



IBM Software Group

Database Analysis and Utility Generation

Helping a DBA to Manage



@business on demand software

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Agenda

- DBA typical challenges
- IBM DB2 Automation Tool to help DBA meet these challenges
- Overview of Automation Tool to fully automate utility generation
- Walk through simple scenario to illustrate ease of use
- Conclusion

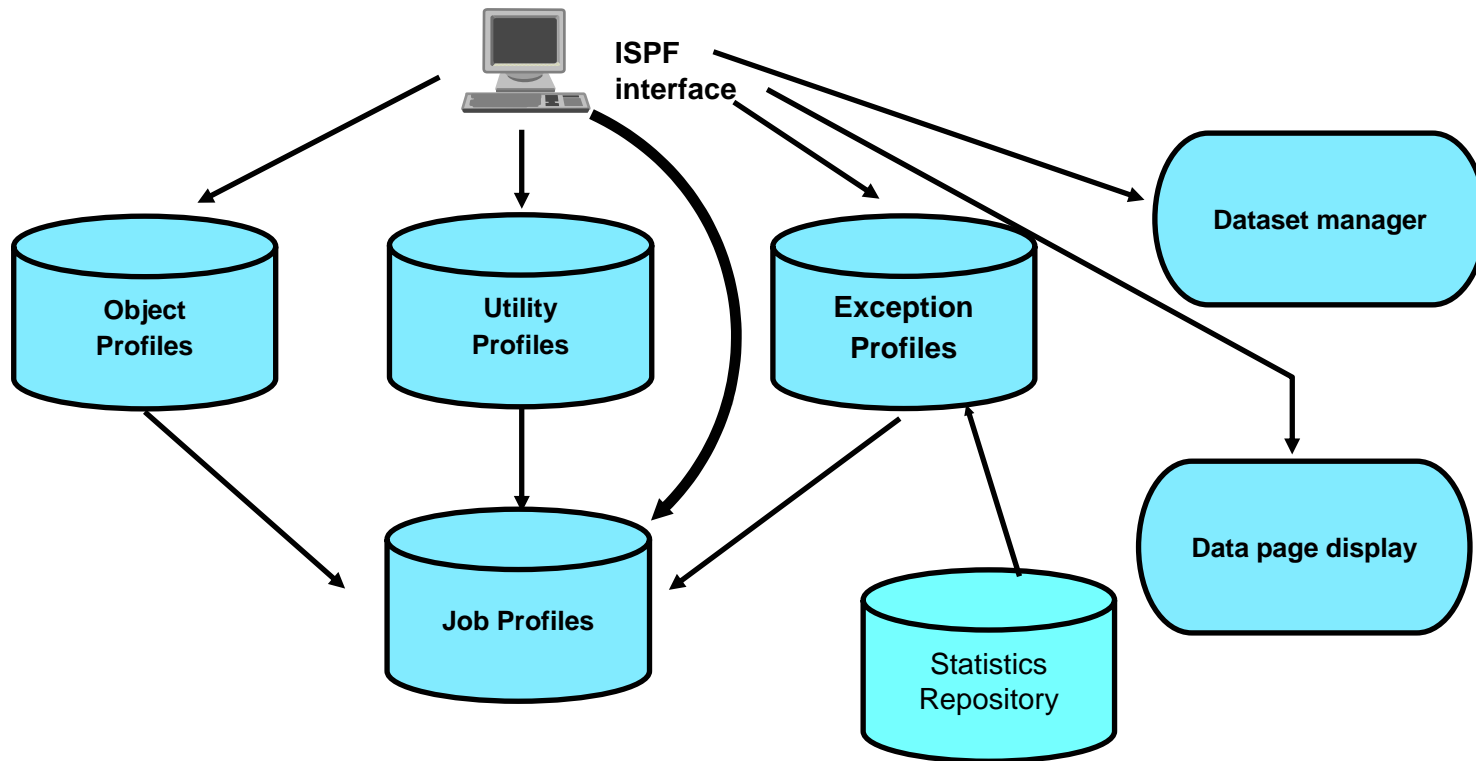


DBA Typical Challenges

- Need to perform an image copy
 - ▶ Created new tables and need a copy for recoverability
 - ▶ Need to create new GDG base for image copy datasets
 - ▶ Recovery takes too long due to infrequent image copies
- Need to reorganize data
 - ▶ Poor performance due to unorganized DB2 data
 - ▶ DB2 objects were sized poorly and now exceeds 50 extents
 - ▶ Reclaim fragmented space, e.g. pseudo-deleted entries
 - ▶ You recently made a change and need to effect the change
- Need to generate current statistics
 - ▶ Poor performing queries
 - ▶ Catalog statistics do not match actual data
- Eliminate unnecessary maintenance activity



DB2 Automation Tool Profiles



Object Profiles

- Identify tablespace and indexes to be processed
 - ▶ By database name, tablespace name, creator, partitions
 - ▶ By database name, index name, creator, partitions
 - ▶ By volume
- Wildcard characters can be used in names or specified explicitly
- They may be contained in a dynamic list
- Can use multiple include / excludes if necessary
- Exclude objects from a more general include, i.e. masking
- Ability to process individual partitions or an entire partitioned tablespace
- Object lists are built dynamically at generator run time



DB2 Automation Tool Main Menu



The screenshot shows a terminal window titled "DEMOMVS.ws - [24 x 80]". The window contains the following text:

```
HAA$MAIN V2R2 ----- IBM DB2 Automation Tool ----- 2005/09/09 13:31:34
Option ==> 0_

DB2 Subsystem ID: DSNB      Current SQLID: DBA282      User: DBA282 - HAA
-----

O. Object Profiles          D. Dataset Manager
U. Utility Profiles        P. Data Page Display
E. Exception Profiles      Y. Disaster Recovery
J. Job Profiles            S. Setup
Q. Quick Build
R. Execution Reports       X. Exit

Enter END command to return to ISPF.
```

At the bottom of the terminal, there is a status bar with the following information:

MA a 02/016
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Object Profiles – Create A New Profile

```

DEMOVMS.ws - [24 x 80]
File Edit View Communication Actions Window Help
D Print entire screen or marked area (text) --- Update Object Profile Display ---- 2005/09/26 09:02:33
Option ==> Scroll ==> CSR
-----
Creator: DBA282          Profile: SAMPLE R810          User: DBA282
Share Option: U (Upd,View,No)  Description: SAMPLE DATABASE R810
Row 1 of 1 >
-----
                Add Objects to the Object Profile
-----
      Wi      Add Tablespaces      U      (Yes/No)
Cmd  Type Ca
A   Press E
*****
      Add Indexes      N      (Yes/No)
      Add Volumes      N      (Yes/No)
      Press ENTER to process or PF3 to Cancel
-----
Valid Line Commands: (Add, Delete, Explode)
Primary Commands:   (Explode)

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```

Object Profiles – Object Criteria

```

DEMO MVS .ws - [24 x 80]
File Edit View Communication Actions Window Help
-----
DLC$OPRU  V2R2  ----- Update Object Profile Display ----- 2005/09/26  09:05:31
Option  ==>                                         Scroll ==> CSR
-----
Creator: DBA282          Profile: SAMPLE R810          User: DBA282
Share Option: U  (Upd,View,No)  Description: SAMPLE DATABASE R810
Row 1 of 1  >
-----
                Enter Tablespace Like to Display
-----
      Wi      Database Like DSN8* Wildcard N (Y or N)
Cmd  Type Ca  Tablespace Like * Exclude I (E or I)
A   Press E   Creator Like PLS_
*****
                Process Dependent Indexes N (Y or N)
                *****

Valid Line Commands: (Add, Delete, Explode)
Primary Commands:   (Explode)

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Object Profile – Include Tablespaces

```

DEMOVS.ws - [24 x 80]
File Edit View Communication Actions Window Help
-----
DLC$OPRT  V2R2  ---  Include Tablespace Selection  ---  2005/09/26  09:08:16
Option  ==>  _____  Scroll ==>  CSR
-----

Database  Like  DSN8*
Tablespace Like  *
Creator    Like  PLS                                     Row 15 of 31  -+>
-----

Cmd  DBNAME      TSNAME      PART  CREATOR  DBID  OBID  PSID  BPOOL  LOCKRULE
-   -
-   DSN8D61L  DSN8S61L    0    PLS      272   6     7     BP0    A
-   DSN8D61L  DSN8S61M    0    PLS      272  12    13    BP0    A
-   DSN8D61L  DSN8S61N    0    PLS      272  18    19    BP0    A
-   DSN8D61P  DSN8S61C    0    PLS      270   1     2     BP0    T
-   DSN8D61P  DSN8S61Q    0    PLS      270   3     4     BP0    P
-   DSN8D71A  DSN8S71D    0    PLS      344   1     2     BP0    P
-   DSN8D71A  DSN8S71E    ALL  PLS      344  10    11    BP0    P
-   DSN8D71A  DSN8S71E    1    PLS      344  10    11    BP0    P
-   DSN8D71A  DSN8S71E    2    PLS      344  10    11    BP0    P
-   DSN8D71A  DSN8S71E    3    PLS      344  10    11    BP0    P

Valid Line Commands: (Select, Indexes, Edit, Report, Validate)

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```

Object Profile – Update

```

DEMOVS.ws - [24 x 80]
File Edit View Communication Actions Window Help
----- Update Object Profile Display ----- 2005/09/26 09:09:43
Option ==> _____ Scroll ==> CSR
-----
Creator: DBA282          Profile: SAMPLE R810          User: DBA282
Share Option: U (Upd,View,No)  Description: SAMPLE DATABASE R810
                                           Row 1 of 2 >
-----
                                Volume /
Cmd  Type  Wild Process  Include/ IX DB Name/ IX Crtr/ IX Name/
      TS   Card Indexes  Exclude TS Crtr  DB Name  TS Name  Part
-    TS   N      N      INC   PLS      DSN8D71A DSN8S71D 0
-    TS   N      N      INC   PLS      DSN8D71A DSN8S71E ALL
***** Bottom of Data *****
Valid Line Commands: (Add, Delete, Explode)
Primary Commands:   (Explode)
MA a
13/003
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```

Utility Profiles

- Select one or more utilities and specify utility options
 - ▶ COPY
 - ▶ RECOVER
 - ▶ COPYTOCOPY
 - ▶ REORG
 - ▶ RUNSTATS
 - ▶ QUIESCE
 - ▶ MODIFY
 - ▶ REPAIR
 - ▶ Dataset reallocation and resizing
 - resizing can be based upon % used or % allocated
 - ▶ Data page verification
 - Validity check of header, space map and data pages
 - Reports inconsistencies
- Multiple utilities selected in one profile executed in sequence on selection screen
- Each utility executed against all objects

Utility Profile Options

```

DEMOVMS.ws - [24 x 80]
File Edit View Communication Actions Window Help
----- Utility Profile Options ----- 2005/09/26 09:14:06
Option ==>

Creator: DBA282      Profile: FIC      User: DBA282

Share Option ==> U (Upd/View/No) Description: FULL IMAGE COPY

                Include in                Update Utility
                Profile                    Options

Data Page Verification Reporting ==> N (Yes/No) ==> N (Yes/No)
Reallocation                    ==> N (Yes/No) ==> N (Yes/No)
Recover                          ==> N (Yes/No) ==> N (Yes/No)
Image Copy                       ==> U (Yes/No) ==> U (Yes/No)
Copy to Copy                     ==> N (Yes/No) ==> N (Yes/No)
Runstats                        ==> N (Yes/No) ==> N (Yes/No)
TS Reorg                        ==> N (Yes/No) ==> N (Yes/No)
IX Reorg                        ==> N (Yes/No) ==> N (Yes/No)
Quiesce                         ==> N (Yes/No) ==> N (Yes/No)
Modify                          ==> N (Yes/No) ==> N (Yes/No)
Repair                          ==> N (Yes/No) ==> N (Yes/No)

Enter END command to return to the Main Menu.

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```

Utility Profile – Image Copy Options 1

```

DEMOVMS.ws - [24 x 80]
File Edit View Communication Actions Window Help
HAA$UTSC V2R2 ----- Image Copy options ----- 2005/09/26 09:14:58
Option ==>
Creator: DBA282      Name: FIC                      User: DBA282
More: +
Exception Rule      ==> A                      (Accepted/Rejected/Both)
Image Copy Utility mode ==> D                      (DB2/Symmetrix/Ess)
Alter EMC Symm/IBM ESS Optns ==> N                      (Yes/No)
Alter Image Copy DSN specs ==> N                      (Yes/No)
Utility ID          ==> _____ (16 characters)

Parallel            ==> N                      (Yes/No)
  Number of objects ==> _____ (0 - 99)
  Number of tape units ==> _____ (0 - 99)
Filter DDname       ==> _____ (8 character DD name)
Sharelevel          ==> R                      (Reference/Change)
Full Image Copy     ==> Y                      (Yes/No)
Check Page          ==> N                      (Yes/No)
Concurrent          ==> N                      (Yes/No)
Change Limit
  First Percent     ==> _____ (% value)
  Second Percent    ==> _____ (% value)

Enter END command to return to the previous screen.  <PF7/PF8> to scroll.

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```

Utility Profile – Image Copy Options 2

```

DEMO MVS .ws - [24 x 80]
File Edit View Communication Actions Window Help
HAA$UIMG V2R2 ----- Image Copy Options ----- 2005/09/26 09:16:14
Option ==> _____

Creator: DBA282      Name: FIC      User: DBA282

Enter the Image Copy options to associate with this utility profile

                Take Image Copy:      View/Update Options:

Local Primary      ==> y      (Yes/No)      ==> y      (Yes/No)
Local Backup       ==> N      (Yes/No)      ==> N      (Yes/No)
Recovery Site Primary ==> N      (Yes/No)      ==> N      (Yes/No)
Recovery Site Backup  ==> N      (Yes/No)      ==> N      (Yes/No)

Enter END command to return to the previous screen

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```

Utility Profile – Image Copy Options 3

```

DEMEMVS.ws - [24 x 80]
File Edit View Communication Actions Window Help
HAA$UCPO V2R2 ----- Image Copy Options ----- 2005/09/26 09:17:37
Option ==> _____

Creator: DBA282      Name: FIC      User: DBA282

Image Copy options for IMAGE COPY LOCAL PRIMARY

Use Threshold Unit if allocated space exceeds x Meg/Trks/Cyls: (Optional)
                                     => _____ (Quantity M|T|C)

Update DSN create spec => Y      => N      (Yes/No)
Unit Type              => _____ => _____ (CART/DISK/etc.)
Catalog                => Y      => Y      (Yes/No)
Data Class             => _____ => _____ (8 character class)
Storage Class         => _____ => _____ (8 character class)
Management Class      => _____ => _____ (8 character class)
Tape specific parameters (only needed if Unit Type is a Tape device):
Expiration date *or*  => _____ => _____ (YYYYDDD/YYDDD)
Retention period      => _____ => _____ (4 digit number)

Enter END command to return to the previous screen

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02/016
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```

Image Copy Dataset Name Generation

```

DEMO MVS - [24 x 80]
File Edit View Communication Actions Window Help
HAA$UCPN  V2R2  ----- LP Image Copy DSN Generation ----- 2005/10/05  08:58:23
Option  ==>
  Creator: DBA282      Name: FIC                      User: DBA282
  IMAGE COPY LOCAL PRIMARY NON-THRESHOLD
  Qualifier code ==>  _  Free form literal ==>  _  Show DSN ==>  N
  GDG Limit      ==>  _  (1-255)
  Current dataset name generation qualifier string:
  &UID..&ICTYPE.&PRIBAC..&DB..&SN.&GDG.

Valid dataset name generation codes are:
( * marked items are not supported in IC dynamic dataset generation.)
  1. Database                11. Date (YYYYDDD)      * 21. GDG (+1)..(+n)
  2. Space Name              12. Year (YYYY)        22. ICBACKUP (#23.#24)
  3. Partition/DSNUM         13. Month (MM)        23. Local/Recovery (L/R)
  * 4. Volser                 14. Day (DD)          24. Primary/Backup (P/B)
  * 5. Partition/DSNUM        15. Julian Day (DDD)  25. ICTYPE (Full/Incr)
      only when partitioned  16. Hours (HH)        26. Utility Name
  * 7. Vcatname               17. Minutes (MM)      27. Job Name
  8. Subsystem ID            18. Seconds (SS)      28. Step Name
  * 9. User ID                * 19. Timestamp        29. Substring Qualifier
  10. Time (HHMMSS)          * 20. Random Number    30. Use freeform literal

Enter END command to return to the previous screen

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hp deskjet 990c on LPT1:

```


Show Image Copy Dataset Name Generation

```

DEMO MVS - [24 x 80]
File Edit View Communication Actions Window Help
HAA$UCPN  V2R2 ----- LP Image Copy DSN Generation ----- 2005/10/05  08:58:23
Option    ==>
  Creator: DBA282      Name: FIC      User: DBA282
  IMAGE COPY LOCAL PRIMARY NON-THRESHOLD
  Qualifier code ==>      Free form literal ==>      Show DSN ==> Y
  GDG Limit      ==>      (1-255)
  Current dataset name generation qualifier string:
  Resulting DSN using current symbolic string
-----
- Using the following sample data as input:

&JOBNAME      = 'JOBNAME '    &STEPNAME     = 'STEPNAME'    &UID         = 'DBA282'
&SSID         = 'DSNB'        &ICTYPE       = 'F'           &UTIL        = 'UTILNAME'
&LOCREM       = 'L'          &PRIBAC       = 'P'           &DB          = 'DATABASE'
&SN           = 'SPACENAM'    &PART         = '00001'
The date/time fields are set to the current time.

The generated dataset would be:

* DBA282.FP.DATABASE.SPACENAM(+1) *

Press ENTER or PF3 to continue

```

MA a 09/003

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Exception Profiles

- Defines conditions for processing selected objects
 - ▶ Primarily to select objects for COPY, REORG and RUNSTATS
- Multiple conditions acceptable
- Evaluated before any JCL generated
- Conditions can be AND/ORed together
- Multiple Exception Profiles can be used .
 - ▶ Multiple conditions ANDed together



Exception Profiles - Information Sources

- VSAM catalog
- SYSCOPY
- Object status
- RUNSTATS
 - ▶ DB2 Catalog
 - ▶ DB2 History tables
 - ▶ Shadow Catalog
 - ▶ Automation Tool Statistics Repository
 - ▶ Dynamic RUNSTATS
- Calendar
- Real Time Statistics
- User defined conditions



Exception Profile – Sample Criteria

```

DEMO MVS ws - [24 x 80]
File Edit View Communication Actions Window Help
HAA$EPRU V2R2 --- Update Exceptions Profile Display --- 2005/09/26 09:41:29
Option ==> _____ Scroll ==> CSR
----- Row 36 of 167 -+>
Creator: DBA282 Profile: FIC CRITERIA User: DBA282
Share Option: U (Update,View,No) Description: _____
Use Stats From: C (Repository,Catalog,Shadow,History,rUnstats)
Conditions To Be: 0 (Anded,Ored) Update Runstats Options: N (Yes,No)
-----
S Statistics Type--- *Column----- Cond -----Exception Value-----
- INDEXSPACESTATS SPACE _____
- EXTENTS _____
- REALTIME ICOPY REAL TIME STAT _____
- REORG_OR_LOAD _____
- S DAYS_SINCE_LAST > 3_____
- UPDATED_PAGES _____
- UPDATED_PAGES_PCT _____
- COPY_CHANGES _____
Valid Line Commands: (And,Or,Select,Deselect,Repeat) - Scroll Right Column Help
Valid CONDitions: LT|<|LE|<=|EQ|=|GT|>|GE|>=|NE|^=|<> "*" indicates DAT stat
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Job Profiles

- Job Profiles combine Object, Utility and Exception Profiles
 - ▶ At least one Object and one Utility Profile is required
 - ▶ Exception profiles are optional
- Set of options, per profile, that allows controlling of utility JCL
 - ▶ One or multiple jobs
 - ▶ Job name templates
 - ▶ Load balancing by object size or utility run time
 - ▶ Generate copy dataset GDG base
 - ▶ DB2 TEMPLATE support
- Utility JCL is built from Job Profile in two modes
 - ▶ Online - immediately builds the utility JCL, first validating any exception profiles if present, then presenting generated utility JCL. Utility JCL created can also be saved in a PDS for later processing
 - ▶ Batch - generator JCL is built which when submitted first checks exceptions, then builds the required JCL
- Use batch 'mode' to integrate with your Job Scheduler



Job Profile – Generation Options

```

DEMOVMS.ws - [24 x 80]
File Edit View Communication Actions Window Help
Generation Options for DBA282.GENERATE FIC
Option ==>
Update Setup Override Options ==> Y (Yes/No)
Update Template/Listdef/Option parms ==> N (Yes/No)
Update Job Break Down Options ==> N (Yes/No)
Automatically Gen GDG Base ==> 000 (0-255 Limit)
Load Balance jobs by ==> N (Time/Dasd/None)
Capture run times for Load Balancing ==> N (Yes/No)
Start spaces in Utility/Read Only ==> N (No/Utility/Read only)
Prefix Utility ID with jobname ==> N (Job/Step/Both/No)
Set JCL member equal to jobname ==> N (Yes/No)
Generate Job when Errors encountered ==> Y (Yes/No/Warnings)
Evaluate Multiple Exception Profiles ==> A (All together/One at a time)
Recall Migrated Spaces ==> N (Yes/No)
Use DSNACCOR Exception Table ==> N (Yes/No)
Rebind Dependent Plans / Packages ==> N (Yes/No)
Utility work dataset high level ==> dba282 (Optional)
Retrieve Jobcard: Dataset ==> _____
Member ==> _____

Jobname Template _____ (Tt,0...#...%...Pppp,D..)
Override byte 1 2 3 4 5 6 7 8
Enter END command to return to Jobs Profile Update

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```

Add Object, Utility, and Exception Profiles

```

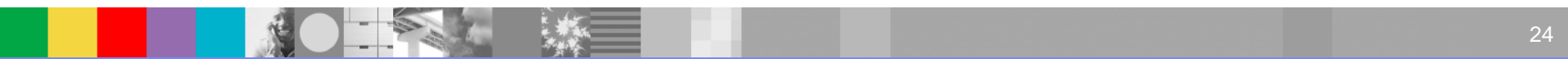
DEMO MVS .ws - [24 x 80]
File Edit View Communication Actions Window Help
----- Jobs Profile Display ----- 2005/09/26 09:49:52
Option ==> Scroll ==> CSR
-----
Profile Like * DB2 Subsystem: DSNB
Creator Like DBA282 Row 1 of 10 >
-----
                          Adding Profiles to the Job Profile
Cmd  Name
C    ED REOR      Add Objects Profiles      y    (Yes/No)
      IMAGE C     Add Utilities Profiles    y    (Yes/No)
      IMAGE C     Add Exception Profiles    y    (Yes/No)
      JOB DEL
      ONLINE
      REALLOC
      REORG
      REORG T
      SAMPLE REORG      DBA282      U
      TEST FIC          DBA282      U
***** Bottom of Data *****
Valid Line Cmds: (Build,Create,Delete,Export,Import,Rename,Update,View)
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Job Profile Display

```

DEMO MVS.ws - [24 x 80]
File Edit View Communication Actions Window Help
----- Update Jobs Profile Display ----- 2005/09/26 09:54:18
Option ==> _____ Scroll ==> CSR
-----
Creator: DBA282      Profile: GENERATE FIC      User: DBA282
Share Option: U (Upd,View,No)      Description: FIC DAYS GT 3
Update Job Generation Options: N (Yes/No)      Row 1 of 3  >
-----
                               <----- Last Update
Cmd  Type  Order  Name                Creator  Userid  Timestamp
--  --  --  --                --  --  --
1  EXCP  1  FIC CRITERIA        DBA282  DBA282  2005-09-2
1  OBJS  1  SAMPLE R810        DBA282  DBA282  2005-09-2
1  UTIL  1  FIC                 DBA282  DBA282  2005-09-2
***** Bottom of Data *****
Valid Line Commands: (Add, Delete, Update, View)
MA  a
07/061
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hp deskjet 990c on LPT1:
    
```



Jobs Profile Display – Build JCL

```

DEMOVMS.ws - [24 x 80]
File Edit View Communication Actions Window Help
-----
DLC$JPRD  V2R2  ----- Jobs Profile Display ----- 2005/09/26  09:55:04
Option  ==>  _____ Scroll ==>  CSR
-----
Profile Creator Like DBA282
Subsystem: DSNB
Row 1 of 11  >
-----
Cmd  Name                               Creator  Updt
-
b  ED REORG PART W/REORG INDEX           DBA282   U
-
  GENERATE FIC                          DBA282   U
-
  IMAGE COPY JOB - USER SKELETAL        DBA282   U
-
  IMAGE COPY JOB - W/MODIFY              DBA282   U
-
  JOB DELETE                             DBA282   U
-
  ONLINE REORG TESING DELTA              DBA282   U
-
  REALLOCATION                             DBA282   U
-
  REORG                                   DBA282   U
-
  REORG TS/IX SEPARATE                   DBA282   U
-
  SAMPLE REORG                           DBA282   U
-
  TEST FIC                                DBA282   U
-----
Valid Line Cmds: (Build,Create,Delete,Export,Import,Rename,Update,View)
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-----
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Build Job Generation

```
DEMOMVS.ws - [24 x 80]
File Edit View Communication Actions Window Help
----- Jobs Profile Display ----- 2005/09/26 09:56:15
Option ==>                               Scroll ==> CSR
-----
Profile Like *                               DB2 Subsystem: DSNB
-----
Build Job for DBA282.GENERATE FIC
-----
- Build Online or Batch  0      (Online/Batch)
C Edit Generated Job     Y      (Yes/No)
Build job in Dataset    DBA282.MARY.AT
Member                  DEMO
-----
Job Cards:
==> //DBA282D JOB DBA282,PETRAS,CLASS=A,NOTIFY=DBA282
==> //*
==> //*
==> //*
-----
Press ENTER to process or PF3 to Cancel
V
MA a                                     13/037
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hp deskjet 990c on LPT1:
```


Generated Job Step for Image Copy - 2

```

DEMOMVS.ws - [24 x 80]
File Edit View Communication Actions Window Help
File Edit Edit_Settings Menu Utilities Compilers Test Help

EDIT          DBA282.MARY.AT(DEMO) - 01.00          Columns 00001 00072
Command ==>          Scroll ==> CSR

000083      TEMPLATE C1LP0001
000084          UNIT          SYSDA
000085          DSN            'DBA282.&ICTYPE.P.&DB..&SN(+1) '
000086          SPACE         TRK
000087          MAXPRIME      00000033
000088          UNCNT         5
000089          DISP          (MOD,CATLG,CATLG)
000090
000091      LISTDEF ICPY1001
000092          INCLUDE TABLESPACE DSN8D71A.DSN8S71D
000093          INCLUDE TABLESPACE DSN8D71A.DSN8S71E
000094
000095      COPY LIST ICPY1001
000096          COPYDDN         (C1LP0001)
000097          FULL              YES
000098
000099          SHRLEVEL          REFERENCE
000100
000101 /*
000102 /**

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```

Utility Profile - REORG Options

```

DEMO MVS .ws - [24 x 80]
File Edit View Communication Actions Window Help
HAA$URED V2R2 ----- Reorg Utility profile options ----- 2005/10/05 07:57:40
Option ==>
Creator: DBA282      Name: ONLINE REORG      User: DBA282
More: +
Include              Update
Online reorg         ==> Y      (Yes/No)    ==> N      (Yes/No)
Copy options         ==> Y      (Yes/No)    ==> N      (Yes/No)
Statistics options   ==> N      (Yes/No)    ==> N      (Yes/No)
Discard              ==> N      (Yes/No)    ==> N      (Yes/No)
  Nopad              ==> N      (Yes/No)
  DSN                 ==> _____ (Name)
Exception Rule       ==> A      (Accepted/Rejected/Both)

Utility ID           ==> _____ (16 characters)
Reuse                ==> N      (Yes/No)
Log                  ==> N      (Yes/No)
Fastswitch           ==> Y      (Yes/No)
Sortdata             ==> Y      (Yes/No)
Keep Dictionary      ==> Y      (Yes/No)
  Sort Device Type   ==> SYSDA   (CART/DISK/etc.)

Press <PF7/PF8> to scroll for additional options.
Enter END command to return to the previous screen.

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Online REORG Options

```

DEMOVMS.ws - [24 x 80]
File Edit View Communication Actions Window Help
----- Online Reorg options ----- 2005/10/05 07:48:59
Option ==> _____

Creator: DBA282      Name: ONLINE REORG      User: DBA282

Enter the options to associate with this utility profile

Sharelevel          ==> C          (Reference/Change/None)
Drain Wait          ==> 0          (0-1800 seconds)
Retry               ==> _____ (blank, 0-255)
Retry Delay         ==> 300       (1-1800 seconds)

Include:             Update:
Deadline Options    ==> Y (Yes/No) ==> y (Yes/No)
Shrlevel Change Options ==> y (Yes/No) ==> y (Yes/No)

Enter END command to return to the previous screen

MA a
02/016
Connected to remote server/host demomvs.demopkg.ibm.com using port 9993
hp deskjet 990c on LPT1:

```

Deadline Options

```

DEMO MVS .ws - [24 x 80]
File Edit View Communication Actions Window Help
HAA$UOPD V2R2 ----- Deadline options ----- 2005/10/05 07:55:12
Option ==> _

Creator: DBA282      Name: ONLINE REORG      User: DBA282

Enter the "Deadline" options to associate with this utility profile

Deadline ==> L      (None/Timestamp/Lde)

Timestamp value ==> _____

Labeled Duration Expression:
Base On Current Date/Timestamp ==> I      (Date/Timestamp)
+/- Value
-      -      Year(s)
-      -      Month(s)
-      -      Day(s)
+      4      Hour(s)
-      -      Minute(s)
-      -      Seconds(s)
-      -      Microseconds(s)

Enter END command to return to the previous screen

MA a
02/016
Connected to remote server/host demomvs.demopkg.ibm.com using port 9993 |hp deskjet 990c on LPT1:

```

Online REORG SHRLEVEL CHANGE Options

```

DEMOMVS.ws - [24 x 80]
File Edit View Communication Actions Window Help
-----
HAA$UOPC  V2R2  ----- Change options ----- 2005/10/05  08:50:06
Option    ==>  _____

Creator: DBA282      Name: ONLINE REORG      User: DBA282

Enter the "Shrlevel Change" options to associate with this utility profile
* Mapping Table Creator    ==> _____ (Blank for dynamic Map Table)
* Mapping Table Name      ==> _____
* Dyn Map Table Bufferpool ==> BPO (BPool for dynamic Map Table)
* Dyn Map Table Storage Group ==> SYSDEFLT (Stogrp for dynamic Map Table)
* Dyn Map Table Primary Quantity ==> 2400 (Primary quantity in kilobytes)
  Maxro                    ==> 300 (Number/DEFER)
  Drain                     ==> W (Writers/All)
  Longlog                   ==> C (Continue/Term/Drain)
  Delay                     ==> 1200 (Number)
  Timeout                   ==> A (Abend/Term)
* We recommend that you leave the Mapping Table Creator and Name blank and
  let Automation tool create a dynamic mapping table. The dynamic mapping
  table will be created before the reorg step and will be dropped after the
  completion of the reorg. You may enter a valid bufferpool and storage group
  you would like the dynamic mapping allocated.

Enter END command to return to the previous screen

M# a
-----
02/016
Connected to remote server/host demomvs.demopkg.ibm.com using port 9993 |hp deskjet 990c on LPT1:

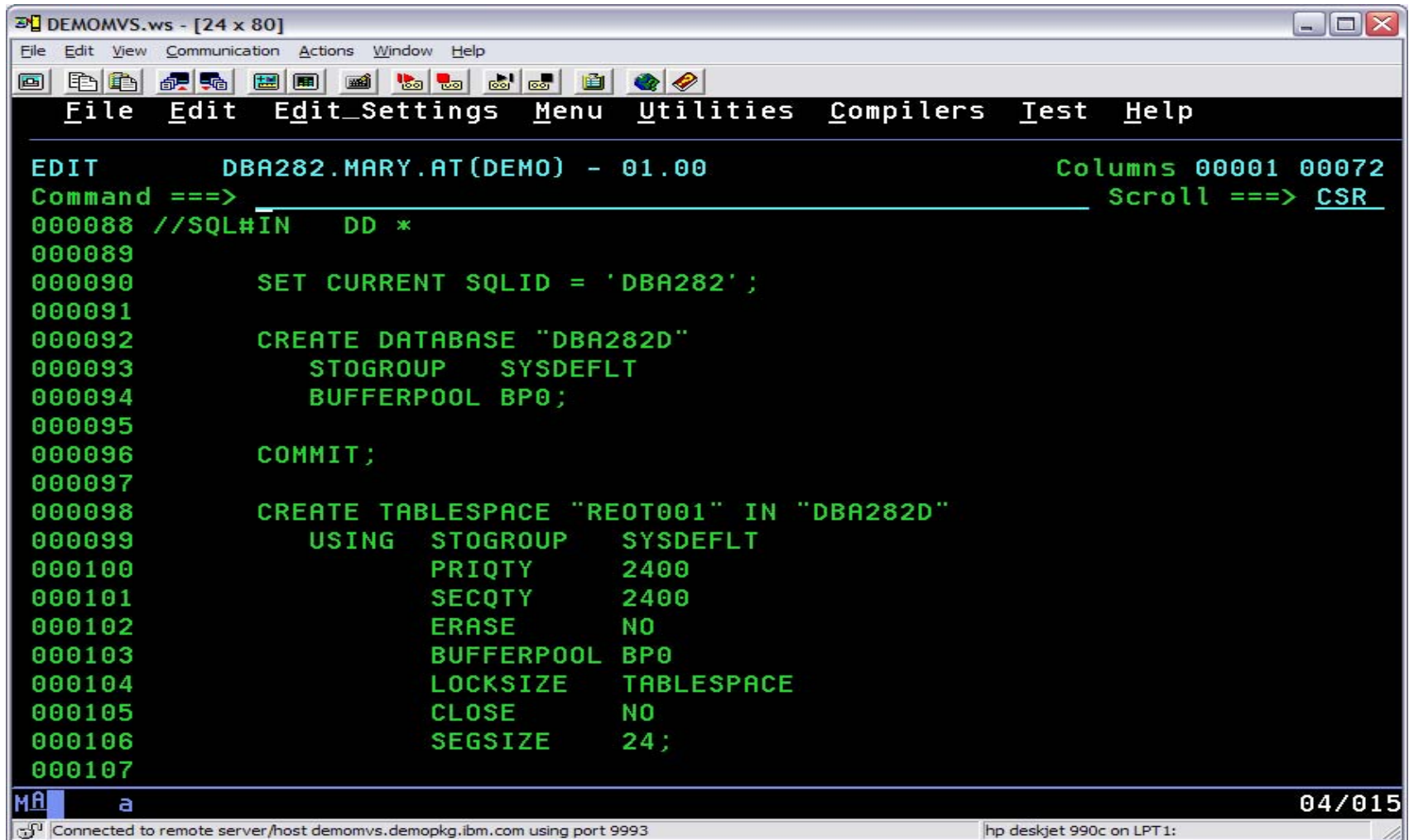
```


Online REORG JCL – page 1

```
DEMOMVS.ws - [24 x 80]
File Edit View Communication Actions Window Help
File Edit Edit_Settings Menu Utilities Compilers Test Help

EDIT          DBA282.MARY.AT(DEMO) - 01.00          Columns 00001 00072
Command ==> _____ Scroll ==> CSR
000068 //** * * * * *
000069 //*
000070 //* Step: CMAP001
000071 //*
000072 //* Desc: This step will create the tablespace, table and index
000073 //* for an Online Reorg Mapping Table. This tablespace will
000074 //* be dropped after the Reorg Utility step is complete.
000075 //*
000076 //** * * * * *
000077 //*
000078 //CMAP001 EXEC PGM=HAA@BSQL,REGION=0020M,COND=(4,LT),
000079 // PARM=(DSNB,HAA220P1)
000080 //*
000081 //STEPLIB DD DSN=DB2AT.V2R2.SHAALOAD,DISP=SHR
000082 // DD DSN=DB2COM.V1R3.SFECLOAD,DISP=SHR
000083 // DD DSN=DB2.V7R1M0.DSNB.SDSNEXIT,DISP=SHR
000084 // DD DSN=DB2.V7R1M0.SDSNLOAD,DISP=SHR
000085 //DB2PARMS DD DSN=DB2AT.V2R2.CONTROL,DISP=SHR
000086 //SYSOUT DD SYSOUT=*
000087 //SQL#OUT DD SYSOUT=*
MA a
05/002
Connected to remote server/host demomvs.demopkg.ibm.com using port 9993 hp deskjet 990c on LPT1:
```

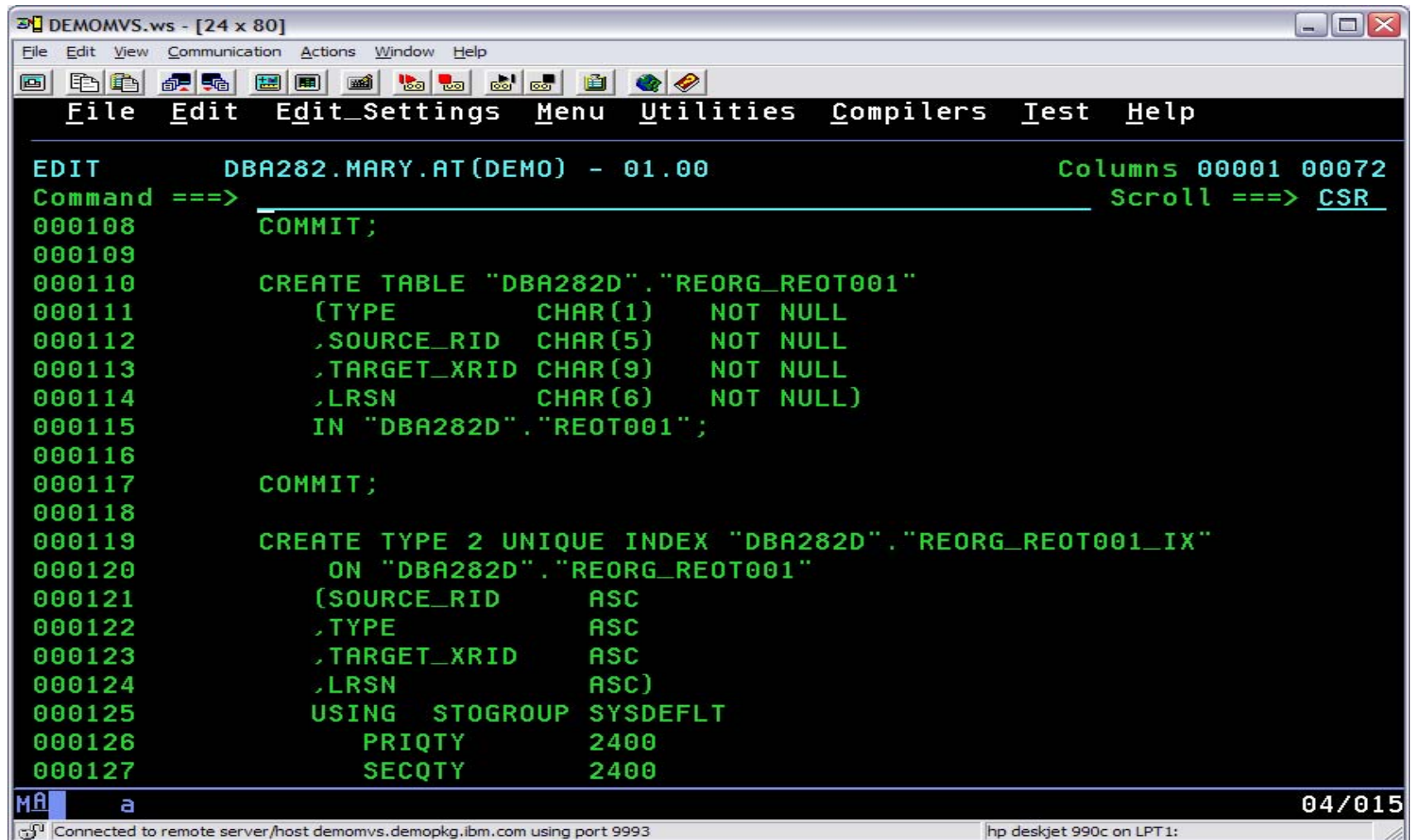
Online REORG JCL – page 2



The screenshot shows a terminal window titled "DEMOMVS.ws - [24 x 80]". The window has a menu bar with "File", "Edit", "View", "Communication", "Actions", "Window", and "Help". Below the menu bar is a toolbar with various icons. The main area of the window displays a JCL script in green text on a black background. The script is for creating a database and a tablespace. The status bar at the bottom shows "MA a" on the left, "04/015" on the right, and "Connected to remote server/host demomvs.demopkg.ibm.com using port 9993" and "hp deskjet 990c on LPT1:" at the bottom.

```
EDIT          DBA282.MARY.AT(DEMO) - 01.00          Columns 00001 00072
Command ==> _____ Scroll ==> CSR
000088 //SQL#IN   DD *
000089
000090         SET CURRENT SQLID = 'DBA282';
000091
000092         CREATE DATABASE "DBA282D"
000093             STOGROUP     SYSDEFLT
000094             BUFFERPOOL  BP0;
000095
000096         COMMIT;
000097
000098         CREATE TABLESPACE "REOT001" IN "DBA282D"
000099             USING     STOGROUP     SYSDEFLT
000100                 PRIQTY     2400
000101                 SECQTY     2400
000102                 ERASE      NO
000103                 BUFFERPOOL  BP0
000104                 LOCKSIZE   TABLESPACE
000105                 CLOSE      NO
000106                 SEGSIZE    24;
000107
```

Online REORG JCL – page 3

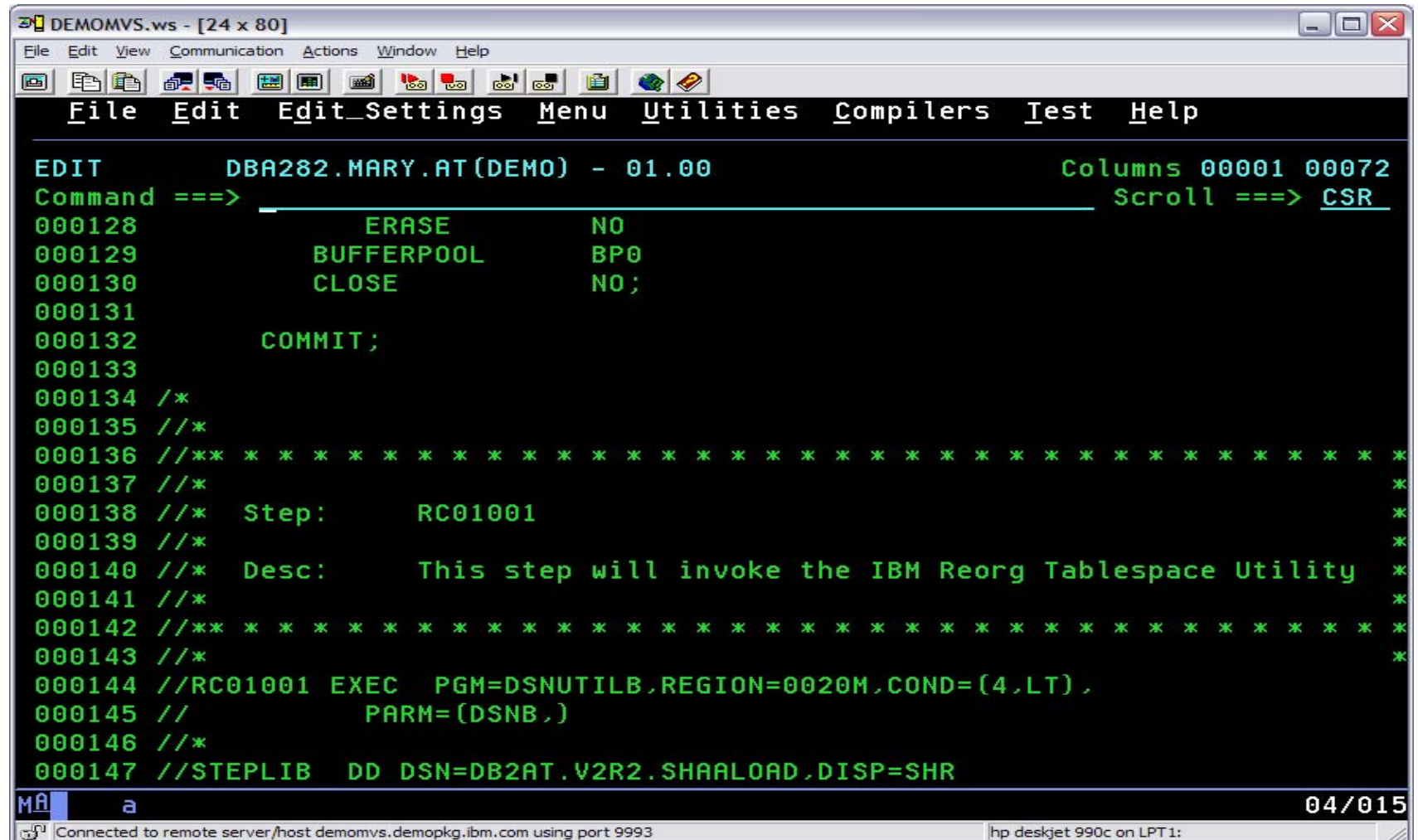


The screenshot shows a terminal window titled "DEMOMVS.ws - [24 x 80]". The window has a menu bar with "File", "Edit", "View", "Communication", "Actions", "Window", and "Help". Below the menu bar is a toolbar with various icons. The main area of the terminal displays the following text:

```
EDIT          DBA282.MARY.AT(DEMO) - 01.00          Columns 00001 00072
Command ==> _____ Scroll ==> CSR
000108      COMMIT;
000109
000110      CREATE TABLE "DBA282D"."REORG_REOT001"
000111          (TYPE          CHAR(1)      NOT NULL
000112           ,SOURCE_RID   CHAR(5)      NOT NULL
000113           ,TARGET_XRID  CHAR(9)      NOT NULL
000114           ,LRSN        CHAR(6)      NOT NULL)
000115      IN "DBA282D"."REOT001";
000116
000117      COMMIT;
000118
000119      CREATE TYPE 2 UNIQUE INDEX "DBA282D"."REORG_REOT001_IX"
000120          ON "DBA282D"."REORG_REOT001"
000121          (SOURCE_RID      ASC
000122           ,TYPE           ASC
000123           ,TARGET_XRID    ASC
000124           ,LRSN          ASC)
000125      USING STOGROUP SYSDEFLT
000126          PRIQTY          2400
000127          SECQTY          2400
```

At the bottom of the terminal, there is a status bar with "MA a" on the left, "04/015" on the right, and a connection message: "Connected to remote server/host demomvs.demopkg.ibm.com using port 9993". A printer status indicator "hp deskjet 990c on LPT1:" is also visible.

Online REORG JCL – page 4



```

DEMOMVS.ws - [24 x 80]
File Edit View Communication Actions Window Help
File Edit Edit_Settings Menu Utilities Compilers Test Help

EDIT          DBA282.MARY.AT(DEMO) - 01.00          Columns 00001 00072
Command ==>    Scroll ==> CSR

000128          ERASE          NO
000129          BUFFERPOOL     BP0
000130          CLOSE          NO;
000131
000132          COMMIT;
000133
000134 /*
000135 /**
000136 /*** * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * *
000137 /**
000138 /** Step:      RC01001
000139 /**
000140 /** Desc:      This step will invoke the IBM Reorg Tablespace Utility *
000141 /**
000142 /*** * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * *
000143 /**
000144 /**RC01001 EXEC PGM=DSNUTILB,REGION=0020M,COND=(4,LT),
000145 /**          PARM=(DSNB,)
000146 /**
000147 /**STEPLIB DD DSN=DB2AT.V2R2.SHAALOAD,DISP=SHR

MÂ a
04/015
Connected to remote server/host demomvs.demopkg.ibm.com using port 9993
hp deskjet 990c on LPT1:

```

Online REORG JCL – page 5

```

DEMO MVS .ws - [24 x 80]
File Edit View Communication Actions Window Help
File Edit Edit Settings Menu Utilities Compilers Test Help

EDIT          DBA282.MARY.AT(DEMO) - 01.00          Columns 00001 00072
Command ==>          Scroll ==> CSR

000148 //          DD DSN=DB2COM.V1R3.SFECLOAD,DISP=SHR
000149 //          DD DSN=DB2.V7R1M0.DSNB.SDSNEXIT,DISP=SHR
000150 //          DD DSN=DB2.V7R1M0.SDSNLOAD,DISP=SHR
000151 //SYSOUT    DD SYSOUT=*
000152 //UTPRINT    DD SYSOUT=*
000153 //SYSPRINT    DD SYSOUT=*
000154 //SYSREC     DD DSN=DBA282.DBA282D.RC01001.REORG.SYSREC,
000155 //              DISP=(MOD,DELETE,CATLG),
000156 //              UNIT=(SYSDA,5),SPACE=(CYL,(5,1),,ROUND)
000157 //SYSUT1      DD DSN=DBA282.DBA282D.RC01001.REORG.SYSUT1,
000158 //              DISP=(MOD,DELETE,CATLG),
000159 //              UNIT=(SYSDA,5),SPACE=(CYL,(5,1),,ROUND)
000160 //SORTOUT     DD DSN=DBA282.DBA282D.RC01001.REORG.SORTOUT,
000161 //              DISP=(MOD,DELETE,CATLG),
000162 //              UNIT=(SYSDA,5),SPACE=(CYL,(5,1),,ROUND)
000163 //** * * * * *
000164 //* Note:  SORTWKxx datasets were not generated because the SORTDEVT *
000165 //*       keyword has been filled in with a sort work device type on *
000166 //*       the Reorg Tablespace Utility Profile. *
000167 //** * * * * *

MA a 04/015
Connected to remote server/host demomvs.demopkg.ibm.com using port 9993 hp deskjet 990c on LPT1:

```

Online REORG JCL – page 6

```

DEMO MVS ws - [24 x 80]
File Edit View Communication Actions Window Help
File Edit Edit_Settings Menu Utilities Compilers Test Help

EDIT          DBA282.MARY.AT(DEMO) - 01.00          Columns 00001 00072
Command ==> _____ Scroll ==> CSR

000168 //R1LP0001 DD DSN=DBA282.DSN8D71A.DSN8S71D.D2005278.T075920,
000169 //          DISP=(MOD,CATLG,CATLG),
000170 //          UNIT=(SYSDA,5),
000171 //          SPACE=(TRK,(1,1),RLSE)
000172 //SYSIN      DD *
000173     REORG TABLESPACE DSN8D71A.DSN8S71D
000174     LOG              NO
000175     SORTDATA
000176     COPYDDN           (R1LP0001)
000177     SHRLEVEL          CHANGE
000178     DEADLINE           CURRENT TIMESTAMP
000179                     + 4 HOURS
000180     DRAIN_WAIT         0
000181     MAPPINGTABLE       "DBA282D"."REORG_REOT001"
000182     MAXRO              300
000183     DRAIN              WRITERS
000184     LONGLOG            CONTINUE
000185     DELAY              1200
000186     TIMEOUT            ABEND
000187     FASTSWITCH         YES

MA a
04/015
Connected to remote server/host demomvs.demopkg.ibm.com using port 9993
hp deskjet 990c on LPT1:

```

Online REORG JCL – page 7

```

DEMO MVS ws - [24 x 80]
File Edit View Communication Actions Window Help
File Edit Edit Settings Menu Utilities Compilers Test Help

EDIT          DBA282.MARY.AT(DEMO) - 01.00          Columns 00001 00072
Command ==> _____ Scroll ==> CSR

000168 //R1LP0001 DD DSN=DBA282.DSN8D71A.DSN8S71D.D2005278.T075920,
000169 //          DISP=(MOD,CATLG,CATLG),
000170 //          UNIT=(SYSDA,5),
000171 //          SPACE=(TRK,(1,1),RLSE)
000172 //SYSIN      DD *
000173 REORG TABLESPACE DSN8D71A.DSN8S71D
000174 LOG              NO
000175 SORTDATA
000176 COPYDDN           (R1LP0001)
000177 SHRLEVEL          CHANGE
000178 DEADLINE           CURRENT TIMESTAMP
000179                  + 4 HOURS
000180 DRAIN_WAIT         0
000181 MAPPINGTABLE       "DBA282D"."REORG_REOT001"
000182 MAXRO              300
000183 DRAIN              WRITERS
000184 LONGLOG            CONTINUE
000185 DELAY              1200
000186 TIMEOUT            ABEND
000187 FASTSWITCH         YES

MA a
04/015
Connected to remote server/host demomvs.demopkg.ibm.com using port 9993
hp deskjet 990c on LPT1:

```

Online REORG JCL – page 8

```

DEMOMVS.ws - [24 x 80]
File Edit View Communication Actions Window Help
File Edit Edit Settings Menu Utilities Compilers Test Help
EDIT          DBA282.MARY.AT(DEMO) - 01.00          Columns 00001 00072
Command ==> _____ Scroll ==> CSR
000188          UNLOAD          CONTINUE
000189          SORTDEVT         SYSDA
000190
000191 /*
000192 /**
000193 /*** * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * *
000194 /**
000195 /** Step:          RC02001
000196 /**
000197 /** Desc:          This step will invoke the IBM Reorg Tablespace Utility
000198 /**
000199 /*** * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * *
000200 /**
000201 //RC02001 EXEC  PGM=DSNUTILB,REGION=0020M,COND=(4,LT),
000202 //              PARM=(DSNB,)
000203 /**
000204 //STEPLIB      DD  DSN=DB2AT.V2R2.SHAALOAD,DISP=SHR
000205 //              DD  DSN=DB2COM.V1R3.SFECLOAD,DISP=SHR
000206 //              DD  DSN=DB2.V7R1M0.DSNB.SDSNEXIT,DISP=SHR
000207 //              DD  DSN=DB2.V7R1M0.SDSNLOAD,DISP=SHR
MA  a
04/015
Connected to remote server/host demomvs.demopkg.ibm.com using port 9993
hp deskjet 990c on LPT1:
  
```


Summary

- Automation Tool improves DBA productivity
- Reduces system resource usage by only invoking DB2 utilities when they are actually required
- Easily build housekeeping utility jobs for new applications
- Eliminate need for manual intervention
- Can automatically detect new objects without having to regenerate object profiles
- Omits objects that have been dropped
- Utilize real-time statistics to determine when objects need maintenance
- Reallocate object size based on space criteria
- Share common utility profiles across enterprise



References and additional Information

- For DB2 Automation Tool V2.2 User's Guide:
 - ▶ DB2 Automation Tool for DB2 for z/OS: SC18-9280-01
- For real time statistics:
 - ▶ Presentation, "Real Time Statistics to Assist a DBA managing DB2" by James Teng, Distinguished Engineer, Silicon Valley Lab, <http://www-1.ibm.com/support/docview.wss?uid=swg27002318>
 - ▶ Real Time Statistics, Chapter 6, Redbook, "DB2 for z/OS and OS/390 Version 7 Selected Performance Topics", SG24-6894-00
 - ▶ IDUG Solutions Journal, "Getting the most out of Real Time Statistics", <http://www.idug.org/idug/member/journal/nov03/article04.cfm>
- Or visit the DB2 and IMS Tools website:
 - ▶ www.software.ibm.com/software/data/db2imstools

