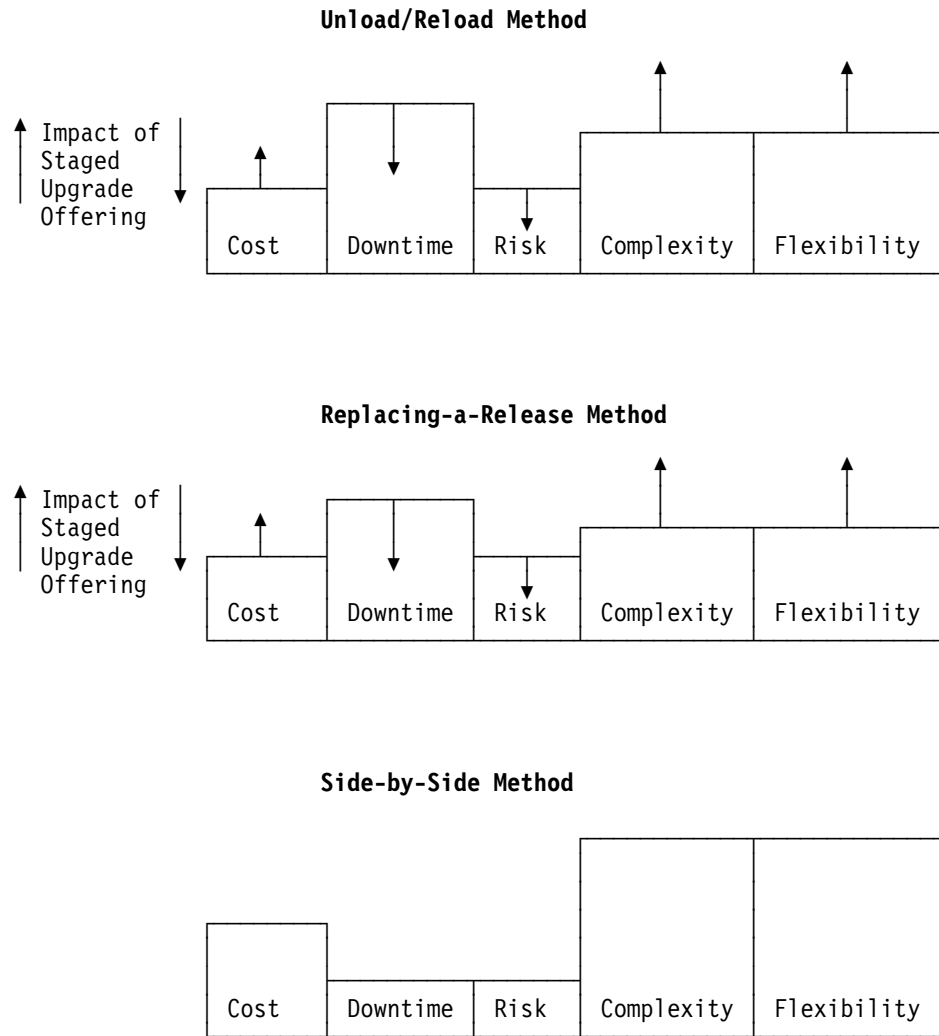


Figure 7-2. Comparison of Upgrade Methods—Visual Image

Table 7-21 on page 7-40 provides supporting information for the comparisons in Figure 7-2:

Table 7-21 (Page 1 of 4). Comparison of Upgrade Methods—Supporting Detail

Method or Offering	Relative Rating	Notes
Cost of hardware and software		
Unload/reload	Low	The cost includes the hardware and new versions of licensed programs (if you do not currently have Version 3). It may also include additional disk units and other peripherals (tape, communications, LAN attachment).
Replacing-a-release	Low	The cost includes the hardware and new versions of licensed programs (if you do not currently have Versions 3). It may also include additional disk units and other peripherals (tape, communications, LAN attachment).
Side-by-side	High	You install a complete new system, which includes duplication of many of the attached devices, such as disk units, workstations, and communications hardware. You may need additional hardware and software to connect your two systems during testing. The processor has a new serial number, which may have financial and tax implications.
Staged Upgrade Offering	Increases	The cost increases by the cost of the offering plus additional hardware (disk units, attachment features). Also, additional space and power outlets are required.
Length of time that your system is unavailable while you prepare for the upgrade. (May occur several weeks before the upgrade procedure.)		
Unload/reload	Low	Downtime for preparation should be the same as for the side-by-side method. You should perform cleanup tasks (such as permanently applying PTFs and reclaiming storage) before you begin to move data. Some cleanup tasks require a dedicated system.
Replacing-a-release	High	In addition to the cleanup tasks, you must prepare your data for the change to disk units that occurs during the upgrade. This preparation requires a dedicated system. It can be done in steps over a several-week period.
Side-by-side	Low	Downtime for preparation should be the same as for the unload/reload method. You should perform cleanup tasks (such as permanently applying PTFs and reclaiming storage) before you begin to move data. Some cleanup tasks require a dedicated system.
Staged Upgrade Offering	No impact	

Table 7-21 (Page 2 of 4). Comparison of Upgrade Methods—Supporting Detail

Method or Offering	Relative Rating	Notes
<i>Length of time that your system is unavailable during the upgrade.</i>		
Unload/reload	High	Your system will be unavailable from the time that you begin your final save operation until you have restored your entire system and performed object conversion for critical applications. You may choose to defer converting some application programs until later.
Replacing-a-release	Medium	Your system will be unavailable from the time you begin your final save operation until you have installed the operating system and converted the objects for your critical applications. You may choose to defer converting some application programs until later.
Side-by-side	Low	You will probably want to quiesce your system while you save data to be moved to the test system. You can use the save-while-active function to minimize this time.
Staged Upgrade Offering	Reduces	You can use the temporary machine to perform tasks that will reduce the down time, such as installing PTFs and converting objects.
<i>Risk of unexpected downtime during upgrade process.</i>		
Unload/reload	Medium	It may be difficult to accurately estimate the time that is required to restore your entire system and to convert the objects for critical applications. You may also need to recover from media errors. This can cause your downtime to be longer than you expected.
Replacing-a-release	Low	It may be difficult to accurately estimate the time that is required to convert the objects for critical applications. This can cause your downtime to be longer than you expected.
Side-by-side	Very low	Unexpected problems in installing the new system or moving user data and programs will not affect the production system.
Staged Upgrade Offering	Reduces	You can use the staged upgrade machine to assist with time estimates. This can reduce the chance that your downtime will be longer than expected.

Table 7-21 (Page 3 of 4). Comparison of Upgrade Methods—Supporting Detail

Method or Offering	Relative Rating	Notes
Risk of unexpected application problems.¹		
Unload/reload	Low	AS/400 Advanced Architecture isolates your applications from the differences in the hardware and the machine instructions set. However, the risk is higher than with the side-by-side method, unless you either test your applications at another site before starting the upgrade or use the Staged Upgrade Offering.
Replacing-a-release	Low	AS/400 Advanced Architecture isolates your applications from the differences in the hardware and the machine instructions set. However, the risk is higher than with the side-by-side method, unless you either test your applications at another site before starting the upgrade or use the Staged Upgrade Offering.
Side-by-side	Very low	You will have tested your applications before you move your new AS/400 with PowerPC technology into production.
Staged Upgrade Offering	Reduces	You can use the staged upgrade machine to test applications that have caused problems during other release upgrades.
Complexity of planning and managing the process.		
Unload/reload	Medium	You must ensure that you use the correct procedures for restoring system information. You must also determine when to convert objects for critical applications.
Replacing-a-release	Low	You must determine when to convert objects for critical applications.
Side-by-side	High	You must manage the process of resynchronizing your applications when you are ready to move your new AS/400 with PowerPC technology into production.
Staged Upgrade Offering	Increases	You must plan how to use the staged upgrade machine. You must manage the movement of data and the use of limited hardware resources on the staged upgrade machine.
Complexity of installing IBM-supplied software		
Unload/reload	Medium	The process for installing OS/400 is similar to installing on a new system. When the operating system is preloaded, you must verify the primary language. The process for installing licensed programs is similar to a manual installation, where the licensed programs that are installed are replaced.
Replacing-a-release	Low	The process is similar to the manual installation process for replacing software.
Side-by-side	Low to medium	The operating system is preloaded, but you must verify the primary language. The process for installing licensed programs is similar to a manual installation, where the licensed programs that are installed are replaced.
Staged Upgrade Offering	Increases	IBM-supplied software must be installed once on the staged upgrade machine and again during the final upgrade process.

Table 7-21 (Page 4 of 4). Comparison of Upgrade Methods—Supporting Detail

Method or Offering	Relative Rating	Notes
Flexibility of the process		
Unload/reload	Low	You can stage the conversion of objects by library.
Replacing-a-release	Low	You can stage the conversion of objects by library.
Side-by-side	High	You can stage testing and the movement of applications in any way that meets your needs.
Staged Upgrade Offering	Increases	The Staged Upgrade Offering provides additional flexibility for testing, converting objects, and applying PTFs.
Flexibility of changing disk configuration		
Unload/reload	High	You can add and remove disk units at the same time that you upgrade your processor. You must configure all disks during the upgrade process. Therefore, you can make changes to ASP configuration and disk protection at the same time.
Replacing-a-release	Low	Your ability to change disk configuration during the upgrade process is limited: <ul style="list-style-type: none"> You cannot remove disk units from your configuration during the upgrade process. This must be done before or after the upgrade. You can add new disk units during the upgrade process. You should not change your disk protection (such as starting or stopping mirrored protection) until after you have completed the upgrade process.
Side-by-side	High	Because you are installing a new system, you can configure disk units and disk protection in any way that you want. The disk configuration on your target system does not need to match the disk configuration on your source system.
Staged Upgrade Offering	No impact	
¹ You should base your assessment of the likelihood of application problems on your experiences with prior release upgrades. If you usually have application problems after an upgrade, you are more likely to have problems after this upgrade.		

Before you continue...

Complete the questionnaire for selecting your upgrade method (Table A-9 on page A-17). On the planning work sheet (Table A-10 on page A-20), enter your choice of upgrade method and whether you will use the Staged Upgrade Offering.

How to Plan Additional Hardware for the Staged Upgrade Offering

If you want to use the Staged Upgrade Offering, you need to plan how you will use it. You must then make arrangements for any additional hardware that you need for the test period. The use of the Staged Upgrade Offering is flexible. Therefore, every organization's needs for additional hardware will differ. Following are some examples of possible hardware requirements:

- Connection capability with your existing system. In addition to tape, you can use object distribution or ObjectConnect to move data between your source system and the staged upgrade machine. This requires one of the following:
 - Communications link.
 - Local area network (LAN) link.
 - Optical fiber bus (OptiConnect for OS/400)—ObjectConnect only.

You may need to add features to your current system and to your staged upgrade machine.

Note: To use ObjectConnect, your source system must be running V3R1M0.

- A tape unit and attachment feature or a method for sharing a tape unit between your current system and your staged upgrade machine. If one of your objectives for the staged upgrade machine is to apply PTFs to the Licensed Internal Code and the operating system, you must be able to attach a tape unit to your temporary machine that is compatible with the tape unit that you will have on your target system. Tape is the only media supported by the Save System (SAVSYS) command. The SAVSYS command does not support save files.
- Additional disk units. If you want to test an entire application, you need sufficient disk capacity to hold the programs and test files. The standard configuration for the staged upgrade machine has very limited disk capacity available after the OS/400 licensed program is loaded.

Notes:

1. If you are ordering additional hardware that is separate from your upgrade order, make sure that you arrange for the additional hardware to be installed. You must also do this if you plan to move hardware (such as IOPs) between systems. If you are unsure, work with your marketing representative or contact your hardware service provider to set up a hardware installation schedule.
2. For more information about OptiConnect for OS/400 and ObjectConnect, see the following:

OptiConnect for OS/400 (V3R1M0)	<i>OptiConnect for OS/400 Programming RQP P8427 Install, Operation, and Service Guide Version 3, SC24-5715</i>
OptiConnect for OS/400 (V3R6M0)	<i>OptiConnect for OS/400, SC41-4414</i>
ObjectConnect (V3R1M0)	<i>ObjectConnect/400 RPQ P82244 Installation, Operation, and Service Guide</i>
ObjectConnect (V3R6M0)	<i>Backup and Recovery – Basic book</i>

Before you continue...

On the planning work sheet (Table A-10 on page A-20), list the additional hardware that you need.

How to Plan Additional Hardware for the Side-by-Side Method

If you plan to use the side-by-side method, you may need to add hardware (and software) to your source system. Make an initial decision about how you want to synchronize information between your source and target systems. Then determine what you need to order to provide the support for your synchronization method. Some options include the following:

- Using a dual-systems approach to keep the source and target systems fully synchronized. You can use OptiConnect for OS/400 and ObjectConnect to do this. (ObjectConnect requires V3R1M0 on your source system.) Other solutions are also available from software providers to support dual systems.
- Synchronizing your systems periodically by saving and restoring changed objects or by using journal entries. You can use save files and object distribution over a communications connection to do this. Or you can save and restore by using tape.
- Restoring all of your information once when you install your target system and again when you are ready to put your target system into production. You need compatible tapes drives on both systems to do this.

Notes:

1. If you are ordering additional hardware that is separate from your upgrade order, make sure that you arrange for the additional hardware to be installed. You must also do this if you plan to move hardware (such as IOPs) between systems. If you are unsure, work with your marketing representative or contact your hardware service provider to set up a hardware installation schedule.
2. For more information about OptiConnect for OS/400 and ObjectConnect, see the following:

OptiConnect for OS/400 (V3R1M0)	<i>OptiConnect for OS/400 Programming RQP P8427 Install, Operation, and Service Guide Version 3, SC24-5715</i>
OptiConnect for OS/400 (V3R6M0)	<i>OptiConnect for OS/400, SC41-4414</i>
ObjectConnect (V3R1M0)	<i>ObjectConnect/400 RPQ P82244 Installation, Operation, and Service Guide</i>
ObjectConnect (V3R6M0)	<i>Backup and Recovery – Basic book</i>

Before you continue...

On the planning work sheet (Table A-10 on page A-20), list the additional hardware that you need.

Chapter 8. How to Place Your Order

The order that you place to upgrade your current system to AS/400 with PowerPC technology can have several parts:

- Your desired configuration. This includes the processor model, main storage, disk units, IOPs, and attachment features. Your marketing representative can use a tool, such as the AS/400 configurator (CFAS400), to create a workable configuration.
- What you need to order to get from your existing system to your desired configuration:
 - You may need to order an entire configuration (side-by-side method or unload/reload method).
 - You may need to order a processor, new disk units, and other devices. You will merge this new configuration with devices from your current system (unload/reload method).
 - You may need to order the parts that the hardware service representative needs to convert your existing system to the new system (replacing-a-release method or unload/reload method). This type of IBM order is called a Miscellaneous Equipment Specification (MES). You and your marketing representative can use the Enhanced Upgrade Order Process (EUOP) to assist with the MES order. See “Enhanced Upgrade Order Process (U.S. Only)–Overview.”
- For the Staged Upgrade Offering, additional equipment that you need to meet your testing needs. This may include disk units, communications hardware and software, workstations and controllers, or a tape attachment feature.
- Changes that you need for your current system before or during the upgrade, such as the following:
 - For the side-by-side method, hardware and software to interchange information between your source and target systems.
 - For the replacing-a-release method, additional disk units to replace disk units that are not supported or to provide sufficient capacity for running disk preparation.
 - For the Staged Upgrade Offering, hardware and software to connect your current system to the temporary machine.

Enhanced Upgrade Order Process (U.S. Only)–Overview

When you and your marketing representative use the Enhanced Upgrade Order Process (EUOP), the AS/400 configuration program (CFAS400) compares your current configuration with your desired configuration and configures the MES order automatically. This simplifies the work that you and the marketing representative have to perform and ensures that the MES order is correct. The EUOP is available only for systems that can be upgraded, which means that your system must be running V2R3M0 or a later version of the OS/400 licensed program. To use EUOP, electronic customer support must be operational on your system.

Figure 8-1 on page 8-2 provides an overview of the EUOP:

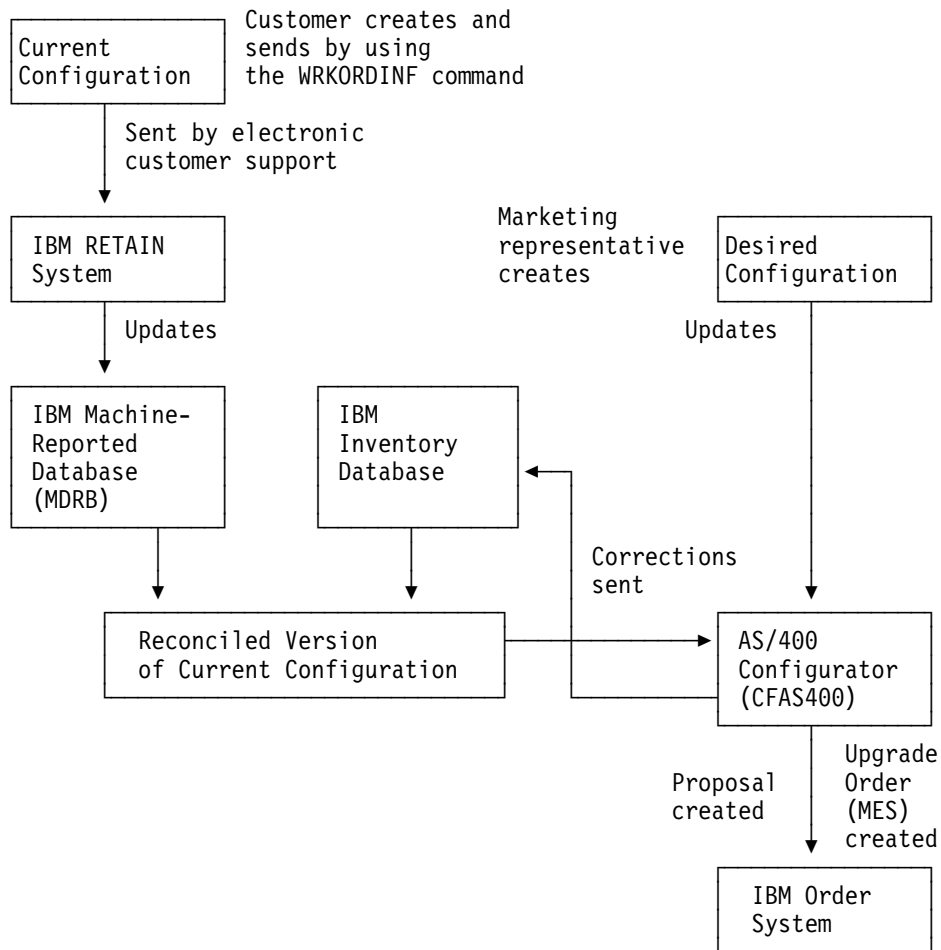


Figure 8-1. Enhanced Order Upgrade Process—Overview

The EUOP uses two sources of information:

- You (the customer) use the Order menu on the AS/400 system to send a current record of your hardware configuration to IBM. The configuration is sent to the IBM RETAIN system by using electronic customer support. (See “How to Use the Enhanced Upgrade Order Process.”)
- The marketing representative uses the AS/400 configurator to define your desired configuration.

The AS/400 configurator compares your current configuration and your desired configuration to create a proposed order. When you approve the order, it is transmitted from the configurator to IBM's order system. The configurator also generates updates for the IBM inventory database so that IBM's records match your actual hardware configuration.

How to Use the Enhanced Upgrade Order Process

To use the EUOP functions that are on your system, do the following:

- 1 Update the contact information (how to contact the person who is working on the order):

- ___ **Step a.** Type WRKCNTINF and press the Enter key. You see the Work with Support Contact Information menu.
- ___ **Step b.** Select option 5 (Work with upgrade order information). You see the Work with Upgrade Order Information display.
- ___ **Step c.** Select option 2 (Change upgrade contact information).
- ___ **Step d.** Enter or correct the information on the Change Upgrade Contact Information display.
 - Note:** Use the name and mailing address of the person who is helping you with your order (marketing representative or business partner).
- ___ **Step e.** Press the Enter key. You see the Work with Upgrade Order Information display again.
- ___ **Step f.** Press F12 (Cancel).
- ___ **Step 2** Create a record of your current hardware configuration:
 - ___ **Step a.** Type GO ORDER and press the Enter key. You see the Order Options display.
 - ___ **Step b.** Select option 4 (Work with order information). The system creates a file that contains your current hardware configuration.
 - ___ **Step c.** You may see the message Order information data not complete. Position the cursor on the message and press help (F1). Then follow the instructions on the Additional Message Information display.
 - ___ **Step d.** On the Work with Order Information Files display, type 1 (Send to IBM) in the Opt column next to the configuration file that you want to send. The system starts the electronic customer support function and sends the file to the IBM RETAIN system.

How to Get Help with Your Order

An IBM Fulfillment Center in Rochester, Minnesota, is staffed with professionals who can answer your questions and assist you when you want to place an order. You can communicate with the IBM Fulfillment Center electronically by using the Request Order Assistance (RQSORDAST) command on your system. You can also reach the IBM Fulfillment Center by calling the toll-free number 800+289-2426.

Appendixes

Appendix A. Work Sheets for Planning

To plan your order for AS/400 with PowerPC technology and your upgrade procedures, you must analyze your current system, evaluate alternatives, and make decisions. This appendix includes a set of forms that you can use to make a record of the decisions that you make.

You may make as many copies of these forms as you need.

Work Sheets for Planning Hardware

Use the work sheets in this topic to help you to determine the hardware configuration that you need on your AS/400 with PowerPC technology.

Work Sheet for Calculating Disk Capacity

Use Table A-1 to determine how much disk capacity you need on your upgraded system.

You complete the *Storage in Megabytes* column either by reading topics in this book or by performing a calculation by using the other rows in the work sheet. The *Information Source* column tells you how to get the information for that row.

Item Number	Description	Information Source	Storage in Megabytes
1	Total capacity on your source system.	“Displaying Your Disk Storage Requirements” on page 6-7.	
2	Total capacity of additional disk units to be added before or during the upgrade procedure (remember to include 2GB load source unit).	“How to Determine What Disk Units You Need” on page 6-16.	
3	Total capacity that is used by checksum protection, if checksum protection is active on your current system.	“How to Display the Storage Amount for Checksum Protection” on page 6-15.	
4	Total capacity of disk units that will not be attached to the target system (unsupported disk units).	“How to Identify Unsupported Hardware Devices” on page 6-13.	
5	Total available capacity.	Item 1 + Item 2 + Item 3 – Item 4	

Order Planning Forms

<i>Table A-1 (Page 2 of 3). Disk Capacity–Planning Work Sheet</i>			
Item Number	Description	Information Source	Storage in Megabytes
6	<i>PowerPC AS Storage Required</i> from the Estimated Storage Requirements display. This value includes growth of the licensed programs and application programs that are installed on your source system now.	“Displaying Your Disk Storage Requirements” on page 6-7.	
7	Storage required for OS/400 options or licensed programs that you plan to add (that are not on your current system).	“How to Determine Additional Software Storage” on page 5-12 and “Licensed Program Sizes” on page B-1.	
8	Storage required for applications that are being added from other sources (PRPQs, licensed program offerings (LPOs), applications from software providers).	“How to Determine Additional Software Storage” on page 5-12.	
9	Storage required for AS/400 Advanced 36 (if applicable).	“How to Determine Additional Software Storage” on page 5-12.	
10	Storage required for the softcopy library and bookshelves.	“How to Determine Additional Software Storage” on page 5-12.	
11	Storage made available by programs that will not be used.	“How to Calculate the Storage for Obsolete Software” on page 5-13.	
12	Storage required to decompress licensed program libraries.	“Compressed Objects and Storage Space” on page 5-5.	
13	Storage required for multiprocess installation of licensed programs (11MB).		
14	Storage required for growth of database cross-reference information.	“How to Calculate the Space Required for Cross-Reference Information” on page 6-9.	
15	Storage required for device parity protection (on disk units that do not have device parity protection now).	“How to Evaluate Disk Protection Requirements” on page 6-16.	
16	Storage required for mirrored protection (for disk units that do not have mirrored protection now).	“How to Evaluate Disk Protection Requirements” on page 6-16.	

Table A-1 (Page 3 of 3). Disk Capacity-Planning Work Sheet

Item Number	Description	Information Source	Storage in Megabytes
17	Total storage needed.	Item 6 + Item 7 + Item 8 + Item 9 + Item 10 - Item 11 + Item 12 + Item 13 + Item 14 + Item 15 + Item 16	
18	Excess capacity before working space.	Item 5 - Item 17	
19	Reserved working space (ASP threshold).	Item 5 × .1	
20	Final unused storage available.	Item 18 - Item 19	

Work Sheet for Verifying IOP Configuration

Use Table A-2 to make sure that your upgraded system will have enough IOP slots for your disk units. Prepare a work sheet for each IOP on your target system. “How to Determine Whether You Have Enough Slots” on page 6-17 describes how to prepare this work sheet.

<i>Table A-2. Work Sheet for IOP Configuration</i>					
Resource Name for the IOP	Serial Number of the IOP	Number of IOP Slots	IOP Slots Used Before Upgrade	Additions and Subtractions	IOP Slots Used After Upgrade
Total Number of Slots Used:					

Work Sheet for Planning Your Auxiliary Storage Pool Configuration

If you have user ASPs on your source system or if you plan to have user ASPs on your target system, use Table A-3 to describe your configuration for auxiliary storage pools (ASPs).

Read “How to Determine Your Configuration for Auxiliary Storage Pools” on page 6-19 to help you prepare this worksheet.

<i>Table A-3. Work Sheet for Planning Auxiliary Storage Pools</i>				
ASP Number	Source System		Target System	
	Purpose and Contents	Storage Allocated	Purpose and Contents	Storage Allocated
	Access path recovery time:		Access path recovery time:	
	Migration plans:			
	Access path recovery time:		Access path recovery time:	
	Migration plans:			
	Access path recovery time:		Access path recovery time:	
	Migration plans:			
	Access path recovery time:		Access path recovery time:	
	Migration plans:			

Work Sheets for Planning Software

Use the work sheets in this topic to plan what software you need to order and how you will install it.

Work Sheet for Planning Licensed Programs

Read the following topics to help you prepare this work sheet:

- “How to Identify National Languages” on page 5-2
- “How to Identify Your Currently Installed Software” on page 5-3

Keep this work sheet. You will complete it when you perform the upgrade preparations using the *AS/400 Road Map for Changing to PowerPC Technology* book.

Table A-5. Master Installation List Work Sheet: Part 1

General Information			
	Currently Installed	Release Received	Media Received
Licensed Internal Code	_____	_____	_____
Operating System/400	_____	_____	_____
Licensed Programs (and Optional Parts)	(See Table A-6)		_____
Primary Language	_____	_____	
Secondary Languages	_____	_____	_____
	_____	_____	_____
Cumulative PTF Package		_____	_____
			Other Media
Primary Installation Procedure (P):	_____		_____
Additional Installation Procedure (A):	_____		_____
Other Installation Procedure (O):	_____		_____
	_____		_____

Table A-6 (Page 1 of 7). Master Installation List Work Sheet: Part 2

Resource		Currently Installed Release	Software Needed		Release Received	Additional Actions?
Option (Part)	Description		New Release	New Product		
5716-999 –	Licensed Internal Code Procedure: P A O					
		Notes:				
5716-SS1 Base	Operating System/400 Procedure: P A O					
		Notes:				

The following libraries and optionally installable parts of OS/400 are shipped with 5716-SS1 at no additional charge.

Order Planning Forms

Table A-6 (Page 2 of 7). Master Installation List Work Sheet: Part 2

Resource		Currently Installed Release	Software Needed		Release Received	Additional Actions?
Option (Part)	Description		New Release	New Product		
Library	OS/400—Library QGPL Procedure: P A O				Yes	
		Notes:				
Library	OS/400—Library QUSRSYS Procedure: P A O				Yes	
		Notes:				
1	OS/400 Extended Base Support Procedure: P A O				Yes	
		Notes:				
2	OS/400—Online Information Procedure: P A O				Yes	
		Notes:				
3	OS/400—Online Education				No	
		Notes:				
4	OS/400—S/36 and S/38 Migration Procedure: P A O				Yes	
		Notes:				
5	OS/400—System/36 Environment Procedure: P A O				Yes	
		Notes:				
6	OS/400—System/38 Environment Procedure: P A O				Yes	
		Notes:				
7	OS/400—Example Tools Library Procedure: P A O				Yes	
		Notes:				
8	OS/400—AFP* Compatibility Fonts Procedure: P A O				Yes	
		Notes:				
9	OS/400— *PRV CL Compiler Support Procedure: P A O				Yes	
		Notes:				
10	OS/400—9406 Problem Analysis				No	
		Notes:				
11	OS/400—S/36 Migration Assistant Procedure: P A O				Yes	
		Notes:				
12	OS/400—Host Servers Procedure: P A O				Yes	
		Notes:				

Table A-6 (Page 3 of 7). Master Installation List Work Sheet: Part 2

Resource		Currently Installed Release	Software Needed		Release Received	Additional Actions?
Option (Part)	Description		New Release	New Product		
13	OS/400–Openness Includes Procedure: P A O				Yes	
		Notes:				
14	OS/400–GDDM Procedure: P A O				Yes	
		Notes:				
16	OS/400–Ultimedia System Facilities Procedure: P A O				Yes	
		Notes:				
19	OS/400–SOMobjects Procedure: P A O				Yes	
		Notes:				
20	OS/400–Advanced 36 Procedure: P A O				Yes	
		Notes:				
21	OS/400–Locale Source Library Procedure: P A O				Yes	
		Notes:				
22	OS/400–ObjectConnect Procedure: P A O				Yes	
		Notes:				
23	OptiConnect for OS/400 Procedure: P A O				Yes	
		Notes:				
Optional parts 15, 17, and 18 are priced features of OS/400. You only receive these options if you specifically ordered them.						
15	OS/400–Common Programming APIs Toolkit Procedure: P A O					
		Notes:				
17	OS/400–Print Services Facility/400 Procedure: P A O					
		Notes:				
18	OS/400–Media and Storage Extensions Procedure: P A O					
		Notes:				
The following licensed programs are shipped with all V3R6M0 orders at no additional charge. These licensed programs are on the CD-ROM labeled B29xx_02.						
5716-PM1 Base	Performance Management/400 Procedure: P A O				Yes	
		Notes:				
5716-TC1 Base	TCP/IP Connectivity Utilities for OS/400 Procedure: P A O				Yes	
		Notes:				

Order Planning Forms

Table A-6 (Page 4 of 7). Master Installation List Work Sheet: Part 2

Resource		Currently Installed Release	Software Needed		Release Received	Additional Actions?
Option (Part)	Description		New Release	New Product		
The following Client Access products are shipped if you order 5716-XA1, Client Access for OS/400.						
5716-XA1 Base	Client Access for OS/400 Procedure: P A O					Notes:
1	Client Access/400 - PC Tools Folder Procedure: P A O					Notes:
5763-XB1 Base	Client Access/400 DOS with Extended Memory Procedure: P A O					Notes:
1	Client Access/400 - Ext DOS SBCS Procedure: P A O					Notes:
2	Client Access/400 - Ext DOS DBCS Procedure: P A O					Notes:
3	Client Access/400 - Ext DOS RUMBA** SBCS Procedure: P A O					Notes:
4	Client Access/400 - Ext DOS RUMBA DBCS Procedure: P A O					Notes:
5	Client Access/400 - Ultimedia Facilities Procedure: P A O					Notes:
5763-XC1 Base	Client Access/400 for Windows 3.1					
1	Client Access/400 - Windows 3.1 SBCS Procedure: P A O					Notes:
2	Client Access/400 - Windows 3.1 DBCS Procedure: P A O					Notes:
3	Client Access/400 - Windows 3.1 RUMBA SBCS Procedure: P A O					Notes:
4	Client Access/400 - Windows 3.1 RUMBA DBCS Procedure: P A O					Notes:

Table A-6 (Page 5 of 7). Master Installation List Work Sheet: Part 2

Resource		Currently Installed Release	Software Needed		Release Received	Additional Actions?
Option (Part)	Description		New Release	New Product		
5	Client Access/400 - Windows 3.1 PC5250 Procedure: P A O					Notes:
6	Client Access/400 - GraphicOps for Windows Procedure: P A O					Notes:
7	Client Access/400 - Ultimedia Facilities Procedure: P A O					Notes:
8	Client Access/400 - Graphical Access for OS/400 Procedure: P A O					Notes:
9	Client Access/400 - SysObject Access for OS/400 Procedure: P A O					Notes:
5763-XF1 Base	Client Access/400 for OS/2 Procedure: P A O					Notes:
1	Client Access/400 - OS/2 SBCS Procedure: P A O					Notes:
2	Client Access/400 - OS/2 DBCS Procedure: P A O					Notes:
3	Client Access/400 - OS/2 RUMBA SBCS Procedure: P A O					Notes:
4	Client Access/400 - OS/2 RUMBA DBCS Procedure: P A O					Notes:
5	Client Access/400 - OS/2 Communications Mgr Procedure: P A O					Notes:
6	Client Access/400 - GraphicOps for OS/2 Procedure: P A O					Notes:
7	Client Access/400 - Ultimedia Facilities Procedure: P A O					Notes:

Order Planning Forms

Table A-6 (Page 6 of 7). Master Installation List Work Sheet: Part 2

Resource		Currently Installed Release	Software Needed		Release Received	Additional Actions?
Option (Part)	Description		New Release	New Product		
5763-XG1 Base	Client Access Optimized OS/2 Client for OS/400 Procedure: P A O					Notes:
	1 Client Access/400 - RUMBA Optimized OS/2 Client Procedure: P A O					Notes:
	2 Client Access/400 - PC5250 Optimized OS/2 Client Procedure: P A O					Notes:
	3 Client Access/400 - GraphicOps OS/2 Client Procedure: P A O					Notes:
	4 Client Access/400 - Ultimedia Facilities Procedure: P A O					Notes:
5 Client Access/400 - Graphical Access for OS/400 Procedure: P A O					Notes:	
5763-XL1 Base	Client Access DOS Client for OS/400 Procedure: P A O					Notes:
	1 Client Access/400 - DOS SBCS Procedure: P A O					Notes:
	2 Client Access/400 - DOS DBCS Procedure: P A O					Notes:
The following blanks are provided for you to evaluate remaining installed software.						
	Procedure: P A O					Notes:
	Procedure: P A O					Notes:
	Procedure: P A O					Notes:
	Procedure: P A O					Notes:

Table A-6 (Page 7 of 7). Master Installation List Work Sheet: Part 2

Resource		Currently Installed Release	Software Needed		Release Received	Additional Actions?
Option (Part)	Description		New Release	New Product		
	Procedure: P A O					
		Notes:				
	Procedure: P A O					
		Notes:				
	Procedure: P A O					
		Notes:				
	Procedure: P A O					
		Notes:				
	Procedure: P A O					
		Notes:				
	Procedure: P A O					
		Notes:				
	Procedure: P A O					
		Notes:				
	Procedure: P A O					
		Notes:				
	Procedure: P A O					
		Notes:				
	Procedure: P A O					
		Notes:				

Work Sheet for Planning Application Software

Use Table A-7 on page A-14 to make of record of any problems that you have discovered with application software and how you plan to solve them. Read "How to Evaluate Existing Applications" on page 5-6 to help you prepare this work sheet.

Table A-7. Work Sheet for Application Software Problems

Application Name	Libraries That Contain the Programs	Problem Description	Action Plan	Date Completed

Work Sheet for Removing Application Software

Use Table A-8 on page A-15 to calculate the space requirements for applications that you plan to remove. Read "How to Calculate the Storage for Obsolete Software" on page 5-13 to help you prepare this work sheet.

Table A-8. Work Sheet for Applications to be Removed

Application Name	Libraries	Current Size	Estimated Size

Work Sheets for Planning Your Upgrade Method

Use the work sheets in this topic to do the following:

- Choose your upgrade method
- Plan any additional hardware or software required by your method

Questionnaire for Selecting Your Upgrade Method

Table A-9 contains a set of questions to help you determine which upgrade method is appropriate for your situation. Before you use the questionnaire, fill in the following information that you gathered in previous topics:

- ___ **Step 1** For the blank space marked X1 in Part 1, enter your estimate for how long your system will be unavailable during the upgrade procedure. Use the information from your timings work sheet (Table A-11 on page A-21). If you did not calculate the value, use the following:
- For a small system (9402), use 12 hours.
 - For a large system (9406), use 48 hours.
- Note:** The times provided are estimates of the typical time that a system is unavailable during the upgrade process.
- ___ **Step 2** For the blank space marked X2 in Part 2, enter your estimate of the time required to prepare your system for the upgrade procedure. Use the information from your timings work sheet (Table A-11 on page A-21).
- ___ **Step 3** For the blank space marked X3 in Part 2, write the number that you calculated in step 3 of "How to Evaluate the Benefits of Reformatting Disk Units" on page 6-20. This is the number of disk units that would benefit from reformatting for performance or error detection.
- ___ **Step 4** For the blank space marked X4 in Part 3, add the time that you think is needed to restore your critical applications to the number of hours in X1. For example, if your estimated downtime in X1 is 15 hours and your estimated restore time is 8 hours, the value for X4 is 23 hours.
- If you are not sure, add the following to the value in X1:
- 6 hours for a small system (9402).
 - 18 hours for a large system (9406).

Table A-9 (Page 1 of 3). Questionnaire for Selecting Your Upgrade Method

<p>Part 1 Preliminary Questions</p>	<p>Can your source system be unavailable for interactive and batch work for (X1)_____ consecutive hours?</p> <p>Yes No</p> <p>↓ Go to Part 4 of the questionnaire.</p> <p>Is your source system running an earlier version of the OS/400 licensed program than V2R3M0?</p> <p>Yes No</p> <p>↓ Go to Part 2 of the questionnaire.</p> <p>Do you plan to upgrade to V2R3M0 or a later version of the OS/400 licensed program before the upgrade?</p> <p>Yes No</p> <p>↓ Go to Part 3 of the questionnaire.</p>
<p>Part 2 Replacing-a-Release Questions</p>	<p>According to the Display Upgrade Preparation (DSPUPGPRP) command, do you have sufficient disk storage to prepare your system for the replacing-a-release method? (You determined this in step “How to Determine the Storage Requirements for Disk Preparation” on page 6-8.)</p> <p>Yes No</p> <p>↓ Either make plans to add more disk capacity or go to Part 3 of the questionnaire.</p> <p>According to Upgrade Assistant, do you have unsupported disk units? (You determined this in “How to Identify Unsupported Hardware Devices” on page 6-13.)</p> <p>No Yes</p> <p>↓ Either make plans to replace them with disk units that are supported by AS/400 with PowerPC technology or go to Part 3 of the questionnaire.</p> <p>Do you want to change your disk protection (from mirrored protection to device parity protection) during the upgrade?</p> <p>No Yes</p> <p>↓ Go to Part 3 of the questionnaire.</p>

Table A-9 (Page 2 of 3). Questionnaire for Selecting Your Upgrade Method

	<p>Can your system be unavailable for (X2)_____ during a several-week period before the upgrade?</p> <p>Yes No</p> <p>↓ Go to Part 3 of the questionnaire.</p> <p>Your system has (X3)_____ disk units that would benefit from reformatting for performance or error detection.</p> <p>Reformatting disk units later requires a dedicated system and sufficient capacity to move data off the disk units. Do you want to reformat these disk units during the upgrade procedure?</p> <p>No Yes</p> <p>↓ Go to Part 3 of the questionnaire.</p> <p>Stop here. You can use the replacing-a-release method. Select feature code 0200.</p>
<p>Part 3 Unload/Reload Questions</p>	<p>Can your system be unavailable for interactive and batch work for (X4)_____ consecutive hours?</p> <p>Yes No</p> <p>↓ Go to Part 4 of the questionnaire.</p> <p>Is your source system running an earlier version of the OS/400 licensed program than V2R3M0?</p> <p>No Yes</p> <p>↓ Upgrading from versions earlier than V2R3M0 is not supported. You may encounter problems when you restore your information. Contact the Transition Support Center for guidance, then continue with the next question.</p> <p>Is your source system a model Bxx?</p> <p>No Yes</p> <p>↓ Stop here. You can use the unload/reload method, but you must order a new system rather than an MES. Order feature code 0203.</p> <p>Stop here. You can use the unload/reload method. Order feature code 0201.</p>

Table A-9 (Page 3 of 3). Questionnaire for Selecting Your Upgrade Method

<p>Part 4 Side-by-Side Questions</p>	<p>Do you have physical space for a second system?</p> <p>Yes No</p> <p>↓ Go to Part 5 of the questionnaire.</p> <p>Do you have the technical and financial resources to install and synchronize a parallel system?</p> <p>Yes No</p> <p>↓ Go to Part 5 of the questionnaire.</p> <p>Stop here. You can use the side-by-side method. Order feature code 0203.</p>
<p>Part 5 Side-by-Side Alternatives</p>	<p>Investigate alternatives to reduce the amount of time that your system will be unavailable during the upgrade process. Consider using the Staged Upgrade Offering or contracting for assistance and machine time from IBM or another organization.</p>

Work Sheet for Planning Additional Hardware and Software

Use Table A-10 to determine whether you need to order additional hardware or software specifically for the upgrade procedure. Read the following topics to help you prepare this worksheet:

- “How to Plan Additional Hardware for the Staged Upgrade Offering” on page 7-44.
- “How to Plan Additional Hardware for the Side-by-Side Method” on page 7-45.
- Table 7-9 on page 7-19.

Table A-10. Upgrade Method and Additional Hardware—Planning Work Sheet

What upgrade method will you use:

Will you use the Staged Upgrade Offering?

If you plan to use the Staged Upgrade Offering, what additional equipment do you need for the staged upgrade machine?

If you plan to use the Staged Upgrade Offering, what additional equipment do you need for your source system?

If you plan to use the side-by-side method, what additional equipment and software do you need to connect the source system and the target system.

If you currently have special hardware (RPQs), how will you provide that function on your new system?

What software will you have pre-loaded on your temporary machine or your side-by-side machine?

Note: The default is to pre-load only the operating system and minimal QGPL and QUSRSYS libraries. This simplifies moving user data from your source machine.

Work Sheets for Estimating Downtime

Use Table A-11 as a guide when you determine system downtime.

Note: Use this work sheet if you plan to use the replacing-a-release or unload/reload methods, with or without the Staged Upgrade Offering. Items whose time estimates are affected by Staged Upgrade Offering are noted.

If you plan to use the Staged Upgrade Offering, be sure to read the relevant sections of the *AS/400 Planning for PowerPC Technology* book.

<i>Table A-11 (Page 1 of 2). Work Sheet for Estimating Downtime</i>			
Activity	Information Source	Time (Hours: Minutes)	
		Replacing-a Release Method	Unload/Reload Method
Preparation of source system (IMPI)			
Save entire system ¹	"Save Entire System" on page 7-17.		
Reclaim storage and reorganize document library objects ¹	"Reclaim Storage and Reorganize Document Library Objects" on page 7-17.		
Disk preparation ¹	"Prepare Disk Storage" on page 7-17.		Not applicable
Reclaim storage and reorganize document library objects ¹	"Reclaim Storage and Reorganize Document Library Objects" on page 7-17.		Not applicable
Save user information	"Save User Information" on page 7-18.		
Create duplicate tapes	"Create Duplicate Tapes" on page 7-18.		
Totals:			
Upgrade to target system (PowerPC AS Processor and V3R6M0)			
Hardware MES upgrade ²	"Install Hardware" on page 7-18.		
Complete running of the upgrade load source utility	"Upgrade the Load Source Unit" on page 7-18.		Not applicable
Install base OS/400	"Install Base OS/400" on page 7-19 and Table 7-10 on page 7-20.		
<p>This work sheet lists only the major tasks that affect downtime. Refer to the <i>AS/400 Planning for PowerPC Technology</i> book for a description of what is involved for each upgrade method.</p> <p>1 These tasks can be done days or weeks in advance.</p> <p>2 Time estimates for these items are affected by Staged Upgrade Offering.</p>			

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<i>Table A-11 (Page 2 of 2). Work Sheet for Estimating Downtime</i>			
Activity	Information Source	Time (Hours: Minutes)	
		Replacing-a Release Method	Unload/Reload Method
Storage management recovery during OS/400 installation	"Perform Storage Management Recovery" on page 7-20 and Table 7-11 on page 7-21.		Not applicable
Authority recovery during OS/400 installation	"Perform Authority Recovery" on page 7-21.		Not applicable
Restore system information	"Restore System Information" on page 7-22.	Not applicable	
Reconfigure system resource names	"Reconfigure System Resource Names" on page 7-22.		
Restore libraries, documents, and directories ²	"Restore Libraries, Documents, and Directories" on page 7-22.	Not applicable	
Install IBM-supplied libraries QGPL and QUSRSYS and licensed programs	"Install Licensed Programs" on page 7-29.		
Object conversion ²	"Run Object Conversion" on page 7-33.		
Perform IPL	"Perform an IPL" on page 7-36.		
Cumulative PTF package ²	"Install the Cumulative PTF Package" on page 7-36.		
Save	"Save Your Entire Upgrade System" on page 7-36.		
Totals:			
Post-installation activities			
Post-installation tasks	"Perform Post-Installation Tasks" on page 7-37.		
Test your system and applications	"Test Your System and Applications" on page 7-37.		
Totals:			
<p>This work sheet lists only the major tasks that affect downtime. Refer to the <i>AS/400 Planning for PowerPC Technology</i> book for a description of what is involved for each upgrade method.</p> <p>1 These tasks can be done days or weeks in advance.</p> <p>2 Time estimates for these items are affected by Staged Upgrade Offering.</p>			

Appendix B. Licensed Program Information

This appendix contains information that is useful when planning for your software installation and installation time. Table B-1 on page B-3 is used with Table A-5 and Table A-6 on page A-7 and is also helpful when determining disk capacity for the licensed programs being installed. If you are using V2R3M0 and have PC Support/400 installed, you may find "Mapping PC Support to Client Access" on page B-12 helpful. This appendix also includes information to help you determine if you should delete optional parts of OS/400.

Licensed Program Sizes

Table B-1 on page B-3 lists licensed programs available from IBM at the time the V3R6M0 release of OS/400 became generally available. The table contains information about the status, release level, and size of each licensed program and any optional parts.

The content of each column in Table B-1 is described below. When *NA* is shown in any column, the licensed program or optional part has no applicable value for that column. For example, licensed programs that are new in V3R6M0 do not have an applicable value for the previous release.

Licensed Program Identifier identifies the licensed program.

Part The 7-character identifier used for the licensed program is shown in boldface type. The base part of the licensed program is always listed first. Any optionally installable parts are listed in the order in which they appear on the displays when you use the Work with Licensed Programs (LICPGM) menu.

Note: The installation processes do not distinguish between no-charge options included with a base product and priced features. Some optional parts listed in Table B-1 are features that must be purchased separately.

Description This is the name of the licensed program or option as it appears on the displays when you use the LICPGM menu.

Status helps you determine when a licensed program installs and any additional actions you need to take.

– The product is reissued for V3R6M0, with little change to function.

New The licensed program or optional part is new for V3R6M0.

Removed Support for the licensed program is removed. Removed products do not appear on the LICPGM menu displays. They are included here to help you identify products that will not be replaced when you install software.

Repackaged This release of the licensed program is packaged differently than the previous release. Function from other software products (such as licensed programs, features, PRPQs) may be combined in this licensed program. Or, function from the previous release of this product may have been removed or moved to another licensed program.

Licensed Program Information

Revised The licensed program either contains a significant amount of new function or has significant changes to existing function.

Earliest Level Compatible with V3R6M0 OS/400 indicates the earliest release level of a licensed program that is compatible with the V3R6M0 operating system. A licensed program with a compatible release level will function when it is installed on a system that uses the V3R6M0 operating system.

V3R6M0 The licensed program must be at the same release level as the operating system. The installed licensed program must be at least the V3R6M0 level to function with the V3R6M0 operating system.

VxRyMz A value in the form of VxRyMz indicates the earliest level of the product that functions with the V3R6M0 operating system. That level and any intermediate levels function with the V3R6M0 operating system. For example, if V3R0M5 is shown, then any of these levels would function with the V3R6M0 operating system: V3R0M5, V3R1M0, V3R1M1, V3R6M0.

Installation Storage Requirements shows the largest and smallest size of the licensed program, in megabytes. Some licensed programs and some objects of the operating system are shipped in a compressed form that requires less storage space. When a range is shown for a licensed program, it indicates the compressed and decompressed sizes. If there is only one value, it is a decompressed size (either it was not compressed or the difference was minimal). When determining storage requirements for licensed programs, use the decompressed size. See "Compressed Objects and Storage Space" on page 5-5 for information about compression and decompression.

Previous

Releases This is the minimum size (compressed) of the licensed program for the previous releases that can be replaced with V3R6M0.

V3R6M0 This is the size for the V3R6M0 release of the licensed program.

Note: The significant growth of V3R6M0 compared to previous releases is partly because of requirements of the new PowerPC architecture.

Table B-1 (Page 1 of 10). Licensed program size information

Licensed Program Identifier			Earliest Level Compatible with V3R6M0 OS/400	Installation Storage Requirements in Megabytes ¹	
Part	Description	Status		Previous Releases	V3R6M0
5716-999					
–	Licensed Internal Code	Revised	V3R6M0	94	664
5716-SS1					
Base	Operating System/400	Revised	NA	-	504.7 - 652.8
Library	OS/400–Library QGPL	–	V3R6M0	-	3.6 ^a
Library	OS/400–Library QUSRSYS	–	V3R6M0	-	58.3 ^a
1	OS/400 Extended Base Support	–	V3R6M0	1	2.7 - 2.8
2	OS/400–Online Information	–	V3R6M0	9.5	20.1 - 26.1
3	OS/400–Online Education	Removed	NA		NA
4	OS/400–S/36 and S/38 Migration	–	V3R6M0	4.5	13.8 - 14.4
5	OS/400–System/36 Environment	–	V3R6M0	5.5	15.7 - 18.7
6	OS/400–System/38 Environment	–	V3R6M0	2	2.2 - 2.9
7	OS/400–Example Tools Library	Repackaged	V3R6M0	10	11.6 - 11.7 ^b
8	OS/400–AFP* Compatibility Fonts	–	V3R6M0	6.5	8.3 - 10.5
9	OS/400– *PRV CL Compiler Support	–	V3R6M0	4.5	23.5 - 26.8
10	OS/400–9406 Problem Analysis	Removed			
11	OS/400–S/36 Migration Assistant	–	V3R6M0	1	1.6 - 2.2
12	OS/400–Host Servers	–	V3R6M0	3	15.1 - 17.5
13	OS/400–Openness Includes	–	V3R6M0	21.8	36.5 - 43.2
14	OS/400–GDDM	–	V3R6M0	0.6	3.5 - 4.0
15	OS/400–Common Programming APIs Toolkit	–	–	0.6	1.3 - 1.6
16	OS/400–Ultimedia System Facilities	–	V3R6M0	2.2	14.0 - 14.6
17	OS/400–Print Services Facility/400	–	V3R6M0	1	0.1
18	OS/400–Media and Storage Extensions	–	V3R6M0	0.1	0.2
19	OS/400–SOMobjects	New	V3R6M0	NA	9.7 - 11.4
20	OS/400–Advanced 36	New	V3R6M0	NA	0.8 - 1.0
21	OS/400–Locale Source Library	New	V3R6M0	NA	
22	OS/400–ObjectConnect	New	V3R6M0	NA	0.7
23	OptiConnect for OS/400	New	V3R6M0	NA	1.7

^a The size of this library does not include any user data.

^b This range represents the packaged to unpackaged size for this licensed program.

Each source physical file in the QUSRTOOL library, except QATTINFO, is contained within and distributed as a save file of the same name. Before any tools can be compiled and run, you must unpackage the appropriate save files. To determine which save files need to be unpackaged, the description of each tool lists the members that make up the tool and the file in which they reside.

To convert save files in the QUSRTOOL library to source physical files, enter the following after the new release Example Tools (QUSRTOOL) library has been installed:

```
CALL PGM(QUSRTOOL/UNPACKAGE) PARM(' *ALL ' 1)
```

The UNPACKAGE program converts save files to source physical files; the PACKAGE program converts source physical files to save files. More information about the PACKAGE and UNPACKAGE programs can be found in file QATTINFO, member TTTINFO.

If you are redistributing the Example Tools Library option, and ran the UNPACKAGE program, it is recommended that you run the PACKAGE program before creating your distribution tape.

Licensed Program Information

Table B-1 (Page 2 of 10). Licensed program size information

Licensed Program Identifier		Status	Earliest Level Compatible with V3R6M0 OS/400	Installation Storage Requirements in Megabytes ¹	
Part	Description			Previous Releases	V3R6M0
	<ul style="list-style-type: none"> Option 1, OS/400 Extended Base Support, was repackaged in V3R1M0. The QGDDM library is now in option 14. If you need the QGDDM library for your applications, you need to install option 14. If option 1 is installed on your current system, it is installed during your primary installation path. If the QGDDM library is installed on your current system, option 14 is installed during your primary installation path. Support was removed for option 3, OS/400 Online Information, in V3R1M0. If you have option 3 installed, it is deleted when V3R6M0 is installed. Beginning in V3R6M0, all members from the source files QATT* (many are named TAA...) in the QUSRTOOL example library (Option 7, OS/400 Example Tools Library) are no longer shipped with OS/400. Refer to the <i>AS/400 Memo to Users</i> for more information about how to obtain enhanced TAATools. for V3R6M0. The TAATools examples were provided in earlier releases of OS/400 on an as-is basis. They may still be used on a V3R6M0 system but may require that you take special action before installing V3R6M0. Some may need code changes to operate correctly on Version 3 Release 6. You need to save the TAA tool examples you want before you perform a procedure that replaces a release. If the tool was created with the default of no observability, it must be either compiled with observability before restoring it to a V3R6M0 system or the source code must be restored and compiled on the V3R6M0 system. Option 10, OS/400 9406 Problem Analysis is removed in Version 3 Release 6. Equivalent function for all models is included in Base OS/400. If you use MI header files in your C programs, you need to install option 13, OS/400 Openness Includes. Before V3R1M0, certain print support function was provided as part of the base OS/400. In V3R1M0, this function became a priced feature of OS/400 (Option 17, OS/400 Print Services Facility/400). OS/400 option 17 must be specifically ordered. If you plan to use a replacing-a-release procedure, consider the following: <ul style="list-style-type: none"> If your current system is V2R3M0 or V3R0M5 and you ordered 5716-SS1 option 17, the option is installed automatically during the replacing-a-release procedure. If your current system is V3R1M0 or V3R6M0 and you do not have option 17 currently installed, you need to use the procedure for adding additional licensed programs to install it. Option 22, ObjectConnect, will install automatically over PRPQ 5799-FNR. Option 23, OptiConnect, will install automatically over PRPQ 5799-FQB. 				

Table B-1 (Page 3 of 10). Licensed program size information

Licensed Program Identifier			Earliest Level Compatible with V3R6M0 OS/400	Installation Storage Requirements in Megabytes ¹	
Part	Description	Status		Previous Releases	V3R6M0
57xx-AD1					
Base	Application Dictionary Services/400	Removed			
Support for all levels of the Application Dictionary Services/400 licensed program was removed in V3R1M0. If you have this product installed and you plan to use a replacing-a-release procedure, the functionally equivalent product (5716-PW1 option 3) is automatically installed if it is on the installation media. The old product is deleted after the new release is installed.					
5716-AF1					
Base	IBM Advanced Function Printing Utilities for OS/400	–	V3R6M0	2.8	6.4 - 9.1
5716-AP1					
Base	IBM Advanced DBCS Printer Support for OS/400	–	V3R6M0	2.1	6.8 - 9.3
1	Adv DBCS Printer Support for OS/400 - IPDS	New	V3R6M0	NA	0.2 - 0.5
57xx-BA1					
Base	AS/400 BASIC	Removed			
Support for all levels (5738-BA1, 5763-BA1) of the AS/400 BASIC licensed program is removed. Support is provided in PRPQ 5799-FPK. Before installing V3R6M0, you should delete this licensed program. The PRPQ must be installed using the RSTLICPGM command.					
5716-BR1					
Base	Backup Recovery and Media Services for OS/400	–	V3R6M0	7.5	34.4 - 55.3
5716-CB1					
Base	Integrated Language Environment COBOL for OS/400	Revised	V3R6M0	2.4	5.8 - 10.6
1	ILE COBOL/400 - System/36-compatible COBOL	–	V3R6M0	1.0	3.7 - 4.9
2	ILE COBOL/400 - System/38-compatible COBOL	–	V3R6M0	1.0	3.3 - 4.3
3	COBOL/400 Previous Compiler	Removed			
4	System/36-Compatible COBOL Previous Compiler	Removed			
5	ILE COBOL/400 - COBOL/400	Repackaged	V3R6M0	1.4	4.8 - 6.4
6	ILE COBOL/400 - *PRV ILE COBOL/400	New	V3R6M0	NA	4.2 - 8.3
<ul style="list-style-type: none"> Option 3, COBOL/400 Previous Compiler, and option 4, System/36-Compatible COBOL Previous Compiler, are removed. Options 5 and 1, respectively, provide equivalent function and support *CUR and *PRV (V2R3M0 and V3R1M0) values for a target release. You must delete options 3 and 4 before installing V3R6M0. If options 3 and 4 remain on the system after V3R6M0 is installed, they could be difficult to delete and could leave orphaned objects on the system. Deleting them before upgrading ensures that all objects associated with the options are deleted. The V2R3M0 Base (5738-CB1) is now in Option 5, COBOL/400. If you have this product installed and you use a replacing-a-release procedure, Option 5 is installed without additional actions required. The compiler for previous release support (V3R1M0) is now in 5716-CB1 Option 6, *PRV ILE COBOL/400. If you use a replacing-a-release procedure, Option 6 requires that you install it using the procedure for additional licensed programs. If you are upgrading to V3R6M0, you need to get PTFs, apply them to your existing release, and recompile your programs before you can successfully move them to the V3R6M0 system. Refer to the <i>Memo to Users</i> for more information. 					

Licensed Program Information

Table B-1 (Page 4 of 10). Licensed program size information

Licensed Program Identifier		Status	Earliest Level Compatible with V3R6M0 OS/400	Installation Storage Requirements in Megabytes ¹	
Part	Description			Previous Releases	V3R6M0
57xx-CD1					
Base	CoOperative Development Environment/400	Repackaged			
<p>This product was repackaged in V3R1M0 and V3R6M0. In V3R1M0, the base of the 5738-CD1 product became part of 5763-PW1 and option 1 of 5738-CD1 became part of the base 5763-CD1. In V3R6M0, the base of the 5763-CD1 became part of 5716-CL1 option 1. If you are replacing a release and have either the 5738-CD1 or the 5763-CD1 product installed, the appropriate 5716 product will install automatically as part of your primary installation path.</p>					
5716-CF1					
Base	Point-of-Sale Communications Utility for OS/400	–	V3R6M0	1.7	4.7 - 6.6
5716-CL1					
Base	Application Development ToolSet Client Server for OS/400	New	V3R6M0	NA	47.7
1	CoOperative Development Environment/400	New	V3R6M0	NA	26.7 - 26.8
2	AS/400 VRPG Client/2	New	V3R6M0	NA	63.3
<p>Option 1 is the functional equivalent of 5763-CD1. Option 2 is the functional equivalent of 5763-VR1. If you have these V3R1M0 products currently installed, these options of 5716-CL1 will automatically replace the older products.</p>					
5716-CM1					
Base	Communications Utilities for OS/400	–	V3R6M0	1.5	4.9 - 6.4
5716-CP2					
Base	CallPath for OS/400	–	V3R6M0	4.0	17.0
5716-CR1					
Base	Cryptographic Support for OS/400	–	V3R6M0	0.5	0.8 - 0.9
5716-CX2					
Base	Integrated Language Environment C for OS/400	–	V3R6M0	7.0	8.8 - 10.6
1	ILE C for OS/400 *PRV Compiler Support	–	V3R6M0	2.0	2.9 - 4.4
<p>If you are upgrading to V3R6M0, you need to get PTFs, apply them to your existing release, and recompile your programs before you can successfully move them to the V3R6M0 system. Refer to the <i>Memo to Users</i> for more information.</p>					
5716-CX4					
Base	VisualAge C++ for OS/400	New	V3R6M0	NA	0.3 - 0.4
1	CSet ++ Client/2 for OS/400	New	V3R6M0	NA	217.7
5716-DB1					
Base	System/38 Utilities for OS/400	–	V3R6M0	3.5	11.3 - 15.6
5716-DCT					
Base	Language Dictionaries for OS/400	–	V3R6M0	0.1	0.1
1	Afrikaans Dictionary	–	V3R6M0	0.4	1.2
2	Dutch Modern Dictionary	–	V3R6M0	2.1	2.2
3	Brazilian Portuguese Dictionary	–	V3R6M0	1.2	1.3
4	Catalan Dictionary	–	V3R6M0	0.4	0.4
5	Danish Dictionary	–	V3R6M0	1.3	1.3
6	German Dictionary	–	V3R6M0	2.3	2.5
7	Swiss German Dictionary	–	V3R6M0	1.9	1.9
8	Spanish Dictionary	–	V3R6M0	1.0	1.0
9	French National Dictionary	–	V3R6M0	1.2	1.2
10	French Canadian Dictionary	–	V3R6M0	1.1	1.1
11	Greek Dictionary	–	V3R6M0	0.7	0.7
12	Icelandic Dictionary	–	V3R6M0	0.5	0.6
13	Italian Dictionary	–	V3R6M0	1.2	1.8
14	US Legal Dictionary	–	V3R6M0	0.1	0.1
15	US Medical Dictionary	–	V3R6M0	0.2	0.3

Table B-1 (Page 5 of 10). Licensed program size information

Licensed Program Identifier			Earliest Level Compatible with V3R6M0 OS/400	Installation Storage Requirements in Megabytes ¹	
Part	Description	Status		Previous Releases	V3R6M0
16	Dutch Dictionary	–	V3R6M0	2.1	2.2
17	Norwegian Dictionary	–	V3R6M0	1.6	1.6
18	Norwegian Nynorsk Dictionary	–	V3R6M0	1.0	1.1
19	Portuguese Dictionary	–	V3R6M0	1.3	1.3
20	Finnish Dictionary	–	V3R6M0	0.1	0.1
21	Swedish Dictionary	–	V3R6M0	1.3	1.3
22	UK English Dictionary	–	V3R6M0	0.7	0.7
23	US English Dictionary	–	V3R6M0	0.7	0.7

Language Dictionaries for OS/400 was repackaged in V3R0M5. If you have dictionaries for the 5738-DCT product installed, the corresponding new options are installed automatically.

5716-DFH

Base	CICS for OS/400	–	V3R6M0	9.8	20.2 - 29.4
1	CICS for OS/400 - Sample Applications	–	V3R6M0	1.0	3.3 - 3.5

57xx-DM1

Base	SystemView Information Warehouse DataHub Support/400	Removed			
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Support for all levels (5738-DM1, 5763-DM1) of the licensed program is removed. Delete the licensed program before installing V3R6M0.

5716-DP1

Base	DataPropagator Relational Capture and Apply for OS/400	–	V3R6M0	2.1	2.9 - 3.8
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5716-DS1

Base	Business Graphics Utility for OS/400	–	V3R6M0	1.0	2.9 - 4.0
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5716-ES1

Base	IBM SystemView OMEGAMON Services/400	–	V3R6M0	9.5	21.0 - 38.0
1	IBM AUTOMATED FACILITIES**/400	–	V3R6M0	1.4	3.4 - 5.0
2	IBM OMEGAVIEW**/400 for OS/2	–	V3R6M0	9.2	10.4

5716-FNT

Base	Advanced Function Printing Fonts for OS/400	–	V3R6M0	0.1	0.1
1	AS/400 Font–Sonoran Serif ^c	–	V3R6M0	4.5	4.9
2	AS/400 Font–Sonoran Serif Headliner	–	V3R6M0	5.0	5.1
3	AS/400 Font–Sonoran Sans Serif ^d	–	V3R6M0	4.5	4.7
4	AS/400 Font–Sonoran Sans Serif Headliner	–	V3R6M0	5.0	5.0
5	AS/400 Font–Sonoran Sans Serif Condensed	–	V3R6M0	3.0	3.4
6	AS/400 Font–Sonoran Sans Serif Expanded	–	V3R6M0	2.5	2.6
7	AS/400 Font–Monotype Garamond**	–	V3R6M0	3.5	3.6
8	AS/400 Font–Century Schoolbook**	–	V3R6M0	4.0	3.9
9	AS/400 Font–Pi and Specials	–	V3R6M0	1.0	0.8
10	AS/400 Font–ITC Souvenir**	–	V3R6M0	4.0	3.9
11	AS/400 Font–ITC Avant Garde Gothic**	–	V3R6M0	3.5	3.7
12	AS/400 Font–Math and Science	–	V3R6M0	3.0	3.1
13	AS/400 Font–DATA1	–	V3R6M0	1.0	0.2
14	AS/400 Font–APL2*	–	V3R6M0	1.0	0.7
15	AS/400 Font–OCR A and OCR B	–	V3R6M0	1.0	0.1

^c Sonoran Serif is a functional equivalent of Monotype Times New Roman.**

^d Sonoran Sans Serif is a functional equivalent of Monotype Arial.**

5716-FN1

Licensed Program Information

Table B-1 (Page 6 of 10). Licensed program size information

Licensed Program Identifier			Earliest Level Compatible with V3R6M0 OS/400	Installation Storage Requirements in Megabytes ¹	
Part	Description	Status		Previous Releases	V3R6M0
Base	Advanced Function Printing DBCS Fonts for OS/400	–	V3R6M0	0.1	0.1
1	AS/400 Font (DBCS)–Japanese	–	V3R6M0	41.0	76.9
2	AS/400 Font (DBCS)–Korean	–	V3R6M0	24	25.2
3	AS/400 Font (DBCS)–Traditional Chinese	–	V3R6M0	13	14.1
4	AS/400 Font (DBCS)–Simplified Chinese	–	V3R6M0	8.0	8.2
5	AS/400 Font (DBCS)–Thai	–	V3R6M0	3.0	3.4
5716-FS1					
Base	OSI File Services for OS/400	–	V3R6M0	18.6	39.5 - 41.7
57xx-FT1					
Base	FORTRAN/400	Removed			
Support for all levels (5738-FT1, 5763-FT1) of the FORTRAN/400 licensed program is removed. Delete the licensed program before installing V3R6M0.					
5716-JS1					
Base	Job Scheduler for OS/400	New	V3R6M0	NA	17.8 - 29.1
This product is the functional replacement for the 5798-JS2 PRPQ (V3R1M0 and V3R0M5) and 5799-JS3 LPO (V2R3M0). If you are replacing a release and have the earlier product installed, this product will automatically replace it.					
5738-LM1					
Base	Application Development Manager/400	Repackaged			
Support for all levels of the Application Development Manager/400 licensed program is removed. If you have this product installed and you plan to use a replacing-a-release procedure, the functionally equivalent product (5716-PW1 option 2) is automatically installed if it exists on the installation media. The old product is deleted after the new release is installed.					
57xx-MC1					
Base	RM/COBOL-85	Removed			
Support for all levels (5738-MC1, 5763-MC1) of the RM/COBOL-85** licensed program is removed. Run time support is provided in the base OS/400.					
5716-MG1					
Base	SystemView Managed System Services for OS/400	–	V3R6M0	1.5	9.7 - 12.8
5716-MQ1					
Base	MQSeries for OS/400	–	V3R6M0	5.1	11.1 - 16.5
1	MQSeries for OS/400 - Samples	–	V3R6M0	1.0	1.9
2	MQSeries for OS/400 - Admin Application	–	V3R6M0	1.0	1.1
You should use the ENDMGDSYS and ENDMGRSRV commands to end the product before performing any save, restore, or install functions.					
5716-MS1					
Base	OSI Message Services for OS/400	–	V3R6M0	1.5	5.7
5716-MW1					
Base	ManageWare for OS/400	–	V3R6M0	18.7	16.4 - 17.4
1	ManageWare for OS/400 - Windows	–	V3R6M0	4.0	4.6
5716-OS1					
Base	OSI Communications Subsystem for OS/400	–	V3R6M0	10.0	37.9 - 50.7
5716-PD1					

Table B-1 (Page 7 of 10). Licensed program size information

Licensed Program Identifier		Status	Earliest Level Compatible with V3R6M0 OS/400	Installation Storage Requirements in Megabytes ¹	
Part	Description			Previous Releases	V3R6M0
Base	Application Program Driver for OS/400	–	V3R6M0	11.5	34.6 - 49.3
5738-PC1					
Base	PC Support/400	Repackaged			
If you are replacing a release, the new Client Access/400 products automatically replace PC Support/400 (5738-PC1). For details of which Client Access/400 product options correlate to which PC Support/400 options, refer to “Mapping PC Support to Client Access” on page B-12.					
57xx-PL1					
Base	AS/400 PL/I	Removed			
Support for all levels (5738-PL1, 5763-PL1) of AS/400 PL/I is removed. Support is provided in PRPQ 5799-PFJ. Delete the licensed program before installing V3R6M0. The PRPQ must be installed using the RSTLICPGM command.					
5716-PM1					
Base	Performance Management/400	New	V3R6M0	NA	15.8 - 18.7
If you have the 5799-MPG PRPQ installed and you are replacing a release, this product is automatically installed.					
57xx-PS1					
Base	AS/400 Pascal	Removed			
Support for all levels (5738-PS1, 5763-PS1) of the AS/400 Pascal licensed program is removed. Support is provided in the PRPQ 5799-FRJ. Delete the licensed program before installing V3R6M0. The PRPQ must be installed with the RSTLICPGM command.					
5716-PT1					
Base	Performance Tools for OS/400	–	V3R6M0	11.5	17.2 - 27.2
1	Performance Tools for OS/400 - Manager Feature	–	V3R6M0	1.7	5.1 - 8.8
2	Performance Tools for OS/400 - Agent Feature	–	V3R6M0	0.1	0.3 - 0.5
5716-PW1					
Base	Application Development ToolSet for OS/400 - SEU	–	V3R6M0	2.5	4.4 - 7.2
1	ADTS/400	–	V3R6M0	4.5	20.5 - 30.0
2	ADTS/400 - App Dev Manager	–	V3R6M0	3.0	13.0 - 20.4
3	ADTS/400 - AppDict Services	New	V3R6M0	14.2	30.4 - 42.8
5716-PW1 option 2 is the functional equivalent of the removed product 5738-LM1, Application Development Manager/400. 5716-PW1 option 3 is the functional equivalent of the removed product 5738-AD1, Application Dictionary Services/400. If you are replacing-a-release the old products are deleted after the new release is installed.					
5716-QU1					
Base	Query for OS/400	–	V3R6M0	1.0	3.2 - 5.0
5716-RG1					
Base	Integrated Language Environment RPG for OS/400	Revised	V3R6M0	2.0	3.1 - 5.7
1	ILE RPG for OS/400 IBM System/36-Compatible RPG II	–	V3R6M0	1.2	3.3 - 4.8
2	ILE RPG for OS/400 IBM System/38-Compatible RPG III	–	V3R6M0	1.0	2.7 - 4.1
3	RPG/400 Previous Compiler	Removed			
4	System/36-Compatible RPG II Previous Compiler	Removed			
5	ILE RPG for OS/400 - RPG for OS/400	Repackaged	V3R6M0	1.1	3.5 - 5.1
6	ILE RPG for OS/400 - *PRV ILE RPG for OS/400	New	V3R6M0	NA	1.8 - 3.6

Licensed Program Information

Table B-1 (Page 8 of 10). Licensed program size information

Licensed Program Identifier		Status	Earliest Level Compatible with V3R6M0 OS/400	Installation Storage Requirements in Megabytes ¹	
Part	Description			Previous Releases	V3R6M0
<ul style="list-style-type: none"> Option 3, RPG/400 Previous Compiler, and option 4, System/36-Compatible RPG II Previous Compiler, are removed. Options 5 and 1, respectively, provide equivalent function and support *CUR and *PRV (V2R3M0 and V3R1M0) values for a target release. You must delete options 3 and 4 before installing V3R6M0. If options 3 and 4 remain on the system after V3R6M0 is installed, they could be difficult to delete and could leave orphaned objects on the system. Deleting them before upgrading ensures that all objects associated with the options are deleted. The V2R3M0 Base (5738-RG1) is now Option 5, RPG/400. If you have this product installed and you use a replacing-a-release procedure, Option 5 is installed without additional actions required. The compiler for previous release support (V3R1M0) is now in 5716-RG1 Option 6, *PRV ILE RPG/400. If you use a replacing-a-release procedure, Option 6 requires that you install it using the procedure for additional licensed programs. If you are upgrading to V3R6M0, you need to get PTFs, apply them to your existing release, and recompile your programs before you can successfully move them to the V3R6M0 system. Refer to the <i>Memo to Users</i> for more information. 					
5716-SM1					
Base	SystemView System Manager for OS/400	–	V3R6M0	0.8	17.8 - 21.2
5716-ST1					
Base	DB2 Query Manager and SQL Development Kit for OS/400	–	V3R6M0	2.2	9.0 - 13.6
5716-STK					
Base	SOMobjects Developer Toolkit for OS/400	New	V3R6M0	NA	10 ^a
<p>^a The actual size may be more or less than this value. Detailed information for this licensed program was not available at the time of printing.</p> <p>This product consists of client and server sections. The server sections install on the AS/400 as part of your chosen installation method. Additional product support and additional actions on the client are required to install and use this product. A Client Access product must be installed and functional prior to installing the client portion of this product. OS/400 option 19 must be installed on the AS/400 to provide runtime support. Refer to the online book <i>SOMobjects (SOM/DSOM 2.1) User Guide</i> for more information.</p>					
5716-SV1					
Base	ADSTAR Distributed Storage Manager for OS/400	–	V3R6M0	5.2	11.2 - 17.7
5716-TC1					
Base	TCP/IP Connectivity Utilities for OS/400	–	V3R6M0	4.6	12.2
5716-UB1					
Base	Ultimedia Ultimedia Business Conferencing for OS/400	–	V3R6M0	0.9	3.7
1	Business Conferencing/400 - Windows	–	V3R6M0	0.1	3.2
2	Business Conferencing/400 - OS/2	–	V3R6M0	3.3	3.4
3	Person to Person for OS/2	–	V3R6M0	0.1	4.4
4	Person to Person for Windows	–	V3R6M0	0.1	4.2
5716-US1					
Base	Client Access Ultimedia Tools for OS/400	–	V3R6M0	0.1	0.1
1	Ultimedia Perfect Image/400 - OS/2 SBCS	–	V3R6M0	9.1	9.7
3	Ultimedia Perfect Image/400 - OS/2 Samples	–	V3R6M0	27.9	28.3
4	Ultimedia Builder/400 - OS/2 SBCS	–	V3R6M0	56.7	45.9
6	Ultimedia Builder/400 - OS/2 Samples	–	V3R6M0	135.0	148.1
5716-VG1					
Base	VisualGen Host Services for OS/400	New	–	NA	1.6
5763-VR1					
Base	AS/400 VRPG Client	Repackaged			

Table B-1 (Page 9 of 10). Licensed program size information

Licensed Program Identifier		Status	Earliest Level Compatible with V3R6M0 OS/400	Installation Storage Requirements in Megabytes ¹	
Part	Description			Previous Releases	V3R6M0
This functional equivalent of this licensed program is option 2 of 5716-CL1.					
5716-WP1					
Base	OfficeVision for OS/400	–	V3R6M0	4.5	12.4 - 19.9
1	OfficeVision for OS/400–Text Search	–	V3R6M0	10.0	20.3 - 26.5
2	OfficeVision for OS/400–Calendar	–	V3R6M0	2.5	7.7 - 12.2
3	OfficeVision for OS/400–Mail	–	V3R6M0	0.5	1.5 - 2.3
4	OfficeVision for OS/400–Editor	–	V3R6M0	2.0	10.7 - 16.5
5716-XA1					
Base	Client Access/400 Family	–	V3R1M0	0.2	0.2
1	Client Access/400 - PC Tools Folder	–	V3R1M0	7.8	13.3
When you order this product, you also receive 5763-XB1, 5763-XC1, 5763-XF1, 5763-XG1, and 5763-XL1.					
5763-XB1					
Base	Client Access/400 DOS with Extended Memory	–	V3R1M0	0.1	0.2
1	Client Access/400 - Ext DOS SBCS	–	V3R1M0	14.2	17.0
2	Client Access/400 - Ext DOS DBCS	–	V3R1M0	9.6	10.8
3	Client Access/400 - Ext DOS RUMBA** SBCS	–	V3R1M0	5.1	7.3 - 7.4
4	Client Access/400 - Ext DOS RUMBA DBCS	–	V3R1M0	5.0	7.7
5	Client Access/400 - Ultimea Facilities	–	V3R1M0	3.5	5.9
The result you get when you replace this licensed program can vary with the installation process you use and the level of this licensed program you have installed. Be certain that you understand the information about how the install options handle compatible licensed programs in the <i>AS/400 Road Map for Changing to PowerPC Technology</i> .					
5763-XC1					
Base	Client Access/400 for Windows 3.1	–	V3R1M0	0.1	0.1
1	Client Access/400 - Windows 3.1 SBCS	–	V3R1M0	11.1	20.8
2	Client Access/400 - Windows 3.1 DBCS	–	V3R1M0	5.9	21.4
3	Client Access/400 - Windows 3.1 RUMBA SBCS	–	V3R1M0	3.1	9.6
4	Client Access/400 - Windows 3.1 RUMBA DBCS	–	V3R1M0	3.1	9.7
5	Client Access/400 - Windows 3.1 PC5250	–	V3R1M0	7.4	10.2
6	Client Access/400 - GraphicOps for Windows	–	V3R1M0	0.1	11.1
7	Client Access/400 - Ultimea Facilities	–	V3R1M0	0.1	5.5
8	Client Access/400 - Graphical Access for OS/400	New	V3R1M0	NA	4.5
9	Client Access/400 - SysObject Access for OS/400	New	V3R1M0	NA	8.8
The result you get when you replace this licensed program can vary with the installation process you use and the level of this licensed program you have installed. Be certain that you understand the information about how the install options handle compatible licensed programs in the <i>AS/400 Road Map for Changing to PowerPC Technology</i> .					
This product requires additional storage space to save using the Save Licensed Program (SAVLICPGM) command. See the <i>Backup and Recovery – Basic</i> , book, SC41-4304, for details.					
Before you delete or replace an existing release of this product, ensure that each option does not have user-created subdirectories. If any user-created subdirectories exist, the install or delete operation may fail.					
5763-XF1					
Base	Client Access/400 for OS/2	–	V3R1M0	0.1	0.2
1	Client Access/400 - OS/2 SBCS	–	V3R1M0	9.9	10.6
2	Client Access/400 - OS/2 DBCS	–	V3R1M0	8.9	9.9 - 10.0
3	Client Access/400 - OS/2 RUMBA SBCS	–	V3R1M0	4.6	6.4
4	Client Access/400 - OS/2 RUMBA DBCS	–	V3R1M0	4.5	5.0 - 5.1

Licensed Program Information

Table B-1 (Page 10 of 10). Licensed program size information

Licensed Program Identifier		Status	Earliest Level Compatible with V3R6M0 OS/400	Installation Storage Requirements in Megabytes ¹	
Part	Description			Previous Releases	V3R6M0
5	Client Access/400 - OS/2 Communications Mgr	–	V3R1M0	5.5	5.1 - 6.6
6	Client Access/400 - GraphicOps for OS/2	–	V3R1M0	14.1	11.3
7	Client Access/400 - Ultimea Facilities	–	V3R1M0	7.3	5.3

The result you get when you replace this licensed program can vary with the installation process you use and the level of this licensed program you have installed. Be certain that you understand the information about how the install options handle compatible licensed programs in the *AS/400 Road Map for Changing to PowerPC Technology*.

Option 4 appears on the LICPGM menu but it may not be included on your distribution media. If you create installation diskettes, this option will fail.

5763-XG1

Base	Client Access Optimized OS/2 Client for OS/400	–	V3R1M0	50.0	8.8 - 62.7
1	Client Access/400 - RUMBA Optimized OS/2 Client	–	V3R1M0	7.0	0.7 - 8.1
2	Client Access/400 - PC5250 Optimized OS/2 Client	–	V3R1M0	8.5	0.8 - 10.5
3	Client Access/400 - GraphicOps OS/2 Client	–	V3R1M0	14	1.3 - 11.4
4	Client Access/400 - Ultimea Facilities	–	V3R1M0	5.0	0.6 - 5.3
5	Client Access/400 - Graphical Access for OS/400	New	V3R1M0	NA	1.9 - 2.0

The result you get when you replace this licensed program can vary with the installation process you use and the level of this licensed program you have installed. Be certain that you understand the information about how the install options handle compatible licensed programs in the *AS/400 Road Map for Changing to PowerPC Technology*.

This product requires additional storage space to save using the Save Licensed Program (SAVLICPGM) command. See the *Backup and Recovery – Basic*, book, SC41-4304, for details.

Before you delete or replace an existing release of this product, ensure that each option does not have user-created subdirectories. If any user-created subdirectories exist, the install or delete operation may fail.

5763-XL1

Base	Client Access DOS Client for OS/400	–	V3R1M0	0.2	0.2
1	Client Access/400 - DOS SBCS	–	V3R1M0	10.7	11.8
2	Client Access/400 - DOS DBCS	–	V3R1M0	6.3	6.7 - 6.8

The result you get when you replace this licensed program can vary with the installation process you use and the level of this licensed program you have installed. Be certain that you understand the information about how the install options handle compatible licensed programs in the *AS/400 Road Map for Changing to PowerPC Technology*.

5716-XZ1

Base	LAN Server for OS/400	–	V3R6M0	81.0	89.4
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Notes:

¹ These numbers represent the range of minimum to maximum size for this licensed program. Refer to “Compressed Objects and Storage Space” on page 5-5 for information about compressed objects.

Mapping PC Support to Client Access

In Version 3, the PC Support/400 (5738-PC1) licensed program is repackaged. Function is now packaged in:

- 5763-SS1 option 12, OS/400 - Host Servers
- 5763-XA1 Client Access/400 Family - Base
- 5763-XB1 Client Access/400 for DOS with Extended Memory
- 5763-XF1 Client Access/400 for OS/2
- 5763-XL1 Client Access/400 for DOS

Table B-2 on page B-13 shows how the PC Support/400 (5738-PC1) licensed program and options correspond to the Client Access/400 products. If you have PC Support/400 Version 2 (5738-PC1) installed, it is replaced by the appropriate Client Access products during the task that replaces licensed programs.

Table B-2. How PC Support/400 Maps to Client Access

Option of 5738-PC1 PC Support/400	Corresponding Client Access Product		
	V3Rx Product ID and Option	Root Folder	Library
Base	5716-SS1 Option 12 (OS/400 - Host Servers)		QIWS
1	5763-XL1 Base 5763-XL1 Option 1	QIWSFLR	QISWF QIWSFS
2	5763-XL1 Base 5763-XL1 Option 2	QIWSFLRD	QIWSF QIWSFD
3	5763-XF1 Base 5763-XF1 option 1	QIWSOS2	QIWS2 QIWS2S
4	5763-XF1 Base 5763-XF1 Option 2	QIWSOS2D	QIWS2 QIWS2D
5	5763-XB1 Base 5763-XB1 Option 1	QIWSFL2	QIWSP QIWSPS
6	5763-XB1 Base 5763-XB1 Option 2	QIWSFL2D	QIWSP QIWSPD
7	5716-XA1 Base 5716-XA1 Option 1	QIWSTOOL	QIWSTL
8	5763-XB1 Base 5763-XB1 Option 3	QRUMBA	QIWSP QRUMBA
9	5763-XB1 Base 5763-XB1 Option 4	QRUMBAD	QIWSP QRUMBAD
10	5763-XF1 Base 5763-XF1 Option 3	QRUMBA2	QIWS2 QRUMBA2
11	5763-XF1 Base 5763-XF1 Option 4	QRUMBA2D	QIWS2 QRUMBA2D
12	5763-XF1 Base 5763-XF1 Option 5	QHMC400	QIWS2 QCM400

How to Remove Licensed Programs

You must remove any unsupported licensed programs before you begin the upgrade procedure. This ensures that all of the associated objects are removed.

Although the installation process removes the program libraries for the unsupported licensed programs, it does not remove associated objects that may be in other libraries such as QUSRSYS. Also, if a licensed program has exit programs that are non-observable, you may not be able to completely delete the product after V3R6M0 is installed. The delete operation will not run the non-observable exit programs. This may result in orphaned objects on your system.

If You Use the 5798-RZH PRPQ

If you have the 5798-RZH Programming Request for Price Quotation (PRPQ) installed, do not delete it until directed to by the final preparation checklist for your upgrade method. You can adversely affect your system and your upgrade preparations if you delete this PRPQ before being directed to by the checklists.

Determining What Unused Parts of Products to Delete

Depending on your business needs, you might be able to delete some of the optional parts of the licensed programs shown in Table B-3 on page B-15. (Table B-3 shows V3R6M0 product identifiers, but the information in the table applies to deleting unwanted parts either before or after installing the new release of software.) For example, you can delete the licensed programs for any clients (DOS, DOS with Extended Memory, Windows** 3.1, or OS/2) that you do not use. Deleting unneeded licensed programs or optional parts will give you more DASD for your business needs.

Note: Before deleting anything, read the following:

- If you do not have current OS/400 software distribution media from IBM, make sure that you save the affected licensed program. Type GO LICPGM on the AS/400 command line and take option 13. You will need extra tapes for this save operation. Saving these licensed programs to tape can take several hours. At a later time, if you need any of the licensed programs or optional parts that were deleted, you can reinstall them from these tapes using GO LICPGM and option 11.
- Some systems are shipped with system backup tapes. These backup tapes are not the same as software distribution media. While you can use software distribution media to reinstall individual licensed programs or optional parts, you cannot use system backup tapes.

To delete unneeded optional parts, use the information in “How to Remove Licensed Programs” on page B-13.

Use Table B-3 on page B-15, Table B-1 on page B-3, and the following keys to help you determine which programs or optional parts you might want to delete.

Keys for Table B-3 on page B-15:

- a You cannot delete the entire OS/400 operating system. You can delete optional parts.
- b It is recommended that you do not delete this part.
- c Delete this optional part if you are not migrating from a System/36 or System/38 to this AS/400.
- d Delete this optional part if you are running only AS/400 applications.
- e This optional part is needed only by software developers.
- f Do not delete this optional part if you are using the Print Services Facility/400 (see optional part number 17 in this table).
- g Delete this part if you do not need to compile CL programs for a previous release.

- h This option is a separately orderable feature.
- i Do not delete this part if you have applications using Ultimedia System Facilities.
- j Do not delete if you are using Client Access/400 products.
- k If you are not using this specific client (DOS, DOS with Extended Memory, Windows 3.1, or OS/2), you can delete the complete licensed program for that client.
- l If you are using this specific client, do not delete the base option.
- m If your system has the optional parts for both SBCS (single-byte character set) and DBCS (double-byte character set) installed, depending on your national language needs, you might be able to delete the optional part you are not using.
- n There are two 5250 emulators (RUMBA** and PC5250) available with this client. If you are not using both, delete one of them.
- o Do not delete this optional part if you require graphical user interface for system operations.
- p This optional part contains sample programs, migration tools, and debug tools. You should delete this optional part only after you download any tools used by your installation.
- q If you delete this optional part, you must first use the CHGSYSLIBL system command to remove QHLPSYS from the system library list.

Table B-3 (Page 1 of 2). Deleting Unwanted Licensed Programs and Optional Parts After the Installation Is Complete

Keys	Licensed Program and Optionally Installable Product Part	Number for Product Part
a	5716-SS1 OS/400	
q	OS/400 Online Information (Help text)	2
c	OS/400 System/36 and System/38 Migration	4
d	OS/400 System/36 and System/38 Environment	5 and 6
e	OS/400 Example Tools Library	7
f	OS/400 AFP Compatibility Fonts	8
g	OS/400 *PRV CL Compiler Support	9
c	OS/400 System/36 Migration Assistant	11
b, j	OS/400 Host Servers	12
e	OS/400 Openness Includes	13
	OS/400 GDDM	14
h	OS/400 Common Programming APIs Toolkit	15
i	OS/400 Ultimedia System Facilities	16
h	OS/400 Print Services Facility/400	17
h	OS/400 Media and Storage Extensions	18
j	5716-XA1 Client Access/400 Family - Base	Base

Licensed Program Information

<i>Table B-3 (Page 2 of 2). Deleting Unwanted Licensed Programs and Optional Parts After the Installation Is Complete</i>		
Keys	Licensed Program and Optionally Installable Product Part	Number for Product Part
p	Client Access/400 - PC Tools Folder	1
k, l	5763-XB1 Client Access/400 for DOS with Extended Memory	Base
m	Client Access/400 - Ext DOS SBCS or DBCS	1 or 2
m	Client Access/400 - Ext DOS RUMBA SBCS or DBCS	3 or 4
i	Client Access/400 - Ultimedia Facilities	5
k, l	5763-XC1 Client Access/400 for Windows 3.1	Base
m	Client Access/400 - Windows 3.1 SBCS or DBCS	1 or 2
m, n	Client Access/400 - Windows 3.1 RUMBA SBCS or DBCS	3 or 4
n	Client Access/400 - Windows 3.1 PC5250	5
o	Client Access/400 - GraphicOps for Windows	6
i	Client Access/400 - Ultimedia Facilities	7
k, l	5763-XF1 Client Access/400 for OS/2	Base
m	Client Access/400 - OS/2 SBCS or DBCS	1 or 2
m	Client Access/400 - OS/2 RUMBA SBCS or DBCS	3 or 4
	Client Access/400 - OS/2 Communications Mgr	5
o	Client Access/400 - GraphicOps for OS/2	6
i	Client Access/400 - Ultimedia Facilities	7
k, l	5763-XG1 Client Access/400 Optimized for OS/2	Base
n	Client Access/400 - RUMBA Optimized for OS/2	1
n	Client Access/400 - PC5250 Optimized for OS/2	2
o	Client Access/400 - GraphicOps for OS/2	3
i	Client Access/400 - Ultimedia Facilities	4
k, l	5763-XL1 Client Access/400 for DOS	Base
m	Client Access/400 - DOS SBCS or DBCS	1 or 2

Procedures for Deleting Licensed Programs

To remove licensed programs, do the following:

- ___ **Step 1** Type G0 LICPGM and press the Enter key. You are shown the Work with Licensed Programs menu.
- ___ **Step 2** Select option 12 (Delete licensed programs). You are shown the Delete Licensed Programs display.
- ___ **Step 3** Type 4 (Delete) in the Option column in front of each licensed program that you want to delete. Page down to display additional licensed programs.

Note: If you select the base part of a licensed program that has optional parts, all the optional parts are also deleted. If you

select only an optional part, the base and any other parts remain on your system.

- ___ **Step 4** Press the Enter key. You are shown the Confirm Delete of Licensed Programs display.
- ___ **Step 5** Press the Enter key if your selections are correct. Press F12 to make corrections.
- ___ **Step 6** You receive confirmation messages from the system when the licensed programs are deleted.
- ___ **Step 7** Press F12 to return to the Work with Licensed Programs menu.

You may have other installed licensed programs and optional parts that do not appear in this list. Refer to note 1 for more information.

Procedures for Deleting PRPQs

To remove PRPQs or licensed programs that are not listed on the LICPGM menu displays, do the following:

- ___ **Step 1** Check the documentation for the product for any special instructions or considerations you should be aware of before you delete the product.

If You Use the 5798-RZH PRPQ

If you have the 5798-RZH Programming Request for Price Quotation (PRPQ) installed, do not delete it until directed to by the final preparation checklist for your upgrade method. You can adversely affect your system and your upgrade preparations if you delete this PRPQ before being directed to by the checklists.

- ___ **Step 2** Type the command:
DLTLICPGM LICPGM(*product identifier*) OPTION(*ALL)
 Press the Enter key.
- ___ **Step 3** Do this for each product you need to delete.

Notes About Deleting Licensed Programs

Notes:

1. If you installed a new licensed program or a new optional part that became available independently of an operating system release or modification level, it will not appear in the list when you use option 12. Use the Delete Licensed Program (DLTLICPGM) command to delete independently shipped licensed programs and optional parts.
2. Do not attempt to use the DLTLIB command to remove a licensed program or optional part of a licensed program from the system. Some licensed programs copy objects into other libraries; the DLTLIB command will not delete the duplicated objects. Using the DLTLIB command to delete a licensed program or optional part could leave the licensed program in a partially installed condition. For a list of IBM-supplied libraries, organized by licensed program, see the *Programming Reference Summary* book, SX41-4720.

Licensed Program Information

3. If you are unable to delete a licensed program, it may be because the library for the licensed program is listed in one of the library lists. Use the WRKSYSVAL command to check the system and user library lists. When the Work with System Values display appears, type a **5** next to the QSYSLIBL and QUSRLIBL system values to display the associated libraries. If the library for the licensed program is listed on this display, press the Enter key to return to the Work with System Values display and then type a **2** to change the system value. When the Change System Value display appears, use the spacebar to remove that licensed program library from the library list. You will be able to delete your licensed program after your next IPL.
4. When V3R1M0 or a higher release is installed and your system is at security level 40 or 50, you cannot delete some products from a previous release level. Message CPD0176 is displayed if the system security level is 50 and a product earlier than V2R3 has exit programs that do not work at level 50. After V3R1M0 or a higher release is installed, you must change the security level to 30, delete the products, then change the security level back to 40 or 50.

Licensed Program Times

Table B-4 on page B-19 will help you determine the maximum time that you need to install licensed programs. Table B-4 shows the base values to use for time calculations and factors that influence your calculations.

Note: The maximum installation time values that you calculate assumes that the system uses single-process installation. For most licensed programs, the system uses multiprocess installation. Because multiprocess installation has many variables that are unique to each system, the time for multiprocess installation is virtually unpredictable using Table B-4 on page B-19 and Table 7-19 on page 7-30. Consider the time you arrive at using this information as your worst-case installation time.

Multiplication Values are base values used to calculate the installation time for the licensed programs and options you plan to install. The base value is not the installation time. You must use this value with the information provided in Table 7-20 on page 7-32.

Base Value A

Use this base value for the licensed programs that you are replacing as part of an upgrade.

Base Value B

Use this base value for the licensed programs that you are adding to an existing system after an upgrade. If you use the Staged Upgrade Offering with your upgrade, use this column to determine installation times for installing software from the distribution media onto the temporary machine. Also use this base value if you are installing a new system that will not restore user data from a previous release.

Factors Influencing Installation Time indicate which licensed programs or optional parts may be affected by additional factors. Characteristics of the licensed programs being installed can sometimes cause a significant impact on your installation time. Table B-4 on page B-19 indicates which licensed programs and options may cause your installation to run longer.

Multiprocess Storage

If the size of a licensed program exceeds the 11MB of auxiliary storage that the system uses for multiprocess installation, the licensed program is installed with the single-process method. Values shown in this column (either *PGM or *LNG) indicate which part of the licensed program requires additional storage for multiprocess installation. "Multiprocess Installation-Overview" on page B-26 describes multiprocess installation. A dash indicates the product will multiprocess install within the system's standard settings.

Documents and Folders

Licensed programs and optional parts with documents or folders can take longer to install. Yes indicates these products have documents or folders.

Table B-4 (Page 1 of 6). Licensed program time information

Licensed Program Identifier		Multiplication Values ¹		Factors Influencing Installation Time		
Part	Description	Base Value A	Base Value B	Multiprocess Storage ²		Documents and Folders ³
				*PGM	*LNG	
5716-999						
–	Licensed Internal Code			NA	NA	NA
5716-SS1						
Base	Operating System/400			NA	NA	NA
Library	OS/400–Library QGPL	1.2	1.2	–	–	–
Library	OS/400–Library QUSRSYS	11.7	11.7	58.3	–	–
1	OS/400 Extended Base Support	14.9	16.2	–	–	Yes
2	OS/400–Online Information	5.0	5.0	–	20.1	–
4	OS/400–S/36 and S/38 Migration	9.6	8.0	12.1	–	–
5	OS/400–System/36 Environment	22.4	21.4	11.4	–	–
6	OS/400–System/38 Environment	5.1	4.9	–	–	–
7	OS/400–Example Tools Library	6.7	6.6	–	–	–
8	OS/400–AFP* Compatibility Fonts	4.4	3.7	–	NA	–
9	OS/400– *PRV CL Compiler Support	21.8	17.8	–	23.5	–
11	OS/400–S/36 Migration Assistant	5.5	5.3	–	–	–
12	OS/400–Host Servers	13.0	11.4	14.4	–	–
13	OS/400–Openness Includes	10.3	5.5	36.5	NA	–
14	OS/400–GDDM	5.5	5.4	–	–	–
15	OS/400–Common Programming APIs Toolkit	4.7	4.7	–	–	–
16	OS/400–Ultimedia System Facilities	8.9	10.0	12.8	–	Yes
17	OS/400–Print Services Facility/400	2.2	2.2	–	NA	–
18	OS/400–Media and Storage Extensions	2.3	2.3	–	–	Yes
19	OS/400–SOMobjects	10.9	11.9	–	–	–
20	OS/400–Advanced 36	5.2	5.1	–	–	–
21	OS/400–Locale Source Library	NA	NA	–	–	–
22	OS/400–ObjectConnect	4.9	4.9	–	–	–
23	OptiConnect for OS/400	9.5	9.6	–	–	–
5716-AF1						
Base	IBM Advanced Function Printing Utilities for OS/400	7.6	6.6	–	–	–
5716-AP1						
Base	IBM Advanced DBCS Printer Support for OS/400	NA	NA	–	–	–
1	Adv DBCS Printer Support for OS/400 - IPDS	NA	NA	–	–	–
5716-BR1						
Base	Backup Recovery and Media Services for OS/400	14.0	18.3	30.4	–	–
5716-CB1						

Licensed Program Information

Table B-4 (Page 2 of 6). Licensed program time information

Licensed Program Identifier		Multiplication Values ¹		Factors Influencing Installation Time		
Part	Description	Base Value A	Base Value B	Multiprocess Storage ²		Documents and Folders ³
				*PGM	*LNG	
Base	Integrated Language Environment COBOL for OS/400	5.4	5.4	–	–	–
1	ILE COBOL/400 - System/36-compatible COBOL	5.2	5.1	–	–	–
2	ILE COBOL/400 - System/38-compatible COBOL	5.1	5.0	–	–	–
5	ILE COBOL/400 - COBOL/400	5.4	5.3	–	–	–
6	ILE COBOL/400 - *PRV ILE COBOL/400	2.7	2.7	–	–	–
5716-CF1						
Base	Point-of-Sale Communications Utility for OS/400	6.4	6.8	–	–	–
5716-CL1						
Base	Application Development ToolSet Client Server for OS/400	10.2	8.5	30.5	17.3	–
1	CoOperative Development Environment/400	9.1	7.9	15.9	–	–
2	AS/400 VRPG Client/2	12.8	9.7	54.5	–	–
5716-CM1						
Base	Communications Utilities for OS/400	5.8	5.8	–	–	–
5716-CP2						
Base	CallPath for OS/400	7.1	6.9	16.4	–	–
5716-CR1						
Base	Cryptographic Support for OS/400	5.3	5.3	–	–	–
5716-CX2						
Base	Integrated Language Environment C for OS/400	6.9	5.2	–	–	–
1	ILE C for OS/400 *PRV Compiler Support	5.1	4.9	–	–	–
5716-CX4						
Base	VisualAge C++ for OS/400	4.6	4.6	–	–	–
1	CSet ++ Client/2 for OS/400	40.6	20.6	15.5	202.3	–
5716-DB1						
Base	System/38 Utilities for OS/400	6.8	6.4	–	–	–
5716-DCT						
Base	Language Dictionaries for OS/400	4.5	4.5	–	–	–
1	Afrikaans Dictionary	2.3	2.3	–	NA	–
2	Dutch Modern Dictionary	2.3	2.3	–	NA	–
3	Brazilian Portuguese Dictionary	2.3	2.3	–	NA	–
4	Catalan Dictionary	2.3	2.3	–	NA	–
5	Danish Dictionary	2.3	2.3	–	NA	–
6	German Dictionary	2.4	2.3	–	NA	–
7	Swiss German Dictionary	2.3	2.3	–	NA	–
8	Spanish Dictionary	2.3	2.3	–	NA	–
9	French National Dictionary	2.3	2.3	–	NA	–
10	French Canadian Dictionary	2.3	2.3	–	NA	–
11	Greek Dictionary	2.3	2.3	–	NA	–
12	Icelandic Dictionary	2.3	2.3	–	NA	–
13	Italian Dictionary	2.3	2.3	–	NA	–
14	US Legal Dictionary	2.3	2.3	–	NA	–
15	US Medical Dictionary	2.3	2.3	–	NA	–
16	Dutch Dictionary	2.3	2.3	–	NA	–
17	Norwegian Dictionary	2.9	2.9	–	NA	–
18	Norwegian Nynorsk Dictionary	2.3	2.3	–	NA	–
19	Portuguese Dictionary	2.3	2.3	–	NA	–
20	Finnish Dictionary	2.3	2.3	–	NA	–
21	Swedish Dictionary	2.3	2.3	–	NA	–
22	UK English Dictionary	2.3	2.3	–	NA	–
23	US English Dictionary	2.3	2.3	–	NA	–

Table B-4 (Page 3 of 6). Licensed program time information

Licensed Program Identifier		Multiplication Values ¹		Factors Influencing Installation Time		
Part	Description	Base Value A	Base Value B	Multiprocess Storage ²		Documents and Folders ³
				*PGM	*LNG	
5716-DFH						
Base	CICS for OS/400	10.2	11.0	16.3	–	–
1	CICS for OS/400 - Sample Applications	4.8	4.9	–	–	–
5716-DP1						
Base	DataPropagator Relational Capture and Apply for OS/400	5.4	5.8	–	–	–
5716-DS1						
Base	Business Graphics Utility for OS/400	5.1	5.0	–	–	–
5716-ES1						
Base	IBM SystemView OMEGAMON Services/400	7.3	7.5	20.7	–	–
1	IBM AUTOMATED FACILITIES**/400	5.1	5.1	–	–	–
2	IBM OMEGAVIEW**/400 for OS/2	7.4	7.1	–	–	Yes
5716-FNT						
Base	Advanced Function Printing Fonts for OS/400	4.6	4.6	–	–	–
1	AS/400 Font–Sonoran Serif ^c	2.7	2.6	–	NA	–
2	AS/400 Font–Sonoran Serif Headliner	2.5	2.5	–	NA	–
3	AS/400 Font–Sonoran Sans Serif ^d	2.6	2.6	–	NA	–
4	AS/400 Font–Sonoran Sans Serif Headliner	2.5	2.5	–	NA	–
5	AS/400 Font–Sonoran Sans Serif Condensed	2.6	2.5	–	NA	–
6	AS/400 Font–Sonoran Sans Serif Expanded	2.5	2.5	–	NA	–
7	AS/400 Font–Monotype Garamond**	2.5	2.5	–	NA	–
8	AS/400 Font–Century Schoolbook**	2.5	2.5	–	NA	–
9	AS/400 Font–Pi and Specials	2.4	2.3	–	NA	–
10	AS/400 Font–ITC Souvenir**	2.5	2.5	–	NA	–
11	AS/400 Font–ITC Avant Garde Gothic**	2.5	2.5	–	NA	–
12	AS/400 Font–Math and Science	2.5	2.5	–	NA	–
13	AS/400 Font–DATA1	2.3	2.3	–	NA	–
14	AS/400 Font–APL2*	2.4	2.3	–	NA	–
15	AS/400 Font–OCR A and OCR B	2.3	2.3	–	NA	–
5716-FN1						
Base	Advanced Function Printing DBCS Fonts for OS/400	4.6	4.6	–	NA	–
1	AS/400 Font (DBCS)–Japanese	6.8	5.8	76.9	NA	–
2	AS/400 Font (DBCS)–Korean	3.9	3.5	25.2	NA	–
3	AS/400 Font (DBCS)–Traditional Chinese	3.0	2.9	14.1	NA	–
4	AS/400 Font (DBCS)–Simplified Chinese	2.6	2.4	–	NA	–
5	AS/400 Font (DBCS)–Thai	2.6	2.5	–	NA	–
5716-FS1						
Base	OSI File Services for OS/400	14.8	14.6	39.0	–	–
5716-JS1						
Base	Job Scheduler for OS/400	8.1	9.3	15.5	–	–
5716-MG1						
Base	SystemView Managed System Services for OS/400	6.4	7.3	–	–	–
5716-MQ1						
Base	MQSeries for OS/400	6.9	7.0	–	–	–
1	MQSeries for OS/400 - Samples	2.7	2.6	–	NA	–
2	MQSeries for OS/400 - Admin Application	5.2	5.1	–	–	–
5716-MS1						
Base	OSI Message Services for OS/400	5.8	6.0	–	–	–
5716-MW1						
Base	ManageWare for OS/400	11.8	15.6	14.8	–	Yes

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Table B-4 (Page 4 of 6). Licensed program time information

Licensed Program Identifier		Multiplication Values ¹		Factors Influencing Installation Time		
Part	Description	Base Value A	Base Value B	Multiprocess Storage ²		Documents and Folders ³
				*PGM	*LNG	
1	ManageWare for OS/400 - Windows	6.3	6.3	-	-	Yes
5716-OS1						
Base	OSI Communications Subsystem for OS/400	14.5	13.6	34.2	-	-
5716-PD1						
Base	Application Program Driver for OS/400	10.3	13.6	32.5	-	-
5716-PM1						
Base	Performance Management/400	7.8	7.1	15.2	-	-
5716-PT1						
Base	Performance Tools for OS/400	8.3	7.6	15.2	-	-
1	Performance Tools for OS/400 - Manager Feature	5.8	5.6	-	-	-
2	Performance Tools for OS/400 - Agent Feature	4.7	4.7	-	-	-
5716-PW1						
Base	Application Development ToolSet for OS/400 - SEU	4.3	4.3	-	-	-
1	ADTS/400	15.2	15.1	16.7	-	-
2	ADTS/400 - App Dev Manager	11.5	11.1	12.1	-	-
3	ADTS/400 - AppDict Services	14.0	11.4	28.7	-	-
5716-QU1						
Base	Query for OS/400	5.3	5.2	-	-	-
5716-RG1						
Base	Integrated Language Environment RPG for OS/400	5.2	5.2	-	-	-
1	ILE RPG for OS/400 IBM System/36-Compatible RPG II	5.2	5.2	-	-	-
2	ILE RPG for OS/400 IBM System/38-Compatible RPG III	5.0	5.0	-	-	-
5	ILE RPG for OS/400 - RPG for OS/400	5.3	5.2	-	-	-
6	ILE RPG for OS/400 - *PRV ILE RPG for OS/400	2.5	2.5	-	-	-
5716-SM1						
Base	SystemView System Manager for OS/400	10.0	9.4	15.3	-	-
5716-ST1						
Base	DB2 Query Manager and SQL Development Kit for OS/400	5.5	5.2	-	-	-
5716-STK						
Base	SOMobjects Developer Toolkit for OS/400	NA	NA	-	-	-
5716-SV1						
Base	ADSTAR Distributed Storage Manager for OS/400	5.3	5.4	-	-	-
5716-TC1						
Base	TCP/IP Connectivity Utilities for OS/400	6.4	6.3	-	-	-
5716-UB1						
Base	Ultimedia Ultimedia Business Conferencing for OS/400	6.2	6.3	-	-	Yes
1	Business Conferencing/400 - Windows	6.0	5.9	-	-	Yes
2	Business Conferencing/400 - OS/2	7.3	7.1	-	-	Yes
3	Person to Person for OS/2	6.9	6.6	-	-	Yes
4	Person to Person for Windows	6.7	6.4	-	-	Yes
5716-US1						
Base	Client Access Ultimedia Tools for OS/400	4.6	4.6	-	-	Yes

Table B-4 (Page 5 of 6). Licensed program time information

Licensed Program Identifier		Multiplication Values ¹		Factors Influencing Installation Time		
Part	Description	Base Value A	Base Value B	Multiprocess Storage ²		Documents and Folders ³
				*PGM	*LNG	
1	Ultimedia Perfect Image/400 - OS/2 SBCS	3.9	3.5	–	NA	Yes
3	Ultimedia Perfect Image/400 - OS/2 Samples	4.6	4.0	28.3	NA	Yes
4	Ultimedia Builder/400 - OS/2 SBCS	6.1	4.9	45.9	NA	Yes
6	Ultimedia Builder/400 - OS/2 Samples	12.1	8.0	148.1	NA	Yes
5716-VG1						
Base	VisualGen Host Services for OS/400	5.1	5.1	–	–	–
5763-VR1						
Base	AS/400 VRPG Client					
5716-WP1						
Base	OfficeVision for OS/400	13.2	12.7	–	–	Yes
1	OfficeVision for OS/400–Text Search	7.8	7.9	19.0	–	Yes
2	OfficeVision for OS/400–Calendar	8.1	7.8	–	–	Yes
3	OfficeVision for OS/400–Mail	6.4	6.4	–	–	Yes
4	OfficeVision for OS/400–Editor	4.1	4.0	–	NA	Yes
5716-XA1						
Base	Client Access/400 Family	4.6	4.6	–	–	–
1	Client Access/400 - PC Tools Folder	4.4	3.9	13.3	–	Yes
5763-XB1						
Base	Client Access/400 DOS with Extended Memory	4.8	4.8	–	–	–
1	Client Access/400 - Ext DOS SBCS	10.6	8.1	11.8	–	Yes
2	Client Access/400 - Ext DOS DBCS	7.5	7.5	–	–	Yes
3	Client Access/400 - Ext DOS RUMBA** SBCS	7.2	7.2	–	–	Yes
4	Client Access/400 - Ext DOS RUMBA DBCS	7.2	7.2	–	–	Yes
5	Client Access/400 - Ultimedia Facilities	7.1	7.1	–	–	Yes
5763-XC1						
Base	Client Access/400 for Windows 3.1	4.6	4.6	–	–	–
1	Client Access/400 - Windows 3.1 SBCS	11.7	11.7	16.6	–	Yes
2	Client Access/400 - Windows 3.1 DBCS	11.3	11.3	13.6	–	Yes
3	Client Access/400 - Windows 3.1 RUMBA SBCS	9.0	9.0	–	–	Yes
4	Client Access/400 - Windows 3.1 RUMBA DBCS	9.0	9.0	–	–	Yes
5	Client Access/400 - Windows 3.1 PC5250	10.1	10.1	–	–	Yes
6	Client Access/400 - GraphicOps for Windows	7.9	7.9	–	–	Yes
7	Client Access/400 - Ultimedia Facilities	8.0	8.0	–	–	Yes
8	Client Access/400 - Graphical Access for OS/400	7.5	7.5	–	–	–
9	Client Access/400 - SysObject Access for OS/400	9.0	9.0	–	–	–
5763-XF1						
Base	Client Access/400 for OS/2	4.7	4.7	–	–	–
1	Client Access/400 - OS/2 SBCS	7.5	7.5	–	–	Yes
2	Client Access/400 - OS/2 DBCS	7.4	7.4	–	–	Yes
3	Client Access/400 - OS/2 RUMBA SBCS	7.2	7.2	–	–	Yes
4	Client Access/400 - OS/2 RUMBA DBCS	7.1	7.1	–	–	Yes
5	Client Access/400 - OS/2 Communications Mgr	3.6	3.6	–	NA	Yes
6	Client Access/400 - GraphicOps for OS/2	7.2	7.2	–	–	Yes
7	Client Access/400 - Ultimedia Facilities	7.1	7.1	–	–	Yes
5763-XG1						
Base	Client Access Optimized OS/2 Client for OS/400	19.4	19.4	–	–	Yes
1	Client Access/400 - RUMBA Optimized OS/2 Client	8.9	8.9	–	–	Yes

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Table B-4 (Page 6 of 6). Licensed program time information

Licensed Program Identifier		Multiplication Values ¹		Factors Influencing Installation Time		
Part	Description	Base Value A	Base Value B	Multiprocess Storage ²		Documents and Folders ³
				*PGM	*LNG	
2	Client Access/400 - PC5250 Optimized OS/2 Client	9.6	9.6	-	-	Yes
3	Client Access/400 - GraphicOps OS/2 Client	8.0	8.0	-	-	Yes
4	Client Access/400 - Ultimedia Facilities	8.0	8.0	-	-	Yes
5	Client Access/400 - Graphical Access for OS/400	7.3	7.3	-	-	-
5763-XL1						
Base	Client Access DOS Client for OS/400	4.7	4.7	-	-	-
1	Client Access/400 - DOS SBCS	7.8	7.8	-	-	Yes
2	Client Access/400 - DOS DBCS	7.4	7.4	-	-	Yes
5716-XZ1						
Base	LAN Server for OS/400	9.4	9.0	-	79.9	-

Notes:

- Do not** use only these values for your time estimate; the result will not be accurate. Use the work sheet in Table 7-19 on page 7-30 and the multiplication factors in Table 7-20 on page 7-32 to calculate the single-process installation time for the licensed programs you plan to install.
- When a product has a numerical value shown in this column, use the value shown with the example within "Additional Requirements for Multiprocess Installation" on page B-26 to determine the extra storage required to use multiprocess installation. If no value is shown, there is no additional storage requirement for multiprocess installation.
- The products indicated can take longer to install. See "Conditions That Affect Installation Time" on page B-24 for more information.

Conditions That Affect Installation Time

The amount of time it takes to install the licensed programs depends on your system configuration and the licensed programs you are installing. That is, the larger models with more system capacity have a shorter installation time than smaller models loading the same licensed programs. The major factors that affect installation performance are:

- Installation device

The speed of the installation device you are installing from has a direct effect on the total installation time. For DSLO systems where tape is used, if your tape device has a hardware decompression feature, the tape files can be loaded faster because the distribution tape is in a compressed format. Otherwise, the system must use software decompression, which requires extra time.

- Number and type of disk unit I/O processors

The amount of auxiliary storage your system has affects the total installation time. This is especially true for multiprocess installations, where the amount of disk unit I/O activity significantly increases. Generally, the more auxiliary storage units you have on your system, the faster the installation.

- Processing unit capacity

The number of installation jobs started by the system depends on the capacity of your processing unit. The number of installation jobs started is a factor in a

multiprocess installation. The larger model systems can support more concurrent jobs during the installation process than smaller models.

- Disk unit space available

Installation files can be loaded into save files only if enough disk unit storage is available in the system auxiliary storage pool (ASP). Multiprocess installation uses save files and requires at least 11 megabytes of available auxiliary storage on your system. If this amount is not available, the system uses the single-process installation. If there is not enough space available during the installation process, the system must wait for an installing job to finish its work and delete the save files before it can load additional files from the installation media.

Some licensed programs require more than this amount of available auxiliary storage to install using the multiprocess method. See “Additional Requirements for Multiprocess Installation” on page B-26 for details.

Use the Work with System Status (WRKSYSSTS) command to determine if you have the required storage available. The auxiliary storage column lists the system storage (in megabytes) and the percentage used. Use these figures to determine if there are at least 11 megabytes available on your system.

- Main storage available in base pool

The number of installation jobs started by the system depends on the amount of main storage on your system. To use multiprocess installation, there must be at least 1536 KB (kilobytes) of main storage available in the base storage pool of the system. If you have less than this amount in the base storage pool, the system uses single-process installation to install the licensed programs. For additional details of how this space is used, see the “Additional Requirements for Multiprocess Installation” on page B-26.

To determine the size of the base pool, use the Work with System Status (WRKSYSSTS) command. The pool size listed under System Pool #2 is the size of the base pool on your system. The size of this pool is larger when all subsystems are ended (ENDSBS *ALL) than when subsystems are active. Therefore, if you are planning to install the licensed programs with all subsystems ended, check the base pool size after you end all subsystems.

- Human interaction

During the installation procedures, you may need to interact with messages and displays, and you must load the next media volume when prompted by the system. When the installation process comes to the end of a media volume, the active multiprocess installation jobs continue to install the licensed programs that are in temporary save files. However, working on. However, the multiprocess installation jobs do not begin installing another licensed program until you load the next media volume.

- User data conversions

The quantity and type of user data on your system can affect the installation performance. Data conversions are changes made automatically to the internal representation of a program or a file. These changes are needed to provide more function within a licensed program. Conversions often occur during the installation process or during the save operations when you save the system after the installation is complete. Some conversions add time to the installation process or to the save operations. The type of object that is being converted

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and the number of these objects on your system affect the amount of additional time needed.

- Licensed programs to be installed

Some licensed programs take much longer to install than others. In addition, products with documents and folders take longer to install if you do not end all subsystems before you begin the installation process. These products are listed in Table B-4 on page B-19.

Multiprocess Installation—Overview

The operating system determines if your system configuration has enough system capacity to use the multiprocess method to install licensed programs. If your system has the required resources, the multiprocess method installs licensed programs concurrently by doing the following:

- Loading the licensed program installation files from the media to temporary save files.
- Using multiple batch jobs to concurrently install licensed programs from the save files. The save files are deleted during the installation process.

During installation, a status display indicates the licensed programs that are currently being installed from save files. The display lists the type of object for each licensed program that is being installed. Most licensed programs have the both of the following types of objects;

- *PGM program objects
- *LNG language objects

If your system does not have the required resources for multiprocess installation, the system installs licensed programs sequentially from the installation media (single-process installation). In this case, the status display indicates the licensed program that is currently being installed from the media.

Additional Requirements for Multiprocess Installation

To use the multiprocess installation method for licensed programs, the system requires the following:

1. You must select more than one licensed program to install from the installation media (this includes IBM-supplied libraries and operating system options). If you are installing only one new licensed program and choose option 11 (Install licensed programs), the system uses the single-process installation process to install the licensed program.
2. You must have fewer than 8 save or restore sessions currently active on your system.
3. A multiprocess installation cannot currently be in progress. If another job is currently performing a multiprocess installation process, the system uses the single-process installation process to install your licensed programs from a different tape device.
4. You must have at least 11 megabytes of available auxiliary storage on your system. If you do not, the system uses the single-process method to install the licensed programs.

The licensed programs that require the system to have more than 11 megabytes of additional auxiliary storage are shown in Table B-4 on page B-19.

5. You must have at least 1536 KB (kilobytes) of main storage available in the base storage pool of the system. The system requires 512K in the system base pool for each of the first three installing jobs. The first job that is started is used to load the tape files into save files. After the requirements for the first three jobs are met, each additional job requires an additional 1024K in the base pool. Therefore, the larger the base pool, the greater number of installation jobs that can be started. This results in a faster installation.

If you are using the automatic installation process or are installing the licensed programs with all subsystems ended, you need to verify only the auxiliary storage and main storage requirements. See the *Work Management* book, SC41-4306, for procedures to change these values if they do not meet the criteria for multiprocess installation. If you do not have the required resources to enable the system to use multiprocess installation, the installation of licensed programs may take significantly longer than a multiprocess installation. The time difference between the single-process installation and the multiprocess installation depends on your system configuration and the licensed programs to be installed.

How to Determine Additional Storage for Multiprocess—Scenario

If any of the licensed programs that you plan to install have a value in the Multiprocess Storage column of Table B-4, calculate the amount of additional auxiliary storage space the system needs for multiprocess installation. The IBM-supplied library QUSRSYS is *always* installed when replacing a release of software.

Licensed programs install as two types of objects: program objects (*PGM) and language objects (*LNG). If Table B-4 shows a value for either object type, that portion of the licensed program requires more auxiliary storage for the system to use the multiprocess method.

- ___ **Step 1.** Determine which licensed programs or optional parts that you plan to install have values in the *Multiprocess Storage* column of Table B-4.
- ___ **Step 2.** Determine which two licensed programs or optional parts from step 1 have the highest values. Add the sizes of the two largest entries.
- ___ **Step 3.** Add 10 to the sum from step 2.

The total is the amount of additional storage, in megabytes, that the system needs to use multiprocess installation for all the licensed programs that you plan to install.

For example, you are replacing your release with V3R6M0 and plan to install OS/400 with options 1, 2, and 12 and Client Access Windows 3.1 Client for OS/400 with option 1. You would need to have 84.9 megabytes of additional auxiliary storage (58.3 + 16.6 + 10) for the system to use multiprocess installation for all these products. (QUSRSYS is automatically selected when you replace a release so you need to account for it in your calculations.)

Another example could be that you decide to add additional licensed programs to your existing V3R6M0 system. One of the products you selected, Application Development ToolSet Client Server for OS/400 (5716-CL1), is listed in the *Multiprocess Storage* column of Table B-4. You would need 85 megabytes of additional auxiliary storage (54.4 + 30.5 + 10) for the system to use multiprocess installation to install the base and option 1 and 2 of Application Development ToolSet Client Server for OS/400.

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Appendix C. Examples

This appendix contains examples that you can use to assist you with your planning and preparation. They are for illustration purposes and are not intended to accurately represent that amount of time that activities will take on your system.

How to Determine the Number of Large User Profiles

The size of a user profile (number of bytes of storage that it uses) is usually a good indication of how many objects that the profile owns. When you use the replacing-a-release method, the system must recover authority information. You can analyze the user profiles on your system to help you estimate how long authority recovery will take.

Do the following:

___ **Step 1** Sign on to your source system with a security officer profile (such as QSECOFR).

___ **Step 2** Type the following and press the Enter key:
 DSPOBJD OBJ(*ALL) OBJTYPE(*USRPRF) OUTPUT(*OUTFILE)
 OUTFILE(QGPL/DSPUSRPRF)

This creates an output file with information about every user profile on your system.

___ **Step 3** To create a query to count the number of large user profiles on the system, type WRKQRY and press the Enter key.

___ **Step 4** On the Work with Queries display, select option 1 (Create) and assign a name and library for your query. Press the Enter key.

___ **Step 5** On the Define the Query display, select the following options:

```

Define the Query
Query . . . . . : DSPUSRPRF
Library . . . . : JCHEIDEL

Type options, press Enter. Press F21 to select all.
1=Select

Opt  Query Definition Option
  1   Specify file selections
      Define result fields
  1   Select and sequence fields
      Select records
      Select sort fields
      Select collating sequence
      Specify report column formatting
  1   Select report summary functions
      Define report breaks
  1   Select output type and output form
      Specify processing options

```

___ **Step 6** Press the Enter key.

___ **Step 7** On the Specify File Selections display, type the name of the file and library that you created with the DSPOBJD command in step 2.

___ **Step 8** Press the Enter key twice to confirm your selection.

Examples

- ___ **Step 9** Type the following values in the *Seq* column on the Select and Sequence Fields display:

```
                                Select and Sequence Fields
Type sequence number (0-9999) for the names of up to 500 fields to
appear in the report, press Enter.

Seq  Field                Text
    ODDCEN                Display century
    ODDDAT                Display date: format- Job date format
    ODDTIM                Display time
    10 ODLBNM                Library
    ODOBNM                Object
    ODOBTP                Object type
    ODOBAT                Object attribute
    ODOBFR                Storage freed: 0-not freed,1-freed
    20 ODOBSZ                Object size
    ODOBTX                Text description
    ODOBLK                Object locked: 0-not locked,1-locked
    ODOBDM                Object damaged: 0-not damaged,1-full,2-par
```

- ___ **Step 10** Press the Enter key twice to confirm your selection.
- ___ **Step 11** On the Select Report Summary Functions display, specify 5 (Count) for the Object field:

```
                                Select Report Summary Functions
Type options, press Enter.
    1=Total  2=Average  3=Minimum  4=Maximum  5=Count

---Options--- Field        Text
5             ODOBNM       Object
             ODOBSZ       Object size
```

- ___ **Step 12** Press the Enter key.
- ___ **Step 13** On the Select Output Type and Output Form display, specify 2 (Summary only) for the *Form of output* field.
- ___ **Step 14** Press the Enter key.
- ___ **Step 15** On the Define the Query display, press F3 (Exit).
- ___ **Step 16** On the Exit this Query display, specify the following:
Y for the *Save definition* prompt.
1 (Run interactively) for the *Run option* prompt.
- ___ **Step 17** When the query completes, you see a report that shows you the number of user profiles that are on your system. Following is an example:

```
                                Display Report

Position to line . . . . .
Line  ....+....1....+
      Object
000001 FINAL TOTALS
000002 COUNT 294
***** ***** End of report *****
```

- ___ **Step 18** Write the total number of user profiles here: _____
- ___ **Step 19** Press F3 (Exit).

___ **Step 20** On the Work with Queries display, select option 2 (Change). Type the name and library of the query that you just created and press the Enter key.

___ **Step 21** On the Define the Query display, type the following:

```

                                Define the Query
Query . . . . . : DSPUSRPRF      Option . .
Library . . . . : JCHEIDEL      CCSID . . .
Type options, press Enter. Press F21 to select all.
1=Select

Opt  Query Definition Option
> Specify file selections
  Define result fields
> Select and sequence fields
  1  Select records
     Select sort fields
     Select collating sequence
     Specify report column formatting
  1 > Select report summary functions

```

___ **Step 22** Press the Enter key.

___ **Step 23** On the Select Records display, type the following:

```

                                Select Records
Type comparisons, press Enter. Specify OR to start each new group.
Tests: EQ, NE, LE, GE, LT, GT, RANGE, LIST, LIKE, IS, ISNOT...

AND/OR  Field          Test  Value (Field, Number, 'Characters', or ...)
        ODOBSZ         GT    40000

```

Note: User profiles that are larger than 40 000 bytes usually have a large number (greater than 100) of owned objects.

___ **Step 24** Press the Enter key.

___ **Step 25** On the Select Report Summary Functions display, specify 2 (Average) for the ODOBSZ (Object size) field:

```

                                Select Report Summary Functions
Type options, press Enter.
  1=Total  2=Average  3=Minimum  4=Maximum  5=Count

---Options---  Field          Text
                5  ODOBNM          Object
                2  ODOBSZ          Object size

```

___ **Step 26** Press the Enter key.

___ **Step 27** On the Define the Query display, press F3 (Exit).

___ **Step 28** On the Exit this Query display, specify the following:

Y for the *Save definition* prompt.

1 (Run interactively) for the *Run option* prompt.

___ **Step 29** When the query completes, you see a report that shows you the number of large user profiles and the average size of those profiles, such as in the following example:

Examples

```
Display Report
Query . . . : JCHEIDEL/DSPUSRPRF
Position to line . . . . .
Line . . .+...1...+...2...+...3.
      Object          Object
                        Size
000001 FINAL TOTALS
000002 AVG              338,504
000003 COUNT 99
***** ***** End of report *****
```

__ **Step 30** Write the values here:

Number of large user profiles: _____

Average size of large user profiles: _____

__ **Step 31** Press F3 (Exit) twice.

Deleting Non-Observable Programs—Scenario

This topic provides an example of how to use a query and a CL program to delete the non-observable programs that have been identified by Upgrade Assistant. This example uses the database file (QAIZADSK) that the system creates when you run option 10 (Submit upgrade preparation job) from the Upgrade menu.

On your source system, do the following:

__ **Step 1** Type WRKQRY and press the Enter key.

__ **Step 2** On the Work with Queries display, type 1 (Create). Assign a name and a library for your query. This example uses NOOBSERV for the query name.

__ **Step 3** Press the Enter key.

__ **Step 4** On the Define the Query display, select the options that you see in the following display:

```
Define the Query
Query . . . . . : NOOBSERV
Library . . . . : QGPL
Type options, press Enter. Press F21 to select all.
1=Select
Opt  Query Definition Option
  1  > Specify file selections
      Define result fields
  1  > Select and sequence fields
  1  > Select records
  1  > Select sort fields
      Select collating sequence
      Specify report column formatting
      Select report summary functions
      Define report breaks
  1  > Select output type and output form
      Specify processing options
```

__ **Step 5** Press the Enter key. You see the Specify File Selections display.

__ **Step 6** Type QAIZADSK for the *File* prompt and QUSRSYS for the *Library* prompt.

__ **Step 7** Press the Enter key twice to confirm your selection.

- ___ **Step 8** Select the following fields on the Select and Sequence Fields display by typing sequence numbers for them:

```

                                Select and Sequence Fields

Type sequence number (0-9999) for the names of up to 500 fields to
appear in the report, press Enter.

Seq  Field          Text
 10  DIOBLI         Object Library
 20  DIOBNM         Object
 30  DIOBTP         Object Type
 40  DIPGOB         Program Observability

```

- ___ **Step 9** Press the Enter key twice to confirm your selections.
- ___ **Step 10** On the Select Records display, type the following:

```

                                Select Records

Type comparisons, press Enter. Specify OR to start each new group.
Tests: EQ, NE, LE, GE, LT, GT, RANGE, LIST, LIKE, IS, ISNOT...

AND/OR Field          Test  Value (Field, Number, 'Characters', or ...)
  AND  DIPGOB         EQ    '0'
  OR   DIOBTP         EQ    'SRVPGM'
  AND  DIPGOB         EQ    '0'
  OR   DIOBTP         EQ    'MODULE'
  AND  DIPGOB         EQ    '0'

```

Note: If you want to delete the non-observable programs in a specific library, you can add that library name as another AND condition for each selection group (&DIOBLI EQ *library-name*).

- ___ **Step 11** Press the Enter key.
- ___ **Step 12** On the Select Sort Fields display, type the following:

```

                                Select Sort Fields

Type sort priority (0-999) and A (Ascending) or D (Descending) for
the names of up to 32 fields, press Enter.

Sort
Prty A/D Field          Text
 10  A  DIOBLI         Object Library
 20  A  DIOBNM         Object
 30  A  DIOBTP         Object Type

```

- ___ **Step 13** On the Select Output Type and Format display, press F5 (Report) to verify that your output is formatted correctly. You should see a display that is similar to the following:

```

                                Display Report

                                Report width .
Position to line . . . . . Shift to column .
Line  ....+....1....+....2....+....3....+....4....+....
      Object   Object   Object   Program
      Library  Type     Observability
000001 IZATEST  IZAFREEMOD  MODULE      0
000002 IZATEST  IZAFREENON  PGM         0
000003 IZATEST  IZAFREEPGM  PGM         0
000004 IZATEST  IZAFREESRV  SRVPGM      0
000005 IZATEST  IZAMODEXST  MODULE      0
000006 IZATEST  IZAMODNOBS  MODULE      0
000007 IZATEST  IZAMODNOTE  MODULE      0
000008 IZATEST  IZAMODPRTF  MODULE      0
000009 IZATEST  IZAPGMC     PGM         0

```

Examples

- ___ **Step 14** Press F12 (Cancel).
- ___ **Step 15** On the Select Output Type and Output Format display, type 3 (Database file) for the *Output type* field. Press the Enter key.
- ___ **Step 16** Complete the Define Database File Output display as follows:

```

                                Define Database File Output

Type choices, press Enter.
(The printed definition shows the output file record layout.)

File . . . . . NOOBSERV      Name, F4 for list
Library . . . . . QGPL       Name, F4 for list
Member . . . . . *FILE      Name, *FIRST, *FILE, F4 for list

Data in file . . . . . 1      1=New file, 2=Replace file
                               3=New member, 4=Replace member
                               5=Add to member

```

- ___ **Step 17** Press the Enter key.
- ___ **Step 18** On the Define the Query display, type the following:
 - Y for the *Save the definition* prompt.
 - 1 or 2 for the *Run option* prompt.
- ___ **Step 19** Figure C-1 shows an example of a CL program to process the output file and delete each program object that is listed in the file. When you run this program, consider submitting it to batch by using the Submit Job (SBMJOG) command.

Take Note!

When you run this program, it deletes program objects from your system. Make sure that you have a full backup of all your application libraries before you run this program. (If you make an error in creating your query, this program might delete the wrong program objects.)

```

                                PGM
                                DCLF      FILE(QGPL/NOOBSERV)
READ:                                RCVF
                                MONMSG    MSGID(CPF0864) EXEC(GOTO CMDLBL(EOF))
                                MONMSG    MSGID(CPF9999)
                                IF          COND(&DIQBTP *EQ 'PGM') THEN(DLTPGM +
                                                PGM(&DIQBTL/&DIQBNM))
                                IF          COND(&DIQBTP *EQ 'SRVPGM') THEN(DLTSRVPGM +
                                                SRVPGM(&DIQBTL/&DIQBNM))
                                IF          COND(&DIQBTP *EQ 'MODULE') THEN(DLTMOD +
                                                MODULE(&DIQBTL/&DIQBNM))
                                GOTO READ
EOF:                                ENDPGM

```

Figure C-1. Sample Program for Deleting Non-Observable Programs

Cleaning Up Private Authorities–Scenario

Private authorities for objects are stored with user profiles, not with objects. When you delete an object from the system, the system does not delete the private authorities for the object in the same operation. When you work with a user's authorities (for whatever reason), the system cleans up that user's authorities.

If you plan to use the replacing-a-release method, you can force the system to clean up authority for deleted objects and deleted user profiles before you begin the upgrade procedure. This may reduce the authority recovery process during the first IPL.

Figure C-2 and Figure C-3 on page C-8 show sample programs that you can use to clean up user authorities. The main program is CLNUSRPRF (Figure C-2). The CLNUSRPRF program calls the CLNOBJOWN (Figure C-3) program.

```

PGM
DCLF      FILE(QGPL/DSPUSRPRF)

/* THE DSPUSRPF FILE IS CREATED BY THE FOLLOWING COMMAND      */
/* TO BE RUN BEFORE THE PROGRAM IS CALLED                     */
/* IT CAN BE RUN FOR *ALL USER PROFILES OR FOR A SUBSET      */
/*
/*          DSPUSRPRF  USRPRF(XXXX) OUTPUT(*OUTFILE) +        */
/*                   OUTFILE(QGPL/DSPUSRPRF)                 */
/*
/* TOP OF LOOP CLEANING UP USER PROFILES AND OBJECT AUTHORIZATION */
/* ASSIGNMENTS.                                                  */
/*
READ:      RCVF
           MONMSG MSGID(CPF0864) EXEC(GOTO CMDLBL(EOF))

/* FORCE CLEAN UP OF PRIVATE AUTHORITIES FOR EACH DELETED OBJECT */
/* THAT THE USER PROFILE WAS AUTHORIZED TO.                    */
/*
           DSPUSRPRF  USRPRF(&UPUPRF) TYPE(*OBJOWN) +
                   OUTPUT(*OUTFILE) OUTFILE(QGPL/OBJOWN)
           MONMSG MSGID(CPA5305)

/* FORCE CLEAN UP OF THE AUTHORIZED USER LIST TO EACH OBJECT   */
/* THAT THIS PROFILE OWNS                                       */
/*
           CALL      PGM(QGPL/CLNOBJOWN)
           GOTO     CMDLBL(READ)

EOF:      DLTF      FILE(QGPL/OBJOWN)
           ENDPGM

```

Figure C-2. Sample Program for Cleaning Up Private Authorities–CLNUSRPRF

Examples

```
PGM
DCLF      FILE(QGPL/OBJOWN)
READ:    RCVF
        MONMSG      MSGID(CPF0864) EXEC(GOTO CMDLBL(EOF))

/* FORCE CLEAN UP OF DELETED USER PROFILES THAT ARE AUTHORIZED   */
/* TO OBJECTS IN QGPL/OBJOWN                                     */

        DSPOBJAUT  OBJ(&OOLIB/&OOOBJ) OBJTYPE(&Ootype) +
        OUTPUT(*OUTFILE) OUTFILE(QTEMP/DSPOBJAUT)
        MONMSG      MSGID(CPA5305)
        GOTO        CMDLBL(READ)
EOF:     ENDPGM
```

Figure C-3. Sample Program for Cleaning Up Private Authorities—CLNOBJOWN

To create and run the programs, do the following:

- ___ **Step 1** Before compiling the programs, you must create the files that the programs use. Type the following commands:

```
DSPUSRPRF USRPRF(profile-name) OUTPUT(*OUTFILE)
        OUTFILE(QGPL/DSPUSRPRF)
DSPUSRPRF USRPRF(profile-name) TYPE(*OBJOWN)
        OUTPUT(*OUTFILE) OUTFILE(QGPL/OBJOWN)
```

Note: You are creating a sample file for the compiler to use. You only need to display one user profile.

- ___ **Step 2** Compile the programs.
- ___ **Step 3** Create an output file of the user profiles that you want to process. Type the following to create an output file for all user profiles:

```
DSPUSRPRF USRPRF(*ALL) OUTPUT(*OUTFILE)
        OUTFILE(QGPL/DSPUSRPRF)
```

Note: Rather than processing all user profiles at the same time, you may want to do them in groups by specifying a generic profile name on the command.

- ___ **Step 4** Run the program by typing the following:

```
CALL QGPL/CLNUSRPRF
```

Notes:

- This can be a very long-running job. You should submit it to batch or schedule it for a time when your system is not busy.
- When the program is processing a user profile, the system places a lock on that user profile. If the user profile owns a large number of objects or has a large number of private authorities, the system may hold the lock for an extended period while it cleans up authority information for that user. During that cleanup period, the user profile is not available for sign on.
- When you run this program, the system writes an entry to the VLIC log every time it cleans up (deletes) an authority entry that is no longer needed. The entries have a major code of 0400.

Appendix D. Program Temporary Fix Information

This appendix contains information about program temporary fixes (PTF) that either help you with the upgrade process or are required for the upgrade process.

Note: As with any PTF, the PTF numbers shown here could be superseded by another PTF. If this occurs, you should order the PTF that supersedes the number shown in this appendix.

Program Temporary Fixes for Upgrade Assistant for OS/400

Several program temporary fixes (PTFs) are available from IBM that can help you upgrade your system. These PTFs are bundled together into two PTF packages: SFxxxx, and MFxxxx. You are notified as you read through this book when to order your PTFs. At that time, you can turn to this appendix, and choose the two PTF packages you need for the currently installed release in the national language version that is your primary language.

Note: If you see a dash (—) listed for a PTF package number in your national language version, then the PTF package is not available in that national language. You should choose a PTF package for your release that is in a national language that you can read. Ensure that you have ordered one SFxxxx and one MFxxxx PTF package for your current release.

V2R3M0 systems require PTF SF21363 to be loaded and applied to Operating System/400 before you start the upgrade process. This PTF changes the Work with Hardware Products (WRKHDWPRD) command. When you receive the Upgrade Assistant PTF packages, you will automatically receive PTF SF21363 as well.

To determine which national language version is your primary language version, go to the Work with Licensed Programs display:

- ___ **Step 1** Type GO LICPGM. You are shown the Work with Licensed Programs display.
- ___ **Step 2** Select option 20 (Display installed secondary languages). You are shown the following display:

Display Installed Secondary Languages			
			System: RCHASLK0
Primary language	:	2924	
Description	:	English	
Language	Description	Library	Installed Release

Figure D-1. Installed Languages

Figure D-1 is an example of the Display Installed Secondary Languages display. Listed at the top of the display is the primary language that is installed on your system. Use the primary language for your system to determine which PTF packages to order.

PTF Information

Feature Code (Primary Language)	National Language Version	V2R3M0	V3R0M5	V3R1M0
2911	Slovenian	— —	— —	SF22026 —
2912	Croatian	— —	— —	SF21910 —
2922	Portuguese	SF21851 MF08594	SF21880 MF09424	SF21911 MF09425
2923	Dutch Netherlands	SF21852 —	SF21881 —	SF21912 —
2924	English	SF18506 MF08591	SF21633 MF08592	SF21157 MF08593
2925	Finnish	SF21853 —	SF21882 —	SF21913 —
2926	Danish	SF21854 —	SF21883 —	SF21914 —
2928	French	SF21855 —	SF21884 —	SF21915 —
2929	German	SF21856 —	SF21885 —	SF21916 —
2931	Spanish	SF21857 MF08564	SF21886 MF09426	SF21917 MF09427
2932	Italian	SF21858 MF08567	SF21887 MF09428	SF21918 MF09429
2933	Norwegian	SF21859 —	SF21888 —	SF21919 —
2937	Swedish	SF21860 —	SF21889 —	SF21921 —
2938	English Uppercase Support for Double-Byte Character Set (DBCS)	SF21861 MF08570	SF21890 MF08571	SF21657 MF08572
2939	German Multinational Character Set	SF21862 —	SF21891 —	SF21923 —
2940	French Multinational Character Set	SF21863 —	SF21892 —	SF21924 —
2942	Italian Multinational Character Set	SF21864 MF08573	SF21893 MF09430	SF21925 MF09431
2950	English Uppercase	SF21865 MF08576	SF21894 MF08577	SF21926 MF08578
2954	Arabic	— —	— —	SF21927 —
2956	Turkish	SF21866 —	SF21895 —	SF21928 —
2957	Greek	SF21867 —	SF21896 —	SF21929 —
2958	Icelandic	SF21868 —	SF21897 —	SF21930 —

Feature Code (Primary Language)	National Language Version	V2R3M0	V3R0M5	V3R1M0
2961	Hebrew	—	—	SF21955 —
2962	Kanji Double-Byte Character Set (DBCS)	SF21870 MF08579	SF21899 MF09432	SF21956 MF09433
2963	Belgian Dutch	SF21871 —	SF21953 —	SF21957 —
2966	Belgian French	SF21873 —	SF21900 —	SF21958 —
2972	Thai	—	—	SF21959 —
2975	Czech	—	—	SF22010 —
2976	Hungarian	—	—	SF21960 —
2978	Polish	—	—	SF21961 —
2979	Russian	—	—	SF21962 —
2980	Brazilian Portuguese	SF21869 —	SF21898 —	SF21963 —
2981	Canadian French	SF21874 —	SF21901 —	SF21964 —
2984	English Uppercase and Lowercase Support for Double-Byte Character Set (DBCS)	SF21875 MF08807	SF21905 MF08808	SF21965 MF08809
2986	Korean Double-Byte Character Set (DBCS)	SF21876 —	SF21906 —	SF21966 —
2987	Traditional Chinese Double-Byte Character Set (DBCS)	SF21877 MF08582	SF21907 MF09434	SF21967 MF09435
2989	Simplified Chinese Double-Byte Character Set (DBCS) (PRC)	SF21878 MF08585	SF21908 MF09436	SF22011 MF09437
2994	Slovakian	—	—	SF22012 —
2996	Portuguese Multinational Character Set	SF21879 MF08588	SF21909 MF09438	SF22013 MF094399
2998	Farsi	—	—	SF22014 —

Special Installation Instructions for the Upgrade Assistant PTFs

The system must be running on IPL-source B for you to use the functions available through the Upgrade Assistant for OS/400. When you complete installing the Upgrade Assistant for OS/400 PTFs, the system should be running on IPL-source B.

Use the Program Temporary Fix (PTF) menu to load and apply the Upgrade Assistant for OS/400 PTFs:

- ___ **Step 1** Type G0 PTF and press the Enter key.
- ___ **Step 2** Select option 8 (Install program temporary fix package).
- ___ **Step 3** You are shown the following display.

```

                                Install Options for Program Temporary Fixes
                                System:  XXXXXXXX
Type choices, press Enter.
Device . . . . .                               Name, *SERVICE
Automatic IPL . . . . . Y                       Y=Yes
                                                N=No
PTF type . . . . . 1                            1=All PTFs
                                                2=HIPER PTFs and HIPER LIC fixes
                                                only
                                                3=HIPER LIC fixes only
Other options . . . . . N                       Y=Yes
                                                N=No
    
```

Select the device. If you received the PTFs on tape, use the name of the tape. If you received the PTFs electronically, use *SERVICE.

Note: When *SERVICE is used, all PTF save files that have not yet been loaded will be loaded.

Select Yes for the *Automatic IPL* prompt.

Press the Enter key.

Program Temporary Fixes for BEST/1 for the AS/400 Capacity Planner

Table D-1 lists the PTFs that you should order for BEST/1 for the AS/400 Capacity Planner so that you can model your current workloads on PowerPC AS processors:

Table D-1. PTF Numbers for Performance Tools Updates

OS/400 Version	PTF Number
Version 2 Release 3 Modification 0	SF23078 ¹
Version 3 Release 0 Modification 5	SF23079 ¹
Version 3 Release 1 Modification 0	SF23093 ¹

¹ More than one PTF may be required to support all the information that is needed to update the performance models. Check for additional co-requisite PTFs when you order this PTF. (**Co-requisite** PTFs are PTFs that depend on each other and should be installed at the same time).

Program Temporary Fixes for Network Interoperability

To exchange objects in a network between a V3R6M0 system and systems running earlier releases, (V2R3M0, V3R0M5, or V3R1M0), PTFs must be applied to the earlier systems. Objects created on a V3R6M0 system cannot be restored to earlier systems in the network until the PTFs are applied to the earlier systems.

You can avoid this delay by ordering the needed PTFs and applying them now to the systems that will remain at earlier release levels.

Use Table D-2 to order the PTFs for the systems that remain at *earlier* release levels. You will receive several corequisite PTFs when you order any of the PTFs shown. These are needed for the following:

- Restoration of save files
- Database objects
- Journal receivers
- Program objects
- Objects that are associated with byte stream files:
 - Document objects (*DOC)
 - Stream File objects (*STMF)
 - Symbolic Link objects (*SYMLNK)

Table D-2. PTFs for Earlier Systems in a Network to Enable Exchanging Data

Order this PTF	For System Remaining at Release
SF26147	V2R3M0
SF26145	V3R0M5
SF26146	V3R1M0

Program Temporary Fixes for Journalled Indexes

Database physical and logical files (indexes) that are journaled will be converted to the V3R6M0 format when OS/400 is installed. The conversion occurs during the journal synchronization step of the IPL process during the OS/400 installation (only replacing-a-release method). You should defer these conversions until after the operating system is installed. Apply the PTF shown in Table D-3 to your current system before starting the upgrade process. By applying the PTF, you can control when the conversion of these objects occurs.

For systems that have V3R1M0 currently installed, loading this PTF before starting the upgrade is especially advisable. An availability and recovery enhancement, System Managed Access Path Protection, that was added to V3R1M0 journals physical and logical files to help reduce down-time should a recovery be required. Because of this added support, many physical and logical files could be journaled.

Table D-3. PTFs for Delaying Conversion of Journalled Indexes. These PTFs are recommended if you plan to use the replacing-a-release upgrade method.

Current Release	Get This PTF
V2R3M0	MF10336
V3R0M5	MF10334
V3R1M0	MF10335

Note: Always check if the PTF is superseded by another PTF. If it is, order the most recent PTF.

PTF Information

Appendix E. IBM Hardware Devices Not Supported on AS/400 with PowerPC Technology

This appendix lists those IBM devices that are not supported on AS/400 with PowerPC technology. These devices may not work correctly on your system. They need to be replaced before the upgrade of your system. Use this appendix as a guide only. This list of supported and unsupported devices may have changed after this book went to press.

Notes:

1. To view the most accurate list of unsupported hardware that exists on your AS/400 system, use the Display Upgrade Preparation command (DSPUPGPRP TYPE(*PRB)).
2. If you have a non-IBM device attached to your system that is configured as an IBM device that is listed in this appendix, that device is not supported on AS/400 with PowerPC technology.
3. If you have non-IBM hardware attached to your system, you must contact your provider of non-IBM hardware and ensure that it is supported on AS/400 with PowerPC technology.
4. If you are replacing your system with AS/400 Advanced 36, you must verify that the devices and controllers that you plan to use are supported on AS/400 Advanced 36.

Unsupported Storage Devices

Feature	9402	9404	9406	Description
2600		X		Disk attachment subsystem
2622			X	Magnetic tape subsystem
2624		X		Disk attachment subsystem: The 2624 is not supported for disk attachment, but is supported for tape attachment.
2647	X	X		Tape attachment subsystem
6100, 9100		X		Single disk storage unit
6131		X		5-1/4 inch diskette unit (model X10, X25, C25)
6132		X		8-inch diskette unit (model X10, X25, C25)
6133	X			5-1/4 inch diskette unit (X02, X04, X06)
6136	X			Diskette attachment
6137		X		5-1/4 inch diskette unit (D25 or expansion unit)
6138		X		8-inch diskette unit (D25 or expansion unit)
6341	X			120MB 1/4-inch cartridge tape unit
6346		X		120MB 1/4-inch cartridge tape unit
6366			X	120MB 1/4-inch cartridge tape unit
9332-200			X	200MB disk storage unit

Unsupported Hardware

Feature	9402	9404	9406	Description
9332-400			X	400MB disk storage unit
9332-600			X	600MB disk storage unit
9335-A01			X	Disk controller for 9335-B01
9335-B01			X	855MB disk storage subsystem

Unsupported Input/Output Expansion Units

Feature	9402	9404	9406	Description
5030			X	I/O card unit
5031			X	I/O card unit
7115	X			Expansion unit
8505			X	I/O card unit conversion feature

Unsupported Communications Controllers

Feature	9402	9404	9406	Description
2625	X	X	X	Ethernet IEEE 802.3 CSMA CD Adapter
2636	X	X	X	4/16 Megabits per second (Mbps) token-ring controller
6150	X	X		X.21 three-line communications controller
6151, 6171	X	X	X	X.21 one-line adapter
6152	X	X		EIA 232/V.24 one-line adapter
6154, 6155, 6174, 6175	X	X	X	EIA 232/V.24 one-line adapter
6160		X		4Mbps token-ring controller
6220 to 6239			X	V1 communications subsystems
6240, 6242			X	V1 V1 token-ring LAN subsystem
6250			X	V1 Ethernet LAN subsystem

Unsupported Workstation Controllers

Feature	9402	9404	9406	Description
6040			X	Twinaxial workstation controller
6041			X	ASCII workstation controller

Unsupported Hardware

Appendix F. IBM Software Objects Not Supported on AS/400 with PowerPC Technology

This appendix lists those software object types that are not fully supported on Version 3 Release 6 Modification 0 (V3R6M0) of the OS/400 licensed program. These objects either will not work or cannot be used on your system. They need to be removed or replaced prior to the upgrade of your system. Use this appendix as a guide only. Object types may have been added or deleted from the list after this book went to press.

Note: To view the most accurate list of unsupported software that exists on your AS/400 system, use the Display Upgrade Preparation command (DSPUPGPRP TYPE(*OBJ)).

Unsupported Object Types

Several object types are not fully supported on AS/400 with PowerPC technology and the V3R6M0 OS/400 licensed program. Objects types that are not fully supported may not work on V3R6M0 and may need to be replaced before you upgrade your system.

A program language that is not fully supported may still allow applications that are already compiled to run on V3R6M0. This is called **run-time support**. Applications in a language with run-time support will run, but cannot be updated. In addition, new applications cannot be created with this programming language.

Description	Type	Attribute	Run-Time Support	Reason
C/400 program objects	*PGM	C	Yes	Unsupported compiler on V3R6M0.
IBM Cross System Product/Application Execution (CSP/AE) objects	*PGM	CSPA	No	Unsupported compiler on V3R6M0. You can convert existing applications to VisualGen applications. For more information, see the <i>AS/400 Memo to Users</i> .
Cross System Product map objects	*CSPMAP	n/a	n/a	Unsupported object type on V3R6M0.
Cross System Product table objects	*CSPTBL	n/a	n/a	Unsupported object type on V3R6M0.
FORTTRAN program objects	*PGM	FTN	No	Unsupported compiler on V3R6M0. Program objects will not run.
RM/COBOL** program objects	*PGM	RMC	Yes	Unsupported compiler on V3R6M0.
System C program objects	*PGM	SYSC	Yes	Unsupported compiler on V3R6M0.

Unsupported Licensed Programs

Several licensed programs are not supported for the V3R6M0 software release. These licensed programs will not work on a V3R6M0 system and need to be deleted before your system is upgraded. Deleting these licensed programs or optional parts before upgrading ensures that all objects associated with the options are deleted. It also makes additional disk storage available.

Table F-2. Unsupported Licensed Programs

Licensed Program	Product Option	Description
5738SS1	0003	OS/400 - Online Education
5738SS1	0010 ¹	OS/400 - 9406 Problem Analysis
5763SS1	0010 ¹	OS/400 - 9406 Problem Analysis
5738CX1	ALL	SAA C/400
5763CX1	ALL	SAA C/400
5738CB1	0003 ²	COBOL/400 - *PRV COBOL/400
5763CB1	0003 ²	COBOL/400 - *PRV COBOL/400
5738CB1	0004 ²	COBOL/400 - *PRV System/36-compatible COBOL
5763CB1	0004 ²	COBOL/400 - *PRV System/36-compatible COBOL
5738DM1	ALL	SystemView Information Warehouse DataHub Support for OS/400
5763DM1	ALL	SystemView Information Warehouse DataHub Support for OS/400
5738FT1	ALL	FORTRAN/400
5763FT1	ALL	FORTRAN/400
5738MC1	ALL	RM/COBOL-85** for the AS/400
5763MC1	ALL	RM/COBOL-85 for the AS/400
5738RG1	0003 ²	RPG/400 - *PRV RPG/400
5763RG1	0003 ²	RPG/400 - *PRV RPG/400
5738RG1	0004 ²	RPG/400 - *PRV System/36-compatible RPG II
5763RG1	0004 ²	RPG/400 - *PRV System/36-compatible RPG II
<p>The following options have equivalent support in V3R6M0 software:</p> <ol style="list-style-type: none"> Support for option 10, OS/400 9406 Problem Analysis, is removed. Equivalent function is now provided in the base of V3R6M0 5716-SS1. Option 3, COBOL/400 Previous Compiler, and option 4, System/36-Compatible COBOL Previous Compiler, are removed. Option 3, RPG/400 Previous Compiler, and option 4, System/36-Compatible RPG II Previous Compiler, are removed. Options 5 and 1 of 5716-CB1 and Options 5 and 1 of 5716-RG1, respectively, provide equivalent function and support *CUR and *PRV (V2R3M0 and V3R1M0) values for a target release. You must delete options 3 and 4 before installing V3R6M0. <p>If these options remain on the system after V3R6M0 is installed, they could be difficult to delete and could leave orphaned objects on the system. Deleting them before upgrading ensures that all objects associated with the options are deleted.</p>		

More information about supported licensed programs is available in the *AS/400 Road Map for Changing to PowerPC Technology* book and through your marketing representative.

Programming Languages That Are Now PRPQs

Some programming languages are available only by a programming request for price quotation (PRPQ). Applications created by these programming languages will still run, but the programs cannot be updated unless the PRPQ is installed on AS/400 with PowerPC technology. In addition, new applications cannot be created with these programming languages unless the PRPQ is installed.

Object Type	Description	Run-Time Support in OS/400	PRPQ Number for V3R6M0
BAS ¹	BASIC	Yes	5799-FPK
PAS ¹	PASCAL	Yes	5799-FRJ
PLI ¹	PL/I	Yes	5799-FPJ

¹ The CMDxxx system menus are no longer available for these compilers.

PRPQ Support for V3R6M0

There are some programming request for price quotations (PRPQs) that are not supported as PRPQs in V3R6M0. Table F-4 lists PRPQs that may no longer be supported, PRPQs that have been replaced by a licensed program, and PRPQs that are supported. This list may not include every PRPQ. in V3R6M0.

Similar function is provided for the following PRPQs:		
PRPQ Resource ID	Description	Alternative
5799-EFT	System Management Tools	Support for this PRPQ was incorporated into the base support of a licensed program in V3R1M0.
5799-EPJ	Ultimedia Video Delivery 400	Support for this PRPQ was incorporated into the base support of a licensed program in V3R1M0.
5799-EYH	Remote AS/400 Panel	Similar support is in AS/400 Remote Access Support for OS/400 5799-FPH.
5799-FBX	Integrated FAX Adapter on V2R3	Support for this PRPQ was incorporated into the base support of a licensed program in V3R0M5.
5799-FBY	IBM Facsimile Requestor	Support for this PRPQ was incorporated into the base support of a licensed program in V3R1M0.

¹ Support for these PRPQs is being removed.

² The default is to ship these manuals to you, at no additional charge, approximately 30 days before you receive your V3R6M0 software.

³ See "Programming Languages That Are Now PRPQs."

Unsupported Software

<i>Table F-4 (Page 2 of 3). PRPQ Support</i>		
5799-FFR	OptiConnect/400 (V2R3M0)	5716-SS1 Operating System/400 option 23, OptiConnect for OS/400
5799-FNN	VisualAge Server	Support for this PRPQ was incorporated into the base support of a licensed program in V3R1M0.
5799-FNR	ObjectConnect/400	5716-SS1 Operating System/400 option 22, OS/400 - ObjectConnect
5799-FQA	Timing and Paging Statistics	Support for this PRPQ was incorporated into the base support of a licensed program in V3R6M0.
5799-FQB	OptiConnect/400 (V3R1M0)	5716-SS1 Operating System/400 option 23, OptiConnect for OS/400
5978-JS2 5799-JS3	Job Scheduler	The Job Scheduler for OS/400 licensed program (5716-JS1) is the functional replacement.
5799-MPG	Performance Management/400	Support for this PRPQ was incorporated into the base support of a licensed program in V3R1M0.
5799-XBK 5799-XBW	Optical Library Dataserver Support/400	5716-SS1 Operating System/400 base
5799-QGY	Performance Investigator	This may require a new PRPQ.
5799-XBY	Common Crypt. Serv.	This may require a new PRPQ.
The following PRPQs are supported for V3R6M0		
PRPQ Resource ID	Description	
5799-DLB	AS/400 Conv. BULL DPS 6	
5799-DLC	AS/400 Conv. Wang VS	
5799-DLD	AS/400 Conv. Unisys ¹	
5799-DLE	AS/400 Conv. DG. Eclipse	
5799-DLF	AS/400 Conv. NCR 9000	
5799-DLF	AS/400 Conv. HP 3000	
5799-DLN	AS/400 Conv. DEC VAX	
5799-DNC	OV/400 Hebrew Version	
5799-DND	OV/400 Arabic Version	
5799-DTB	RPG/400 Conversion Tool (W)	
5799-DWN	RPG/400 Conversion Tool (A)	
5799-EHA	UNISYS A-Series	
5799-ELP	TI Model 99 Conversion Tool	
5799-FPJ	PL/I Compiler (V1) ³	
<p>1 Support for these PRPQs is being removed.</p> <p>2 The default is to ship these manuals to you, at no additional charge, approximately 30 days before you receive your V3R6M0 software.</p> <p>3 See "Programming Languages That Are Now PRPQs" on page F-3.</p>		

<i>Table F-4 (Page 3 of 3). PRPQ Support</i>	
5799-FPK	BASIC Compiler (V1) ³
5799-FRJ	PASCAL ³
5799-FPX	Workstation Remote IPL
5799-XCR	Preinstall Planning Manuals ²
The following PRPQs are not supported for V3R6M0. If you have any of the following PRPQs installed, contact your marketing representative to determine any replacement product. If there is no replacement product, you should remove them from your system before you upgrade.	
PRPQ Resource ID	Description
5799-EER	AS/400 Timing and Page Statistics
5799-EET	AS/400 Programmer Tools
5799-EEZ	IBM System C/400 Compiler (V2)
5799-ENY	Ultimedia Host Support/400
5799-FBA	Ultimedia Video Delivery 400
5799-FBR	Common Crypt. Arch Serve/400 ¹
5799-PGP	Menu-Based NL Query ¹
5799-PRG	Performance Investigator/400
5799-XBL	Application Performance Tuning Aid (V2)
5799-XBP	F-Model 9337 040 & 140 Support
5799-XCB	VisualAge ENVY** Comp Feature
5799-XCC	ENVY/400
5899-XCZ	Signals, Spawn V3R1M0
<p>1 Support for these PRPQs is being removed.</p> <p>2 The default is to ship these manuals to you, at no additional charge, approximately 30 days before you receive your V3R6M0 software.</p> <p>3 See "Programming Languages That Are Now PRPQs" on page F-3.</p>	

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Bibliography

The following publications that provide additional information about topics described or referred to in this book.

- *APPC Programming*, SC41-3443.

This book describes the advanced program-to-program communications (APPC) support for the AS/400 system. Guides in developing application programs that use APPC and defining the communications environment for APPC communications. Includes application program considerations, configuration requirements and commands, problem management for APPC, and general networking considerations.

- *AS/400 Advanced Series Handbook*, GA19-5486.

This book provides information about all aspects of AS/400 Advanced Series. It includes descriptions of AS/400 Advanced Application Architecture; system concepts; AS/400 Advanced System, AS/400 Advanced Server, and AS/400 Advanced Portable; other hardware components including all peripherals; and licensed programs available.

- *AS/400 Advanced 36 Planning and Reference Handbook*, SA21-9656.

This book provides information for configuring and planning the installation of AS/400 Advanced 36.

- *AS/400 Licensed Internal Code Diagnostic Aids – Volume 1*, LY44-4900, and *AS/400 Licensed Internal Code Diagnostic Aids – Volume 2*, LY44-4901.

AS/400 Licensed Internal Code Diagnostic Aids – Volume 1 provides information about service tools and procedures needed to determine, isolate, and solve programming problems occurring with V3R6 licensed internal code (LIC) used below the machine interface. This does not include the operating system diagnostic aids, but some of the techniques listed could be useful in diagnosing operating system programming problems.

AS/400 Licensed Internal Code Diagnostic Aids – Volume 2 contains trace point and licensed internal code log entry information for use in diagnosing V3R6 licensed internal code and some operating system problems.

- *AS/400 Planning for PowerPC Technology*, SA41-4154.

This book provides an overview of the upgrade to PowerPC Technology and describes each of the three methods for upgrading to a PowerPC AS processor and Version 3 Release 6 licensed programs. Because you need to choose a method before placing an upgrade order, this book is avail-

able to help you evaluate your system hardware and software in order to choose the best upgrade method for your system.

- *AS/400 Road Map for Changing to PowerPC Technology*, SA41-4150.

This book describes how to order and plan for an upgrade to a PowerPC AS processor and V3R6 software, using one of the three methods for upgrading to AS/400 with PowerPC technology. For each upgrade method, it instructs you how to prepare for the upgrade and provides specific steps by which the upgrade is performed.

- *Automated Tape Library Planning and Management*, SC41-3309.

This book provides information about tasks that can be performed with an automated tape library (ATL). It describes recommended methods for designing and using ATLs. It compares ATL devices that are currently available.

- *Backup and Recovery – Basic*, SC41-4304. This book describes how to:

- Plan a save strategy for your system.
- Perform basic save operations.
- Select which availability options are appropriate for you system.
- Recover your system if a failure occurs.

- *Backup and Recovery – Advanced*, SC41-4305.

This book provides information about setting up and managing the following:

- Journaling, access path protection, and commitment control
- User auxiliary storage pools (ASPs)
- Disk protection (device parity protection, mirrored protection, and checksum)

It provides performance information about backup media and save/restore operations. It also includes advanced backup and recovery topics, such as using save-while-active support, saving and restoring to a different release, and programming tips and techniques.

- *BEST/1 Capacity Planning Tool*, SC41-3341.

This book describes using the BEST/1 capacity planner to create and analyze a model of your system. This analysis is used to determine current system performance and predict future data processing needs. This book contains scenarios that will help you get started with capacity planning, plus in-depth information about specific topics, such as memory modeling.

- *Central Site Distribution*, SC41-4308.

Bibliography

This book provides information about how to create and distribute media containing licensed programs, program temporary fixes (PTFs), and application programs.

- *Client Access/400 for DOS Setup*, SC41-3556.

This book provides information about installing, configuring, and administering Client Access for DOS. It also contains chapters on analyzing problems, and appendixes on memory requirements and using AS/400 national language support with Client Access.

- *Client Access/400 for DOS with Extended Memory Setup*, SC41-3500.

This book provides information about installing, configuring, and administering Client Access for DOS with Extended Memory. It also contains information on how to analyze problems, use expanded or extended memory as well as what the memory requirements are, and use AS/400 national language support with Client Access.

- *Client Access/400 for OS/2 Setup*, SC41-3520.

This book provides information about installing, configuring, and administering Client Access for OS/2. It also contains information on how to analyze problems, memory requirements, installation work sheets for DOS, and how to use AS/400 national language support with Client Access.

- *Client Access/400 Optimized for OS/2 – Getting Started*, SC41-3510.

This book provides information about planning, installing, configuring, and getting started using Client Access/400 Optimized for OS/2.

- *Communications Configuration*, SC41-3401.

This book provides information on how to configure the communications functions available with the OS/400 licensed program, including detailed descriptions of network server, network interface, line, controller, device, mode, class-of-service, and NetBIOS descriptions; configuration lists; and connection lists.

- *LAN and Frame Relay Support*, SC41-3404.

This book describes the AS/400 support for IBM token-ring, distributed data interface (DDI), Ethernet, and wireless local area networks and frame relay wide area networks. Also includes information about AS/400 functions used for problem determination and management of local area networks.

- *LAN Server for OS/400 Administration*, SC41-3423.

This book provides information about using the LAN Server for OS/400 licensed program, including information about the File Server I/O Processor (FSIOP). Discussion includes installing, configuring, and using LAN Server for OS/400 and the FSIOP.

- *Local Device Configuration*, SC41-4121.

This book provides information about configuring local devices on the AS/400 system. This includes information on how to configure the following:

- Local work station controllers (including twinaxial controllers)
- Tape controllers
- Locally attached devices (including twinaxial devices)

- *Office Services Concepts and Programmer's Guide*, SH21-0703.

This book provides information about writing applications that use OfficeVision for OS/400 functions. This book also introduces OfficeVision for OS/400 application program interfaces (APIs).

- *Optical Support*, SC41-4310.

This book serves as a user's guide and reference for OS/400 Optical Support. By explaining the functions that are unique to Optical Support, this book can help the user understand optical library dataserer concepts, plan for optical library, administer an optical library dataserer, operate an optical library dataserer, and solve optical dataserer problems.

- *OptiConnect for OS/400*, SC41-4414.

This book describes OptiConnect support, which can connect multiple AS/400s using a fiber optic cable. OptiConnect allows you to access inter-system databases more quickly and enables you to off-load work to another AS/400. Additional topics include configuration, installation, and operation information.

- *Physical Planning Reference*, SA41-4109.

This book provides information for the data processing manager or administrator who is planning activities for the initial installation of an AS/400 system.

- *Security – Basic*, SC41-3301. This book explains why security is necessary, defines major concepts, and provides information on planning, implementing, and monitoring basic security on the AS/400 system.

- *Security – Reference*, SC41-4302.

This book tells how system security support can be used to protect the system and the data from being used by people who do not have the proper authorization, protect the data from intentional or unintentional damage or destruction, keep security information up-to-date, and set up security on the system.

- *Software Installation*, SC41-4120.

This book includes planning information and step-by-step instructions for the following procedures for

installing the operating system and licensed programs:

- Initial installation
 - Replacing the installed release with a new release
 - Adding additional licensed programs
 - Adding secondary languages
 - Changing the primary language of the system
- *System Operation Quick Reference*, SX41-4201.
This book provides a summary of how to do day-to-day system operations on the AS/400 system.
 - *System Startup and Problem Handling*, SC41-4206.
This book provides information about the system unit control panel, starting and stopping the system, using tapes and diskettes, working with program temporary fixes, as well as handling problems.
 - *System/36 Migration Planning*, SC41-4152.
This book provides information to help migrate products and applications using the AS/400 System/36 Migration Aid. It also includes information for planning the details of migration and an overview of the functions on the System/36 to AS/400 Migration Aid.
 - *System/36 to AS/400 Migration Aid User's Guide and Reference*, SC09-1166.

This book provides the system operator, applications programmer, systems programmer and data processing manager with information about using the S/36* to AS/400* migration aid to move S/36 items to the AS/400 System using menus and displays or commands.

- *System/38 Migration Planning*, SC41-4153.

This book provides information to help migrate products and applications using the AS/400 System/38 Migration Aid. It includes information for planning the details of migration and an overview of the functions on the System/38 to AS/400 Migration Aid.

- *System/38 to AS/400 Migration Aid User's Guide and Reference*, SC09-1165.

This book provides the system operator, application programmer, programmer, or data processing manager with information about using the System/38 to AS/400 Migration Aid to move System/38 objects to the AS/400 system using menus and displays, or commands.

- *TCP/IP Fastpath Setup*, SC41-3430.

This book describes how to set up and use TCP/IP on AS/400. The book uses simplified installation and configuration scenarios to illustrate the basics needed to use TCP/IP. It provides an overview of file transfer, printing, and other TCP/IP functions.

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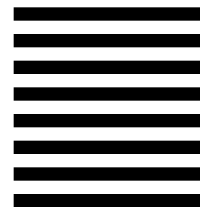
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