Memorandum To: Application System/400 Users

Subject: AS/400 Version 4 – Release 2.0

Please Note

This "Memo To Users" is intended to cover *only* significant changes that have potential impacts on current customers who are planning to install V4R2 on their AS/400 systems. For an overview of the enhancements for V4R2, see *What's New for AS/400 Operating System, OS/400 Version 4 Release 2*, G325-6351.

If your system is currently at V3R2 or V3R7, see also the *New Release Planning* book, SA41-5100-00, which describes the enhancements for V4R1. For significant changes that might have potential impacts, see the *Read This First* and the *Memorandum to AS/400 Users - Version 4 Release 1*. You can order these documents by entering the following command:

```
SNDPTFORD SF98016
```

Take Note!

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

First Edition (February 1998)

This edition applies to the licensed program IBM Operating System/400 (Program 5769-SS1), Version 4 Release 2 Modification 0.

This edition applies only to reduced instruction set computer (RISC) systems.

Contents

Notices

This information was developed for products and services offered in the U.S.A. IBM may not offer the products, services, or features discussed in this document in other countries. Consult your local IBM representative for information on the products and services currently available in your area. Any reference to an IBM product, program, or service is not intended to state or imply that only that IBM product, program, or service may be used. Any functionally equivalent product, program, or service that does not infringe any IBM intellectual property right may be used instead. However, it is the user's responsibility to evaluate and verify the operation of any non-IBM product, program, or service.

IBM may have patents or pending patent applications covering subject matter described in this document. The furnishing of this document does not give you any license to these patents. You can send license inquiries, in writing, to:

IBM Director of Licensing
IBM Corporation
500 Columbus Avenue
Thornwood, NY 10594
U.S.A.

For license inquiries regarding double-byte (DBCS) information, contact the IBM Intellectual Property Department in your country or send inquiries, in writing, to:

IBM World Trade Asia Corporation
Licensing
2-31 Roppongi 3-chome, Minato-ku
Tokyo 106, Japan

The following paragraph does not apply to the United Kingdom or any other country where such provisions are inconsistent with local law: INTERNATIONAL BUSINESS MACHINES CORPORATION PROVIDES THIS PUBLICATION "AS IS" WITHOUT WARRANTY OF ANY KIND, EITHER EXPRESS OR IMPLIED, INCLUDING, BUT NOT LIMITED TO, THE IMPLIED WARRANTIES OF NON-INFRINGEMENT, MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE. Some states do not allow disclaimer of express or implied warranties in certain transactions, therefore, this statement may not apply to you.

This information could include technical inaccuracies or typographical errors. Changes are periodically made to the information herein; these changes will be incorporated in new editions of the publication. IBM may make improvements and/or changes in the product(s) and/or the programs(s) described in this publication at any time without notice.

Licensees of this program who wish to have information about it for the purpose of enabling: (i) the exchange of information between independently created programs and other programs (including this one) and (ii) the mutual use of the information which has been exchanged, should contact:

IBM Corporation
Software Interoperability Coordinator
3605 Highway 52 N
Rochester, MN 55901-7829
U.S.A.

Such information may be available, subject to appropriate terms and conditions, including in some cases, payment of a fee.

The licensed program described in this information and all licensed material available for it are provided by IBM under terms of the IBM Customer Agreement or any equivalent agreement between us.

Keep all statements regarding IBM's future direction or intent are subject to change or withdrawal without notice, and represent goals and objectives only.

This information is for planning purposes only. The information herein is subject to change before the products described become available.

Trademarks

The following terms are trademarks of International Business Machines Corporation in the United States, or other countries, or both:

ADSTAR Distributed Storage Manager for AS/400
Advanced Function Printing
AFP
APPN
Application System/400
AS/400
Client Access
DB2
DRDA
IBM
Operating System/400
OS/2
OS/400
PowerPC
Print Services Facility
PSF
400

Microsoft, Windows, Windows NT, and the Windows 95 logo are registered trademarks of Microsoft Corporation.

Other company, product, and service names may be trademarks or service marks of others.

About "Memorandum to Users—Version 4 Release 2"

Two memos are distributed with Version 4 Release 2 Modification 0 (usually shown herein as Version 4 Release 2 or V4R2) of the Application System/400 (AS/400) system. Before you install the new release, you should read the following documents carefully:

- *Read This First*
  This document contains important information about your order. It also contains additional sources of information that will assist you with the successful installation of V4R2. It is important that you read this memo *first.*
- *Memorandum To AS/400 Users*
  This memo describes changes in V4R2 that could impact your programs or system operations. The information in this memo should be used to prepare for changes on your current release and to use the new release.

For an overview of the enhancements for V4R2, see *What's New for AS/400 Operating System, OS/400 Version 4 Release 2*, G325-6351.

Additional Incompatibility Information

For incompatibility information that was not available when this memo was published, see Informational APAR II10954.

Installing V4R2 Over V3R7

If you are currently using V3R7 and plan to install V4R2 (skipping over V4R1), there are additional considerations you should be aware of before you install the release. These considerations are found in the *New Release Planning* book, SA41-5100-00, which describes the enhancements for V4R1. This publication should be ordered and read so that you can fully understand all the changes made in V4R1. You should also order and read both the *Read This First* and the *Memorandum To AS/400 Users –Version 4 Release 1.* These documents contain incompatibility-related information about the new functions and enhancements incorporated into V4R1. You can order these documents by entering the following command:

```
SNDPTFORD SF98016
```

Upgrading to V4R2 from V3R2

If you are currently using V3R2 and plan to upgrade to V4R2 there are additional considerations you should be aware of. These considerations are found in the:

- *New Release Planning* book, SA41-4100-00, which describes the enhancements for V3R7.
- *New Release Planning* book, SA41-5100-00, which describes the enhancements for V4R1.

These publications should be ordered and read so that you can fully understand all the changes made in V3R7 and V4R1.

You should also order and read the *Read This First* and the *Memorandum To AS/400 Users –Version 3 Release 7* and the *Read This First* and the *Memorandum To AS/400 Users –Version 4 Release 1.* These documents contain incompatibility-related information about the new functions and enhancements incorporated into V3R7 and V4R1. You can order these documents by entering the following commands:

For V3R7:

```
SNDPTFORD SF98086
```

For V4R1:

```
SNDPTFORD SF98016
```

Besides the items documented in the *Memorandum to AS/400 Users*, there are some additional incompatibilities that need to be considered whenever upgrading to PowerPC Technology. These incompatibilities are documented in the *AS/400 Road Map for Changing to PowerPC Technology*, SA41-5150-01.

Who Should Use This Memo

This memo contains information critical for several audiences. For an audience description for each section in this memo, see "How This Memo Is Organized."

Also, you can refer to the table of contents for topics that pertain to you or the people who use your AS/400 system. Ensure that this memo is circulated to the appropriate people.

How This Memo Is Organized

This memo has three chapters, with the information grouped by licensed program within each chapter. Each chapter describes the OS/400 (Operating System/400) licensed program information first, followed by all other affected licensed programs (described in alphabetic order by their full program name), and followed by any other IBM programs.

The chapters are:

- "System Management Considerations" contains new release changes to systems management functions. This chapter is intended for the person responsible for systems management functions such as configuration and tailoring the system.
- "Operational Considerations" contains new release changes that may affect the way things operate or appear on the new release. This chapter is intended for all users of the AS/400 system.
- "Programming Considerations" contains new release changes that may affect existing applications. These changes may also affect applications saved on a V4R2 system to be restored on a previous release system. This chapter is intended for application programmers and system programmers who use the AS/400 system and its licensed programs, as well as for businesses with complex networks or application development businesses that have systems at different releases.

Installation Considerations

In previous releases, the *Memorandum To AS/400 Users* included an installation chapter that contained notices that could be critical to the successful installation and operation of your system. All information about the installation and installation-related tasks is now included in the *AS/400 Software Installation Version 4* book, SC41-5120-01, and the *AS/400 Road Map for Changing to PowerPC Technology* , SA41-5150-01. Therefore, before you install V4R2 on your system, be sure to read the *AS/400 Software Installation Version 4* book if you are at V3R7 or V4R1, or the *AS/400 Road Map for Changing to PowerPC Technology*, if you are at V3R2.

PTF Numbers in This Memo

PTF numbers in this memo may have been superseded.

Memos for Previous Releases

In addition to ordering the *Read this First* and the *Memorandum to AS/400 Users* for previous releases using the SNDPTFORD command, you may also view them through the Internet at URL http://as400service.rochester.ibm.com/.

1. Select: AS/400 Preventive Service Planning Information (PSPs)
2. Select: All Preventive Service Planning Documents by Release

How to send your comments

Your feedback is important in helping to provide the most accurate and high-quality information.

- You can mail your comments to the following address:

  IBM Corporation
  Attention Department 542
  IDCLERK
  3605 Highway 52 N
  Rochester MN 55901-7829 USA

- If you prefer to send comments by FAX, use either of the following numbers:

  United States and Canada: 1-800-937-3430
  Other countries: 1-507-253-5192

- If you prefer to send comments electronically, use this network ID:

  IBMMAIL, to IBMMAIL(USIB56RZ)
  IDCLERK@RCHVMW2.VNET.IBM.COM

System Management Considerations

This chapter describes changes to system management functions, such as configuring and tailoring the system, and is intended for the person who performs these functions.

IBM-Supplied Objects

If you have changed any IBM-supplied job descriptions or subsystem descriptions in library QSYS, some of the changes are saved when V4R2 is installed. Previously, changes you made to these objects were not saved when a new release was installed. For more information on which changes are saved, see the *Software Installation* book, SC41-5120-01.

If you have duplicated any IBM-supplied objects (such as commands), you may want to make new duplicates after the release is installed to take advantage of functions added in the new release. Existing duplicates of IBM-supplied objects may not work on V4R2.

Operating System/400 (5769-SS1)

OS/400 Licensing - Message Change

With Version 4, use of OS/400 software is controlled by an OS/400 license authorization code, otherwise known as a license key, for all AS/400 systems except for the 9401 Model 150. If you don't have this unique license key entered, OS/400 operates for a 70-day grace period, after which you cannot complete an IPL of the system until after a unique license key is entered. For V4R2, during that grace period, message CPF9E7D is sent to the QSYSOPR message queue every four hours until the key is entered or the grace period expires. Previously, on V4R1, message CPF9E72 was sent to the QSYSOPR message queue once for each license use request.

Saving and Restoring Journal Receivers to Previous Releases

For V4R2, to exchange journal receivers in a network between a V4R2 system and systems running earlier releases, PTFs must be applied to the earlier release systems. For the appropriate PTF numbers, see Informational APAR II10954.

More Tape Storage Needed for Saving Database Files

For V4R2, database files are converted to lengthen the current header extension area by 512 bytes of storage per file. This conversion takes place at first touch. The additional storage affects SAVE media. For example, for a system with 10,000 files that are being saved to tape, an additional 5,120,000 bytes would be needed in V4R2.

Restoring Objects

For V4R2, to improve security and data integrity, when restoring over existing objects there are now more situations when a copy of certain objects are made rather than just restoring over the existing object(s). There may be situations when two copies of objects are maintained for a period of time during install or restore operations. These situations cause the install or restore operations to require more space for these objects for a period of time, and could cause your user storage limits to be exceeded.

Escape message CPF384F, `&2 &1 not restored to library &3`, is no longer issued when a restore operation replaces an active program.

Default Value for USEOPTBLK Parameter of Save Functions

For V4R2, the default value for the USEOPTBLK parameter is changed from *NO to *YES on the following commands and API:

```
SAV          SAVOBJ
SAVCFG       SAVSAVFDTA
SAVCHGOBJ    SAVSECDTA
SAVDLO       SAVSYS
SAVLIB
QSRSAVO API
```

You should be aware of the following:

- Message CPD378A, `Parameter not valid with USEOPTBLK value`, is no longer sent if USEOPTBLK(*YES) is specified along with a TGTRLS value that doesn't support optimal block size. Instead the save completes, but optimal block size is not used.
- Message CPD378A, `Parameter not valid with USEOPTBLK value`, is no longer sent if USEOPTBLK(*YES) is specified with DTACPR(*YES). Instead the save completes, and if the optimal block size is 32K or larger, data compression is not performed and optimal block size is used. If the optimal block size is 32K or smaller, data compression is performed.

  Message CPD378A is also no longer sent if USEOPTBLK(*YES) and DTACPR(*YES) are specified along with a TGTRLS value that doesn't support optimal block size. Instead the save completes, optimal block size is not used, and data compression is performed.
- When the QlpHandleCdState API is used to put the system into CD-ROM state before doing a save, message CPF384E, `USEOPTBLK(*YES) not valid for CD-ROM premastering`, is no longer sent if USEOPTBLK(*YES) is specified. Instead the save completes, but optimal block size is not used.
- Tapes produced with USEOPTBLK(*YES) can only be duplicated by the Duplicate Tape (DUPTAP) command to a tape drive that supports the same block size. If you are creating a tape that you want to duplicate to other media types for distribution use, you should specify USEOPTBLK(*NO).

Primary Group Authority

For V4R2, primary group authority is included in the adopted authority check when the profile being adopted is the primary group of the object being accessed. Previously, primary group authority was only adopted in a very small subset of possible cases. There may now be cases where your users have more authority than previously.

Non-Expired Passwords Required for Starting Communications Jobs

For V4R2, requests to start APPC communications jobs with a userid and password are now rejected if that password has expired (has not been changed in the time interval specified in the user profile). Message CPF1269 with reason code 730, `Password has expired`, is sent to the QSYSMSG message queue (if it exists) or to the QSYSOPR message queue. Previously, requests with expired passwords successfully started the communications jobs.

Examples of applications and commands likely to be affected are user written programs that send in passwords, and DDM files where the device on the target system has SECURELOC(*VFYENCPWD) specified.

For Display Station Pass Through and Client Access, the expired passwords continue to be detected as they were on previous releases.

Security Level 10

The security level on your system is set by using the QSECURITY system value. In a future release, IBM may drop support for security level 10. IBM strongly recommends security level 40. You should plan to move to security level 40 or higher as soon as possible.

Changes to Command Authority

- The public authority for the following commands has been changed from *USE to *EXCLUDE and the user profiles QPGMR and QSYSOPR now have *USE authority to them:

  ```
  ADDPEXDFN     DLTPEXDTA
  CHGPEXDFN     STRPEX
  RMVPEXDFN     ENDPEX
  ```

- The Change Network Attributes (CHGNETA) command now requires *IOSYSCFG special authority.
- To use the End Journal Access Path (ENDJRNAP) and End Journaling PF Changes (ENDJRNPF) commands, you now also need *OBJOPR authority to the *JRN object.

Enforcement of Corequisite PTFs

On previous releases, a PTF may be applied, removed, or permanently applied without its corequisite PTFs. For V4R2, corequisite PTFs must be applied, removed, and permanently applied together. If you try to apply a PTF that has one or more corequisite PTFs, but one or more of the corequisite PTFs is missing, the PTF is not applied. A message is issued indicating that corequisite PTFs are missing.

Similarly, if you want to remove or permanently apply a PTF, all its corequisite PTFs must be removed or permanently applied at the same time. If you try to remove or permanently apply a PTF without its corequisite PTFs, the PTF is not removed or permanently applied. A message is issued indicating that the corequisite PTFs are missing.

For more information on PTF handling, see the *Basic System Operation Administration and Problem Handling* book, SC41-5206.

Attended IPL Required When System Date is Reset

Whenever the system date is reset, for example when an MFIOP is replaced or unplugged or the system control panel is removed or unplugged, the system date gets set to a default date of August 23, 1928. This causes scheduled jobs not to run, produces applications containing an incorrect date field, and produces profiles with expired passwords. On V4R2, you are now required to enter a correct system date on the next IPL after the system date is reset. The system forces the IPL into attended mode so that the correct system date can be entered. You must enter the system date for the IPL to continue. A message is sent to QHST and QSYSOPR explaining what happened to the IPL.

Add Performance Explorer Definition (ADDPEXDFN) Command

For V4R2, the default value for the JOB parameter on the ADDPEXDFN command is changing from *ALL to *, which means that only the job that does the Start Performance Explorer (STRPEX) command is included in the data collection session. If you want the command to include all jobs in the PEX data collection session as it did previously, you need to specify JOB(*ALL).

Also, for V4R2, a new TASK parameter is added to the ADDPEXDFN command, with a default value of *NONE. This default causes the ADDPEXDFN command to not include all Licensed Internal Code tasks, which previously it did include. If you want the command to include all Licensed Internal Code tasks, you need to specify TASK(*ALL)

Change to Power Down System (PWRDWNSYS) Command

On previous releases, if you issued a PWRDWNSYS OPTION(*IMMED) command and it took longer than the time specified in the QPWRDWNLMT system value, System Reference Code (SRC) B900 3F10 was displayed and the power down stopped. For V4R2, the SRC is no longer displayed. Instead, the system ignores the SRC and continues powering down. If you want the system to continue to display the SRC and stop the power down in this situation, you need to specify TIMOUTOPT(*SYSREFCDE) on the PWRDWNSYS command.

Communications Functions Moved from QSYSARB and QLUS

For V4R2, many APPC functions that used to be performed in the QSYSARB or QLUS system jobs are now done in one of the QCMNARBxx system jobs, where xx is a number 01-12. The following are a result of this change:

- For APPC configurations (APPC controller descriptions and their device descriptions), it is now necessary to look in the appropriate QCMNARBxx joblog for messages in addition to the QSYSARB or QLUS joblogs.

  You can find the appropriate QCMNARBxx job name by doing a DSPCTLD for the APPC Controller description. The *System job* field shows the name of the system job that is doing the work for that controller and its devices.
- APPC messages sent to the QSYSOPR message queue are now sent from the appropriate QCMNARBxx job rather than from the QSYSARB job. When you select F9=*Display message details* on the message in the QSYSOPR message queue, the *From job* field now shows the QCMNARBxx job.
- Automatically created APPC controllers and device descriptions have their text description changed slightly. The message text now reads "AUTOMATICALLY CREATED BY SYSTEM", rather than "AUTOMATICALLY CREATED BY QLUS".

The QCMNARB system value controls how many QCMNARB system jobs are started during the IPL, and is shipped with a default value of *CALC.

If you have APPC controller descriptions that have non-APPC device descriptions attached to them, these configurations do not use the QCMNARBxx jobs. These configurations continue to have work done in QSYSARB.

For more information on the QCMNARBxx system jobs, see the *Communications Management* book, SC41-5406.

Old Inquiry Messages Removed From QSYSOPR Message Queue

For V4R2, device, controller, line, and network interface failure inquiry messages are now removed from the QSYSOPR message queue when the affected object's status changes. For example, if you vary off a controller that has an unanswered inquiry message for it on the QSYSOPR message queue, that message is removed. Inquiry messages which have been answered are not affected by this change; they remain on the QSYSOPR message queue until some action is taken to remove them.

Even if a message is removed from the QSYSOPR message queue, the corresponding message remains in the QHST message queue.

Messages Sent to QSYSOPR Message Queue

Messages no longer sent: The following allocation messages are no longer sent to the QSYSOPR message queue, but are still sent to the QHST message queue:

- Message CPF1187, `Subsystem &1 cannot allocate work station &2.`
- Message CPF1273, `Communications device &2 was allocated to subsystem &1.`
- Message CPF1274, `Subsystem &1 cannot allocate communications device &2.`
- Message CPF1275, `Subsystem &1 cannot allocate device &2.`

If you need to determine what job has a device allocated, you can use the Display Device Description (DSPDEVD) command to see the allocation information. For non-APPC devices, this information is in the *Allocated to* field. For APPC devices, this information is on the *Active modes* display, showing which job each mode is allocated to.

Fewer messages sent: Previously, when a configuration object became unusable, messages were sent to the QSYSOPR message queue for that object as well as for all the configuration objects attached to it. Now, only a single message is sent for the configuration object that encountered the failure.

For example, when a line becomes unusable, only message CPI5942, `Line description &23 not usable at this time`, is sent to the QSYSOPR message queue. Previously, message CPI5941, `Controller description &24 not usable at this time`, was also sent for each controller attached to the unusable line, and message CPI5922, `Device description &25 not usable at this time`, was also sent for each device attached to each of the controllers.

To identify all of the configuration objects affected by a failure, use the Work with Configuration Status (WRKCFGSTS) command, specifying the object named in the message.

Automatically Created Virtual Devices and Controllers

For V4R2, the naming convention for automatically created virtual display devices and virtual controllers has changed.

Naming Convention for automatically created virtual display devices: Automatically created virtual display devices that use the QPADEV prefix are now named using alphanumeric characters. Previously, they were named with only numeric characters. The range of device names now goes from 0001 to ZZZZ.

Naming Convention for automatically created virtual controllers: For V4R2, the automatically created virtual controllers continue to use the naming convention QPACTLxx, where xx is a numeric from 01 to 99. However, if additional virtual controllers are needed, they are named QPACTL0001 and go through QPACTL9999, extending the names to 10 numeric characters (no alphanumeric, unlike display devices). Only customers that have more than 25,146 virtual devices see the new 10 character virtual controller naming convention on the new release.

Simplified Display Device Recovery

For V4R2, display device recovery has been simplified so that interactive subsystems no longer attempt to recover workstation devices when the devices are powered off. This includes all display device types; local workstations, remote workstations, and virtual display devices. Fewer messages now get logged to the joblog of the interactive subsystem.

Vary Configuration (VRYCFG) Command

For V4R2, a new FRCVRYOFF parameter is added to the VRYCFG command that allows you to force the vary off of an APPC controller and its attached devices when there are active jobs using the device. It also allows you to force the vary off of a network server description when there are active jobs using the network server.

Previously, you could create a data area, FRCVRYOFF, which was used to force a vary off of an APPC controller and its attached devices. With this support provided on the VRYCFG command, the data area is no longer used. If you have used the data area in the past, you should retrieve the information from the data area that you need and then delete the data area.

*JOBCTL special authority is now required to use the FRCVRYOFF(*YES) option or to end jobs by replying **G** to message CPA2610 in the QSYSOPR message queue.

Configure Device Media Library (CFGDEVMLB) Command

For V4R2, a CFGDEVMLB command specifying ADPTTYPE(*LAN) creates the APPN device description with ONLINE(*NO). The APPN device description is no longer varied on during an IPL. When using the Work with Configuration Status (WRKCFGSTS) display, you may notice that the APPN device description appears varied off until you vary on your MLB device description.

Local Area Network (LAN) Controller Descriptions

For V4R2, the value of *CALC of the LANRSPTMR parameter on the following commands now works differently for LAN controller descriptions:

```
CHGCTLAPPC      CRTCTLAPPC
CHGCTLFNC       CRTCTLFNC
CHGCTLHOST      CRTCTLHOST
CHGCTLRWS       CRTCTLRWS
CHGCTLRTL       CRTCTLRTL
DSPCTLD (where link type is *LAN or *FR)
```

For V4R2, specifying *CALC results in a three second wait (parameter value of 30), rather than just a one second wait (parameter value of 10) as it did in previous releases. LAN controller descriptions tolerate adverse network conditions three times longer than before. However, it takes three times longer to notice that a connection is broken.

Work with RouteD Configuration (WRKRTDCFG) Command

For V4R2, the HOST and NET statements are no longer valid on the WRKRTDCFG displays. This information is now specified on the Add TCP/IP Route (ADDTCPRTE) and Change TCP/IP Route (CHGTCPRTE) commands. If you specify the HOST or NET statements on the WRKRTDCFG displays, message TCP547F, `Configuration entry not valid`, is issued.

Start TCP/IP (STRTCP) Command

For V4R2, the Client Access host servers are automatically started when the STRTCP command is issued. These are the same host servers that start when the Start Host Servers (STRHOSTSVR) command is issued with SERVER(*ALL) specified. Previously, the STRTCP command did not start the Client Access host servers automatically. If you do not want the Client Access host servers automatically started, you can use the AS/400 Operations Navigator to select the servers you don't want started. The Operations Navigator updates the QATOCSTART file in library QUSRSYS.

To end the host servers, you still need to use the End Host Servers (ENDHOSTSVR) command.

Change TCP Attributes (CHGTCPA) Command

For V4R2, the IPRSBTIMO and ARPTIMO parameters on the CHGTCPA command have the following changes:

- The range for IPRSBTIMO has expanded to include the values 5 through 59. The value associated with the special value *DFT has changed from 120 to 10 seconds.
- The value associated with the special value *DFT for ARPTIMO has changed from 5 to 15 minutes.

Service Tools

For V4R2, altering storage now requires *ALLOBJ and *SERVICE special authorities.

Socket Host Servers - Option 12

Start Host Server (STRHOSTSVR) and End Host Server (ENDHOSTSVR) commands:

For V4R2, the *DRDA value is removed from the SERVER parameter of the STRHOSTSVR and ENDHOSTSVR commands.

CPA Toolkit - Option 15

Additional Authority Required for APIs: For V4R2, to use the *settimeofday* and *adjtime* APIs you must have *USE authority to the QP0ZXCPA service program in the QSYS library. Otherwise, the APIs fail with errno EPERM.

Printer Services Facility/400 - Option 17

Command Parameter Changes

RMTLOCNAME, PORT, and ACTTMR parameters: The RMTLOCNAME, PORT, and ACTTMR parameters are removed from the Create PSF Configuration (CRTPSFCFG) and Change PSF Configuration (CHGPSFCFG) commands. If you have programs that specify these parameters, they need to be changed.

RETRY parameter: The RETRY parameter on the CRTPSFCFG and the CHGPSFCFG commands now applies to device descriptions configured as DEVCLS(*LAN), LANATTACH(*IP), and AFP(*YES) in addition to printer device descriptions configured as AFPATTACH(*APPC) and AFP(*YES). RETRY now applies to all attempts to connect with a printer, such as at PSF initialization using the Start Print Writer (STRPRTWTR) command and reconnecting after a session has been released.

Also, the default value of the RETRY parameter is changed from 2 to 15 retries.

RETRYDLY parameter: The default value for the RETRYDLY parameter on the CRTPSFCFG command is changed from 0 to 90 seconds.

These default changes for the RETRYDLY and RETRY parameters do not affect existing PSF configuration objects. However, if a PSF configuration object is not specified in a printer device description, the new default values are used. If you do not want to use the new default values, you need to create a PSF configuration object, specifying different values for the RETRY and RETRYDLY parameters. Then, you must specify that PSF configuration object in the printer device description.

AS/400 Advanced Function Printing Utilities (5769-AF1)

More Restrictive Public Authority of Sample Files

For V4R2, the sample files for the Advanced Function Printing Utilities (files named QAFCxxxx) in libraries QGPL and QAFP now have public authority *USE. Previously these files had public authority of *CHANGE. These files include the sample source overlay files, PFD definition files, database files, and the sample graphics (GDF) file.

OS/400 Integration for Novell NetWare (5769-SA3)

QFPATIME Data Area No Longer Supported: For V4R2, a new SYNCTIME parameter is added to the Create Network Server Description (CRTNWSD) and Change Network Server Description (CHGNWSD) commands that allows you to synchronize the NetWare server date and time with the AS/400 system date and time. On V4R1, support for this was provided with a PTF which allowed you to create data area QFPATIME in library QUSRSYS, which caused the NetWare monitor job to synchronize the server date and time with the system date and time every 30 minutes. Without the PTF, the server date and time is synchronized with the system date and time only one time after the vary on of the NetWare server.

For V4R2, the system no longer checks for data area QFPATIME. If you created this data area in V4R1 and want the same support it provided, you need to use the CHGNWSD command to change the SYNCTIME parameter to *YES.

Message Queue Manager/400 (MQM/400) (5769-MQ1)

Additional User Libraries

For V4R2, two additional libraries, QMQMDATA and QMQMPROC, which contain user data, are now saved when all user libraries are saved using the Save Library (SAVLIB) command with LIB(*ALLUSR) specified.

Performance Tools/400 (5769-PT1)

Print Performance Explorer Report (PRTPEXRPT) Command

For V4R2, the default value for the first element of the TRACEOPT parameter on the PRTPEXRPT command has changed from *TIMESTAMP to *TASK.

Changes for DDM Job Database I/O

For V4R2, the logical database I/O counts for DDM server jobs have been removed from the total transaction counts and are now shown in separate columns, sections, fields, or rows. The following displays, commands and reports are changed:

Analyze Performance Data (ANZPFRDTA) Command: The DDM counts are removed from the Select Time Intervals to Analyze display *Transaction count* column. If you want to know information about DDM counts, you need to run the Display Performance Data (DSPPFRDTA) command.

Display Performance Data (DSPPFRDTA) Command: The DDM counts are removed from the the Select Time Intervals to Display display *Transaction count* column. A new line is added to the Display Performance Data display to report DDM counts.

Display Performance Graph (DSPPFRGPH) Command: The DSPPFRGPH command now generates a new graph for DDM information. This command also generates the QAPGSUMD file, which has changed to save the DDM information that is used to display the new graph.

Print System Report (PRTSYSRPT) Command: The DDM counts have been removed from the *Workload* section *Number Transaction* column and are added to the *Logical I/O count* column. The DDM counts are also removed from the *Resource Utilization* section *Tns/Hour Rate* column.

Print Component Report (PRTCPTRPT) Command: The DDM counts are removed from the *Component Interval Activity* section *Tns/Hour* and *Rsp/Tns* columns. A new column *DDM I/Os* has been added.

Print Job Interval Report (PRTJOBRPT) Command: The DDM counts are removed from the *Interactive Job Summary* section *Tns Count* and *Tns/Hour* columns. A new column *DDM I/Os* has been added.

Work with System Activity (WRKSYSACT) Display

For V4R2, changes have been made to the automatic refresh function on the Work with System Activity display. The F19 key is now also used to end the automatic refresh function. Previously, the Attention key (*Attn*) was used to end an automatic refresh session.

Also, the WRKSYSACT displays for Views 2 and 3 no longer have priority (*Pty*) or CPU utilization (*CPU Util*) columns as they had previously. These two columns are replaced with a new column for thread identifier (*Thread ID*). The *Pty* and *CPU Util* columns are still displayed in View 1 of the WRKSYSACT display.

Thread Identifiers in Reports

Some of the reports generated by the PRTxxxRPT commands have changed to include a thread identifier. Some reports have added an additional column for the thread identifier; other reports use an existing column.

For more information on these changes, see the *Performance Tools for AS/400* book, SC41-5340.

TCP/IP Connectivity Utilities (5769-TC1)

Device Recovery for TELNET Sessions

Device Recovery for Network Station TELNET Sessions: On previous releases, support was provided with PTFs that allowed TELNET-attached jobs for Network Stations to specify a user defined virtual device name, rather than using virtual devices with names of QPADEVxxxx. However, these TELNET jobs did not support the disconnect options of the QDEVRCYACN system value, or the DEVRCYACN job attribute. If you tried to use the disconnect options (*DSCMSG or *DSCENDRQS) of device recovery or tried to use the Disconnect Job (DSCJOB) command from any TELNET session, message CPF1358, `DSCJOB not allowed for server jobs`, was sent to the joblog of the ending job. For V4R2, the disconnect option of device recovery now works for Network Station TELNET-attached jobs and message CPF1358 is no longer sent.

Device Recovery for Other TELNET Sessions: For V4R2, TELNET supports user written exit programs for session initialization. If you write an exit program that selects a virtual display device name, then the disconnect options are allowed.

Inactivity Timeout System Values

For V4R2, the settings of the QINACTITV and QINACTMSGQ system values now affect the following functions:

- TCP/IP TELNET
- IPX TELNET
- Workstation Gateway
- Any TELNET-like application that uses the Virtual Terminal APIs

When the QINACTITV interval expires, jobs using any of the above functions are included in the processing as defined by QINACTMSGQ.

Previously, the settings of the system values had no effect on the above functions. For some of these functions there were other ways to have sessions end due to inactivity. To have TCP/IP TELNET or Workstation Gateway sessions end due to inactivity, you had to use the Change TELNET Attribute (CHGTELNA) command or the Change Workstation Gateway Attribute (CHGWSGA) command to specify a specific value in the INACTTIMO parameter (the default value is 0). If you have used this parameter in the past to cause sessions to end, you should set the parameter back to 0 and use the setting of the QINACTITV and the QINACTMSGQ system values, which provide more function. In a future release, IBM may choose to no longer support the INACTTIMO parameter on the CHGTELNA and CHGWSGA commands.

For V4R2, if you specify a value other than 0 in the INACTTIMO parameter on either the CHGTELNA or the CHGWSGA commands, you should be aware that the QINACTITV value may also be used. Whichever interval expires first takes effect.

Operational Considerations

This chapter is intended for all users of the AS/400 system. This chapter contains new release changes that may affect the way things operate or appear on the new release.

Operating System/400 (5769-SS1)

Graphic Character Set JIS 90

For V4R2, a new Graphic Character Set know as JIS 90 is provided on the OS/400 for data sharing purposes. JIS 90, also known as CCSID 943, is based on earlier JIS standards, but adds two characters and changes the graphic representation of 11 characters. The appearance of these 11 characters is slightly different with V4R2.

Work with Directory Entry (WRKDIRE) Display Changes

For V4R2, changes have been made to some of the field options on the WRKDIRE displays. On the displays that appear when you specify *1=Add* or *2=Change* from the first WRKDIRE display, options have changed for the *Mail service level* field and the *Preferred address* field. For the *Mail service level*, the other mail service option has changed from 3 to 9. For the *Preferred address* field, the other preferred address option has changed from 4 to 9. If you are used to specifying a 3 for the *Mail service level* field or a 4 for the *Preferred address* field, you now need to specify a 9 instead.

Main Storage Dump Displays

For V4R2, the order of options on the Select Main Storage Dump Process and Select Main Storage Dump Task displays is changed to match the order of options from the Display/Alter/Dump service function. There are now the following five options on these displays:

1. From task/process name
2. From Task Dispatching Element (TDE) address
3. From TDE number
4. From TDE ID
5. From list of tasks/processes

Programming Considerations

This chapter describes new release changes that may affect existing applications. These changes may also affect applications that are saved on a V4R2 system to be restored on a previous release system. The chapter is intended for application programmers and system programmers who use the AS/400 system and its licensed programs, networked enterprises, and application development businesses that have systems at different release levels.

Operating System/400 (5769-SS1)

Output File Changes

Changes made to output files for the new release may affect your applications. When fields are added to the end of the previous record format, you should specify no level checking (LVLCHK(*NO)) so your applications run the same as they did previously.

Model Output Files for Security Auditing: Beginning with V4R2, enhancements to any existing output files or any new output files for security auditing are provided in the *TYPE4 format only.

JBXRFR field of QAPMJOBS file: For V4R2, the JBXRFR field in the QAPMJOBS output file created by the Start Performance Monitor (STRPFRMON) command now returns the number of stream file reads, including the number of file system symbolic link reads. Previously, the JBXRFR field returned the number of regular file reads, which is the number of stream file reads minus the number of file system symbolic link reads. If you have programs that retrieve information from this field, it may now return a larger number than previously.

Larger Sequence Numbers for Tapes: For details on output file changes made because of the larger sequence numbers for tapes support, see "Larger Sequence Numbers for Tapes" on page 16.

UCS-2 Sort Sequence Tables: For details on output file changes made because of the support for UCS-2 sort sequence tables, see "UCS-2 Sort Sequence Tables" on page 16.

Journal Changes

Journal Entry Changes: For V4R2, several changes have been made that affect journal entries. If you use the Display Journal (DSPJRN), the Retrieve Journal Entry (RTVJRNE) or the Receive Journal Entry (RCVJRNE) commands to display, retrieve, or receive journal entries, you should be aware of the following:

Journaled Object Names: The name that appears for a journaled object is now the same name as it was at the time of the journal entry deposit. On previous releases, the name that appeared for a journaled object was the name that the object was last known by on the system. For example, if you journal a file called FILEOLD, then you do a put of a record and rename the file to FILENEW, when you displayed the put record entry, it gave FILENEW as the object name instead of FILEOLD. Now on V4R2, the name FILEOLD is displayed when viewing the entry.

System Name: The system name that appears in a journal entry is now the system name where the journal entry was actually deposited. On previous releases, the system name that appeared was the name of the system you were doing the display, retrieve, or receive on. Now on V4R2, if you restore a journal receiver from System A to System B, the system name that appears for the journal entries in that receiver is System A, not System B as it was previously.

Journal Entries no Longer Sent: The following two journal entries are no longer sent to the journal, and are not viewable when looking at journal entry data.

```
Journal Code -  F  - For Database File member operation
  Entry Type -  PM - Access path moved
  Entry Type -  PN - Access path renamed
```

Change Journal (CHGJRN) Command During Install of V4R2: During the first IPL after V4R2 is installed, a CHGJRN command to attach a new journal receiver is done once for all user managed journals that exist on the system. If you always save your journal receivers after a CHGJRN command, you may want to save them after V4R2 is installed.

Dual Journal Receivers: In a future release, the Create Journal (CRTJRN) and CHGJRN commands may be changed so that you can only create or change a journal with one single journal receiver attached at any time. If you have dual journal receivers when this future release is installed, no entries will be deposited to the dual receiver, they will only be deposited to the first of the duals. You will still be able to display, or view entries from old dual receivers.

If you want to protect your journal receivers, you can mirror the ASP where the journal receivers reside, or have RAID DASD in the ASP where the journal receivers reside. In addition, you can use the remote journal support provided in V4R2. For more information on the remote journal support, see the *Backup and Recovery* book, SC41-5304-01.

National Language Decimal Format

For V4R2, support has been added to determine the decimal format for edited numeric output fields when a display or printer file is opened. The new support is the default for files created on V4R2 using the Create Display File (CRTDSPF) or the Create Printer File (CRTPRTF) commands. Files created prior to V4R2 can be changed to use the new support by specifying DECFMT(*JOB) on the Change Display File (CHGDSPF) or the Change Printer File (CHGPRTF) command, except for files with 3-character and 4-character EDTCDE(Y) fields. Files with those edit codes must use the CRTDSPF or CRTPRTF command to get the new support.

Previously, support for determining the decimal format when the file is opened was provided with PTFs. As part of the PTF support, you can create data area QWSDECFMT to specify the decimal format to use. The value in the data area overrides the value in the QDECFMT system value. If you are using the QWSDECFMT data area , you should switch to use the V4R2 job attribute support. In the future, IBM may no longer support the QWSDECFMT data area. You can specify the decimal format job attribute on the Change Job (CHGJOB) command or the Change Job (QWTCHGJB) API.

SOMOBJID Parameter on the Restore (RST) Command

The SOMOBJID parameter on the RST command is an obsolete parameter which, when specified, does not have any affect on the RST operation. In a future release, IBM may choose to delete this parameter from the RST command.

Larger Sequence Numbers for Tapes

For V4R2, the save and restore commands (SAVxxx and RSTxxx) have now added support for tape sequence numbers that are larger than 9999. Several messages now have a new large sequence number field. If the tape sequence number is greater than 9999, the new field is used and the existing sequence number field contains ++++. If you have applications that retrieve the sequence number from the existing sequence number field, they need to be changed to retrieve the information from the new field if you want to handle sequence numbers greater than 9999. Following are the messages that have the new field:

```
CPC3DC4    CPC3704    CPD370E    CPF3711    CPF3718
CPC3DC5    CPC3724    CPD372C    CPF3712    CPF375F
CPC3DC6    CPC9023    CPD3721    CPF3713    CPF3771
CPC3728    CPC9410    CPD3729    CPF3714    CPF3774
CPC370C    CPD3DE4    CPD375D    CPF3715    CPF3837
CPC370E    CPD3DE5    CPD3772    CPF3716    CPF3839
CPC3701    CPF416E    CPF3710    CPF3717    CPF9003
CPF902E
```

Also, some model output files now contain a new field for the larger sequence numbers. If the tape sequence number is larger than 9999, the new field is used and the existing sequence number field contains -5. If you have applications that retrieve the sequence number from the existing sequence number field, they need to be changed to retrieve the information from the the new field if you want to handle sequence numbers greater than 9999. Following are the output files, with the commands they are used by, that contain the new field:

```
   File Name        Command Name
---------------    ----------------
   QADSPOBJ           DSPOBJD
   QAOJSAVO           SAVDLO
   QASAVOBJ           SAVOBJ, SAVLIB, SAVCHGOBJ, SAVSECDTA,
                        SAVCFG, SAVSYS
   QAOJRSTO           RSTDLO
   QASRRSTO           RSTLIB, RSTCFG, RSTUSRPRF, RSTOBJ
```

For additional considerations for using larger sequence numbers for tapes, see the *Backup and Recovery* book, SC41-5304.

UCS-2 Sort Sequence Tables

For V4R2, support for UCS-2 sort sequence tables is provided to allow UCS-2 data to be sorted. Previously, only single-byte sort sequence tables were supported and there was no sorting of UCS-2 fields other than using hex. You should be aware of the following for UCS-2 data:

- Files created on releases prior to V4R2 that have sort sequence tables and UCS-2 fields in them can be restored to V4R2, but the UCS-2 fields sort differently on the new release. The sort sequence tables for these files are automatically converted to the UCS-2 CCSID so that the UCS-2 fields are sorted as well.

  A file created on V4R2, with a single-byte sort sequence specified can be saved and restored on a previous release. However, if there are UCS-2 fields in the file, those fields are only sorted in hex on the previous release.

- For files that are recreated on V4R2 that have a single-byte sort sequence table and UCS-2 fields that are keyed, select/omit or joined, a UCS-2 sort sequence table is generated for the V4R2 file. The UCS-2 fields sort differently than on previous releases.

- Because sort sequence tables can now be applied to UCS-2 data, different data can be returned than was returned on previous releases for queries and views that contain UCS-2 data.
- UCS-2 sort sequence tables can require significantly more space than single-byte tables. Single-byte sort sequence tables are always 256 bytes. The average size of a UCS-2 sort sequence table is 1500 bytes, with a maximum size of approximately 256K bytes. There are situations where the UCS-2 sort sequence tables are stored within files, programs, and SQL packages, which increases the size of these objects.
- Views, files, and SQL programs that contain a UCS-2 sort sequence table are not allowed to be saved and restored or distributed to previous releases.
- The record format in the model outfile QAFDCSEQ from the Display File Description (DSPFD) command has a new field which contains up to 2000 bytes of a UCS-2 sort sequence table. If there is a UCS-2 sort sequence table, this field is filled in and the field for the single byte table is all blanks. If you have programs that retrieve data from the single byte table field, they may need to be changed to also retrieve data from the new UCS-2 table field. If the UCS-2 sort sequence table is greater than 2000 bytes, another new field in the record indicates that the stored data is truncated.

Dynamic Screen Manager (DSM)

For V4R2, if you specify a display file name on the Create Low-Level Environment (QsnCrtEnv) or the Change Low-Level Environment (QsnChgEnv) API, the API fails with message CPFA344, `The file &2 in library &3 is not valid. Reason code &1.`, if the file is not a display file.

Overrides Scoped to ILE Activation Groups

For V4R2, more commands process overrides scoped to ILE activation groups. The following commands now process such overrides for both the TOFILE and FROMFILE parameters:

```
CPYF            CPYSRCF
CPYFRMDKT       CPYSPLF
CPYFRMTAP       CPYTODKT
CPYTOTAP
CPYFRMQRYF  (only the to file is capable of being overridden)
```

The following commands now process such overrides for the SRCFILE parameter:

```
CRTBNDCL        CRTFORMDF       CRTPAGSEG
CRTCLMOD        CRTGSS          CRTPF
CRTCLPGM        CRTICFF         CRTPRTF
CRTCMD          CRTLF           CRTSRCPF
CRTDSPF         CRTOVL          CRTTBL
CRTFNTRSC       CRTPAGDFN       RTVCLSRC
RTVCFGSRC
```

The following commands now process such overrides for the specified parameter:

```
DCLF    (FILE parameter)
SBMRMTCMD  (DDMFILE parameter)
```

Openness Includes - Option 13

RPG Includes for the Retrieve User Information (QSYRUSRI) API: For V4R2, the QSYRUSRI API RPG includes (as found in QSYSINC/QRPGSRC and QSYSINC/QRPGLESRC) have four field element names that are changed.

For the QSYSINC/QRPGSRC include, the following are changed.

Old Name	New Name
QSYC30	QSYC3V
QSYC3M	QSYC3Q
QSYC3N	QSYC3R
QSYC3P	QSYC3S

For the QSYSINC/QRPGLESRC include, the following are changed:

Old Name	New Name
QSYOP00	QSYTICAL00
QSYLCO	QSYLO
QSYLCL	QSYLL
QSYGRPMBR	QSYGMI03

DB2/400 Query Manager and SQL Development (5769-ST1)

UCS-2 Sort Sequence Tables

For sort sequence considerations for UCS-2 data see "UCS-2 Sort Sequence Tables" on page 16.

Overrides Scoped to ILE Activation Groups

For V4R2, SQL now processes overrides scoped to ILE activation groups.

QSYS2/SYSPROCS Catalog File

The IS_VARIANT column in the QSYS2/SYSPROCS catalog file is changed to the IS_DETERMINISTIC column. Any programs that contain SQL statements that reference the IS_VARIANT column need to be changed to reference the IS_DETERMINISTIC column and recompiled.

ILE COBOL for AS/400 (5769-CB1)

New Reserved Words

For V4R2, the following reserved words are added:

TYPEDEF
LOCALE
LOCAL-STORAGE
RECURSIVE

If you have defined any variables named with any of these words for use in your ILE COBOL programs, you need to rename them. An error is issued by the ILE COBOL compiler if any of these words are user defined in your ILE COBOL programs. Previously, these values were allowed to be user defined.

The error occurs only if the programs are compiled for V4R2.

ILE RPG for AS/400 (5769-RG1)

QWSDECFMT Data Area No Longer Supported

For V4R2 a new DECFMT job value is provided for specifying the job decimal format. In previous releases, ILE RPG programs compiled with a PTF applied and specifying DECEDIT(*JOBRUN) in the control specifications may have used data area QWSDECFMT to specify the job decimal format. For V4R2, the data area is not used. Instead, the decimal format for the job must be set to the value that was specified in the data area. Otherwise, the value in the QDECFMT system value is used. The job decimal format can be specified by the Change Job (CHGJOB) command or the Change Job (QWTCHGJB) API.

Indicator Changes

The following changes may affect programs that are recompiled for V4R2:

- Indicators were formerly compared using the alternate collating sequence (if specified). This is no longer done. This only causes a behavioral difference in the following cases:
  - the alternate sequence causes x'F0' and x'F1' to compare equal
  - the alternate sequence has x'F0' after x'F1' and indicators are compared for less-than or greater-than.
- It was formerly supported to define character fields like indicators using *LIKE DEFINE. This is no longer supported in either of the following cases:
  - Length adjustment is specified and the resulting length is longer than 1. To correct this, you can define a character(1) field and change any LIKE definitions where the LIKE field is an indicator to use this new field. Or you can change the severity of the message issued so that the program compiles and runs the same without changing the source. You can change messages RNF0532 and RNS0532 to have severity 10.
  - The result field is already explicitly defined elsewhere as a character field. To correct this, remove all but one definition of the field.

Varying Length Fields

For V4R2, the ILE RPG compiler supports varying-length fields. If you compile an existing program for V4R2 without specifying CVTOPT(*VARCHAR) or CVTOPT(*VARGRAPHIC), and that program uses externally-described varying-length fields, the varying-length field definitions are added to the program. You need to change your program for either of the following two conditions:

- The compile fails because of the addition of the varying-length fields. Compile failures occur if either of the following is true:
  - The name of the varying-length field is the same as another name currently defined in the program.
  - The name of the varying-length field is the same as another field in another externally-described format used in the program, and the attributes of the two fields are not the same.

- Input, output, and update operations on varying-length fields may result in non-zero values for the fields. Previously, varying-length fields in output records were set to zero and varying-length fields in update records were ignored. For V4R2, varying-length fields in output and update records may have non-zero values.

  Programs that are affected by this change use more than one file that contains the same varying-length field. For example, suppose the program reads a record from one of the files containing the varying-length field. The current value of that field becomes the value of the field in the program. If the program then performs an output operation for a record format contained in one of the other files, and that record format contains the varying-length field, the newly created record contains the same value of the varying-length field as the first file. Previously, the varying-length field in the second file contained zeroes. Similar changes occur if the program does an update operation.

TCP/IP Connectivity Utilities/400 (5769-TC1)

Standard In/Standard Out (stdin/stdout) for CGI Programs

For V4R2, the stdin/stdout interface for Common Gateway Interface (CGI) programs is enhanced so that several limitations are removed.

- If a CGI program writes more than 254 bytes of data to stdout that contains no imbedded new line characters, the data is no longer truncated as it was previously.
- If a form attempts to pass in more than 254 bytes of data through POST to a CGI program, the data is no longer truncated as it was previously.
- If a CGI program writes data to stdout, then calls another program which runs in a *NEW activation group, the initial CGI program's data is no longer overwritten as it was previously.
- A CGI can run in a named activation group.

If you have applications that have been written to deal with these limitations, those applications now can be changed.

Appendix A. Machine Interface Changes

Materialize Process Attributes (MATPRATR) Instruction

For V4R2, option X'2A' on the MATPRATR instruction is being changed to signal the MCH6801, `Domain Violation`, if the option is specified by a user state program or procedure. The Secondary Process Communications Object pointer, which is materialized by option 2A, points to a protected space which cannot be read from user state.

Process Management Instructions

For V4R2, changes are made to the process management instructions to support native threads. You should be aware of the following:

- The automatic storage stack has become a *thread-scoped* resource. Formerly, automatic storage was an *activation group-scoped* resource. Each activation group supplied a single 16-megabyte process space for automatic storage. Consequently:
  - Automatic storage for all user state programs running in a thread is limited to 16 megabytes.
  - You can no longer isolate automatic storage between activation groups.

  Under the new process structure each thread of execution is allocated two process spaces for automatic storage for execution in user-state and system-state. Each process space contributes 16,773,120 bytes of automatic storage. In the old process structure the total amount of automatic storage in the process was extended by the number of activation groups. Now, it is possible that even an application structured in multiple activation groups could overflow the 16,773,120 limit in user-state.

  Under the old process structure design, a measure of isolation was provided between programs executing in different activation groups. A program in one activation group could not accidentally modify the automatic storage of a program in another activation group. (For example, an error induced by pointer arithmetic could not yield an address in another process space.) Under the new process structure, all user-state programs running in a thread share a single automatic storage stack. Multiple threads can be used to accomplish the isolation of automatic storage.
- Changes were made to MI instructions to have them consistently deal with the activation group mark. These include:
  - Find Relative Invocation Number (FNDRINVN)

    If no activation exists for the invocation or the activation exists and it belongs to a shared activation group owned by another process, then the activation group mark is taken to be
    - 1 for a system-state invocation
    - 2 for a user-state invocation

    Previously, the FNDRINVN instruction returned the mark of the activation group which supplied the automatic storage for the invocation.
  - Materialize Activation Attributes (MATACTAT)

    The machine does not return information about an activation in another process. If the input activation mark is zero and an activation exists and it belongs to a shared activation group in another process, the MATAGPAT instruction signals MCH4417, Process object access invalid.

Previously, the MATACTAT instruction returned the mark of the activation group which supplied the automatic storage for the invocation.

– Materialize Activation Group Attributes (MATAGPAT)

  The automatic storage size field and the advisory automatic storage bit are no longer returned by this instruction. Automatic storage is provided by the thread.

– Materialize Invocation Attributes (MATINVAT)

  If no activation exists for the invocation or the activation exists and it belongs to a shared activation group owned by another process, then the activation group mark is taken to be

  - 1 for a system-state invocation
  - 2 for a user-state invocation

  Previously, the MATINVAT instruction returned the mark of the activation group which supplied the automatic storage for the invocation.

– Materialize Invocation Information (MATINVIF)

  If no activation exists for the invocation or the activation exists and it belongs to a shared activation group owned by another process, then the activation group mark is taken to be

  - 1 for a system-state invocation
  - 2 for a user-state invocation

  Previously, the MATINVIF instruction returned the mark of the activation group which supplied the automatic storage for the invocation.

– Materialize Invocation Stack (MATINVS)

  If no activation exists for the invocation or the activation exists and it belongs to a shared activation group owned by another process, then the activation group mark is taken to be

  - 1 for a system-state invocation
  - 2 for a user-state invocation

  Previously, the MATINVS instruction returned the mark of the activation group which supplied the automatic storage for the invocation.

Address to Binary and Binary to Address Change

For V4R2, the convert address-to-binary and convert binary-to-address operations are changed to preserve the binary value when it is converted to an address and then converted back to a binary value. Previously, a zero was always the value returned for MI programs no matter what the original binary value was. Because of this change, existing C++ and ILE C program objects that are recompiled from source with a target release of V4R2, may change in the following ways:

- If the program does a convert from binary to address where the binary value is non-zero and the program then does a compare against that address to see if it is the null pointer value, a FALSE is now returned. Previously, a TRUE was returned in this case (all conversions from binary to address resulted in a null pointer value).

  The following C program fragment illustrates the change:

```
if( (void *)(1) == NULL )
   printf( "Pre-V4R2 behavior\n" );
else
   printf( "V4R2 or later behavior\n" );
```

If you use the CMPPTRT or the MATPTRL instructions, you are also affected by this change.

- If the program does a convert from binary to address where the binary value is non-zero and then converts that address back to binary, the original binary value is the result. Previously, this resulted in a binary value of zero.

  The following C program fragment illustrates the change:

```
int *ptr = (int *)(1);
if( (int)ptr == 0 )
   printf( "Pre-V4R2 behavior\n" );
else if( (int)ptr == 1 )
   printf( "V4R2 or later behavior\n" );
else
   printf( "Should never get here\n" );
```

- If the program does a convert from address to binary when the address is loaded from a location that contains a valid pointer which is not a space pointer, no exception is signaled. A value of binary zero is returned. Previously, an exception was signaled.

  The following C program fragment illustrates the change:

```
char template[256];
unsigned int i;
union {
  _SPCPTR spcptr;
  _SYSPTR sysptr;
  } myOverlay;

CRTS(&myOverlay.sysptr, &template);
i = (unsigned int) myOverlay.spcptr; /* exception before V4R2 */
```

Printed in Denmark by Scanprint a·s
Certified Quality System DS/ISO 9002

GI10-0818-00