



IBM System i™

Backup/Recovery Strategies Update

Debbie Saugen

***i want stress-free IT.
i want control.
i want an **i**.***

© Copyright IBM Corporation, 2006. All Rights Reserved.
This publication may refer to products that are not currently
available in your country. IBM makes no commitment to make
available any products referred to herein.

About the Speaker

Debbie Saugen is the Technical Owner of System i Backup and Recovery in the Rochester, MN Development Lab. She is also a Senior Business Recovery Architect/Consultant with IBM Business Continuity and Resiliency Services.

Debbie ensures the Backup and Recovery Solution meets the customer's requirements in capability and usability. She does actual Backup/Recovery testing using the new functions, products and publications.

As a recognized expert on Backup and Recovery worldwide, Debbie enjoys sharing her knowledge by speaking at Common, Technical Conferences, Business Continuity and Resiliency Conferences, User Group conferences and writing for various magazines, books and websites.

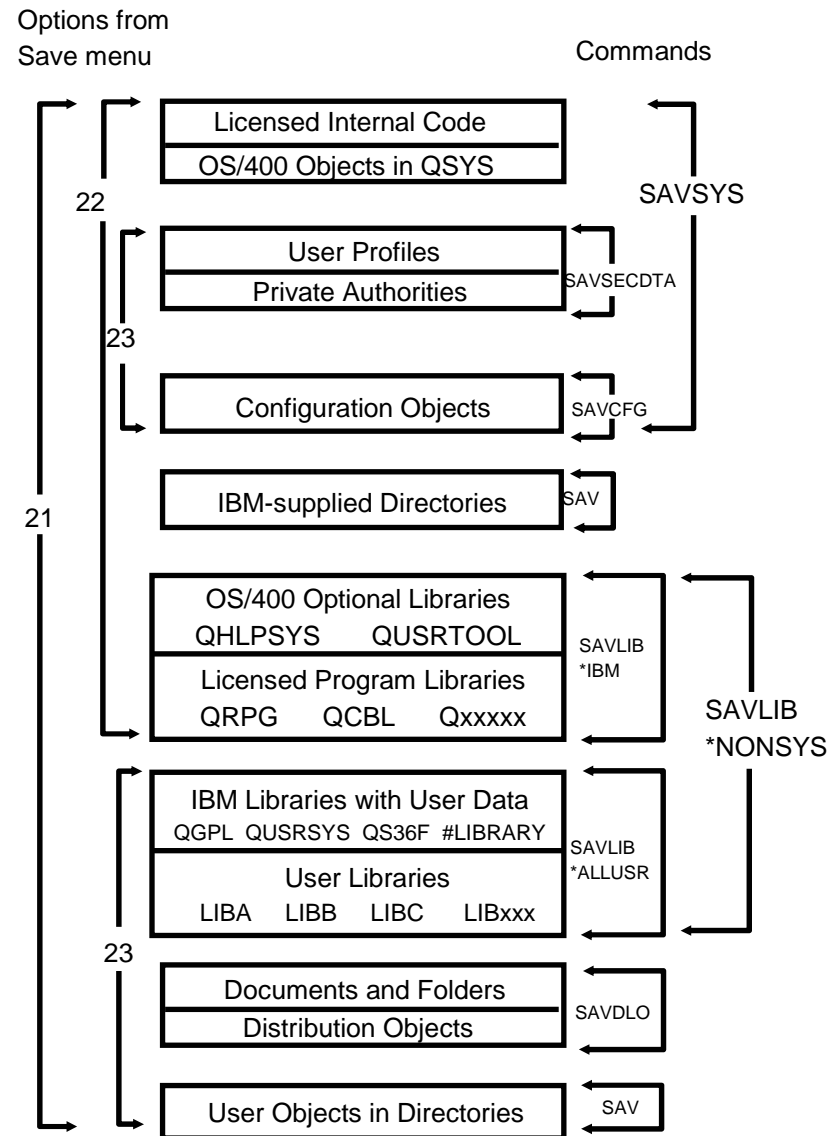
You can reach Debbie at dsaugen@us.ibm.com.

Agenda

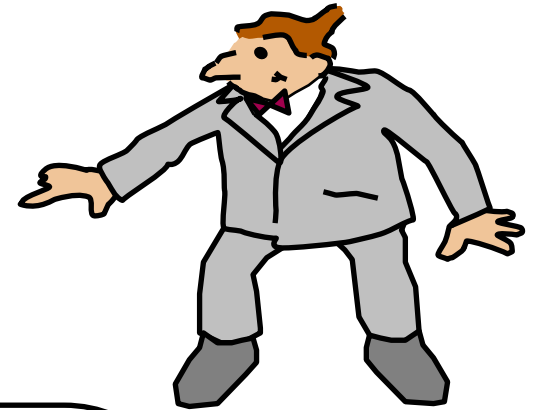
- Backup Basics
 - Backing Up the Entire System
 - Backing Up System Data
 - Backing Up User Data
 - Backing Up Spooled File Data (*New for V5R4*)
 - SAVSYSINF/RSTSYSINF Commands (*New for V5R4*)
- Ensuring a Complete Backup Strategy
 - Lotus Notes Servers
 - Windows Servers
 - Linux in a Partition
 - AIX in a Partition
 - Independent ASPs
 - Logical Partitioned Systems
 - Hardware Management Console (HMC)
- Backup Recovery and Media Services (BRMS)
- Backup and Recovery Information
- Recovering after Complete System Loss



Save Commands and Menu Options



Save Menu Options 21, 22, 23



Save

Select one of the following:

Save system and user data

Option 20. Define save system and user data defaults

Option 21. Entire system

Option 22. System data only

Option 23. All user data

Save Menu Option 21

- Entire System - Runs Commands:
 - ENDSBS SBS(*ALL) OPTION(*IMMED)
 - CHGMSGQ QSYSOPR DLVRY(*BREAK or *NOTIFY)
 - SAVSYS
 - SAVLIB LIB(*NONSYS) ACCPTH(*YES)
 - SAVDLO DLO(*ALL) SAVFLR(*ANY)
 - SAV DEV('/QSYS.LIB/tape-device-name.DEVD')
OBJ(('/*') ('/QSYS.LIB' *OMIT) ('/QDLS' *OMIT))
UPDHST(*YES)
 - STRSBS SBSD (controlling-subsystem)

Save Menu Option 22

- System Data Only - Runs Commands:
 - ENDSBS SBS(*ALL) OPTION(*IMMED)
 - CHGMSGQ QSYSOPR DLVRY(*BREAK or *NOTIFY)
 - SAVSYS
 - SAVLIB LIB(*IBM) ACCPTH(*YES)
 - SAV DEV('/QSYS.LIB/tape-device-name.DEVD')
OBJ('/QIBM/ProdData') ('/QOpenSys/QIBM/ProdData'))
UPDHST(*YES)
 - STRSBS SBSD (controlling-subsystem)

Save Menu Option 23

- All User Data - Runs Commands:
 - ENDSBS SBS(*ALL) OPTION(*IMMED)
 - CHGMSGQ QSYSOPR DLVRY(*BREAK or *NOTIFY)
 - SAVSECDTA
 - SAVCFG
 - SAVLIB LIB(*ALLUSR) ACCPTH(*YES)
 - SAVDLO DLO(*ALL) FLR(*ANY)
 - SAV DEV('/QSYS.LIB/tape-device-name.DEVD')
OBJ(('/*) ('/QSYS.LIB *OMIT) ('/QDLS *OMIT)
('/QIBM/ProdData' *OMIT) ('/QOpenSys/QIBM/ProdData' *OMIT))
UPDHST(*YES)
 - STRSBS SBSD (controlling-subsystem)

Backing Up Spooled File Data *(New for V5R4)*

- Save /Restore of Spooled Files Now Supported in i5/OS
 - Preserves Spooled File Data, Spooled File Identity and Attributes
 - Spooled File Name
 - Spooled File Number
 - Creation Date/Time
 - Fully Qualified Job Name
 - Job System Name
 - Attributes May Not be Preserved
 - System 36 Identifier
 - Output Queue Name/Library (Restored to Different Output Queue/Library)
 - ASP (Output Queue on Different ASP)
 - New Expiration Date (Restore Occurs After Expiration Date)
 - New Save/Restore Attributes of Spooled File

Backing Up Spooled File Data *(New for V5R4)*

- New SPLFDTA Parameter on Save/Restore Commands
 - SPLFDTA(*NONE) is Default on Saves
 - SPLFDTA(*ALL) Supported
 - SPLFDTA(*NEW) is Default on Restores
 - Restore Spooled Files That Don't Exist
 - SPLFDTA(*NONE) Supported on Restores

Notes:

New Spooled Files APIS

QSRSAVO & QSRRSTO APIs provide save/Restore support with full capability to select and subset spooled data.

- Include or omit by Output queue, Job name, Job number, User name, Spooled file name, Spooled file number, Job system name, User-specified data, Form type, or Create date/time ranges
- Set expiration date on spooled files

Backing Up Spooled File Data *(New for V5R4)*

- Save and Restore Entire OUTQs
 - No support to Save/Restore Individual Spooled Files
- Save and Restore Menu Options
 - Optionally Save and Restore ALL Spooled Files
- Display Save/Restore Media to See List of Spooled Files
 - DSPTAP, DSPOPT, and DSPSAVF Commands
 - Similar to Displaying Members in a Database File
- Performance Improvement
 - Faster than Existing Methods to Save/Restore Spooled Files
 - No Requirement for
 - Copying Spooled File to Database File
 - Document Library Objects (DLOs)
 - Spooled Files Saved and Restored Directly
- BRMS Uses New Support
 - No User Interface Changes to BRMS
 - Performance Improvement

SAVSYSINF and RSTSYSINF *(New for V5R4)*

- Save System Information (SAVSYSINF) Command Performs a Partial Save of Data Saved by Save System (SAVSYS) Command
- Cumulative Save Since Last SAVSYS
- Restricted State Not Required
 - SAVSYS Requires Restricted State
- Saves
 - System Reply List Entries
 - Certain System Values
 - Some System Values are Not Saved
 - Not Required for System Recovery
 - Service Attributes
 - Network Attributes
 - Environment Variables
 - PTFs for 5722SS1 and 5722999 Applied (TEMP or PERM) Since Last SAVSYS
 - All Group PTFs
 - All PTF Cover Letters and Loaded PTFs Copied into *SERVICE

Notes:

The SAVSYSINF command saves the following object types in QSYS:

- *DTAARA
- *JOBQ
- *JRN
- *CLS
- *IGCTBL
- *MSGF
- *JOBQ
- *JRNRCV
- *MSGQ (1)
- *EDTD
- *SBSD
- *TBL
- *CMD (1)

(1) objects changed since last SAVSYS

The SAVSYSINF Command does not save the following:

- Licensed Internal Code
- QSYS Library
- System values which cannot be changed, saved or are related to date/time or password level
- Configuration objects (use SAVCFG)
- Security Data (use SAVSECDTA)

Loaded PTFs are only saved if copied into *SERVICE area. This enables SAVSYSINF to find the save files of the PTFs. The Copy PTFs (CPYPTF) service attribute specifies whether to copy PTF save files into *SERVICE when PTFs are loaded from a tape or optical device. Use the CHGSRVA CPYPTF(*YES) command to change the service attribute on your system to copy PTF save files when loading PTFs from media.

SAVSYSINF and RSTSYSINF Considerations

- Base SAVSYS Required
 - SAVSYSINF Not Replacement for SAVSYS
- *ALLOBJ or *SAVSYS Special Authority Required
- Can't be Used For
 - Restoring to Another Existing System
 - System Upgrades or Migrations
- Intended for Customers Who
 - Can't Bring System to Restricted State for SAVSYS
 - Can't Take Down Time for SAVSYS
- PTF Save Files Must Remain on System Until Next SAVSYS
 - Do Not Run Delete Program Temporary FIX (DLTPTF) Command Unless
 - Right Before SAVSYS
 - Right After SAVSYS
 - Installing PTFs Default is NOT to Restore Save Files
 - Change System Default CPYPTF(*YES) on CHGSRVA Command or
 - Use CPYPTF(*YES) in INSPTF Command Consistently
- Increases System Recovery Time and Complexity
 - SAVSYS and SAVSYSINF Needs to be Recovered
 - RSTSYSINF Additional Step per Backup and Recovery Checklists

SAVSYSINF Backup Strategy

- After Base SAVSYS, Perform these Commands to Save System Changes
 - SAVLIB LIB(*IBM)
 - SAV OBJ((' /QIBM/ProdData') (' /QOpenSys/QIBM/ProdData')) UPDHST(*YES)
 - SAVSYSINF
- Commands to Save User Data
 - SAVSECDTA
 - SAVCFG
 - SAVLIB LIB(*ALLUSR)
 - SAVDLO DLO(*ALL) FLR(*ANY)
 - SAV OBJ((' /') (' /QSYS.LIB' *OMIT) (' /QDLS' *OMIT)) UPHST(*YES)

Simple Backup Strategy

- Simple Backup Strategy
 - Perform Entire System Saves Using Menu
 - Option 21
 - Daily for Simple Backup Strategy
 - Simplifies System Recoveries

Medium Backup Strategy

- Medium Backup Strategy
 - Perform Saves of System Data Only Using
 - Menu Option 22 After Installing:
 - New Release
 - PTFs
 - Licensed Program Products
 - Perform Saves of All User Data
 - Daily for Medium Backup Strategy

Complex Backup Strategy

- Complex Backup Strategy
 - Customized CL Programs or BRMS
 - Saving Changed Objects
 - Saving Journals & Receivers
 - Save-while-active Function
 - Replicated Systems for 24X7 Strategy

Ensuring a Complete Backup Strategy



Backing Up Domino Servers

Domino Data in Many Different Directories:

- /QSYS.LIB/QNOTES.LIB: Licensed Program Data - Changes Infrequently.
Saved with SAVLIB *IBM or SAVLIB *NONSYS.
- /QSYS.LIB/QNOTESAPI.LIB: C APIs - Changes Infrequently.
Saved with SAVLIB *IBM or SAVLIB *NONSYS.
- /QSYS.LIB/QNOTESCPP.LIB: C++ APIs - Changes Infrequently.
Saved with SAVLIB *IBM or SAVLIB *NONSYS.
- /QSYS.LIB/QNOTESHTST.LIB: HiTest APIS - Changes Infrequently.
Saved with SAVLIB *IBM or SAVLIB *NONSYS.
- /QSYS.LIB/QNOTESLSKT.LIB: LotusScript Extensions - Changes Infrequently.
Saved with SAVLIB *IBM or SAVLIB *NONSYS.
- /QSYS.LIB/QUSRNOTES.LIB: Customization Information that Changes.
Saved with SAVLIB *ALLUSR or SAVLIB *NONSYS.

Backing Up Domino Servers

Majority of Domino Data in the Integrated File System

- /QIBM/ProdData/Lotus/Notes: Static product information - Changes Infrequently. Saved with SAV command.
- /QIBM/UserData/Lotus/Notes: Customization Files that Change. Saved with SAV command.
- Pathname specified when you configure the server: Path for the databases on the server. Saved with SAV command.

Note: Path names may reside on an IASP so care must be taken to ensure the IASP is varied on, otherwise the save will not be successful.

Backing Up Domino Servers

Backup Domino Product after Install or Applying Fixes

To save the product information, use one of these options:

1. Save Menu Option 21 to Save Entire System.
2. Save Menu Option 22 to Save System Data only.

Option 22 saves the product libraries and directories, including the QNOTESxx libraries and the /QIBM/ProdData/LOTUS/NOTES directory.

Backing Up Domino Servers

- Save Changes Associated with Server
 - Database
 - User's Mail Databases
 - Names and Address Book for Server
- Main Backup Domino Server Setup
 - Limit Locations of Domino Databases
 - Save Everything

Backing Up Domino Server Example

Backing up directory for your Domino Server and the IBM-supplied directory:

1. Ensure complete copy of server, by ending the server before the save:
ENDDOMSVR SERVER(server-name)
2. Save Domino Server directory and system-supplied directory (substitute your directory name for /NOTES/DATA:
SAV DEV('QSYS.LIB/tape-device-name.DEVD')
OBJ((' /NOTES/DATA/*')
('/QIBM/UserData/Lotus/Notes/*'))
3. Save library that contains customization information for your Domino servers: SAVLIB LIB(QUSRNOTES) DEV(tape-device-name)

NOTE: If you use option 21 or option 23 from the Save menu regularly, you do not need to back up your Domino server separately.

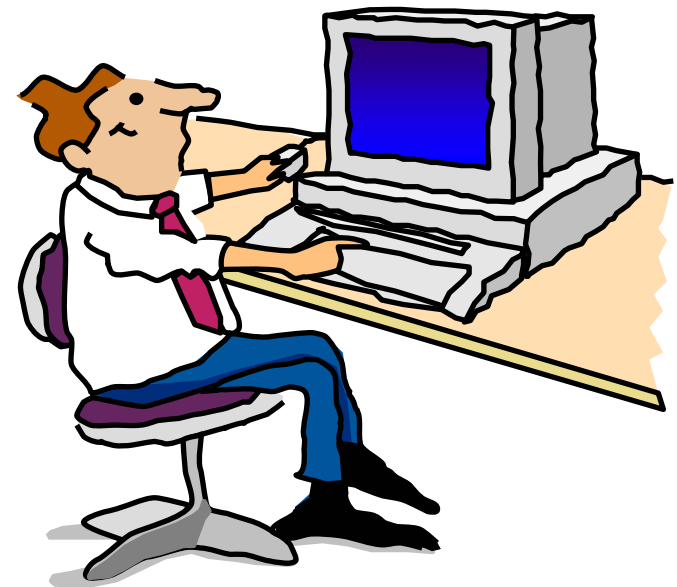
Backing Up Domino Server Example

- Saving Everything for Domino Databases
 - Save Entire System (Save Menu Option 21)
 - Save User Data (Save Menu Option 23)
 - SAV Command

```
SAV DEV ('/QSYS.LIB/tape-device-name.DEVD') OBJ(('/*')  
('QSYS.LIB' *OMIT) ('/QDLS' *OMIT)  
('/QIBM/ProdData' *OMIT)  
('/QOpenSys/QIBM/ProdData' *OMIT)) UPDHST(*YES)
```

Online Backup of Lotus Notes Servers

- Save Domino Server While Active (V4R4 and Higher)
 - V4R4 BRMS PTF SF65062
 - Domino 5.02c
 - No Need to Reach Checkpoint - True Online Backup
 - No need to End Server or Replicate to another Server for Backup
 - BRMS handles Recovery Process
 - Allows 24X7 up time of Domino Server



Integration for Windows Server

- Windows Server Data in Many Different Directories
 - /QNTC: Logical Representation of Windows Server Data
 - /QFPNWSSTG: Physical Storage of Windows Server Data if System ASP
 - /dev/IASP/Network server name.udfs: Physical Storage of Windows Server Data if in IASP
 - /QSYS.LIB/QNTAP.LIB: Licensed Program Data - Changes Infrequently. Saved with SAVLIB *IBM or SAVLIB *NONSYS.
 - /QIBM/ProdData/NTAP: Static product information - Changes Infrequently. Saved with SAV command.

Backing Up Windows Server

- Full Backup Saving /QFPNWSSTG or /dev/IASP/xxxx.udfs
 - NWSD for IXS/IXA Varied Off
- Saving Individual NT Server Objects Prior to V4R5
 - Copy Server Objects (Windows NT Command) to IFS Directory on AS/400
 - Objects Saved when Directory Saved
 - IBM's Tivoli Storage Manager (TSM)
 - Save to AS/400 Media using Window's NT Backup Product (Backup Exec)
- Saving /QNTC Directories Starting with V4R5
 - NWSD for IXS/IXA Varied On
 - Working TCP/IP Internal LAN Connection
 - Saves /QNTC Directories Associated with IXS/IXA

Backing Up Windows Server

- During Backup System Attempts to Save Directories in the /QNTC or /QFPNWSSTG Directory
 - If IXS/IXA Varied On, /QNTC Directories Saved
 - Requires Working TCP/IP Internal LAN Connection
 - If IXS/IXA Varied Off, /QFPNWSSTG Directories Saved
 - Individual Files and Directories Cannot be Restored From /QFPNWSSTG
- Time to Save /QFPNWSSTG SIGNIFICANTLY Less than Saving /QNTC
 - For Save Option 21 or 23 Vary Off NWSD
 - ***In V5R3, Default is to Vary Off Network Servers on Save Menu Options 21 and 23***
 - For Objects Changing Frequently
 - Place in One or Two Subdirectories in /QNTC
 - Save Changes with NWSD Varied ON

Backing Up Linux in a Partition

- Linux Data Stored in Two Ways
 - "Virtual Disks" (NWSSTG) Owned by iSeries
 - Real Disk Devices Owned by Linux
- Virtual Disks Backed Up Using the SAV Command
 - Stored in /QFPNWSSTG or /dev/IASPNAME/networkserver.udfs Directory
 - Linux Partition NWSD Must Be Varied Off
 - Restored with RST Command
 - Save Menu Option 21 (Entire System) Includes Linux
 - No Capability for File Level Save on iSeries

Backing Up Linux in a Partition

- Real Disk Devices Backed Up Using Linux Commands
 - Linux Writes to Virtual or Direct Attached Tape Devices
 - Requires Standard Linux Commands
 - Capability for File Level Save and Restore
- "Virtual" Disks Can Also be Backed Up to Virtual or Real Tape Devices with Standard Linux Commands

Backing Up AIX in a Partition *(New for V5R3)*

- AIX Data Stored in Two Ways
 - "Virtual Disks" (NWSSTG) Owned by i5/OS
 - Requires POWER5 Hardware
 - Requires AIX 5.3 Release
 - Real Disk Devices Owned by AIX
 - Requires Current AIX 5.2 Release
 - Backup Using IBM's Tivoli Storage Manager (TSM)
 - Virtual Disks Backed Up Using the SAV Command
 - Stored in /QFPNWSSTG or /dev/IASPNNAME/networkserver.udfs Directory
 - AIX Partition NWSD Must Be Varied Off
 - Restored with RST Command
 - Save Menu Option 21 (Entire System) Includes AIX
 - No Capability for File Level Save on i5/OS

Backing Up Independent ASPs

- Independent ASP (Disk Pools 33-255) Used for Switched Disks & Clustering
 - Support for Libraries in IASPs in V5R2
 - Save/Restore Individual ASPs or Entire System with IASPs
 - ASPDEV Parameter on SAVxxx and RSTxxx Commands
- Independent ASPs Require Available State for Save
- Save-while-active Strategy for 24 X 7
- BRMS for IASPs Backup/Recovery Strategy
- Restricted State Save - Save Option 21 (Entire System)
 - Clustering Fail Over will Prevent Save of Data
 - Switches ASPs to Another System
- To Include Independent ASP Data - Save Option 21
 - End Cluster Resource Group
 - Ensure Independent ASPs are in an Available State

Backing Up Independent ASPs

- IASP Configuration Not Saved
 - Maintained on System and Can Be Recovered
- IASP Configuration Must be Created During System Recovery to Different System
- System Recovery to Different System Requires
 - Restore of System and User Data
 - May or May Not Include Independent ASP Data Depending on Save
 - IPL of System
 - Configuration of IASPs Using iSeries Navigator
 - Restore of IASP Data
- BRMS Guides Recovery of IASPs
 - ***In V5R3 Can Recover an IASP with History from Another System***
 - ***STRRCYBRM OPTION(*ASPDEV) ACTION(*RESTORE)***

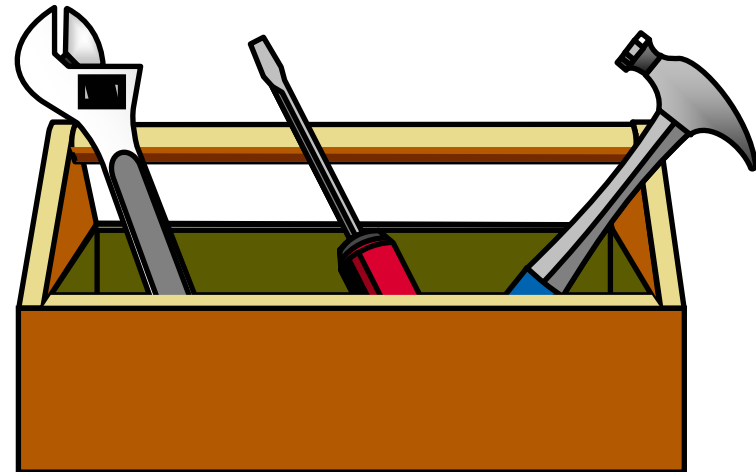
Backing Up Logical Partitions

- Logical Partitioned Systems
 - Backup Each Partition - Multiple Tape Devices Required to Backup Concurrently
 - Recovering Primary Partition - All Partitions Ended
 - Recovery of Secondary Partition Initiated from Primary (Manual D-IPL)
 - Partition Configuration Maintained on System but Not Saved
- Recovery of Logical Partitioned Systems
 - After Restoring Licensed Internal Code, Partition and DASD Configuration Recovered or Recreated, and Operating System Restored, Secondary Partitions Can Recover Concurrently
 - Partition Configuration Can be Recovered on Same System but Must be Created on a Different System

Backing Up Hardware Management Console (HMC)

- Required on i5 Hardware for Partitioned or CUoD Systems
- Backed Up Separately Outside of an Option 21 Save
- Backup Performed on HMC Console to DVD/RAM or FTP to Another Server – Can Be Scheduled
 - Backup Partition Profiles Prior to Installs and Upgrades
 - bkprofdata -m managedsysname -f deb.file
 - rstprofdata
 - Cannot Recover to System with Different Serial Number
 - DRCIndex and Serial Number Saved
- Disaster Recovery Backup (*Latest HMC Firmware*)
 - Available February 24
 - mksysplan -m managedsysame -f deb.sysplan
 - Deploysysplan Recalculates DRCIndex and Serial Number
 - Recover to Like Hardware
 - Equal to or Greater
 - Different Serial Number Allowed

Backup Recovery and Media Services

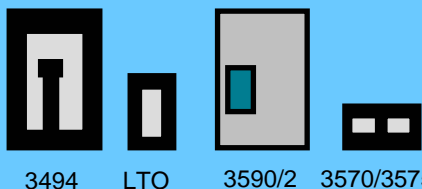


Backup Recovery and Media Services (BRMS)

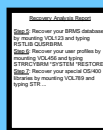
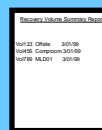
- i5/OS's Strategic Backup Management Product (5722-BR1)
- Manages Your Media
- Automates Your Backups
- Simplifies Your Recoveries
- Provides Detailed Reporting
 - Detailed Reports on What Was Saved, Not Saved
 - Detailed Instructions on Recovery Process
- Tape Library Support
- Virtual Tape Support (*New for V5R4*)

BASE*Backup Planning****Critical
Application**Lib1
Lib2**Non-Critical
Application**Lib3
Lib4

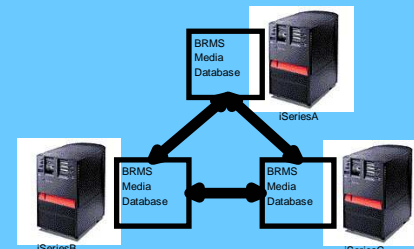
- What Objects should be backed up?
- What media? Tape, savefile, or TSM?
- Full, Incremental, or Cumulative Backups?
- Save-while-active, Parallel saves
- Spoolfile and Object Level saves
- Duplicate Backup Tapes
- Did last night's backup run OK?
- Virtual Tape Support

Tape Library Support**Media Management**

- What is on Tape XYZ?
- What tapes should be in location DEF?
- What tapes are old or have a lot of errors?
- What tapes should move offsite today?
- What tape has the latest copy of Object ABC?

**Recovery**

- List of Tapes required
- List of Steps to Recover
- On-Line Progress Report
- Location-specific Recovery Steps

BRMS GUI**Option #1: Network****Network****Option #2: HSM****Hierarchical Storage Management**

- Migrate libraries, root folders, and spoolfiles among disk ASPs based on age, size, and last use criteria
- Archive objects to tape based on age, size, frequency of use, and ASP storage criteria
- Dynamically recall database files, DLO's and streamfiles when needed

Notes:

Backup Recovery and Media Services: Is an integrated and comprehensive tool for managing the backup, archiving and recovery environment for a single server or multiple servers in a site or across a network where data exchange by tape is required.

Backup: The key to maximizing the availability of an iSeries 400 or AS/400 system is to reduce the backup window, while still allowing for simple system recovery. BRMS is designed to perform very complex backups easily. Backups are easy to define and easy to change. Full error checking is performed by BRMS to ensure that errors don't go unnoticed by operators. BRMS offers full-function backup facilities, including keywords to match the normal save keywords (such as *IBM and *ALLUSR), *EXITs to allow processing of user commands or programs during the backup procedures, full incremental or noncumulative incremental saves, saves to save files, and save while active.

"What could be simpler than backing up the entire system every night?" Nothing is simpler, but not everyone can afford the outage that this type of save would require. BRMS is an effective solution in backing up only what is really required.

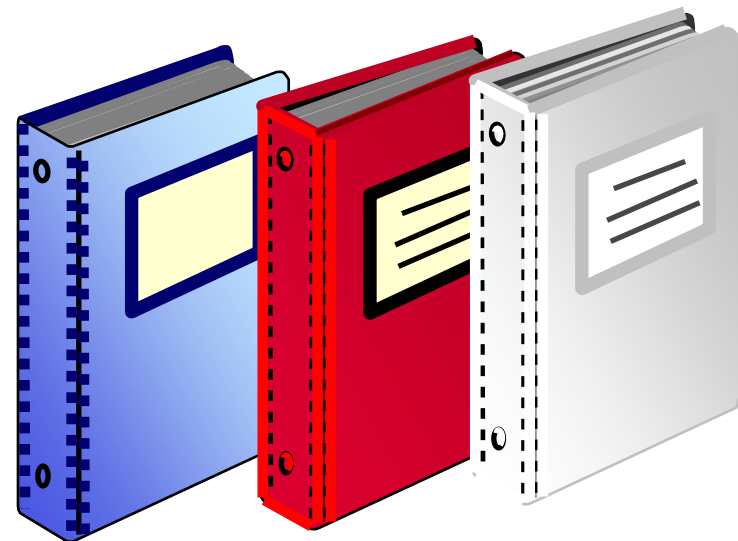
Recovery: BRMS offers a step-by-step recovery which is in the form of a report printed after the nightly backups are complete. Recovery no longer consists of operators clenching the desk with white knuckles at 4 o'clock in the morning, trying desperately to restore the system in time for the users at 8:00 AM without any idea what is going on or how long it will take. With native OS/400 commands, the only feedback they get is the occasional change to the message line on line 25 of the screen as the recovery takes place. BRMS/ changes all of this with full and detailed feedback during the recovery process--with an auto-refresh screen, updated as each library is restored.

Archival of Data: Data archiving is important in sites where large volumes of history data must be kept by the organization and rapid access to this information is not required. BRMS will archive data from DASD to tape and track information about objects that have been archived. Locating data in the archives is very easy, and the restore can be triggered from a work-with screen.

Dynamic Retrieval for database files is possible with BRMS. Database files archived with BRMS can be restored upon access within user applications. No changes are required to user applications to initiate the restore.

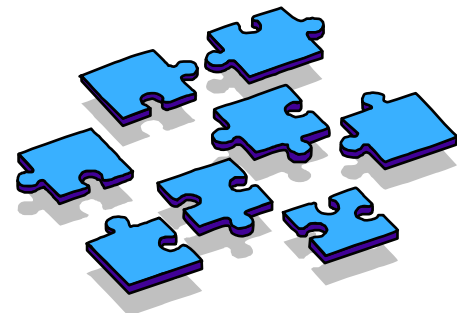
Classifies, tracks and protects tape media: In a large single system or multi-system environment, control and management of tape media is very important. BRMS allows cataloging of an entire tape library and manages these as they move from location to location in an organization. It is essentially a comprehensive inventory management system for all tapes. It provides many reports as instructions to operators about required actions.

Backup and Recovery Information



Backup and Recovery Information

- Read the Book with Each New Release?
 - You MUST use the correct version of the book with each new release!
- ARE YOU SAVING THE RIGHT STUFF poster
 - *New UPDATED Poster for V5R4* (Includes BRMS - G325-6328-04)
- Starter Kit for IBM iSeries and AS/400 (www.iseriesnetwork.com)
 - iSeries Backup Basics & BRMS Chapters
 - New Updated Edition
- iSeries NEWS Magazine Backup/Recovery FAQs
 - Commonly asked Backup/Recovery Questions and Answers
 - www.iseriesnetwork.com



Backup and Recovery Book

- Hardcopy **No Longer** Shipped Free
- Fee Charge for Book
- Hardcopy **Critical** for DASD Configuration and Recoveries
- Ensure **YES** on Configurator for Hardcopy

Backup and Recovery Information

- Backup Information Moved to Information Center -
<http://www.iseries.ibm.com/infocenter> (V5R1 and Higher)
 - Planning a Backup and Recovery Strategy
 - Getting your Media Ready to Save your System
 - Before you Save Anything
 - Saving your System with the GO SAVE Command
 - Manually Saving Parts of your System
 - Saving your System under Time Limitations
 - Setting up Disk Protection for your Data
 - Controlling System Shutdown using a Power-handling Program

Recovery Strategies - Checklists

- Use Chapter 3 (*V5R4 Book*) to select right recovery strategy. Disaster recovery is titled: "Recovering Your Entire System after a Complete System Loss"
- Tips for Using Checklist for Recovery
 - Find Appropriate Checklist
 - Make Copy of Checklist
 - Check off each step as you complete it
 - Make notes about what you did and what happened
 - Keep the checklist for future reference

Notes:

If you are faced with recovering all or part of your system, you may feel stress or even panic. Your goal is to get your system back to normal as quickly as possible. You want constructive action immediately.

But before beginning your recovery, you must do the following:

Make sure you understand what has caused the problem. Understanding the cause helps you choose the correct recovery steps.

PLAN YOUR RECOVERY! Use the charts in this chapter to find the correct recovery steps for your situation.

Keep a record of what you have already done and what you do for the rest of your recovery. This record is important if you need help later.

If your problem requires hardware or software service, make sure you understand what the service representative did. Do not be afraid to ask questions such as:

Was a disk unit replaced: If yes, which one?

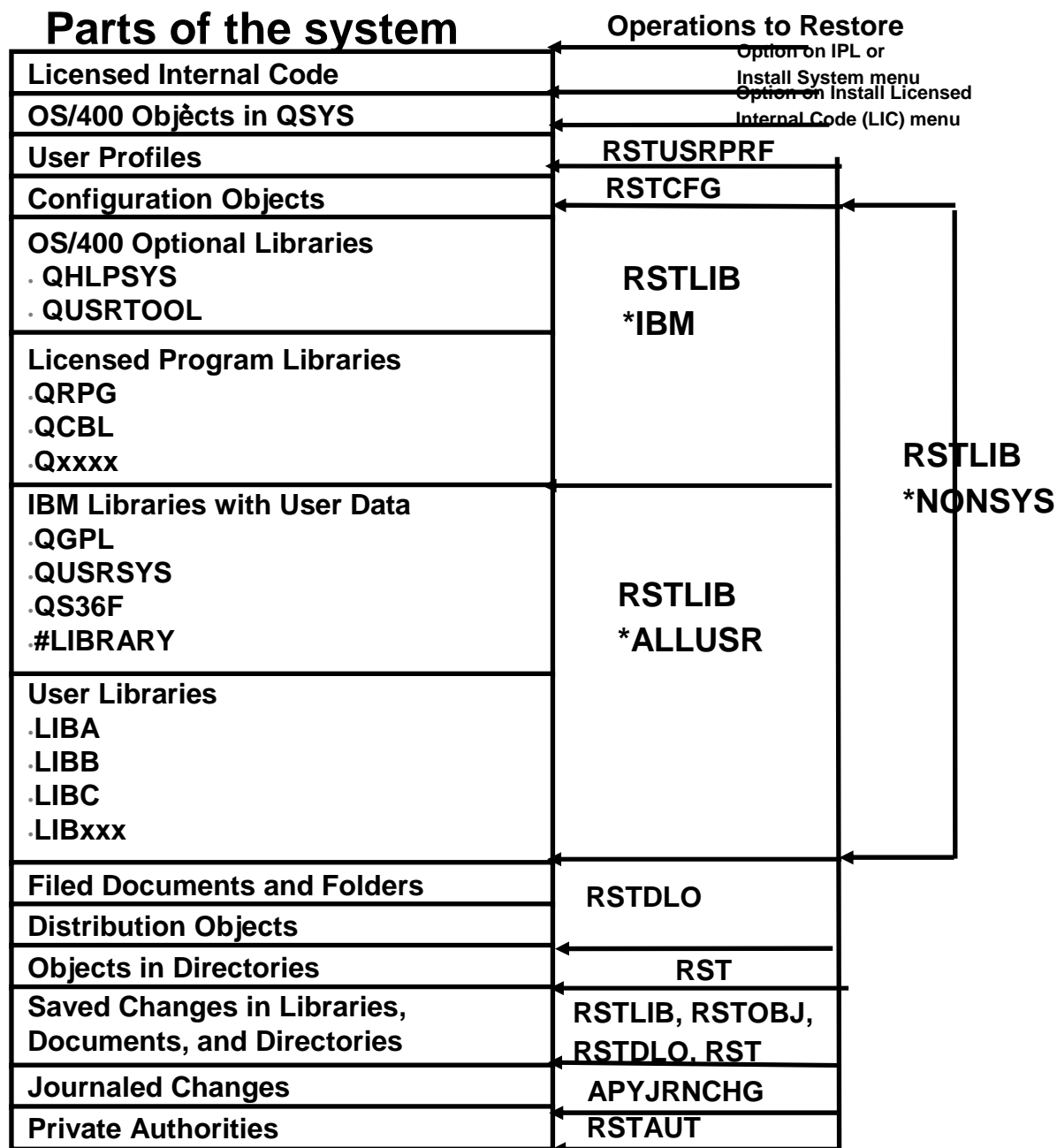
Was the Licensed Internal Code restored: If yes, what option from the Install Licensed Internal Code (LIC) menu was used?

Did the disk configuration need to be recovered? Was it successful?

Could the failed disk unit be pumped. How successfully?

Backup and Recovery Book

- Key Recovery Procedures to Remember
 - Step by Step Restore Instructions when Recovering Your Server to the **Same** Server - See Appendix C (**V5R3 and V5R4**)
 - Step by Step Restore Instructions when Recovering Your Server to a **Different** Server - See Appendix D (**V5R3 and V5R4**)
- System Migrations
 - Moving Previous Release User Data to a System at a Higher Release in Chapter 14, "Release to Release Support" (**V5R3 and V5R4**)



Recovering with Alternate Installation Device

- Allows Setup of Alternate Installation Device for Alternate IPL
- ***REQUIRED for FIBRE CHANNEL TAPE DEVICES!***
- Define Via Dedicated Service Tools (DST)

NOTE: Alternate Installation Device **REQUIRES** PID Install CD or SAVSYS on DVD for Installs and System Recoveries from Tape Media

Recovering After Complete System Loss

- Step by Step Recovery Procedures Recovering to **Same** System in Backup and Recovery Book
 - Appendix C (*V5R3 and V5R4*)
- Step by Step Recovery Procedures Recovering to *Different* System in Backup and Recovery Book
 - Appendix D (*V5R3 and V5R4*)
- The Recovery Process:
 - IPL from SAVSYS media to Install the Licensed Internal Code using option 2 (Install Licensed Internal Code and Initialize system)
 - Configure the disk units (assign to ASP and set up disk protection). If you saved any User-Defined File System (UDFSs), you must configure your user ASPs or the UDFSs will not restore.
 - If necessary, start mirroring

Recovering After Complete System Loss

- Install the Operating System
- Update Required System Values for Recovery (***Subset Listed Here***)
 - System Value QALWOBJRST to *ALL
 - System Value QJOBMSGQFL to *PRTWRAP
 - System Value QVFYOBJRST to '1' (V5R1 or Higher)
 - Security Sensitive System Value Changes Not Allowed
 - DST Option in V5R2 or Higher
 - Default is to Allow Changes
 - If Disallowed, Must Update in DST to Allow Changes During Recovery

Recovering After Complete System Loss

- Restoring to Different system?
 - Specify ALWOBJDIF(*ALL) on RSTxxx Commands
 - Restore Menu Option 21 Handles
 - Select Option for Restoring to Different System
 - Relinks Authorization Lists to Objects
 - Specify SRM(*NONE) on RSTCFG Command
 - Restore Menu Option 21 Handles
 - Select Option for Restoring to Different System

Recovering After Complete System Loss

- Prevent Messages Unrelated to Recovery from Interrupting (Can Setup Restore Menu Option 21 to Handle)
 - CHGMSGQ MSGQ(QSYSOPR) DLVRY(*NOTIFY) SEV(99)
- Restore User Profiles (Restore Menu Option 21)
- Restore Device Configuration (Restore Menu Option 21)
- Restore IBM and User Libraries (Restore Menu Option 21)

Note: If Not Restoring All of User Libraries, Be Sure to Restore QSYS2, QGPL, and QUSRSYS

*SAVLIB/RSTLIB of *NONSYS or *ALLUSR Saves and Restores QSYS2, QGPL and QUSRSYS First (New in V5R3)*

Recovering After Complete System Loss

- Restore Document Library Objects (Restore Menu Option 21)
- Restore Directories (Restore Menu Option 21)
- If SAVSYSINF Part of Backup Strategy, Perform Following (*New in V5R4*)
 - UPDPTFINF
 - Updates all Program Temporary Fix Information for PTF Save Files in QGPL
 - RSTSYSINF
 - Restores System Data and Objects Saved with SAVSYSINF
- Restore Authority (Restore Menu Option 21)
- Reapply PTFs Applied Since Last SAVSYS
- Change Restore QSECOFR Profile Password
 - Password is Restored Value
 - May be Expired or Disabled on SAVSYS or SAVSECDTA Save

Recovering After Complete System Loss

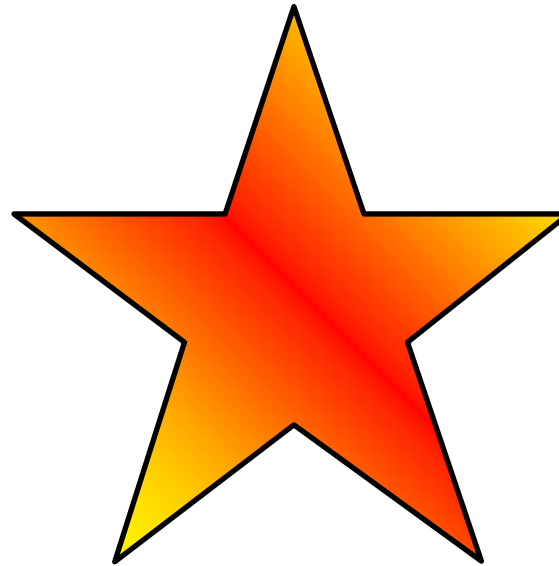
- SIGNOFF *LIST or DSPJOBLOG * *PRINT
- Check Job Log
- Place Scheduled Jobs on Hold
 - WRKJOBSCDE
 - Select Option 3

Recovering After Complete System Loss

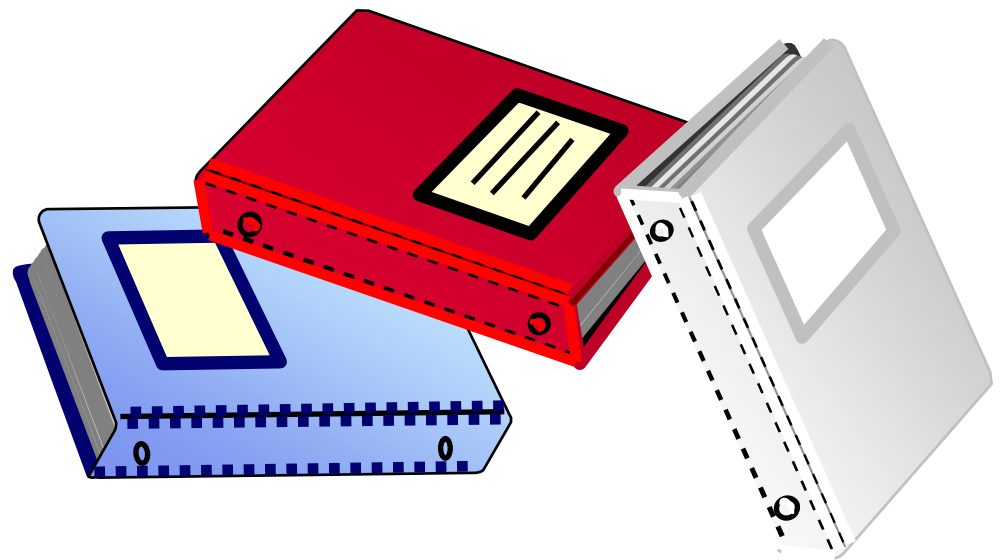
- Perform IPL
- For Content Manager OnDemand for iSeries
 - Perform Additional Recovery Steps to Start Journaling
- For Windows Server for iSeries if You Saved with Netfinity Servers Varied On
 - Perform Additional Recovery Steps to Add Links for Server Descriptions
 - Additional Restore Step to Restore Windows Server
- For Windows Server for iSeries if You Saved with Netfinity Servers Varied Off
 - Perform Additional Recovery Steps to Add Links Server Descriptions
- For CCA Cryptographic Service Provider 5733-CY1 (V5R4)
 - Reinstall Product to Complete Recovery
 - Call QCCADEV/QCCAELOAD

Remember.....Test Your Recovery!!!

The Only Way to Ensure you have a Good Backup Strategy is to Test your Recovery!!!!



Reference Material



Reference Material

Backup and Recovery; SC41-5304-08 (V5R4)

Backup, Recovery and Media Services; SC41-5345-05 (V5R4)

Backup, Recovery and Media Service for OS/400: A Practical Approach Redbook; SG24-4840

<http://www.redbooks.ibm.com/abstracts/sq244840.html>

Virtual Tape Redbook; SQ24-7164

V5R4 iSeries Performance Capabilities Reference; SC41-0607-10

<http://www-03.ibm.com/servers/eserver/iserries/perfmgmt/resource.html>

BRMS Web Page:

<http://www-03.ibm.com/servers/eserver/iserries/service/brms/>

Trademarks and Disclaimers

© IBM Corporation 1994-2006. All rights reserved.

References in this document to IBM products or services do not imply that IBM intends to make them available in every country.

Trademarks of International Business Machines Corporation in the United States, other countries, or both can be found on the World Wide Web at <http://www.ibm.com/legal/copytrade.shtml>.

Intel, Intel logo, Intel Inside, Intel Inside logo, Intel Centrino, Intel Centrino logo, Celeron, Intel Xeon, Intel SpeedStep, Itanium, and Pentium are trademarks or registered trademarks of Intel Corporation or its subsidiaries in the United States and other countries.

Linux is a registered trademark of Linus Torvalds in the United States, other countries, or both.

Microsoft, Windows, Windows NT, and the Windows logo are trademarks of Microsoft Corporation in the United States, other countries, or both.

UNIX is a registered trademark of The Open Group in the United States and other countries.

Java and all Java-based trademarks are trademarks of Sun Microsystems, Inc. in the United States, other countries, or both.

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

Information is provided "AS IS" without warranty of any kind.

The customer examples described are presented as illustrations of how those customers have used IBM products and the results they may have achieved. Actual environmental costs and performance characteristics may vary by customer.

Information concerning non-IBM products was obtained from a supplier of these products, published announcement material, or other publicly available sources and does not constitute an endorsement of such products by IBM. Sources for non-IBM list prices and performance numbers are taken from publicly available information, including vendor announcements and vendor worldwide homepages. IBM has not tested these products and cannot confirm the accuracy of performance, capability, or any other claims related to non-IBM products. Questions on the capability of non-IBM products should be addressed to the supplier of those products.

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

Some information addresses anticipated future capabilities. Such information is not intended as a definitive statement of a commitment to specific levels of performance, function or delivery schedules with respect to any future products. Such commitments are only made in IBM product announcements. The information is presented here to communicate IBM's current investment and development activities as a good faith effort to help with our customers' future planning.

Performance is based on measurements and projections using standard IBM benchmarks in a controlled environment. The actual throughput or performance that any user will experience will vary depending upon considerations such as the amount of multiprogramming in the user's job stream, the I/O configuration, the storage configuration, and the workload processed. Therefore, no assurance can be given that an individual user will achieve throughput or performance improvements equivalent to the ratios stated here.

Photographs shown may be engineering prototypes. Changes may be incorporated in production models.