



DB2 Recovery Expert for z/OS

DB2 Recovery Expert for z/OS V1.1

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Presentation Agenda

- **DB2 z/OS recovery**
- **Current IBM products for recovery**
- **DB2 Recovery Expert z/OS function**
- **DB2 Recovery Expert z/OS architecture**
- **DB2 Recovery Expert z/OS demonstration**

DB2 Recovery

- **DB2 recovery is perhaps the most complex activity that DBAs participate in**
- **There are many different potential scenarios**
- **Recoveries are not an everyday thing**
 - most people don't practice recovery enough
 - skills are often not sharp when they are needed
- **There is a need for an Expert type product to assist DBAs in recovery activities**

DB2 Recovery

- **Different types of recovery situations all requiring different recovery solutions**
 - Hardware failures
 - Application failures
 - Accidentally dropped objects
 - Application System recovery
 - Disaster recovery

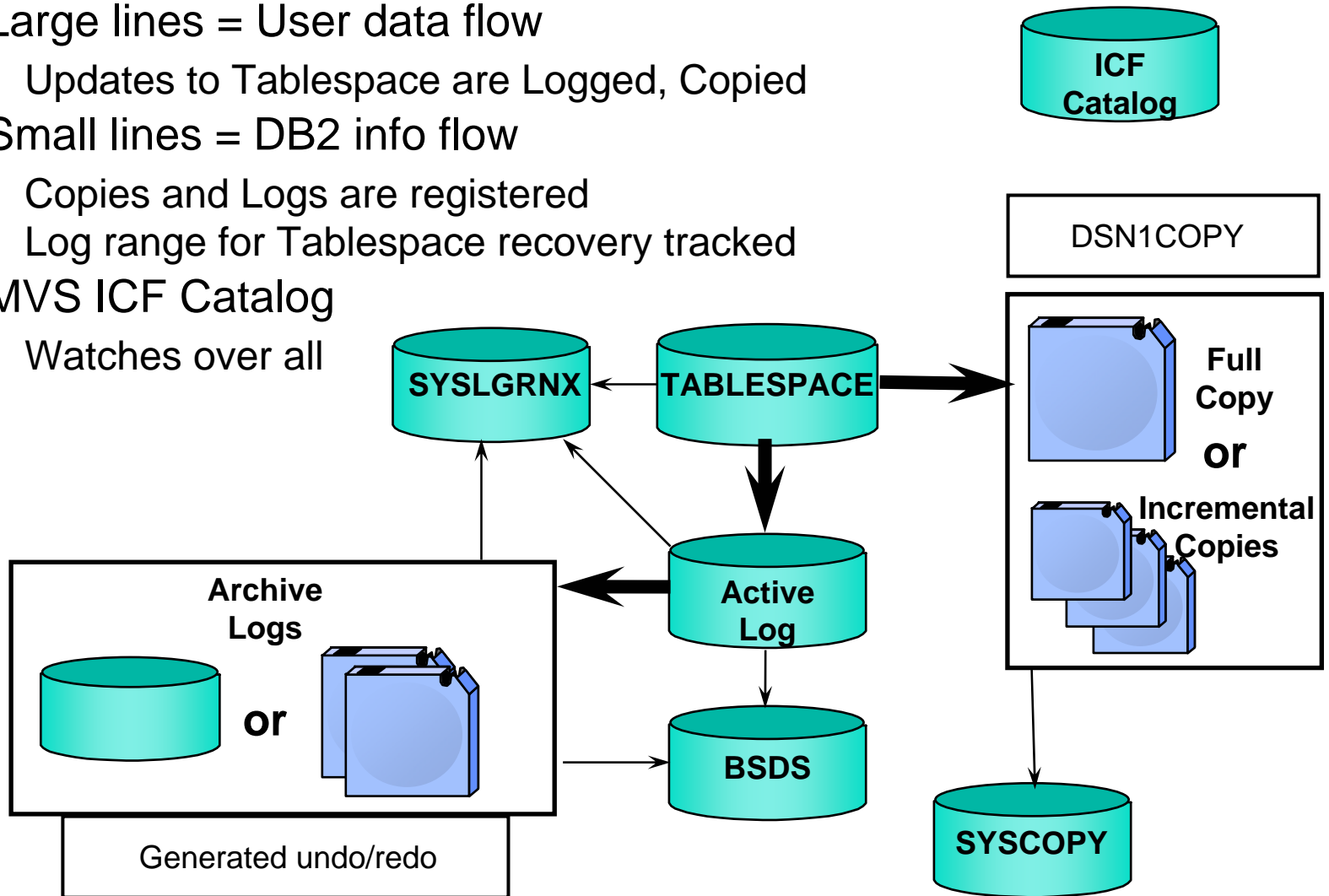
- **Different recovery choices**
 - Recover to
 - Current, IC, PIT, LRSN, Timestamp (quite time)
 - Recover using
 - IC, log, DSN1COPY, undo, redo
 - Recover related objects

What are your DB2 Recovery Assets

- **DB2 Active and Archived Log**
 - Generated Undo/Redo
- **Bootstrap Dataset – BSDS**
- **SYSLGRNX**
- **SYSCOPY**
- **Full and Incremental copies**
 - DSN1COPY
- **Tablespace to be recovered**
- **ICF Catalog**

DB2 Recovery Asset Review

- Large lines = User data flow
 - Updates to Tablespace are Logged, Copied
- Small lines = DB2 info flow
 - Copies and Logs are registered
 - Log range for Tablespace recovery tracked
- MVS ICF Catalog
 - Watches over all



Current IBM products for DB2 z/OS recovery

- **DB2 COPY Utility**
 - Make backups of application and catalog objects
- **DB2 RECOVER Utility**
 - Primary recovery tool for application and catalog objects
- **Log Analysis Tool**
 - Selective backout and recovery
- **Object Restore**
 - Dropped object recovery (and more)
- **Change Accum Tool**
 - Speed recovery by producing log subset files or using log records to update image copies
- **Automation Tool**
 - Disaster recovery support
- **V8 – SYSTEM BACKUP and RESTORE Utilities**
 - Backup and restore complete application subsystems
- **DB2 RECOVERY EXPERT for z/OS**

DB2 Recovery Expert for z/OS V1.1

- **Provide Expert assist for performing many types of DB2 recoveries**
- **DB2 Recovery Expert analyses the requested recovery**
 - Providing a selection of possible recovery plans
 - Selecting for you, the needed recovery assets and utilities
 - Assists in selecting recovery points
 - Builds required JCL

Select objects to recovery

■ **Selecting Groups of Objects to Recover**

- Recovery Expert provides 4 ways to specify a group of objects to be recovered
 - Explicit selection (one by one)
 - By pattern
 - Via RI relationships (Grouper and catalog RI)
 - Grouper groups can be selected in the object tree
 - If Automation Tool is available, via Automation Tool object profiles
 - Automation Tool profiles can be selected in the object tree

Select objects to recovery

Recovery Advisor

Welcome

1. Location
2. **Objects**
3. Point in Time
4. Recovery Plan

Select the objects that you want to recover.

Select the objects you wish to recover in the list of available objects, and click the right arrow to add them to the list of objects to recover. The list at the bottom of the window will help you by showing detailed properties for the objects you click on.

In order to define a pattern matching multiple objects, select the node labeled "Pattern" under the type of object you wish to select, then click the right arrow. A window will display where you can type the specific pattern values.

The objects you select, as well as objects related to them, will be recovered. For example, if you select a table space, the tables it contains will also be recovered. On the Recovery Plan page, you should carefully review the complete list of objects under Recovered Objects in the Recovery plans tree.

Available objects

- I81A
 - Storage Groups
 - Databases
 - Table Spaces
 - Tables
 - Plans
 - Packages
 - Grouper Groups
 - Object Profiles

Selected objects

Properties

Name	Value
Active?	true
DB2-established stored procedures address space	I81ASPAS
Database services address space	I81ADBM1
Distributed data facility address space	I81ADIST
Host name	rs01.rocketsoftware.com
IP address	10.1.1.107

◀ Back Next ▶ Save... Close Help

Recover Points

- **There are 3 choices when specifying a recovery point**
 - Recover to current
 - Recover to a timestamp
 - Can be selected from
 - Object version
 - Recovery history events
 - Quiet points
 - Recover to an RBA/LRSN
 - Can be selected from
 - Recovery history events
 - Quiet points

Select Recovery Point

Recovery Advisor

Welcome

- 1. Location
- 2. Objects
- 3. Point in Time**
- 4. Recovery Plan

Select the point in time to which you want to recover.
Select one of the available options for the point in time to which to recover.

Point in time

Current

Select this option when you want to recover data that is logically consistent, but has a physical error or other corruption in how it is stored.

Timestamp 2006-06-05 10.02.44 000000 (explicit)

Select this option when you want to recover previous versions of the selected objects, or when data has become logically inconsistent and you can identify a prior timestamp when the data was consistent.
Use the browse button for help in selecting the timestamp.

Log RBA 0000C3AB86F0 (explicit)

Select this option when data has become logically inconsistent and you can identify a prior log RBA when the data was consistent.
Use the browse button for help in selecting the log RBA.

◀ Back Next ▶ Save... Close Help

Recovery Plans

Recovery Advisor

Welcome

1. Location
2. Objects
3. Point in Time
4. Recovery Plan

Generate and execute a plan to recover the selected objects.

Click Generate to generate one or more recovery plans for the selected objects.
 After generating, you can select a plan to review its details.
 If it has been some time since you generated the recovery plans, you can click Validate to check whether the external resources required by the plans (such as image copy data sets) are still available.
 Finally, select the plan you wish to use for recovery, and click Run to run it. To instead view or edit the JCL generated to run the plan, click View JCL.

Recovery plans

Generate...

Plans

- Plan 1: Using DSN1 COPY and RECOVER LOGONLY (cost = 2)
- Plan 2: Using DSN1 COPY of IC and redo SQL (cost = 2)
- Plan 3: Using RECOVER (cost = 2)
- Plan 4: Using RECOVER to IC and redo SQL (cost = 2)
- Recovered Objects
 - Table space TESTDB02.TESTTS02
 - Table partition TESTDB02.TESTTS02.1
 - Table partition TESTDB02.TESTTS02.2
 - Table partition TESTDB02.TESTTS02.3
 - Table partition TESTDB02.TESTTS02.4
 - Table CSPITT.CSPITT_TBL02
 - View CSPITT.CSPITT_VIEW2
 - Index CSPITT.CSPITT_IDX02
 - Index partition CSPITT.CSPITT_IDX02.1
 - Index partition CSPITT.CSPITT_IDX02.2

Properties

Name	Value
Plan cost	2
Plan name	Using RECOVER

Validate Run View JCL...

Back Next Save... Close Help

Recovery Plans steps

Recovery Advisor

Welcome

1. Location
2. Objects
3. Point in Time
4. Recovery Plan
5. Results

Generate and execute a plan to recover the selected objects.

Click Generate to generate one or more recovery plans for the selected objects.
 After generating, you can select a plan to review its details.
 If it has been some time since you generated the recovery plans, you can click Validate to check whether the external resources required by the plans (such as image copy data sets) are still available.
 Finally, select the plan you wish to use for recovery, and click Run to run it. To instead view or edit the JCL generated to run the plan, click View JCL.

Recovery plans

Generate...

Plans

- Plan 1: Using DSN1 COPY and RECOVER LOGONLY (cost = 2)
- Plan 2: Using DSN1 COPY of IC and redo SQL (cost = 2)
- Plan 3: Using RECOVER (cost = 2)**
 - Job 1
 - Check Status
 - START DATABASE
 - Check Status
 - RECOVER
 - REBUILD INDEX
 - COPY
 - Check Status
 - START DATABASE
 - Check Status
- Plan 4: Using RECOVER to IC and redo SQL (cost = 2)
- Recovered Objects
 - Table space TESTDB02.TESTTS02

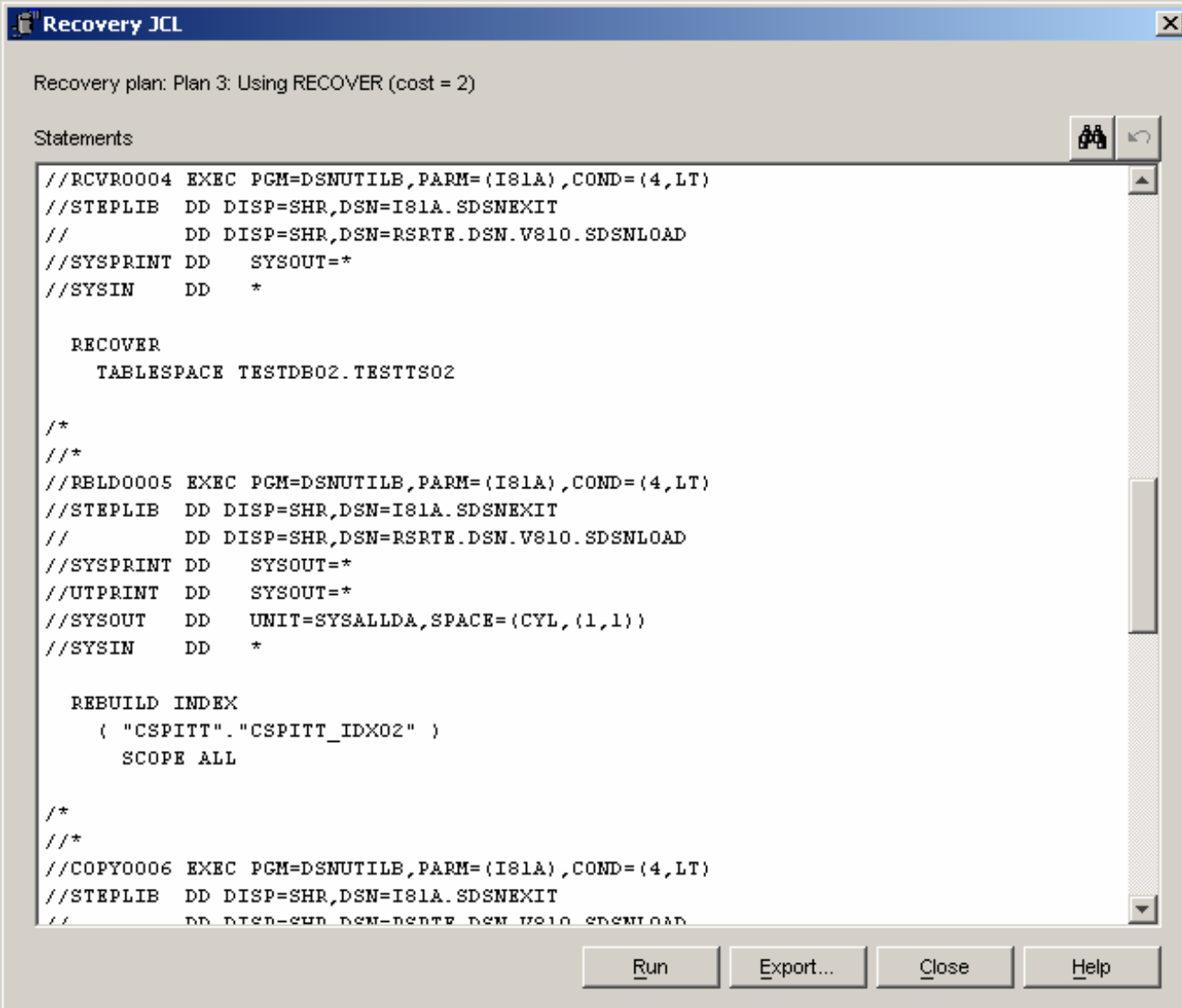
Properties

Name	Value
Plan cost	2
Plan name	Using RECOVER

Validate Run View JCL...

Back Next Save... Close Help

Recovery JCL



Recovery plan: Plan 3: Using RECOVER (cost = 2)

Statements

```
//RCVR0004 EXEC PGM=DSNUTILB,PARM=(I81A),COND=(4,LT)
//STEPLIB DD DISP=SHR,DSN=I81A.SDSNEXIT
// DD DISP=SHR,DSN=RSRTE.DSN.V810.SDSNLOAD
//SYSPRINT DD SYSOUT=*
//SYSIN DD *

RECOVER
  TABLESPACE TESTDB02.TESTTTS02

/*
/**
//RBLD0005 EXEC PGM=DSNUTILB,PARM=(I81A),COND=(4,LT)
//STEPLIB DD DISP=SHR,DSN=I81A.SDSNEXIT
// DD DISP=SHR,DSN=RSRTE.DSN.V810.SDSNLOAD
//SYSPRINT DD SYSOUT=*
//UTPRINT DD SYSOUT=*
//SYSOUT DD UNIT=SYSALLDA,SPACE=(CYL,(1,1))
//SYSIN DD *

REBUILD INDEX
  ("CSPITT"."CSPITT_IDX02")
  SCOPE ALL

/*
/**
//COPY0006 EXEC PGM=DSNUTILB,PARM=(I81A),COND=(4,LT)
//STEPLIB DD DISP=SHR,DSN=I81A.SDSNEXIT
// DD DISP=SHR,DSN=RSRTE.DSN.V810.SDSNLOAD
```

Run Export... Close Help

DB2 Recovery Expert for z/OS V1.1

- **Recovery Expert V1.1 provides**
 - Application recovery
 - Drop recovery
 - Single or multiple objects
 - Dependency analysis
 - Quiet point analysis
 - SYSTEM RESTORE

DB2 Recovery Expert for z/OS V1.1

- **Includes functionality from:**
 - Log Analysis Tool
 - Object Restore
 - NO pre-reqs for LAT or OR
- **Recovery Expert can utilize Automation Tool Object Profiles for object selection IF:**
 - the customer has Automation Tool
 - the customer already has object profiles set up in Automation Tool

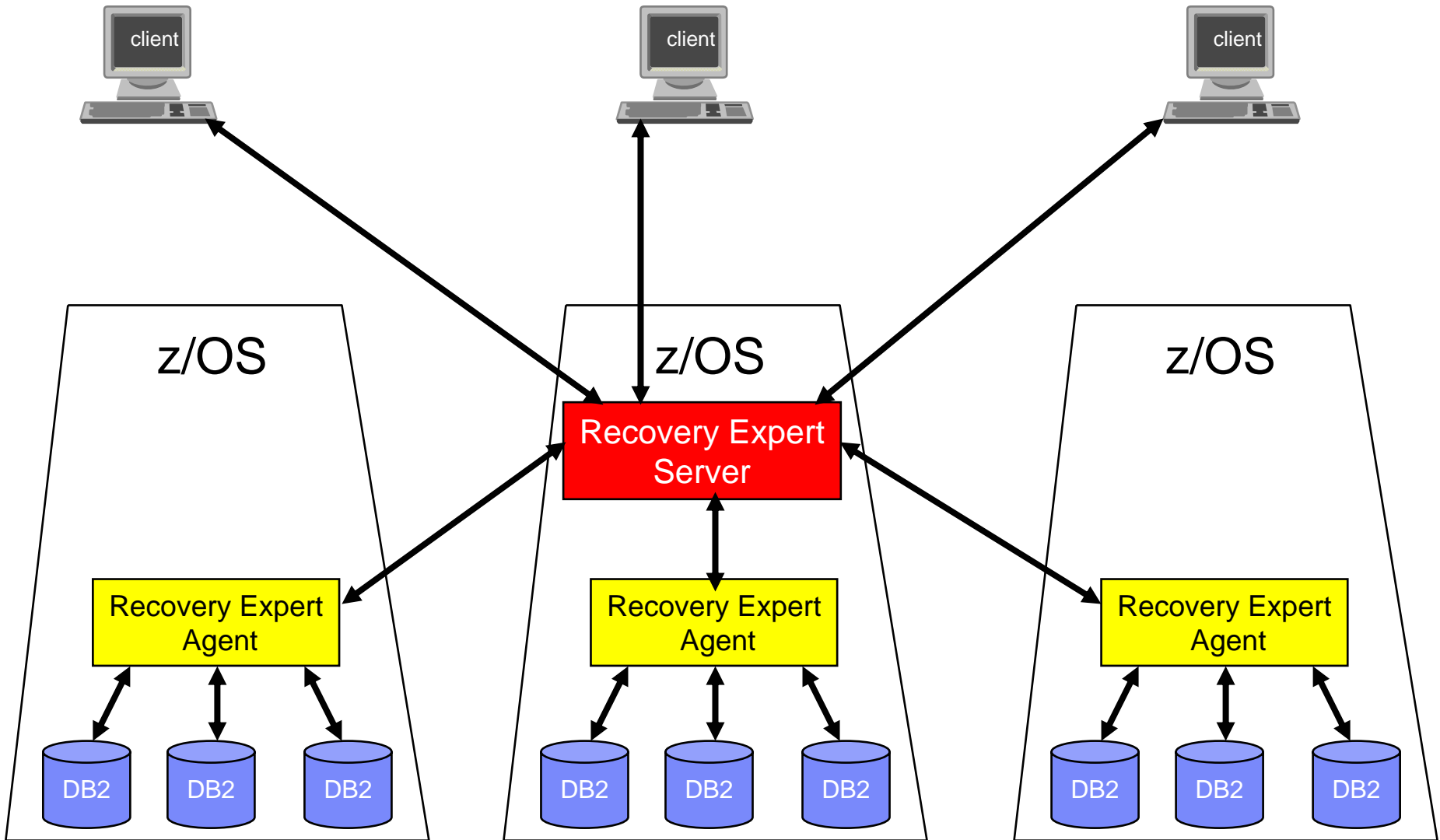
DB2 Recovery Expert for z/OS V1.1

- **V1.1 does not include functionality from:**
 - Change Accum
- **V1.1 does not do backup management**
 - Customers can use Automation Tool to perform the backups
- **V1.1 does not support**
 - Disaster recovery
 - Hardware assisted recovery
 - Integration with RE MP

Product Architecture

- **3 Tier Architecture**
 - UI – Windows - Java (no ISPF interface)
 - SERVER
 - z/OS - C/C++
 - AGENT
 - z/OS - C/C++ and assembler
- **Server and Agent run as started tasks or batch jobs**
- **Communication via TCP Sockets**
- **One UI can log onto any number of Servers across an Enterprise (one at a time)**
- **Servers can talk to any number of agents across an Enterprise**
 - Servers can talk to agents on different LPARs or systems

The DB2 Recovery Expert for z/OS environment



Schema Level Repository

- **Schema Level Repository (SLR)**
 - Enhanced version of Object Restore's Version Repository
 - Stored in DB2 tables
 - Updated via batch job
 - like Object Restore today
- **The SLR update program**
 - goes through the DB2 catalog and builds the base for the Schema Level Repository
- **The SLR update needs to be scheduled on a regular basis to insure that the SLR is up to date**



DB2 Recovery Expert for z/OS

DB2 Recovery Expert V1.1 Recovery Scenarios

Scenarios

- Scenario 1 – Recovery of table space to current
- Scenario 2 – Recovery of table space to a selected timestamp point-in-time from quiet time
- Scenario 3 – Selection of an RBA or LRSN from recovery history events or quiet times – dropped object
- Scenario 4 – Recovery of a set of related table

Scenario 1 – Recover TS to Current

■ Description

- TS DEMODB07.DEMOTS07
 - Updates to table
 - Full image copy
 - Perform SLR update
 - Updates to table
 - Selects from table
- Recover to current
 - Using Recovery Utility

RE z/OS starting screen

DB2 Recovery Expert for z/OS

File Edit Tools Help

Launchpad

Recovery Select to recover data or dropped objects in an operational database system.

Log Analysis Select to analyze database log files to determine points of consistency (quiet times) for an object or objects.

Specifications Select to work with previously saved recovery and log analysis specifications.

Messages

Status	Location	Specification	Type	Timestamp	Description
success	I71A on RS01	(unsaved)	Recovery plan generation	Jun 18, 2006 8:14:37 AM	Recovery plan generation for DEMODB07.DEMOTS07 has completed successfully.
success	I81A on RS01	(unsaved)	Log analysis	Jun 18, 2006 9:37:33 AM	The job ARYJOB / JOB00743 has ended on RS01 with MAXCC=0.
success	I81A on RS01	(unsaved)	Recovery plan generation	Jun 18, 2006 9:46:38 AM	Recovery plan generation for DEMODB03.DEMOTS03 has completed successfully.
warning	I81A on RS01	(unsaved)	Recovery plan execution	Jun 18, 2006 9:49:00 AM	The job ARYJOB / JOB00744 has ended on RS01 with MAXCC=4.
success	I81A on RS01	(unsaved)	Recovery plan generation	Jun 18, 2006 10:32:57 AM	Recovery plan generation for TDBG01.DEPT_EMP.Group_1 has completed successfully.
success	I81A on RS01	(unsaved)	Recovery plan generation	Jun 18, 2006 4:08:51 PM	The job ARYJOB / JOB00756 has ended on RS01 with MAXCC=0.
success	I81A on RS01	(unsaved)	Recovery plan generation	Jun 18, 2006 4:30:37 PM	Recovery plan generation for ALA23SMP has completed successfully.
success	I81A on RS01	(unsaved)	Recovery plan generation	Jun 18, 2006 4:34:08 PM	Recovery plan generation for ALA23SMP has completed successfully.

Ready

Select Location

Recovery Advisor

1. Location
2. Objects
3. Point in Time
4. Recovery Plan

Select the location that contains the objects you want to recover.
This advisor helps you recover data and dropped objects.
To start the recovery process, select a location. A location is a DB2 UDB for z/OS and OS/390 subsystem (or data sharing group).

Locations

- z/OS Subsystems
 - I71.A
 - I71K
 - I81.A**
 - I81E
- z/OS Data Sharing Groups
- z/OS Systems
- z/OS Sysplexes

Properties

Name	Value
Active?	true
DB2-established stored procedures address...	I81.ASPAS
Database services address space	I81.ADBM1
Distributed data facility address space	I81.ADIST
Host name	rs01.rocketsoftware.com
IP address	10.1.1.107
Mode	NFM
Port number	3800
Resync port number	3801
Subsystem ID	I81.A
System services address space	I81.AMSTR
Version	DSN08015

Status

Name	Value
DB2 restart RBA	0000C5304000
DB2 restart time	18:33:01 JUN 15, 2006
Last checkpoint	10:09:08 JUN 16, 2006
Log copy 1	I81.A.LOGCOPY1.DS03 IS 6% FULL
Log copy 2	I81.A.LOGCOPY2.DS03 IS 6% FULL
Log high offloaded RBA	0000C586FFFF

◀ Back Next ▶ Save... Close Help

Select object/objects or group

Recovery Advisor

1. Location
2. Objects
3. Point in Time
4. Recovery Plan

Select the objects that you want to recover.

Select the objects you wish to recover in the list of available objects, and click the right arrow to add them to the list of objects to recover. The list at the bottom of the window will help you by showing detailed properties for the objects you click on.

In order to define a pattern matching multiple objects, select the node labeled "Pattern" under the type of object you wish to select, then click the right arrow. A window will display where you can type the specific pattern values.

The objects you select, as well as objects related to them, will be recovered. For example, if you select a table space, the tables it contains will also be recovered. On the Recovery Plan page, you should carefully review the complete list of objects under Recovered Objects in the Recovery plans tree.

Available objects

- I81 A
 - Storage Groups
 - Databases
 - Table Spaces
 - Pattern
 - DEMODB03.DEMOTS03
 - DEMODB07.DEMOTS07
 - Tables
 - Plans
 - Packages

Selected objects

- Table space DEMODB07.DEMOTS07

Properties

Name	Value
Altered timestamp	2006-06-18-14.31.24.135850
Created timestamp	2006-06-18-14.31.24.135850
Creator	PDDAVI
DBID	301
Implicit?	N
ORID	1

◀ Back Next ▶ Save... Close Help

Select recovery point

Recovery Advisor

1. Location
2. Objects
3. Point in Time
4. Recovery Plan

Select the point in time to which you want to recover.
Select one of the available options for the point in time to which to recover.

Point in time

Current

Select this option when you want to recover data that is logically consistent, but has a physical error or other corruption in how it is stored.

Timestamp 2006-06-18 17.12.55 000000 (explicit)

Select this option when you want to recover previous versions of the selected objects, or when data has become logically inconsistent and you can identify a prior timestamp when the data was consistent.
Use the browse button for help in selecting the timestamp.

Log RBA 0000C58E6288 (explicit)

Select this option when data has become logically inconsistent and you can identify a prior log RBA when the data was consistent.
Use the browse button for help in selecting the log RBA.

◀ Back Next ▶ Save... Close Help

Generate and select Recovery plan then run

Recovery Advisor

1. Location
2. Objects
3. Point in Time
4. Recovery Plan

Generate and execute a plan to recover the selected objects.

Click Generate to generate one or more recovery plans for the selected objects.
After generating, you can select a plan to review its details.
If it has been some time since you generated the recovery plans, you can click Validate to check whether the external resources required by the plans (such as image copy data sets) are still available.
Finally, select the plan you wish to use for recovery, and click Run to run it. To instead view or edit the JCL generated to run the plan, click View JCL.

Recovery plans

Generate...

Plans

- [-] Plan 1: Using DSN1 COPY and RECOVER LOGONLY (cost = 2)
- [-] Plan 2: Using DSN1 COPY of IC and redo SQL (cost = 2)
- [-] Plan 3: Using RECOVER (cost = 2)
 - [-] Job 1
 - [+] Check Status
 - [+] -START DATABASE
 - [+] Check Status
 - [+] RECOVER
 - [+] REBUILD INDEX
 - [+] COPY
 - [+] Check Status
 - [+] -START DATABASE
 - [+] Check Status
- [-] Plan 4: Using RECOVER to IC and redo SQL (cost = 2)
- [-] Recovered Objects

Properties

Name	Value
Plan cost	2
Plan name	Using RECOVER

Validate Run View JCL...

◀ Back Next ▶ Save... Close Help

Recovery job results

The screenshot displays the 'Recovery Advisor' window. On the left is a navigation pane with five items: 1. Location, 2. Objects, 3. Point in Time, 4. Recovery Plan, and 5. Results. The main area is titled 'Review recovery job results.' and contains instructions: 'Select one of the jobs in the list and click View to view its results. If you do not need to retain a job's results for future reference, select the job and click Delete.'

Below the instructions are two tables. The first table, labeled 'Plans', has columns: Plan, Start, End, MAXCC, and Job count. It contains one row: Plan 3: Using RECOVER (cost = 2), with Start time 2006-06-18-17.24.45.726885, End time 2006-06-18-17.25.05.935911, MAXCC 0, and Job count 1.

The second table, labeled 'Jobs', has columns: Job name, Job ID, Start, End, and MAXCC. It contains one row: ARYJOB, with Job ID JOB00758, Start time 2006-06-18-17.24.45.727023, End time 2006-06-18-17.25.05.858247, and MAXCC 0.

At the bottom right of the main area are buttons for 'View...' and 'Delete'. At the bottom of the window are navigation buttons: 'Back', 'Next', 'Save...', 'Close', and 'Help'.

Plan	Start	End	MAXCC	Job count
Plan 3: Using RECOVER (cost = 2)	2006-06-18-17.24.45.726885	2006-06-18-17.25.05.935911	0	1

Job name	Job ID	Start	End	MAXCC
ARYJOB	JOB00758	2006-06-18-17.24.45.727023	2006-06-18-17.25.05.858247	0

Review job output by step name

Recovery Job Results

Job: ARYJOB / JOB00758
 Step name: JES2
 DD name: JESMSGLG

```

JES2 JOB LOG -- SYSTEM RS01 -- NODE N1

17.24.45 JOB00758 ---- SUNDAY, 18 JUN 2006 ----
17.24.45 JOB00758 IRR010I USERID PDDAVI IS ASSIGNED TO THIS JOB.
17.24.45 JOB00758 ICH70001I PDDAVI LAST ACCESS AT 17:17:10 ON SUNDAY, JUNE 18, 2006
17.24.45 JOB00758 $HASP373 ARYJOB STARTED - INIT 3 - CLASS A - SYS RS01
17.24.45 JOB00758 IEF403I ARYJOB - STARTED - TIME=17.24.45
17.24.46 JOB00758 RKTSW01I
----- Timings (HH:MM:SS.hh) -----
17.24.46 JOB00758 RKTSW01I JOBNAME STEPNAME PROCSTEP STEP RC CPU (Total) CPU (TCB) CPU (SRB) CPU (Other)
17.24.46 JOB00758 RKTSW01I ARYJOB CRST0001 1 00 00:00:00.10 00:00:00.03 00:00:00.00 00:00:00.07
17.24.47 JOB00758 RKTSW01I STUT0002 2 00 00:00:00.05 00:00:00.04 00:00:00.00 00:00:00.01
17.24.47 JOB00758 RKTSW01I CRST0003 3 00 00:00:00.05 00:00:00.03 00:00:00.00 00:00:00.02
17.24.51 JOB00758 RKTSW01I RCVR0004 4 00 00:00:00.08 00:00:00.06 00:00:00.00 00:00:00.02
17.24.58 JOB00758 RKTSW01I BELD0005 5 00 00:00:00.70 00:00:00.64 00:00:00.01 00:00:00.05
17.24.59 JOB00758 RKTSW01I COPY0006 6 00 00:00:00.09 00:00:00.06 00:00:00.00 00:00:00.03
17.25.00 JOB00758 RKTSW01I CRST0007 7 00 00:00:00.05 00:00:00.03 00:00:00.00 00:00:00.02
17.25.00 JOB00758 RKTSW01I STRW0008 8 00 00:00:00.05 00:00:00.04 00:00:00.00 00:00:00.01
17.25.01 JOB00758 RKTSW01I CRST0009 9 00 00:00:00.05 00:00:00.03 00:00:00.00 00:00:00.02
17.25.01 JOB00758 IEF404I ARYJOB - ENDED - TIME=17.25.01
17.25.01 JOB00758 RKTSW01I ARYJOB JOB TOTALS: 00:00:01.22 00:00:00.96 00:00:00.01 00:00:00.25
17.25.01 JOB00758 $HASP395 ARYJOB ENDED

----- JES2 JOB STATISTICS -----
18 JUN 2006 JOB EXECUTION DATE
121 CARDS READ
831 SYSOUT PRINT RECORDS
0 SYSOUT PUNCH RECORDS
55 SYSOUT SPOOL KBYTES
0.26 MINUTES EXECUTION TIME
  
```

View JCL... Export... Close Help

Scenario 2 – Recover TS to PIT using undo

■ Description

- TS DEMODB03.DEMOTS03
 - Updates to table
 - Full image copy
 - Perform SLR update
 - Updates to table
 - Incremental image copy
 - Wait
 - Updates to table
 - Quiesce
 - Wait
 - Updates to table
 - Quiesce
 - Wait
 - Updates to table
 - Selects from table
 - Perform SLR update
- Recover to PIT, quite time
 - Using Undo SQL

Select object to recover

Recovery Advisor

1. Location
2. Objects
3. Point in Time
4. Recovery Plan

Select the objects that you want to recover.

Select the objects you wish to recover in the list of available objects, and click the right arrow to add them to the list of objects to recover. The list at the bottom of the window will help you by showing detailed properties for the objects you click on.

In order to define a pattern matching multiple objects, select the node labeled "Pattern" under the type of object you wish to select, then click the right arrow. A window will display where you can type the specific pattern values.

The objects you select, as well as objects related to them, will be recovered. For example, if you select a table space, the tables it contains will also be recovered. On the Recovery Plan page, you should carefully review the complete list of objects under Recovered Objects in the Recovery plans tree.

Available objects

- I81 A
 - Storage Groups
 - Databases
 - Table Spaces
 - Pattern
 - DEMODB03.DEMOTS03
 - DEMODB07.DEMOTS07
 - Tables
 - Plans
 - Packages

Selected objects

- Table space DEMODB03.DEMOTS03

Properties

Name	Value
DEID	300
Implicit?	N
OBID	1
PSID	2
Partition count	4
Repository status	Both repository and DB2 catalog

◀ Back Next ▶ Save... Close Help

Select Timestamp and click on (explicit)

The screenshot shows the 'Recovery Advisor' window with the 'Point in Time' step selected in the left-hand navigation pane. The main area is titled 'Select the point in time to which you want to recover.' and contains three radio button options: 'Current', 'Timestamp', and 'Log RBA'. The 'Timestamp' option is selected and has three input fields: a date dropdown set to '2006-06-18', a time dropdown set to '17.53.12', and a numeric field set to '000000'. Each of these fields has a browse button to its right. Below the 'Timestamp' options is a description: 'Select this option when you want to recover previous versions of the selected objects, or when data has become logically inconsistent and you can identify a prior timestamp when the data was consistent. Use the browse button for help in selecting the timestamp.' The 'Log RBA' option is also present with a text field containing '0000C58E6288' and a browse button. Its description reads: 'Select this option when data has become logically inconsistent and you can identify a prior log RBA when the data was consistent. Use the browse button for help in selecting the log RBA.' At the bottom of the window are five buttons: 'Back', 'Next', 'Save...', 'Close', and 'Help'.

Recovery Advisor

1. Location
2. Objects
3. Point in Time
4. Recovery Plan

Select the point in time to which you want to recover.
Select one of the available options for the point in time to which to recover.

Point in time

Current

Select this option when you want to recover data that is logically consistent, but has a physical error or other corruption in how it is stored.

Timestamp 2006-06-18 17.53.12 000000 ... (explicit)

Select this option when you want to recover previous versions of the selected objects, or when data has become logically inconsistent and you can identify a prior timestamp when the data was consistent.
Use the browse button for help in selecting the timestamp.

Log RBA 0000C58E6288 ... (explicit)

Select this option when data has become logically inconsistent and you can identify a prior log RBA when the data was consistent.
Use the browse button for help in selecting the log RBA.

◀ Back Next ▶ Save... Close Help

Select 'Quiet times' and 'Run New Report'

Select Point in Time

Select from

Object definition levels Recovery history events Quiet times

Scanned ranges

Start Timestamp	End Timestamp
2006-06-18-08.36.12.000000	2006-06-18-09.36.12.000000

Run New Report...

Quiet times found

Start Timestamp	End Timestamp	Start LRSN	End LRSN
-----------------	---------------	------------	----------

Filter... Refresh

OK Cancel Help

Specify date and time to analyze

Log Analysis Advisor

1. Location
2. Range
3. Objects
4. JCL

Specify the range of log data that you want to analyze.
Select the type of log range to use and specify "preceding" or "from" and "to" values.

Log range

Preceding 1 hour(s)

Date/time from 2006-06-18 17:11:32 to 2006-06-18 18:11:32

Recovery Expert typically uses the SYSLGRNX directory table to optimize which log files must be read. You can choose not to use SYSLGRNX if errors occur when trying to use it, or if the overhead of using it will likely outweigh the savings it provides.

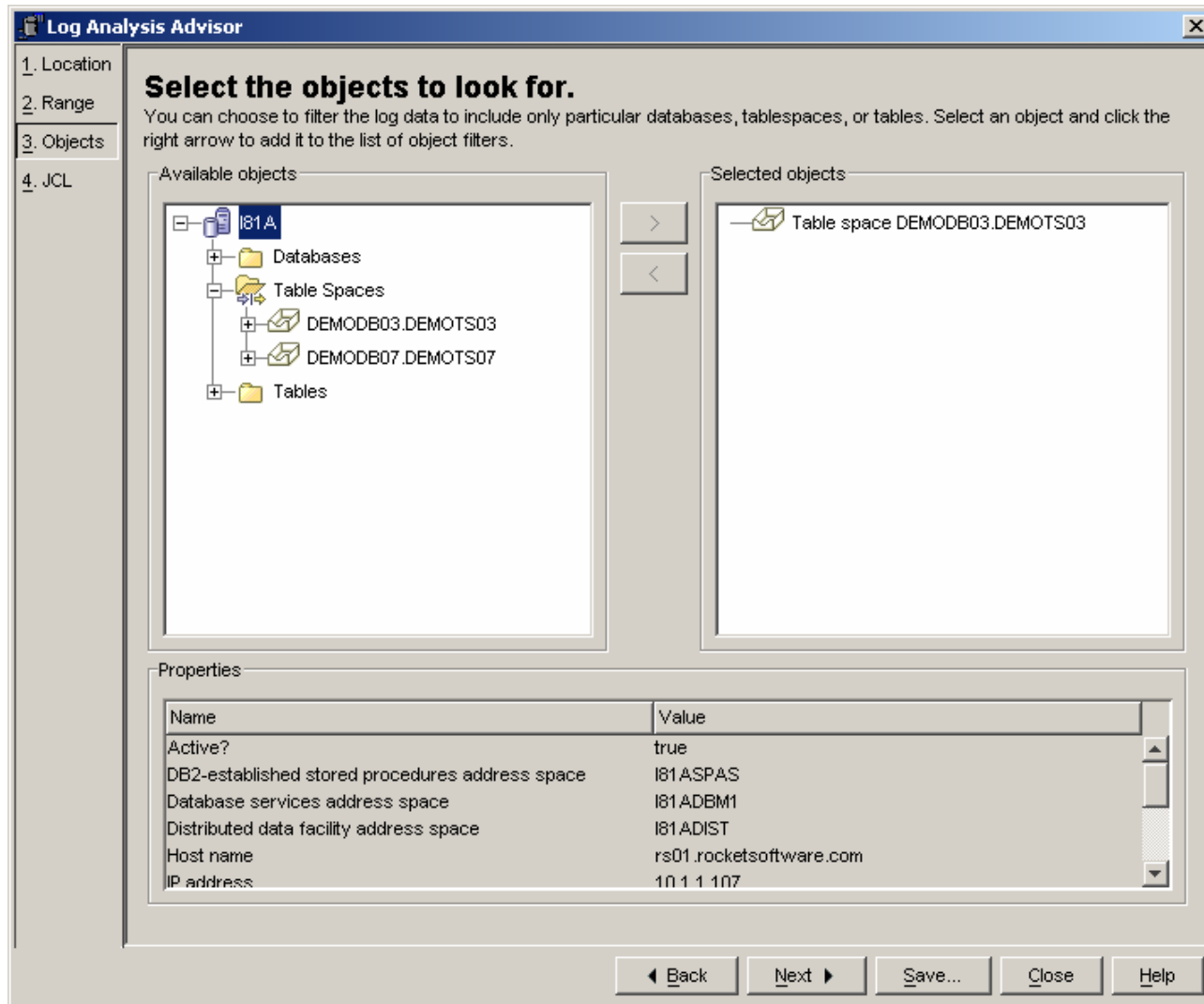
Use SYSLGRNX

You can specify the minimum duration of a quiet time in order for it to be included in the output. This helps limit the amount of quiet time information that is saved.

Minimum quiet time 00:00:30

◀ Back Next ▶ Save... Close Help

Review and change if needed objects to report on



Review and sub

Log Analysis Advisor

1. Location
2. Range
3. Objects
4. JCL

Submit JCL for the log analysis.
Review the JCL statements to perform the log analysis, then click Run to run them.

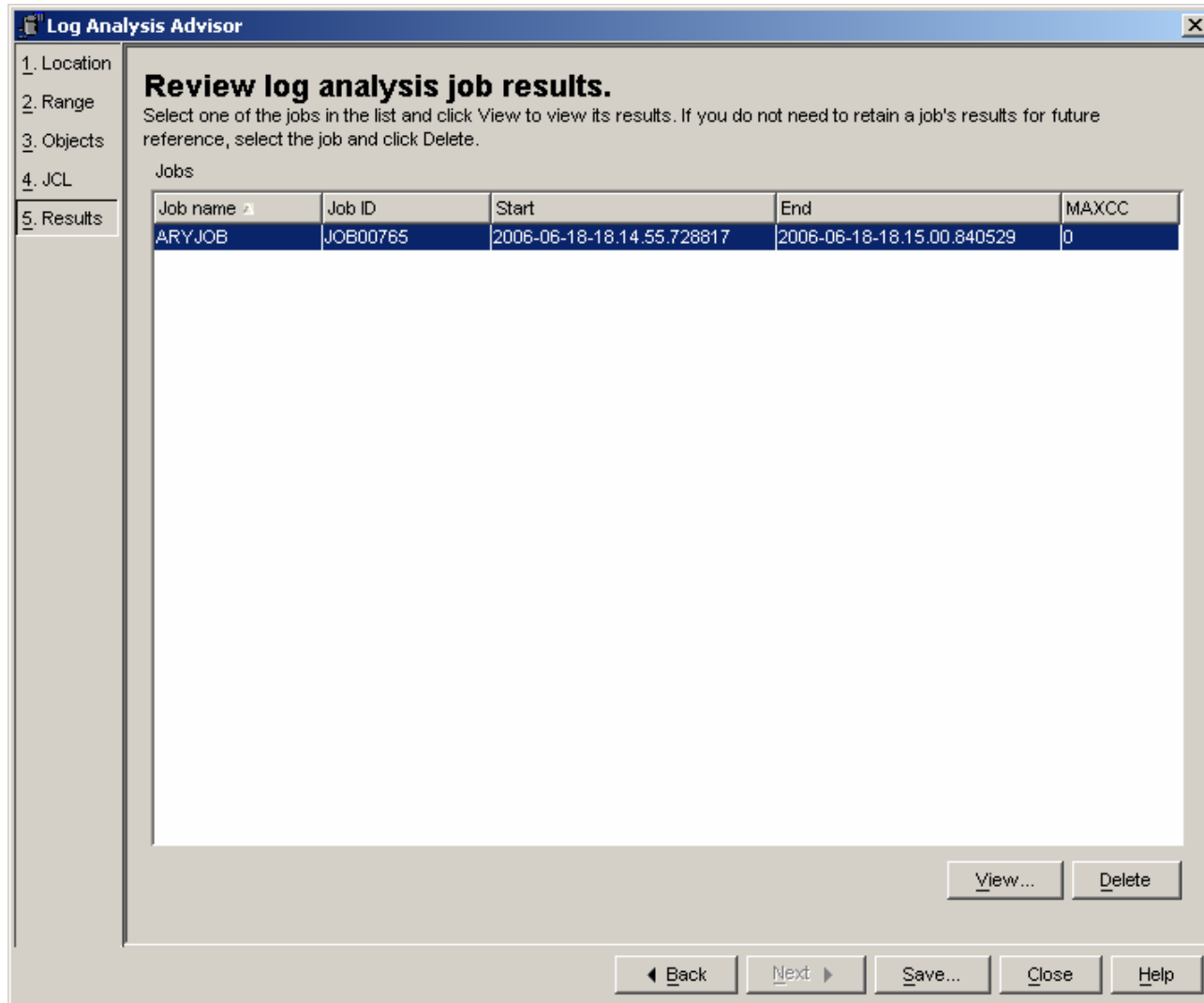
Statements

```
//ARYJOB JOB , 'DB2 RECOVERY EXPERT',MSGCLASS=H,
//          REGION=OM,NOTIFY=&SYSUID
//
//*****
//* DB2 Recovery Expert for z/OS
//*
//* Log Analysis Services - Quiet Time Reporting and Data Capture
//*
//* Generated by PDDAVI 2006-06-18 18:14
//*
//* SSID: I81A
//*
//*****
//*
//*****
//* STEP 1: CLEAN UP PREVIOUS DATASETS, IF ANY *
//*****
//STEP1   EXEC PGM=IEFBRL4,COND=(4,LT)
//EXTFILE DD   DSN=PDDAVI.ARYLAT.EXTFILE.R0000421,
//          SPACE=(CYL,(15,10),RLSE),DCB=(LRECL=32752,BLKSIZE=32760,RECFM=VB),
//          UNIT=SYSDA,DISP=(MOD,CATLG,DELETE)
//*
//*****
//* STEP 2: READ THE DB2 LOG TO GENERATE THE GENERAL REPORT *
//*****
//STEP2   EXEC PGM=ARYGEN1,REGION=OM,COND=(4,LT)
//STEP3   DD   DSN=SYS.DSN=DSNEMO.ARY210.D010506.LOADLIB
```

Run Export...

Back Next Save... Close Help

If desired review log analysis job



The screenshot shows the 'Log Analysis Advisor' window. On the left is a navigation pane with five items: 1. Location, 2. Range, 3. Objects, 4. JCL, and 5. Results. The main area is titled 'Review log analysis job results.' and contains instructions: 'Select one of the jobs in the list and click View to view its results. If you do not need to retain a job's results for future reference, select the job and click Delete.' Below this is a table of jobs.

Job name	Job ID	Start	End	MAXCC
ARYJOB	JOB00765	2006-06-18-18.14.55.728817	2006-06-18-18.15.00.840529	0

At the bottom right of the main area are buttons for 'View...' and 'Delete'. At the bottom of the window are navigation buttons: '< Back', 'Next >', 'Save...', 'Close', and 'Help'.

Click Refresh, select Quiet Time Timestamp, OK

Select Point in Time [X]

Select from

Object definition levels Recovery history events Quiet times

Scanned ranges

Start Timestamp ▲	End Timestamp
2006-06-18-08.36.12.000000	2006-06-18-09.36.12.000000
2006-06-18-17.11.32.000000	2006-06-18-18.11.32.000000

Run New Report...

Quiet times found

Start Timestamp ▲	End Timestamp	Start LRSN	End LRSN
2006-06-18-17.11.32.000000	2006-06-18-17.33.28.000000	0000C5A30A4C	0000C5A95AC8
2006-06-18-17.33.36.000000	2006-06-18-17.35.23.000000	0000C5AD2750	0000C5B35539
2006-06-18-17.35.28.000000	2006-06-18-17.40.09.000000	0000C5B6E150	0000C5BD1539
2006-06-18-17.40.14.000000	2006-06-18-17.43.17.000000	0000C5C0D8D0	0000C5C378AB
2006-06-18-17.43.17.000000	2006-06-18-17.46.18.000000	0000C5C39B79	0000C5C40448
2006-06-18-17.46.19.000000	2006-06-18-17.49.20.000000	0000C5C42831	0000C5C490C4
2006-06-18-17.49.20.000000	2006-06-18-18.11.32.000000	0000C5C4A388	0000C5C610FA

Filter... Refresh

OK Cancel Help

Generate plans, select Recovery plan then run

Recovery Advisor

1. Location
2. Objects
3. Point in Time
4. Recovery Plan

Generate and execute a plan to recover the selected objects.
Click Generate to generate one or more recovery plans for the selected objects.
After generating, you can select a plan to review its details.
If it has been some time since you generated the recovery plans, you can click Validate to check whether the external resources required by the plans (such as image copy data sets) are still available.
Finally, select the plan you wish to use for recovery, and click Run to run it. To instead view or edit the JCL generated to run the plan, click View JCL.

Recovery plans

Generate...

Plans

- Plan 1: Using DSN1 COPY and RECOVER LOGONLY (cost = 3)
- Plan 2: Using DSN1 COPY of IC and redo SQL (cost = 3)
- Plan 3: Using RECOVER (cost = 3)
- Plan 4: Using RECOVER to IC and redo SQL (cost = 3)
- Plan 5: Using undo SQL (cost = 1)**
- Recovered Objects
 - Table space DEMODB03.DEMOTS03
 - Table partition DEMODB03.DEMOTS03.1
 - Table partition DEMODB03.DEMOTS03.2
 - Table partition DEMODB03.DEMOTS03.3
 - Table partition DEMODB03.DEMOTS03.4
 - Table PDDAVI.PDDAVI_TBL03
 - View PDDAVI.PDDAVI_VIEW3
 - Index: PDDAVI.PDDAVI_IDX03
 - Index partition PDDAVI.PDDAVI_IDX03.1

Properties

Name	Value
Plan cost	1
Plan name	Using undo SQL

Validate Run View JCL...

Back Next Save... Close Help

Recovery job results

Recovery Advisor

1. Location
2. Objects
3. Point in Time
4. Recovery Plan
5. Results

Review recovery job results.
Select one of the jobs in the list and click View to view its results. If you do not need to retain a job's results for future reference, select the job and click Delete.

Plans

Plan	Start	End	MAXCC	Job count
Plan 5: Using undo SQL (cost = 1)	2006-06-18-18.40.33.376540	2006-06-18-18.41.09.619091	0	1

Jobs

Job name	Job ID	Start	End	MAXCC
ARYJOB	JOB00766	2006-06-18-18.40.33.376682	2006-06-18-18.41.09.595041	0

View... Delete

◀ Back Next ▶ Save... Close Help

Scenario 3 – Recover Dropped TS to RBA

■ Description

- TS DEMODB04.DEMOTS04
 - Updates to table
 - Full image copy
 - Perform SLR update
 - Updates to table
 - Incremental image copy
 - Wait
 - Updates to table
 - Quiesce
 - Wait
 - Updates to table
 - Selects from table
 - Wait
 - Perform SLR update
 - Drop Table Space
 - Perform SLR update
- Recover of Dropped TS to RBA
 - Using DSN1COPY and REDO SQL

Objects in SLR only show in red

1. Location
2. Objects
 3. Point in Time
 4. Recovery Plan

Select the objects that you want to recover.
 Select the objects you wish to recover in the list of available objects, and click the right arrow to add them to the list of objects to recover. The list at the bottom of the window will help you by showing detailed properties for the objects you click on.
 In order to define a pattern matching multiple objects, select the node labeled "Pattern" under the type of object you wish to select, then click the right arrow. A window will display where you can type the specific pattern values.
 The objects you select, as well as objects related to them, will be recovered. For example, if you select a table space, the tables it contains will also be recovered. On the Recovery Plan page, you should carefully review the complete list of objects under Recovered Objects in the Recovery plans tree.

Available objects

- I81.A
 - Storage Groups
 - Databases
 - Table Spaces
 - Pattern
 - DEMODB03.DEMOTS03
 - DEMODB04.DEMOTS04**
 - DEMODB07.DEMOTS07
 - Tables
 - Plans

Selected objects

Properties

Name	Value
Active?	true
DB2-established stored procedures address space	I81ASPAS
Database services address space	I81ADBM1
Distributed data facility address space	I81ADIST
Host name	rs01.rocketsoftware.com
IP address	10.1.1.107

◀ Back Next ▶ Save... Close Help

Select object to be recovered

1. Location
2. Objects
3. Point in Time
4. Recovery Plan

Select the objects that you want to recover.

Select the objects you wish to recover in the list of available objects, and click the right arrow to add them to the list of objects to recover. The list at the bottom of the window will help you by showing detailed properties for the objects you click on.

In order to define a pattern matching multiple objects, select the node labeled "Pattern" under the type of object you wish to select, then click the right arrow. A window will display where you can type the specific pattern values.

The objects you select, as well as objects related to them, will be recovered. For example, if you select a table space, the tables it contains will also be recovered. On the Recovery Plan page, you should carefully review the complete list of objects under Recovered Objects in the Recovery plans tree.

Available objects

- I81 A
 - Storage Groups
 - Databases
 - Table Spaces
 - Pattern
 - DEMODB03.DEMOTS03
 - DEMODB04.DEMOTS04**
 - DEMODB07.DEMOTS07
 - Tables
 - Plans

Selected objects

- Table space DEMODB04.DEMOTS04

Properties

Name	Value
Implicit?	N
OBID	1
PSID	2
Partition count	4
Repository status	Repository only

◀ Back Next ▶ Save... Close Help

Select RBA and click on (explicit)

Recovery Advisor

1. Location
2. Objects
3. Point in Time
4. Recovery Plan

Select the point in time to which you want to recover.
Select one of the available options for the point in time to which to recover.

Point in time

Current

Select this option when you want to recover data that is logically consistent, but has a physical error or other corruption in how it is stored.

Timestamp 2006-06-18 19.00.18 000000 (explicit)

Select this option when you want to recover previous versions of the selected objects, or when data has become logically inconsistent and you can identify a prior timestamp when the data was consistent.
Use the browse button for help in selecting the timestamp.

Log RBA: 0000C58E6288 (explicit)

Select this option when data has become logically inconsistent and you can identify a prior log RBA when the data was consistent.
Use the browse button for help in selecting the log RBA.

◀ Back Next ▶ Save... Close Help

Click on 'Recovery history events', refresh, select

Select from

Object definition levels Recovery history events Quiet times

Events

Start RBA	Timestamp	Database	Space	Space Type	Type	Secondary Type	Share Level	DSNUM	File Sequence N
0000C5CCABEC	2006-06-18-18.48.43.100760	DEMODB04	DEMOTS04	T	F		R	0	0
0000C5D0E000	2006-06-18-18.48.49.235404	DEMODB04	DEMOTS04	T	I		R	0	0
0000C5D17646	2006-06-18-18.51.50.536655	DEMODB04	DEMOTS04	T	Q	W		0	0

Show events that are not points of consistency

Filter... Refresh

OK Cancel Help

Log RBA filled for us

Recovery Advisor

1. Location
2. Objects
3. Point in Time
4. Recovery Plan

Select the point in time to which you want to recover.

Select one of the available options for the point in time to which to recover.

Point in time

Current

Select this option when you want to recover data that is logically consistent, but has a physical error or other corruption in how it is stored.

Timestamp 2006-06-18 19.00.18 000000 ... (explicit)

Select this option when you want to recover previous versions of the selected objects, or when data has become logically inconsistent and you can identify a prior timestamp when the data was consistent.
Use the browse button for help in selecting the timestamp.

Log RBA 0000C5D17646 ... (recovery history ev...)

Select this option when data has become logically inconsistent and you can identify a prior log RBA when the data was consistent.
Use the browse button for help in selecting the log RBA.

◀ Back Next ▶ Save... Close Help

Generate and select plan, view JCL

Recovery Advisor

1. Location
2. Objects
3. Point in Time
4. Recovery Plan

Generate and execute a plan to recover the selected objects.

Click Generate to generate one or more recovery plans for the selected objects.
 After generating, you can select a plan to review its details.
 If it has been some time since you generated the recovery plans, you can click Validate to check whether the external resources required by the plans (such as image copy data sets) are still available.
 Finally, select the plan you wish to use for recovery, and click Run to run it. To instead view or edit the JCL generated to run the plan, click View JCL.

Recovery plans

Generate...

Plans

Plan 1: Using DSN1COPY of IC and redo SQL (cost = 3)

- Job 1
 - SQL
 - START DATABASE
 - Check Status
 - DSN1COPY
 - Table space DEMODB04.DEMOTS04
 - Table PDDAVI.PDDAVI_TBL04
 - Table partition DEMODB04.DEMOTS04.1
 - Image copy data set PDDAVI.I81A.DB04.TS04I.D060618.T1
 - Image copy data set PDDAVI.I81A.DB04TS04.D060618.T2
 - REBUILD INDEX
 - COPY
 - Log analysis
 - Table space DEMODB04.DEMOTS04
 - Table PDDAVI.PDDAVI_TBL04

Properties

Name	Value
Plan cost	3
Plan name	Using DSN1COPY of IC and redo SQL

Validate Run View JCL...

Back Next Save... Close Help

Recovery JCL

Recovery plan: Plan 1: Using DSN1COPY of IC and redo SQL (cost = 3)

Statements

```

/**
//DCPX0004 EXEC PGM=ARY#UTIL,PARM='UTGENA,I81A ',COND=(4,LT)
//STEPLIB DD DISP=SHR,DSN=RSDEMO.ARY310.D010606.LOADLIB
// DD DISP=SHR,DSN=I81A.SDSNEXIT
// DD DISP=SHR,DSN=RSRTE.DSN.V810.SDSNLOAD
//DB2PARMS DD DISP=SHR,DSN=RSTEST.ARY310.D010606.CONTROL
//SYSPRINT DD SYSOUT=*
//CONTROLS DD *
CONFIG DEFAULT
//SYSXLAT DD DSN=PDDAVI.ARY06169.S192240.M898716.SYSXLAT,
// UNIT=SYSALLDA,SPACE=(CYL,(1,1),RLSE),
// DISP=(NEW,CATLG,DELETE)
//SYSIN DD *
TABLESPACE
0302,DEMODB04
0002,DEMOTS04
0003,"PDDAVI"."PDDAVI_TBL04"
/*
/**
//DCPY0005 EXEC PGM=ARYLDSN1,COND=(4,LT),
// PARM='CHECK,PAGESIZE(4K),FULLCOPY,NUMPARTS(4),OBIDXLAT,RESET'
//STEPLIB DD DISP=SHR,DSN=RSDEMO.ARY310.D010606.LOADLIB
// DD DISP=SHR,DSN=I81A.SDSNEXIT
// DD DISP=SHR,DSN=RSRTE.DSN.V810.SDSNLOAD
//SYSUT1 DD DISP=SHR,DSN=PDDAVI.I81A.DB04TS04.D060618.T224837
//SYSIN DD *
I81A.DSNDBC.DEMODB04.DEMOTS04.I0001.A001
//SYSPRINT DD SYSOUT=*

```

Run Export... Close Help

Recovery Advisor

1. Location
2. Objects
3. Point in Time
4. Recovery Plan
5. Results

Review recovery job results.

Select one of the jobs in the list and click View to view its results. If you do not need to retain a job's results for future reference, select the job and click Delete.

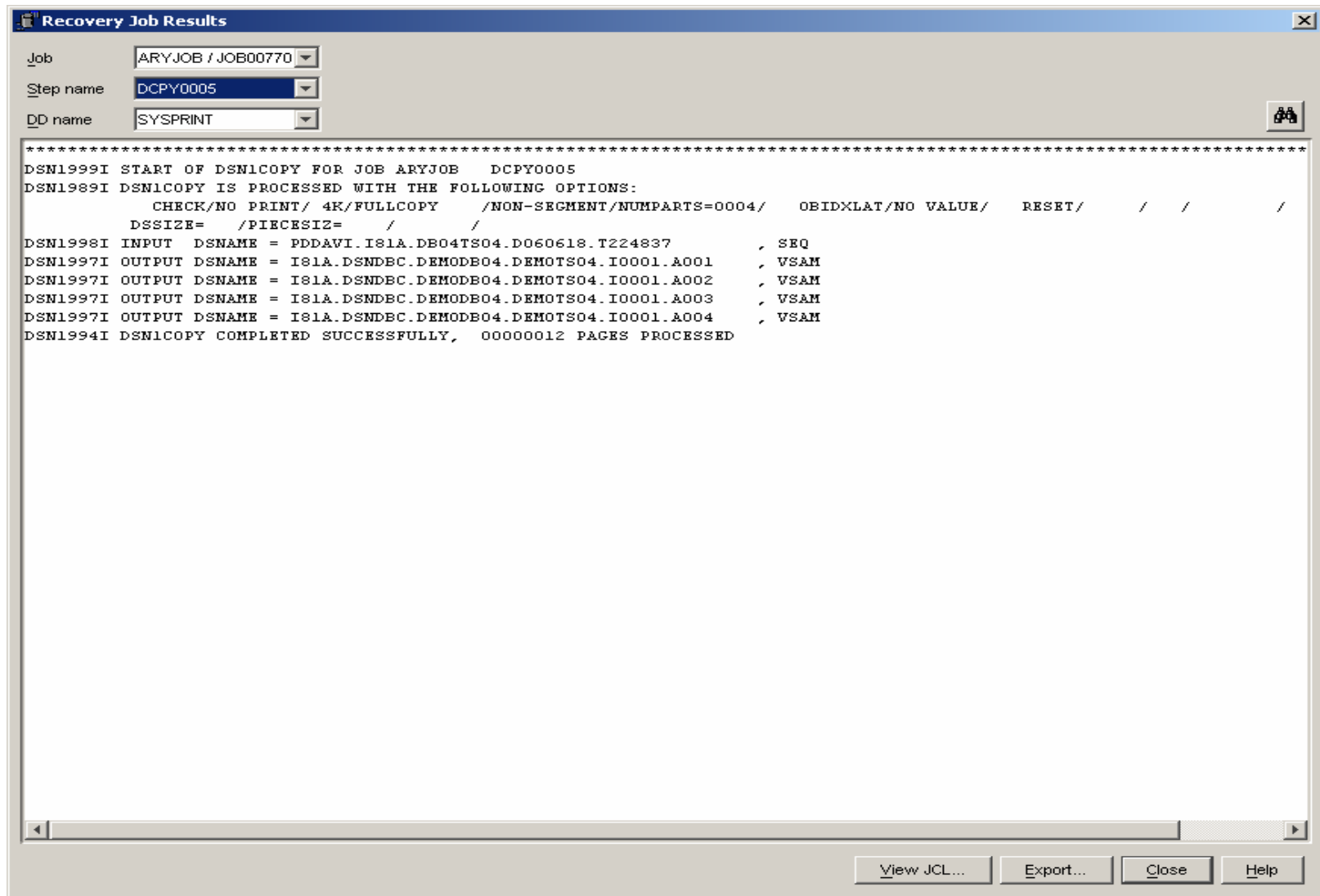
Plans

Plan	Start	End	MAXCC	Job count
Plan 1: Using DSN1COPY of IC and redo S...	2006-06-18-19.38.05.761629	2006-06-18-19.38.46.151153	0	1

Jobs

Job name	Job ID	Start	End	MAXCC
ARYJOB	JOB00770	2006-06-18-19.38.05.761908	2006-06-18-19.38.46.088407	0

View SYSPRINT, select by step name



The screenshot shows a window titled "Recovery Job Results" with a scrollable text area containing the following text:

```
*****
DSN1999I START OF DSN1COPY FOR JOB ARYJOB   DCPY0005
DSN1989I DSN1COPY IS PROCESSED WITH THE FOLLOWING OPTIONS:
      CHECK/NO PRINT/ 4K/FULLCOPY  /NON-SEGMENT/NUMPARTS=0004/  OBIDXLAT/NO VALUE/  RESET/      /      /      /
      DSSIZE=      /PIECESIZ=      /
DSN1998I INPUT  DSNAME = PDDAVI.I81A.DB04TS04.D060618.T224837      , SEQ
DSN1997I OUTPUT DSNAME = I81A.DSNDBC.DEMODB04.DEMOTS04.I0001.A001      , VSAM
DSN1997I OUTPUT DSNAME = I81A.DSNDBC.DEMODB04.DEMOTS04.I0001.A002      , VSAM
DSN1997I OUTPUT DSNAME = I81A.DSNDBC.DEMODB04.DEMOTS04.I0001.A003      , VSAM
DSN1997I OUTPUT DSNAME = I81A.DSNDBC.DEMODB04.DEMOTS04.I0001.A004      , VSAM
DSN1994I DSN1COPY COMPLETED SUCCESSFULLY, 00000012 PAGES PROCESSED
```

At the bottom of the window, there are four buttons: "View JCL...", "Export...", "Close", and "Help".

Scenario 4 – Recovery of a set of related table

■ **Description**

- Use Grouper set of related tables
 - TDBG01
 - Version DEPT_EMP
 - Group1
- Recover
 - Using recover to current

Select Group Set of related tables

Recovery Advisor

1. Location
2. Objects
3. Point in Time
4. Recovery Plan

Select the objects that you want to recover.

Select the objects you wish to recover in the list of available objects, and click the right arrow to add them to the list of objects to recover. The list at the bottom of the window will help you by showing detailed properties for the objects you click on.

In order to define a pattern matching multiple objects, select the node labeled "Pattern" under the type of object you wish to select, then click the right arrow. A window will display where you can type the specific pattern values.

The objects you select, as well as objects related to them, will be recovered. For example, if you select a table space, the tables it contains will also be recovered. On the Recovery Plan page, you should carefully review the complete list of objects under Recovered Objects in the Recovery plans tree.

Available objects

- Groupers Groups
 - Pattern
 - CATALOGWIDE
 - IVP
 - SAMPLE
 - TDBG01
 - DEPT_EMP
 - Group_1
 - Tables
 - CSBANK.ACT

Selected objects

- Groupers group TDBG01.DEPT_EMP.Group_1

Properties

Name	Value
Created timestamp	2006-05-09-15.51.54.608359
Creator	PDDAVI
Group ID	329
Remarks	
Version ID	104

◀ Back Next ▶ Save... Close Help

Select recover to current

Recovery Advisor

1. Location
2. Objects
3. Point in Time
4. Recovery Plan

Select the point in time to which you want to recover.
Select one of the available options for the point in time to which to recover.

Point in time

Current

Select this option when you want to recover data that is logically consistent, but has a physical error or other corruption in how it is stored.

Timestamp 2006-06-19 10.57.12 000000 (explicit)

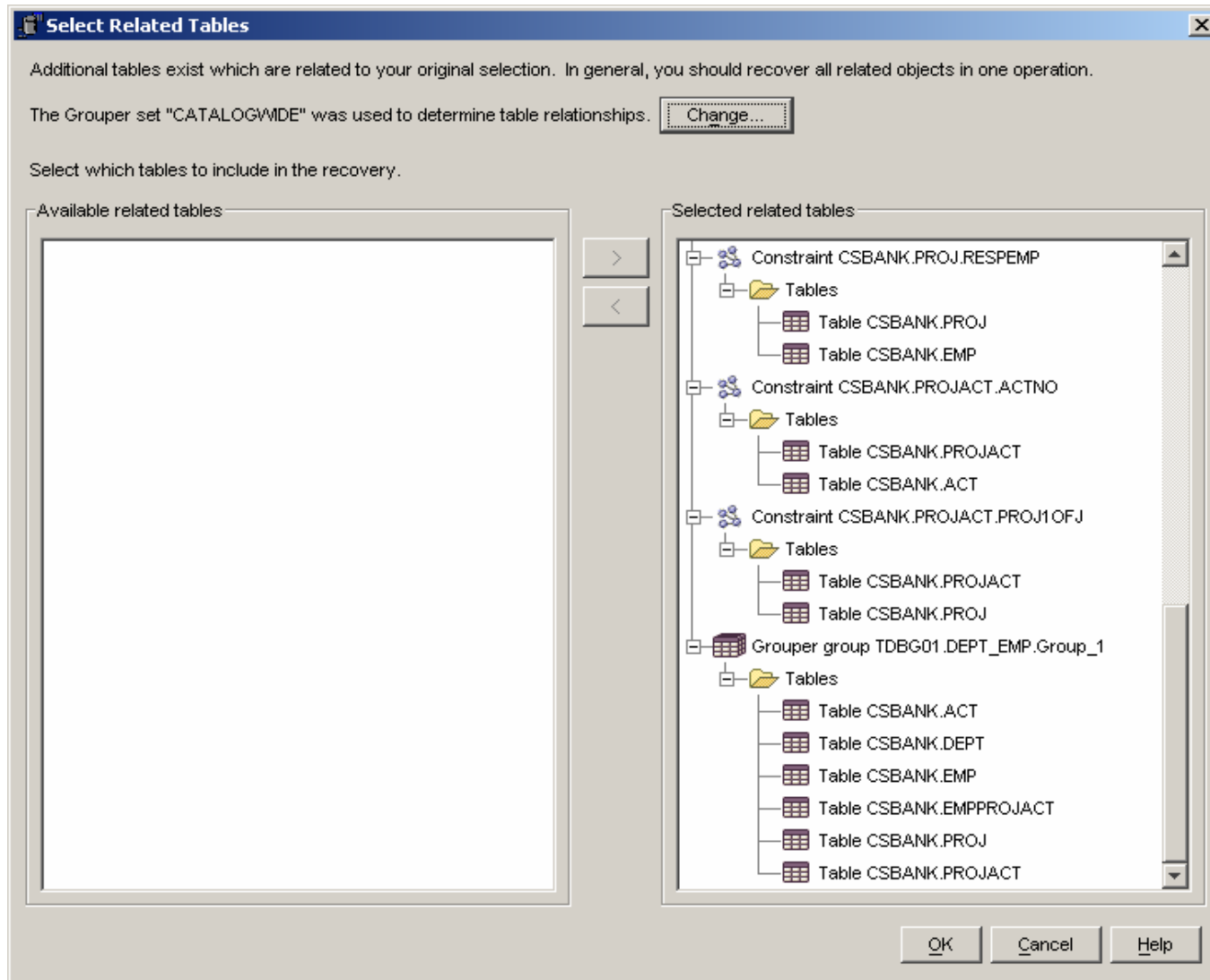
Select this option when you want to recover previous versions of the selected objects, or when data has become logically inconsistent and you can identify a prior timestamp when the data was consistent.
Use the browse button for help in selecting the timestamp.

Log RBA 0000C5E5B24A (explicit)

Select this option when data has become logically inconsistent and you can identify a prior log RBA when the data was consistent.
Use the browse button for help in selecting the log RBA.

◀ Back Next ▶ Save... Close Help

Selected Related Tables and constraints to recover



Select Plan and View JCL

Recovery Advisor

1. Location
2. Objects
3. Point in Time
4. Recovery Plan

Generate and execute a plan to recover the selected objects.

Click Generate to generate one or more recovery plans for the selected objects.
After generating, you can select a plan to review its details.
If it has been some time since you generated the recovery plans, you can click Validate to check whether the external resources required by the plans (such as image copy data sets) are still available.
Finally, select the plan you wish to use for recovery, and click Run to run it. To instead view or edit the JCL generated to run the plan, click View JCL.

Recovery plans

Generate...

Plans

- Plan 1: Using RECOVER (cost = 6)
 - Job 1
 - Recovered Objects
 - Table space DSNDB04.ACTA13YJ
 - Table space DSNDB04.DEPT16OG
 - Table space DSNDB04.EMPA1EZE
 - Table space DSNDB04.EMPP1KYM
 - Table space DSNDB04.PROJ1DVI
 - Table space DSNDB04.PROJ1I4L
 - Table partition DSNDB04.ACTA13YJ.0
 - Table partition DSNDB04.DEPT16OG.0
 - Table partition DSNDB04.EMPA1EZE.0
 - Table partition DSNDB04.EMPP1KYM.0
 - Table partition DSNDB04.PROJ1DVI.0
 - Table partition DSNDB04.PROJ1I4L.0

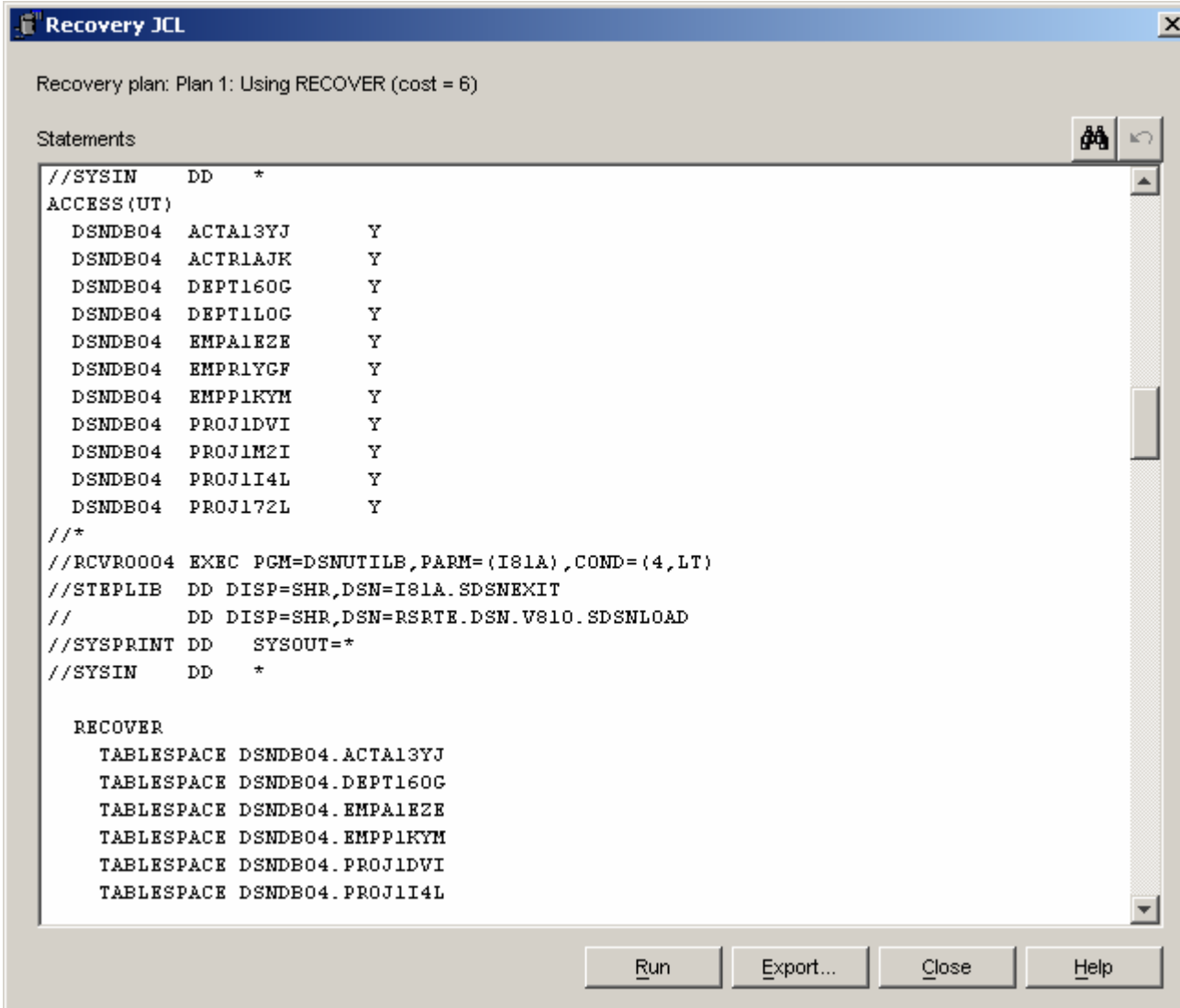
Properties

Name	Value
Plan cost	6
Plan name	Using RECOVER

Validate Run View JCL...

Back Next Save... Close Help

Recovery JCL



Recovery plan: Plan 1: Using RECOVER (cost = 6)

Statements

```
//SYSIN DD *  
ACCESS (UT)  
  DSNDB04 ACTA13YJ Y  
  DSNDB04 ACTR1AJK Y  
  DSNDB04 DEPT160G Y  
  DSNDB04 DEPT110G Y  
  DSNDB04 EMPA1EZE Y  
  DSNDB04 EMPR1YCF Y  
  DSNDB04 EMPP1KYM Y  
  DSNDB04 PROJ1DVI Y  
  DSNDB04 PROJ1M2I Y  
  DSNDB04 PROJ1I4L Y  
  DSNDB04 PROJ172L Y  
/**  
//RCVRO004 EXEC PGM=DSNUTILB,PARM=(I81A),COND=(4,LT)  
//STEPLIB DD DISP=SHR,DSN=I81A.SDSNEXIT  
// DD DISP=SHR,DSN=RSRTE.DSN.V810.SDSNLOAD  
//SYSPRINT DD SYSOUT=*  
//SYSIN DD *  
  
RECOVER  
  TABLESPACE DSNDB04.ACTA13YJ  
  TABLESPACE DSNDB04.DEPT160G  
  TABLESPACE DSNDB04.EMPA1EZE  
  TABLESPACE DSNDB04.EMPP1KYM  
  TABLESPACE DSNDB04.PROJ1DVI  
  TABLESPACE DSNDB04.PROJ1I4L
```

Run Export... Close Help



DB2 Recovery Expert for z/OS

Questions

