Tips and Tricks to improve system performance and save disk space.

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iTech Solutions because IBM i (AS/400s) don't come with System Administrators

In this session

In this presentation we will discuss the ways to clean up our disk space, and what you can do to improve performance. While the IBM i may manage itself in some areas, there are many optimization and cleanup techniques that are part of IBM i, yet most shops don't spend the time and effort to implement them. We will learn the "tricks" that can help you reduce your disk I/O, reduce disk utilization, reduce memory faulting, and improve system performance.
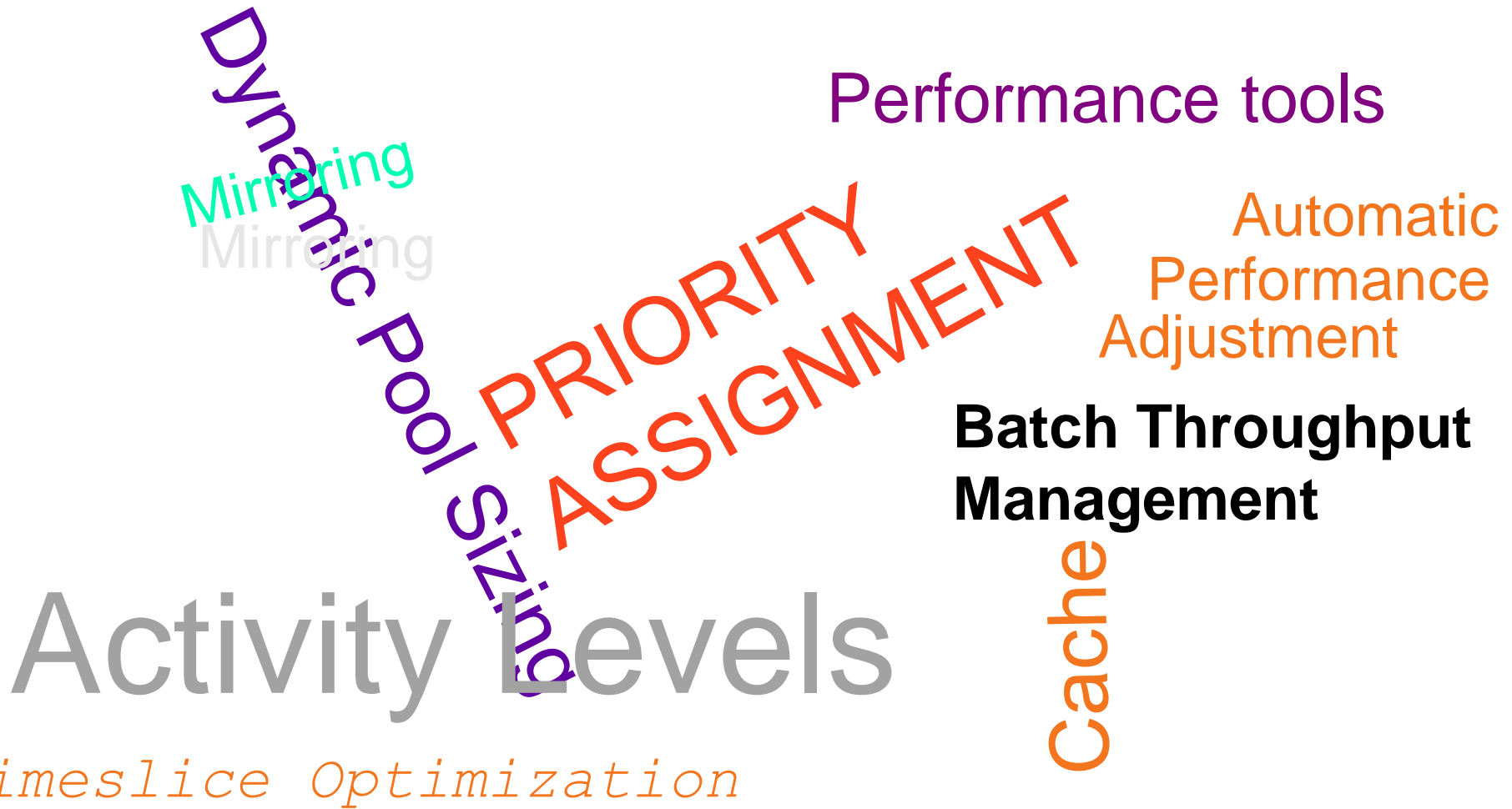
What We'll Cover …

- Performance Terms and Problems
- Physical Files
- Logical Files
- Programs
- Other Objects
- Performance and Expert Cache
- Basic Cleanup and Why
- Save Files, Reclaim Storage, and Spool Files
- DISKTASKs
- What to do Tomorrow
- Wrap-up

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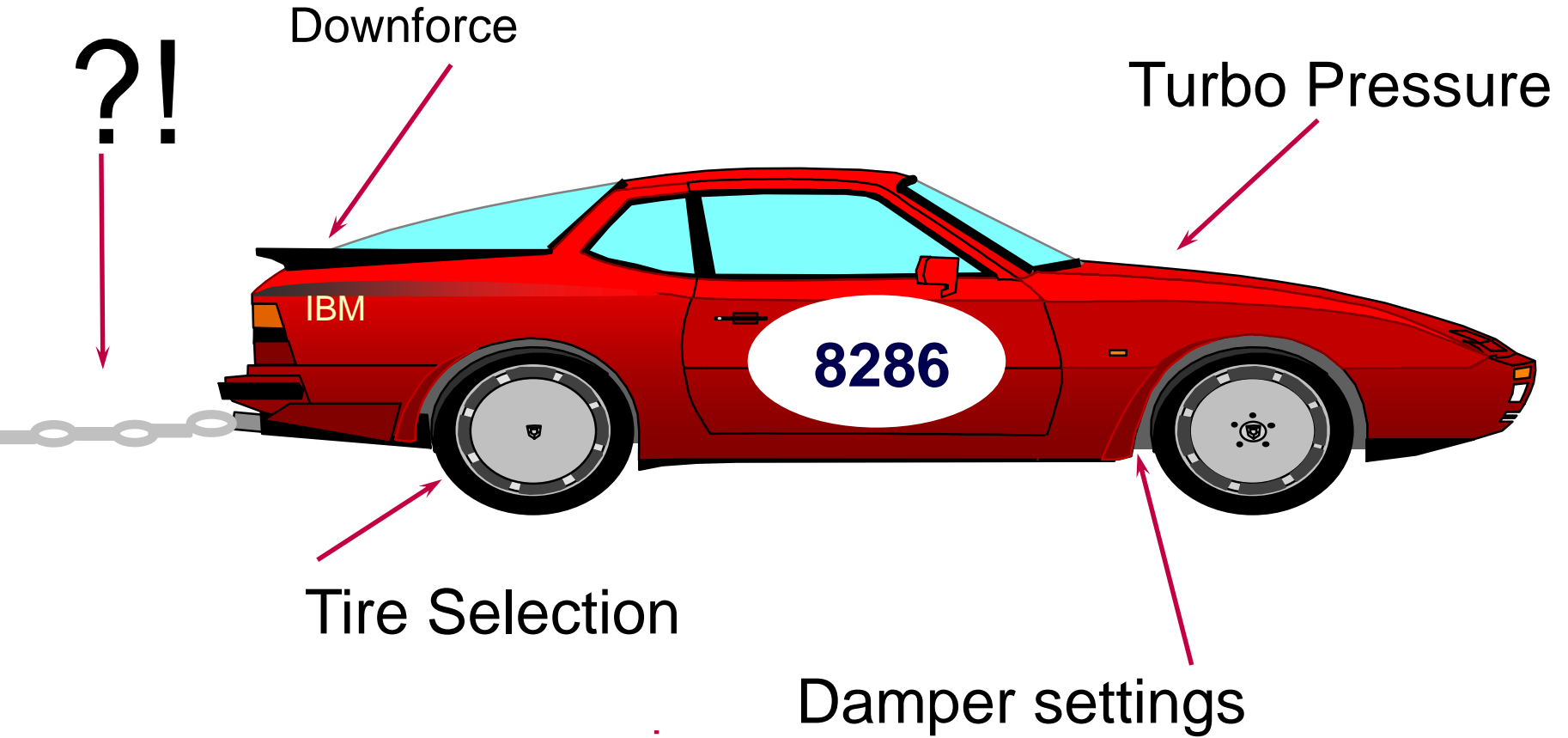- DISKTASKs
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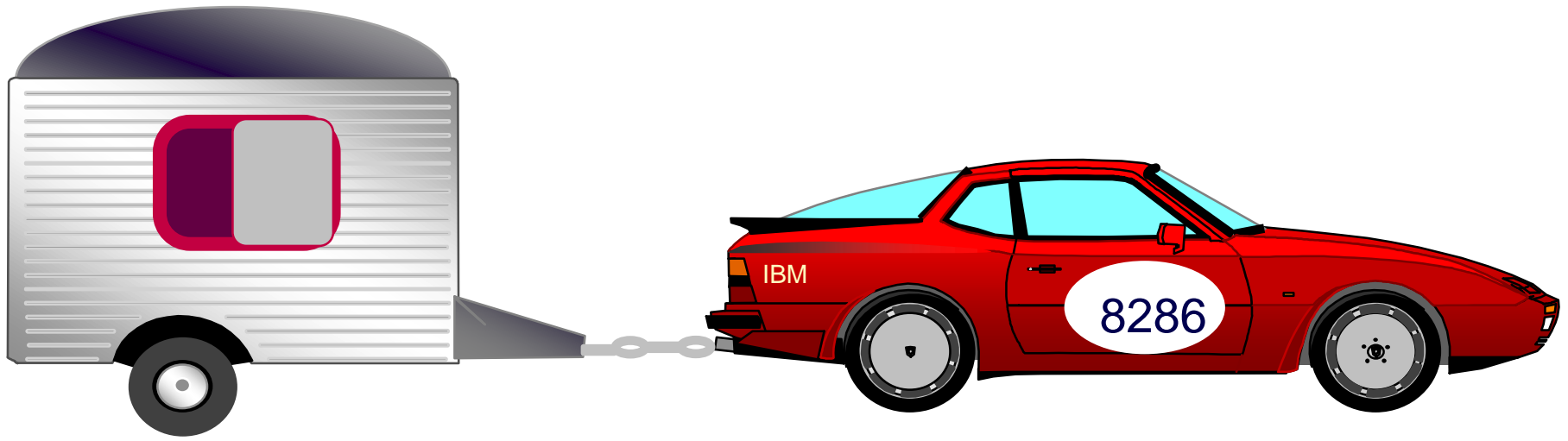
Is This Where to Start Performance Tuning?

Dynamic Pool Sizing

Mirroring

Mirroring

Performance tools

PRIORITY ASSIGNMENT

Automatic Performance Adjustment

Batch Throughput Management

Cache

Activity Levels

Timeslice Optimization

Identifying the Problem

?!

Downforce

Turbo Pressure

IBM

8286

Tire Selection

Damper settings

Identifying the Problem (cont.)

What Performance can you expect?

Why We Should Be Cleaning

Hidden costs.

"Having a lot of storage is like having children. It can cost you almost nothing to have a child, but the upkeep costs a lot. In fact, Aberdeen's research and other people's research show that there can be an order of magnitude difference between the cost to acquire the storage and the cost to maintain it."
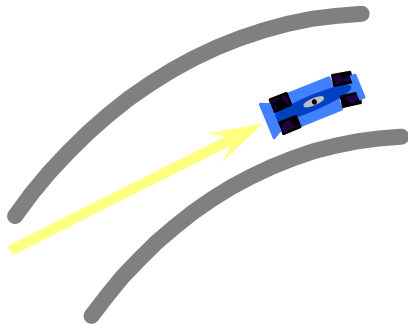
Dan Tanner
Analyst with Aberdeen Group
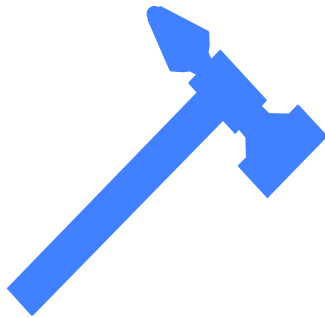
What We Will Discuss
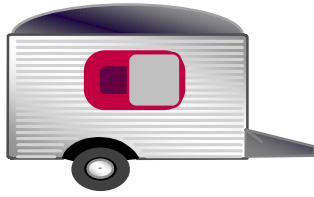
Removing Excess Baggage

Optimization

Tuning

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Generate List of Files

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Create Query

- Select input file as yourlib/DSPFDPF
- Select these fields: MBLIB, MBFILE, MBNAME, MBNRCD, MBNDTR, MBDSZ2
- Sort by MBDSZ2 Descending
- Select records by: MBNDTR GT 0 and MBFILE NLIKE 'QADB%'

Use SQL on SysTableStat

```
select table_schema, Table_name, Data_size, Number_Deleted_Rows,
Logical_reads, Physical_reads, Sequential_reads, Random_reads
from qsys2.systablestat Order by Number_Deleted_rows, Logical_reads
DESC Fetch first 25 rows only █
```

List to Work On

Physical Files

- Size
- Reorganize (normal and while active*)
- Blocking
- Resequence
- Purge & Archive
- 3rd Party Software

RGZPFM

All Records are stored in pages. Think of a page as a chess board containing:

Deleted records

Active records

RGZPFM (cont.)
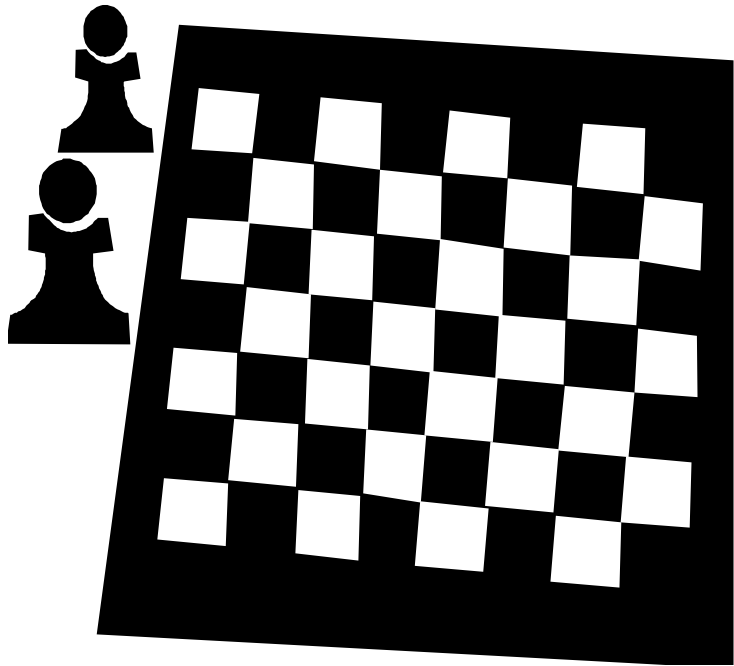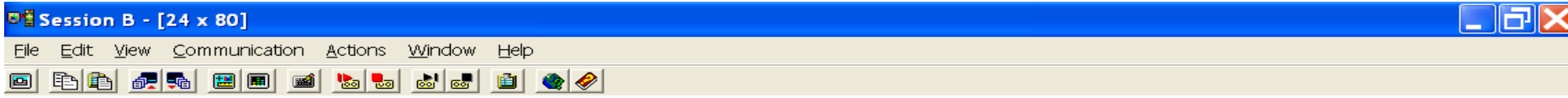

```
Session B - [24 x 80]
File  Edit  View  Communication  Actions  Window  Help

                        Work with Member Locks
                                                    System:    OSSI03
     File . . . . . :    BIGFILE          Type . . . . . :    PHY
       Library  . . :      ITECHDB        ASP device . . . :    *SYSBAS

     Type options, press Enter.
       4=End job    5=Work with job    8=Work with job locks


                                        Lock
     Opt  Member       Job          User      Type   Lock        Status   Share
      _   BIGFILE      PETEMA1      PETEM     MBR    *SHRRD      HELD
      _                                       MBR    *SHRRD      HELD
      _                                       DATA   *SHRUPD     HELD
      _                                       DATA   *SHRUPD     HELD


                                                              Bottom
     F3=Exit    F5=Refresh    F11=Display thread data    F12=Cancel

MA       b                                                        12/003
  Printed 1 screen(s).                           Win2PDF on PDFFILE:
```
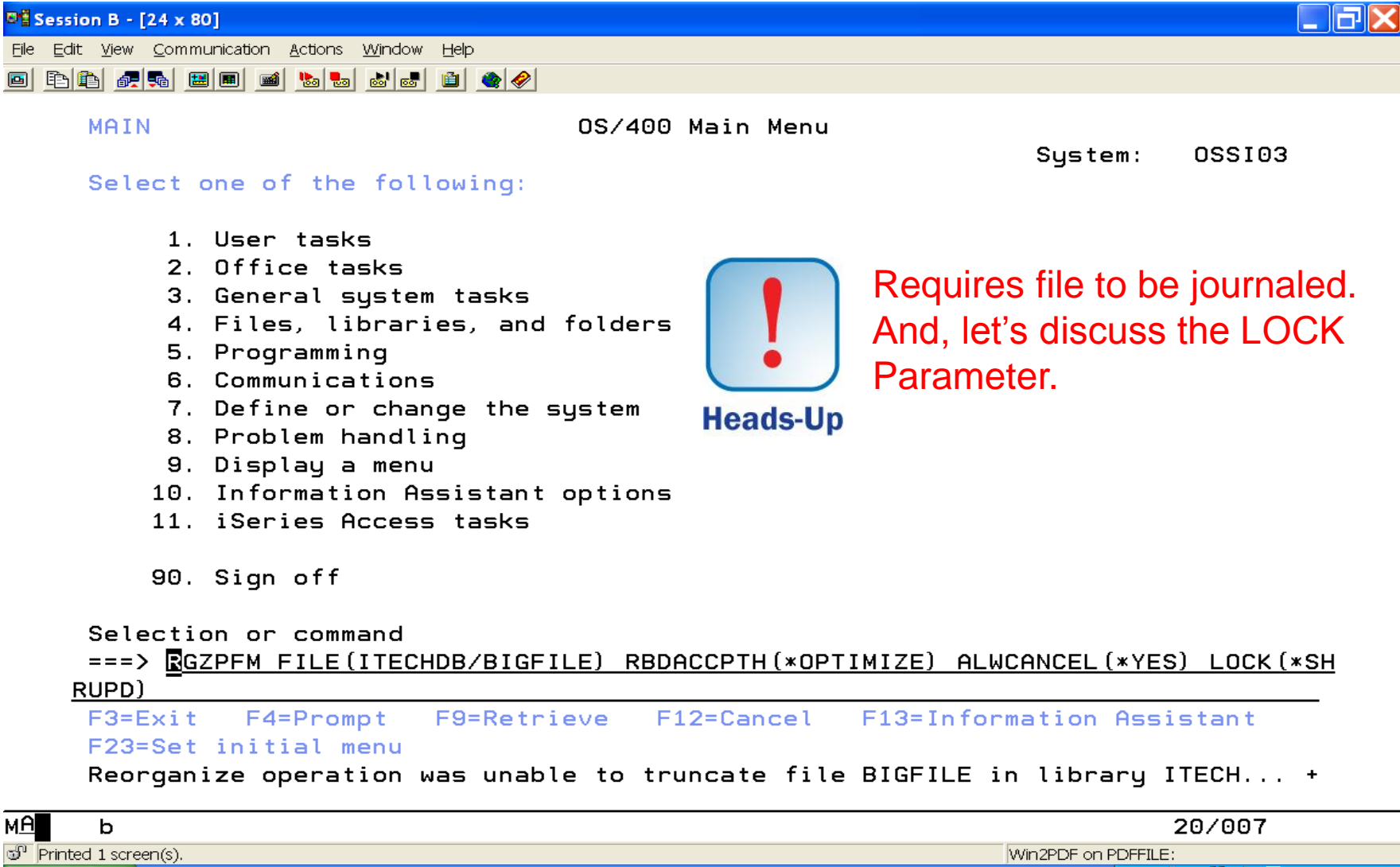
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The Old Way

Reorganize While Active

```
Session B - [24 x 80]
File  Edit  View  Communication  Actions  Window  Help

 MAIN                          OS/400 Main Menu
                                                      System:     OSSI03
     Select one of the following:

            1. User tasks
            2. Office tasks
            3. General system tasks
            4. Files, libraries, and folders
            5. Programming
            6. Communications
            7. Define or change the system
            8. Problem handling
            9. Display a menu
           10. Information Assistant options
           11. iSeries Access tasks


           90. Sign off

     Selection or command
     ===> RGZPFM FILE(ITECHDB/BIGFILE) RBDACCPTH(*OPTIMIZE) ALWCANCEL(*YES) LOCK(*SH
     RUPD)
     F3=Exit    F4=Prompt    F9=Retrieve    F12=Cancel    F13=Information Assistant
     F23=Set initial menu
     Reorganize operation was unable to truncate file BIGFILE in library ITECH... +

MA    b                                                              20/007
    Printed 1 screen(s).                                  Win2PDF on PDFFILE:
```

Heads-Up

Requires file to be journaled. And, let's discuss the LOCK Parameter.

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Locked, Others Can Read

Use SQL on SysTableStat – Which files are you using

```
select table_schema, Table_name, Data_size, Number_Deleted_Rows,
Logical_reads, Physical_reads, Sequential_reads, Random_reads
from qsys2.systablestat Order by Logical_reads DESC Fetch first 25
rows only
```

Use SQL on SysTableStat

LOGICAL_READS	PHYSICAL_READS	SEQUENTIAL_READS
4,547,213,640,645	985,582	4,547,197,786,116
170,444,924,421	89,447	170,446,878,171
165,359,854,071	322,516	152,888,188,150
157,726,773,102	4,446,000	141,302,803,674
134,467,763,922	145,504,964	134,352,917,904
101,949,364,352	1,038,491	101,948,680,803
100,142,334,628	43,183	4,632,253,545
74,906,986,788	1,374,666	74,035,189,475
58,997,662,054	59,281,520	55,777,534,830
50,920,370,758	10,786,870	50,909,291,944
34,765,165,919	14,720,547	32,981,404,486
34,037,661,091	45,873,380	19,093,803,558
33,778,698,449	13,341	33,775,028,979
30,160,893,021	8,322	811,166,753
		More...

Physical Files

- Size
- Reorganize
- Blocking
- Resequence
- Purge & Archive
- 3rd Party Software

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Logical Files

- Size
- Sharing
- Performance
- Maintenance Level
- Onetime Fixes
- 3rd Party Software

Sharing Access Paths

```
Session B - [27 x 132]

File   Edit   View   Communication   Actions   Window   Help

                                        Display Spooled File
File . . . . . . :   QPDSPFD                                          Page/Line   2/51
Control . . . . .   █                                                 Columns     1 - 130
Find . . . . . .    _____
*...+....1....+....2....+....3....+....4....+....5....+....6....+....7....+....8....+....9....+....0....+....1....+....2....+....3
         Access path valid . . . . . . . . . . . :          Yes
         Implicit access path sharing  . . . . . :          Yes
           Access path journaled . . . . . . . . :          No
         Number of unique partial key values . . :
           Key field 1 . . . . . . . . . . . . . :                   17486
         File owning access path . . . . . . . . :          LXLIB/LMABRELA
         Member  . . . . . . . . . . . . . . . . :          LMABRELA
         Shared access path attributes
           Maintenance . . . . . . . . . . . . . :          *IMMED
           Access path recovery  . . . . . . . . :          *NO
           Force keyed access path . . . . . . . :          *NO
           Keys must be unique . . . . . . . . . :          No
         Last change date/time . . . . . . . . . :          01/26/05  04:09:47
         Last save date/time . . . . . . . . . . :          03/01/07  10:45:09
         Last restore date/time  . . . . . . . . :          01/31/02  14:17:33
         Last used date  . . . . . . . . . . . . :          03/02/07
         Days used count . . . . . . . . . . . . :                   2
           Reset date  . . . . . . . . . . . . . :
         Number of data members  . . . . . . . . :                   1
                                                                                More...

    F3=Exit   F12=Cancel   F19=Left   F20=Right   F24=More keys


MA█    b                                     03/022
     Printed 1 screen(s).                                              Win2PDF on PDFFILE:
```

Sharing Example

- Sales Physical File

- Logical File A
  - Keyed by Country

- Logical File B
  - Key by Country, State

Logical Files

- Size
- Sharing
- Performance
- Maintenance Level
- Onetime Fixes
- 3rd Party Software

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Programs

- Symbol Table
- Starting in V5R1 Observability & Creation Data
- V6R1 Migrations
  - Analyze Object Convert - ANZOBJCVN
- Types of Compression
- Optimization
- Usage

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Removing Excess Baggage — *Other Objects*

- Device Files
- Menus
- Panel Groups
- Source Files
- Spool Files

Removing Excess Baggage — *Other Ways*

- Temporary & Spool Storage – RCLTMPSTG & RCLSPLSTG
- IFS
- Reclaim Storage – RCLSTG *ALL | *DBXREF | *DIR
- Resizing of Objects
- History Logs, Spool Files, Journal Rcvrs

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Performance — Expert Cache

- Part of IBM i
- Look ahead cache
- Used only with Shared Pools
- *CALC Paging Option
- CHGSBSD to use Shared Pools
- WRKSHRPOOL

WRKACTJOB


```
Session A - [24 x 80]

File   Edit   View   Communication   Actions   Window   Help

                      Work with System Status                      ITECH07
                                                    08/29/11   12:03:42
% CPU used . . . . . . . . :          .8    System ASP . . . . . . . . :    977.1 G
Elapsed time . . . . . . :      00:00:01    % system ASP used  . . . . :    46.2812
Jobs in system . . . . . :          492     Total aux stg  . . . . . . :    977.1 G
% perm addresses . . . . :         .007     Current unprotect used . . :     3981 M
% temp addresses . . . . :         .083     Maximum unprotect  . . . . :     4020 M


Sys        Pool    Reserved      Max    ----DB-----    --Non-DB---    Act-    Wait-    Act-
Pool      Size M    Size M       Act    Fault Pages    Fault Pages    Wait    Inel     Inel
  1       493.69    247.25     +++++     .0     .0      .0     .0      .0      .0       .0
  2      5199.39     35.16       195     .0     .0      .0     .0    4134      .0       .0
  3       422.14       .00        47     .0     .0    15.9   22.0    53.0      .0       .0
  4        20.76       .00         5     .0     .0      .0     .0      .0      .0       .0



                                                                             Bottom
===>  _____
F21=Select assistance level

MA    A                        MW                                          12/008
I902 - Session successfully started
```

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WRKSHRPOOL (cont.)

Minimum Sizes are not correct for your machine

```
Session A - [24 x 80]
File  Edit  View  Communication  Actions  Window  Help

                     Work with Shared Pools
                                                System:    ITECH07
Main storage size (M)   . :        6136.00

Type changes (if allowed), press Enter.

                Defined     Max    Allocated    Pool    -Paging Option--
Pool            Size (M)   Active  Size (M)      ID    Defined   Current
*MACHINE          489.58   +++++      489.58     1     *FIXED    *FIXED
*BASE            4992.44     195     4992.44     2     *CALC     *CALC
*INTERACT         633.21      47      633.21     3     *CALC     *CALC
*SPOOL             20.76       5       20.76     4     *CALC     *CALC
*SHRPOOL1            .00       0                       *FIXED
*SHRPOOL2            .00       0                       *FIXED
*SHRPOOL3            .00       0                       *FIXED
*SHRPOOL4            .00       0                       *FIXED
*SHRPOOL5            .00       0                       *FIXED
*SHRPOOL6            .00       0                       *FIXED
                                                                 More...
Command
===>
F3=Exit    F4=Prompt    F5=Refresh    F9=Retrieve    F11=Display tuning data
F12=Cancel

MA    A                    MW                                      09/014
I902 - Session successfully started
```

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Performance

- QPFRADJ
  - 0 No Adjustment
  - 1 Adjustment at IPL
  - 2 Adjustment at IPL & Automatically
  - 3 Automatically

General Performance

- Queries
- Indexes
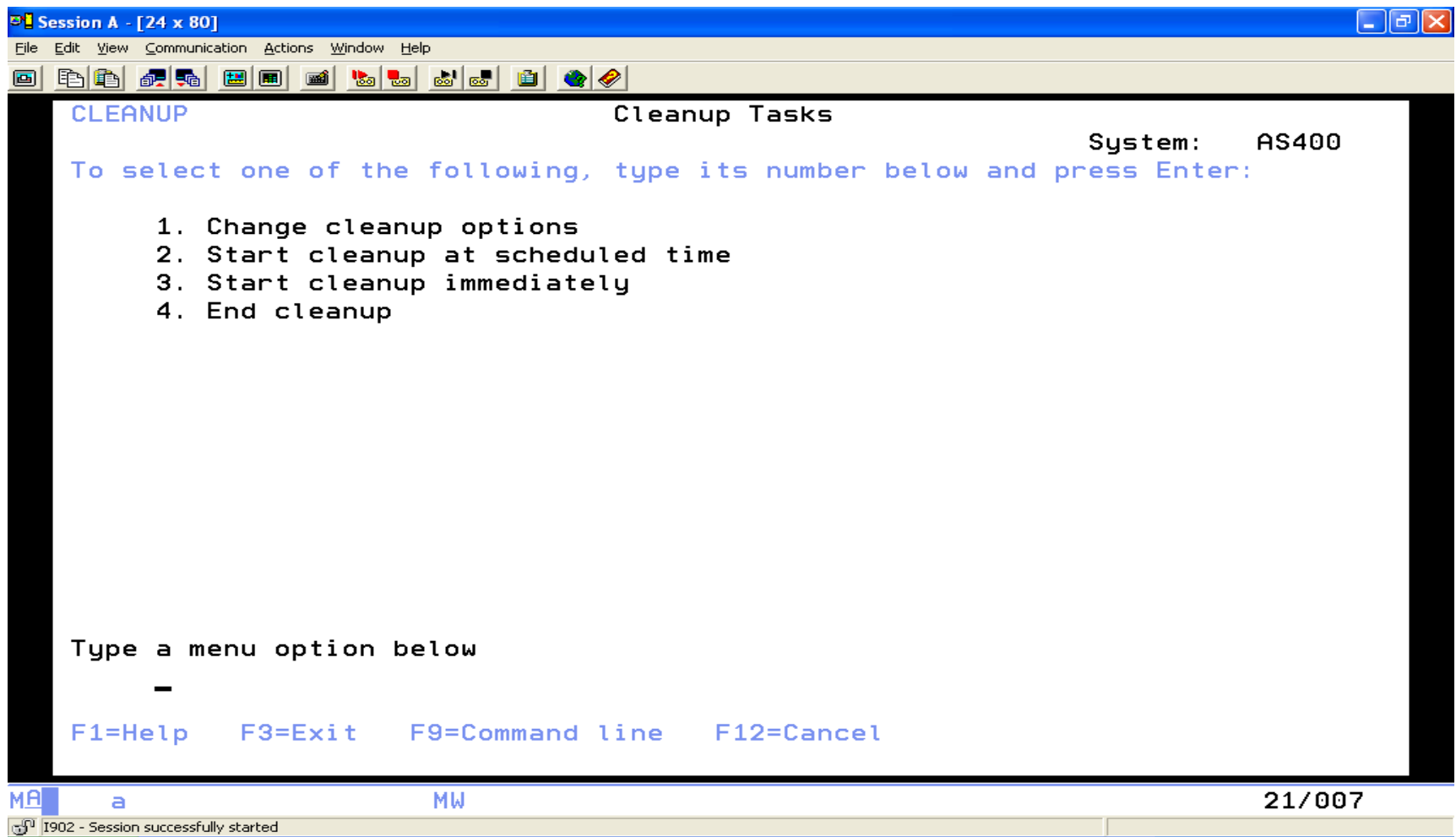- Backups
- Balanced Disks – STRASPBAL

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Why We Should Be Cleaning

- Backups

- Performance

- Recovery

Automation

Automation (cont.)

Session A - [24 x 80]

File Edit View Communication Actions Window Help

```
                         Change Cleanup Options                    AS400
                                                       03/17/07   15:34:48

   Type choices below, then press Enter.

   Allow automatic cleanup . . . . . . . . . . . . . .   Y          Y=Yes, N=No

   Time cleanup starts each day  . . . . . . . . . .   22:00:00     00:00:00-
                                                                    23:59:59,
                                                                    *SCDPWROFF,
                                                                    *NONE

   Number of days to keep:
     User messages . . . . . . . . . . . . . . . . . .   7          1-366, *KEEP
     System and workstation messages . . . . . . . .   4          1-366, *KEEP
     Critical system messages  . . . . . . . . . . .   366        1-366, *KEEP
     Job logs and other system output  . . . . . . .   7          1-366, *KEEP
     System journals and system logs . . . . . . . .   21         1-366, *KEEP




   F1=Help   F3=Exit   F5=Refresh   F12=Cancel

MA      a                    MW                                  17/056
```
I902 - Session successfully started

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Cleanup

- User MSGQs when not signed on
- QSYSOPR under System & WS
- Only QEZDEBUG & QEZJOBLOG
- System Journals (See next slide for names)
- History Log, Problem Logs, some temporary PTF objects, and Alert DB

System Journals Cleaned

- QAOSDIAJRN   Journal for DIA files.
- QDSNX   Journal for DSNX logs.
- QSNADS   Journal for SNADS files.
- QSNMP   Journal for SNMP.
- QSXJRN   Journal for problem databases.
- QLYJRN   Journal for Application Development Manager transactions.
- QPFRADJ   Journal for performance adjustment data.
- QX400   Journal for OSI Message Services.
- QCQJMJRN   Journal for Managed System Services.
- QO1JRN   Journal for Application Enabler OFC files.
- ADJRNLO   Journal for application program driver files.
- QLYPRJLOG   Journal for project logs.
- QMAJRN   Journal for order assistance requests.
- QZMF   Journal for mail server framework log.
- QVPN   Journal for Virtual Private Networking.
- QZCAJRN   Journal for the SNMP database.
- QACGJRN   Journal for job accounting data.

Verify Cleanup Is Cleaning

Session A - [24 x 80]

File Edit View Communication Actions Window Help

```
                    Display History Log Contents
  _

  Cleanup has started.
  Job 050117/QPGMR/QCLNUSRMSG started on 03/16/07 at 23:00:03 in subsystem QCTL
  Job 050118/QPGMR/QCLNSYSMSG started on 03/16/07 at 23:00:03 in subsystem QCTL
  Job 050119/QPGMR/QCLNSYSPRT started on 03/16/07 at 23:00:03 in subsystem QCTL
  Job 050120/QPGMR/QCLNSYSLOG started on 03/16/07 at 23:00:03 in subsystem QCTL
  Job 050121/QPGMR/QCLNCALITM started on 03/16/07 at 23:00:04 in subsystem QCTL
  Job 050122/QPGMR/QCLNUSRPGM started on 03/16/07 at 23:00:04 in subsystem QCTL
  Job 050123/QPGMR/QCLNCRITMS started on 03/16/07 at 23:00:04 in subsystem QCTL
  Cleanup of user messages started.
  Cleanup of operator and work station messages started.
  Job 050121/QPGMR/QCLNCALITM ended on 03/16/07 at 23:00:04; 1 seconds used; en
  Job 050123/QPGMR/QCLNCRITMS ended on 03/16/07 at 23:00:04; 1 seconds used; en
  User cleanup program started.
  User cleanup program successfully completed.
  Job 050122/QPGMR/QCLNUSRPGM ended on 03/16/07 at 23:00:04; 1 seconds used; en
  Cleanup of job logs and other system output started.
  Cleanup of operator and work station messages successfully completed.
                                                                     More...

  Press Enter to continue.

  F3=Exit    F10=Display all    F12=Cancel
```

MA   a   MW   01/001

I902 - Session successfully started

PTFs

```
                        Display PTF Status
                                              System:    MPERPRD1

Product ID  . . . . . . . . . . . . . . :    5770999
IPL source  . . . . . . . . . . . . . :      ##MACH#B
Release of base option  . . . . . . . :      V7R2M0     L00


Type options, press Enter.
  5=Display PTF details   6=Print cover letter   8=Display cover letter
  10=Display PTF apply information


     PTF                                         IPL
Opt  ID       Status                             Action
__   TL16306  Permanently applied                None
__   TL16127  Permanently applied                None
__   TL15311  Permanently applied                None
__   TL15310  Permanently applied                None
__   TL15135  Permanently applied                None
__   TL14276  Permanently applied                None
__   TL14101  Superseded                         None
                                                       More...

F3=Exit   F11=Display alternate view   F17=Position to   F12=Cancel
```
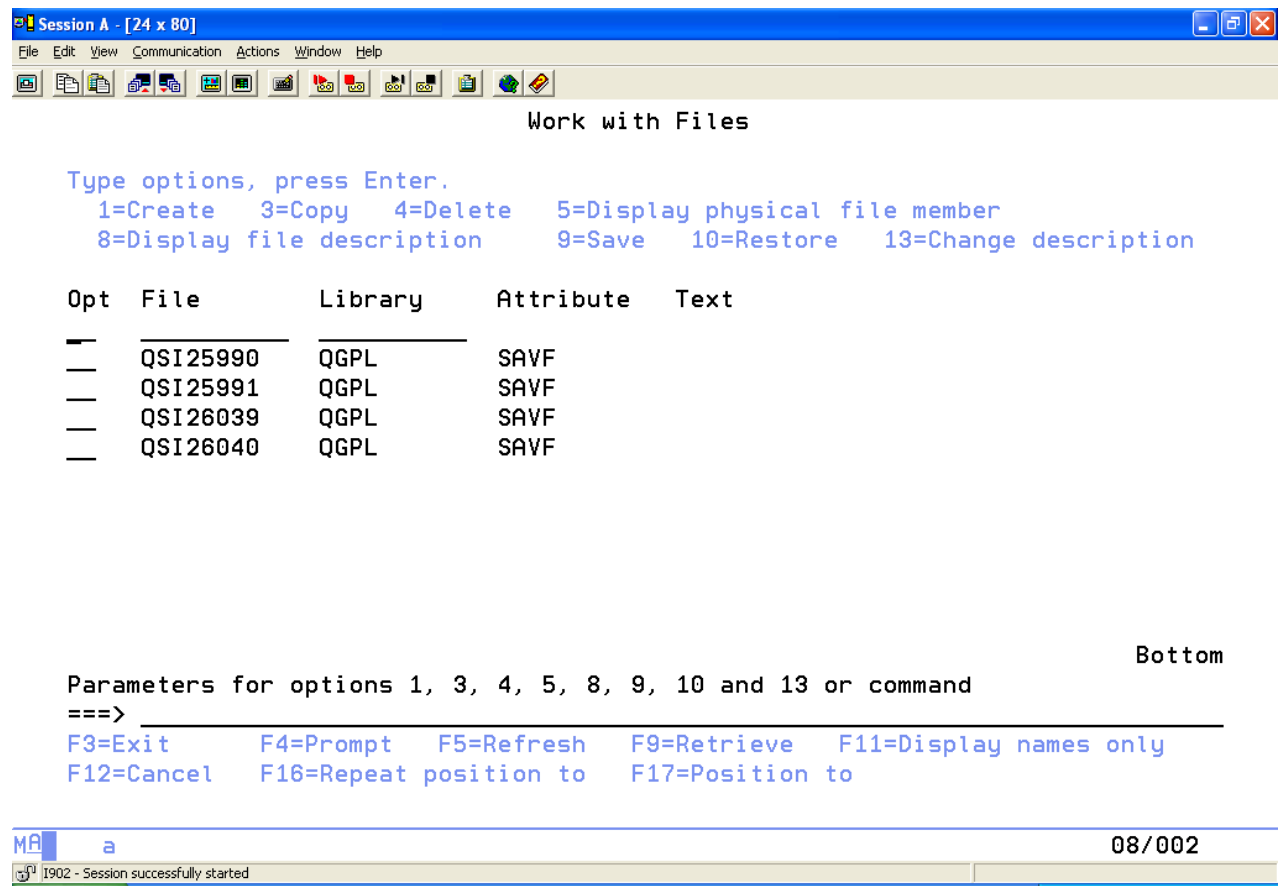
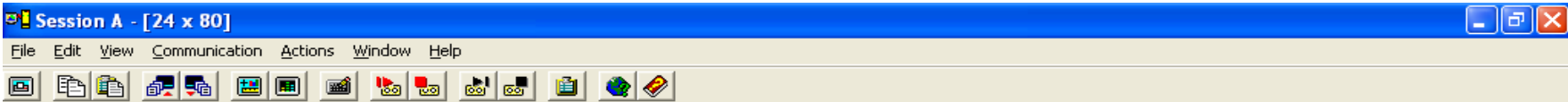itechsol.com

Permanently Apply PTFs

When a PTF is applied, it completely replaces the affected objects in the product. PTFs can be applied temporarily or permanently. If they are applied temporarily, the replaced objects are saved by the system and can later be restored to the product by the Remove Program Temporary Fix (RMVPTF) command. If PTFs are applied permanently, the replaced objects are deleted from the system.

PTFs You Have Downloaded

- Have cover letters stored as members in QGPL/QAPZCOVER

- Save Files in QGPL
  - QMF*
  - QSI*
  - QSF*

- Use DLTPTF

```
Session A - [24 x 80]
File  Edit  View  Communication  Actions  Window  Help

                          Work with Files

Type options, press Enter.
  1=Create    3=Copy    4=Delete    5=Display physical file member
  8=Display file description    9=Save    10=Restore    13=Change description

Opt  File         Library      Attribute    Text
__   _____   _____
__   QSI25990     QGPL         SAVF
__   QSI25991     QGPL         SAVF
__   QSI26039     QGPL         SAVF
__   QSI26040     QGPL         SAVF


                                                              Bottom
Parameters for options 1, 3, 4, 5, 8, 9, 10 and 13 or command
===> _____
F3=Exit      F4=Prompt    F5=Refresh    F9=Retrieve    F11=Display names only
F12=Cancel   F16=Repeat position to    F17=Position to

MA  a                                                          08/002
I902 - Session successfully started
```

DLTPTF

Session A - [24 x 80]

File Edit View Communication Actions Window Help

Delete Program Temporary Fix (DLTPTF)

Type choices, press Enter.

```
PTF  . . . . . . . . . . . . . .    *all         Character value, *ALL
                + for more values   _____
Product  . . . . . . . . . . . .    *ALL         F4 for list
Release  . . . . . . . . . . . .    *ALL         *ALL, VxRxMx
Delete duplicate PTF numbers . .    *NO          *YES, *NO
```

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

MA   a   09/037

I902 - Session successfully started

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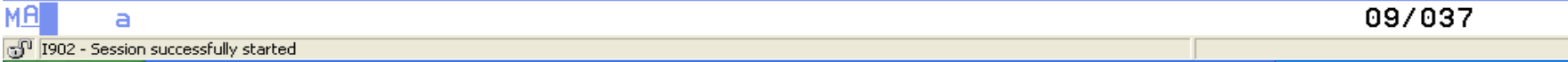
Licensed Programs You Are NOT Using

```
                    Display Installed Licensed Programs

Licensed    Installed
Program     Status        Description
5770SS1     *COMPATIBLE   Library QGPL
5770SS1     *COMPATIBLE   Library QUSRSYS
5770SS1     *COMPATIBLE   IBM i
5770SS1     *COMPATIBLE   Extended Base Support
5770SS1     *COMPATIBLE   Online Information
5770SS1     *COMPATIBLE   Extended Base Directory Su
5770SS1     *COMPATIBLE   Example Tools Library
5770SS1     *COMPATIBLE   AFP Compatibility Fonts
5770SS1     *COMPATIBLE   *PRV CL Compiler Support
5770SS1     *COMPATIBLE   Host Servers
5770SS1     *COMPATIBLE   System Openness Includes
5770SS1     *COMPATIBLE   Extended NLS Support
5770SS1     *COMPATIBLE   ObjectConnect
5770SS1     *COMPATIBLE   Integrated Server Support

Press Enter to continue.
```

Careful

Never delete the library, always use DLTLICPGM

Warning

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Remove Old Main Storage Dumps

- STRSST & signon
- Select option 1. Start a Service Tool
- Select option 6. Main Storage Dump Manager
- Select option 2. Work with copies of MSD

Old Performance Data

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- Programs
- Other Objects
- Performance and Expert Cache
- Basic Cleanup and Why
- Save Files, Reclaim Storage, and Spool Files
- DISKTASKs
- What to do Tomorrow
- Wrap-up

Save Files

- Can be a big payoff, BUT …
- You need to decide which ones to keep and which ones to delete.
- Find out Date last used, Date when created, and by what UserID.
- Don't delete any of them in Q libraries.
- DSPSAVF to help you decide.
- Backup to Special Tape before delete.

Caution

Generate List of Files on the System

Submit Job (SBMJOB)

Type choices, press Enter.

Command to run . . . . > DSPOBJD OBJ(*ALLUSR/*ALL) OBJTYPE(*FILE) OUTPUT(*OUTFILE) OUTFILE(PETEM/DSPSAVFS)

Job name	*JOBD	Name, *JOBD
Job description	*USRPRF	Name, *USRPRF
Library		Name, *LIBL, *CURLIB
Job queue	*JOBD	Name, *JOBD
Library		Name, *LIBL, *CURLIB
Job priority (on JOBQ)	*JOBD	1-9, *JOBD
Output priority (on OUTQ) . . .	*JOBD	1-9, *JOBD
Print device	*CURRENT	Name, *CURRENT, *USRPRF...

More...

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

MA   a   05/037
I902 - Session successfully started

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Create Query

- Select input file as yourlib/DSPSAVFS
- Select these fields: ODLBNM, ODOBNM, ODOBSZ, ODOBOW, ODLDAT , ODUDAT
- Sort by ODOBSZ Descending
- Select records by:
    ODOBAT EQ   'SAVF'

List of Save Files

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Libraries

- Programmers who have left
- Old Libraries
- Backup Libraries
- WRKLIB *ALL

Old Journal Receivers

- DSPOBJD OBJ(*ALL/*ALL) OBJTYPE(*JRNRCV)
- Ones people forgot about and they just grow.
- Sequence number jump.

```
Session A - [24 x 80]
File  Edit  View  Communication  Actions  Window  Help

                      Display Object Description - Basic
                                                      Library 1 of 7
  Library . . . . . . . . :    ADTSLAB      Library ASP device  . :   *SYSBAS
                                            Library ASP group . . :   *SYSBAS


  Type options, press Enter.
    5=Display full attributes   8=Display service attributes


  Opt  Object      Type      Attribute          Size  Text
    _    JRNRECEIVE  *JRNRCV                     36864
    _    JRNREC1000  *JRNRCV                     36864
    _    JRNREC1001  *JRNRCV                    356352
    _    JRNREC2001  *JRNRCV                    126976




                                                            Bottom
   F3=Exit   F12=Cancel   F17=Top   F18=Bottom
   (C) COPYRIGHT IBM CORP. 1980, 2005.
MA      a                                                  10/003
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```

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Reclaim Storage


```
                    Reclaim Storage  (RCLSTG)

  Type choices, press Enter.

  Estimate time required . . . . .   *NO          *NO, *YES
  Select . . . . . . . . . . . . .   *ALL         *ALL, *DBXREF, *DIR
  Omit . . . . . . . . . . . . . .   *NONE        *NONE, *DBXREF, *DIR
  ASP device or group  . . . . . .   *SYSBAS      Name, *SYSBAS







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

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More on Reclaims

- After RCLSTG look in library QRCL and directory QReclaim
- Subcomponents of RCLSTG
  - RCLLNK OBJ(/)
  - RCLDBXREF (*CHECK or *FIX)
  - RCLOBJOWN USRPRF( )
  - RCLDLO DLO(*ALL)
  - RCLLIB LIB( )
  - RCLSPLSTG DAYS(1)
- RCLTMPSTG LIB(*ALL) DAYS(1)

Delete Expired Spool Files

```
Session A - [24 x 80]
File  Edit  View  Communication  Actions  Window  Help

                    Delete Expired Spooled files (DLTEXPSPLF)

    Type choices, press Enter.

    ASP group  . . . . . . . . . . . .   *ALL           Name, *ALL, *SYSBAS







                                                          NEW

                                                      Since V5R4




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

MA        a                                                              05/037
     I902 - Session successfully started
```
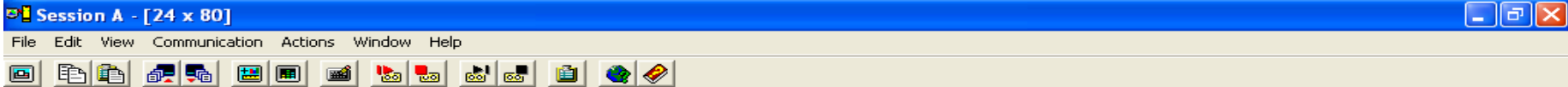
Set Spool Files to Expire

Change Spooled File Attributes (CHGSPLFA)

Type choices, press Enter.

Additional Parameters

```
Output queue . . . . . . . . . .   *DEV          Name, *SAME, *DEV
  Library  . . . . . . . . . . .   _____    Name, *LIBL, *CURLIB
File separators  . . . . . . . .   0             0-9, *SAME
Page range to print:
  Starting page  . . . . . . . .   1             Number, *SAME, *ENDPAGE
  Ending page  . . . . . . . . .   *END          Number, *SAME, *END
File becomes available . . . . .   *FILEEND      *SAME, *JOBEND, *FILEEND...
Save file  . . . . . . . . . . .   *NO           *SAME, *NO, *YES, *IMMED
Expiration date for file . . . .   *DAYS         Date, *SAME, *NONE, *DAYS
Days until file expires  . . . .   21            1-366
Output priority  . . . . . . . .   5             1-9, *SAME, *JOB
User data  . . . . . . . . . . .   'DSPEDTD    ' User data, *SAME
Align page . . . . . . . . . . .   *NO           *SAME, *NO, *YES
                                                             More...
F3=Exit   F4=Prompt   F5=Refresh   F12=Cancel   F13=How to use this display
F24=More keys
```

MA   a   17/039
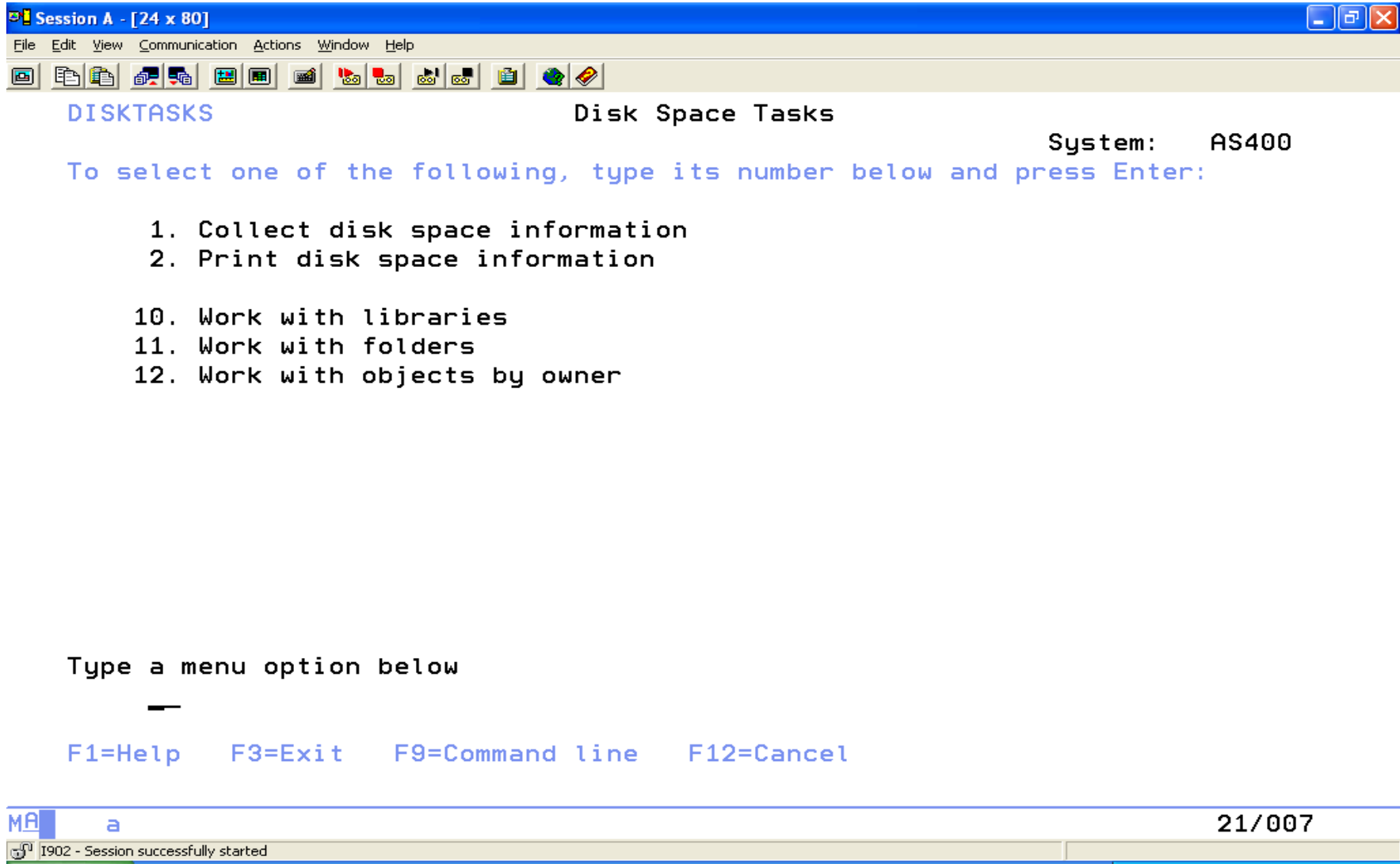
I902 - Session successfully started

What We'll Cover …

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Collect Disk Information

- You can run RTVDSKINF to Collect Disk Information, or you can use the DISKTASKs Menu.

- You will want to run the RTVDSKINF command in Batch.

- Using the DISKTASKs menu, you can select option 1 to automate the collection of the RTVDSKINF information on a selected interval (Daily, Weekly, or monthly).

GO DISKTASKS


```
DISKTASKS                          Disk Space Tasks
                                                  System:    AS400
   To select one of the following,  type its number below and press Enter:

        1. Collect disk space information
        2. Print disk space information

       10. Work with libraries
       11. Work with folders
       12. Work with objects by owner




   Type a menu option below
       __

   F1=Help    F3=Exit    F9=Command line    F12=Cancel
```

Collect Disk Information


```
Session A - [24 x 80]

File   Edit   View   Communication   Actions   Window   Help

                    Collect Disk Space Information            ITECH07
                                              08/29/11   12:07:06


Information collected . . . . . . :    08/14/11   06:00:00



A job will be submitted to collect disk space information.  This job may
take several hours to complete, depending on the size of your system.



Type choice below, then press Enter.

   When to collect information . . .    _    1=Date/time
                                             2=Weekly
                                             3=Monthly








F1=Help    F3=Exit    F12=Cancel
Weekly collection scheduled on *SUN, 09/04/11, at 06:00:00.

MA     A                    MW                                        13/040
    I902 - Session successfully started
```

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Print Disk Information


```
Session A - [24 x 80]

File  Edit  View  Communication  Actions  Window  Help

                    Print Disk Space Information            ITECH07
                                               08/29/11   12:07:35
   Information collected . . . . . . . :    08/14/11   06:00:00


   Select one type of report below, then press Enter.
     1=Select

   Opt       Type of Report
    1        Library
    _        Folder
    _        Owner
    _        Specific object
    _        System summary information




                                                            Bottom
   F1=Help    F3=Exit    F5=Refresh    F12=Cancel

MA     A              MW                              11/003
  I902 - Session successfully started
```

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System Level

Display Spooled File screen (Session B - [24 x 80]):

```
Display Spooled File
File . . . . . . :    QPEZDISK                      Page/Line  1/4
Control : : : : :                                   Columns    1 - 78
Find . . . . . . :
*...+....1....+....2....+....3....+....4....+....5....+....6....+....7....+...
                                                      System Information
  Information collected . . . . . . . . . :  11/03/13  07:00:00   Customize
                                                                  Report t
  Total disk space on system in 1,000,000                        Asp devi
    bytes . . . . . . . . . . . . . . . . :  977105               Librarie
  Main storage size in megabytes : . . . :  15552                 Size of
                                                                  Sort by
  Machine type-model . . . . . . . . . . :  8202-E4B
  System serial number . . . . . . . . . :  06-D2C7P
                                             % of            Size in
  Description                                Disk       1,000,000 bytes
  User libraries                             6.73           65730.39
  User directories                          10.85          105980.24
  Folders and documents                       .00               4.23
  QSYS                                        .23            2273.79
  Other IBM libraries                        1.54           15042.91
                                                               More...
  F3=Exit    F12=Cancel    F19=Left    F20=Right    F24=More keys
```
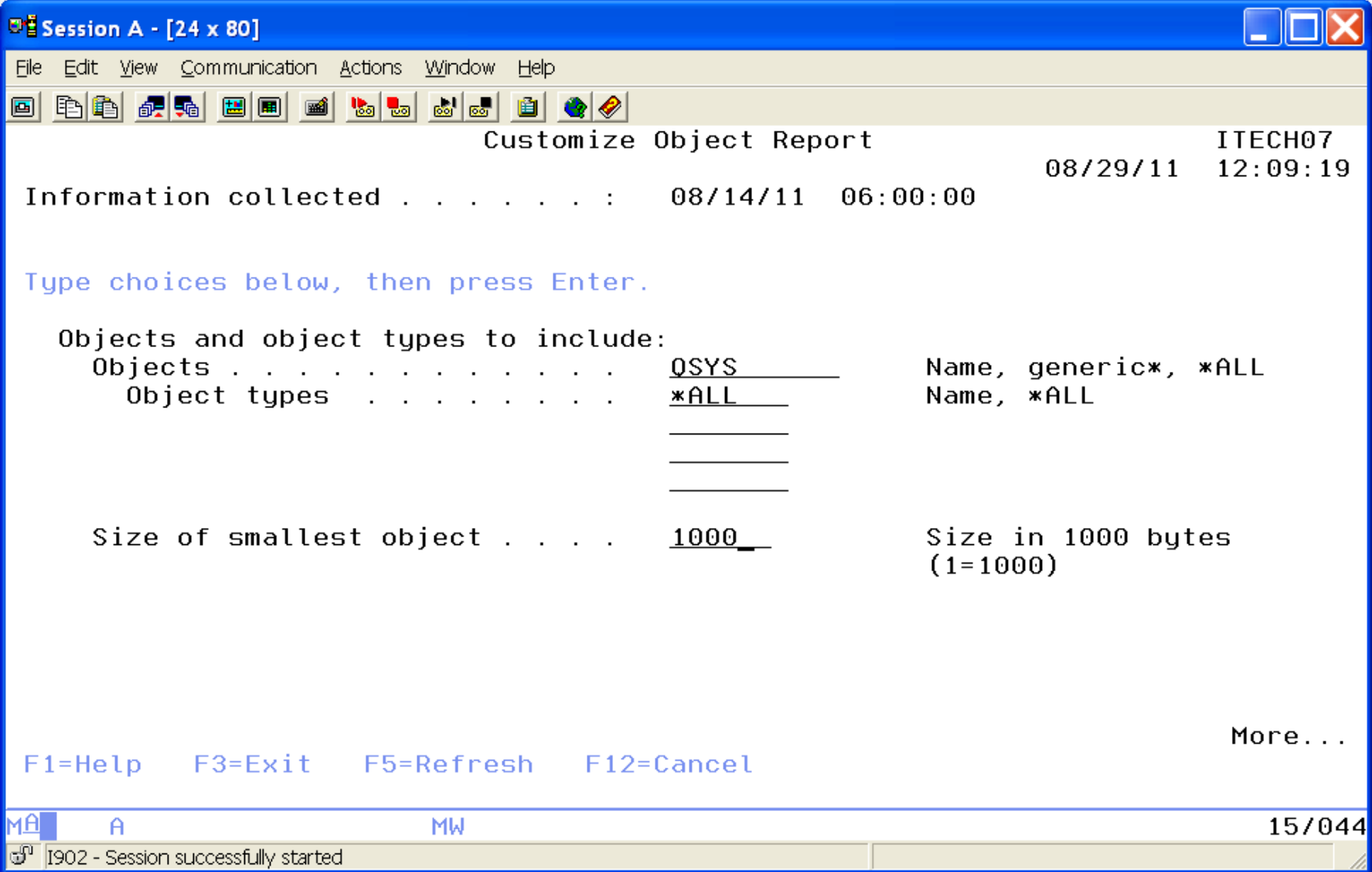
MA   B   MW   03/022

I902 - Session successfully started

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Library Level

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Objects in QSYS Larger Than 1 MB

Customize Object Report   ITECH07
                                          08/29/11   12:09:19
Information collected . . . . :   08/14/11   06:00:00

Type choices below, then press Enter.

  Objects and object types to include:
    Objects . . . .   QSYS   Name, generic*, *ALL
            Object types . . . .   *ALL   Name, *ALL
                                             _____
                                             _____
                                             _____

    Size of smallest object   1000   Size in 1000 bytes
                                                      (1=1000)

                                                          More...

 F1=Help   F3=Exit   F5=Refresh   F12=Cancel

Report on QSYS


```
Session A - [24 x 80]
File  Edit  View  Communication  Actions  Window  Help

                          Display Spooled File
 File  .  .  .  .  .  :    QPEZDISK              Page/Line    4/2
 Control  .  .  .  .  .    _____               Columns      1 - 78
 Find  .  .  .  .  .  .    _____
 *...+....1....+....2....+....3....+....4....+....5....+....6....+....7....+...
 5722SS1 V5R4M0   060210
                                                Library and Objects Informat
 Library/                                % of        Size in   Last      Las
 Object          Type      Owner      Library      1000 bytes  Change    Use
 QSYS            *LIB      QSYS                    1966166.5   03/11/07   03/
    QADBIFLD     *FILE     QSYS          7.94       156172.3   03/11/06   03/
    QILOMAIN     *PGM      QSYS          1.59        31174.7   02/26/07
    QCZPXLC      *PGM      QSYS           .96        18960.4   02/26/07
    QADBIATR     *FILE     QSYS           .91        17883.1   03/11/06   02/
    QADBILFI     *FILE     QSYS           .86        16818.2   03/11/06   02/
    QPZA004747   *PGM      QSYS           .65        12861.4   02/26/07
    QADBIREL     *FILE     QSYS           .64        12619.8   02/26/07   02/
    QTQIINIT     *SRVPGM   QSYS           .63        12480.5   02/26/07   07/
    QSQPDTBL     *PGM      QSYS           .59        11673.6   02/26/07
    QCZPXLCN1    *PGM      QSYS           .58        11423.7   02/26/07
    QPZA005069   *SRVPGM   QSYS           .57        11169.8   02/26/07   02/
                                                                    More...
 F3=Exit    F12=Cancel    F19=Left    F20=Right    F24=More keys

MA      a                                                      03/024
I902 - Session successfully started
```

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All Files Over 100 MB

All Files Over 100 MB (cont.)

Folders Not the IFS

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Get the Directory Information

- The Retrieve Directory Information (RTVDIRINF) command is used to collect attributes for directories and files in the Integrated File System. The collected information is stored in database files that are named using the information file prefix specified by the INFFILEPFX parameter. The files are created in the library specified by the INFLIB parameter, defaults to QUSRSYS.

- You will want to run this in batch.

- You can run the Print Directory Information (PRTDIRINF) command to print reports using the retrieved directory information.
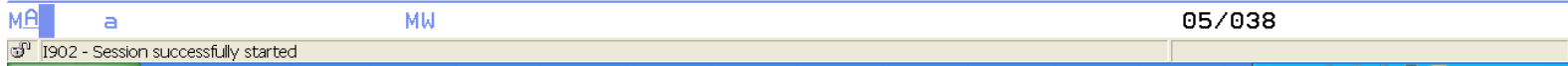
Get the Directory Information (cont.)
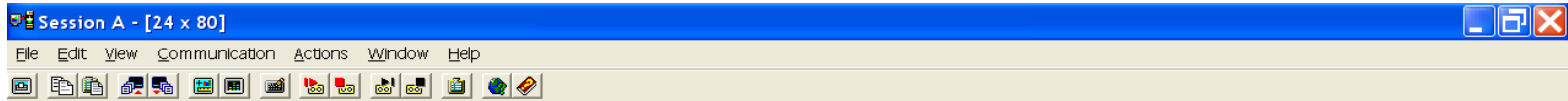
```
Session A - [24 x 80]
File  Edit  View  Communication  Actions  Window  Help

                    Retrieve Directory Information  (RTVDIRINF)        Level: 2

     Type choices, press Enter.

     Directory  . . . . . . . . . . .   /_____

     Directory subtree  . . . . . . .   *ALL        *ALL, *NONE
     Information file prefix  . . . .   *GEN        Name, *GEN
     Information library  . . . . . .   QUSRSYS     Name




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

MA   a              MW                                      05/038
I902 - Session successfully started
```
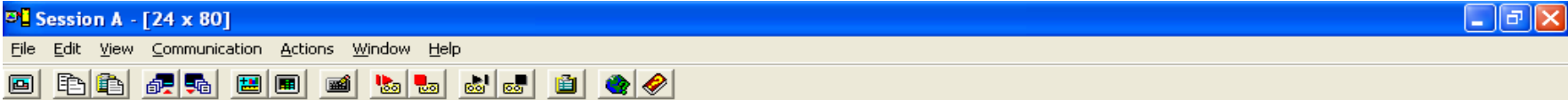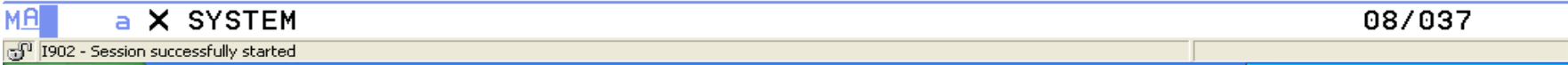
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Print Directory Information


```
Session A - [24 x 80]
File  Edit  View  Communication  Actions  Window  Help

                    Print Directory Information (PRTDIRINF)

   Type choices, press Enter.

   Type of report . . . . . . . . . . >  *DIR          *DIR, *OBJ, *OWN
   Information file prefix  . . . .      *LAST         Name, *LAST
   Information library  . . . . . .      *LAST         Name, *LAST
   Directory subtree  . . . . . . .      *ALL          *ALL, *NONE







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

MA          a  X SYSTEM                                            08/037
   I902 - Session successfully started
```

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Directory: Size, Number, Subdirectories

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What We'll Cover …

- Performance Terms and Problems
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- Logical Files
- Programs
- Other Objects
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Don't Let Fear, Uncertainty, and Doubt (FUD) Stop You!

It can't be true!

You can't do it safely?

What does IBM think?

What will my BP think?

Recovery implications?
What are the alternatives?

Programs

Optimization – CHGPGM
Symbol Tables - CPROBJ
Compression   *ALL | *OBJ

Physical Files

Reorganize - RGZPFM
Resequence   -   keyfile(name)
Purge, Purge, Purge

Logical Files

Access Path Sharing
Access Path Maintenance -
        CHGLF

Objects	Compress -	CPROBJ
	Delete	*ARCHIVE!!!*
	Clear	

Object Types	Logs	Spool Members
	Journals	Reclaim Storage
	Queues	Online Education
	Oversized Objects	

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7 Key Points to Take Home

- Generate a list of files on your system using the DSPFD on slide 10, and then select the largest files with deleted records as the SQL/Query criteria on slide 11. You have your files with the most deleted records, now we know which files need to be reorganized.

- When reorganizing files, don't forget that the ALWCANCEL(*YES) provides the reorganize while active function.

- Figure out which logical files can be shared by examining the keys of the logical files and creating the superset keys first and the subset keys last.

7 Key Points to Take Home (cont.)

- Use Expert Cache to have the next records in memory before you use them, by changing the paging option of the memory pool to *CALC.

- Save files are always big disk hogs; use the procedures on slides 55 and 56 to identify your culprits.

- Automate the collection of object information by setting up weekly disk collections.

- Run Reclaim Storage every 6 – 12 months to find damaged objects, identify offend objects, and reorganize the QADB* files in QSYS.

Your Turn!

Questions?

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