

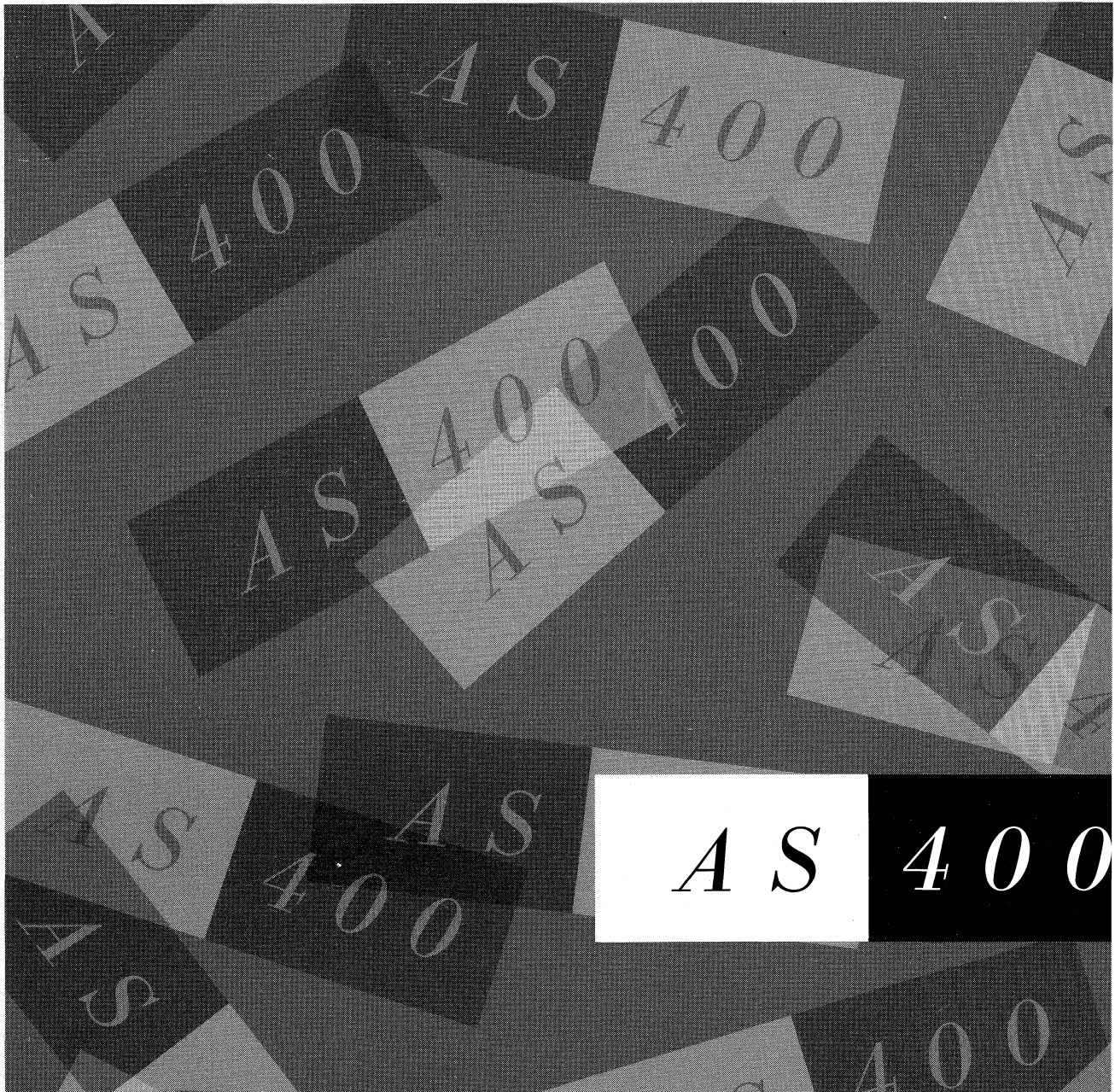


Application System/400

SC41-0145-02

**Performance Management/400
Offerings and Services, including
Performance Management/400 - Subset**

Version 3





Application System/400

SC41-0145-02

**Performance Management/400
Offerings and Services, including
Performance Management/400 - Subset**

Version 3

Take Note!

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

Third Edition (September 1994)

This edition applies to the licensed program Performance Management/400 Offerings and Services (Program 5799-MPG), Version 3 Release 1 Modification 0, and to all subsequent releases and modifications until otherwise indicated in new editions. This publication replaces SC41-0145-01 and makes that publication obsolete. Make sure you are using the proper edition for the level of the product.

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Because the changes and additions are extensive, this publication should be reviewed in its entirety.

Refer to the "Summary of Changes" for a summary of changes made to the Performance Management/400 Offerings and Services and how they are described in this publication.

This publication contains examples of data and reports used in daily business operations. To illustrate them as completely as possible, the examples include the names of individuals, companies, brands, and products. All of these names are fictitious and any similarity to the names and addresses used by an actual business enterprise is entirely coincidental.

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AS/400 PerformanceEdge	400

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About This Guide

Performance Management/400 Offerings and Services (PM/400) is an IBM system management service offering. The Performance Management/400 software assists customers by helping them plan for and manage system resources through ongoing analysis of key performance indicators.

The Performance Management/400 product is a billable service. The Performance Management/400 - Subset is an IBM Service Exclusive and is available to customers that have an IBM AS/400 Maintenance agreement. Contact your local IBM service representative to learn about the terms and conditions that apply in your area.

The service uses a set of software and procedures to automate performance analysis and capacity planning. This service helps the user maximize current application and hardware performance (using performance trend analysis), and better understand (using capacity planning) how their business trends relate to the timing of required hardware upgrades such as CPU, memory, or disk.

You may need to refer to other IBM manuals for more specific information about a particular topic. The *Publications Reference* manual, SC41-3003, provides information on all the manuals in the AS/400 library.

Summary of Changes

This edition has been updated to include the PM/400 - Subset Service Exclusive which is part of AS/400 PerformanceEdge in the United States and it may be available to customers with an IBM AS/400 Maintenance Agreement in other geographic areas. Check with your local IBM Service Representative for availability of the PM/400 - Subset Service Exclusive.

The following changes were made to this release.

- A section that explains how to upgrade your PM/400 product to a new release was added to Chapter 2, "Installation and Configuration."
- The quarterly graphs have been changed to give a 12-month review.
- All graphs were changed to reflect a 24-hour average.
- Appendix B, "Configuring PM/400 for Advantis," was added to aid you in configuring the PM/400 product for Advantis.
- Appendix C, "Changing System Time," was added to aid you in changing the system time in your geographic area.

Chapter 1. Introduction

To do a proper job of capacity planning and performance analysis, the user must systematically collect, analyze, maintain, and archive performance data. Most users do not allocate the time to continuously collect data, let alone analyze it. Users who do understand the value of capacity planning and performance analysis allocate as much as one-third to one-half of a technical person's time to perform these functions. The Performance Management/400 (PM/400) software completely automates these functions, and provides summarized performance and capacity information in a way that technical and non-technical personnel can understand.

Integral to the PM/400 software is a scheduler that automatically starts the jobs necessary to support the PM/400 performance data collection and analysis. The PM/400 reports and graphs provide information that assist you in capacity planning for your AS/400* system.

The PM/400 service includes Performance Analysis Reports — a set of reports and graphs, available for one or two shifts per day, that allow the customer to analyze performance and capacity data without investing the time usually associated with data collection and report preparation.

The PM/400 Service Offering Performance Analysis reports are available:

- monthly
- quarterly
- annually

Note: Customers who receive quarterly or annual reports may request one or more monthly reports for an additional fee.

The PM/400 - Subset reports are available semi-annually. Customers may request one or more detailed monthly reports for a fee.

The overhead associated with the PM/400 product is minimal. The PM/400 product uses between 1% to 2% of the CPU. PM/400 software uses approximately 3 megabytes of disk space. The performance data collected by the performance monitor uses approximately 10 to 25 megabytes per day, depending upon the amount of activity on the system. If performance data is saved for 4 days (the default setting), the amount of disk space used equals 40 to 100 megabytes.

PM/400 Service Offering and PM/400 - Subset Overview

An overview of the PM/400 Service Offering's and PM/400 - Subset's process is outlined below. Detailed information on the operation and maintenance of the PM/400 product is provided in the following chapters of this operator's guide.

- Automated performance data collection and management software is installed on the customer's system.
- Continuous collection of performance data is started.
- Performance data is managed using the data reduction process.
- Weekly transmission of summarized data to an IBM* location using the customer's electronic customer support line and modem (or equivalent). In

the United States and Canada, the transmission is to the AS/400 Competency Center in Rochester, Minnesota.

- Performance data is maintained by IBM and analyzed monthly.
- Management reports and graphs produced by IBM are mailed to the customer. The type and frequency of the reports depends on whether you are enrolled as a PM/400 Service Offering (fee) customer or a PM/400 - Subset customer.

PM/400 Service Offering versus PM/400 - Subset

The PM/400 product is designed to help you manage your AS/400 systems for productivity by automatically collecting and summarizing usage information over time, and then presenting that information in a way that is easy to understand. Capacity planning information is provided by trending system utilization resources and throughput data which can be thought of as an “early warning system” for your AS/400 system. You can think of the PM/400 product as a “virtual resource” that informs you about the health of your system.

In addition to the easily understood reports and graphs, the PM/400 Service Offering includes the “Work with Historical Performance Data Commands.” These PM/400 commands are similar to the “Work with System Status, Work with Active Jobs, and Work with Disk Status commands,” except they display statistics from previously collected performance data, instead of displaying statistics from the time the command was entered forward. These commands give the user a powerful problem determination tool. With these commands, one can go back to an interval where there was a problem on the system and determine the cause. For example, if a user complained about poor response time, such as between 2 p.m. and 3 p.m. two days ago, in a matter of seconds the system status, active jobs, and disk status during that time period can be displayed enabling the user to determine what caused the poor response time.

Currently the PM/400 Service Offering gives the user three options as to the delivery frequency of the reports and graphs: monthly, quarterly, and annually. The PM/400 service fee that the customer pays depends on the frequency. The “Work with Historical Performance Data commands” are available with all options.

AS/400 PerformanceEdge* is an enhancement to the IBM AS/400 Maintenance Agreement. It combines standard Maintenance Services with the following electronic support options, at no additional charge.

- AS/400 Service Director* - Automatically reports problems to IBM Hardware Service.
- PM/400 - Subset - Automates the collection, analysis, and reporting of performance data.
- AS/400 Forum - Provides bulletin board access and has been enhanced to provide summarized trending data from PM/400.

The PM/400 - Subset provided with AS/400 PerformanceEdge gives the user a subset of the PM/400 Service Offering’s reports and graphs semi-annually. The following tables outline the reports, graphs, and features available from the PM/400 Service Offering and AS/400 PerformanceEdge.

PM/400 - Subset provides trending information and graphs that show weekly averages.

The PM/400 Service Offering provides trending information and graphs that provide information by day and time of day.

Figure 1-1. PM/400 Report Availability

Reports	PM/400 Service Offering Monthly/Quarterly/Annual	PM/400 - Subset Semi-Annual
Management Summary	Yes	Yes
Application Summary	Yes	No
Technical Summary	Yes	Yes
IOP/Communication Summary	Yes	No
Workload Summary	Yes	Yes

Figure 1-2. PM/400 Monthly Graph Availability

Graphs	PM/400 Service Offering Monthly/Quarterly/Annual (Color)	PM/400 - Subset Semi-Annual (Black/White)
CPU Utilization by Date	Yes	No
CPU Utilization by Time of Day	Yes	Yes
Response Time by Date	Yes	No
Response Time by Time of Day	Yes	No
Throughput by Date	Yes	No
Throughput by Time of Day	Yes	No
Faulting Rates by Date	Yes	No
Faulting Rates by Time of Day	Yes	No
Disk Space by Date	Yes	No
Disk Arm Utilization by Date	Yes	No
Number of Jobs by Date	Yes	No
Pages Spooled by Date	Yes	No

Figure 1-3. PM/400 Graphs 12-Month Review

Graphs 12-Month Review	PM/400 Service Offering Monthly/Quarterly/Annual (Color)	PM/400 - Subset Semi-Annual (Black/White)
CPU Utilization by Week	Yes	Yes
Response Time by Week	Yes	Yes
Throughput by Week	Yes	Yes
Faulting Rates by Week	Yes	Yes
Disk Space by Week	Yes	Yes

Figure 1-4. PM/400 Feature Availability

Features	PM/400 Service Offering Monthly/Quarterly/Annual	PM/400 - Subset Semi-Annual
Work with Historical Performance Data commands	Yes	No (30 day trial)
Reports & Graphs for second shift (batch)	Yes	No
Fiscal quarterly & annual reports and graphs	Yes	No
Access to PM/400 summary data using Forum	No ¹	Yes

¹ Access to PM/400 Summary Data is only available with AS/400 PerformanceEdge.

Performance Helpdesk

The Performance Helpdesk enables customers who do not have extensive skills in performance and capacity management, or who wish to concentrate their skilled technical personnel on their normal tasks, to take advantage of skilled IBM performance specialists. Customers may contact an IBM performance specialist who will make tuning recommendations that may improve system performance.

Inform the person answering the telephone that you would like to have an IBM performance specialist return your call. You are asked for your IBM customer number, AS/400 system serial number, and the time you prefer to be called back. The serial number can be displayed by entering the following command on the command line and pressing the Enter key:

```
DSPSYSVAL QSRLNBR
```

If you do not specify a time, the performance specialist attempts to return your call within 3 hours of your initial call.

When you are contacted by our performance specialist, they have the details of your previous performance data, and are prepared to discuss any performance or capacity management questions with you.

The performance specialist gives you an estimate of how long it is going to take to provide the information you request. At the end of the follow-up conversation, the performance specialist tells you the time spent. This time is billed to you at

the specified hourly rate. Any questions on the use of the Performance Helpdesk can be directed to an IBM Solution Manager.

Finally, the Performance Helpdesk services, as well as the Performance Analysis Reports, are covered by a satisfaction guarantee — helping to protect the customer's investment in the service offering.

PM/400 Telephone Numbers

In the United States and Canada, the PM/400 Performance Helpdesk can be accessed by dialing 1-800-AS40015 (1-800-274-0015) between the hours of 6 a.m. and 6 p.m. central standard time (CST).

For other locations, contact your local IBM support personnel to obtain the following telephone numbers and record the numbers below.

PM/400 Helpdesk _____

PM/400 Data _____

Verifying the PM/400 Data Number

This example is for a U.S. telephone number, but the process is the same for all locations.

1. On a command line enter the following:
 - a. Type DSPDTAARA and press F4 to prompt for options.
 - b. Type Q1PGTELE in the *Specific Data Area* field.
 - c. Type QMPGLIB in the *Specific Library* field and press the Enter key.
2. If the line is direct dial, verify that the first telephone number (at offset 0) is either:
 - SST:18005475497 or :18005475497 (the : is required for dial tone)
 - SST9:18005475497 (if 9 is needed for access)

If you have ever used the electronic customer support line to download a program temporary fix (PTF), you can check the format of the telephone number by typing DSPDTAARA DTAATR(QUSRSYS/QESTELE) and pressing the Enter key. Check the number at offset 0.

Changing the PM/400 Data Number

To change the PM/400 data number, type the following on a command line:

```
CHGDTAARA DTAARA(QMPGLIB/Q1PGTELE(1 15)) VALUE('SST:18005475497')
```

The starting position is 1 and the length is 15 for direct dial. If 9 is required in the dial sequence, the starting position is 1, the length is 16, and the value is 'SST9:18005475497.'

Notes:

1. The other numbers visible on the DSPDTAARA command are not used.
2. SST is for tone telephones only. Use SSP for pulse telephones.

Product Deliverables

The following tables provide a brief description of the PM/400 reports and graphs. Refer to Figure 1-1 on page 1-3, Figure 1-2 on page 1-3, Figure 1-3 on page 1-4, and Figure 1-4 on page 1-4 for a description of which reports and graphs are available with the PM/400 Service Offering or with the PM/400 - Subset Service Exclusive.

Reports

Figure 1-5. PM/400 Reports

Report Title	Report Description
Management Summary	Provides management with an encapsulated view of the current hardware and throughput performance, and growth trends.
Application Summary	Lists the results of the Top 10 Analysis for Batch Jobs and Interactive Users. The top 10 batch jobs are listed by Run Time, CPU Time, IO/Sec, Total IOs, Total Pages Printed, and Total Number of Runs. For interactive users, the categories are Average Response Time, Maximum Response Time, CPU per Transaction, IO per Transaction, Total Transactions, and Total Pages Printed.
Technical Summary	Gives technical personnel information on memory utilization and the settings of key system values.
Communication/IOP Summary	Lists the Top 10 Communication Lines of each line type by utilization, and the Top 10 IOPs by utilization.
Workload Summary	Lists the Workload Profile for the previous month by High and Low Priority, and the Workload Characteristics for the last three months.

Graphs

Figure 1-6 (Page 1 of 2). PM/400 Graphs

Graph Title	Graph Description
CPU Utilization	Shows the daily average CPU utilization by priority, System, High Priority, and Low Priority. A 3-month trend line is also plotted for system plus high priority, and total CPU utilization.
CPU by Interval	Shows the average CPU utilization by priority, System, High Priority, and Low Priority per interval. The maximum system and high priority CPU utilization is shown.
Response Time	Shows the daily average response times for terminals and personal computers, and shows the maximum overall response time for any 15-minute interval.
Response Time by Interval	Shows the average response time for terminals and personal computers per interval and shows the maximum overall response time for each interval.
Throughput	Shows the daily average transactions per hour and the 3-month trend line.
Throughput by Interval	Shows the average and maximum transactions per hour per interval.
Faulting Rates	Shows the average and maximum faulting rates for the machine pool and all other pools combined.
Faulting by Interval	Shows the average and maximum faulting rates for the machine pool and all other pools combined per interval.

Figure 1-6 (Page 2 of 2). PM/400 Graphs

Graph Title	Graph Description
Disk Space	Graphs the daily disk space utilization and, based on a 3-month trend, where the utilization will be next month, in 2-months, and in 3-months.
Disk Arm Utilization	Graphs the daily average disk utilization in terms of percent and shows the 3-month trend line.
Number of Jobs	Graphs the daily number of jobs; interactive and batch. The 3-month trend line for the total is also plotted.
Spooled Pages	Shows the daily number of spooled pages for interactive and batch.

Data Collection Considerations

The most important requirement for establishing an accurate trend of the system utilization, workload, and performance measurements is consistency. Consider the total number of transactions per shift. If data collection is inconsistent — for example, one day with no data collection, one day only during peak activity, and another day during the entire shift — any trend charted using this data would not be valid. Ideally, performance data should be collected 24-hours per day. The PM/400 product satisfies this requirement by starting the performance monitor 24-hours a day through its own scheduler. The performance monitor is started with 15-minute intervals and no trace.

Performance data collection requirements that preclude 24-hour data collection, or prohibit the PM/400 product from starting the performance monitor are acceptable, as long as the data is collected consistently. Data collection periods should not exceed 24-hours.

The performance monitor can be ended at any time by entering the ENDPFRMON command (see “Installing the PM/400 Product for the First Time” on page 2-1). If this is necessary, please note the following PM/400 product considerations:

- The PM/400 scheduler starts the performance monitor at the beginning of the next hour. (To prevent this restart, refer to Chapter 6, “Work with Automatically Scheduled Jobs,” regarding the scheduler and changing run times.)
- Days with little or no data collected are not included in trend calculations. Therefore, the performance monitor should not be interrupted often.

If you need to end the performance monitor to collect TRACE data, enter the following on the AS/400 command line:

```
ENDPFRMON  
STRPFRMON LIB(QMPGDATA) TRACE(*ALL) DMPTRC(*YES) ...
```

By collecting the TRACE data into the PM/400 performance data library, the information is still available to the PM/400 software. Remember that the PM/400 software purges the data at the number of days you have specified. (For purge specification information, refer to Chapter 7, “Work with PM/400 Customization.”)

After your collection has ended, PM/400 restarts the data collection at the next 1-hour boundary.

Chapter 2. Installation and Configuration

Installing the IBM PM/400 software is easy and almost automatic. Installation consists of restoring the product, running the configuration command, and answering a few simple questions about how the PM/400 product should function. These questions relate to the disposition of performance data and modifications to the startup program. It is recommended that the configuration procedure on the following pages be read through before running the configuration program.

The PM/400 software is supported by the Operating System/400* (OS/400*) system, Version 2 Release 2 or higher.

National Language Support for the PM/400 Product

National language support versions (NLVs) are available for the PM/400 product as follows:

- For PM/400, Version 2 Release 2:
 - NLV2924: English uppercase and lowercase only
- For PM/400, Version 2 Release 3, and later
 - NLV2924: English uppercase and lowercase
 - NLV2950: English uppercase
 - NLV2938: English uppercase support for double-byte character set (DBCS)
 - NLV2984: English uppercase and lowercase support for DBCS

Note: NLV2938 and NLV2984 are supported in a single-byte character set (SBCS) environment only.

Installing the PM/400 Product for the First Time

For Version 2 Release 3 and later, the PM/400 software is found on the last volume of the OS/400 distribution tapes. Customers using PM/400 - Subset as part of AS/400 PerformanceEdge should load the PM/400 software from the last volume of the OS/400 distribution tapes.

Use the Restore Licensed Program (RSTLICPGM) control language (CL) command to perform an initial install of the PM/400 software. Use the following installation process:

1. Sign on to the AS/400 system as the security officer (QSECOFR).
2. Install the PM/400 software using the RSTLICPGM command. Type RSTLICPGM and press F4 to prompt for the following options:

LICPGM(5799MPG)

The program number.

DEV(name)

The name of the tape device containing the distribution tape.

RSTOBJ(*ALL)

The objects to restore for the licensed program. *ALL specifies to restore all objects.

- LNG(xxxx)** The language used for the product.
- For PM/400, Version 2 Release 2, use 2924.
- For PM/400, Version 2 Release 3, specify the appropriate language number from the following:
- 2924: English uppercase and lowercase
 - 2950: English uppercase
 - 2938: English uppercase support for DBCS
 - 2984: English uppercase and lowercase support for DBCS
- Note:** NLV2938 and NLV2984 are supported in a SBCS environment only.

Note: If the PM/400 software is being installed on an AS/400 system where English is not the primary language, the QSYS29xx library must precede the QSYS library in the library list when the PM/400 software is being used.

If the RSTLICPGM command does not complete successfully:

- a. Determine and resolve any problems.
- b. Delete any part of the PM/400 software that was installed with the Delete Licensed Program (DLTLICPGM) CL command. Type DLTLICPGM and press F4 to prompt for the following options:

LICPGM(5799MPG)

The program number.

OPTION(*ALL) The items to delete. *ALL specifies to delete the entire PM/400 software.

- c. Delete the QMPGLIB library, if it still exists on the AS/400 system, using the Delete Library (DLTLIB) CL command.
- d. When the QMPGLIB library no longer exists on the AS/400 system, restart the install process from step 1 on page 2-1.

3. Sign off the system.

Note: When you install the PM/400 software, a library named QMPGLIB is created on your AS/400 system.

Replacing an Earlier PM/400 Version

For Version 2 Release 3 and later, the PM/400 software is found on the last volume of the OS/400 distribution tapes. Customers using PM/400 - Subset as part of AS/400 PerformanceEdge should load the PM/400 software from the last volume of the OS/400 distribution tapes.

Use the Restore Licensed Program (RSTLICPGM) command to replace an earlier version of the PM/400 software.

Note: Prior to replacing an earlier PM/400 version, a backup copy of the QMPGLIB library must be made.

1. Sign on to the AS/400 system as the security officer (QSECOFR). End the QMPGSCH subsystem using the End Subsystem (ENDSBS) command. Type ENDSBS and press F4 to prompt for the following options:

SBS(QMPGSCH)

The subsystem name.

OPTION(*IMMED)

Specify *IMMED to end immediately.

Note: This subsystem might not be present.

Use the End Subsystem (ENDSBS) command to end the Q1PGSCH subsystem. Type ENDSBS and press F4 to prompt for the following options:

SBS(Q1PGSCH)

The subsystem name.

OPTION(*IMMED)

Specify *IMMED to end immediately.

2. Create a backup copy of the QMPGLIB library using the Save library (SAVLIB) command.
3. Replace the current PM/400 version using the RSTLICPGM command. Type RSTLICPGM and press F4 to prompt for the following options:

LICPGM(5799MPG)

The program number.

DEV(name) The name of the tape device containing the distribution tape.

RSTOBJ(*ALL) The objects to restore for the licensed program. *ALL specifies to restore all objects.

LNG(yyyy)

The language used for the product.

For PM/400, Version 2 Release 2, use 2924.

For PM/400, Version 2 Release 3, specify the appropriate language number from the table below:

- 2924: English uppercase and lowercase
- 2950: English uppercase
- 2938: English uppercase support for DBCS
- 2984: English uppercase and lowercase support for DBCS

Note: NLV2938 and NLV2984 are supported in a SBCS environment only.

Notes:

- a. If the PM/400 software is being installed on an AS/400 system where English is not the primary language, the QSYS29xx library must precede the QSYS library in the library list when the PM/400 software is being used.
 - b. If the RSTLICPGM command does not complete successfully, call IBM Support before attempting to restore PM/400 from your backup copy.
4. Sign off the system.

Upgrading to a New Release of the PM/400 and PM/400 - Subset Software

The following tasks must be performed for both the PM/400 and PM/400 - Subset software.

1. Install the new PM/400 or PM/400 Subset software using the RSTLICPGM command. For more information on this command, see “Installing the PM/400 Product for the First Time” on page 2-1.
2. Convert the data collected by the performance monitor using the Convert Performance Data (CVTPFRDTA) command. To convert the performance monitor data:
 - a. End the performance monitor using the End Performance Monitor (ENDPFRMON) command. On the command line type ENDPFRMON and press the Enter key.
 - b. Type CVTPFRDTA on the command line and press CMD 4 to prompt for the following options:

FROMLIB	Specify the name of the library that PM/400 is using for data collection. Usually this is the QMPGDATA library.
TOLIB	Specify the name of the library that PM/400 is using for data collection. Usually this is the QMPGDATA library.
3. Run the Configure PM/400 (CFGPM400) command. Type CFGPM400 on the command line and press the Enter key.

For additional information, refer to “Configuring the PM/400 Product” on page 2-6.

Saving the PM/400 Product

To save the PM/400 product, use the Save Licensed Program (SAVLICPGM) CL command as follows:

1. Sign on to the AS/400 system as the security officer (QSECOFR).
2. End the Q1PGSCH subsystem using the End Subsystem (ENDSBS) command. Type ENDSBS and press F4 to prompt for the following options:

SBS(Q1PGSCH)

The subsystem name.

OPTION(*IMMED)

Specify *IMMED to end immediately.

3. Use the Initialize Tape (INZTAP) command to initialize a tape to hold the saved version. Type INZTAP and press F4 to prompt for the following options:

DEV(name)

The name of the tape device containing the save tape.

NEWVOL(VOL1)

The volume identifier.

4. Save the PM/400 product using the SAVLICPGM command. Type SAVLICPGM and press F4 to prompt for the following options:

LICPGM(5799MPG)

The program number.

DEV(name)

The name of the tape device where the library is saved.

5. Use the STRSBS QMPGLIB/Q1PGSCH command to restart the PM/400 software.
6. Sign off the system.

Deleting the PM/400 Product

To delete the PM/400 product, use the Delete Licensed Program (DLTLICPGM) command as follows:

1. Sign on to the AS/400 system as the security officer (QSECOFR).
2. End the Q1PGSCH subsystem with the ENDSBS command. Type ENDSBS and press F4 to prompt for the following options:

SBS(Q1PGSCH)

The subsystem name.

OPTION(*IMMED)

Specify *IMMED to end immediately.

3. Delete the PM/400 product using the DLTLICPGM command. Type DLTLICPGM and press F4 to prompt for the following options:

LICPGM(5799MPG)

The program number.

OPTION(*ALL)

The items to delete. *ALL specifies to delete the entire PM/400 product.

4. Sign off the system.

Configuring the PM/400 Product

From the Command Entry display, you can run the PM/400 configuration command by typing CFGPM400 on the command line and pressing F4.

```
Command Entry                                PRODCPU
Request level: 1

Previous commands and messages:

Type command, press Enter.
====> CFGPM400

Bottom

F3=Exit  F4=Prompt  F9=Retrieve  F10=Include detailed messages
F11=Display full  F12=Cancel  F13=User support  F16=System main menu
```

The PM/400 configuration process proceeds through a series of questions about the configuration and use of the AS/400 system. Respond to the displayed prompts to complete the PM/400 configuration.

Sending Performance Data to IBM

On the Configure PM/400 (CFGPM400) display, specify *YES or *NO to send performance data directly to IBM.

```
Configure PM/400 (CFGPM400)

Type choices, press Enter.

Send performance data to IBM? . *YES      *YES, *NO

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

***YES** Specifies that this site sends the necessary PM/400 performance data to IBM, using an electronic customer support modem or equivalent. This is the default. If this AS/400 system has a modem, you should use this option.

If *YES is specified, go to "YES - Sending Performance Data to IBM" on page 2-8.

***NO** Specifies that this site does not send PM/400 performance data to IBM. Use this option if this AS/400 system does not have an electronic customer support modem or equivalent. If you specify *NO, you must have another AS/400 system in your network which does have a modem. The AS/400 system with the modem sends the data to IBM on behalf of the AS/400 system without the modem. The AS/400 system with the modem must be configured to collect the data from the AS/400 system without the modem. See Chapter 9, "Work with Remote AS/400 Systems," for additional information.

If *NO is specified, go to "NO - Sending Performance Data to IBM" on page 2-10.

YES - Sending Performance Data to IBM

If you specified *YES to the *Send performance data to IBM?* prompt, the following Configure PM/400 (CFGPM400) display appears.

```
Configure PM/400 (CFGPM400)

Type choices, press Enter.

Send performance data to IBM? . *YES          *YES, *NO
Receive performance data . . . . *NO          *YES, *NO
Performance data library . . . . QMPGDATA     Name
Modify startup program . . . . . *YES          *YES, *NO

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

1. Receive Performance Data

At the *Receive performance data* prompt, specify *YES or *NO to receive performance data from other AS/400 systems.

***YES** This site receives the PM/400 performance data from other AS/400 systems for transmission to IBM. Select this option if this AS/400 system has an electronic customer support modem and there are other AS/400 systems in your network that do not have electronic customer support modems. See Chapter 9, "Work with Remote AS/400 Systems," for more information.

***NO** This site does not receive the PM/400 performance data. This is the default. Select this option if any of the following are true.

- a. You do not have more than one AS/400 system.
- b. This AS/400 system does not have an electronic customer support modem.
- c. All your AS/400 systems have their own electronic customer support modems.
- d. Your AS/400 systems that do not have an electronic customer support modem will not use this AS/400 system to send their data to IBM.

2. Performance Data Library

At the *Performance data library* prompt, specify the library name to be used for AS/400 performance monitor data. The default is QMPGDATA.

3. Modify Startup Program

At the *Modify startup program* prompt, specify *YES or *NO to modify the startup program.

***YES** The PM/400 configuration makes the required modifications to the startup program automatically. The PM/400 software requires its own subsystem to be started. The only change to the startup program is to start the PM/400 subsystem.

If *YES is specified, go to "Modifying the Startup Program" on page 2-11.

***NO** Required modification must be made manually.

If *NO is specified, go to "Adding Site Contact Information" on page 2-12.

Note: If you wish to make the modifications yourself, do so after completion of the configuration program. The procedure is outlined in the *Work Management* manual, SC41-3306, in the "Changing the IPL Start-Up Program (QSTRUP)" section.

To update the startup program, add the following two lines and recompile the program.

```
QSYS/STRSBS QMPGLIB/Q1PGSCH  
MONMSG CPF0000
```

Note: Until the startup program has been modified, you need to start the PM/400 software after each initial program load (IPL) by entering the following command:

```
STRSBS QMPGLIB/Q1PGSCH
```

NO - Sending Performance Data to IBM

If you specified *NO to the *Send performance data to IBM?* prompt, the following Configure PM/400 (CFGPM400) display appears.

```
Configure PM/400 (CFGPM400)

Type choices, press Enter.

Send performance data to IBM? . *NO          *YES, *NO
Performance data library . . . . QMPGDATA   Name
Modify startup program . . . . . *YES       *YES, *NO

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

1. Performance Data Library

At the *Performance data library* prompt, specify the library name to be used for the AS/400 performance monitor. The default is QMPGDATA.

2. Modify Startup Program

At the *Modify startup program* prompt, specify *YES or *NO to modify the startup program.

***YES** The PM/400 software makes required modifications to the startup program automatically. The PM/400 software requires its own subsystem to be started. The only change to the startup program is to start the PM/400 subsystem.

If *YES is specified, go to “Modifying the Startup Program” on page 2-11.

***NO** Required modification must be made manually.

If *NO is specified, go to “Adding Site Contact Information” on page 2-12.

Note: If you want to make the modifications yourself, do so after completion of the configuration program. The procedure is outlined in the *Work Management* manual in the “Changing the IPL Start-Up Program (QSTRUP)” section.

To update the startup program, add the following two lines and recompile the program:

```
QSYS/STRSBS QMPGLIB/Q1PGSCH
MONMSG CPF0000
```

Note: Until the startup program has been modified, you need to start the PM/400 software after each IPL by entering the following command:

```
STRSBS QMPGLIB/Q1PGSCH
```

Modifying the Startup Program

If you specified *YES at the *Modify startup program* prompt, and the QSTRUP system value is other than *NONE, the following information is displayed and can be modified:

- Current startup program
- Current startup Library
- New startup program (default is QSTRUP)
- New startup Library (default is QGPL)

Note: This step assumes that there are no other problems which would prevent the PM/400 software from modifying the startup program.

```
Configure PM/400 (CFGPM400)

Type choices, press Enter.

Send performance data to IBM . . *NO          *YES, *NO
Performance data library . . . . QMPGDATA    Name
Purge performance data . . . . . *YES        *YES, *NO
Modify startup program . . . . . *YES        *YES, *NO

Current startup program . . . . . QSTRUP
Library . . . . . QGPL

New startup program . . . . . QSTRUP
Library . . . . . QGPL

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

Adding Site Contact Information

At this point in the configuration, site contact information is required. You need to provide the following:

- Company Name
- Contact
- Primary telephone number
- Alternate telephone number
- Mailing address (This must be a street address or a post office box.)
- City/State
- Country
- Zip Code
- Graph fee option (1, 2, or 4)

```
Configure PM/400 (CFGPM400)

Type choices, press Enter.

Company Name . . . . . 'The Quill Group, Inc.'

Contact . . . . . 'John Tuttle'
Primary telephone number . . . . '3035551220'
Alternate telephone number . . . . '3035559648'
Mailing address: line one . . . . '1180 Mnt. Pines Rd.'
                        line two . . .
                        line three . .

City/State . . . . . 'Boulder, CO'
Country . . . . . 'USA'
Zip Code . . . . . '80302'
Graph fee option . . . . . 1           Character value
                                       (1=Monthly, 2=Annual,
                                       4=Quarterly)

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

Note: If third party billing is needed, refer to Chapter 5, “Work with Contact/Enrollment Information.”

After the PM/400 configuration is completed, you can customize the PM/400 software to your operating environment. Refer to Chapter 7, “Work with PM/400 Customization.”

If you specified *YES at the *Receive PM/400 data from others* prompt, refer to Chapter 9, “Work with Remote AS/400 Systems.”

Chapter 3. The PM/400 Menu

The PM/400 Service Offering and PM/400 - Subset are based on the analysis of AS/400 performance data collected over user-specified intervals. To maintain the parameters for the collection and use of that data, several data collection and status functions are provided. These functions include:

- Work with Historical Performance Data
- Work with Contact/Enrollment Information
- Work with Automatically Scheduled Jobs
- Work with PM/400 Customization
- Work with Top Ten Omissions
- Work with Remote AS/400 Systems

The PM/400 Menu is accessed from the Command Entry display by issuing the following GO command from the AS/400 command line:

```
GO QMPGLIB/PM400
```

Command Entry PRODCPU
Request level: 1

Previous commands and messages:

Bottom

Type command, press Enter.
====> GO QMPGLIB/PM400

F3=Exit F4=Prompt F9=Retrieve F10=Include detailed messages
F11=Display full F12=Cancel F13=User support F16=System main menu

All of these functions are documented in detail in the following sections of this manual. To facilitate the user's access to all of these functions, the following PM/400 Menu display is provided.

```
PM/400                      PM/400 Menu                      System: PRODCPU

Select one of the following:

    1. Work with Historical System Status
    2. Work with Historical Active Jobs
    3. Work with Historical Disk Status
    4. Work with Contact/Enrollment Information
    5. Work with Automatically Scheduled Jobs
    6. Work with PM/400 Customization
    7. Work with Top Ten Omissions
    8. Work with Remote AS/400's

Selection or command
====>

F3=Exit  F4=Prompt  F9=Retrieve  F12=Cancel
F13=User support  F16=System main menu
```

The PM/400 Menu provides direct access to these eight PM/400 software functions:

1. Work with Historical System Status. (See "Work with Historical System Status" on page 4-2.)
2. Work with Historical Active Jobs. (See "Work with Historical Active Jobs" on page 4-6.)
3. Work with Historical Disk Status. (See "Work with Historical Disk Status" on page 4-11.)
4. Work with Contact/Enrollment Information. (See Chapter 5, "Work with Contact/Enrollment Information.")
5. Work with Automatically Scheduled Jobs. (See Chapter 6, "Work with Automatically Scheduled Jobs.")
6. Work with PM/400 Customization. (See Chapter 7, "Work with PM/400 Customization.")
7. Work with Top Ten Omissions. (See Chapter 8, "Work with Top Ten Omissions.")
8. Work with Remote AS/400 Systems. (See Chapter 9, "Work with Remote AS/400 Systems.")

To start a function, type the corresponding number into the selection field and press the Enter key.

Chapter 4. Work with Historical Performance Data

Note: The Work with Historical Performance Data functions of PM/400 are only available as part of the PM/400 Service and are not available with PM/400 - Subset. These functions are active for a 30-day trial immediately after the PM/400 - Subset software has been installed. PM/400 - Subset is only available as part of AS/400 PerformanceEdge.

The PM/400 Service includes Work with Historical Performance Data functions, which display AS/400 performance monitor data. These functions use performance data to create screens similar to the OS/400 System Status, Active Jobs, and Disk Status displays. These screens quickly provide information useful in understanding specific events or conditions on the system and determining the appropriate corrective action. These screens typically cover a 15-minute interval. There are three Work with Historical Performance Data functions:

- Work with Historical System Status
- Work with Historical Active Jobs
- Work with Historical Disk Status

These functions are run from the PM/400 Menu (see Chapter 3, “The PM/400 Menu”).

Using the enhanced function keys and search capabilities of the Work with Historical Performance Data functions, you can quickly locate the following information:

- A period of high total CPU utilization
- A period of high system and interactive CPU utilization
- Jobs using high CPU or high I/O
- A particular user or group of users

How to Use the Functions

This section describes how to use the Work with Historical Performance Data functions of PM/400 to identify CPU, I/O, or memory intensive problems.

1. Menu option 1 (Work with Historical System Status) allows you to move through the performance monitor data quickly and identify the time interval during which the problem occurred.

Function keys F9 (Peak total CPU), F10 (Peak system and interactive CPU), and F11 (Peak total faults) can help you identify the problem time interval.

2. On the Work with Historical System Status display, you can check the faulting in each memory pool and the total system faulting.
3. By pressing F15 (Work with active jobs), you display the active jobs for the current performance data interval. You can try to identify the subsystems, user jobs, or system tasks that are contributing to the problem.
4. The Enhanced Functions Keys allow you to find periods of high CPU utilization, high response time, or high disk activity.

Work with Historical System Status

This section describes the Work with Historical System Status function.

Enhanced Functions Keys

- F9** Peak total CPU
Shows the interval within the currently displayed performance data member in which the maximum total CPU utilization occurred.
- F10** Peak system and interactive CPU
Shows the interval within the currently displayed performance data member in which the maximum system and interactive CPU utilization occurred.
- F11** Peak total faults
Shows the interval within the currently displayed performance data member in which the maximum total page faults occurred.
- F15** Work with active jobs
Shows the Work with Historical Active Jobs for the currently displayed performance data interval.
- F16** Work with disk status
Shows the Work with Historical Disk Status for the currently displayed performance data interval.

From the Command Entry display, you can start the Work with Historical System Status function by typing the following at the command line and pressing the Enter key:

```
GO QMPGLIB/PM400
```

The PM/400 Menu display appears.

```
PM/400                      PM/400 Menu                      System: PRODCPU
Select one of the following:
    1. Work with Historical System Status
    2. Work with Historical Active Jobs
    3. Work with Historical Disk Status
    4. Work with Contact/Enrollment Information
    5. Work with Automatically Scheduled Jobs
    6. Work with PM/400 Customization
    7. Work with Top Ten Omissions
    8. Work with Remote AS/400's

Selection or command
====> 1

F3=Exit  F4=Prompt  F9=Retrieve  F12=Cancel
F13=User support  F16=System main menu
```

Type a 1 on the command line and press the Enter key. The PM/400 System Status (DSPPMSYSS) display appears.

```

PM/400 System Status (DSPMSYSS)

Type choices, press Enter.

Member . . . . . *LAST           Name, *LAST, *SELECT
Library . . . . . *MPGDFT        Name, *MPGDFT

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

```

This display allows the input of library and member names. The default library and member names are QMPGDATA and *LAST, respectively. The default values retrieve the member with the most recent data.

If a desired member name is known, enter that member name in the field. However, the *SELECT option is a much easier way to select a member name.

When the *SELECT option is used, the Select Performance Data Member display appears.

```

Select Performance Data Member

Library . . . . . QMPGDATA

Type option, press Enter.
1=Select

Option  Member      Description      Date
      Q930430000    2/22/93 MONDAY
      Q930420000    2/21/93 SUNDAY
      Q930410000    2/20/93 SATURDAY
1     Q930400000    2/19/93 FRIDAY
      Q930390000    2/18/93 THURSDAY
      Q930380000    2/17/93 WEDNESDAY
      Q930370000    2/16/93 TUESDAY
      Q930360000    2/15/93 MONDAY
      Q930350000    2/14/93 SUNDAY
      Q930340000    2/13/93 SATURDAY

F3=Exit  F12=Cancel

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```

All the members from the QMPGDATA library are listed. Type a 1 next to the member for which you want information and press the Enter key. The Work with Historical System Status display for the selected member appears.

Work with Historical System Status										PRODCPU
Interval. . . 31										2/19/93
Library...: QMPGDATA										FRIDAY
Member...: Q930400000										
End date. .	2/19/93	CPU util..:	73.4	Sys & Int.:	38.6	Act job...:	197			
End time. .	15:33:28	Trans.....:	370	Prg *YES..:	411	% Dyn *NO.:	96.4			
Elapsed...:	14:57:24	Aux stg...:	5143	% used....:	77.5	Tot faults:	6.7			
Pool ID	Size (KB)	Resrvd (KB)	Act Lvl	--DB(/sec)-	-NDB(/sec)-	Transitions/min			Total	
01	8500	4306		.0	.0	.0	.5	20.1	.0	.0
02	6960		7	.1	.2	.3	1.4	5.0	.0	.0
03	1500		7	.0	.1	.4	1.4	18.8	.0	.0
04	18000		7	.7	5.9	2.4	12.2	51.0	.0	.0
05	3000		7	.9	5.7	1.8	6.3	.1	.0	.0
06	3000		4	.1	.6	.0	.1	12.3	.0	.0
Bottom										
F3=Exit										F4=Work with members
F7=Display previous										F8=Display next
F9=Peak total CPU										F10=Peak system and interactive CPU
F24=More keys										
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Using this display, the user can move backward or forward by 15-minute intervals and look at Active Jobs or Disk Status during each interval.

Note: Rough guidelines for faulting are:

- Keep the machine pool less than 1
- Keep the total less than 40
- Keep each pool less than 20

Refer to the *Work Management* manual for details.

The PM/400 System Status (DSPPMSYSS) display contains the same information as the IBM Work with System Status display, with a couple additions. First, the data displayed covers the last 15-minute period recorded in the member. Second, the heading information displays the interval number in this member and the ending date and time of the currently displayed interval.

The CPU utilization is broken into two categories, total and System plus Interactive (*Sys & Int.*). It is nice to know the total, but the real measure of a problem is the CPU used by the critical workload.

The field definitions are the same as on the IBM Work with System Status display, with some additions. First, the far right column shows the total of the data base (*DB*) and the non-data base (*NDB*) faults for each pool. Also, the total non-machine pool faults are shown. These fields make it easy to determine if faulting was a problem during this particular interval.

Field	Description
CPU util	Average CPU utilization during specified interval.
Sys & Int	Average system and interactive CPU utilization ¹ .
Act job	Number of active jobs in the interval. (These jobs did not necessarily do any work.)
Trans	The total number of interactive transactions.
Prg *YES	Purge *YES transactions and time slice end events for all other job types.
% Dyn *NO	The percentage of PURGE(*YES) transactions and time slice end events that were run PURGE(*NO). Refer to the <i>Work Management</i> manual for details.
Aux Stg	The total amount of auxiliary storage on the system in MB.
% used	The total amount of auxiliary storage (as a percent) used by system and user objects including the operating system, user programs, data base files, temporary objects, and so on.
Tot Faults	The rate of faults per second of all pages except machine pool pages.

¹ Refer to "CPU Utilization Graphs" on page 10-21 and page 11-2 for more information on system and high priority CPU utilization. Refer to the *Work Management* manual for details on the meaning and use of this information.

Work with Historical Active Jobs

This section describes the Work with Historical Active Jobs function.

Enhanced Functions Keys

- F9** Peak total CPU
Shows the interval within the currently displayed performance data member in which the maximum total CPU utilization occurred.
- F10** Peak system and interactive CPU
Shows the interval within the currently displayed performance data member in which the maximum system and interactive CPU utilization occurred.
- F13** High priority CPU
Shows jobs which have a run priority less than or equal to the high priority limit as defined in the PM400 custom options.
- F14** Tasks
Includes OS/400 tasks with displayed historical active jobs.
- F16** Resequence
Shows historical active jobs sorted by the job detail column in which the cursor is positioned.
- F21** Nondisplay instructions/keys
Shows information without key and option descriptions and without performance interval totals.

From the Command Entry display, you can start the Work with Historical Active Jobs command by typing the following at the command line and pressing the Enter key:

```
GO QMPGLIB/PM400
```

The PM/400 Menu display appears.

```
PM/400                               PM/400 Menu                               System: PRODCPU
Select one of the following:
1. Work with Historical System Status
2. Work with Historical Active Jobs
3. Work with Historical Disk Status
4. Work with Contact/Enrollment Information
5. Work with Automatically Scheduled Jobs
6. Work with PM/400 Customization
7. Work with Top Ten Omissions
8. Work with Remote AS/400's

Selection or command
===> 2

F3=Exit  F4=Prompt  F9=Retrieve  F12=Cancel
F13=User support  F16=System main menu
```

Type a 2 on the command line and press the Enter key. The PM/400 Active Jobs (DSPPMACTJ) display appears.

```
PM/400 Active Jobs (DSPPMACTJ)

Type choices, press Enter.

Member . . . . . *LAST      Name, *LAST, *SELECT
Library . . . . . *MPGDFT    Name, *MPGDFT
Subsystem . . . . . *ALL      Name, *ALL
List tasks . . . . . *NO      Character value, *YES, *NO

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

This display allows the input of library and member names. The default library and member names are QMPGDATA and *LAST, respectively. The default values retrieve the member with the most recent data. Optionally, system tasks or jobs in a particular subsystem can be listed. Enter *YES in the *List Tasks* field to display Vertical Licensed Internal Code tasks as well as jobs. Enter a subsystem name (for example, QINTER) in the *Subsystem* field to limit the list of jobs to that subsystem.

You can enter *SELECT in the *Member* field to select from the available performance members.

When the *SELECT option is used, the Select Performance Data Member display appears. All the members from QMPGDATA library are listed with the date and day.

```

Select Performance Data Member

Library . . . . QMPGtATA

Type option, press Enter.
1=Select

Option Member      Description                      Date
-----
          Q930430000 2/22/93 MONDAY
          Q930420000 2/21/93 SUNDAY
          Q930410000 2/20/93 SATURDAY
1        Q930400000 2/19/93 FRIDAY
          Q930390000 2/18/93 THURSDAY
          Q930380000 2/17/93 WEDNESDAY
          Q930370000 2/16/93 TUESDAY
          Q930360000 2/15/93 MONDAY
          Q930350000 2/14/93 SUNDAY
          Q930340000 2/13/93 SATURDAY

F3=Exit  F12=Cancel

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```

All the members from the QMPGDATA library are listed. Type a 1 next to the member for which you want information and press the Enter key. The Work with Historical Active Jobs display for the selected member appears.

```

Work with Historical Active Jobs                                PRODCPU
                                                                2/19/93
Interval. . .      16 Library...: PMDEMO      Member...: Q930400000 FRIDAY

End date. . 2/19/93 CPU util...: 100.0 Sys & Int.: 58.1 Act job...: 226
End time. . 11:55:35 Trans.....: 360 Prg *YES...: 398 % Dyn *NO.: 96.2
Elapsed...: 14:57:07 Aux stg...: 5143 % used....: 77.5

Type options, press Enter.
5=Display detail

SBS/Job  User      Typ P1 Py CPU% Int  Resp  SynIO  AsyIO  Lg1IO  PAGf  Elaps
-----
5 QPFRADJ  QSYS      SYS 2 0  .0          0  0  0  0  14:57
  QPFRMON  QPGMR     BAT 2 0  .3          145 339 1511 0 14:57
  QPGMR    QSYS     SBS 2 0  .0          0  0  0  0 14:57
  QROUTER  QSNADS    BAT 2 40 .0          0  0  0  0 14:57
  QSNADS   QSYS     SBS 2 0  .0          0  0  0  0 14:57
  QSPL     QSYS     SBS 2 0  .0          0  0  0  0 14:57
  QSPLMAINT QSYS     SYS 2 20 .0          630 2  0 10 14:57
  QSYSARB  QSYS     SYS 2 0  .0          16 15  0  0 14:57
More...

F10=Peak system and interactive CPU      F12=Cancel      F13=High priority CPU
F14=Tasks      F15=Work with system status      F16=Resequence      F24=More keys

```

The *SBS/Job* and *User* headings are input capable so that you can quickly locate a particular job or user. For example, if you needed to review all users with an ID of TELExxxx, you would type *tele* over the prompt *User* and press the Enter key. All user IDs of TELExxxx would be displayed first.

To identify the job using the most CPU, place the cursor on the heading *CPU%* and press the F16 (Resequence) key.

The fields are similar to those on the IBM Work with Active Jobs display. The active jobs fields *Function* and *Status* are not shown. Additional fields include *AsyIO* (Asynchronous I/Os), *CmlO* (Communication I/Os), and *PAGf* (PAG Faults).

The *CPU%* field reflects the CPU utilization by a job during the elapsed time for the job (*Elaps*), not necessarily the elapsed time of the interval.

The *Sys & Int* (System and Interactive CPU utilization) field is more accurate on this display than on the Work with Historical System Status or Display Historical Disk Status displays. This value represents the CPU utilization by all jobs and tasks with a priority less than or equal to 20. In particular, high-priority batch jobs are included.

By typing a 5 next to a job name and pressing the Enter key, you can display detail information about the specific job. The following three displays show some of the information you can view this way.

```

Work with Historical Active Jobs

Library: QMPGDATA      Member:  Q930400000
Interval#: 13 Elapsed seconds: 897 End: 930407031528
Job: 240630 / QPGMR / QPFRMON SBS: QMPGLIB / Q1PGSCH
Transitions 13 Transactions Times: CPU MS: 6096
A->W: 13 Transaction:
W->I: Most recent transaction Suspended..:
A->I: Start: Reroute....:
End..:

Exception: EAO: 1633 Bin: Dec: FIP:

Logical I/O: DB reads DB writes DB Updates Comm reads Comm writes
              1511 26
Physical I/O: DB reads DB writes NonDB reads NonDB writes Waits for
Sync.: 130 4 11 async I/O
Async: 338 1 16
PAG I/O: Brings Purges Faults Aux I/O flt Perm writes Checksum I/O
              9 130

Print: Lines: Pages: Files: More...

F3=Exit F12=Previous screen

```

```

Work with Historical Active Jobs

Library: QMPGDATA      Member:  Q930400000
Interval#: 13 Elapsed seconds: 897 End: 930407031528
Job: 240630 / QPGMR / QPFRMON SBS: QMPGLIB / Q1PGSCH

Attributes: Type . . . . . B Pool . . . . . 02
             Subtype . . . . Priority . . . . 000
             S36 . . . . . N Time slice . . . 4999
             Routing entry . . 9999

Flags: Pass-thru source Pass-thru target
        Emulation active PC support . . .
        Target DDM . . . MRT . . . . .

Configuration: Line/controller
                Secondary line
                Workstation port 1 WS address 1
                IOP bus number 1 IOP bus ad 1
                IOA number . . . 1

F3=Exit F12=Previous screen More...

```

Work with Historical Active Jobs

Library: QMPGDATA Member: Q930400000
Interval#: 13 Elapsed seconds: 897 End: 930407031528
Job: 240630 / QPGMR / QPFRMON SBS: QMPGLIB / Q1PGSCH

Application queuing time	Queuing transaction nbr
Resource usage time. . .	Resource usage number. .
MRT queuing time	Time spent at MRTMAX . .
Number of MRT entries. .	
Number of calls to ACPUT	Amount of data sent. . .
Number of calls to ACGET	Amount of data received
Time spent at PUT start	Time spent at GET start
Intervals at first PUT .	
REQIO transmit number. .	REQIO receive number . .

Bottom

F3=Exit F12=Previous screen

For a description of these fields, refer to the appendix in the *Work Management* manual that describes the fields in the QAPMJOBS performance file.

Work with Historical Disk Status

This section describes the Work with Historical Disk Status function.

Enhanced Functions Keys

F9 Peak total CPU

Shows the interval within the currently displayed performance data member in which the maximum total CPU utilization occurred.

F10 Peak system and interactive CPU

Shows the interval within the currently displayed performance data member in which the maximum system and interactive CPU utilization occurred.

F11 Display storage use

Shows the storage protection status and unit service, wait, and response information for the selected performance data interval by unit and ASP.

F21 Nondisplay instructions/keys

Shows information without key and option descriptions and without performance interval totals.

From the Command Entry display, you can start the Work with Historical Disk Status command by typing the following at the command line and pressing the Enter key:

```
GO QMPGLIB/PM400
```

The PM/400 Menu display appears.

```
PM/400                               PM/400 Menu                               System: PRODCPU
Select one of the following:

    1. Work with Historical System Status
    2. Work with Historical Active Jobs
    3. Work with Historical Disk Status
    4. Work with Contact/Enrollment Information
    5. Work with Automatically Scheduled Jobs
    6. Work with PM/400 Customization
    7. Work with Top Ten Omissions
    8. Work with Remote AS/400's

Selection or command
===> 3

F3=Exit  F4=Prompt  F9=Retrieve  F12=Cancel
F13=User support  F16=System main menu
```

Type a 3 on the command line and press the Enter key. The PM/400 Disk Status (DSPPMDSKS) display appears.

```

PM/400 Disk Status (DSPPMDSKS)

Type choices, press Enter.

Member . . . . . *LAST      Name, *LAST, *SELECT
Library . . . . . *MPGDFT   Name, *MPGDFT

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

```

This display allows the input of library and member names. The default library and member names are QMPGDATA and *LAST, respectively. The default values retrieve the member with the most recent data. If a desired member name is known, enter that member name in the field. However, the *SELECT option is a much easier way to select a member name.

When the *SELECT option is used, the Select Performance Data Member display appears.

```

Select Performance Data Member

Library . . . . . QMPGDATA

Type option, press Enter.
1=Select

Option Member      Description      Date
Q930430000      2/22/93 MONDAY
Q930420000      2/21/93 SUNDAY
Q930410000      2/20/93 SATURDAY
1 Q930400000      2/19/93 FRIDAY
Q930390000      2/18/93 THURSDAY
Q930380000      2/17/93 WEDNESDAY
Q930370000      2/16/93 TUESDAY
Q930360000      2/15/93 MONDAY
Q930350000      2/14/93 SUNDAY
Q930340000      2/13/93 SATURDAY

F3=Exit
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```

All the members from the QMPGDATA library are listed. Type a 1 next to the member for which you want information, and press the Enter key. The Work with Historical Disk Status display appears.

```

Work with Historical Disk Status
Interval# . . . 43 Library.... QMPGDATA Member.... Q930400000 PROD CPU
2/19/93
FRIDAY
End date. . . 2/19/93 CPU util... 62.3 Sys & Int.: 19.8 Act job...: 141
End time. . . 10:45:06 Trans.....: 182 Prg *YES...: 151 % Dyn *NO.: 100.0
Elapsed...: 00:14:58 Disk util..: 2.5 Max util...: 11.2 Max arm...: 25
Aux stg...: 62359 % used.....: 39.8

Unit Type ASP Size % I/O Size Reads Writes Avg Size(K) %
(MB) Used /sec (K) /sec /sec Read Write Busy
1 2800 1 320 100.0 .1 1.1 .0 .1 1.5 1.1 .2
1 2800 1 320 100.0 .2 1.2 .1 .1 1.1 1.2 .6
2 2800 1 320 84.4 .8 .6 .1 .7 .7 .6 1.3
2 2800 1 320 84.4 .8 .6 .0 .8 1.0 .6 1.5
3 9336 2 857 23.8 4.5 .7 .0 4.5 .0 .7 5.7
3 9336 2 857 23.8 4.5 .7 .0 4.4 3.8 .7 5.7
4 9336 2 857 23.8 4.5 .7 .0 4.5 .0 .7 4.4
4 9336 2 857 23.8 4.5 .7 .0 4.5 .0 .7 4.8
More...

F3=Exit F4=Work with Members F7=Display previous F8=Display next
F9=Peak total CPU F10=Peak system and interactive CPU F24=More keys
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```

Press the F11 key (Display storage usage) to show the storage protection status and unit service, wait, and response information for the selected performance data interval by unit and ASP.

```

Work with Historical Disk Status
Interval# . . . 43 Library.... QMPGDATA Member.... Q930400000 PROD CPU
2/19/93
FRIDAY
End date. . . 2/19/93 CPU util... 62.3 Sys & Int.: 19.8 Act job...: 141
End time. . . 10:45:06 Trans.....: 182 Prg *YES...: 151 % Dyn *NO.: 100.0
Elapsed...: 00:14:58 Disk util..: 2.5 Max util...: 11.2 Max arm...: 25
Aux stg...: 62359 % used.....: 39.8

--Protection-- --Protected-- -Unprotected- Service Wait Response
Unit ASP Type Status Size % Used Size % Used Time Time Time
1 1 MRR ACTIVE 320 .0 0 .0 15.3 .0 15.3
1 1 MRR ACTIVE 320 .0 0 .0 34.3 .0 34.3
2 1 MRR ACTIVE 320 84.4 0 .0 16.6 .0 16.6
2 1 MRR ACTIVE 320 84.4 0 .0 18.1 1.4 19.5
3 2 MRR ACTIVE 857 23.8 0 .0 12.9 .8 13.7
3 2 MRR ACTIVE 857 23.8 0 .0 12.9 .1 13.0
4 2 MRR ACTIVE 857 23.8 0 .0 9.7 .1 9.8
4 2 MRR ACTIVE 857 23.8 0 .0 10.8 .0 10.8
5 1 MRR ACTIVE 857 48.0 0 .0 9.3 .0 9.3
More...

F3=Exit F4=Work with Members F7=Display previous F8=Display next
F9=Peak total CPU F10=Peak system and interactive CPU F24=More keys

```

The Work with Historical Disk Status display is similar to the IBM Work with Disk Status display.

Additional fields contained in the upper portion of the display are *Disk util* (Average disk utilization), *Max util* (Maximum utilization for any arm), and *Max arm* (Disk arm that experienced the maximum utilization).

Chapter 5. Work with Contact/Enrollment Information

During the configuration of the PM/400 software, you were asked to identify the contact person and provide mailing information for your organization. The Work with Contact/Enrollment Information function has been provided in the event it becomes necessary to change that information or to specify third-party billing.

Note: It is essential that this information is current. The PM/400 reports and graphs are mailed to this address.

From the Command Entry display, you can start the Work with Contact/Enrollment Information function by typing the following at the command line:

```
GO QMPGLIB/PM400
```

then press the Enter key.

Command Entry PRODCPU
Request level: 1

Previous commands and messages:

Bottom

Type command, press Enter.
==> GO QMPGLIB/PM400

F3=Exit F4=Prompt F9=Retrieve F10=Include detailed messages
F11=Display full F12=Cancel F13=User support F16=System main menu

The PM/400 Menu display appears.

```

PM/400                                PM/400 Menu                                System: PRODCPU

Select one of the following:

    1. Work with Historical System Status
    2. Work with Historical Active Jobs
    3. Work with Historical Disk Status
    4. Work with Contact/Enrollment Information
    5. Work with Automatically Scheduled Jobs
    6. Work with PM/400 Customization
    7. Work with Top Ten Omissions
    8. Work with Remote AS/400's

Selection or command
====> 4

F3=Exit  F4=Prompt  F9=Retrieve  F12=Cancel
F13=User support  F16=System main menu

```

Type a 4 on the command line and press the Enter key. The Work with Contact Information display appears.

```

                                Work with Contact Information                                System: PRODCPU

Type changes, press Enter.

Company name . . . . . The Quill Group, Inc.
Operations Contact. . . . . John Tuttle
Telephone numbers:
  Primary . . . . . 13035551220
  Alternative . . . . . 13035559159
Mailing address for Reports:
  Name. . . . . John Tuttle
  Address . . . . . 1180 Mnt Pines Rd

City/State . . . . . Boulder, CO
Country . . . . . USA
Zip code . . . . . 80302

Graph Fee Option. . . . . 1 (1=Monthly, 2=Annual, 4=Quarterly)
                                (Annual customers may call 1-800-IBM-IBMO
                                for On Request reports.)

F3=Exit  F11=Third Party Billing  F12=Cancel
(c) Copyright Midrange Performance Group, Inc. 1992
                                Bottom

```

This display requests the contact person's name, telephone number(s), and mailing address. This information is required if reports are to be sent by IBM. The highlighted fields indicate mandatory input.

If there is a third party responsible for billing, press F11 (Third Party Billing). The Work with Third Party Billing display appears.

Work with Third Party Billing

System: PRODCPU

Note: Do not enter this information unless you are billing to a third party.

Type changes, press Enter.

Company name

Contact

Telephone numbers:

Primary

Alternative

Billing address:

Name

Address

City/State

Country

Zip code

Bottom

F3=Exit F12=Cancel

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This display requests third-party billing information. Do not enter billing information unless you are billing to a third party. The highlighted fields indicate mandatory input.

Chapter 6. Work with Automatically Scheduled Jobs

The PM/400 software includes a scheduler which automates the starting of jobs necessary to support the PM/400 software functions.

As part of the PM/400 software installation process, the scheduler subsystem and a job called **Q1PSCH** are started. The following commands are then started according to the schedule described in the *Function* field of the table below.

Job/Command	Schedule	Function
Q1PTEST/SNDMSG	At install	Verifies installation
Q1PCM1/MPGCM	Weekly	Transmits the reduced performance data to IBM
Q1PCM2/CALL	Daily	Varies communications offline
Q1PPMSUB/STRPFRMON	Hourly	Collects performance data
Q1PDR/MPGDR	Daily	Performs data reduction and purges AS/400 performance data
Q1PPG/CALL	Monthly	Purges reduced performance data
Q1PCM4/CALL	As needed	Accesses the PM/400 data from remote AS/400 systems

The scheduler automatically starts the required jobs at predetermined dates and times. The dates and times may be changed according to site requirements.

From the Command Entry display, you can start the Work with Automatically Scheduled Jobs function by typing the following at the command line and pressing the Enter key:

```
GO QMPGLIB/PM400
```

Command Entry PRODCPU
Request level: 1

Previous commands and messages:

Bottom

Type command, press Enter.
==> GO QMPGLIB/PM400

F3=Exit F4=Prompt F9=Retrieve F10=Include detailed messages
F11=Display full F12=Cancel F13=User support F16=System main menu

The PM/400 Menu display appears.

```

PM/400                               PM/400 Menu                               System: PRODCPU
Select one of the following:
    1. Work with Historical System Status
    2. Work with Historical Active Jobs
    3. Work with Historical Disk Status
    4. Work with Contact/Enrollment Information
    5. Work with Automatically Scheduled Jobs
    6. Work with PM/400 Customization
    7. Work with Top Ten Omissions
    8. Work with Remote AS/400's

Selection or command
===> 5

F3=Exit  F4=Prompt  F9=Retrieve  F12=Cancel
F13=User support  F16=System main menu

```

Type a 5 on the command line and press the Enter key. The Work with Auto Scheduled Jobs display appears.

```

                                Work with Auto Scheduled Jobs
Type options, press Enter.
2=Change

Opt  Name           Status  Next Run Date  Next Run Time  Runs to date
    Q1PTEST         I       3/03/92       23:25         1
    Q1PPMSUB        A       2/02/93       22:00         1
    Q1PDR           A       2/03/93       0:00          1
    Q1PCM2          A       2/03/93       6:00          1
    Q1PPG           A       3/01/93       0:00          1
    2  Q1PCM1        A       12/31/99      23:25         0
    Q1PCM4          I       99:99         0

```

F3=Exit F12=Cancel
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The Work with Auto Scheduled Jobs display lists the job name, status (A = active or I = inactive), next run date and time, and runs to date.

Press F5 to refresh the screen with current job information.

Note: If the PM/400 software scheduler subsystem is ever ended after the installation of the PM/400 software, it can be started again by issuing the following command:

```
STRSBS QMPGLIB/Q1PGSCH
```

Type a 2 next to the job that you want to change and press the Enter key. The Change Auto Scheduled Jobs display appears, giving detailed information for

that job. This display allows changes to be made to the next run date and run time, if required.

```

Change Auto Scheduled Jobs

Type information, press Enter.

Job name . . . . . : Q1PCM1
Text . . . . . : MPG Once a Week Data Download
Next run date . . . . . 5/10/94
Next run time . . . . . 2:27

Library/Program run before . . . . . /
Library/Program run after . . . . . /

Bottom

F3=Exit F12=Cancel

```

The Change Auto Scheduled Jobs display contains the following fields.

Field	Description
Job name	Name of the job to be submitted
Text	This field describes the function of this job
Next run date	The next scheduled date for automatic submission
Next run time	The next scheduled time for automatic submission
Library/Program run before	The Library and Program names to be run before this PM/400 function
Library/Program run after	The Library and Program names to be run after this PM/400 function

Jobs are submitted using the Submit Job command and run under the same user profile as the scheduler, by default QPGMR.

Note: The *Library/Program run before* function is particularly useful for insuring that the communication line is in a Varied Off state prior to the Q1PCM1 being run. The *Library/Program run after* function re-establishes your normal communication environment.

Chapter 7. Work with PM/400 Customization

The Work with PM/400 Customization function provides the user with the ability to establish global parameters for the operation of the PM/400 software. Customization includes setting the priority limit, trend and shift schedules, performance data library, and purge specifications.

From the Command Entry display, you can start the Work with PM/400 Customization function by typing the following at the command line and pressing the Enter key:

```
GO QMPGLIB/PM400
```

Command Entry	PRODCPU		
Previous commands and messages:			
Type command, press Enter.			
===> GO QMPGLIB/PM400			
Bottom			
F3=Exit	F4=Prompt	F9=Retrieve	F10=Include detailed messages
F11=Display full	F12=Cancel	F13=User support	F16=System main menu

The PM/400 Menu display appears.

PM/400	PM/400 Menu	System: PRODCPU	
Select one of the following:			
1. Work with Historical System Status			
2. Work with Historical Active Jobs			
3. Work with Historical Disk Status			
4. Work with Contact/Enrollment Information			
5. Work with Automatically Scheduled Jobs			
6. Work with PM/400 Customization			
7. Work with Top Ten Omissions			
8. Work with Remote AS/400's			
Selection or command			
===> 6			
F3=Exit	F4=Prompt	F9=Retrieve	F12=Cancel
F13=User support	F16=System main menu		

Type a 6 on the command line and press the Enter key. The Work with PM/400 Customization display appears.

```

Work with PM/400 Customization
Type changes, press Enter.                               System:  MPG
High priority limit . . . . . 20
Trending days . . . . .           S M T W T F S
                                Y Y Y Y Y
First shift . . . . . 12:34 - 17:00
Second shift . . . . . 18:00 - 20:00
Graphs/Reports for second shift . . . N (Y/N)
Performance data library . . . . . QMPGDATA
Performance data purge days . . . . . 4

F3=Exit  F12=Cancel
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```

This display allows the user to set global PM/400 software operating parameters.

Parameter	Function
High priority limit	This parameter sets the limit for high priority jobs. The default is set to 20. This value tells the PM/400 software which workload (by priority) should be considered high priority. For example, if your telephone order users are running at a priority of 20 and the order processing program is running at a slightly lower priority of 22, you would want to set the high priority limit to 22. With the high priority limit set at 22, the order processing program is included in the trending of high priority workloads.
Trending days	This parameter sets the days of the week on which a trend will be calculated for the performance data. Trending days are typically Monday through Friday.
First/second shift	This parameter defines the first and second shift times, for example, 8:00 a.m. to 5:30 p.m. and 5:30 p.m. to 8:00 a.m. It is advisable on graphs where there are sharp changes in CPU utilization at the ends of the graph to adjust the shift definitions accordingly.
Graphs/Reports for second shift	This parameter selects whether or not reports and graphs are produced for the second shift.
Performance data library	This parameter specifies the library name for the AS/400 system performance data. The default is QMPGDATA.

Performance data purge days

This parameter specifies the number of days of performance data that are collected prior to automatic purging by the PM/400 software. The default (and recommendation) is 4 days. The performance data collected by the AS/400 system performance monitor (QPFRMON) requires 12 - 25 MB per day. Therefore, the default of 4 for performance data purge days means that approximately 60 - 120 MB of disk space is required. A value of 4 means there is data for four previous days plus the collection for the current day. If performance data purge days is set to 0, the disk space required is approximately 12 - 25 MB.

Chapter 8. Work with Top Ten Omissions

The PM/400 software application summary includes a Top 10 Analysis of batch jobs, users, and communication lines. Some jobs, users, or communication lines are inappropriate for such an analysis. For example, some jobs with longer than normal run times (for example, autostart jobs) should not be included in the run time category. This function is provided to omit these jobs, users, or communication lines from the categories of the Top 10 Analysis.

From the Command Entry display, you can start the Work with Top Ten Omissions function by typing the following at the command line and pressing the Enter key:

```
GO QMPGLIB/PM400
```

Command Entry PRODCPU
Request level: 1

Previous commands and messages:

Bottom

Type command, press Enter.
====> GO QMPGLIB/PM400

F3=Exit F4=Prompt F9=Retrieve F10=Include detailed messages
F11=Display full F12=Cancel F13=User support F16=System main menu

The PM/400 Menu display appears.

PM/400

PM/400 Menu

System: PRODCPU

Select one of the following:

1. Work with Historical System Status
2. Work with Historical Active Jobs
3. Work with Historical Disk Status
4. Work with Contact/Enrollment Information
5. Work with Automatically Scheduled Jobs
6. Work with PM/400 Customization
7. Work with Top Ten Omissions
8. Work with Remote AS/400's

Selection or command

==> 7

F3=Exit F4=Prompt F9=Retrieve F12=Cancel
F13=User support F16=System main menu

Type a 7 on the command line and press the Enter key. The Work with Top Ten Omissions display appears.

Omit Jobs from Top Ten

From the Work with Top Ten Omissions display, you can select the jobs, users, or communication lines to be omitted. To select the Omit Jobs function, type a 1 in the selection field.

Work with Top Ten Omissions

Select one of the following:

1. Enter jobs to be omitted from Top Ten
2. Enter users to be omitted from Top Ten
3. Enter communications lines to be omitted from Top Ten

Selection
1

F3=Exit F12=Cancel

The Omit Jobs from Top Ten display appears, listing the jobs and the categories on which the Top 10 Analysis is based.

Omit Jobs from Top Ten

Type job names and a Y in each category to omit, press the Enter key.

Job Name	Run Time	CPU Time	I/O/sec	Total I/Os	Pages Printed	Executions
Q1PPMSUB						Y
Q1PSCH	Y		Y			Y
QDIA	Y		Y			Y
QDIAHSTPRT	Y		Y			Y
QDIAINDUSR	Y		Y			Y
QDIALOCAL	Y		Y			Y
QDIANOTIFY	Y		Y			Y
QNFTP	Y		Y			Y
QPFRMON	Y		Y			Y
QROUTER	Y		Y			Y
QXFSEV	Y		Y			Y
QZDSTART	Y		Y			Y

+

F3=Exit F12=Cancel

To omit a job from a particular category, type a Y in the appropriate field.

Omit Users from Top Ten

From the Work with Top Ten Omissions display, you can select the jobs, users, or communication lines to be omitted. To select the Omit User function, type a 2 in the selection field and press the Enter key.

```
Work with Top Ten Omissions

Select one of the following:

1. Enter jobs to be omitted from Top Ten
2. Enter users to be omitted from Top Ten
3. Enter communications lines to be omitted from Top Ten

Selection
  2

F3=Exit  F12=Cancel
```

The Omit Users from Top Ten display appears, listing the users and the categories on which the Top 10 Analysis is based.

```
Omit Users from Top Ten

Type user profiles names and a Y in each category to
omit, press Enter

--- Enter a 'Y' to omit the user from the following categories ---
User Name  Avg Resp  Max Resp  CPU/tran  I/Os/Tran  Trans/Day  Pages Printed
BONZO1      Y          Y          Y          Y          Y          Y
JTUTTLE     Y          Y          Y          Y          Y          Y
AUNTIEM     Y          Y          Y          Y          Y          Y
TOMMYP      Y          Y          Y          Y          Y          Y
RUFUS       Y          Y          Y          Y          Y          Y
LENOARDBOX  Y          Y          Y          Y          Y          Y
BETTYBOOP   Y          Y          Y          Y          Y          Y
ZAPHOD      Y          Y          Y          Y          Y          Y
ARTDENT     Y          Y          Y          Y          Y          Y
BARBI       Y          Y          Y          Y          Y          Y
RHCF        Y          Y          Y          Y          Y          Y
JAMESB      Y          Y          Y          Y          Y          Y

F3=Exit  F12=Cancel
```

To omit a user from a particular category, type a Y in the appropriate field.

Omit Communication Lines from Top Ten

From the Work with Top Ten Omissions display, you can select the jobs, users, or communication lines to be omitted. To select the Omit Communication Lines function, type a 3 in the selection field and press the Enter key.

```
Work with Top Ten Omissions

Select one of the following:

1. Enter jobs to be omitted from Top Ten
2. Enter users to be omitted from Top Ten
3. Enter communications lines to be omitted from Top Ten

Selection
  3

F3=Exit  F12=Cancel
```

The Omit Communication Lines from Top Ten display appears, listing the names of the communication lines and the categories on which the Top Ten Analysis is based.

```
Omit Communication Lines from Top Ten

Type line description names and a Y in each category to omit, press Enter.

Line Name                                Y=Omit
QESLINE                                  Y
CHICAGO                                  Y
REMOTE                                   Y
NEWYORK                                  Y
LOSANGELES                               Y
BOULDER                                  Y

F3=Exit  F12=Cancel
```

To omit a communications line enter the line name and type a Y in the appropriate field.

Chapter 9. Work with Remote AS/400 Systems

In some sites, a primary AS/400 system in a network of AS/400 systems sends the required performance data (using an electronic customer support modem) to IBM for processing. The other AS/400 systems in the network may send their performance data to the primary AS/400 system for transmission to IBM. This function allows the user to identify those other AS/400 systems and schedule their transmission of data.

It is recommended that the transmission of data to the primary AS/400 system be evenly scheduled throughout the week to minimize performance impacts on the primary AS/400 system. For example, in a network of twelve AS/400 systems, each of three groups of four systems could be scheduled to send their data on Monday, Wednesday, and Friday, respectively. Thus, the amount of data sent to the primary AS/400 system would be evenly distributed.

The PM/400 software makes the following assumptions about the network:

- The Advanced Peer-to-Peer Networking* (APPN*) link is defined between the AS/400 system receiving data and the AS/400 system sending data.
- The control units were created with APPN=*YES specified.
- The system value QUATOCFG is set to 1 to automatically create controllers and devices.

If your network does not meet these assumptions, refer to "Non-APPN Network Considerations" on page 9-4.

From the Command Entry display, you can start the Work with Remote AS/400 system function by typing the following at the command line and pressing the Enter key:

```
GO QMPGLIB/PM400
```

Command Entry PRODCPU
Request level: 1

Previous commands and messages:

Bottom

Type command, press Enter.
==> GO QMPGLIB/PM400

F3=Exit F4=Prompt F9=Retrieve F10=Include detailed messages
F11=Display full F12=Cancel F13=User support F16=System main menu

The PM/400 Menu display appears.

```
PM/400                      PM/400 Menu                      System: PRODCPU
Select one of the following:
    1. Work with Historical System Status
    2. Work with Historical Active Jobs
    3. Work with Historical Disk Status
    4. Work with Contact/Enrollment Information
    5. Work with Automatically Scheduled Jobs
    6. Work with PM/400 Customization
    7. Work with Top Ten Omissions
    8. Work with Remote AS/400's

Selection or command
===> 8

F3=Exit  F4=Prompt  F9=Retrieve  F12=Cancel
F13=User support  F16=System main menu
```

Type an 8 on the command line and press the Enter key. The Work with Remote AS/400s display appears.

```

Work with Remote AS/400s

Type options, press Enter.
  2=Change

Option  RemotLoc  Status  Description                               Next Download
        BOULDER   A       Boulder, Colorado Site                    Date       Time
        BOULDER1  A       North Boulder, Colorado Site              5/05/93    0:00

F3=Exit  F5=Refresh  F6=Create  F12=Cancel

```

Initially, there is not a remote AS/400 system displayed. Press F6 (Create) to create a new remote location. For each remote site, you need to know the following:

- Local network ID
- Default local location

You can use the Display (DSPNETA) command to display these values from the remote system.

The Work with Remote AS/400s display shows a list of remote AS/400 systems, including their status (active or inactive) and their descriptions. Use the following displays to create or change the description for a remote site AS/400 system.

```

PM/400 Remote Site Maintenance

Type information, press Enter.

Remote location name . . . . . BOULDER
Remote net ID . . . . . *NETATR
Description . . . . . Boulder, CO site

Next download date/time . . . . . 5/05/93 0:00
Interval Months/Days . . . . . / 7

Bottom

F3=Exit  F5=Refresh  F12=Cancel
Verify the data and press Enter if correct or F5 to Refresh

```

```

Change Remote Site AS/400

Type information, press Enter.

Remote location name . . . BOULDER   Status . . A Serial number. . .
Remote net ID. . . . . *NETATR       Model . . . . .
Description . . . . . Boulder, CO site
Next download date/time . . . . . 5/05/93 0:00
Interval Months/Days . . . . . / 7

Data transfers to date . . . . . :
Last transfer attempt..:           :00:00 by job:
Last transfer completed:           :00:00 Records..:    0 Seconds...:    0

Last transfer to host . . . . . :
Rejects by host...:    0 Major/Minor code...:    Transfer date:
Last changed by . . . . . : ETHIEL      on: 2/09/93 at: 17:08:09

F3=Exit  F12=Cancel  F16=Delete

Bottom

```

Non-APPN Network Considerations

The primary AS/400 system receives PM/400 data from other AS/400 systems and then sends the PM/400 data to IBM.

The remote AS/400 system sends PM/400 data to the primary AS/400 system.

The following assumes that the controllers that are referenced have previously been defined.

You need to create advanced program-to-program communications (APPC) device pairs to support the connection to each remote AS/400 system. Use the Create Device Description (CRTDEVAPPC) command.

On the remote AS/400 system, type CRTDEVAPPC and press F4 to prompt for the following:

- DEV(D(Q1PLOC)** Specifies the name of the device description.
- RMTLOCNAME(Q1PLOC)**
Specifies the name of the remote location.
- ONLINE(*YES)** Specifies whether this device is varied online at initial program load (IPL).
- LCLLOCNAME(Q1PRMxxx)**
Specifies the location name.
'Q1PRMxxx' matches the RMTLOCNAME of the primary AS/400 system. 'xxx' is unique for each remote location.
- CTL(yyyyyy)** Specifies the name of the attached controller.
'yyyyyy' is a controller that attaches to the primary AS/400 system.
- MODE(Q1PMOD)** Specifies the mode name.
- APPN(*NO)** Specifies if APPN-capable.

On the primary AS/400 system, type CRTDEVAPP and press F4 to prompt for the following:

DEV(D(Q1PRMxxx) Specifies the name of the device description.
'Q1PRMxxx' is the device description name.

RMTLOCNAME(Q1PRMxxx)
Specifies the name of the remote location.
'Q1PRMxxx' matches the LCLLOCNAME of the remote AS/400 system.
'xxx' is unique for each remote location.

ONLINE(*YES) Specifies whether this device is varied online at IPL.

LCLLOCNAME(Q1PLOC)
Specifies the location name.
'Q1PLOC' matches the RMTLOCNAME of the primary AS/400 system.

CTL(aaaaaa) Specifies the name of the attached controller.
'aaaaaa' is a controller that attaches to the remote AS/400 system.

MODE(Q1PMOD) Specifies the mode name.

APPN(*NO) Specifies if APPN-capable.

Once the APPC devices are defined, you need to vary on the devices using the Vary Configuration (VRYCFG) command.

On the remote AS/400 system, type VRYCFG and press F4 to prompt for the following:

CFGOBJ(Q1PLOC) Specifies the configuration object.

CFGTYPE(*DEV) Specifies the type.

STATUS(*ON) Specifies the status.

On the primary AS/400 system, type VRYCFG and press F4 to prompt for the following:

CFGOBJ(Q1PRMxxx)
Specifies the configuration object.
'Q1PRMxxx' is the device description name.

CFGTYPE(*DEV) Specifies the type.

STATUS(*ON) Specifies the status.

Chapter 10. PM/400 Reports and Graphs

The output of the PM/400 service is a set of management reports and graphs on a monthly, quarterly, annual, or request basis. The output of the PM/400-Subset Service Exclusive is a set of management reports and graphs on a semi-annual or request basis. The purpose of the reports and graphs is to give management a clear understanding of the current performance of their AS/400 system and an accurate growth trend. The following pages describe each report and graph in detail and present some of their benefits and uses.

24-Hour Review

The PM/400 graphs have been changed to show a 24-hour window on the four Time graphs. This does not change the trending or utilization information for your first shift or second shift reports. The 24-hour review is for your convenience.

With the 24-hour review, you can do the following:

- Understand the off-shift resource utilizations
- Determine if overnight operations are starting to run into first-shift operations
- Determine if the off-shift operations are resource constrained

12-Month Review

The quarterly or semi-annual (PM/400 - Subset) graphs are enhanced to always provide a 12-month review rather than a 3-month review. This should allow you to better visualize your growth and anticipate any seasonal peaks.

Management Summary Report

This report is included with the PM/400 Service and with PM/400 - Subset.

The Management Summary report (Figure 10-1 on page 10-2) is designed to give a clear and accurate picture of the data center's current performance and projected future performance. Current performance is expressed in averages and maximums for the specified time period (one month). Future performance is shown by using capacity planning techniques to predict performance based on trends in previous performance data. The report covers hardware and throughput performance, and trends. To achieve the most accurate performance picture, weekends, holidays, and days with little or no data collection are excluded from all calculations.

The Hardware Performance section of the report enables you to maximize the utilization of the hardware, and accurately forecast when hardware upgrades are required — both major benefits of implementing a capacity planning system. A capacity planning system also allows you to maintain your target service levels and provides you with the information necessary for fiscal planning.

**International Business Machines
PM/400
Management Summary**

ABC Corporation

System Name	PRODCPU S1012345	Model	D70
Time Frame	January First Shift	Memory	112MB

Hardware Performance

	Current Month (Avg)	Current Month (Max)	Guideline	Trend in Months	
				Until Guideline	History
CPU Utilization					
High/Pri + System	56%	82%	60%	1.3	3
Total	86%	100%	95%	7.5	3
Memory Utilization (% of Faulting Guideline)	61%	185%	100%	6.3	3
Disk Space	90%	93%	80%	0.0	3

Throughput Performance

	Current Month (Avg)	Current Month (Max)	Trend in Percent		
			1 Month	3 Months	6 Months
Transaction/Hour	5487	7259	51%	56%	18%
Trans. in Thousand	58.4	79.1	43%	67%	20%
Jobs/Day	940	1148	7%	34%	-5%

Figure 10-1. Management Summary Report

Management Summary Report Details

The Management Summary report contains the following details.

- System Name** Specifies the name of the system for which performance information is being summarized. The system name is equal to the SYSNAME network attribute.
- Time Frame** Specifies the month which the calculations cover. The data reflects those hours, defined as first or second shift. Refer to Chapter 7, "Work with PM/400 Customization," for information on how to customize hours for first and second shift.
- Model** Specifies the model number of the CPU.
- Memory** Specifies the current amount of main storage.

Hardware Performance

Current Month (Average)

CPU Utilization

High/Pri + System

Specifies the average system and high priority interactive and non-interactive CPU utilization. Based on the High Priority Limit value defined in the PM/400 Customization function.

- Total** Specifies the average system, high, and low priority interactive and non-interactive CPU utilization. The difference between High/Pri + System and Total indicates the amount of CPU utilization due to low priority interactive and non-interactive workloads.

Memory Utilization

Specifies the average non-machine pool faulting, stated as a percent based on the IBM guidelines for good performance. For example, IBM's faulting guideline for good performance on a B50 is 30 faults per second. If the average faulting rate during the month was 15, the percentage reported would be 50%.

Disk Space

Specifies the average disk space utilization.

Current Month (Maximum)

CPU Utilization

High/Pri + System

Maximum daily average of system and high priority interactive and non-interactive CPU utilization. Based on the High Priority Limit value.

Total Maximum daily average of system, high priority, and low priority interactive and non-interactive CPU utilization.

Memory Utilization

Maximum non-machine pool faulting stated as a percentage based on the IBM guidelines for good performance.

Disk Space

Maximum disk space utilization.

Guideline

CPU Utilization

High/Pri + System

Guideline for system and high priority interactive and non-interactive workloads necessary to maintain consistent response times.

Total Guideline for Total CPU utilization. This is the guideline value used when considering all workload priorities: system, high priority, and low priority. The guideline value is critical in determining response time.

Memory Utilization

100% is the faulting guideline for good performance. In the case of a B50, 100% equals 30 faults per second.

Disk Space

Disk performance begins to suffer when disk storage for an auxiliary storage pool is between 80% and 90%. At this level, the system may be less efficient in obtaining enough storage to perform day-to-day tasks.

Trend in Months Until

Guideline

For all categories, this is the number of months until the average percentage reaches the guideline. A "NEG" entry in this column indicates that the trend is negative. A "36+" entry in this column indicates that the trend is more than 36 months from reaching the guideline.

History

For all categories, this is the number of months of historical performance data used to calculate the trend.

Throughput Performance

Current Month (Average)

Transaction/Hour

Average number of transactions per hour.

Trans. in Thousand

Average number of transactions per shift in thousands.

Jobs/Day

Average number of high priority and low priority jobs per shift.

Current Month (Maximum)

Transaction/Hour

Maximum number of transactions per hour for any day of the month.

Trans. in Thousand

Maximum number of transactions per shift for any day of the month in thousands.

Jobs/Day

Maximum number of high priority and batch jobs per shift.

Trend in Percent

1 Month

For all categories, the percent growth for the last month based on a linear regression analysis.

3 Months

For all categories, the percent growth for the last three months, based on a linear regression analysis.

6 Months

For all categories, the percent growth for the last six months, based on a linear regression analysis.

Application Summary Report

This report is included only with the PM/400 Service Offering.

The Application Summary report (Figure 10-2 on page 10-7) describes all jobs run during a specified month and is not divided by first or second shift. The Application Summary report is designed to give the data processing manager a list of the jobs and users that are using the most resources. This is accomplished by performing a Top 10 Analysis in six categories on batch jobs and interactive users. By understanding which jobs and users are using the most resources, often limited staff resources can be focused on the application area with the biggest potential payback.

The PM/400 software excludes some job names from the batch analysis in order to disregard known applications that use a particular resource. Some examples are: the performance monitor, some specific autostart jobs, and some specific jobs which would always have the longest run times. In any given category, a job can appear only once. If a job ran multiple times during the time frame, the averages or totals are used when sorting the list.

International Business Machines PM/400 Application Summary

ABC Corporation

System Name	PRODCPU	Model	D70
Time Frame	January	Memory	112MB

Batch Top 10 Analysis

Job	Avg Run Time	Total CPU Time		Avg I/O/Sec	No.	Total I/Os	Total Pages Spooled		Total No. of Runs		
	H:M	Job	Hours	Job		Job	(K)s	Job	No.	Job	No.
Q123LNUP	09:03	CAP123A	14.01	INV123C	36	CST123C	4523	CST123C	41687	CST123C	1253
123	08:50	FRC123CL	13.58	MPG123UB	36	CST123A	3425	MRP123CB	15358	ALLOCATION	511
SCR123	08:50	CST123EC	13.16	ACP123C	32	MRP123CB	2772	CST123B	8919	BOM123C	118
Q123SCD	08:45	MRP123CB	12.38	INV123B	32	CAP123A	2710	INV123C	8446	PUR123C	118
Q123SERV	07:14	MRP124CB	09.52	YEAR123	32	MRP123	2191	CST123A	8119	CDT123A	113
LIB123CL	04:58	SFC123C	09.44	CAP123CB	32	MRP124CB	1756	ACP123C	8006	CST123B	109
MPD123L	04:51	MRP123I	04.53	FAY123ERS	31	QPFRMON	1540	MRP123CB	7828	PUR123D	107
MRP123CB	04:42	PURC123S	03.37	PRO123FILES	31	FRC123CL	1539	INV123CB	6764	SCUFFY	101
CAP123A	04:37	CST123C	03.28	MRP123CB	30	CST123B	1473	MPD123CL	3949	CST123D	96
Z123F291	04:28	INV123	03.22	SO3123101	29	CST6123C	1230	PUR123C	3947	MRP123CB	86

Interactive Top 10 Analysis

User	Average Resp	Maximum Resp		CPU/Trans		I/Os/Trans		Total Trans		Total Pages	
	Sec	User	Sec	User	Sec	User	No.	User	No.	User	No.
RWATSON	26.7	DHOOTON	5922	SALINAS	3.3	EENQUIST	755	KTHOMPSON	43960	WWILLIAMS	8002
PBAIR	24.6	VSAMMONS	5157	DCONNOLE	3.1	DCONNOLE	314	BNIKKEL	34652	BNIKKEL	7556
DCONNOLE	21.0	JCAMILLI	2724	JSMITH	2.5	MWATSON	284	QSYSOPR	31159	VSAMMONS	6163
BLAMB	20.3	DZILLES	2707	DCOMBE	2.1	RWATSON	148	DZILLES	29512	ETHIEL	5316
JSMITH	19.2	KTHOMPSON	2543	PBAIR	2.1	DWATSON	137	AWATSON	28706	DCOMBE	5238
PWERTZLER	16.0	PWERTZLER	1662	NMALONEY	2.0	NMALONEY	124	SANDBACH	28392	DHOOTON	5151
JCAMILLI	15.0	RWATSON	1375	DDAVENPORT	1.9	JCAMILLI	108	JBENNY	26306	BSUMMERS	5103
DDAVENPORT	14.0	BSUMMERS	674	HUNTRAY	1.7	RTURNER	107	HSMYTH	25441	JSMITH	4923
DWATSON	13.2	RTURNER	596	WWILLIAMS	1.3	JSMITH	107	SDONNEL	25151	RTURNER	4693
SENHAUSER	13.0	EENQUIST	582	BLAMB	1.3	PWERTZLER	104	DHOOTON	23157	SDONNEL	4486

Average Response Time = 2.7
Maximum Response Time = 111

Figure 10-2. Application Summary Report

Application Summary Report Details

The Application Summary report contains the following details:

System Name

Specifies the name of the system for which performance information is being summarized. The system name is equal to the SYSNAME network attribute of the CPU being analyzed.

Time Frame

Specifies the month which the calculations cover. The data reflects those hours of the day during which the performance monitor was running (normally 24-hours).

Model Specifies the current model of the CPU.

Memory

Specifies the current amount of main storage.

Batch Top 10 Analysis

Avg Run Time

Specifies the average amount of time needed to process a particular job (Hour:Minutes).

Total CPU Time

Specifies the total amount of time spent using the CPU during the month (Hours).

Avg I/O/Sec

Specifies the number of input/output (I/O) operations performed per second (the fastest job at doing I/O).

Total I/Os

Specifies the total number of I/O operations performed by the job. These include synchronous and asynchronous I/Os.

Total Pages Spooled

Specifies the total number of pages produced by a job (but not necessarily printed).

Total No. of Runs

Specifies the total number of times the job was run during the month.

Interactive Top 10 Analysis

Average Resp

Specifies the highest average response time in descending order (seconds). This is the average for all the user's transactions.

Maximum Resp

Specifies the highest maximum response time in descending order (seconds). These are the maximum response times experienced by users during the month.

CPU/Trans

Specifies the highest average CPU per transaction among all users (seconds). These are the users who process the most CPU-intensive transactions.

I/Os/Trans

Specifies the highest average I/O operations per transaction among all users. These are the users who start the most I/O-intensive transactions.

Total Trans

Specifies the highest total number of transactions performed by users. These are the most active users.

Total Pages

Specifies the highest total number of spooled output pages produced, but not necessarily printed, by users.

Average Response Time

Specifies the monthly average response time of all users.

Maximum Response Time

Specifies the average maximum response time for 15-minute intervals.

Technical Summary Report

This report is included with the PM/400 Service Offerings and with PM/400 - Subset.

The Technical Summary report (Figure 10-3 on page 10-11) is designed to give a concise memory analysis, current settings for system values, and maximum observed numbers during the specified time frame. The memory analysis is used to tune system memory to optimum performance levels. The goal in tuning memory is to identify the peak periods for each analysis interval and tune to those peaks rather than making minor adjustments continuously. By analyzing a month of data, the peak can be identified.

Expertise to help you make system tuning decisions based on the information in this report is available using the Performance Helpdesk service (see "Performance Helpdesk" on page 1-4). Additionally, you may contact your local IBM Support Team to ask for assistance.

**International Business Machines
PM/400
Technical Summary**

ABC Corporation

System Name	PRODCPU	Model	D70
Time Frame	January First Shift	Memory	112MB

Memory Analysis

Pool #	SIZE (K)			ACT LEVEL		AVG Fault	MAX Fault	Average		
	MIN	MAX	CURR	MAX	CURR			A—W	W—I	A—I
1	14700	20200	20200	0	0	0.9	5.6	14.6	0	0
2	9070	33638	20138	5	5	6.3	30.9	6.4	0.4	0.3
3	350	350	350	7	7	1.4	9.7	18.4	0	0
4	14000	45000	45000	12	12	9.6	33.9	81.1	0.8	0
5	4000	7000	7000	7	7	1.9	14.2	15.2	0	0
6	2000	2200	2000	20	20	0.6	9.5	13.6	0	0
7	13500	35000	20000	6	6	4.3	45.1	1.6	0	0
All Pools						25	74			

Job System Values

<u>System Values</u>	<u>Observed Max Jobs</u>	
Init Act Jobs	200	414
Add Act Jobs	25	
Init Total Jobs	700	1890
Add Total Jobs	50	

Figure 10-3. Technical Summary Report

Technical Summary Report Details

The Technical Summary report contains the following details:

System Name

Specifies the name of the system for which technical information is being summarized. The system name is equal to the SYSNAME network attribute of the CPU being analyzed.

Time Frame

Specifies the month which the calculations cover. The data reflects those hours, defined as first or second shift. Refer to Chapter 8, "Work with Top Ten Omissions."

Model Specifies the current model of the CPU.

Memory

Current amount of main storage.

Memory Analysis

Pool # Specifies the ID of the memory pool as displayed on the Work with System Status display.

Size(K)

MIN Specifies the minimum pool size during the month.

MAX Specifies the maximum pool size during the month.

CURR Specifies the pool size on the last day of the month.

Act Level

MAX Specifies the maximum activity level during the month.

CURR Specifies the activity level on the last day of the month.

Faulting Rate

Average

Specifies the average faulting rate during the month.

Maximum

Specifies the maximum faulting rate for any 15-minute interval during the month.

Job Transitions

A-W Specifies the average active-to-wait transitions per minute.

W-I Specifies the average wait-to-ineligible transitions per minute.

A-I Specifies the average active-to-ineligible transitions per minute.

All Pools

Average

Specifies the average faulting rate of all pools during the month.

Maximum

Specifies the maximum faulting rate of all pools during the month.

Job System Values

Init Act Jobs

Specifies the setting at the end of the month for the QACTJOB system value.

MAX Jobs

Specifies the maximum observed active jobs during the month.

Add Act Job

Specifies the setting at the end of the month for the QADLACTJ system value.

Init Total Jobs

Specifies the setting at the end of the month for the QTOTJOB system value.

MAX Jobs

Specifies the maximum observed total number of jobs in the system during the month.

Add Total Jobs

Specifies the setting at the end of the month for the QADLTOTJ system value.

IOP/Communications Summary Report

This report is included only with the PM/400 Service Offerings.

The IOP/Communications Summary report (Figure 10-4 on page 10-15) provides a concise view of how IOPs and communication lines are being utilized. The IOP's Top Ten Analysis lists all IOPs by percentage of utilization. Potential performance problems due to IOP over utilization becomes immediately visible. (Guidelines for IOP utilization are in the *Work Management* manual.)

The Communication Lines summary lists up to ten communications lines by percentage of utilization. Additionally, the percentage of data that was either transmitted or received in error is listed. This report alerts you to over-utilization or error conditions which could cause performance problems.

**International Business Machines
PM/400
IOP/Communications Summary**

ABC Corporation

System Name	PRODCPU	Model	D70
Time Frame	January First Shift	Memory	112MB

**IOP's
Top 10 Analysis**

	<u>Addr</u>	<u>Addr</u>	<u>Addr</u>	<u>Addr</u>	<u>Addr</u>	<u>Addr</u>	<u>Addr</u>	<u>Addr</u>	<u>Addr</u>	<u>Addr</u>
Utilization	0-05	0-06	1-05	1-06	1-07					
IOP Type	65 %	40 %	25 %	12 %	9 %					
	2507	2507	6111	6110	2608					

Communication Lines

<u>Description Name</u>	<u>Type</u>	<u>Line Speed</u>	<u>Avg Util</u>	<u>% in Error</u>	<u>IOP Addr</u>
LOSANGELES	SDLC	2400	14 %	1 %	0-05
CHICAGO	SDLC	9600	13 %	3 %	0-06
REMOTE	SDLC	19200	9 %	1 %	0-06
NEWYORK	SDLC	19200	5 %	5 %	0-06
ECS	SDLC	9600	0 %	1 %	0-06
LOCAL	Token	4Mb	13 %	1 %	0-05

Figure 10-4. IOP/Communication Summary Report

IOP/Communications Summary Report Details

The IOP/Communications Summary report contains the following details.

System Name

Specifies the name of the system for which performance information is being summarized. The system name is equal to the SYSNAME network attribute of the CPU being analyzed.

Time Frame

Specifies the month which the calculations cover. The data reflects those hours, defined as first or second shift. Refer to Chapter 8, "Work with Top Ten Omissions."

Model Specifies the current model of the CPU.

Memory

Specifies the current amount of main storage.

IOP's Top 10 Analysis

Addr Specifies the system address of the IOP. The first number is the bus address; the second is the address on the specified bus.

Utilization

Specifies the average utilization (as a percentage) of the IOP by shift.

IOP Type

The model number of the IOP.

Communication Lines

Description Name

Specifies the name assigned to the communication line as specified in the line description.

Type Specifies the type of line protocol used.

Line Speed

Specifies the speed of the line in bits-per-second.

Avg Util

Specifies the average utilization (as a percentage) of the line during the shift.

% in Error

Specifies the percentage of data transmissions that were in error and were retransmitted.

IOP Addr

Specifies the address of the IOP to which the communication line is attached.

Workload Summary Report

This report is included with the PM/400 Service Offerings and with PM/400 - Subset.

The Workload Summary report (Figure 10-5 on page 10-18) is designed to provide an overview of the types of workloads and how they affect the utilization of the system. The Workload Profile section of the report shows the workload broken down into high and low priority job types. Within the high and low priority categories are system, interactive, and batch job types. You are able to readily see how these job types are affecting CPU utilization and disk resources. The Workload Characteristics section presents the workload statistics for the last three months for interactive and batch job types. This information can be used to track trends in each category.

**International Business Machines
PM/400
Workload Summary**

ABC Corporation

System Name	PRODCPU	Model	D70
Time Frame	January First Shift	Memory	112MB

Workload Profile

Priority	Job Type	CPU Util	Cum Util	CPU per I/O		Disk I/O/Sec	
				Sync	Async	Sync	Async
HIGH	System	9%	9%	0.100	0.100	5.4	5.6
	Interactive	44%	53%	0.300	0.100	15.6	5.6
	Batch	3%	56%	1.200	1.000	10.0	9.6
LOW	Interactive	9%	65%	0.090	0.050	2.4	1.2
	Batch	21%	86%	1.900	1.600	15.5	12.0

Workload Characteristics

	Last Month	2ND Month	3RD Month
Interactive			
CPU/TX	0.287	0.329	0.331
I/O/TX	10.00	10.00	11.00
Batch			
CPU/IO	0.004	0.004	0.003
IO/Sec	12.00	13.00	14.00

Figure 10-5. Workload Summary Report

Workload Summary Report Details

The Workload Summary report contains the following details.

System Name

Specifies the name of the system for which performance information is being summarized. The system name is equal to the SYSNAME network attribute of the CPU being analyzed.

Time Frame

Specifies the month which the calculations cover. The data reflects only those hours of the day during which the performance monitor was running.

Model Specifies the current model of the CPU.

Memory

Specifies the current amount of main storage.

Workload Profile

Priority

This category divides the workload reporting into either high or low priority. The default high priority number is 20. The user can change this default by accessing the PM/400 Customization function from the PM/400 Main Menu.

Job Type

This category divides the workload into system, interactive, and batch for high priority, and interactive and batch for low priority.

CPU Util

Specifies the average CPU utilization (as a percentage) during the shift.

Cum Util

Specifies the cumulative average utilization (as a percentage).

CPU per I/O

Sync Specifies the amount of CPU utilization in seconds per synchronous I/O.

Async Specifies the amount of CPU utilization in seconds per asynchronous I/O.

Disk I/O/Sec

Sync Specifies the number of synchronous disk I/Os per second.

Async Specifies the number of asynchronous disk I/Os per second.

Workload Characteristics

Interactive

CPU/TX

Specifies the amount of CPU utilization per transaction in seconds.

I/O/TX

Specifies the number of synchronous and asynchronous I/Os per transaction.

Batch

CPU/IO

Specifies the amount of CPU utilization per I/O in seconds.

IO/Sec

Specifies the number of I/Os per second.

Last Month

Specifies the average for each category in the previous month.

2ND Month

Specifies the average for each category 2 months ago.

3RD Month

Specifies the average for each category 3 months ago.

CPU Utilization Graphs

The CPU Utilization graphs, daily (Figure 10-6 on page 10-22) and by interval (Figure 10-7 on page 10-23), are designed to give a picture of current CPU requirements. A daily CPU graph shows the average CPU utilization for each day during the month for system, high priority, and low priority, the 3-month trend of system plus high priority, and total CPU utilization. A 24-Hour CPU graph shows the average and maximum CPU utilization for intervals of an average day.

The CPU Utilization graphs give the data processing manager information on how to best utilize the CPU. For example, by moving some batch work to off peak hours, the CPU can be more evenly utilized. Another example would be to initiate staggered lunch breaks so the system and high priority CPU utilization could be more evenly distributed. Examples such as these can allow you to fully utilize the CPU, thereby better managing system resources. Also, when hardware upgrades are necessary, these two graphs make the justification to upper management much easier.

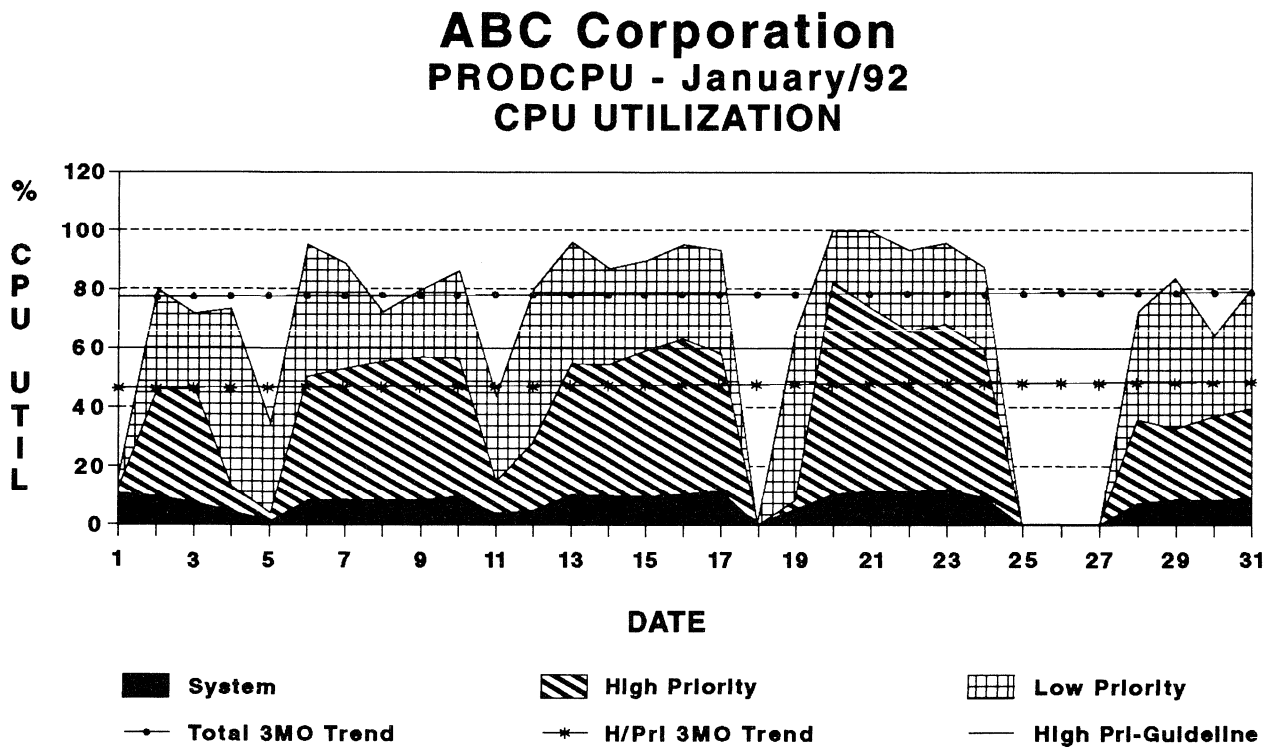
One of the most important performance statistics is provided in these graphs, namely system and high priority CPU utilization. The IBM guidelines for system and high priority CPU utilization is 60%. Utilization less than 60% ensures consistent user response times.

A system and high priority CPU utilization of greater than 60% indicates a potential problem. If the trend line runs above 60%, it is an indication of a problem. A maximum above 60% indicates that at least once during the month there was a problem.

Daily Graph

The daily CPU utilization (Figure 10-6) is a stacked graph showing the average daily CPU utilization for the system, high priority, and low priority workloads. Averages are calculated for the hours defined for each shift. The workload of the individual components can be calculated by visually subtracting the utilization from the other workload. In this example, the low priority workload ranges from 20% to 25%. Trend lines based on the last 3 months' data are printed on the graph for total and system plus high priority utilization.

- X-axis—Days of the month (1 through 31)
- Y-axis—Percent CPU utilization



Prepared by IBM
First Shift

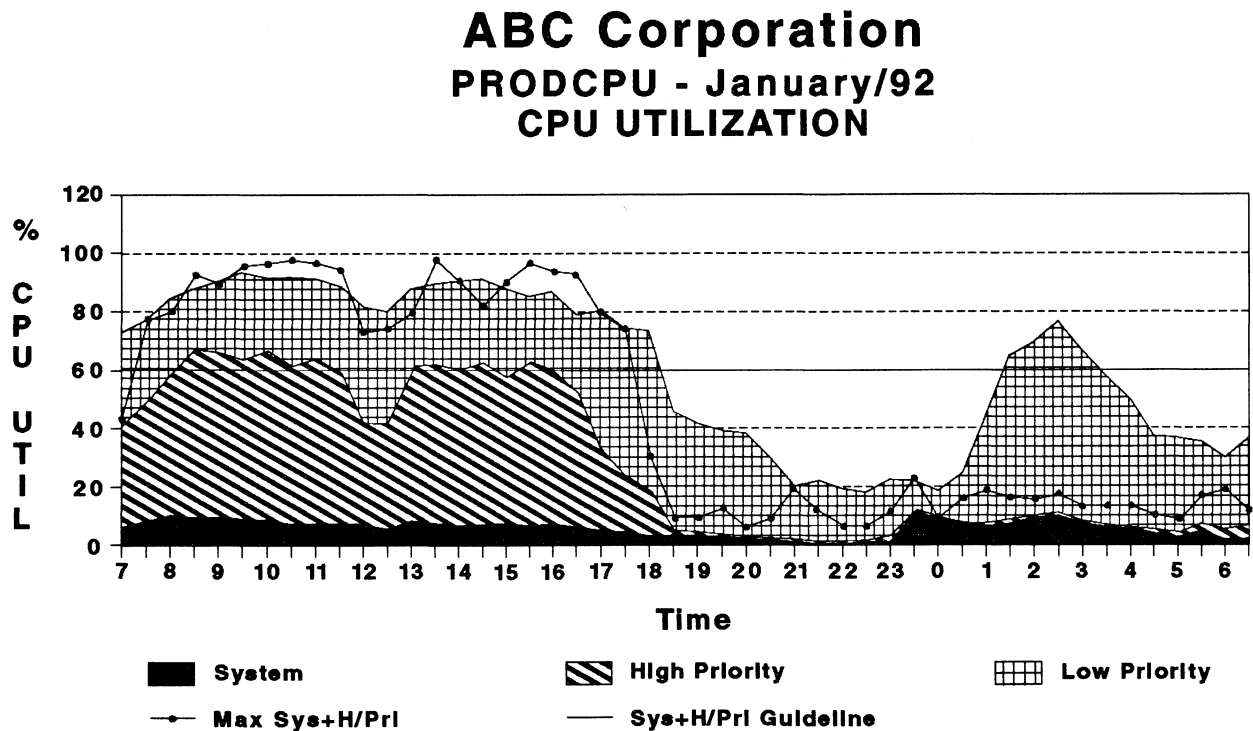
Figure 10-6. CPU Utilization Daily Graph

24-Hour Graph

The 24-Hour Graph is included with the PM/400 Service and PM/400 - Subset. The 24-Hour CPU utilization (Figure 10-7) is a stacked graph showing the average CPU utilization for the system, high priority, and low priority workloads. Averages are calculated using utilization readings for each interval, excluding weekends and holidays. The workload of the individual components can be calculated by visually subtracting the utilization from the other workload. In this example, the low priority workload ranges from 20% to 30%. Also printed on the graph is the maximum system and high priority CPU utilization for each interval during the month. For example, at 8:45, the average system and high priority CPU utilization was 68%, but one day it was 90%.

- X-axis—Hours of the day (24-hours)
- Y-axis—Percent CPU utilization

Note: It is advisable on graphs where there are sharp changes in CPU utilization at the ends of the graph to adjust the shift definitions accordingly, for example to 0800 and 1600. Refer to Chapter 7, "Work with PM/400 Customization."



Prepared by IBM
First Shift

Figure 10-7. CPU Utilization 24-Hour Graph

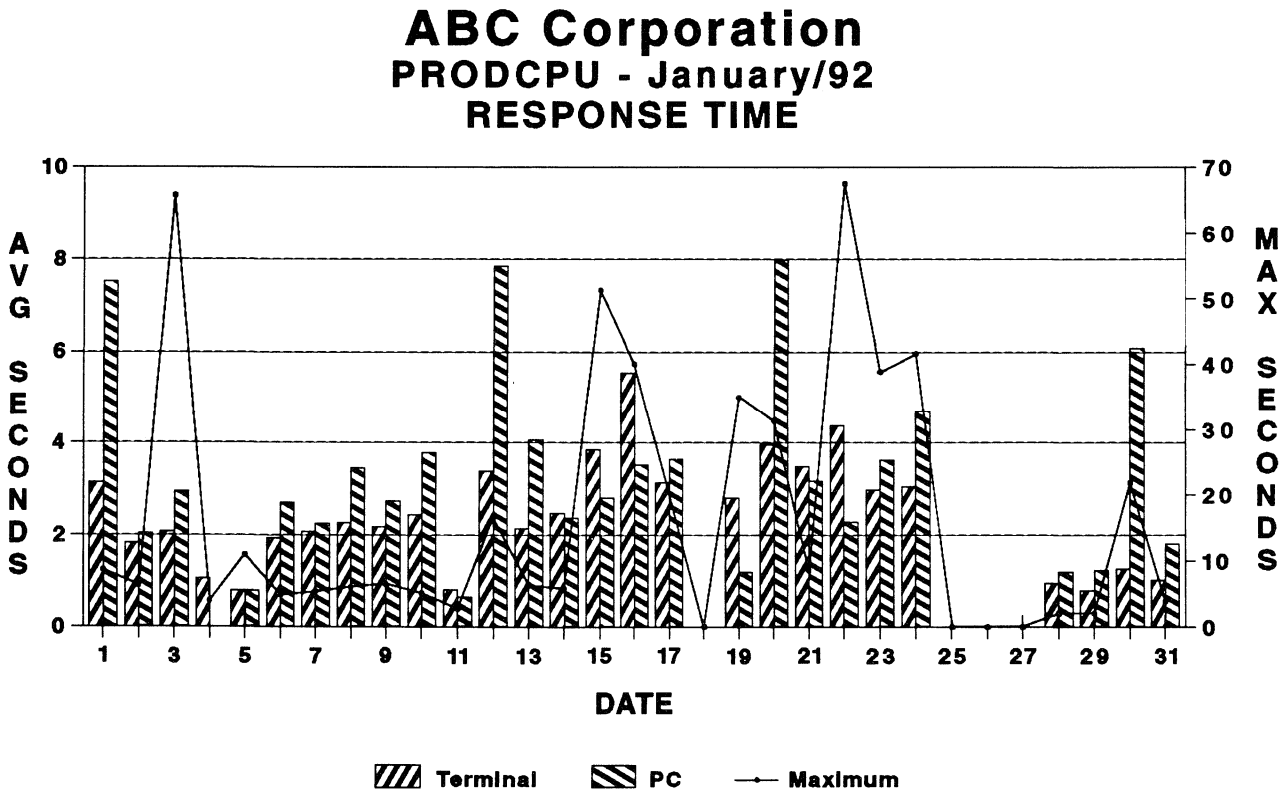
Response Time Graphs

Response Time graphs, daily (Figure 10-8) and by interval (Figure 10-9 on page 10-25), show average and maximum response times for terminals and personal computers. These graphs allow you to assess system performance against response time objectives, and identify response time problems by time-of-day and day-of-month.

Daily Graph

The daily graph (Figure 10-8) shows the average daily response time for terminals, personal computers (and pass-through target jobs), and the maximum response time during the day. The left Y-axis shows the average response time and is used to read the bars on the chart. The right Y-axis shows the maximum response time and is used to read the maximum line on the graph. Maximum response time is the highest average for any interval on that day. Note the scale on both of the Y-axes is dynamic and changes from month to month. Changes in the scales are based on the numbers being graphed.

- X-axis—Days of the month (1 through 31)
- Left Y-axis—Average response time in seconds (bar chart)
- Right Y-axis—Maximum response time in seconds (line graph)



Prepared by IBM
First Shift

Figure 10-8. Response Time Daily Graph

24-Hour Graph

The 24-Hour Graph (Figure 10-9) shows the average response time for terminals, personal computers (and pass-through target jobs), and the maximum during any given hour for any day of the month during that interval. Maximum response time is the highest average for that interval during the month. Averages are calculated using daily response times for each interval, excluding weekends and holidays. As with the daily graph, there are two Y-axes.

- X-axis—Hours of the day (24-hours)
- Left Y-axis—Average response time in seconds (bar chart)
- Right Y-axis—Maximum response time in seconds (line graph)

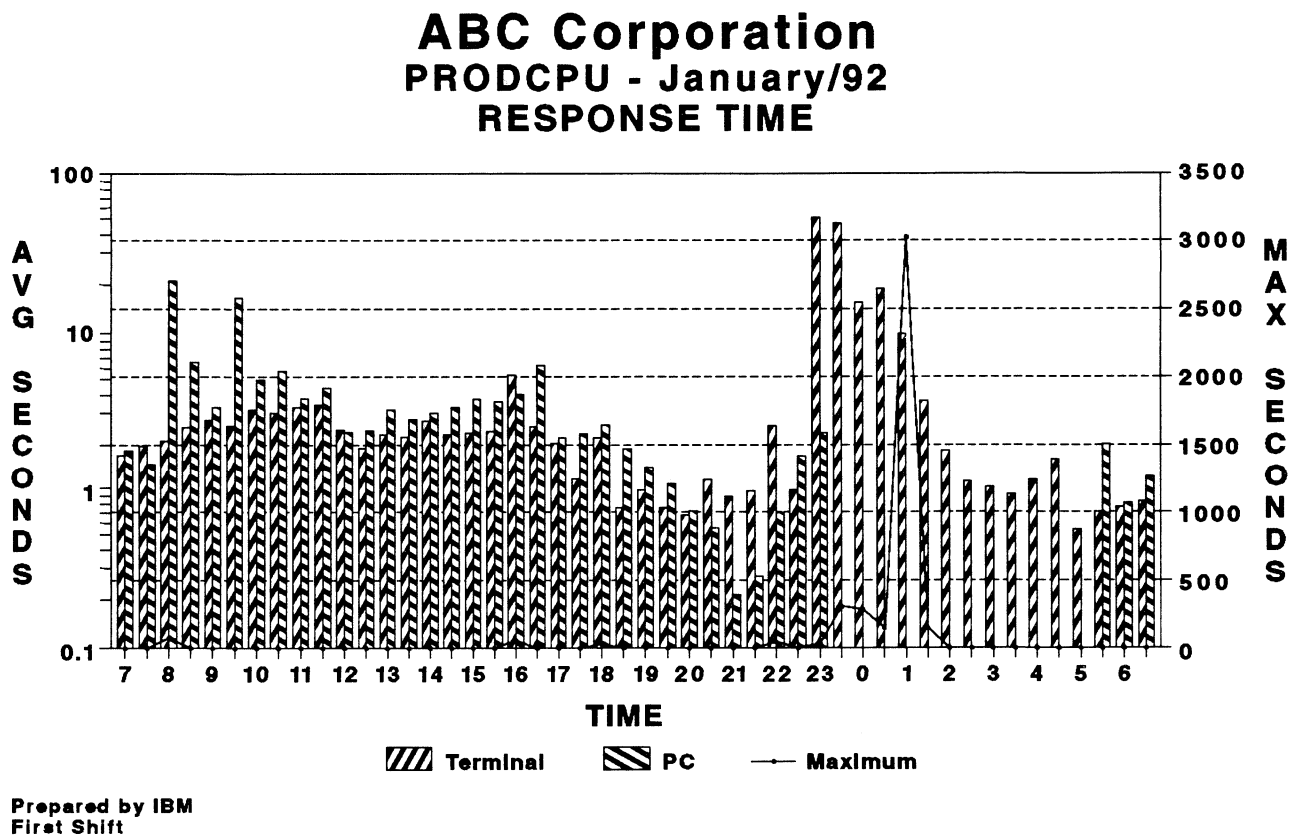


Figure 10-9. Response Time 24-Hour Graph

Throughput Graphs

Throughput graphs, daily (Figure 10-10) and by interval (Figure 10-11 on page 10-27), show the average rate in number of transactions per hour in averages and maximums. These charts give a clear picture of the interactive workload. Combined with the CPU utilization charts, the throughput graphs indicate the complexity of online transactions. It is possible to predict the change in CPU utilization if a predictable change in workload is proposed. For example, if a new application is coming online and the average throughput is 6000 transactions per hour and the high priority CPU utilization is 40%, then an increase of 1000 transactions per hour would increase CPU utilization by 7%.

Daily Graph

The daily graph (Figure 10-10) shows the average daily throughput in terms of transactions per hour. The scale on the Y-axis is dynamic and could change from time to time. Changes in the scales are based on the numbers being graphed. A 3-month trend is also provided on the graph.

- X-axis—Days of the month (1 through 31)
- Y-axis—Average daily transactions per hour

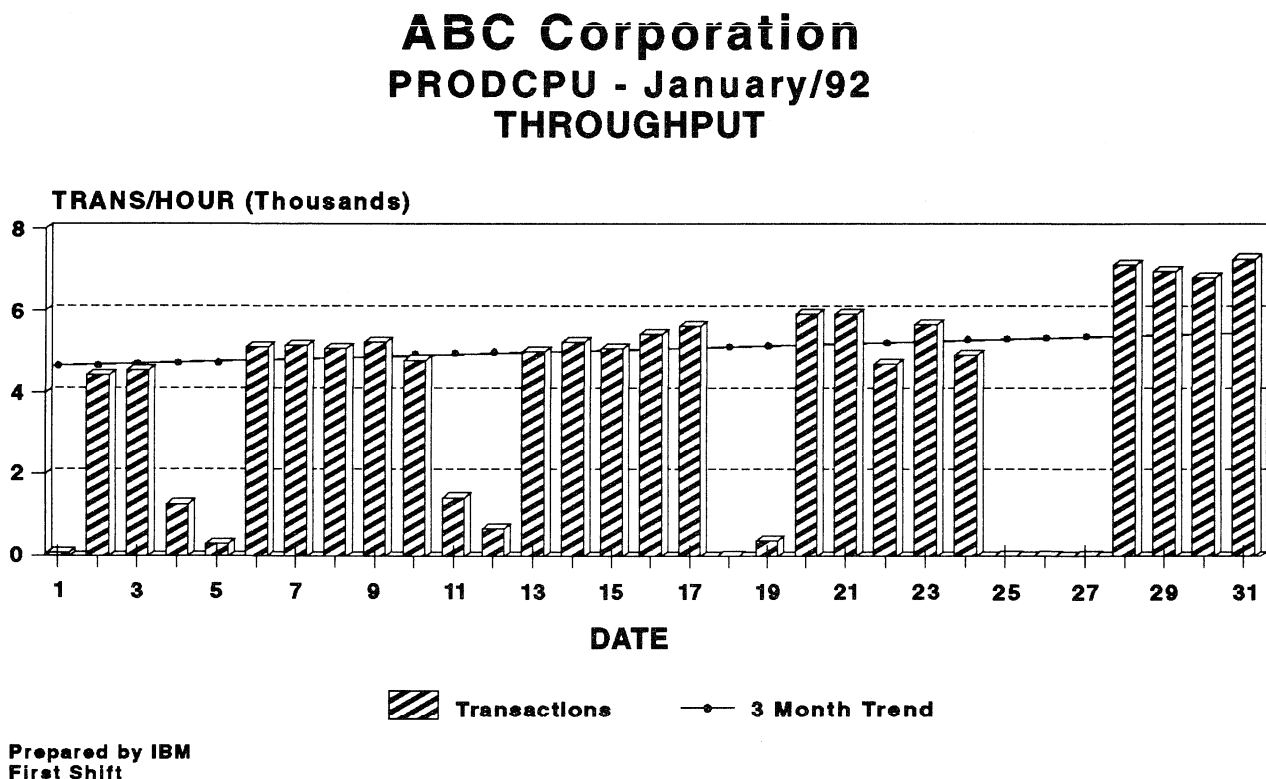
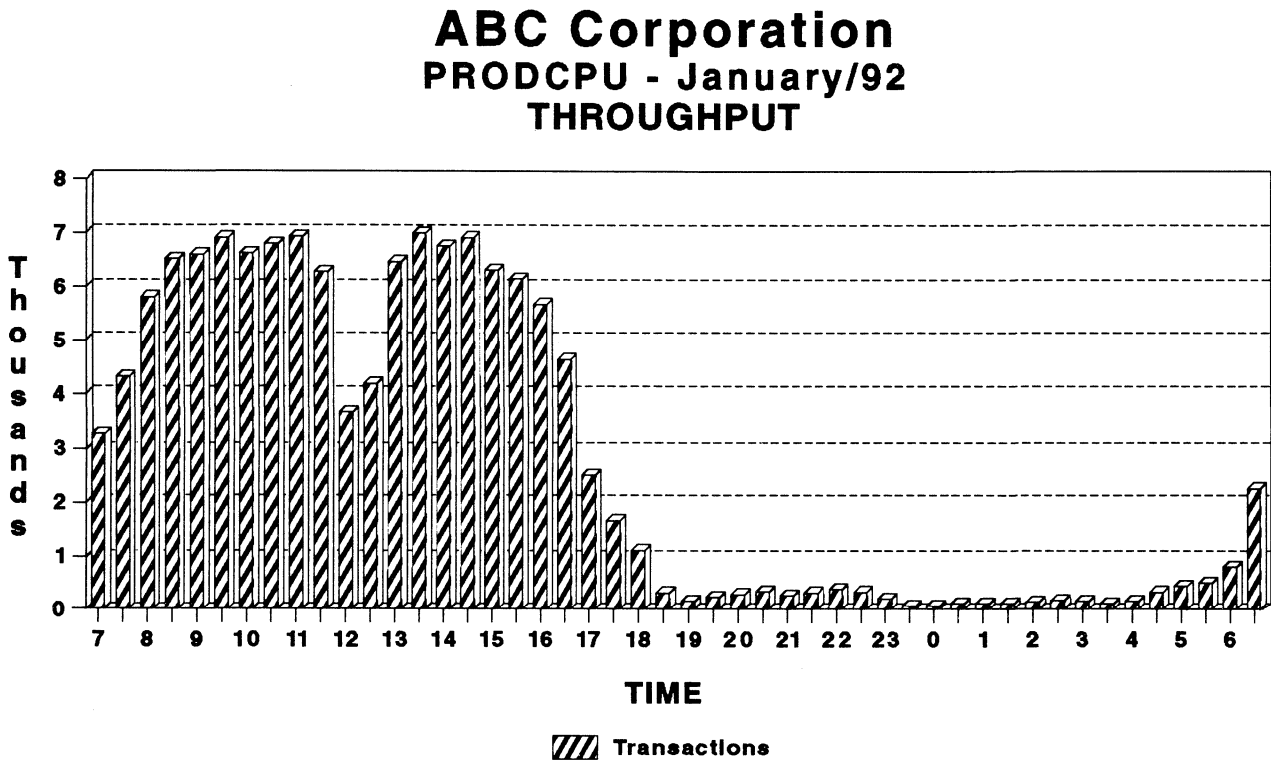


Figure 10-10. Throughput Daily Graph

24-Hour Graph

The 24-Hour graph (Figure 10-11) shows the average hourly throughput in terms of transactions per hour. Averages are calculated using daily throughput transactions per hour for each interval, excluding weekends and holidays.

- X-axis—Hours of the day (24-hours)
- Y-axis—Average transactions per hour



Prepared by IBM
First Shift

Figure 10-11. Throughput 24-Hour Graph

Faulting Rates Graphs

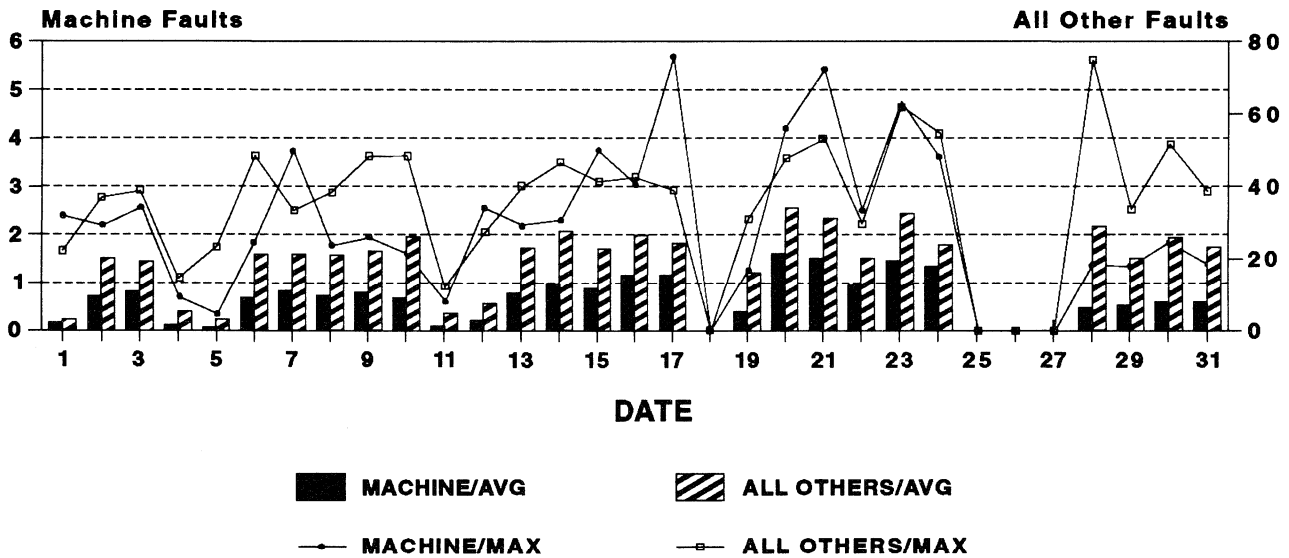
The Faulting Rates graphs, daily (Figure 10-12) and by interval (Figure 10-13 on page 10-29), provide a concise picture of the average and maximum faulting rate on a daily and interval basis. These charts break down faulting by machine and all other pools. This graphically shows the relationship of memory utilization to IBM guidelines. The information in these graphs can be used to identify requirements for tuning existing memory or adding additional memory.

Daily Graph

The daily graph (Figure 10-12) shows the average and maximum faulting rates. The left Y-axis shows the average machine pool faulting rate per second and is indicated by the blue bars and line. The blue (or solid) bars and line represent machine pool faulting averages and maximums. The right Y-axis shows all other pool faulting and is indicated by the green (or striped) bars and line.

- X-axis— Days of the month (1 through 31)
- Left Y-axis—Faults per second (blue bars and line)
- Right Y-axis—Faults per second (green bars and line)

ABC Corporation PRODCPU - January/92 FAULTING RATES



Prepared by IBM
First Shift

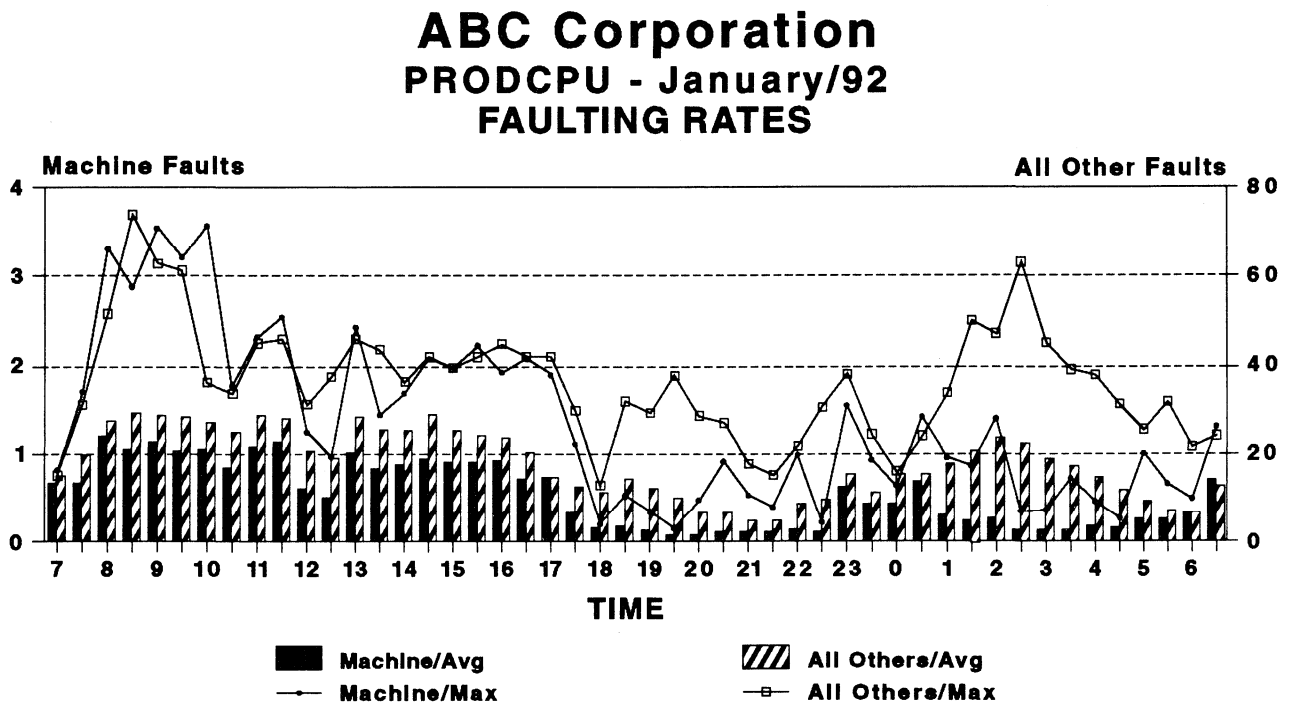
Figure 10-12. Faulting Rates Daily Graph

24-Hour Graph

The 24-Hour graph (Figure 10-13) shows the average and maximum faulting rates for the machine and all other pools. Averages are calculated using daily faulting rates for each interval, excluding weekends and holidays. The left Y-axis shows the average machine pool faulting rate per second and is indicated by the blue bars and line. The blue (or solid) bars and line represents machine pool faulting averages and maximums. The right Y-axis shows all other pool faulting and is indicated by the green (or striped) bars and line.

- X-axis—Hours of the day (24-hours)
- Left Y-axis—Faults per second (blue bars and line)
- Right Y-axis—Faults per second (green bars and line)

High overall faulting can be expected during periods with high sign-on activity and periods that have high job initiations. For example, high faulting could be expected in the morning when users are signing on the system and initiating their daily activities. Typically the system is configured for “normal” operations so the sign-on activity puts an extra load on the system.



Prepared by IBM
First Shift

Figure 10-13. Faulting Rates 24-Hour Graph

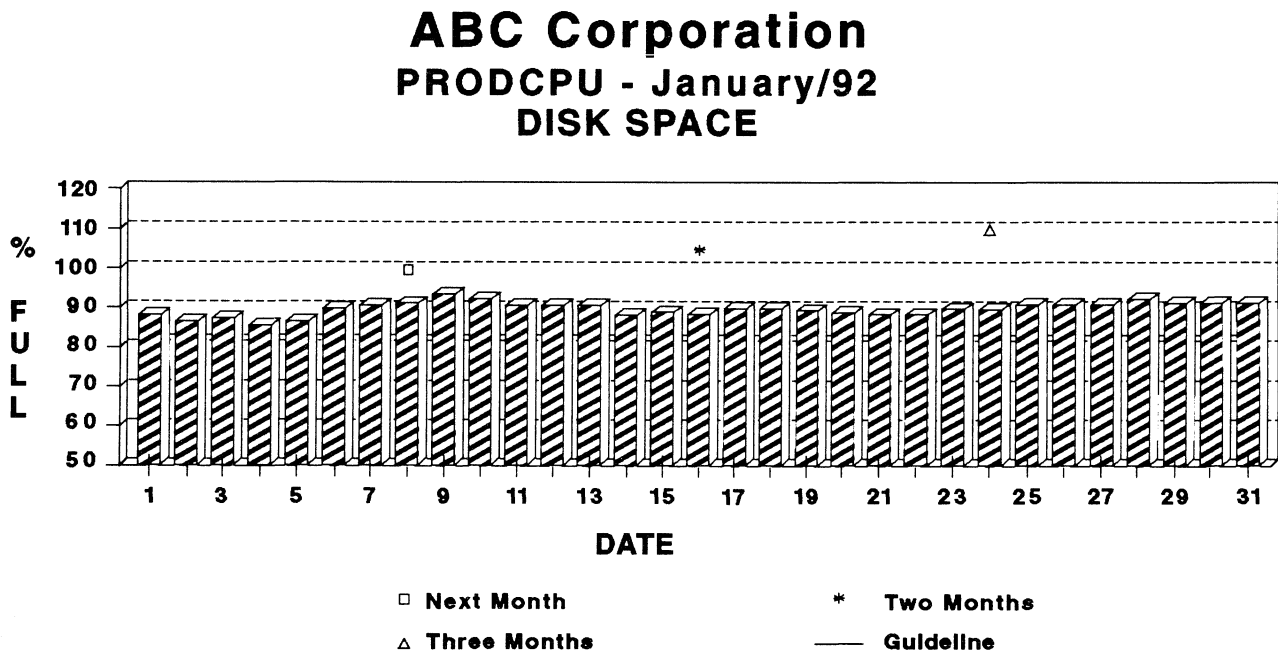
Disk Graphs

These graphs present a concise picture of the current disk space (Figure 10-14) and disk arm utilization (Figure 10-15 on page 10-31). The graphs are used to monitor the disk subsystem to determine when new disk hardware is needed. One graph shows disk space utilization, which helps you know when to buy more disk. The other graph shows disk arm utilization, which indicates if there are performance problems with the disk subsystem.

Disk Space

The Disk Space graph (Figure 10-14) shows the average disk space in terms of percentage for all auxiliary storage pools. When this number approaches 80%, you should consider purchasing more disk drives or deleting objects to free up disk space. Also printed on the graph is the 3-month growth trend. Three indicators are printed on the graph, which represents where the disk utilization will be one, two, and three months from now.

- X-axis—Days of the month (1 through 31)
- Y-axis—Percentage of disk space used



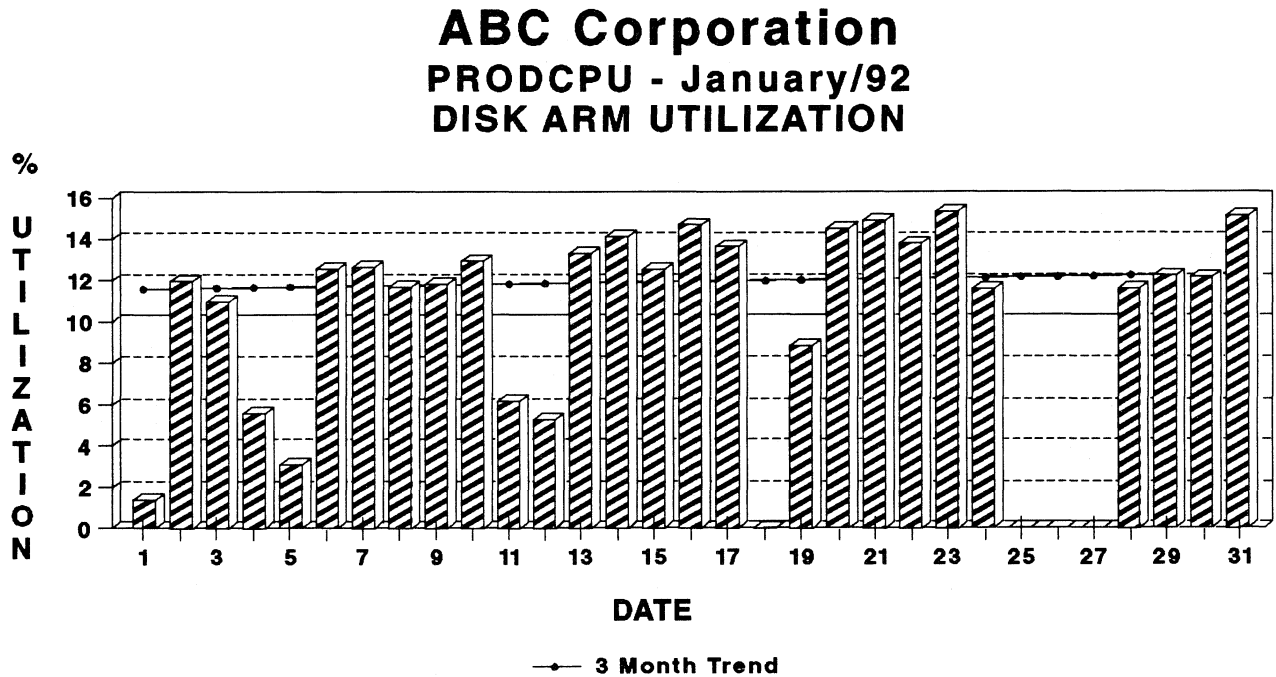
Prepared by IBM
First Shift

Figure 10-14. Disk Space Graph

Disk Arm Utilization

The Disk Arm Utilization graph (Figure 10-15) shows the average disk utilization in terms of percentages of time busy. When this number reaches 40%, the performance of the disk can impact response time or batch throughput. Adding a new disk spreads out the workload and reduces contention on any one arm. A 3-month trend is also provided on the graph.

- X-axis—Days of the month (1 through 31)
- Y-axis—Percentage of time the disk is busy



Prepared by IBM
First Shift

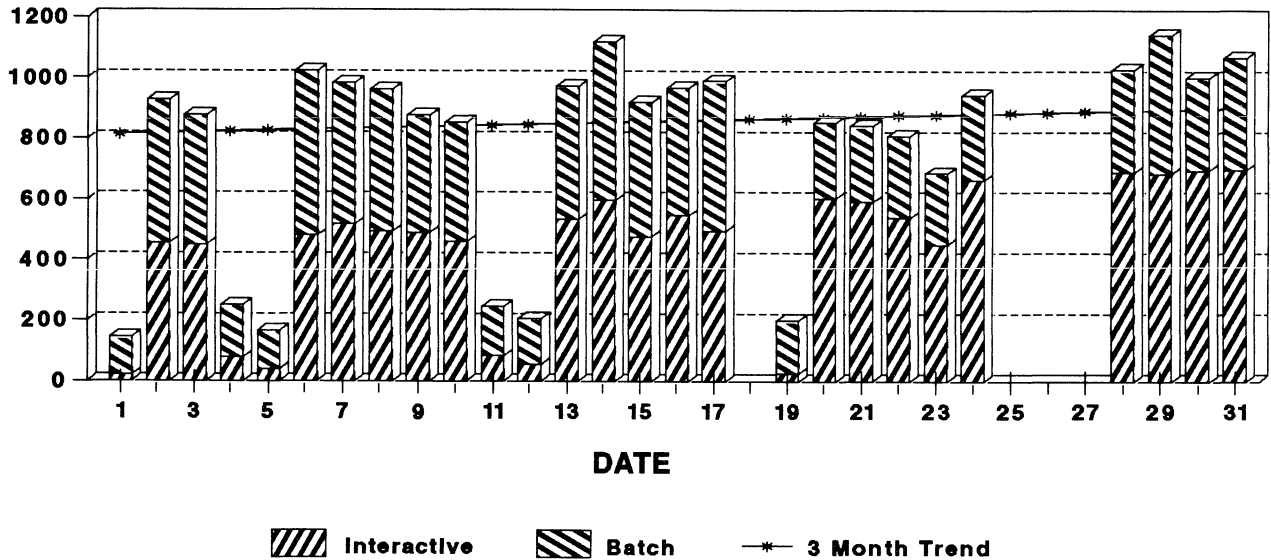
Figure 10-15. Disk Arm Utilization Graph

Number of Jobs

The Number of Jobs graph (Figure 10-16) shows the number of interactive and batch jobs. This provides an indication of the current job throughput in terms of jobs per day. A 3-month trend is printed which shows the growth direction.

- X-axis—Days of the month (1 through 31)
- Y-axis—Number of jobs

ABC Corporation PRODCPU - January/92 NUMBER OF JOBS



Prepared by IBM
First Shift

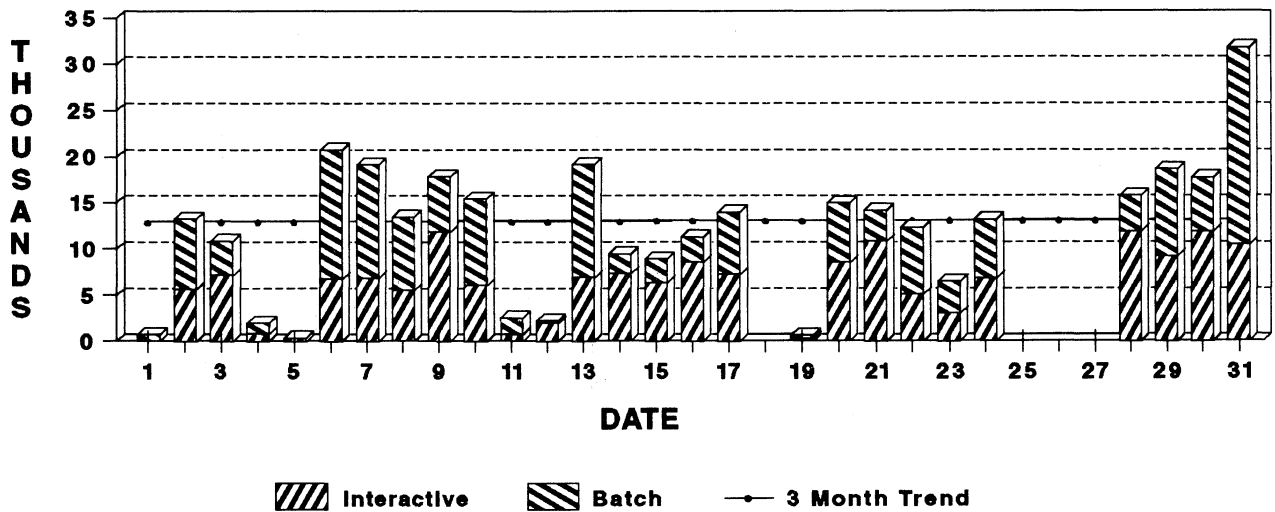
Figure 10-16. Number of Jobs Graph

Pages Spooled

The Pages Spooled graph (Figure 10-17) shows the number of pages produced by interactive and batch jobs. This number represents pages that were produced but not necessarily printed. Operators could have deleted some of the pages before they were printed. A 3-month trend is also printed on the graph with a line.

- X-axis—Days of the month (1 through 31)
- Y-axis—Number of spooled pages

ABC Corporation PRODCPU - January/92 PAGES SPOOLED



Prepared by IBM
First Shift

Figure 10-17. Pages Spooled Graph

Chapter 11. PM/400 Quarterly, Semi-Annual, and Annual Graphs

The following pages describe the quarterly, semi-annual, and annual graphs that are available to the PM/400 product users.

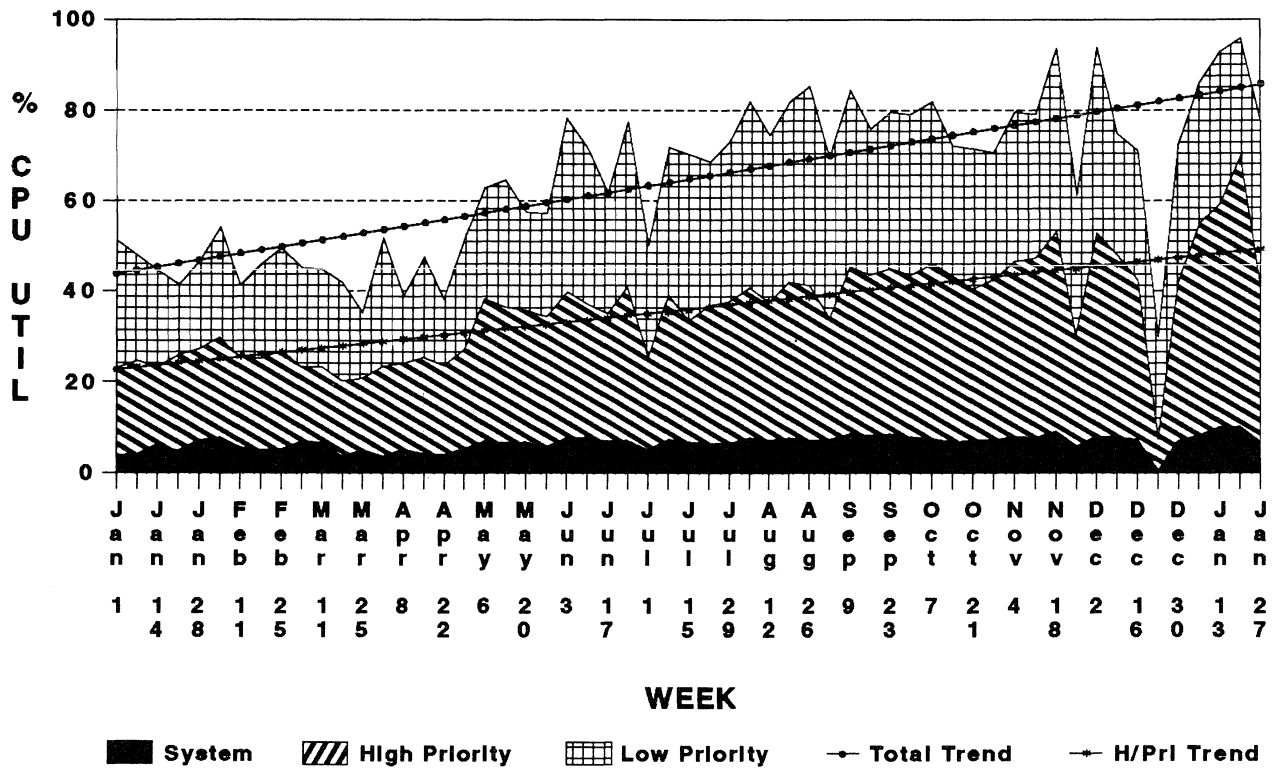
- The PM/400 service provides these graphs both quarterly and annually.
- The PM/400 - Subset provides these graphs both semi-annually and annually.
- The quarterly or semi-annual graphs have been enhanced to give a review of the previous 12-months and the current month instead of just a 3-month review.
- The plotted data is used to generate trend lines.

CPU Utilization 12-Month Review

The CPU Utilization 12-month review graph (Figure 11-1) provides the same information as the daily CPU Utilization graph, except that utilization is averaged by weeks instead of days per month.

- X-axis—Weeks
- Y-axis—Percent CPU utilization

ABC Corporation PRODCPU - 1992 CPU UTILIZATION



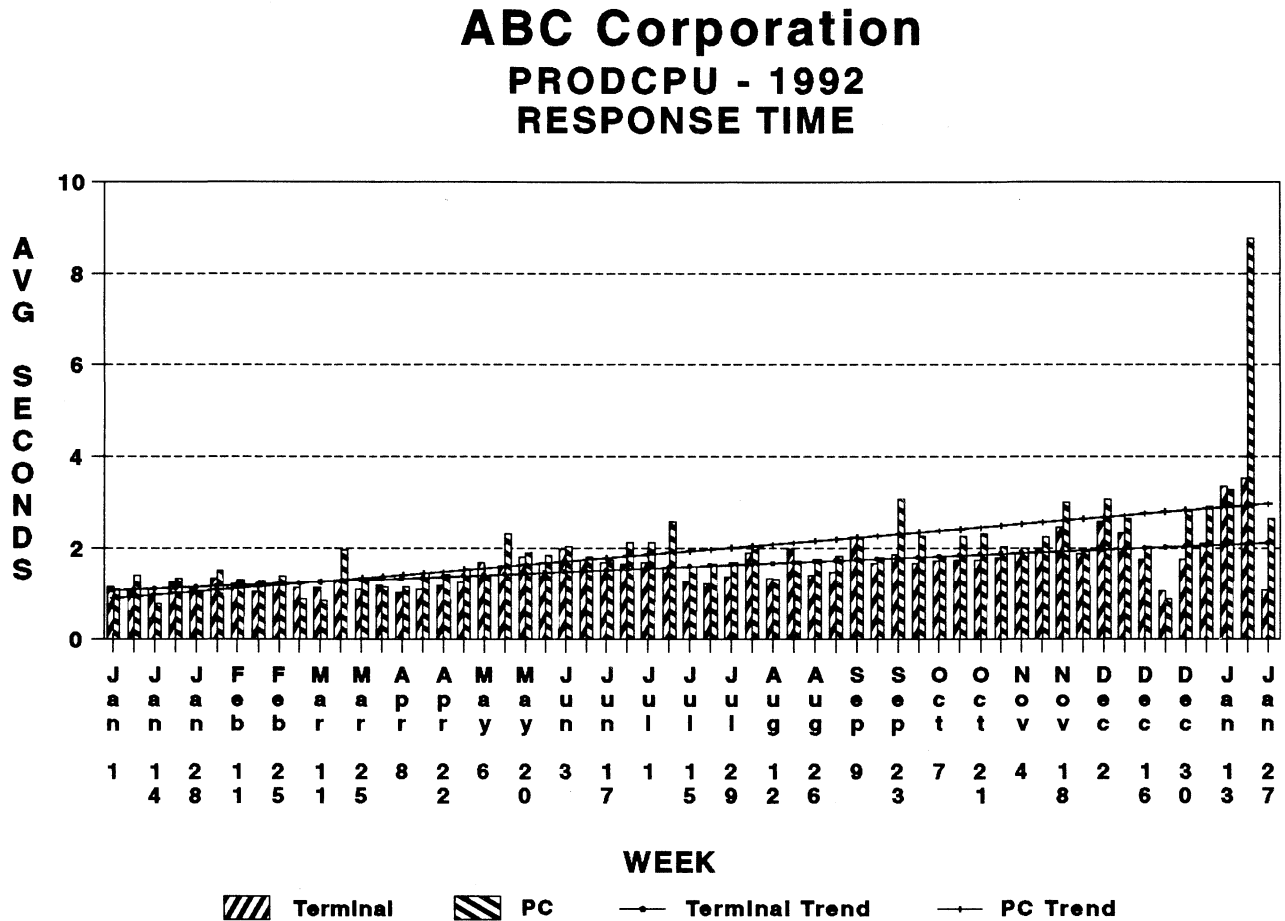
Prepared by IBM
First Shift

Figure 11-1. CPU Utilization Graph (12-Month Review)

Response Time 12-Month Review

The Response Time 12-month review graph (Figure 11-2) provides the same information as the daily Response Time graph, except that response time is averaged by weeks instead of days per month.

- X-axis—Weeks
- Y-axis—Average response time in seconds (bar chart)



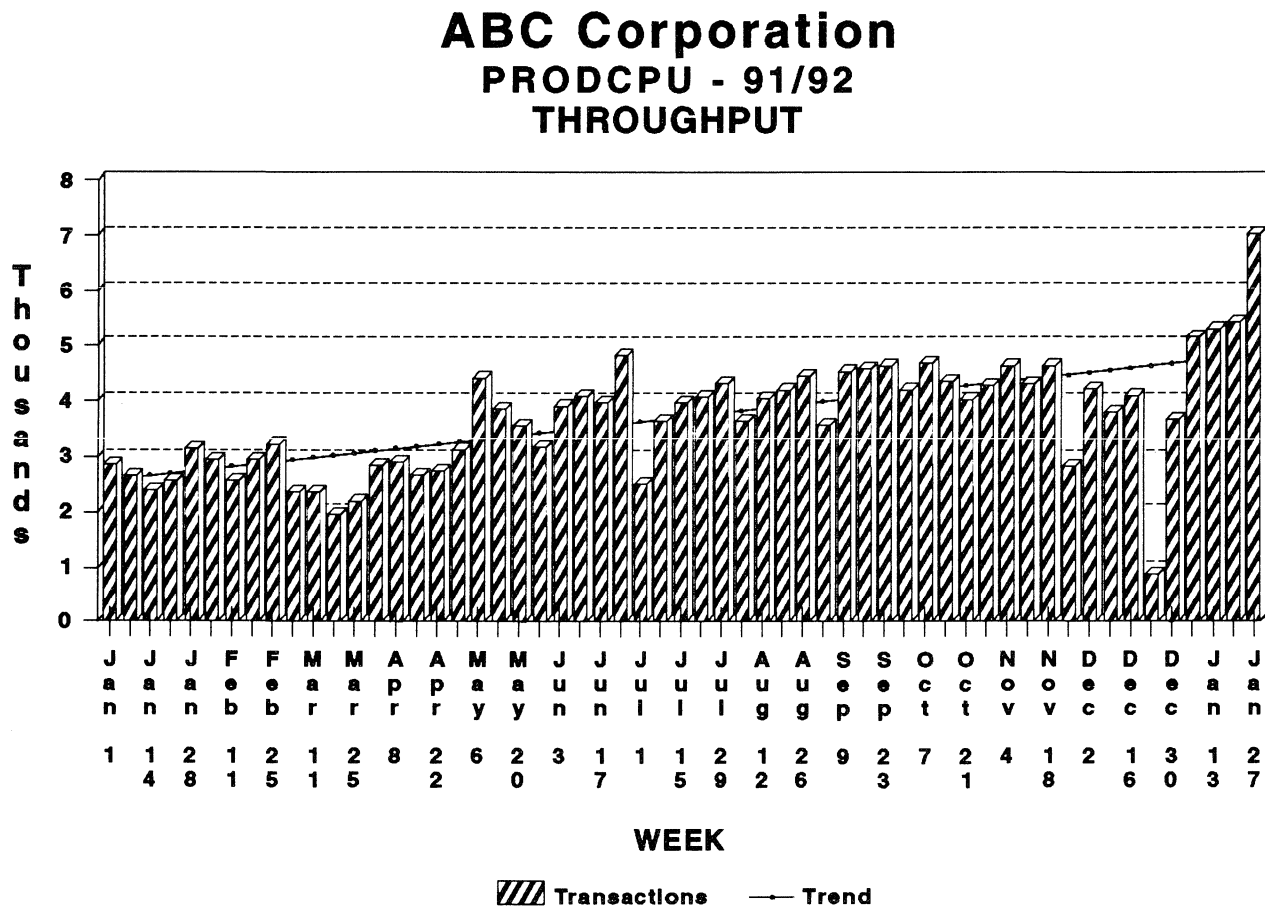
Prepared by IBM
First Shift

Figure 11-2. Response Time Graph (12-Month Review)

Throughput 12-Month Review

The Throughput 12-month review graph (Figure 11-3) is the same as the daily Throughput graph, except that throughput is averaged by weeks instead of days per month.

- X-axis—Weeks
- Y-axis—Average weekly transactions per hour



Prepared by IBM
First Shift

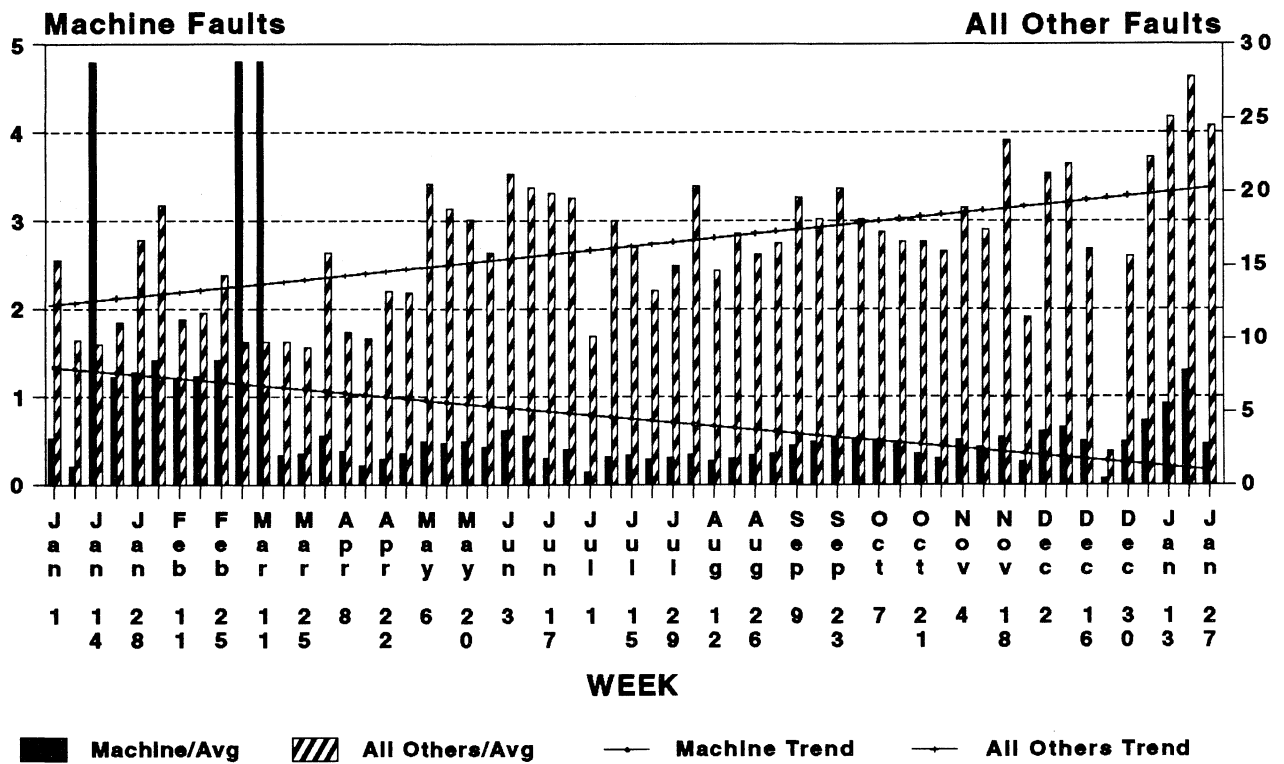
Figure 11-3. Throughput Graph (12-Month Review)

Faulting Rates 12-Month Review

The Faulting Rates 12-month review graph (Figure 11-4) provides the same information as the daily Faulting Rates graph, except that faulting rates are averaged by weeks instead of days per month.

- X-axis—Weeks
- Left Y-axis—Faults per second in the machine pool (blue bars and line)
- Right Y-axis—Faults per second for all others (green bars and line)

ABC Corporation PRODCPU - 1992 FAULTING RATES



Prepared by IBM
First Shift

Figure 11-4. Faulting Rate Graph (12-Month Review)

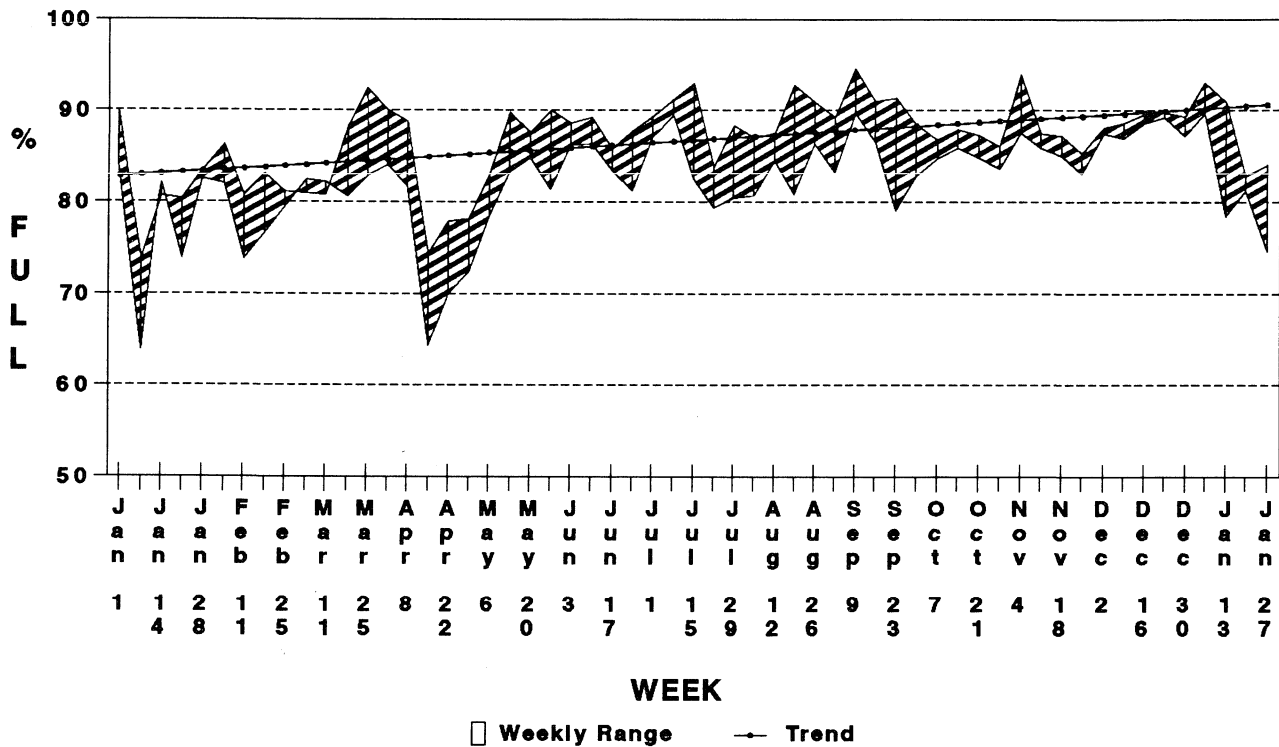
Disk Space 12-Month Review

The Disk Space 12-month review graph (Figure 11-5) shows the average high and low disk space utilization for each week.

- X-axis—Weeks
- Y-axis—Average high and low disk space utilization

In this example, the disk space was more than 90% full at the start of March. The disk capacity was added on April 15 and by the end of May, this new disk capacity was over 80% full.

ABC Corporation PRODCPU - 91/92 DISK SPACE



Prepared by IBM
First Shift

Figure 11-5. Disk Space Graph (12-Month Review)

Appendix A. PM/400 - Subset Online Data Review

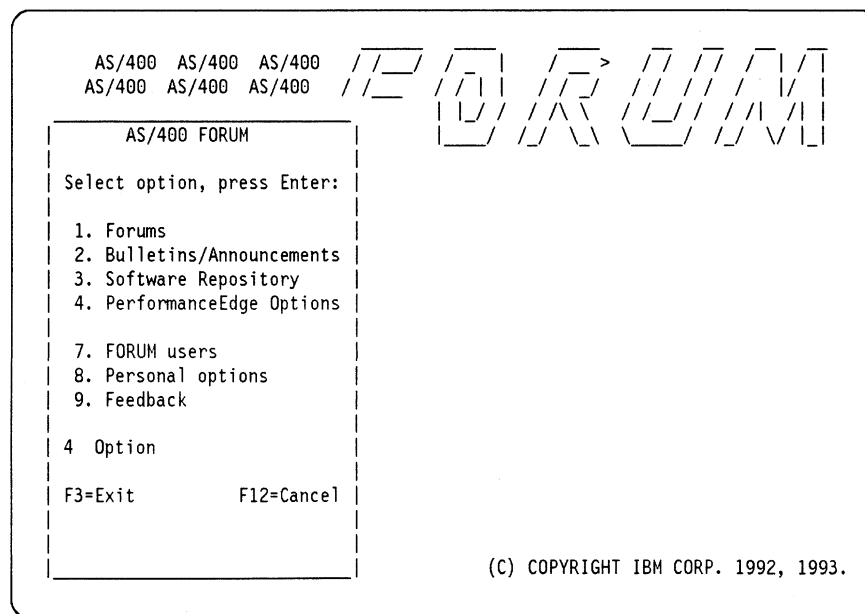
The following function is available as part of the PM/400 - Subset Service Exclusive. Check with your IBM Service Representative for availability in your country.

A feature of the PM/400 - Subset Service Exclusive is the ability to review PM/400 summarized data using AS/400 Forum. This allows you to review your CPU, Memory, and DASD utilization and trend information.

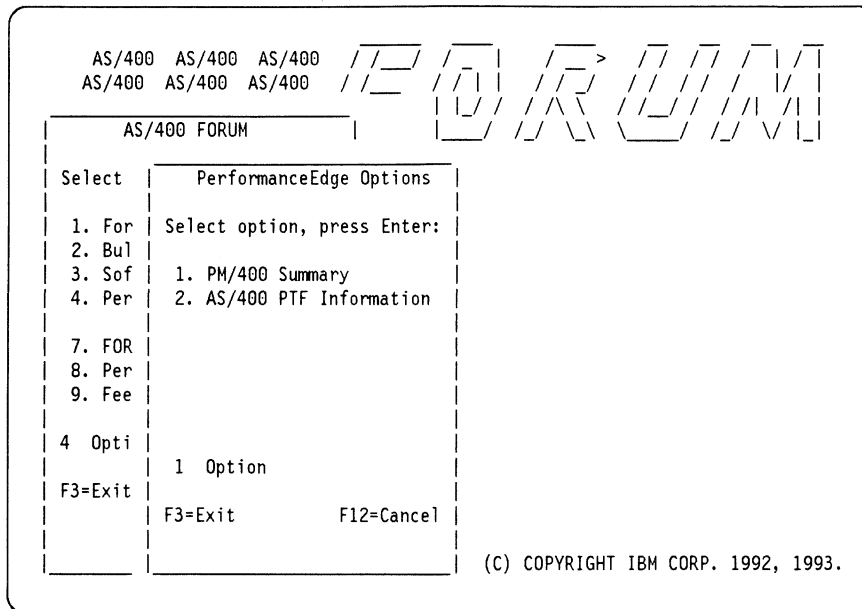
The following sequence of screens illustrates how you access the data for any AS/400 systems that you own. In this example the customer has two AS/400 systems.

It is assumed in this example that you have access to AS/400 Forum, and that you have been provided with the documentation necessary to sign on to the AS/400 Forum.

Once you have signed on to AS/400 Forum, select option 4 (PerformanceEdge Options) and press the Enter key.

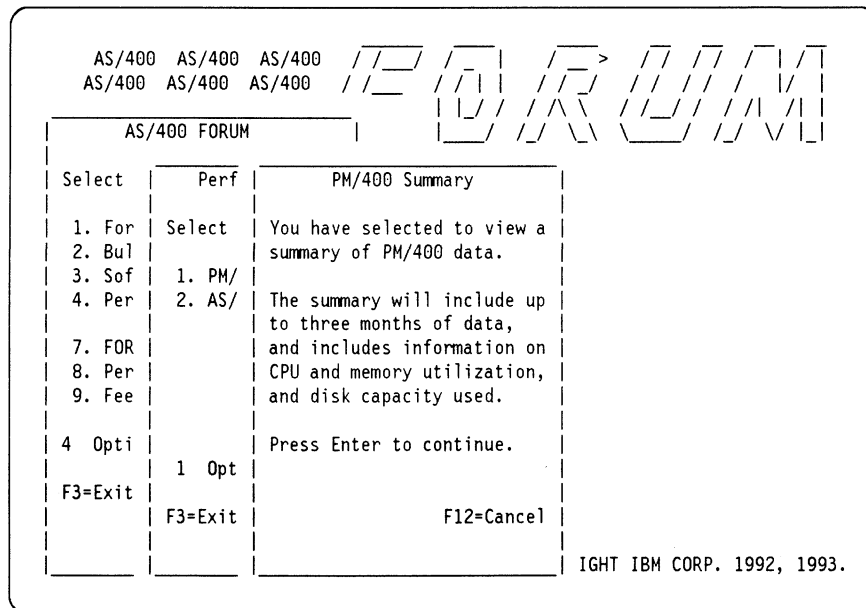


The PerformanceEdge Options window appears.



This option allows you to review the PM/400 Summary or to review AS/400 PTF information. To review the PM/400 Summary Data, select option 1 (PM/400 Summary) and press the Enter key.

The following panel briefly explains the PM/400 Summary option.



After pressing the Enter key, you are presented with a menu of the serial numbers of the AS/400 systems that you are allowed to view. Press the Enter key to select the system for which you want to review the PM/400 Summary data.


```

AS/400 AS/400 AS/400
AS/400 AS/400 AS/400
AS/400 FORUM
Select Perf P Select System
1. For Select You hav Enter the serial number and
2. Bu1 Select summary machine type of the AS/400
3. Sof 1. PM/ whose PM/400 summary data
4. Per 2. AS/ The sum you wish to view:
7. FOR and inc Serial number _____
8. Per CPU and Machine type _____
9. Fee and dis Press Enter to continue.
4 Opti Press E
F3=Exit 1 Opt
F3=Exit F3=Exit F12=Cancel
ORP. 1992, 1993.

```

Enter the 7-character serial number as stored in the system value QSRLNBR, and your system machine type, 9402, 9404 or 9406. Press the Enter key to show the CPU statistics.

CPU Statistics

The CPU statistics for shifts 1 and 2 are presented for the last 3-months. If PM/400 product has been active for less than 3-months, then fewer months are displayed.

In this example, the first shift System and High Priority CPU utilization has reached 55.0% for October. Based on the last 3-months of data, the System and High Priority workload are at 60% in 10.4-months (Mo/GL).

```

PM/400 - CPU Utilization
System serial 1015062 System name MY_AS400
Shift 1
AVE% Mo/GL Guideline (GL) = 60%
AUG 49.0 16.3 |XXXXXXXXXXXXXXXXXXXXXXXXX//|
SEP 52.0 13.2 |XXXXXXXXXXXXXXXXXXXXXXXXX//|
OCT 55.0 10.4 |XXXXXXXXXXXXXXXXXXXXXXXXX//|
+-----+-----+-----+-----+-----+-----+-----+-----+
10 20 30 40 50 60 70 80 90 100
Shift 2
AVE% Mo/GL Guideline (GL) = 60%
AUG 26.0 33.0 |XXXXXXXXXXXXX//|
SEP 28.0 31.2 |XXXXXXXXXXXXX//|
OCT 29.0 36.0 |XXXXXXXXXXXXX//|
+-----+-----+-----+-----+-----+-----+-----+-----+
10 20 30 40 50 60 70 80 90 100
NOTE: XX=system and high priority, //=other
F4=Promotions F5=Retrieve F11=Memory F12=Cancel

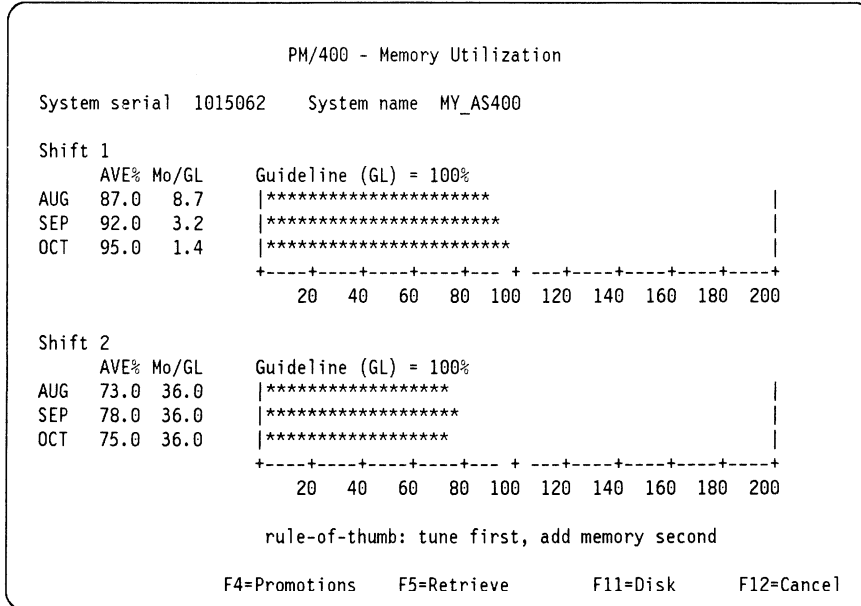
```

Press F11 (Memory) to view the Memory Utilization.

Memory Utilization

Memory Utilization is expressed as a percentage of the faulting guideline for your AS/400 system; therefore, the Guideline is set at 100%. If the memory utilization is above 100%, then the faulting is above the recommended guideline.

Remember, tune first and buy memory second. Often times, excessive faulting can be corrected by adjusting the activity levels of the pools and reappportioning memory.

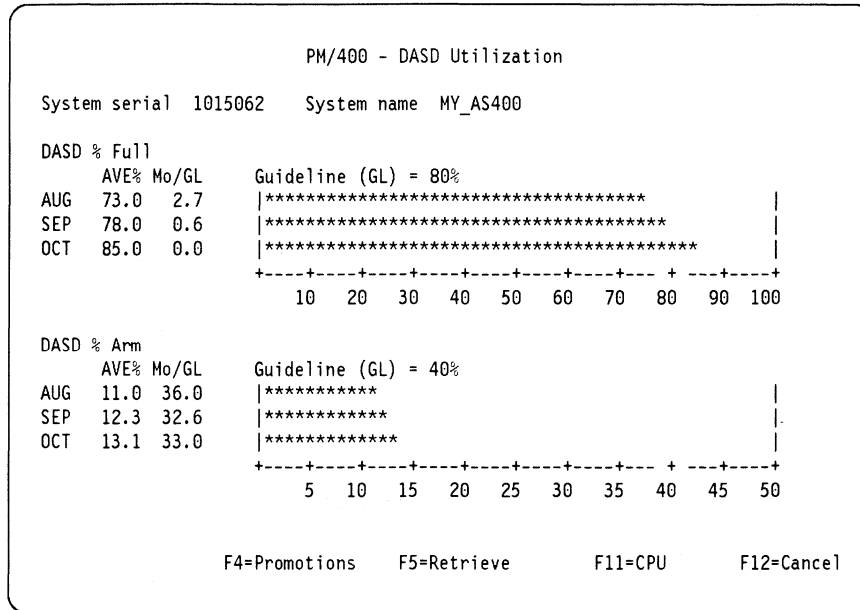


Press F11 (Disk) to view DASD Utilization.

DASD Utilization

DASD Utilization (percent full) is a critical performance variable. It is recommended that for good performance the DASD utilization be managed below 80%.

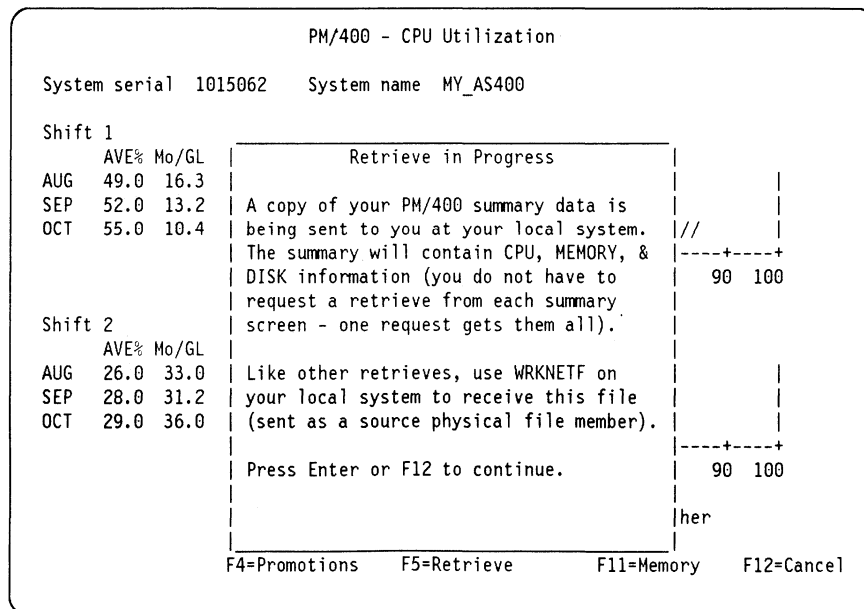
In this example, the DASD utilization has been growing and is currently at 85%. Some sort of corrective action is required. This could include deleting unused libraries, archiving and removing low usage libraries, reorganizing files to remove deleted records, and acquiring more DASD capacity.



Press the F5 (Retrieve) key to retrieve the PM/400 data.

AS/400 Retrieve of PM/400 Data

By pressing F5 (Retrieve) when reviewing your PM/400 summary data you can receive a file that can be viewed or printed on your AS/400 system. The following Retrieve in Progress panel appears indicating that the data is being sent to your AS/400 system.



The following is an example of data being retrieved using option F5.

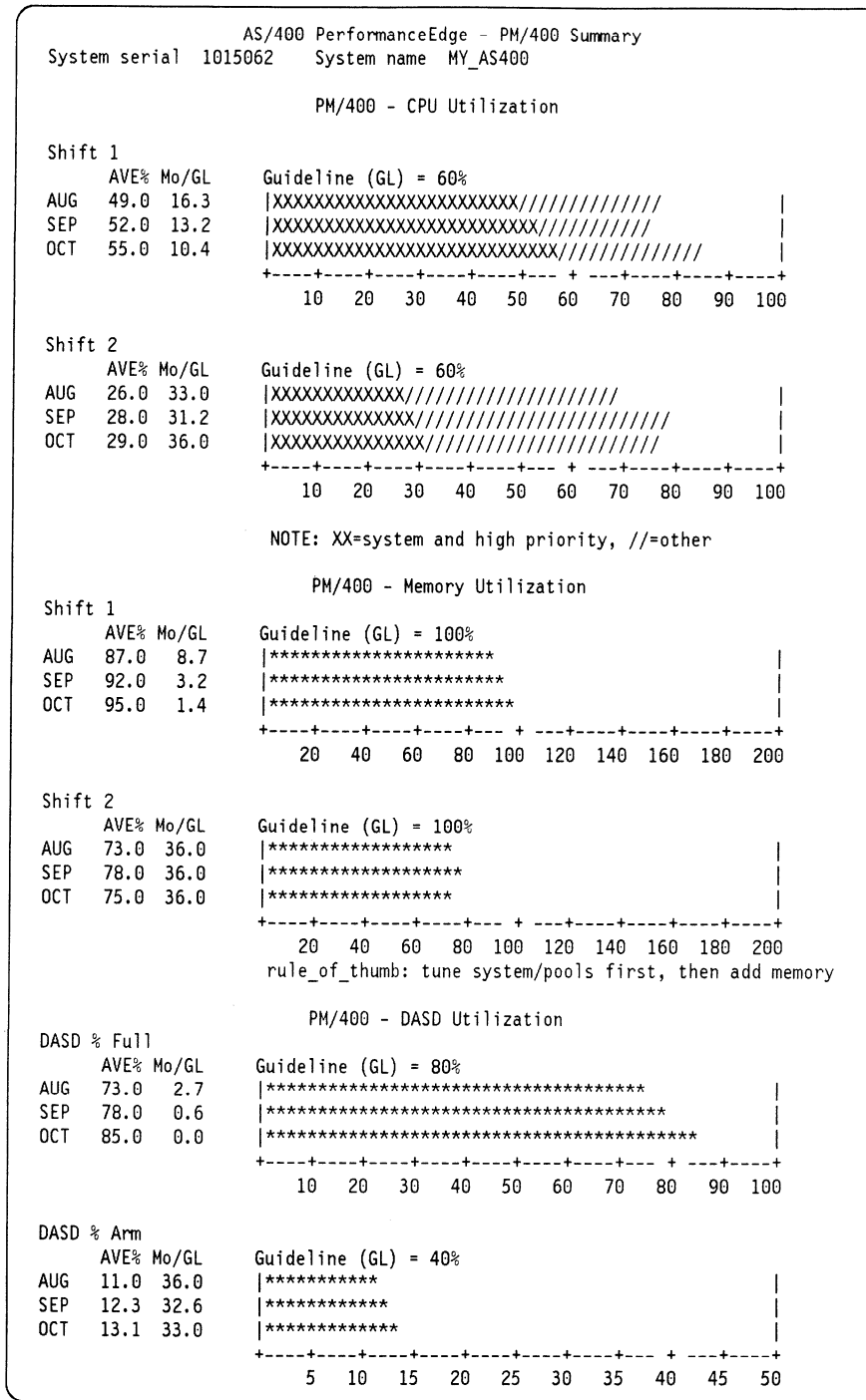


Figure A-1. PM/400 Summary Data Retrieve

Appendix B. Configuring PM/400 for Advantis

PM/400 is capable of supporting a connection to IBM AS/400 systems using Advantis (IIN). The assumptions are:

1. That the IBM sight supporting your geography supports Advantis, and has been given a local location name (LU).
2. That the AS/400 system that is running PM/400 is already enrolled with Advantis and has been assigned a local location name (LU) by Advantis.

Once the PM/400 product has been installed and the CFGPM400 command has been run, you are able to configure the PM/400 product for Advantis.

Displaying and Printing the MPGCTL Data Area

Perform the following to display and print the MPGCTL data area:

- On a command line type, DSPDTAARA and press CMD 4 to prompt.
- Specify the data area, enter Q1PCTL.
- Specify the library, enter QMPGLIB and press the Enter key.
- Print this screen for reference purposes by pressing the Print key.

Changing the PM/400 Data Area

You need to provide RMTLOCNAME, RMTNETID, and LCLLOCNAME to PM/400. You need to provide these variables in a data area:

1. Specify RMTLOCNAME (8 characters)

```
CHGDTAARA DTAARA(QMPGLIB/Q1PCTL  
(23 8)) VALUE('rmtlocname')
```

Where rmtlocname for customers in the United States and Canada is IKSUPT02.

Customers in other geographic areas should contact your local IBM support team for the Remote Location Name of the AS/400 system supporting your geography and record the name below.

Remote Location Name _____

2. Specify RMTNETID

```
CHGDTAARA DTAARA(QMPGLIB/Q1PCTL  
(42 8)) VALUE('rmtnetid')
```

Where rmtnetid for customers in the United States and Canada is APPN.

Customers in other geographic areas should contact your local IBM support team for the Remote Network Identifier of the AS/400 system supporting your geography and record the identifier below.

Remote Network Identifier _____

3. Specify LCLLOCNAME (8 characters)

```
CHGDTAARA DTAARA(QMPGLIB/Q1PCTL  
(50 8)) VALUE('lcllocname')
```

Where lcllocname is the location (LU) name assigned to your AS/400 by Advantis. Record the location name below.

Local Location Name _____

PM/400 senses that you have configured for Advantis and starts using the Advantis connection.

Appendix C. Changing System Time

Many countries around the world have put into effect some form of daylight savings time.

If you need to change the system time, do the following:

- End the performance monitor, type ENDPFRMON on the command line and press the Enter key.
- Change the system time.

PM/400 automatically restarts the performance monitor.

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Version 3

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