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CA Technologies Product References

This document references the following CA Technologies products:

■ CA Fast Check® for DB2 for z/OS (CA Fast Check)
■ CA Fast Index® for DB2 for z/OS (CA Fast Index)
■ CA Fast Load for DB2 for z/OS (CA Fast Load)
■ CA Fast Recover™ for DB2 for z/OS (CA Fast Recover)
■ CA Fast Unload® for DB2 for z/OS (CA Fast Unload)
■ CA LogCompress™ for DB2 for z/OS (CA LogCompress)
■ CA Quick Copy for DB2 for z/OS (CA Quick Copy)
■ CA Rapid Reorg® for DB2 for z/OS (CA Rapid Reorg)
■ CA Recovery Analyzer™ for DB2 for z/OS (CA Recovery Analyzer)

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Documentation Changes

The following updates have been made in the third edition of this documentation:

- Details about the internal tables, skeletons, and models are now provided in the Implementation Guide.

The following updates have been in the second edition of this documentation:

- Support a Subsystem After Converting to Extended Log Records (see page 29)—Added this topic.
- How to Verify that Your Recovery Strategies Provide Complete Object Coverage (see page 146)—Replaced chapter with this scenario.

The following updates have been made since the last release of this documentation:

- The PRA#LOAD Batch Job (see page 20)—Added the requirement for SELECT or READ authority on SYSIBM.SYXMLRELS.
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Chapter 1: Introduction

This section contains the following topics:

- General Overview (see page 11)
- User Prerequisites (see page 12)
- DB2 Recovery Support (see page 12)
- Recovery Process (see page 13)

General Overview

CA Recovery Analyzer enables you to recover DB2 spaces with very little knowledge about DB2 recovery. It provides automated online recovery scenarios for tablespaces, indexspaces, tablespaces and indexspaces that are dependent on plans and packages, DASD volumes, storage groups, archived logs, the active log, the BSDS, and disaster recovery.

CA Recovery Analyzer can automatically recover all indexes (if needed) and run all the referential integrity changes needed to move all children out of check pending status.

CA Recovery Analyzer uses an ISPF panel-driven interface to guide you through the process of selecting recovery options. It uses your selections to generate the necessary JCL or Batch Processor stream of control statements to perform the recovery. This enables you to start your recovery jobs faster, thereby minimizing downtime and recovering your data in a fraction of the time it would take to do it manually.

Note: This guide assumes that the product components have already been installed at your site. For more information about installing, see the CA Database Management Solutions for DB2 for z/OS Installation Guide and the CA Database Management Solutions for DB2 for z/OS Implementation Guide.
User Prerequisites

Users should have a basic knowledge of the following concepts before using CA Recovery Analyzer:

- DB2 and how a database works, including knowledge of objects such as tablespaces and indexes
- How to use IBM TSO
- How to use CA SYSVIEW
- How to create and maintain partitioned data sets (PDS)
- The following DB2 recovery components:
  - BSDS—maintains logs
  - Active and archive logs—track all activity
  - SYSIBM.SYSCOPY table—contains information about the image copies, including the data set name and location
  - Image copies (full and incremental)—are used to recover data

More information:

DB2 Recovery Support (see page 12)

DB2 Recovery Support

The ability to recover objects, log data sets, BSDS, and DB2 subsystems, and to perform disaster recovery, is crucial in any DB2 shop. Without recovery capabilities you can lose a table, tablespace, database, or entire DB2 subsystem. Because recovery is so important, IBM has provided a number of DB2 utilities to help with the process. They have also included a number of built-in DB2 functions to help ensure that objects are recoverable.

SYSIBM.SYSCOPY Table

Every DB2 subsystem has a SYSCOPY table in the DB2 catalog. The recovery process relies on this table to access the correct image copies and log data sets. This table tracks all activities performed at a tablespace level. It has a row for each reorganization, load, quiesce, recovery, and image copy that occurs. Each row includes a starting relative byte address (RBA), which references the active or archive log. The table also contains information about the image copies, including the data set name and location.
Active Log Data Set
Whenever you add, change, or delete a row in a table, DB2 records the change in the active log data set. This data set also contains records indicating reorganizations, loads, quiesces, and other data-changing utility runs. Each record is identified with an RBA.

Archived Log Data Set
The active log data set quickly grows large because it is constantly updated with new information. Much of the information quickly becomes obsolete. Every time you make an image copy, you no longer need the record of changes up to that point unless the image copy fails. To save DASD space, DB2 periodically starts a new active log and archives the old active log. The archive might be written to tape, where it is saved until needed.

Bootstrap Data Set
The constant creation of new active log data sets and archiving of old log data sets must be tracked. DB2 uses the bootstrap data set (BSDS) to store the name and RBA range of the active log data set and information about each archive log data set. Each time a log data set is archived, a backup copy of the bootstrap data set is created.

The BSDS also stores other records, such as a conditional restart record and DDF record.

Recovery Process
When you recover an object, the SYSIBM.SYSCOPY table identifies the most recent full image copy. The recover utility (such as CA Fast Recover or the IBM RECOVER utility) restores the object to the last full image copy, then applies any subsequent incremental image copies to the tablespace. Finally, the recover utility uses the log data sets to reproduce the changes made to the tablespace since the last image copy was taken.

If an image copy is lost or destroyed, the recover utility restores the object to the previous image copy and forward recovers through the archived and active logs.
The bootstrap data set and active and archive log data sets are critical files for recovery. The ability to recover quickly from BSDS or log failure is imperative. IBM provides the tools to recover these data sets. However, because BSDS or log failure is rare, many DBAs have not used these tools.

CA Recovery Analyzer fills the gap of inexperience. It accesses the system information to determine which utility calls are necessary to complete the recovery options that you request. It prompts you for information it does not have, and generates a job that is ready to submit to JES or the Batch Processor. You do not have to guess which utility parameters to include in each phase of the recovery.

How to Perform a Recovery with CA Recovery Analyzer

CA Recovery Analyzer simplifies the process of recovering data.

To perform a recovery, you typically do the following:
1. Select recovery options.
2. Generate the recovery analysis.
3. Browse or edit the job, if needed.
4. Submit the job to the Batch Processor or JES.

Recovery Tasks to Consider

You must consider two sets of recovery tasks: those you do on a regular basis to maintain current system information, and those you do when an actual recovery is necessary.

CA Recovery Analyzer maintenance tasks consist of running the PRA#LOAD batch job on a regular basis. This can be performed routinely as part of your nightly batch jobs.

The recovery tasks are, by their very nature, unpredictable; however, CA Recovery Analyzer provides the tools for you to perform them quickly and efficiently. CA Recovery Analyzer lets you create and save recovery scenarios and disaster recovery scenarios, called strategies. You can specify global options for the majority of your recoveries, and then override the global options for specific options as needed. Strategies can be updated and implemented repeatedly. You can also perform one-time recoveries with the quick recover option. Quick recovery scenarios are not usually saved, but after you create one, you have the option of saving it as a strategy.

More information:

The PRA#LOAD Batch Job (see page 20)
Calls to Other Products

When CA Recovery Analyzer generates a recovery analysis, it produces JES or Batch Processor jobs that make calls to a number of recovery utilities. The following DB2 commands, utilities, and CA products form the backbone of the recovery options:

- REPAIR
- ALTER via SQL
- DSN1LOGP (Print Log Records Utility)
- DSNJU003 (Change Log Inventory Utility)
- DSNJU004 (Print Log Map Utility)
- CA Fast Check
- CA Quick Copy
- CA Fast Recover
- CA Fast Load
Chapter 2: Operational Considerations

This section contains the following topics:

- **Authorization and Security** (see page 17)
- **The PRA#LOAD Batch Job** (see page 20)
- **Support a Subsystem After Converting to Extended Log Records** (see page 29)
- **LISTDEF Control Statements** (see page 30)

### Authorization and Security

You must have the proper authorization and security to use various CA Recovery Analyzer functions. Many of the security restrictions are implemented by the DB2 security system. You can never bypass DB2 security. Additional security is provided through the Product Authorization facilities.

### Product Authorization

Product authorization is broken into phases so that you can let a large group of users see which objects are recoverable, but restrict the actual recovery procedures to fewer users. You can grant these authorizations through the CA-DB2 Products Main Menu.

**Note:** For more information, see the *CA Database Management Solutions for DB2 for z/OS General Facilities Reference Guide*.

You can grant or revoke authorization to the following CA Recovery Analyzer functions:

- **Analysis Services**
  Generates recovery scenarios.

- **Job Generation**
  Generates JCL or Batch Processor control statements.

- **Vol/Stogrp Recovery**
  Accesses the volume and storage group recovery options.

- **Batch**
  Executes a recovery and runs the PRA#LOAD batch job and related tasks.
D. R. Strat. Serv.

Generates disaster recovery strategies.

Special Services

Accesses the CA Recovery Analyzer special services.

Required Authorization

CA Recovery Analyzer requires the same security considerations as DB2. These are summarized in the following sections.

To recover a tablespace or indexspace, you must have one of the following kinds of authority:

- SYSCTRL or SYSADM authority
- DBADM or DBCTRL authority for the database containing the tablespace to be recovered
- RECOVERDB privilege for the database containing the tablespace to be recovered

To recover a volume or a storage group, you must have one of the authorities in the previous list, plus CREATESG authority.

To re-establish dual bootstrap data sets online, you must have one of the following kinds of authority:

- BSDS privilege
- SYSCTRL authority
- SYSADM authority

To use the other BSDS options, no special DB2 authorities are required because the DB2 subsystem is down when you execute them.

To use the log data set recovery option, no special DB2 authority is required.

To use the DB2 subsystem recovery option, you must have INSTALL SYSADM authority.

To use the disaster recovery option, you must have INSTALL SYSADM authority.
To create a disaster recovery strategy, you must have one of the following kinds of authority:

- DISPLAY privilege
- SYSOPR authority
- SYSCTRL authority
- SYSADM authority

To use the quick recovery, strategy services, system recovery, display restricted spaces, and point in time recovery functions you must have one of the following kinds of authority:

- DISPLAYDB privilege
- DISPLAY privilege
- DBMAINT authority
- DBCTRL authority
- DBADM authority
- SYSOPR authority
- SYSCTRL authority
- SYSADM authority

**Security Authorization**

To execute a recovery, you must have authority to access the underlying data sets, the active and archive log data sets, the bootstrap data sets, and the volume table of contents (VTOCs). You must also specify the appropriate authorization identifiers to permit access to VSAM data sets.

**Note:** Security authorities are required only to execute recoveries. You do not need these authorities to prepare for a recovery (for example, to create and analyze a recovery strategy).
The PRA#LOAD Batch Job

You must run the PRA#LOAD batch job on every DB2 subsystem on which you plan to use CA Recovery Analyzer. The PRA#LOAD job must be run with a SYSADM ID or with a DBADM ID that has authority held on PTDB with USE of STOGROUP PTSG. The ID must also have SELECT or READ authority on SYSIBM.SYSXMLRELS.

PRA#LOAD retrieves and saves information that is required for object and volume recovery. The PRA#LOAD batch job gets the object information from the DB2 catalog and data set information from the VTOC (volume table of contents). The information is placed into product-specific versions of the DB2 tables. CA Recovery Analyzer uses these tables to perform analysis instead of accessing the DB2 catalog directly, which can increase processing time.

The PRA#LOAD batch job is created during the customization step of the install process. After the customization is complete, PRA#LOAD is placed in hlq.CDBASAMP.

Note: If PRA#LOAD is not in the hlq.CDBASAMP library, run the install customization step as described in the CA Database Management Solutions for DB2 for z/OS Implementation Guide.

Maintain Current System Information Using PRA#LOAD

CA Recovery Analyzer must have access to current system information to effectively perform recoveries. For example, to recover a volume or data set, CA Recovery Analyzer must have access to information that tells it where objects are located. It must know the location of all the data sets that make up the object to be recovered, the referential integrity relationships among objects, and information about tablespace and indexspace partitions. CA Recovery Analyzer contains a batch job, PRA#LOAD, that builds a table with this information.

To maintain current system information, do the following:

- Tailor the PRA#LOAD job parameters for the subsystem.
- Include PRA#LOAD in your nightly batch jobs.
- Run PRA#LOAD hourly if your DB2 environment is dynamic, or if a volume has become damaged. PRA#LOAD reads the updated volume information.

More information:

PRA#LOAD Job Parameters (see page 22)
How Often to Run the PRA#LOAD Job (see page 22)
**PRA#LOAD Job Steps**

PRA#LOAD uses the following job steps to gather the information it needs:

**DELETE1**
- Deletes work data sets.

**PRA#PTIV**
- Uploads DB2 catalog tables and creates the input files for PRA#LOAD. You can eliminate specific databases from the PRA#LOAD scan by adding an ELIMINDB DD statement to this step.

**PRA#LOAD**
- Scans the DB2 catalog and determines where data sets reside. This step performs up to 25 concurrent catalog searches based on the parameter specified in the PRA#PTIV step.

**PRA#REPT**
- Produces PRA#LOAD error reports. This step also sorts and merges the PRA#LOAD data and prepares it to be loaded into the DB2 tables.

**LOAD#PRA**
- Loads the repository tables with the new VTOC and catalog data.

**PRA#COPY**
- Makes backup copies of the required tables. Archive these image copies on tape to help ensure their availability. If you archive them to a DASD device, be sure they reside on volumes different from the CA Recovery Analyzer tables. If a volume on which these tables reside fails, you must recover the tables before recovering user-defined tablespaces and indexspaces.

**Note:** If you are using disaster recovery and you are running the ssid@CDC job, you can eliminate this job step from PRA#LOAD.

**More information:**

- [Eliminate Databases from the PRA#LOAD Job](see page 24)
- [Reports Generated by PRA#LOAD](see page 24)
How Often to Run the PRA#LOAD Job

Before running PRA#LOAD for the first time, verify that the generation data group (GDG) base data sets needed for the PRA#COPY step of the PRA#LOAD job have been created. The base data sets are created by running the PRA#DGDG job.

After you have verified this, run PRA#LOAD at least every night. If any of the following circumstances exist, run the PRA#LOAD batch job periodically during the day so that the VTOC information remains current:

- Users create tablespaces during the day.
- Information flow is so heavy that tablespaces go into new extents during the day.
- A DASD device is disabled or is no longer available. If the device is not available to retrieve space information, the old quantities are used.

When upgrading to a new release of CA Recovery Analyzer, regenerate all PRA#LOAD jobs for all DB2 systems to help ensure the jobs are consistent with release changes.

Important! If you change the names for the product suite database (the default name is PTDB) or storage group (the default name is PTSG), verify that they are valid in the SETUPxx member for the target DB2 system before running PRA#LOAD. For more information about valid SETUP member entries, see the CA Database Management Solutions for DB2 for z/OS Implementation Guide.

PRA#LOAD Job Parameters

PRA#LOAD is created and its parameters are set during the installation process.

The following example shows the job parameters:

```
//PRA#LOAD EXEC PROC=PRA#LOAD,
// PRAHLVL='PRA.DXXB',
// SSID='DXXB',
// UTILID='PXX#LOAD',
// SMSSCAN=Y,
// RESTRT1=,
// RESTRT2=,
// ENVDEF='SUFFIX=00'
```

If you must modify the parameters, see the following descriptions:

**PRAHLVL**

Defines the high-level qualifier for data sets created and used during the PRA#LOAD execution.

**SSID**

Defines the DB2 subsystem ID against which PRA#LOAD executes.
UTILID

Defines the utility ID that is used if the job abends in one of the load steps. This parameter assists in restart processing. You do not need to change this value.

SMSSCAN

Specifies whether to call the MVS catalog to request SMS information.

This parameter is used in the PRA#LOAD step. The PRA#LOAD step performs concurrent catalog searches based on the number of tasks specified in the MAXTASKS parameter. This step retrieves all information from the MVS catalog and Catalog Macro Facilities, thereby eliminating VTOC allocation. With the VTOC eliminated, primary space allocations are captured with the SMS data, storage, and management classes.

Because requesting SMS information requires two calls to the MVS catalog, the SMSSCAN parameter has been added to let you eliminate this scan.

The following values are valid:

Y

Calls the MVS catalog to request SMS information.

N

Does not call the MVS catalog.

RESTRT1, RESTRT2

Assists in restart processing if the job abends during one of the load steps. Do not change this value.

ENVDEF

Lets you specify the ENVDEF related parameters, SUFFIX or ENV, for steps in the PRA#LOAD job. The options are shown following:

ENVDEF='SUFFIX=xx'

ENVDEF='ENV=xxxxxxxx'

xx

(Optional) Specifies the suffix of the PTISYSxx parmlib member (where xx is the suffix) to use when multiple PTISYS parmlib members exist. This value overrides the SUFFIX value of the ENVDEF parmlib member. If the ENVDEF parmlib member is not present and you do not specify the SUFFIX parameter, the default suffix of 00 is used.

xxxxxxxx

Specifies a value that combines with the SMF ID of the system the job is run on to dynamically determine a SUFFIX value from the ENVDEF parmlib member.

Note: For information about ENV and its relation to ENVDEF, and for information about creating an ENVDEF parmlib member, see the CA Database Management Solutions for DB2 for z/OS Installation Guide.
Eliminate Databases from the PRA#LOAD Job

You can eliminate databases from the PRA#LOAD job to make it run faster. Some installations request that you not scan the VTOC and VVDS for test subsystems, because those spaces are never recovered by CA Recovery Analyzer.

To eliminate databases from PRA#LOAD scan, do one of the following:

- Add an ELIMINDB DD statement to the PRA#PTIV step and specify the databases to eliminate from the scan. You can use selection criteria (the same patterns that are used for LIKE predicates) to eliminate more than one database.

The following sample syntax eliminates all tablespaces in database PRATEST and the tablespaces in all databases that start with TST:

```
//PRA#LOAD EXEC PROC=PRA#LOAD,
//     PRAHLVL='&PRAHLVL'
//     SSID='DXXB'
//     UTILID='PXX#LOAD'
//     SMSSCAN=Y,
//     RESTART1=,
//     RESTART2=,
//     ENVDEF='SUFFIX=00'
//PRA#PTIV.ELIMINDB DD*
PRATEST
TST% /*
```

- Alternatively, put the control statements (control cards) in a PDS, and point the DD to that PDS member. See the following example:

```
//PRA#PTIV.ELIMNDB DD DSN=MYCONTROL.LIB(MYMBR),DISP=SHR
```

The specified databases are eliminated from the PRA#LOAD job.

Reports Generated by PRA#LOAD

PRA#LOAD can generate the following reports:

- [Locate Failure Table/Index Spaces report](#) (see page 25)
- [Migrated Table/Index Spaces report](#) (see page 27)
- [Multi Volume Table/Index Spaces report](#) (see page 28)
Locate Failure Table/Index Spaces Report

The Locate Failure Table/Index Spaces report shows the tablespaces and indexspaces that are listed in the DB2 catalog but not in the MVS catalog. This can happen if the underlying VSAM data sets that make up a tablespace or indexspace are deleted outside of DB2. The entries in the DB2 catalog for the tablespace or indexspace still exist; however, because the data sets have been deleted, the tablespace or indexspace is unusable.

When this report is generated, CA Recovery Analyzer also generates drop statements to drop the spaces that are listed in this report from the DB2 catalog. One drop statement is automatically generated for each tablespace and indexspace listed in this report. The drop statements are placed in the location specified by the DROP#DDL DD statement.

The following shows a sample Locate Failure Table/Index Spaces report:

<table>
<thead>
<tr>
<th>Database</th>
<th>Table / Index Space</th>
<th>IPREFIX</th>
<th>Partition Nbr</th>
<th>Table / Index Ind</th>
</tr>
</thead>
<tbody>
<tr>
<td>ACCTCR</td>
<td>ACCTCR</td>
<td>I</td>
<td>0000</td>
<td>Table</td>
</tr>
<tr>
<td>ACCTOR</td>
<td>ACCTOR</td>
<td>I</td>
<td>0000</td>
<td>Index</td>
</tr>
</tbody>
</table>

This report contains the following fields:

**Database**

Identifies the database in which the affected tablespace or indexspace resides.

**Table / Index Space**

Identifies the affected tablespace or indexspace.

**IPREFIX**

Identifies the first character of the instance qualifier for the index data set name. Valid values are I or J.

**Default:** I

**Partition Nbr**

Identifies the partition number of the tablespace or indexspace. A value of 000 indicates that the space is not partitioned.

**Table / Index Ind**

Identifies whether the listed object is a tablespace or an indexspace.
The following illustration shows a DROPDDL DD statement:

// * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * *
// *                                                             *
// *  STEP:        PRA#REPT                                      *
// *                                                             *
// *  PARAMETERS:  1. DB2 SUBSYSTEM ID (1-4) CHARACTERS          *
// *                                                             *
// *  RESTART:     RESTART JOB FROM BEGINNING OF THE JOB         *
// *                                                             *
// *  DESCRIPTION: PRODUCE PRA#LOAD REPORTS AND SORT FILES TO BE *
// *               LOADED INTO DB2.                              *
// *                                                             *
// * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * *
// /*
// /*
// /* VTOC         DD  DSN=&PRAHLVL..PTRA.VTOC,
// /* DISP=(MOD,DELETE,DELETE),
// /* UNIT=SYSDA,SPACE=(TRK,(0))
// /*
// /* DROPDDL DD  DSN=&PRAHLVL..PTRA.DROP#DDL,
// /* DISP=(NEW,CATLG,DELETE),
// /* UNIT=SYSDA,SPACE=(TRK,(35,5),RLSE)
// /*
// /* SORTOUT1 DD  DSN=&PRAHLVL..PTRA.SORTOUT1,
// /* DISP=(MOD,DELETE,DELETE),
// /* UNIT=SYSDA,SPACE=(TRK,(0))
// /*

The following illustration shows sample drop statements after a PRA#LOAD job executes:

Menu  Utilities  Compilers  Help
----------------------------------
BROWSE    USER02.SAMPLE.DROP#DDL        Line 00000000 Col 001 080
Command ===>                                                 Scroll ===> CSR
DROP INDEX      PDCJC.BNCHIX1;
                  COMMIT;
DROP INDEX      PDCJC.BNCHIX2;
                  COMMIT;
DROP INDEX      PDCJC.BNCHIX3;
                  COMMIT;
                 DROP TABLESPACE BNCHDB.BNCHTS;
                 COMMIT;
                 DROP TABLESPACE DBWDSLOW.MANYPART;
                 COMMIT;
The drop statements do not execute automatically. You can submit the drop statements through SPUFI or another facility you use for executing DDL.

Notes:
- If individual partitions of a partitioned tablespace appear on the Locate Failure Table/Index Spaces report, the DROP#DDL statements contain a drop statement for the entire tablespace.
- Spaces contained in the DSNDDB01, DSNDDB06, and DSNDDF databases are included in the Locate Failure Table/Index Spaces report, but are not included in the DROP#DDL statements. You cannot drop these spaces because they are part of the DB2 system databases.

Migrated Table/Index Spaces Report

The Migrated Table/Index Spaces report lists the tablespaces and indexespaces that have been migrated by HSM (hierarchical storage manager). See the following sample report:

<table>
<thead>
<tr>
<th>Database</th>
<th>Table / Index Space</th>
<th>Partition Nbr</th>
<th>Table / Index Ind</th>
</tr>
</thead>
<tbody>
<tr>
<td>ABKDB</td>
<td>DSNADH01</td>
<td>000</td>
<td>Table</td>
</tr>
<tr>
<td>ACDB</td>
<td>DSNADH01</td>
<td>000</td>
<td>Table</td>
</tr>
<tr>
<td>ACDB</td>
<td>DSNADH01</td>
<td>000</td>
<td>Table</td>
</tr>
<tr>
<td>ACMD08</td>
<td>DSNADX01</td>
<td>000</td>
<td>Index</td>
</tr>
<tr>
<td>ACMD08</td>
<td>DSNAGH01</td>
<td>000</td>
<td>Index</td>
</tr>
<tr>
<td>ACMD08</td>
<td>DSNAPX01</td>
<td>000</td>
<td>Index</td>
</tr>
<tr>
<td>ACMD08</td>
<td>DSNAUH01</td>
<td>000</td>
<td>Index</td>
</tr>
<tr>
<td>ACMD08</td>
<td>DSNAUX02</td>
<td>000</td>
<td>Index</td>
</tr>
</tbody>
</table>

Migrated tablespaces and indexespaces no longer reside on an active volume. If you perform a volume recovery that requires data from migrated spaces, CA Recovery Analyzer can access them; however, the spaces remain migrated until you perform a recovery on them or until you access them through DB2.

This report contains the following fields:

Database
- Identifies the database in which the affected tablespace or indexespace resides.

Table / Index Space
- Identifies the affected tablespace or indexespace.
Partition Nbr

Identifies the partition number of the tablespace or indexspace. A value of 000 indicates that the space is not partitioned.

Table / Index Ind

Identifies whether the listed object is a tablespace or an indexspace.

Multi Volume Table/Index Spaces Report

The Multi Volume Table/Index Spaces report lists the tablespaces and indexspaces that span multiple volumes. When spaces span volumes, we recommend recovering them to a single volume to improve performance.

See the following sample report:

<table>
<thead>
<tr>
<th>Database</th>
<th>Table / Index Space</th>
<th>Partition Nbr</th>
<th>Sequence Nbr</th>
<th>Volser</th>
<th>Table / Index Ind</th>
</tr>
</thead>
<tbody>
<tr>
<td>ABCD</td>
<td>PTITSANE</td>
<td>008</td>
<td>001</td>
<td>DB3008</td>
<td>Table</td>
</tr>
<tr>
<td>ABCD</td>
<td>PTITSANE</td>
<td>008</td>
<td>002</td>
<td>DB3043</td>
<td>Table</td>
</tr>
<tr>
<td>ABCD</td>
<td>PTITSMG2</td>
<td>008</td>
<td>001</td>
<td>DB3025</td>
<td>Table</td>
</tr>
<tr>
<td>ABCD</td>
<td>PTITSMG2</td>
<td>008</td>
<td>002</td>
<td>DB3013</td>
<td>Table</td>
</tr>
</tbody>
</table>

This report contains the following fields:

Database

Identifies the database in which the affected tablespace or indexspace resides.

Table / Index Space

Identifies the affected tablespace or indexspace.

Partition Nbr

Identifies the partition number of the tablespace or indexspace. A value of 000 indicates that the space is not partitioned.

Sequence Nbr

Identifies the extent number.

Volser

Identifies the volume serial where the listed extent is located.

Table / Index Ind

Identifies whether the listed object is a tablespace or an indexspace.
Suppress a PRA#LOAD Report

You can suppress any or all of the reports generated by PRA#LOAD.

To suppress a report, delete or comment out the DD statement for that report in the PRA#LOAD step of the PRA#LOAD job.

The report is suppressed (not produced) the next time that PRA#LOAD executes.

The following sample shows the DD statements that produce the reports:

```
//PTIPARM DD DSN=HIGHLVL..CDBAPARM,DISP=SHR
//SYSPRINT DD SYSPUT=*  
//SYSOUT DD SYSPUT=* 
//SYSUDUMP DD SYSPUT=* 
//PRA#SRTM DD SYSPUT=* 
//PRAERRCT DD SYSPUT=*   CATALOG ERROR REPORT  
//PRAERRMG DD SYSPUT=*  MIGRATED DATASET REPORT  
//PRAERRMV DD SYSPUT=*  MULTI-VOLUME DATASET REPORT 
//PRA#VTOC DD SYSPUT=* 
//SORTIN DD DSN=SYSTEM..&SUBSYS..PRA#LOAD.SORTIN, 
//  DISP=(NEW,CATLG,DELETE), 
//  UNIT=DISK,SPACE=(TRK,(20,5),RLSE,CONTIG), 
//  DCB=(RECFM=FB,LRECL=118,BLKSIZ=27494) 
```

The following section describes the DD statements that produce the reports:

**PRAERRCT**

Produces the Locate Failure Table/Index Spaces Report.

**PRAERRMG**

Produces the Migrated Table/Index Spaces report.

**PRAERRMV**

Produces the Multi Volume Table/Index Spaces report.

Support a Subsystem After Converting to Extended Log Records

IBM provides a means to convert a DB2 subsystem from 6-byte RBA and LRSN values to 10-byte values. This conversion significantly increases the log addressing capacity and reduces the possibility of exhausting these values due to heavy logging activity.

When a subsystem is converted to 10-byte RBA and LRSN values, use the current CA Recovery Analyzer online panels to reanalyze your CA Recovery Analyzer strategies. This reanalysis regenerates the control statements to support the longer values.
LISTDEF Control Statements

More information:

Analyze a Recovery Strategy (see page 65)
Generate the Backup JCL (see page 127)

LISTDEF Control Statements

LISTDEF control statements are not supported.
Define Profile Settings

You can set up a profile to set the variables that are specific to CA Recovery Analyzer. Your profile is maintained in DB2 tables and does not rely on the ISPF profile. A profile for each user is maintained for each function, such as recovery strategy services, disaster recovery, and global options. One of each of these profiles is also maintained for each subsystem that the user accesses.

Follow these steps:

1. Type PROFILE on the command line in any CA Recovery Analyzer panel and press Enter.
   The Profile Menu appears.
2. Select option 2 (PRA Profile Variables) and press Enter.
   **Note:** For instructions about using option 1 to define global variables that your products share, see the *CA Database Management Solutions for DB2 for z/OS General Facilities Reference Guide*.
   The Profile Parameters panel appears.
3. Set the parameters as applicable for your site and press Enter.
   If you entered Y in the Change IC DSN Qualifier Order field, your changes are processed and the Image Copy Before DSN Qualifiers panel appears. Go to Step 4.
   If you entered N in the Change IC DSN Qualifier Order field, your changes are processed. Skip to Step 5.
Define Profile Settings

4. Set a naming pattern for the image copy data sets:
   a. Select the appropriate qualifiers for the image copy data sets to create *before* the recovery process takes place.

   **Notes:**
   - Data set qualifiers are limited to 44 characters total. Choosing too many qualifiers can result in a data set name that is too long to be valid.
   - We recommend that you select Alias Name, SQL ID, or User ID as the first qualifier.
   - If you select Generation Data Group, it must be the last qualifier in the sequence.
   - If you want the image copy data set name for a nonpartitioned tablespace to match the DB2 VSAM data set name for the tablespace, select DSNUM instead of Partition Number.

   Press Enter.
   Your changes are saved.

   b. Type **A** in the Before IC/After IC field and press Enter.

   The Image Copy After DSN Qualifiers panel appears.

   **Note:** The Before IC/After IC field toggles between the Image Copy Before DSN Qualifiers panel and the Image Copy After DSN Qualifiers panel.

   c. Select the appropriate qualifiers for the image copy data sets that will be created *after* the recovery process takes place. Press Enter.

   Your changes are saved.

   d. Press PF3 (End).

   The Profile Parameters panel reappears.

5. Press PF3 (End).

   The Profile Menu reappears.
Example: Set a Naming Pattern for the Before-Image Copies

The following illustration shows a naming pattern for the local primary and backup copies that are created before the recovery process takes place:

<table>
<thead>
<tr>
<th>Item Field</th>
<th>Item Field</th>
</tr>
</thead>
<tbody>
<tr>
<td>(1) Alias Name</td>
<td>(14) Time (THHHHSS) Hours Minutes Seconds</td>
</tr>
<tr>
<td>(2) Database Name</td>
<td>(15) Time (THHHHSS.MSSSSSS) Timestamp</td>
</tr>
<tr>
<td>(3) Tablespace Name</td>
<td>(16) Random Number (R####)</td>
</tr>
<tr>
<td>(4) Partition Number</td>
<td>(17) Generation Data Group (+1)</td>
</tr>
<tr>
<td>(5) Dataset Number (Global Opt)</td>
<td>(18) User Defined Literal 1 == &gt; B</td>
</tr>
<tr>
<td>(6) Image Copy Backup Type</td>
<td>(19) User Defined Literal 2 =&gt; ________________</td>
</tr>
<tr>
<td>(7) Sub System ID</td>
<td>(20) User Defined Literal 3 =&gt; ________________</td>
</tr>
<tr>
<td>(8) SQL ID</td>
<td>(21) User Defined Literal 4 =&gt; ________________</td>
</tr>
<tr>
<td>(9) User ID</td>
<td>(22) Exclude Period Between Qualifiers</td>
</tr>
<tr>
<td>(10) VCAT Name</td>
<td>(23) Substring of Qualifier 1 == &gt; ____________</td>
</tr>
<tr>
<td>(11) Date (DDMMDDY) Gregorian (USA)</td>
<td>(24) Substring of Qualifier 2 == &gt; ____________</td>
</tr>
<tr>
<td>(12) Date (DYYYYMMDD) Gregorian (ISO)</td>
<td>(25) DSNUM (DB2 Vsam Dataset Number)</td>
</tr>
<tr>
<td>(13) Date (DYYYYDD) Julian</td>
<td>(26) Partition # Visible Only When Nonzero</td>
</tr>
</tbody>
</table>

Copy to: Enter the numbers of the above fields to order the dataset qualifiers

- (LP) => 01 => 07 => 13 => 14 => 16 => __ => __ => __ => __ => __
- (LB) => 01 => 07 => 12 => 14 => 16 => __ => __ => __ => __ => __
- (RP) => 01 => 02 => 03 => 04 => 05 => 06 => __ => __ => __ => __
- (RB) => 01 => 02 => 03 => 04 => 05 => 06 => __ => __ => __ => __

In the previous illustration, these qualifiers have been selected for the local primary copy: the alias name, the SSID, the Julian date, the timestamp, and a random number. These qualifiers result in a data set name similar to the following example:

LPDEMO.D123.08127.T100811.M012047.RGL00001

These qualifiers have been selected for the local backup copy: the alias name, the SSID, the Gregorian date, the time, and a random number. These qualifiers result in a data set name similar to the following example:

LBDEMO.D123.D20080506.T105714.R983797

Restore Default Profile Values

You can reset your profile values to the default values set in the PRA parmlib member.

To restore the default profile values, enter the REFPROF primary command on any panel except the Image Copy Before DSN Qualifiers panel or the Image Copy After DSN Qualifiers panel. Press Enter.

Your profile values are reset to the defaults.
Chapter 4: Creating and Updating Recovery Strategies

This section contains the following topics:

- **Recovery Strategy Overview** (see page 35)
- **Create a Recovery Strategy** (see page 35)
- **Copy a Recovery Strategy** (see page 37)
- **Update a Recovery Strategy** (see page 38)
- **Review the Recovery Strategy** (see page 39)
- **Delete a Strategy or Version** (see page 54)

### Recovery Strategy Overview

CA Recovery Analyzer enables you to create recovery strategies. When you create a strategy, you select the DB2 objects to recover, select the recovery options to use, and save the strategy for later use.

**Note:** You can select only local objects to recover. CA Recovery Analyzer does not support recovery on remote systems.

When you are ready to use the strategy to recover objects, you use CA Recovery Analyzer to analyze it. The analysis generates the necessary JCL or Batch Processor statements to perform the recovery. You can perform the analysis online or in batch. (Batch analysis lets you automate production batch recovery.) CA Recovery Analyzer retrieves the recovery point at the time of analysis.

Each time that you analyze a strategy, the analysis is saved as a version of the strategy. The versions are listed under the strategy from least recent to most recent. You can generate multiple versions of a strategy, specifying different options each time. For example, one version of a strategy can specify recovery to a full image copy, and another version can specify recovery to current.

After you have analyzed a strategy, you can submit the resulting JCL or Batch Processor statements to recover the selected objects.

### Create a Recovery Strategy

CA Recovery Analyzer enables you to create recovery strategies. When you create a strategy, you select the DB2 objects to recover, select the recovery options to use, and save the strategy for later use.
Follow these steps:

1. Type 2 (Strategy Services) on the Main Menu and press Enter. The Recover Strategy Services panel appears.

2. Enter the following values:
   a. Type C (Create) in the O field on the first line.
   b. Enter a name for the new strategy and, optionally, a description.
   c. (Optional) Enter Y in the OP (Options Set) field to set global recovery options for the strategy.
   d. Enter a valid option in the SO (Share Option) field to specify whether other users can use the strategy.

Press Enter.

   If you entered Y in the OP field, the Options Selection Menu appears. Set the global recovery options (see page 55), press PF3 (End) to exit, then go to Step 3.

   If you entered N in the OP field, the Create Recovery Strategy panel appears. Go to Step 3.

3. Select the objects to include in the recovery strategy:
   - Enter selection criteria in the Specify Object Selection Criteria section of the panel to filter the objects. You can enter DB2-like selection criteria (% for 0 or more characters, or * for all).
     
     **Note:** Selection criteria are evaluated when you analyze the recovery strategy, not when you create or update it. If objects are added or dropped after you create the strategy, these changes are included in the strategy analysis. For a complete description of selection criteria, see the CA Database Management Solutions for DB2 for z/OS General Facilities Reference Guide.

   - Enter one of the following values in the Select Objects for Recovery section:
     - Type S (Select) next to an object type to select the objects you want from a list.
     - Type A (Autobuild) next to an object type to include all objects that meet your selection criteria.

Press Enter.

   If you typed S, a selection list appears, showing all objects that meet your criteria. Go to Step 4.

   If you typed A, the Strategy Recovery - Review Objects panel appears. Go to Step 7.
4. Type S (Select) next to each object to include in the strategy.
   
   **Note:** You can also type ALL on the command line to select all objects on the panel.

   Press Enter.

   The selected objects are removed from the list, and a message informs you that the selected objects have been queued.

5. (Optional) Type S (Shrink) in the command line and press Enter.

   A new panel appears, showing the objects that you selected.

6. Press PF3 (End).

   The Strategy Recovery - Review Objects panel appears, showing the objects that have been selected.

7. (Optional) Add other object types to the strategy:
   
   a. Enter A (add object after) or B (add object before) next to an object in the list and press Enter.

      The Create Recovery Strategy panel reappears.

   b. Repeat Steps 3 through 6 to add more objects.

      The Strategy Recovery - Review Objects panel reappears, showing the objects that have been selected.

      The recovery strategy has been created. You can now review the strategy.

**More information:**

[Review the Recovery Strategy](see page 39)

---

**Copy a Recovery Strategy**

You can copy an existing recovery strategy to a different subsystem or to the same subsystem.

**Important!** If you copy the strategy to the same subsystem, give a new name to the copy.

**Follow these steps:**

1. Type 2 (Strategy Services) on the Main Menu and press Enter.

   The Recover Strategy Services panel appears.

2. Type C (Copy) next to a strategy and press Enter.

   The Strategy Copy window appears. The Copy From section shows the strategy that you selected.
3. Enter a subsystem ID in the Copy To section. Optionally, enter a new strategy name, creator, share option, or description in the other fields. Press Enter.

The recovery strategy is copied, and the previous panel reappears with the message Successfully Copied. If you copied the strategy to the same subsystem, the new strategy appears in the list. You can now update or review the recovery strategy.

More information:

Review the Recovery Strategy (see page 39)
Update a Recovery Strategy (see page 38)

Update a Recovery Strategy

You can update an existing recovery strategy to change the settings.

Follow these steps:

1. Type 2 (Strategy Services) on the Main Menu and press Enter.

   The Recovery Strategy Services panel appears.

2. (Optional) Change the criteria in the header fields to display the strategy you want, and press Enter.

   The strategy list updates to reflect your selection criteria.

3. Type U (Update) in the O field next to the strategy to update. Press Enter.

   The Strategy Recovery - Review Objects panel appears.

4. Follow the instructions for reviewing a strategy to add and delete objects, display their associated tablespaces and indexspaces, and so on.

More information:

Review the Recovery Strategy (see page 39)
Review the Recovery Strategy

When you are creating or updating a recovery strategy, the Strategy Recovery - Review Objects panel appears after you select the objects to include in your recovery strategy. You can use this panel to add or delete objects from the recovery and to override the global recovery options for individual objects in the strategy. If you selected objects by using the autobuild option, you can exclude individual objects from the autobuild. You can display the indexes for a tablespace, the tables for an indexspace, and any whole long names that are truncated for display.

These instructions assume that you are in the process of creating or updating a recovery strategy, and that the Strategy Recovery - Review Objects panel is already displayed.

Follow these steps:

1. (Optional) Change the value in the SHARE OPTION field. This field controls whether other users can view and use this recovery strategy.

2. Enter the appropriate value in the MULTIPLE JOB OPTION field. This field controls whether the strategy is split into multiple jobs.

   **Note:** If a strategy recovers many objects, consider generating more than one recovery job when analyzing the strategy. Multiple recovery jobs can maximize tape mounting efficiency and can take advantage of parallel processing. You can let CA Recovery Analyzer automatically generate multiple jobs that are based on optimal tape mounting. You can also split the strategy into multiple jobs yourself.

3. (Optional) Type a value in the REVIEW OPTIONS field and press Enter.
   
   If you entered Y, the Options Selection Menu appears. Go to Step 4.
   
   If you entered N, the panel does not change. Go to Step 5.

4. **Set the global options** (see page 56) and press PF3 (End).

   The Strategy Recovery - Review Objects panel reappears.

5. (Optional) Enter a value in the Cmd field next to an object to perform one of the following actions on that object:

   - Type A or B to add an object.
   - Type RI or RIA to **add objects based on their RI relationships** (see page 45).
   - Type E to **exclude an object** (see page 51). This option is used when you use the autobuild option to select objects for the strategy.
   - Type D to **delete an object** (see page 53).
   - Type O to **override the global recovery options for that object** (see page 59).
   - Type IX to display the indexspaces that are associated with the selected object.
Review the Recovery Strategy

- Type **TS** to display the tablespaces that are associated with the selected object.
- Type **Z** to display whole long names that have been truncated for display.


6. (Optional) Enter the number of jobs to create for the objects to recover in the Job # field. This step is only necessary if you specified Y or P for the Multiple Job option.

7. Press PF3 (End).

You have reviewed the recovery strategy selections. The Recovery Strategy Services panel reappears with a message indicating that your strategy was saved. You can now analyze the strategy to generate the recovery JCL.

More information:

- **Generate Multiple Jobs Automatically** (see page 40)
- **Generate Multiple Jobs Manually** (see page 41)
- **Differences Between the RI and RIA Commands** (see page 46)
- **Analyze a Recovery Strategy** (see page 65)

---

**Generate Multiple Jobs Automatically**

This procedure describes how to have CA Recovery Analyzer generate multiple jobs automatically, based on optimal tape mounting.

**Note:** CA Recovery Analyzer can still determine that one job is the most efficient way to process the recovery.

Follow these steps:

1. Set the Multiple Job Option to **Y** on the Strategy Recovery - Review Objects panel when you create or update the strategy.

2. Set the Autobuild Multiple Jobs field to **Y** on the Recovery Strategy Options panel when you analyze the strategy.
Generate Multiple Jobs Manually

This procedure describes how to generate multiple jobs by manually assigning job numbers to strategy lines.

Follow these steps:

1. Perform the following actions when you create or update the strategy:
   a. Set the Multiple Job Option to Y on the Strategy Recovery - Review Objects panel.
   b. Enter a job number next to each line in the strategy on the Strategy Recovery - Review Objects panel. You can use the EVERY n command to group every n strategy lines into a job, or the MAKE n command to divide the displayed strategy lines into n jobs.

   Notes:
   - The EVERY and MAKE commands assign job numbers per strategy line, not per object. If a strategy line contains an autobuild list, a plan name, or a package name, CA Recovery Analyzer applies the same job number to all objects associated with the list, plan, or package. Therefore, some jobs can contain more objects than others. To assign separate job numbers to individual objects, expand the list, plan, or package before assigning the job numbers.
   - If you do not want to assign the job numbers yourself, CA Recovery Analyzer can assign them during strategy analysis.

2. Set Autobuild Multiple Jobs to N on the Recovery Strategy Options panel when you analyze the strategy.

More information:

Generate Multiple Jobs Manually with Autobuilds Expanded (see page 42)
Generate Multiple Jobs During Batch Analysis (see page 42)
**Generate Multiple Jobs Manually with Autobuilds Expanded**

This procedure describes how to expand autobuild, plan, and package strategy lines into individual objects before you generate multiple jobs. Expanding the lines lets you group a similar number of objects into each recovery job.

**Follow these steps:**

1. Set the Multiple Job Option to P on the Strategy Recovery - Review Objects panel when you create or update the strategy.
   
   **Important!** Do not set the job numbers now.

2. Analyze the strategy. When the Strategy Recovery - Review Objects panel appears, press PF3 (End) to continue without entering job numbers.

   
   A message shows how many jobs will be created. Also, all autobuilds, plans, and packages are expanded so that every object is listed individually on the panel.

4. Use the EVERY n or MAKE n commands to assign job numbers on the Strategy Recovery - Review Objects panel. You can also adjust jobs as needed by using the header fields Break Objects In to <x> # Of Jobs or Make A New Job For Every <x> Objects. Press PF3 (End).

**Generate Multiple Jobs During Batch Analysis**

This procedure describes how to set up a recovery strategy that generates multiple jobs and assigns the job numbers during the strategy analysis.

**Follow these steps:**

1. Set the Multiple Job Option to P on the Strategy Recovery - Review Objects panel when you create or update the strategy.
   
   **Important!** Do not set the job numbers now.

2. Analyze the strategy. When the Strategy Recovery - Review Objects panel appears, adjust jobs as needed. Use the header fields Break Objects Into <x> # Of Jobs or Make A New Job For Every <x> Objects. When autobuilds, plans, or packages are expanded during analysis, the multiple jobs are created from the expanded object list.

   **Important!** Use the panel fields rather than the commands to adjust the job numbers, because the panel fields are propagated to the batch analysis job. This propagation helps ensure that the proper breakdown occurs if the autobuilds, plans, or packages expand differently during batch analysis time.

   Press PF3 (End).

3. Set the Analyze Online or Batch field to B and set the Autobuild Multiple jobs field to Y on the Recovery Strategy Options panel.

   **Note:** Batch mode is required.
Add Objects to a Recovery Strategy

You can add objects to an existing recovery strategy to include them in the recovery.

Follow these steps:

1. **Type 2** (Strategy Services) on the Main Menu and press Enter.
   
   The Recovery Strategy Services panel appears.

2. (Optional) Change the criteria in the header fields to display the strategy you want, and press Enter.
   
   The strategy list updates to reflect your selection criteria.

3. **Type U** (Update) in the O field next to the strategy to update. Press Enter.
   
   The Strategy Recovery - Review Objects panel appears.

4. **Type A** (add line after) or **B** (add line before) next to an object in the list and press Enter.
   
   The Update Recovery Strategy panel appears.

5. Select the objects to add to the recovery strategy:
   
   - Enter selection criteria in the Specify Object Selection Criteria section of the panel to filter the objects. You can enter DB2-like selection criteria (% for 0 or more characters, or * for all).

   **Note**: Selection criteria are evaluated when you analyze the recovery strategy, not when you create or update it. If objects are added or dropped after you create the strategy, these changes are included in the strategy analysis. For a complete description of selection criteria, see the *CA Database Management Solutions for DB2 for z/OS General Facilities Reference Guide*.

   - Enter one of the following values in the Select Objects for Recovery section:
     
     - **Type S** (Select) next to an object type to select the objects you want from a list.
     
     - **Type A** (Autobuild) next to an object type to include all objects that meet your selection criteria.

   Press Enter.

   If you typed S, a selection list appears. Go to Step 6.

   If you typed A, the Strategy Recovery - Review Objects panel appears. A line is added to the strategy that includes all the objects meeting your selection criteria. You can now review the strategy.
6. Type S (Select) next to each object to include in the recovery.

   **Note:** You can also type ALL on the command line to select all objects on the panel. Press Enter.

   The selected objects are removed from the selection list, and a message informs you that the selected objects have been queued.

7. (Optional) Type S (Shrink) in the command line and press Enter.

   A new panel appears, showing the selected objects.

8. Perform any of the following actions, if needed:

   ■ Delete the S next to an object to omit it from the recovery.

      **Note:** Omitted objects are not added back to the selection list. To view omitted objects in the selection list, go back to the beginning of this procedure and start over.

   ■ Type S (Shrink) on the command line to add more objects.

9. (Optional) Add other object types to the strategy:

   a. Enter A (add object after) or B (add object before) next to an object in the list and press Enter.

      The Update Recovery Strategy panel reappears.

   b. Repeat Steps 5 through 8 to add more objects.

      The Strategy Recovery - Review Objects panel reappears, showing the objects that have been selected.

10. Press PF3 (End).

    If you typed S in the command line, the object selection list reappears. Return to Step 6.

    If you made no panel changes, or if you deleted the S from any objects, your selections are processed. The Strategy Recovery - Review Objects panel reappears. You can continue to add objects, or you can now review the strategy.

**More information:**

[Review the Recovery Strategy](see page 39)
**Refresh the Object Statistics**

When you are adding objects to a recovery strategy (using the Strategy Recovery - Tablespace List or Strategy Recovery - Index List panel) or to a quick recovery (using the Quick Recover - Tablespace List panel), you can refresh the object statistics to help ensure that CA Recovery Analyzer has current system information for the selected objects. The statistics are extracted from the VTOC.

**Note:** The PRA#LOAD batch job also refreshes object statistics. We recommend that this job be run regularly on your system, to keep the VTOC current. If this recommendation is being followed, you do not need to refresh the object statistics yourself unless you know that the physical attributes of an object (such as its location, referential integrity relationships, or partitioning) have changed since the last PRA#LOAD execution.

To refresh the object statistics, do one of the following:

- Enter `R` (Refresh) next to an object to refresh the statistics for that object only.
- Enter `REFRESH` on the command line to refresh the statistics for all objects shown on the panel.

**Note:** If you attempt to refresh too many spaces, a message warns you that the refresh may take a long time. You are prompted to confirm whether you want to proceed with the refresh.

**More information:**

The PRA#LOAD Batch Job (see page 20)

**Add Objects Based on RI Relationships**

You can view which objects in the strategy have referential integrity relationships with other objects, and can add those objects too.

**Follow these steps:**

1. Type `2` (Strategy Services) on the Main Menu and press Enter.
   
   The Recovery Strategy Services panel appears.

2. (Optional) Change the criteria in the header fields to display the strategy you want, and press Enter.
   
   The strategy list updates to reflect your selection criteria.

3. Type `U` (Update) in the O field next to the strategy to update. Press Enter.
   
   The Strategy Recovery - Review Objects panel appears with a list of the objects that are included in the recovery strategy.
4. Enter a value in the Cmd field next to an object to perform one of the following actions on that object:
   
   a. Type RI or RIA next to an object.
      
      If you typed RI, the RI relationships for the selected tablespace appear.
      
      If you typed RIA, the complete RI structure for all the tables that are related to the tables in the selected tablespace appear. This structure shows the highest-level parent down to the lowest-level child.
      
   b. Enter S next to each object to include in the recovery strategy. Press PF3 (End).
      
      The Strategy Recovery - Review Objects panel reappears.
      
      The selected objects have been added to the recovery strategy. You can now review the strategy.

   **More information:**

   Review the Recovery Strategy (see page 39)

   **Differences Between the RI and RIA Commands**

   When you use the RI command on a tablespace, CA Recovery Analyzer builds the RI structure beginning with the parents of tables in the tablespaces and continuing down the RI chain. All spaces that will be placed in check pending status as a result of the recovery are listed.

   For example, if you use the RI command on a tablespace containing one table that has a parent and a child, the resulting structure shows the following:

   - The table’s parent
   - All of the parent’s children, including the table in the selected tablespace
   - The table's children
   - All descendants of the table’s children

   When you use the RIA command on a tablespace, the entire RI structure is exploded. CA Recovery Analyzer begins with tables in the selected tablespace and goes up the RI structure, resolving the relationships of all tables, until the entire structure is built.
Example: Use the RI and RIA Commands on Tablespace PRARITSD

The following example show the different results achieved with the two commands. For the example, the following RI relationships exist for these tables:

If you enter the RI command next to tablespace PRARITSD on the Strategy Recovery - Review Objects panel, the following RI structure is built:

<table>
<thead>
<tr>
<th>Cmd</th>
<th>Type</th>
<th>Lvl</th>
<th>Creator</th>
<th>Table Name</th>
<th>Database</th>
<th>Tablespace</th>
</tr>
</thead>
<tbody>
<tr>
<td>SYS</td>
<td>2</td>
<td>USERXXX</td>
<td>PRARID</td>
<td>PRARIDB</td>
<td>PRARITSD</td>
<td></td>
</tr>
</tbody>
</table>
The RI command retrieved the table name PRARID in the PRARITSD tablespace. PRARID has one parent table called PRARIC in the tablespace PRARITSC, which is listed first in the structure. The PRARID table appears next. Because PRARIC and PRARID do not have other children, the list is complete.

If you use the RIA command on the same tablespace, the referential integrity structure for all relationships is exploded, as shown in the following illustration:

```
<table>
<thead>
<tr>
<th>Cmd</th>
<th>Type</th>
<th>Lvl</th>
<th>Creator</th>
<th>Table Name</th>
<th>Database</th>
<th>Tablespace</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>SYS</td>
<td>1</td>
<td>USERXXX</td>
<td>PRARIA</td>
<td>PRARIDB</td>
<td>PRARITSA</td>
</tr>
<tr>
<td></td>
<td>SYS</td>
<td>2</td>
<td>USERXXX</td>
<td>PRARIB</td>
<td>PRARIDB</td>
<td>PRARITSB</td>
</tr>
<tr>
<td></td>
<td>SYS</td>
<td>3</td>
<td>USERXXX</td>
<td>PRARIC</td>
<td>PRARIDB</td>
<td>PRARITSC</td>
</tr>
<tr>
<td></td>
<td>SYS</td>
<td>4</td>
<td>USERXXX</td>
<td>PRARID</td>
<td>PRARIDB</td>
<td>PRARITSD</td>
</tr>
<tr>
<td></td>
<td>SYS</td>
<td>2</td>
<td>USERXXX</td>
<td>PRARIE</td>
<td>PRARIDB</td>
<td>PRARITSE</td>
</tr>
<tr>
<td></td>
<td>SYS</td>
<td>3</td>
<td>USERXXX</td>
<td>PRARIF</td>
<td>PRARIDB</td>
<td>PRARITSF</td>
</tr>
<tr>
<td></td>
<td>SYS</td>
<td>2</td>
<td>USERXXX</td>
<td>PRARIG</td>
<td>PRARIDB</td>
<td>PRARITSG</td>
</tr>
</tbody>
</table>
```

All tables in the entire RI structure are now listed. Beginning with the selected tablespace, CA Recovery Analyzer checks every table for RI relationships. Whenever a parent or child is found, relationships in those tables are also checked, thus building a complete RI structure.

**Note:** If a relationship occurs more than once in a structure, the appearance of that relationship is suppressed after the first occurrence.

**Example: Use the RIA Command on Self-Referencing Tables**

Using the RIA command on a tablespace that contains self-referencing tables (tables that are dependents of themselves) can result in several different but accurate representations of the RI structure. The results depend on the following factors:

- Where the tablespace on which you enter the RIA command falls in the RI structure
- Which table name is returned first from the SYSIBM.SYSRELS catalog table (if there is more than one table in the tablespace)

Using the RIA command on a tablespace containing tables that are both parents and children of each other can also produce different but accurate representations of the RI structure.
In this example, we refer to the standard sample tables provided with DB2. Several of these tables are self-referencing. The following shows the relationships between the tables:
When you enter the RIA command on tablespace DSN8S41D, the following RI relationship structure is built:

When you enter the RIA command on tablespace DSN8S41E, the following RI relationship structure is built:

Because the RI structure began building with the EMP table, the results are slightly different, but still accurate.
When you enter the RIA command on tablespace DSN8S41P, the following RI relationship structure is built:

<table>
<thead>
<tr>
<th>Cmd Type Lvl</th>
<th>Creator</th>
<th>Table Name</th>
<th>Database</th>
<th>Tablespace</th>
</tr>
</thead>
<tbody>
<tr>
<td>SYS</td>
<td>1</td>
<td>DEPT</td>
<td>DSN8D41A</td>
<td>DSN8S41D</td>
</tr>
<tr>
<td>SYS</td>
<td>2</td>
<td>DEPT</td>
<td>DSN8D41A</td>
<td>DSN8S41D</td>
</tr>
<tr>
<td>SYS</td>
<td>1</td>
<td>EMP</td>
<td>DSN8D41A</td>
<td>DSN8S41E</td>
</tr>
<tr>
<td>SYS</td>
<td>2</td>
<td>EMP</td>
<td>DSN8D41A</td>
<td>DSN8S41E</td>
</tr>
<tr>
<td>SYS</td>
<td>1</td>
<td>EMP</td>
<td>DSN8D41A</td>
<td>DSN8S41E</td>
</tr>
<tr>
<td>SYS</td>
<td>2</td>
<td>EMP</td>
<td>DSN8D41A</td>
<td>DSN8S41E</td>
</tr>
<tr>
<td>SYS</td>
<td>1</td>
<td>PROJ</td>
<td>DSN8D41A</td>
<td>DSN8S41P</td>
</tr>
<tr>
<td>SYS</td>
<td>2</td>
<td>PROJ</td>
<td>DSN8D41A</td>
<td>DSN8S41P</td>
</tr>
<tr>
<td>SYS</td>
<td>3</td>
<td>PROJECT</td>
<td>DSN8D41A</td>
<td>DSN8S41P</td>
</tr>
<tr>
<td>SYS</td>
<td>4</td>
<td>EMPPROJECT</td>
<td>DSN8D41A</td>
<td>DSN8S41P</td>
</tr>
<tr>
<td>SYS</td>
<td>1</td>
<td>EMP</td>
<td>DSN8D41A</td>
<td>DSN8S41E</td>
</tr>
<tr>
<td>SYS</td>
<td>2</td>
<td>PROJ</td>
<td>DSN8D41A</td>
<td>DSN8S41P</td>
</tr>
<tr>
<td>SYS</td>
<td>1</td>
<td>DEPT</td>
<td>DSN8D41A</td>
<td>DSN8S41D</td>
</tr>
<tr>
<td>SYS</td>
<td>2</td>
<td>PROJ</td>
<td>DSN8D41A</td>
<td>DSN8S41P</td>
</tr>
<tr>
<td>SYS</td>
<td>1</td>
<td>ACT</td>
<td>DSN8D41A</td>
<td>DSN8S41P</td>
</tr>
<tr>
<td>SYS</td>
<td>2</td>
<td>PROJECT</td>
<td>DSN8D41A</td>
<td>DSN8S41P</td>
</tr>
</tbody>
</table>

In this case, tablespace DSN8S41P contains four tables. The RI structure begins building with the first table that is returned from a query to the SYSIBM.SYSRELS catalog table.

Because the tables in this tablespace are at the bottom of the RI structure, the structure must be built from the bottom up. With self-referencing tables, this can result in many tables at level 1 in the RI structure.

### Exclude Autobuild Objects From a Strategy

When you add objects to a recovery strategy, you can use the A (autobuild) command. This command automatically adds all objects that meet your selection criteria. The autobuild command can add unwanted objects. You can exclude these objects. This exclusion is done on the Strategy Recovery - Review Objects panel, which appears after you add objects to your recovery strategy.

These instructions assume that you are currently creating or updating a strategy, and that the Strategy Recovery - Review Objects panel is already displayed.
Follow these steps:

1. Type the **E** (Exclude) line command on the Strategy Recovery - Review Objects panel and press Enter.
   
The Exclude Spaces Selection panel appears.

2. Specify the objects to exclude from the recovery:
   
   - Enter selection criteria in the Specify Object Selection Criteria section of the panel to filter the objects. You can enter DB2-like selection criteria (% for 0 or more characters, or * for all).

   **Note:** Selection criteria are evaluated when you analyze the recovery strategy, not when you create or update it. If objects are added or dropped after you create the strategy, these changes are included in the strategy analysis. For a complete description of selection criteria, see the *CA Database Management Solutions for DB2 for z/OS General Facilities Reference Guide*.

   - Enter one of the following values in the Exclude Objects from Recovery section of the panel:
     
     - Type **S** (Select) next to an object type to select the objects you want from a list.
     
     - Type **A** (Autobuild) next to an object type to exclude all objects that meet your selection criteria.

   Press Enter.

   If you typed S, a selection list appears. Go to Step 3.

   If you typed A, the Strategy Recovery - Review Objects panel appears. Go to Step 5.

3. Type **S** (Select) next to each object to exclude from the strategy.
   
   **Note:** You can also type **ALL** on the command line to select all objects on the panel.

   Press Enter.

   The selected objects are removed from the selection list, and a message informs you that the selected objects have been queued.

4. (Optional) Type **S** (Shrink) in the command line and press Enter.
   
   The Strategy Recovery - TS Data Queue panel appears, showing the selected objects.

5. Press PF3 (End).
   
   The Strategy Recovery - Review Objects panel reappears. The excluded spaces appear in the strategy with a line type of E or X.
6. (Optional) Exclude other object types from the strategy:
   a. Enter the A (add an object after) or B (add an object before) line command and press Enter.
      The Exclude Spaces Selection panel reappears.
   b. Repeat Steps 2 through 5 to add more objects.
      The Strategy Recovery - Review Objects panel reappears.

7. Review the strategy, review the recovery options (if necessary), and press PF3 (End).
   The strategy is saved and the Recovery Strategy Services panel reappears. You can now analyze the strategy.

**Delete Objects From a Recovery Strategy**

You can delete objects from a recovery strategy.

**Follow these steps:**

1. Type 2 (Strategy Services) on the Main Menu and press Enter.
   The Recovery Strategy Services panel appears.

2. (Optional) Change the criteria in the header fields to display the strategy you want, and press Enter.
   The strategy list updates to reflect your selection criteria.

3. Type U (Update) in the O field next to the strategy to update. Press Enter.
   The Strategy Recovery - Review Objects panel appears.

4. Type D (Delete) next to an object in the list and press Enter.
   The object disappears from the list.

5. (Optional) Repeat Step 4 to delete additional objects from the recovery strategy.

6. Press PF3 (End).
   The Recovery Strategy Services panel reappears with a message that the strategy has been saved.
Delete a Strategy or Version

You can delete a strategy or a version of a strategy that is no longer needed.

**Note:** If you delete a strategy, you also delete any versions of that strategy.

**Follow these steps:**

1. Perform one of the following actions:
   a. Type **2** (Strategy Services) on the Main Menu and press Enter, to delete a recovery strategy.
      The Recovery Strategy Services panel appears.
   b. Type **6** (Reporting Services) on the Main Menu and press Enter, to delete a reporting strategy.
      The Strategy Reporting Services panel appears.

2. Type **D** (Delete) next to the strategy or version. Press Enter.
   A confirmation window appears.

3. Type **Y** to confirm and press Enter.
   The previous panel reappears with a message indicating that the strategy or version has been deleted.
Chapter 5: Setting Options for Recovery Strategies

This section contains the following topics:

- Recovery Strategy Options (see page 55)
- Set Global Recovery Options for All Spaces in a Strategy (see page 56)
- Override Global Recovery Options for Individual Objects (see page 59)
- Set the Utility Options (see page 60)

Recovery Strategy Options

When you create, update, or analyze a recovery strategy, you can set various recovery options for the tablespaces and indexspaces included in the strategy. For example, you can specify a point of recovery to use, whether to make image copies before or after recovery, whether to include a tablespace’s indexes in the recovery, and so on.

When you set the options for your recovery strategy, your settings will apply to all spaces within that strategy. You can also save the settings to your profile, where they become your personal global defaults, to be applied to all recovery strategies that you create or update. (Each user has their own profile, and can save their own global defaults.) You can override your global defaults for individual spaces as needed.

When configuring your recovery strategy, you can specify the following:

- Global options for all spaces in the recovery strategy (see page 56)
- Options for utilities used in the recovery (see page 60)
- Options for individual spaces that will override the global options (see page 59)
Set Global Recovery Options for All Spaces in a Strategy

You can set global options when you create, update, or analyze a recovery strategy. These options apply to all tablespaces and indexspaces in the strategy. You can specify the utilities to use, the types of objects to include in the recovery, and when to take image copies (that is, before or after the recovery).

**Note:** If you set an option when creating or updating a recovery strategy, the option is saved for that strategy only. If you set an option when analyzing a recovery strategy, the option is applied only to that analysis. If you want to save your option settings as a global default for all recovery strategies, save the options to your profile.

**Follow these steps:**

1. Access the Options Selection menu by taking one of the following actions:
   - Enter Y in the Review Options field on the Strategy Recovery - Review Objects panel (when creating or updating a strategy).
   - Enter Y in the Review Strategy Options field on the Recovery Strategy Options panel (when analyzing a strategy).

   The Options Selection Menu appears.

2. Type 1 (Global Options) and press Enter.

   The Global Strategy Recovery Options panel appears.

3. Make your selections and press Enter.

   **Note:** If you specify Y in the Avoid Recovery field, submit the strategy for execution immediately after you analyze it. Verify that none of the avoided recovery objects have changed. You can use the SUBMIT line command from strategy services to compare the current time and analysis time to verify that both are current.

   **Important!** We do not recommend that you select the REPAIR option (R) in the Check Utility field. This option removes the check pending flag without checking any referential integrity constraints. The integrity of any data in an RI relationship is set at risk. Use this option only if you understand the consequences of your actions.

   Your selections in this panel dictate which panel appears next:
   - If the Specify Utility Vendors window appears, go to Step 4.
   - If the Select Checkpoint RBA for Recovery Point panel appears, skip to Step 5.
   - If the Enter Jobcard Information window appears, skip to Step 6.
4. Specify the utilities to use (CA, IBM, or other) and press Enter.
   
   Your selections in the Global Strategy Recovery Options panel dictate which panel appears next:
   
   - If the Select Checkpoint RBA for Recovery Point panel appears, go to Step 5.
   - If the Enter Jobcard Information window appears, skip to Step 6.
   - If the Global Strategy Recovery Options panel reappears, skip to Step 7.

5. Type $ in the Cmd field to select the RBA to use as your recovery point and press Enter.
   
   Your selections in the Global Strategy Recovery Options panel dictate which panel appears next:
   
   - If the Enter Jobcard Information window appears, go to Step 6.
   - If the Global Strategy Recovery Options panel reappears, skip to Step 7.

6. Specify the JOB statement information to enter into your recovery strategy and press Enter.
   
   The Global Strategy Recovery Options panel reappears.
   
   **Note:** Your selected options apply only to the strategy that you are currently working with. To apply these options to all strategies that you create or update, save the options to your profile.

7. Press PF3 (End).
   
   The Options Selection Menu reappears. The global recovery options that you have selected are applied to all spaces in the strategy.

**More information:**

[Save the Recovery Options to Your Profile](#) (see page 59)
Create Image Copies Without Performing a Recovery

You can create image copies without actually performing a recovery. This feature is useful when using CA Recovery Analyzer to perform a backup using an image copy. CA Recovery Analyzer can simplify the creation of image copies by autobuilding your list of objects, automatically generating backup DSNs, and so on. The image copy can be stored on tape in case you need it for data recovery.

Follow these steps:

1. Access the Options Selection menu by performing one of the following actions:
   - Enter Y in the Review Options field on the Strategy Recovery - Review Objects panel (when creating or updating a strategy).
   - Enter Y in the Review Strategy Options field on the Recovery Strategy Options panel (when analyzing a strategy).

   The Options Selection Menu appears.

2. Type 1 (Global Options) and press Enter.

   The Global Strategy Recovery Options panel appears.

3. Make the following selections:
   - Select N (No) in the Recovery Point field. This value tells CA Recovery Analyzer not to perform a recovery.
   - Select Y in the Image Copy Before or the Image Copy After field (or both).
   - Specify a value in the Image Copy Retain field. Y places all image copies on one tape. N does not.
   - Specify values in the other fields on this panel as needed.

   Press Enter.

   Your selections on this panel dictate which panel appears next.

4. Continue making selections and pressing Enter in the subsequent panels that appear.

   After you have gone through all of the option panels, the Global Strategy Recovery Options panel reappears.

5. Press PF3 (End).

   The Options Selection Menu reappears. The next time that you analyze this strategy, CA Recovery Analyzer will create image copies without performing a recovery.
Save the Recovery Options to Your Profile

When you create or update a recovery strategy, you can save the options that you specified on the Global Strategy Recovery Options panel to your CA Recovery Analyzer profile. These options are then used for all recovery strategies that you create or update in the future.

Notes:

- Each CA Recovery Analyzer user has a separate profile. Your saved options apply to only your strategies.
- You must be in create or update mode to make permanent changes. Any changes you make to the global options during analysis (job generation) are not saved.
- If you do not save your options as global defaults, they apply only to the strategy that you are currently working with.

To save the recovery options to your profile, type SAVE on the command line and press Enter.

The recovery options are saved in your CA Recovery Analyzer profile and are used as defaults the next time you create or update a strategy or perform a quick recovery.

More information:

Set Global Recovery Options for All Spaces in a Strategy (see page 56)

Override Global Recovery Options for Individual Objects

When you create or update a recovery strategy, you can override the global recovery options for individual objects in the strategy.

Global options can be overridden in the Strategy Recovery - Review Objects panel. This panel appears as part of the creation or update process. These instructions assume that you are currently creating or updating a strategy, and that the Strategy Recovery - Review Objects panel is already displayed.

Follow these steps:

1. Type O in the command field next to the object whose settings you want to override and press Enter.

An options panel appears for the selected object type.
2. Modify the appropriate fields on the panel.
   
   **Note:** You can merge the global and individual options into one list by typing M in the command line and pressing Enter. When you are done viewing the merged list, you can press Enter again to return to the previous panel.

   Press PF3 (End).

   The Strategy Recovery - Review Objects panel appears.

3. Press PF3 (End).

   The strategy is saved with the selected overrides to the global options, and the Recovery Strategy Services panel reappears.

**More information:**

- [Update a Recovery Strategy](#) (see page 38)
- [Analyze a Recovery Strategy](#) (see page 65)
- [Create a Recovery Strategy](#) (see page 35)

### Set the Utility Options

CA Recovery Analyzer can call utilities when you use a strategy to perform a recovery. You can set options for the utilities when you create, update, or analyze a recovery strategy.

**Note:** You can also set the utility options when performing other types of recoveries (for example, when recovering storage groups, DASD volumes, or DB2 subsystems, or when performing quick recoveries).
Follow these steps:

1. Access the Options Selection menu by taking one of the following actions:
   - Type Y in the Review Options field on the Strategy Recovery - Review Objects panel (when creating or updating a strategy).
   - Type Y in the Review Strategy Options field on the Recovery Strategy Options panel (when analyzing a strategy).
   The Options Selection Menu appears.

2. Enter one of the following options:
   - 2 (Copy/Recover/Check Options)
     Note: This option lets you set standard copy, recover, and check options that apply to both CA and IBM utilities.
   - 3 (Quick Copy Options)
   - 4 (Fast Recover Options)
   - 5 (Fast Load Options)
   - 6 (FDR Options)
   - 7 (Fast Check Options)
   Press Enter.
   The options panel for that utility appears.

3. Make your selections and press PF3 (End).
   The Options Selection menu reappears.

4. Repeat Steps 2 and 3 as needed for additional utilities.
   Your utility options are set.

More information:

Set Standard Copy, Recover, and Check Options (see page 62)
Set Standard Copy, Recover, and Check Options

The Copy/Rcvr/Chk Opts for IBM/CA panel lets you set options that are common to CA and IBM utilities for image copies, recoveries, and data checks.

Follow these steps:

1. Access the Options Selection menu by taking one of the following actions:
   - Type Y in the Review Options field on the Strategy Recovery - Review Objects panel (when creating or updating a strategy).
   - Type Y in the Review Strategy Options field on the Recovery Strategy Options panel (when analyzing a strategy).
   The Options Selection Menu appears.
2. Type 2 (Copy/Recover/Check Options) and press Enter.
   The Copy/Rcvr/Chk Opts for IBM/CA panel appears.
3. Make your selections and press PF3 (End).
   If you entered Y (Yes) or U (Update) in the SMS field next to a copy type, the SMS Information window for the selected copy type appears. Go to Step 4.
   If you did not enter Y or U in an SMS field, the Options Selection menu reappears. Your standard copy, recover, and check options have been set.
4. Enter the SMS information to use for the selected image copy type and whether to create the image copy on a Large Block Interface (LBI) tape, and press Enter.
   The Copy/Rcvr/Chk Opts for IBM/CA panel reappears.
5. Press PF3 (End).
   The Options Selection menu reappears. Your standard copy, recover, and check options have been set.

Image Copy Considerations

When CA Recovery Analyzer calls a copy utility to take an image copy, CA Recovery Analyzer checks to see whether the image copy has already been used and exists in SYSIBM.SYSCOPY. Space quantities are set to the size of a tablespace. The proper amount of space is always allocated for an image copy (with no wasted space).

CA Recovery Analyzer also compares the generated image copy data set names to avoid duplicates. If you are not cataloging image copies and choose to perform an image copy before and after the recovery in the same job stream, the image copy data set names are checked to be sure they are unique for each copy.
XML Considerations

XML support is not provided for the CA Fast Check and CA Fast Recover model utilities. You cannot use these utilities to process tables containing XML columns. Instead, use the IBM utilities.

Use Third-Party Utilities with CA Recovery Analyzer

When you use a recovery strategy to recover data, CA Recovery Analyzer can call other utilities as part of the recovery process. You can use licensed copies of CA, IBM, or third-party utilities. The Global Strategy Recovery Options panel lets you select which utilities to use. If you plan to use CA or IBM utilities, select that utility type on the panel. If you plan to use third-party utilities, additional changes are required.

Follow these steps:

1. Access the Global Strategy Recovery Options panel (see page 56).
2. Type O (Other) in the Utility Vendor field and press PF3 (End).
   
   Your selection is saved and you exit the panel.

   Note: Your selection is saved only in the current strategy. If you want to apply this selection to future strategies, save it to your profile.

3. Edit the JCL and control statement skeletons in high-level.CDBASKL0 to include information about the third-party utilities.

   The skeletons are fully commented with instructions for updating. The comment lines begin with the characters “)CM.” Specify the program name of the utility, add STEPLIB data set names, and add any other DD statements that the copy utility requires.

   The following table lists the skeletons involved:

<table>
<thead>
<tr>
<th>Third-Party Utility</th>
<th>Skeleton Name</th>
<th>Skeleton Type</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Copy</td>
<td>PRSCPOJ</td>
<td>JCL</td>
<td>n/a</td>
</tr>
<tr>
<td>Copy</td>
<td>PRSCPOC</td>
<td>Control statement</td>
<td>n/a</td>
</tr>
<tr>
<td>Recover</td>
<td>PRSRCOJ</td>
<td>JCL</td>
<td>n/a</td>
</tr>
<tr>
<td>Recover</td>
<td>PRSRTOC</td>
<td>Control statement</td>
<td>Recover TOCOPY</td>
</tr>
<tr>
<td>Recover</td>
<td>PRSRROC</td>
<td>Control statement</td>
<td>Recover TORBA or current</td>
</tr>
<tr>
<td>Recover</td>
<td>PRSRIOC</td>
<td>Control statement</td>
<td>Recover the indexes for a tablespace</td>
</tr>
<tr>
<td>Recover</td>
<td>PRSRXOC</td>
<td>Control statement</td>
<td>Recover an index</td>
</tr>
</tbody>
</table>
Set the Utility Options

<table>
<thead>
<tr>
<th>Third-Party Utility</th>
<th>Skeleton Name</th>
<th>Skeleton Type</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Load</td>
<td>PRSLOOJ</td>
<td>JCL and control statements</td>
<td>n/a</td>
</tr>
</tbody>
</table>

4. Save the updated skeletons.

CA Recovery Analyzer uses the specified third-party utilities.

More information:

Save the Recovery Options to Your Profile (see page 59)
Chapter 6: Analyzing and Submitting Recovery Strategies

This section contains the following topics:
- **Analyze a Recovery Strategy** (see page 65)
- **Review the Recovery JCL** (see page 67)
- **Submit the Recovery JCL** (see page 68)
- **Submit Multiple Strategy Versions** (see page 68)

### Analyze a Recovery Strategy

Analyzing a strategy produces the JCL to recover the spaces included in your strategy. You can then submit the JCL to complete the recovery process.

**Note:** You can generate either JCL or Batch Processor statements. We recommend generating JCL for optimal performance. (The Batch Processor does not support tape stacking.)

Each time that you analyze a strategy, the analysis is saved as a version of the strategy. The versions are listed under the strategy from least recent to most recent. You can generate multiple versions of a strategy, specifying different options each time. For example, one version of a strategy can specify recovery to a full image copy, and an alternate version can specify recovery to current.

**Follow these steps:**

1. Type 2 (Strategy Services) on the Main Menu and press Enter.
   
   The Recovery Strategy Services panel appears.

2. Type A in the O field next to the strategy to analyze. You can change the criteria in the header fields to display the strategy you want. Press Enter.

   If you entered P (Prompt) in the Multiple Job Options field on the Strategy Recovery - Review Objects panel when you created the strategy, the Strategy Recovery - Review Objects panel appears. Go to Step 3.

   If you entered Y or N in the Multiple Job Options field on the Strategy Recovery - Review Objects panel, the Recovery Strategy Options panel appears. The Strategy Recovery - Review Objects panel does not appear because you have already specified the job numbers or you are not using multiple jobs. Skip to Step 4.

3. Enter a job number for each object and press PF3 (End).
   
   The Recovery Strategy Options panel appears.
4. Type **O** (online) or **B** (batch) in the Analyze Online or Batch field, set the other strategy options as needed, enter a data set name, and press Enter.

   **Note:** The message "Online/Batch switch" appears when you change the value in the Analyze Online or Batch field. This message indicates that you are switching between batch and online mode. Press Enter to continue.

If you specified Y in the Review Strategy Options field, the Options Selection Menu appears. Set the **global recovery options** (see page 55), and then press PF3 (End) to return to the Recovery Strategy Options panel.

If you specified batch analysis, the Generate JCL to Intrdr or DSN window appears. Go to Step 5.

If you specified online analysis, the Percent Complete window appears. Skip to Step 6.

5. Enter a data set name for the JCL, select a value for the override errors option, and press Enter.

   The Percent Complete window appears.

6. Review the Check Pending Spaces panel, if it appears. Also specify how to resolve the check pending status for each space.

   **Important!** We do not recommend the P (Repair with NOCHECKPEND) option. This option removes the check pending flag without checking any referential integrity constraints. The integrity of any data in an RI relationship is set at risk. Use this option only if you understand the consequences of your actions.

   Press PF3 (End).

   If the RI resolves successfully, the JCL generates and the Recovery Strategy Services panel reappears. A message indicates that the strategy version has been saved. The version appears on the panel, indented below its strategy name. You can now review or submit the JCL.

   If another problem occurs with the recovery, the Selected Recovery Point Error panel appears. Go to Step 7.

7. Review the Selected Recovery Point Error panel, if it appears, and press Enter.

   **Note:** For more information, see the "Selected Recovery Point Errors and Remedies" appendix.

   The Percent Complete window appears. When the analysis is complete, the Recovery Strategy Services panel reappears. A message indicates that the strategy version has been saved. The version appears on the panel, indented below its strategy name. You can now review or submit the JCL.

**More information:**

- [Review the Recovery JCL](#) (see page 67)
- [Submit the Recovery JCL](#) (see page 68)
Review the Recovery JCL

After you analyze a strategy, you can review the resulting JCL before you submit it for execution.

**Note:** If you entered Y in the Edit Dataset after Generation field when you created or updated the strategy, the JCL appears automatically after the strategy is analyzed. The following instructions explain how to review the JCL when you do not enter Y in this field.

The following instructions assume that you are viewing the list of available strategies on the Recovery Strategy Services panel, Strategy Reporting Services panel, or Point in Time Strategy Services panel.

**Follow these steps:**

1. Type one of the following values next to a strategy version:
   - **B (Browse)**
     - Lets you browse the JCL.
   - **E (Edit)**
     - Lets you edit the JCL.
   - **V (View)**
     - Lets you view the JCL. You cannot save any changes.

     Press Enter.

     The JCL appears.

2. View or edit the JCL, then press PF3 (End).

   The previous panel reappears.
Device Utilization Report

When you analyze a recovery strategy, the resulting recovery job includes a Device Utilization Report.

This report provides the following image copy information:

- The image copy data sets that are needed for the recovery job
- Whether those data sets are saved to tape (T) or disk (D)
- The volumes that contain the image copy data sets
- The sequence order of the image copy data sets
- Whether the volume will be retained to retrieve another image copy for the recovery

This report also provides the following archive log information:

- The archive log data sets that are needed for the recovery job
- The volumes that contain the archive log data sets
- Whether the archive log is cataloged

Submit the Recovery JCL

After you analyze a strategy, you can submit the resulting strategy versions to execute the JCL that they contain.

Follow these steps:

1. Type S next to one or more strategy versions and press Enter.
2. Confirm that you want to submit the selected versions by typing Y (Yes) or A (All). Press Enter.
   Your JCL is submitted.

Submit Multiple Strategy Versions

You can submit multiple strategy versions.

Follow these steps:

1. Type 2 (Strategy Services) on the Main Menu and press Enter.
   The Recover Strategy Services panel appears.
2. Type S next to each version you want to submit and press Enter.
   The Confirm Strategy Submit window appears.
3. Enter a value in the Submit Strategy Version field:

   Y
   Submits the selected version.

   N
   Does not submit the version. This value is the default.

   A
   Submits all selected versions without additional confirmation.

   Press Enter.
   A message appears indicating that the jobs have been submitted.

4. Press Enter.
   The Recovery Strategy Services panel reappears.
Chapter 7: Additional Recovery Strategy Functions

This section contains the following topics:

- **Associate a Strategy with a Batch Job** (see page 71)
- **Quiesce the Tablespaces in a Strategy** (see page 72)
- **Translate Image Copies to Another Subsystem** (see page 73)

**Associate a Strategy with a Batch Job**

You can associate a strategy with a particular production batch job by adding a job name, step name, or procedure step name to the strategy. For example, if a certain batch job tends to fail, identify the affected tablespaces. Then create a strategy to recover those tablespaces. Include the name of the job step in the strategy.

**Note:** To find the strategy quickly, you can use the FIND command on the Recovery Strategy Services panel to search for the job step that is associated with the strategy. You can also have a job scheduler invoke CA Recovery Analyzer using the name of a job, job step, or procedure step to recover the space to the appropriate point.

**Follow these steps:**

1. Type `2` (Strategy Services) on the Main Menu and press Enter.
   - The Recover Strategy Services panel appears.
2. Type `B` next to a strategy and press Enter.
   - The Recover for Batch Job Info window appears.
3. Enter the name of the job that this strategy recovers. Optionally, enter the step name and procedure step name that this strategy recovers.
   **Note:** If you enter values in all three fields, the combination of job name, job step, and procedure step name must be unique.
   - Press Enter.
   - The Recovery Strategy Services panel reappears and the batch job information appears next to the strategy.
Quiesce the Tablespaces in a Strategy

You can generate JCL to quiesce all tablespaces in a strategy. If the strategy has a recovery RBA (of any number), the strategy is updated with the RBA of the quiesce point. The new RBA then becomes a valid recovery point for the strategy.

**Note:** The following procedure creates a job that contains only a quiesce for the objects in a strategy. You can specify a quiesce step in the recovery job stream when you set the global strategy options.

**Follow these steps:**

1. Type 2 (Strategy Services) on the Main Menu and press Enter.
   The Recover Strategy Services panel appears.

2. Type Q next to a strategy and press Enter.
   The Quiesce Recover Strategy panel appears.

3. Modify the fields on this panel as required, enter a data set name to contain the generated output, and press Enter.
   The Percent Complete window appears.

4. Review the Selected Recovery Point Error panel, if it appears, and press Enter.
   **Note:** For more information, see the "Selected Recovery Point Errors and Remedies" appendix.

   The Percent Complete window appears. When the analysis is complete, one of the following results happens:
   - If you selected N (No) in the Edit Dataset after Generation field, the Recovery Strategy Services panel reappears. A message indicates that the strategy version has been saved. The version appears on the panel, indented below its strategy name. You can now review or submit the JCL.
   - If you selected Y (Yes) in this field, the JCL appears. You can now review or submit the JCL.
   - If you selected S (no and Submit) in this field, a message indicates that the quiesce JCL has been submitted.

   You can now review and submit the JCL.

**More information:**

- [Review the Recovery JCL](#) (see page 67)
- [Submit the Recovery JCL](#) (see page 68)
- [Set Global Recovery Options for All Spaces in a Strategy](#) (see page 56)
Translate Image Copies to Another Subsystem

You can automatically translate image copies of the objects in a strategy to another subsystem. CA Recovery Analyzer reads the image copies, retrieves the DBID, PSID, and all OBIDs in the selected spaces, finds new DBIDs and all OBIDs, and then calls DSN1COPY with the XLAT parameters.

Note: You cannot automatically translate an image copy of a tablespace containing tables that have rows of identical length. In that case, review the row data in the tables to determine which table OBID correlates to which image copy OBID. You can then use the DSN1COPY XLAT and Recover feature to enter the old and new OBIDs.

Follow these steps:

1. Type 2 (Strategy Services) on the Main Menu and press Enter.
   The Recover Strategy Services panel appears.
2. Type X next to a strategy and press Enter.
   The Translate Strategy Options panel appears.
3. Enter the new subsystem ID, enter a data set name to contain the generated output, and modify the other fields on this panel as required.

Important! The Stop & Start Spaces field gives you the option to stop and start spaces using ACCESS (FORCE). This option can compromise the integrity of your data. Use ACCESS (FORCE) only if you understand the implications.

Press Enter.

Your selections are processed. Your selections on this panel determine which panel you see next.
Chapter 8: Using Quick Recovery

This section contains the following topics:

How to Perform a Quick Recovery (see page 75)
Save a Quick Recover Job as a Strategy (see page 85)

How to Perform a Quick Recovery

This section provides an overview of the quick recover option. Creating a quick recover job is identical to creating a recovery strategy, except a quick recover job is generally not saved because it is intended to be used for one-time recoveries. (You can, however, save a quick recover scenario as a recovery strategy.)

To perform a quick recovery, do the following:

1. Select the objects to be recovered.
2. Review your selections (see page 77).
3. Generate the recovery JCL (see page 83).
4. Review the recovery JCL (see page 84).
5. Submit the recovery JCL (see page 84).

Select Objects for Quick Recovery

Select the objects to include in the quick recovery.

Follow these steps:

1. Type 1 (Quick Tablespace/Indexspace Recovery) on the Main Menu and press Enter. The Quick Recover - Select Objects panel appears.
2. Select the objects to include in the recovery:
   - Enter selection criteria in the object selection criteria section of the panel. You can enter DB2-like selection criteria (% for 0 or more characters, or * for all).
     Note: For a complete description of selection criteria, see the CA Database Management Solutions for DB2 for z/OS General Facilities Reference Guide.
   - Enter one of the following values in the Select Objects for Recovery section:
     - Type S (Select) to select the objects you want from a list.
     - Type A (Autobuild) to include all objects that meet your selection criteria.
How to Perform a Quick Recovery

Press Enter.
If you typed S, a selection list appears. Go to Step 3.
If you typed A, the Quick Recover - Review Objects panel appears. You can now review your recovery selections.

3. Type S (Select) next to each object to include in the quick recovery.
   Note: You can also type ALL on the command line to select all objects on the panel.
   Press Enter.
   The selected objects are removed from the selection list, and a message informs you that the selected objects have been queued.

4. (Optional) Type S (Shrink) in the command line and press Enter.
   A new panel appears, showing the selected objects.

5. Press PF3 (End).
   The objects for the quick recovery have been selected. The Quick Recover - Review Objects panel appears. You can now review your recovery selections.

More information:

Review Your Quick Recovery Selections (see page 77)

Refresh the Object Statistics

When you are adding objects to a recovery strategy (using the Strategy Recovery - Tablespace List or Strategy Recovery - Index List panel) or to a quick recovery (using the Quick Recover - Tablespace List panel), you can refresh the object statistics to help ensure that CA Recovery Analyzer has current system information for the selected objects. The statistics are extracted from the VTOC.

Note: The PRA#LOAD batch job also refreshes object statistics. We recommend that this job be run regularly on your system, to keep the VTOC current. If this recommendation is being followed, you do not need to refresh the object statistics yourself unless you know that the physical attributes of an object (such as its location, referential integrity relationships, or partitioning) have changed since the last PRA#LOAD execution.
To refresh the object statistics, do one of the following:

- Enter R (Refresh) next to an object to refresh the statistics for that object only.
- Enter REFRESH on the command line to refresh the statistics for all objects shown on the panel.

**Note:** If you attempt to refresh too many spaces, a message warns you that the refresh may take a long time. You are prompted to confirm whether you want to proceed with the refresh.

**More information:**

The PRA#LOAD Batch Job (see page 20)

---

**Review Your Quick Recovery Selections**

When you are creating a quick recover job, the Quick Recover - Review Objects panel appears after you select the objects to include in your recovery. You can use this panel to review your selections, add or delete objects from the recovery, and override the global options with alternate recovery options for individual objects. You can also display the indexes for a tablespace, the tables for an indexspace, and the RI relationships for a tablespace. If you selected the objects using the autobuild command, you can exclude objects from the autobuild.

These instructions assume that you are in the process of creating a quick recovery, and that the Quick Recover - Review Objects panel is already displayed.

**Follow these steps:**

1. (Optional) Type a value in the REVIEW OPTIONS field and press Enter.
   - If you entered Y, the Options Selection Menu appears. Go to Step 2.
   - If you entered N, the panel does not change. Go to Step 3.

2. **Set the global options** (see page 80) and press PF3 (End).
   - The Quick Recover - Review Objects panel reappears.
3. Enter a value in the Cmd field next to an object to perform one of the following actions on that object:
   ■ Type A or B to add an object.
   ■ Type RI or RIA to add objects based on their RI relationships (see page 79).
   ■ Type D to delete an object. When you press Enter, the object disappears from the list.
   ■ Type E to exclude an object (see page 79).
   ■ Type O to override the global options for the selected object (see page 82).
   ■ Type IX to display the indexspaces that are associated with the selected object.
   ■ Type TS to display the tablespaces that are associated with the selected object.
   ■ Type Z to display whole long names that have been truncated for display.
   Press PF3 (End).
   The Options Selection Menu appears.

4. Press PF3 (End) again.
   You have reviewed the quick recovery selections. The Quick Recover - Recovery Options panel appears. You can now generate the quick recover JCL.

More information:

Generate the Quick Recover JCL (see page 83)
Differences Between the RI and RIA Commands (see page 46)
Add Objects Based on RI Relationships

You can view which objects in the quick recovery job have referential integrity relationships with other objects, and can add those objects too. This task is done from the Quick Recover - Review Objects panel, which appears after you select the objects to include in your recovery.

These instructions assume that you are in the process of creating a quick recovery, and that the Quick Recover - Review Objects panel is already displayed.

Follow these steps:
1. Type RI or RIA next to an object.
   - If you typed RI, the RI relationships for the selected tablespace appear.
   - If you typed RIA, the complete RI structure for all the tables that are related to the tables in the selected tablespace appear. This structure shows all tables from the highest-level parent down to the lowest-level child.
2. Enter S next to each object to include in the recovery strategy. Press PF3 (End).
   - The Strategy Recovery - Review Objects panel reappears. The selected objects have been added to the quick recovery.

More information:
Review the Recovery Strategy (see page 39)

Exclude Autobuild Objects From a Quick Recovery

When you add objects to a quick recover job, you can use the A (autobuild) command. This command automatically adds all objects that meet your selection criteria. The autobuild command can unwanted objects. You can exclude these objects. This exclusion is done on the Quick Recover - Review Objects panel, which appears after you add objects to your quick recover job.

These instructions assume that you are in the process of creating a quick recovery, and that the Quick Recover - Review Objects panel is already displayed.

Follow these steps:
1. Type the E (Exclude) line command on the Quick Recover - Review Objects panel and press Enter.
   - The Exclude Spaces Selection panel appears.
2. Specify the objects to exclude from the recovery:
   - Enter selection criteria in the Specify Object Selection Criteria section of the panel to filter the objects. You can enter DB2-like selection criteria (% for 0 or more characters, or * for all).
Enter one of the following values in the Exclude Objects from Recovery section of the panel:

- Type S (Select) next to an object type to select the objects you want from a list.
- Type A (Autobuild) next to an object type to exclude all objects that meet your selection criteria.

Press Enter.

If you typed S, a selection list appears. Go to Step 3.

If you typed A, the Quick Recover - Review Object panel appears. Go to Step 5.

3. Type S (Select) next to each object to exclude from the quick recovery.

   **Note:** You can also type ALL on the command line to select all objects on the panel.

   Press Enter.

   The selected objects are removed from the selection list, and a message informs you that the selected objects have been queued.

4. (Optional) Type S (Shrink) in the command line and press Enter.

   A list of the selected objects appears.

5. Press PF3 (End).

   The Quick Recover - Review Object panel reappears. The excluded spaces appear with a line type of E or X.

**Set Global Options for All Spaces in the Quick Recovery**

When performing a quick recovery, you can set global recovery options that apply to all tablespaces and indexspaces included in the recovery. These options are accessed through the Options Selection menu.

**Note:** The same recovery options are available for quick recoveries and for recovery strategies. When you select the options while performing a quick recovery, the options apply only to that recovery. When you select the options while working with a recovery strategy, the options are saved with that strategy. The options are applied every time that the strategy is analyzed.
Follow these steps:

1. Access the Options Selection menu by taking one of the following actions:
   - Enter Y in the Review Options field on the Quick Recover - Review Objects panel.
   - Enter Y in the Review Quick Recovery Options field on the Quick Recover - Recovery Options panel.
   - Press PF3 (End) on the Quick Recover - Review Objects panel.
     The Options Selection menu appears.

2. Type 1 (Global Options) and press Enter.
   The Quick Recover - Global Options panel appears.

3. Make your selections and press PF3 (End).
   Your selections are saved. The global recovery options have been set. The Options Selection Menu reappears.

4. Press PF3 (End) again.
   The Quick Recover - Recovery Options panel appears. You can now generate the quick recover job.

More information:

Recovery Strategy Options (see page 55)
Generate the Quick Recover JCL (see page 83)
Override Global Options for Individual Objects in the Quick Recovery

You can override the global recovery options for individual objects in the recovery.

This procedure assumes that you are in the process of creating a quick recover job and that the Quick Recover - Review Objects panel is already displayed.

Follow these steps:

1. Type O (Override) in the command field next to the object on the Quick Recover - Review Objects panel and press Enter.
   An option panel for the selected object type appears.
2. Modify the appropriate fields on the panel and press PF3 (End).
   Notes:
   - You can view field descriptions in the online help by pressing PF1.
   - You can merge the global and individual options into one list by typing M in the command line and pressing Enter. When you are done viewing the merged list, press Enter again to return to the previous panel.
   The Quick Recover - Review Objects panel reappears.
3. Press PF3 (End).
   The Options Selection Menu appears.
4. Press PF3 (End) again.
   The Quick Recover - Recovery Options panel appears. The global options for the selected object have been overridden. You can now generate the quick recover JCL.

More information:

Generate the Quick Recover JCL (see page 83)
Generate the Quick Recover JCL

After you have selected the spaces to recover and set the object options, you can generate the quick recover job. The job is generated from the Quick Recover - Recovery Options panel, which appears after you set the global options for your quick recover job.

**Note:** You can generate either JCL or Batch Processor statements. We recommend generating JCL for optimal performance. The Batch Processor does not support tape stacking.

This procedure assumes that you are in the process of creating a quick recover job, and that the Quick Recover - Recovery Options panel is already displayed.

**Follow these steps:**

1. Make the appropriate selections on the Quick Recover - Recovery Options panel, enter a data set name (with a member name if the data set is partitioned), and press Enter.

   **Important!** If you enter F in the Stop & Start Spaces field, CA Recovery Analyzer includes JCL to stop and start spaces using ACCESS (FORCE). This option can compromise the integrity of your data. Use this option only if you understand the implications.

   If you entered N in the Save Recovery as a Strategy field, the Quick Recover - Recovery Options panel reappears. Go to Step 2.

   If you entered Y in the Save Recovery as a Strategy field, the Save Quick Recover as a Strategy panel appears. You can now optionally save the quick recover job as a strategy.

2. Set the options that you want and press Enter.

   The job is submitted for execution. The Percent Complete window appears.

3. Review the Check Pending Spaces panel, if it appears, and press PF3 (End).

   If the RI resolves successfully, the JCL generates. You can now review or submit the JCL.

   If another problem occurs with the recovery, the Quick Recover - Recovery Point Error panel appears. Go to Step 4.

4. Review the Quick Recover - Recovery Point Error panel, if it appears. This panel identifies the spaces that will encounter errors and the type of error each space will encounter. These errors can affect the success of the recovery. Press Enter.

   The Percent Complete window appears. The job generates. You can now review or submit the JCL.
More information:

- Review the Quick Recover JCL (see page 84)
- Submit the Quick Recover JCL (see page 84)
- Recovery Point Error Overview (see page 169)
- Save a Quick Recover Job as a Strategy (see page 85)

Review the Quick Recover JCL

After you generate the job, you can review the resulting JCL before you submit it for execution.

**Note:** If you entered Y in the Edit Dataset after Generation field when you generated the job, the JCL appears automatically after the job is generated. The following instructions explain how to review the JCL when you do not enter Y in this field.

**Follow these steps:**

1. Access the data set member where you saved the JCL output. You specified this name when you generated the job.
2. View or edit the JCL, then press PF3 (End).
   You exit the data set member.

Submit the Quick Recover JCL

After you generate a job and review the resulting JCL, you can submit the JCL for execution.

**Note:** If you entered S in the Edit Dataset after Generation field when you generated the job, the JCL is automatically submitted for execution. The following instructions explain how to submit the JCL if you did not enter S in this field.

**Follow these steps:**

1. Access the data set member where you saved the JCL output. You specified this name when you generated the job.
2. Type `submit` on the command line and press Enter.
   The JCL is submitted.
Save a Quick Recover Job as a Strategy

You can save a quick recover job as a recovery strategy so that you can reuse it later.

This procedure assumes that you are in the process of creating a quick recover job, and that the Quick Recover - Recovery Options panel is displayed.

Follow these steps:

1. Modify the appropriate fields on the Quick Recover - Recovery Options panel, type Y in the Save Recovery as a Strategy field, and press Enter.
   The Save Quick Recover as a Strategy window appears.

2. Enter a new strategy name, select a share option, enter a description of the strategy (the description is optional), and press Enter.
   The Recovery Strategy Options panel appears.

3. Type O (Online) or B (Batch) in the Analyze Online or Batch field, set the other strategy options as needed, enter a data set name, and press Enter.
   **Note:** The message "Online/Batch switch" appears when you change the value in the Analyze Online or Batch field. This message indicates that you are switching between batch and online mode. Press Enter to continue.
   If you specified batch analysis, the Generate JCL to Intrdr or DSN window appears. Go to Step 4.
   If you specified online analysis, the Percent Complete window appears. Skip to Step 5.

4. Enter a data set name for the JCL, select a value for the override errors option, and press Enter.
   The Percent Complete window appears.

5. Review the Check Pending Spaces panel, if it appears, and press PF3 (End).
   If the RI resolves successfully, the JCL generates. The Recovery Strategy Services panel reappears with a message indicating that the strategy version has been saved. The version appears on the panel, indented below its strategy name. You can now review or submit the JCL.
   If another problem occurs with the recovery, the Selected Recovery Point Error panel appears. Go to Step 6.

6. Review the Selected Recovery Point Error panel, if it appears, and press Enter.
   The Percent Complete window appears. When the analysis is complete, the Recovery Strategy Services panel reappears. A message indicates that the strategy version has been saved. The version appears on the panel, indented below its strategy name. You can now review or submit the JCL.
More information:

Review the Recovery JCL (see page 67)
Submit the Recovery JCL (see page 68)
Recovery Point Error Overview (see page 169)
Chapter 9: Recovering a DASD Volume

This section contains the following topics:

- Recover a DASD Volume (see page 87)
- Review the DASD Recovery JCL (see page 89)
- Submit the DASD Recovery JCL (see page 89)

Recover a DASD Volume

You can recover a DASD volume.

Follow these steps:

1. Type 3 (System Recovery Options) on the Main Menu and press Enter.
   The System Recovery Options panel appears.
2. Type 1 (Recover DB2 DASD Volume) in the option line and press Enter.
   A window appears, prompting you for volume information.
3. Enter the volume information and press Enter.
   If you entered Y for Volume list, the Select MVS VOLSER to Recover window appears. Go to Step 4.
   If you entered N for Volume list, the Scan Type Selection window appears. Skip to Step 5.
4. Type S next to the volume to recover and press Enter.
   The Scan Type Selection window appears.
5. Select a catalog scanning method.
   Note: For detailed descriptions and best practices for scanning, see the online help.
   Press Enter.
   CA Recovery Analyzer scans the volume. If it detects unrecoverable objects, an image copy warning window appears. Go to Step 6.
   If it detects DB2 subsystem objects or CA Recovery Analyzer objects, an object warning window appears. Exit, follow the instructions in this window, and then return to Step 1.
   Otherwise the Statistics for Volume window appears. Skip to Step 7.
6. Read the message in the image copy warning window, if it appears, and press Enter.

   **Note:** This window indicates that you must make an image copy before the recovery to recover the objects that would otherwise be unrecoverable. CA Recovery Analyzer lets you request an image copy on a subsequent panel before the recovery.

   The Statistics for Volume window appears.

7. Review the statistics for the selected volume and press Enter.

   The Recover DASD Volume panel appears. Because you are recovering an entire DASD volume, all items on the panel are preselected for you.

8. Do one or more of the following actions:
   - Type **S** next to the objects to recover, or remove the **S** from the objects to omit them from the recovery.
     
     **Note:** You can enter STATS to return to the Statistics for Volume window and view updated statistics as items are removed or added to the recovery.
   - Type **D** next to a tablespace to display a list of valid recovery points that you can select.
   - Type **N** in the SCREEN field to display a list of spaces that matched the DB2 naming criteria but were not found in the VTOC table. CA Recovery Analyzer cannot find a space when any of the following conditions are true:
     - The space belongs to a subsystem that cannot be found.
     - The space was added to the subsystem after the last PRA#LOAD was run.
   - Type **O** in the SCREEN field to display a list of non-DB2 data sets found on the volume.
     **Note:** This list is for informational purposes only. Its purpose is to show non-DB2 objects that existed on the pack. The data sets in this list are not recovered.

   Press PF3 (End).

   The Options Selection Menu appears.

9. Set the global recovery options and press PF3 (End).

   The Volume - Recovery Options panel appears.

10. Make the appropriate selections and press PF3 (End).

    The job is submitted for execution. The Percent Complete window appears.

11. Review the Quick Recover - Recovery Point Error panel, if it appears, and press Enter.

    The Percent Complete window appears. The job generates. You can now review or submit the JCL.
More information:

Review the DASD Recovery JCL (see page 89)

Review the DASD Recovery JCL

After you generate the job, you can review the resulting JCL before you submit it for execution.

**Note:** If you entered Y in the Edit Dataset after Generation field when you generated the job, the JCL appears automatically after the job is generated. The following instructions explain how to review the JCL when you do not enter Y in this field.

**Follow these steps:**
1. Access the data set member where you saved the JCL output. You specified this name when you generated the job.
2. View or edit the JCL, then press PF3 (End).
   
   You exit the data set member.

Submit the DASD Recovery JCL

After you generate a job and review the resulting JCL, you can submit the JCL for execution.

**Note:** If you entered S in the Edit Dataset after Generation field when you generated the job, the JCL is automatically submitted for execution. The following instructions explain how to submit the JCL if you did not enter S in this field.

**Follow these steps:**
1. Access the data set member where you saved the JCL output. You specified this name when you generated the job.
2. Type `submit` on the command line and press Enter.
   
   The JCL is submitted.
Chapter 10: Recovering a Storage Group

This section contains the following topics:

Recover a Storage Group (see page 91)
Review the Storage Group Recovery JCL (see page 92)
Submit the Storage Group Recovery JCL (see page 93)

Recover a Storage Group

You can recover the objects in an entire storage group.

Follow these steps:

1. Type 3 (System Recovery Options) on the Main Menu and press Enter.
   The System Recovery Options panel appears.
2. Type 2 (Recover DB2 Storage Group) in the option line and press Enter.
   A window appears, prompting you for storage group information.
3. Enter a storage group, select the analysis mode, and press Enter.
   If you selected online mode, a window appears. This window notifies you that the DB2 catalog is being scanned. Go to Step 4.
   If you selected batch mode, the Options Selection menu appears. Skip to Step 7.
4. Read the message in the warning window, if it appears, and press Enter.
   **Note:** This window indicates that you must make an image copy before the recovery to recover the objects that would otherwise be unrecoverable. CA Recovery Analyzer lets you request an image copy on a subsequent panel before the recovery.
   If CA Recovery Analyzer detects DB2 subsystem objects or CA Recovery Analyzer objects, an object warning window appears. *Exit, follow the instructions in this window, then return to Step 1.*
   Otherwise the Statistics for Storage Group window appears. Go to Step 5.
5. Review the information in the window and press Enter.
   The Recover Storage Group panel appears.
6. Press PF3 (End).
   **Note:** By default, all objects on the panel are selected for recovery. If you delete the S next to an object to omit it from the recovery, press Enter to process your selections before pressing PF3.
   The Options Selection Menu appears.
7. Type 1 (Global Options) and press Enter. 
   The Global Stogroup Options panel appears.
8. Set the appropriate recovery options and press PF3 (End). 
   The Options Selection Menu reappears.
9. Press PF3 (End) again. 
   The Stogroup - Recovery Options panel appears.
10. Make the appropriate selections. 

   **Important!** The Stop & Start Spaces field gives you the option to stop and start 
   spaces using ACCESS (FORCE). This option can compromise the integrity of your 
   data. Use ACCESS (FORCE) only if you understand the implications. 
   Press Enter. 
   The job is submitted for execution. The Percent Complete window appears. 
11. Review the Selected Recovery Point Error panel, if it appears, and press Enter. 
   The Percent Complete window appears. The job generates. You can now review or 
   submit the JCL.

**More information:**

- Review the Storage Group Recovery JCL (see page 92) 
- Submit the Storage Group Recovery JCL (see page 93) 
- Recovery Point Error Overview (see page 169)

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**Review the Storage Group Recovery JCL**

After you generate the job, you can review the resulting JCL before you submit it for 
execution.

**Note:** If you entered Y in the Edit Dataset after Generation field when you generated the 
job, the JCL appears automatically after the job is generated. The following instructions 
explain how to review the JCL when you do not enter Y in this field.

**Follow these steps:**

1. Access the data set member where you saved the JCL output. You specified this 
   name when you generated the job.
2. View or edit the JCL, then press PF3 (End). 
   You exit the data set member.
Submit the Storage Group Recovery JCL

After you generate a job and review the resulting JCL, you can submit the JCL for execution.

**Note:** If you entered S in the Edit Dataset after Generation field when you generated the job, the JCL is automatically submitted for execution. The following instructions explain how to submit the JCL if you did not enter S in this field.

**Follow these steps:**

1. Access the data set member where you saved the JCL output. You specified this name when you generated the job.
2. Type `submit` on the command line and press Enter.
   The JCL is submitted.
Chapter 11: Recovering a Bootstrap Data Set

This section contains the following topics:

- **BSDS Recovery Overview** (see page 95)
- **Recover a Single BSDS** (see page 96)
- **Compare Two BSDS** (see page 97)
- **Recover Both BSDS** (see page 97)
- **Add a Record to the BSDS** (see page 100)
- **Delete a Record from the BSDS** (see page 101)
- **Modify a Record in the BSDS** (see page 102)
- **Change DASD Space on the BSDS** (see page 103)
- **Add and Remove Passwords** (see page 104)
- **Print the Log Map** (see page 104)

**BSDS Recovery Overview**

You can recover a single or dual BSDS. The CA Recovery Analyzer Recover Bootstrap Datasets (BSDS) option lets you select recovery and function options before generating the JCL needed to recover the BSDS.

You can also perform the following tasks:

- Add, modify, or delete records in the BSDS.
- Add or remove passwords from the data set.
- Reallocate the BSDS size.
- Print the log map.

Normally, you do not need to update the BSDS because DB2 updates it automatically. However, you might want to change the BSDS for the following reasons:

- To create or cancel conditional restart records
- To add or relocate active logs
- To recover a damaged BSDS

**Important!** Use these options with caution. They can override the efforts of DB2 to maintain data consistency. Do not use these options unless you understand the consequences of what you are doing.
Recover a Single BSDS

You can recover a single bootstrap data set that has failed. This option assumes that you are running in single bootstrap data set mode and want to return to dual mode. When you select this option, it generates the commands to copy the contents of the good BSDS to a new data set. If DB2 is active, CA Recovery Analyzer generates a DB2 RECOVER BSDS statement. If DB2 is inactive, CA Recovery Analyzer generates a DSNJU003 NEWLOG statement.

Follow these steps:

1. Type 3 (System Recovery Options) on the Main Menu and press Enter.
   The System Recovery Options panel appears.
2. Type 3 (Recover Bootstrap Datasets) and press Enter.
   The Subsystem/Coupling Facility BSDS List appears.
3. Type S next to the subsystem or coupling facility to process. You can select only one. Press Enter.
   The Bootstrap Dataset Recovery window appears.
4. Type 1 (Recover Single Bootstrap Dataset) and press Enter.
   The Single BSDS Recovery window appears.
5. Make your selections and press Enter.
   If you indicated that the DB2 subsystem is active, then a different Single BSDS Recovery window appears. Go to Step 6.
   If you indicated that the DB2 subsystem is inactive, then the Generation Panel appears. You can now specify the processing options to generate the JCL and submit the job.

   **Note:** CA Recovery Analyzer overwrites the failed active log with the good one. If you accidentally specify that the good active log has failed, it is overwritten by the failed one. CA Recovery Analyzer lets you recover from this error by renaming the log from `dsn` to `dsn.PTPRA` before overwriting it. If you overwrite the wrong log, rename `dsn.PTPRA` back to the active log and try again.

6. Select a recovery option and press Enter.
   The Generation Panel appears. You can now specify the processing options to generate the JCL, and submit the job.
Compare Two BSDS

You can compare the two bootstrap data sets before recovering. This comparison lets you determine where the error occurred, but comparing them is not required. SUPERC performs the comparison.

Follow these steps:
1. Type 3 (System Recovery Options) on the Main Menu and press Enter.
   The System Recovery Options menu appears.
2. Type 3 (Recover Bootstrap Datasets) and press Enter.
   The Subsystem/Coupling Facility BSDS List appears.
3. Type S next to a subsystem to process that subsystem/coupling facility. You can select only one. Press Enter.
   The Bootstrap Dataset Recovery window appears.
4. Type 8 (Print Log Map) and press Enter.
   The Print / Compare BSDS window appears.
5. Type 2 (Compare 2 Bootstrap Datasets) and press Enter.
   The Compare 2 Bootstrap Datasets window appears.
6. Enter the names of the data sets to compare. Press Enter.
   The Generation Panel appears. You can now specify the processing options to generate the JCL, and submit the job.

   Note: For more information about this panel, see the “Performing the Recovery Analysis” chapter.

Recover Both BSDS

You can recover both bootstrap data sets. This option assumes that you do not have an active bootstrap data set and want to return to dual mode.

You need the following information:

- **Archive number** (see page 99)
- **Start and end RBAs of the active log** (see page 104)

When you generate the JCL, CA Recovery Analyzer inserts a DSNJU003 NEWLOG statement. This statement invokes the Change Log Inventory Utility to modify the BSDS.
Follow these steps:

1. Type 3 (System Recovery Options) on the Main Menu and press Enter.
   The System Recovery Options menu appears.
2. Type 3 (Recover Bootstrap Datasets) and press Enter.
   The Subsystem/Coupling Facility BSDS List appears.
3. Type S next to a subsystem to process that subsystem/coupling facility. You can select only one. Press Enter.
   The Bootstrap Dataset Recovery window appears.
4. Type 2 (Recover Both Bootstrap Datasets) and press Enter.
   The Dual BSDS Recovery window appears.
5. Complete the fields in this window and press Enter.
   The Generation Panel appears. You can now specify the processing options to generate the JCL, and submit the job.

   Note: For more information about this panel, see the “Performing the Recovery Analysis” chapter.
Determine the Archive Number

The archive that you specify in the Dual BSDS Recovery window is used to supply an earlier version of the BSDS. Use the most current archive log that has a good BSDS. Bootstrap data sets do not have log records for the log with which they are associated. Therefore, an archive log record is added to the BSDS using the archive information requested.

Various methods exist to determine the number of the most recently used archive. Three methods are described here.

To determine the archive number, perform one of the following actions:

- Determine the archive number by looking at the master job of the DB2 subsystem for which you are performing a recovery. Search for the last DSNJ003I message in the job. This message contains the name of the archive log created most recently. The archive number is the last seven digits of the data set name. If no archive logs have been written since the DB2 subsystem came up, the master job does not contain a DSNJ003I message.

- Determine the archive number using LISTCAT. Perform a catalog listing of all data sets that begin with the archive prefix. If the archive logs are cataloged, you get a list of the logs. The archive number is the last seven digits of the data set name.

- Determine the archive number using the console log. Look in the console log for the most recent DSNJ003I message for the subsystem in question. The console log can store messages from several different DB2 subsystems. Be sure that the message applies to the correct subsystem. The archive number is the last seven digits of the data set name.

Because these methods are not foolproof, consider using a guide log to track the most recent archive log name. The system operator can make a log entry every time the active log is archived.
Add a Record to the BSDS

This section explains how to add a record to the BSDS. You can add a new active log, a new archive log, or a conditional restart record. Adding records to the BSDS lets you keep it synchronized with a new log data set you have added.

When you generate the JCL, CA Recovery Analyzer inserts a DSNJU003 statement. This statement invokes the Change Log Inventory Utility to modify the BSDS. If you add a new active or archive log data set, CA Recovery Analyzer inserts a DSNJU003 NEWLOG statement. If you add a conditional restart record, it inserts a DSNJU003 CRESTART CREATE statement.

Follow these steps:
1. Type 3 (System Recovery Options) on the Main Menu and press Enter.
   The System Recovery Options menu appears.
2. Type 3 (Recover Bootstrap Datasets) and press Enter.
   The Subsystem/Coupling Facility BSDS List appears.
3. Type S next to a subsystem to process that subsystem/coupling facility. You can select only one. Press Enter.
   The Bootstrap Dataset Recovery window appears.
4. Type 3 (Add a Record to BSDS) and press Enter.
   The Add Record to BSDS window appears.
5. Select a record type and press Enter.
   If you selected Add New Active Log, the Add Active Log to BSDS window appears.
   If you selected Add New Archive Log, the Add Archive Log to BSDS window appears.
   If you selected Add Conditional Restart, the Add Conditional Restart window appears.
6. Complete the fields in the window and press Enter.
   The Generation Panel appears. You can now specify the processing options to generate the JCL, and submit the job.

   Note: For more information about this panel, see the “Performing the Recovery Analysis” chapter.
Delete a Record from the BSDS

After an archive log is obsolete, you can delete the archive log data set. (When you delete the data set, you can maintain data integrity by also deleting its BSDS record.) You can also delete an active log and cancel a conditional restart record or a checkpoint restart record using this option.

When you generate the JCL, CA Recovery Analyzer inserts a DSNJU003 statement. This statement invokes the Change Log Inventory Utility to modify the BSDS. If you delete a new active or archive log data set, CA Recovery Analyzer inserts a DSNJU003 DELETE statement. If you cancel a conditional restart record, it inserts a DSNJU003 CRESTART CANCEL statement. If you cancel a checkpoint restart, it inserts a CHECKPT CANCEL statement.

Follow these steps:

1. Type 3 (System Recovery Options) on the Main Menu and press Enter.
   The System Recovery Options menu appears.
2. Type 3 (Recover Bootstrap Datasets) and press Enter.
   The Subsystem/Coupling Facility BSDS List appears.
3. Type S next to a subsystem to process that subsystem/coupling facility. You can select only one. Press Enter.
   The Bootstrap Dataset Recovery window appears.
4. Type 4 (Delete a Record from BSDS) and press Enter.
   The Delete Record from BSDS window appears.
5. Select an option and press Enter.

   If you selected Delete Archive Log from BSDS, the Archive Log List panel appears. Go to Step 6.

   If you selected Delete Active Log from BSDS, the Delete Active Log window appears. Skip to Step 7.

   If you selected Cancel Checkpoint Restart, the Cancel Checkpoint Restart window appears. Skip to Step 7.

   If you selected Cancel Conditional Restart, the Generation Panel appears. You can now specify the processing options to generate the JCL, and submit the job.

6. Type S next to an archive log to select that archive log for processing and press Enter. Only one archive log can be selected at a time.

   The Delete Archive Log from BSDS window appears.
Modify a Record in the BSDS

You can modify the highest written log RBA in the active or an archived log data set. You can also update the checkpoint queue or the DDF (Distributed Data Facility) location, logical unit, and password value in the bootstrap data set. Finally, you can alter the DB2 catalog VSAM name.

When you generate the JCL, CA Recovery Analyzer inserts a DSNJU003 statement. This statement invokes the Change Log Inventory Utility to modify the BSDS. If you opt to modify the high RBA in the BSDS, CA Recovery Analyzer inserts a DSNJU003 HIGHRBA statement. If you opt to modify the DDF record, it inserts a DSNJU003 DDF statement. If you opt to modify the checkpoint restart record, it inserts a DSNJU003 CHECKPT statement.

Follow these steps:

1. Type 3 (System Recovery Options) on the Main Menu and press Enter.
   The System Recovery Options menu appears.
2. Type 3 (Recover Bootstrap Datasets) and press Enter.
   The Subsystem/Coupling Facility BSDS List appears.
3. Type 5 next to a subsystem to process that subsystem/coupling facility. You can select only one. Press Enter.
   The Bootstrap Dataset Recovery window appears.
4. Type 5 (Modify a Record in BSDS) and press Enter.
   The Modify Record in BSDS window appears.
5. Select an option and press Enter.
   - If you selected Modify High RBA in BSDS, the Modify High RBA Record window appears.
   - If you selected Modify DDF / Communication, the Modify DDF Record window appears.
   - If you selected Modify Checkpoint Restart, the Modify Checkpoint Restart window appears.
   - If you selected Alter VSAM Catalog, the Modify VSAM Catalog window appears.
6. Complete the fields in the window and press Enter.
   The Generation Panel appears. You can now specify the processing options to generate the JCL, and submit the job.
   
   **Note:** For more information about this panel, see the “Performing the Recovery Analysis” chapter.

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**Change DASD Space on the BSDS**

This section explains how to change the DASD space on the BSDS. If you want the bootstrap to hold more archives, you can increase the size of the BSDS. For example, you can change the size from 700 archive logs to 800 archive logs.

**Follow these steps:**

1. Type 3 (System Recovery Options) on the Main Menu and press Enter.
   The System Recovery Options menu appears.

2. Type 3 (Recover Bootstrap Data Sets) and press Enter.
   The Subsystem/Coupling Facility BSDS List appears.

3. Type S next to a subsystem to process that subsystem/coupling facility. You can select only one. Press Enter.
   The Bootstrap Dataset Recovery window appears.

4. Type 6 (Change DASD Space on BSDS) and press Enter.
   The Reallocate BSDS DASD Space window appears.

5. Complete the fields in the window and press Enter.
   The Generation Panel appears. You can now specify the processing options to generate the JCL, and submit the job.
   
   **Note:** For more information about this panel, see the “Performing the Recovery Analysis” chapter.
Add and Remove Passwords

You can add or remove passwords on archive log data sets, the system directory (DSNDB01), and the system catalog (DSNDB06).

When you generate the JCL, CA Recovery Analyzer inserts a DSNJU003 statement. This statement invokes the Change Log Inventory Utility to modify the BSDS. If you alter the archive log password, CA Recovery Analyzer inserts a DSNJU003 ARCHIVE statement. If you alter a system password, it inserts a DSNJU003 SYSTEMDB statement.

Follow these steps:

1. Type 3 (System Recovery Options) on the Main Menu and press Enter.
   The System Recovery Options menu appears.
2. Type 3 (Recover Bootstrap Data Sets) and press Enter.
   The Subsystem/Coupling Facility BSDS List appears.
3. Type S next to a subsystem to process that subsystem/coupling facility. You can select only one. Press Enter.
   The Bootstrap Dataset Recovery window appears.
4. Type 7 (Add / Remove Passwords) and press Enter.
   The Add / Remove Passwords window appears.
5. Select an option and press Enter.
   If you selected Archive Log Dataset Passwords, the Archive Log Dataset Password window appears.
   If you selected DSNDB01/DSNDB06 Database Passwords, the Database DSNDB01/DSNDB06 Password window appears.
6. Complete the fields in the window and press Enter.
   The Generation Panel appears. You can now specify the processing options to generate the JCL, and submit the job.
   **Note:** For more information about this panel, see the “Performing the Recovery Analysis” chapter.

Print the Log Map

You can print the log map for a bootstrap data set. The log map contains the following information:

- Log data set names and log RBA associations for both copies of the active and archived log data sets
- Passwords for those data sets
Chapter 11: Recovering a Bootstrap Data Set

- Status of all conditional restart records in the BSDS
- Contents of the queue of checkpoint records in the BSDS
- DDF communication record in the BSDS, if it exists
- Contents of quiesce history record

When you generate the JCL, CA Recovery Analyzer inserts a DSNJU004 statement. This statement invokes the Print Log Map Utility.

Follow these steps:

1. Type 3 (System Recovery Options) on the Main Menu and press Enter.
   The System Recovery Options menu appears.
2. Type 3 (Recover Bootstrap Datasets) and press Enter.
   The Subsystem/Coupling Facility BSDS List appears.
3. Type 5 next to a subsystem to process that subsystem/coupling facility. You can select only one. Press Enter.
   The Bootstrap Dataset Recovery window appears.
4. Type 8 (Print Log Map) and press Enter.
   The Print / Compare BSDS window appears.
5. Type 1 (Print Bootstrap Dataset) and press Enter.
   The Print Bootstrap Dataset window appears.
6. Enter the name of the dataset that contains the BSDS to print. Press Enter.
   The Generation Panel appears. You can now specify the processing options to generate the JCL, and submit the job.

Note: For more information about this panel, see the “Performing the Recovery Analysis” chapter.
Chapter 12: Recovering Log Data Sets

This section contains the following topics:

Recover an Active Log Data Set (see page 107)
Recover an Archive Log Data Set (see page 108)
Change the Active Log DASD Space (see page 109)
Print the Recovery Log (see page 109)

Recover an Active Log Data Set

This section describes how to recover the active log data set.

Follow these steps:

1. Type 3 (System Recovery Options) on the Main Menu and press Enter.
   The System Recovery Options menu appears.
2. Type 4 (Recover Log Datasets) and press Enter.
   The Log Dataset Recovery window appears.
3. Type 1 (Recover Active Log Dataset) and press Enter.
   The Active Log Dataset Recovery window appears.
4. Complete the fields in the window.
   
   **Note:** The Failing Active Log Copy field lets you specify which log copy failed. CA Recovery Analyzer generates JCL to replace the failed log copy with the good one. If you accidentally replace the good log copy with the failed one, you can recover from this error. Before CA Recovery Analyzer replaces the log copy, it renames the specified active log from *dsn* to *dsn.PTPRA*. If you specified the wrong active log, rename *dsn.PTPRA* back to the active log and try again.

   Press Enter.

   The Generation Panel appears. You can now specify the processing options to generate the JCL, and then submit the job.
Recover an Archive Log Data Set

This section describes how to recover the archive log data set.

Follow these steps:

1. Type 3 (System Recovery Options) on the Main Menu and press Enter.
   The System Recovery Options menu appears.
2. Type 4 (Recover Log Datasets) and press Enter.
   The Log Dataset Recovery window appears.
3. Type 2 (Recover Archive Log Dataset) in the Option line. If you want to view a list of archive log data sets, also type Y in the Log List field. Press Enter.
   If you entered Y in the Log List field, the Archive Log List panel appears. Go to Step 4.
   If you did not enter Y in the Log List field, the Archive Log Recovery window appears. Skip to Step 5.
4. Type S next to an archive log to select that archive log for processing.
   Note: You can select only one log.
   Press Enter.
   The Archive Log Recovery window appears.
5. Specify the following values:
   - The archive log prefix
   - The failing archive log number (which can be found in the DB2 master job log)
   - The failing archive log copy
   - The medium on which you want the new archive log (if you want the new archive log cataloged)
   Press Enter.
   The Generation Panel appears. You can now specify the processing options to generate the JCL, and submit the job.

To complete the archive log recovery, add the new archive data set records to BSDS. (The lower portion of the Archive Log Recovery window reminds you.) This step cannot be performed automatically because the VOLSER where the archive log resides is unknown. You can determine this VOLSER after the archive log is recovered.

More information:

Add a Record to the BSDS (see page 100)
Change the Active Log DASD Space

This section describes how to reallocate the active log DASD space. Reallocating space can be helpful in the following situations:

- If the active log runs out of space before it is archived, you can make the space larger.
- If you consistently have extra space and DASD space is constrained, you can reduce the space allocation.
- You can move the log data set to another volume.

Follow these steps:

1. Type 3 (System Recovery Options) on the Main Menu and press Enter. The System Recovery Options menu appears.
2. Type 4 (Recover Log Datasets) and press Enter. The Log Dataset Recovery window appears.
3. Type 3 (Change DASD Space on Active Log) and press Enter. The Reallocate Active Log DASD Space window appears.
4. Complete the fields and press Enter. The Generation Panel appears. You can now specify the processing options to generate the JCL, and submit the job.

Note: For more information about this panel, see the “Performing the Recovery Analysis” chapter.

Print the Recovery Log

This section describes how to print the recovery log. This option generates a call to the DB2 DSN1LOGP utility. This option produces a formatted summary or detailed report on the contents of the recovery log. The recovery log contents are useful in the following situations:

- To retrieve information about each archive log data set
- To review the DDF communication record or conditional restart control records
- To scan the log for a particular type of information
**Follow these steps:**

1. Type **3** (System Recovery Options) on the Main Menu and press Enter.
   The System Recovery Options menu appears.

2. Type **4** (Recover Log Datasets) and press Enter.
   The Log Dataset Recovery window appears.

3. Type **4** (Print Recovery Log) and press Enter.
   The Print Recovery Log window appears.

4. Define the BSDS data set name, and starting and ending RBA. Enter other options to customize the report as needed. Press Enter.
   The Generation Panel appears. You can now specify the processing options to generate the JCL, and submit the job.

   **Note:** For more information about this panel, see the “Performing the Recovery Analysis” chapter.
Chapter 13: Recovering DB2 Subsystems

This section contains the following topics:

- Recover the DB2 Catalog (see page 111)
- Review the DB2 Catalog Recovery JCL (see page 112)
- Submit the DB2 Catalog Recovery JCL (see page 112)
- Reallocate the Temporary Database (see page 113)
- Recover CA Recovery Analyzer Spaces (see page 113)
- Review the Space Recovery JCL (see page 114)
- Submit the Space Recovery JCL (see page 115)

Recover the DB2 Catalog

If the DB2 catalog and directory become corrupted, you can recover them.

**Note:** You cannot recover the catalog and directory to the last full image copy unless CA Recovery Analyzer created the image copy.

**Follow these steps:**

1. Type 3 (System Recovery Options) in the Main Menu and press Enter.
   The System Recovery Options panel appears.
2. Type 5 (Recover DB2 Subsystem) and press Enter.
   The DB2 Subsystem Recovery window appears.
3. Type 1 (Recover DB2 Catalog) and press Enter.
   The Recover DB2 Catalog panel appears.
4. Select the spaces to include in the DB2 catalog recovery. You can use any of the following methods:
   - Type an **S** in the CMD field next to each space to include.
   - Type **ALL** in the command line to select all tablespaces and indexspaces.
   - Type **SPACES** in the command line to select all tablespaces.
   - Type **INDEXES** in the command line to select all indexspaces.
   - Type **RESET** in the command line to remove all tablespaces and indexspaces from selection.

Press PF3 (End).
The Options Selection Menu appears.
5. Type **1** (Global Options) and press Enter.
The Global Catalog Recovery Options panel appears.

6. Make your selections and press PF3 (End).
The Options Selection Menu reappears.

7. Press PF3 (End).
The Catalog Recovery - Review Objects panel appears.

8. Review the list of selected objects and press PF3 (End).
The Job Built Via Catalog Recovery window appears.

9. Complete the fields in this panel and press Enter.
The Percent Complete window appears.

10. Review the Selected Recovery Point Error panel, if it appears, and press Enter.
The Percent Complete window appears. The job generates. You can now review or submit the JCL.

---

**Review the DB2 Catalog Recovery JCL**

After you generate the job, you can review the resulting JCL before you submit it for execution.

*Note:* If you entered Y in the Edit Dataset after Generation field when you generated the job, the JCL appears automatically after the job is generated. The following instructions explain how to review the JCL when you do not enter Y in this field.

**Follow these steps:**

1. Access the data set member where you saved the JCL output. You specified this name when you generated the job.

2. View or edit the JCL, then press PF3 (End).

   You exit the data set member.

---

**Submit the DB2 Catalog Recovery JCL**

After you generate a job and review the resulting JCL, you can submit the JCL for execution.

*Note:* If you entered S in the Edit Dataset after Generation field when you generated the job, the JCL is automatically submitted for execution. The following instructions explain how to submit the JCL if you did not enter S in this field.
Follow these steps:
1. Access the data set member where you saved the JCL output. You specified this name when you generated the job.
2. Type submit on the command line and press Enter.
   The JCL is submitted.

Reallocate the Temporary Database

DB2 uses DSNDB07 internally as a workspace and sort space. You can use the Reallocate Temp Database option to delete the database from a failing device and define it to another device, or to resize the database.

Follow these steps:
1. Type 3 (System Recovery Options) in the Main Menu and press Enter.
   The System Recovery Options panel appears.
2. Type 5 (Recover DB2 Subsystem) and press Enter.
   The DB2 Subsystem Recovery window appears.
3. Type 2 (Reallocate Temp Database) and press Enter.
   The Reallocate Temporary Database (DSNDB07) window appears.
4. Make your selections and press Enter.
   The Generation Panel appears. You can now specify the processing options to generate the JCL, and submit the job.
   Note: For more information about this panel, see the “Performing the Recovery Analysis” chapter.

Recover CA Recovery Analyzer Spaces

When the CA Recovery Analyzer data sets reside on a failing device, you can use the Recover CA Recovery Analyzer option to recover the tablespaces and indexspaces in those data sets.

Follow these steps:
1. Type 3 (System Recovery Options) in the Main Menu and press Enter.
   The System Recovery Options panel appears.
2. Type 5 (Recover DB2 Subsystem) and press Enter.
   The DB2 Subsystem Recovery window appears.
3. Type 3 (Recover CA Recovery Analyzer) and press Enter.
   The Recover PRA Spaces panel appears.

4. Type an S in the CMD field next to each tablespace and indexspace to recover.
   Selecting a tablespace automatically includes all the tables in the space.
   **Note:** You can also type **ALL** on the command line to select all objects on the panel.
   Press PF3 (End).
   The Options Selection Menu appears.

5. Set your recovery options. Press PF3 (End).
   The Spaces Recovery - Review Objects panel appears.

6. Review the list of selected objects and press PF3 (End).
   The Job Built Via PRA Spaces Recovery window appears.

7. Enter the necessary values on this panel.
   **Important!** The Stop & Start Spaces field gives you the option to stop and start spaces using ACCESS (FORCE). This option can compromise the integrity of your data. Use ACCESS (FORCE) only if you understand the implications.
   Press Enter.
   The Percent Complete window appears.

8. Review the Selected Recovery Point Error panel, if it appears, and press Enter.
   The Percent Complete window appears. The job generates. You can now review or submit the JCL.

**More information:**

- [Review the Space Recovery JCL](page 114)
- [Submit the Space Recovery JCL](page 115)
- [Set Global Recovery Options for All Spaces in a Strategy](page 56)
Follow these steps:

1. Access the data set member where you saved the JCL output. You specified this name when you generated the job.
2. View or edit the JCL, then press PF3 (End).
   You exit the data set member.

Submit the Space Recovery JCL

After you generate a job and review the resulting JCL, you can submit the JCL for execution.

Note: If you entered S in the Edit Dataset after Generation field when you generated the job, the JCL is automatically submitted for execution. The following instructions explain how to submit the JCL if you did not enter S in this field.

Follow these steps:

1. Access the data set member where you saved the JCL output. You specified this name when you generated the job.
2. Type submit on the command line and press Enter.
   The JCL is submitted.
Chapter 14: Performing the Recovery Analysis

This section contains the following topics:

*Recovery Analysis Overview* (see page 117)

*Submit Batch Jobs Using Batch Processor* (see page 117)

Recovery Analysis Overview

After you build a recovery scenario, you must perform a recovery analysis. The analysis process produces code that you can submit to JES or to the Batch Processor.

Submit Batch Jobs Using Batch Processor

Some functions let you generate Batch Processor statements instead of JCL. For example, on the following panel, you can generate Batch Processor statements for broken page recovery:

```
PRBRKO  ------  PRA Broken Page Recover Options  ------  SCROLL  ------  CSR
COMMAND  ===>  DB2 SSID  ===>  Dxxx

----------------------------------------------------------------------------- USER02

Recovery Analyzer Job Generation Options:

Generate PBP or JCL  ===>  B  (Batch processor/Jcl)
Edit Dataset after Generation  ===>  Y  (Yes/No/no and Submit)
Utility ID  ===>  USER  (text/USER/STRAT)
Dataset Name  ===>  'USER02.PRA.WORK(BROKENPG)'

Jobcard Specification:

=> //USER02B JOB (12060,230), 'Userxx', CLASS=A,
=> // MSGCLASS=X,MSGLEVEL=(1,1),REGION=4096K
=> /*JOBPARM ROOM=57
=> /*
```
Follow these steps:

1. Type B (Batch Processor) in the appropriate field on the product panel and press Enter.
   The Batch Processor Interface panel appears.

2. Type B in the Execution Mode field, change any other settings as needed, and press Enter.
   The CA Batch JCL Specification panel appears.

3. Type MJPRA in the Model Member field and change any other settings as needed.
   Note: Specify JCL model member MJPRA for all CA Recovery Analyzer batch jobs. Other CA DB2 products do not use model MJPRA.
   Press Enter.
   The batch job generates.

Note: For more information about using the Batch Processor, see the CA Database Management Solutions for DB2 for z/OS Batch Processor Reference Guide.
Chapter 15: Disaster Recovery

This section contains the following topics:

- Disaster Recovery Overview (see page 119)
- How to Prepare for Disaster Recovery (see page 121)
- How to Perform Disaster Recovery (see page 131)

Disaster Recovery Overview

Disaster recovery consists of backing up and restoring your DB2 subsystem and user data at a local or remote site after a subsystem crash. The goal is to restore as much data as possible, using as few resources as possible.

CA Recovery Analyzer uses the archive log method to perform disaster recovery. This method rebuilds the subsystem by using archive logs and image copies that are copied and shipped to the remote recovery site. This method minimizes data loss because you lose only those changes that were made after the RBA of the last archive log. This method can be used at sites that require uninterrupted DB2 operation.
The archive log method minimizes your data loss when backups are performed frequently. Consider the following scenario. Your installation backs up archive logs every night at 10:00 p.m., and the system goes down on Friday at 5:00 p.m. You lose data only from the Thursday night backup to the crash on Friday:

![Diagram showing data loss and backup schedule]

**Notes:**
- The archive log method is used only with DB2 systems. This method does not recover data from other systems, such as IMS and IDMS. This method is also not intended to recover data from non-DB2 controlled VSAM files.
- CA Recovery Analyzer previously supported an alternate method that was known as the *active log method*. This method is no longer supported because it can result in significant data loss. You lose any data changes that were made after the last backup of the BSDS and active logs. Also, this method requires significant downtime, which makes it impractical for sites requiring 24-hour DB2 availability.
How to Prepare for Disaster Recovery

As a database administrator, you are expected to ensure that your team can perform a disaster recovery. The ability to recover quickly from any DB2 database outage—software problems, user error, hardware error, site disaster—is critical. CA Recovery Analyzer can simplify your disaster recovery preparations by generating the backup JCL and the restore JCL to perform most of the work for you. Automating the backup and recovery process can greatly reduce time, effort, and human error.

This scenario explains how to prepare for disaster recovery (DR). Specifically, it explains how to use CA Recovery Analyzer to back up a DB2 subsystem and its user data. This process also generates the JCL to restore the subsystem and user data at a recovery site. This scenario does not explain how to back up the operating system or any non-DB2 systems and software.

Note: This scenario assumes that you plan to use CA Recovery Analyzer to restore the DB2 subsystem and user data (see page 131). This scenario also assumes that you have a separate plan to back up (and restore) the operating system.

Important! These instructions do not provide an in-depth review of disaster recovery. These instructions also do not discuss every possible way to prepare for disaster recovery. We assume that you are familiar with disaster recovery concepts and requirements. You are responsible for verifying that your disaster recovery plan adheres to all required compliance standards. You are also responsible for testing your disaster recovery plan and verifying that it works as intended.

The following illustration shows how a database administrator can use CA Recovery Analyzer to prepare for disaster recovery:
Important! Perform these steps frequently to keep your backups current and minimize data loss.

To prepare for disaster recovery, the database administrator performs the following steps.

1. **Back up the user data** (see page 122).
2. **Back up the DB2 subsystem and create the restore JCL** (see page 124).
3. **Store the backups and the restore JCL** (see page 130).

### Back Up the User Data

Create regular image copies that match your database processing schedules. These steps explain how to use a CA Recovery Analyzer strategy to create these image copies. The same strategy can be used to recover the data at your recovery site. When reanalyzing the strategy, request recovery jobs instead of backup jobs.

**Note:** These instructions assume that you have already identified the tablespaces and indexspaces to back up.

**Follow these steps:**

1. Select Strategy Services on the Main Menu and press Enter.
2. Type **C** (Create) in the O field on the first line. Enter a name for the strategy and, optionally, a description. Press Enter.
3. Select the tablespaces to include in the strategy:
   a. Type **A** (Autobuild) next to Table, LOB, or XML Space to automatically include all of those objects that meet your selection criteria.  
      **Note:** Objects can be dynamically created and dropped at any time. The autobuild option automatically includes new objects and excludes dropped objects.
   b. Use the Specify Object Selection Criteria section of the panel to filter the objects.  
      Press Enter.
   
   The Strategy Recovery - Review Objects panel appears, showing the objects that match your criteria.
4. Select the indexspaces to include in the strategy:
   a. Type **A** (add object after) or **B** (add object before) as a line command. Press Enter.
   
   You return to the Create Recovery Strategy panel.
b. Type A (Autobuild) next to Indexspace.

c. Use the Specify Object Selection Criteria section to filter the objects.

Press Enter.

The Strategy Recovery - Review Objects panel reappears, showing the objects that match your criteria.

5. Select your strategy options:

■ Specify whether to generate multiple image copy jobs in the Multiple Job Option field. Generating multiple jobs lets you use parallel processing, which can reduce elapsed processing time.

■ If you request multiple jobs, enter a job number for each strategy line in the Job # field.

■ Type Y in the Review Options field so that you can set the analysis options.

Press Enter.

The Options Selection Menu appears.


7. Set the global recovery options:

■ Recovery Point—N (No, do not perform a recovery.)

■ Recover Via Logonly—N (No, do not recover by using Logonly processing.)

■ Image Copy Before—Y (Yes, take an image copy before starting recovery.)

■ Image Copy After—N (No, do not take an image copy after the recovery completes.)

■ Image Copy Retain—Y (Yes, place all image copies on one tape.)

Press F3 (End).

8. Press F3 (End) again until you return to the Recovery Strategy Services panel.

The new strategy appears in the list.

9. Analyze the strategy by typing A next to it, pressing Enter, and following the prompts.

**Note:** Each time that you analyze a strategy, the analysis is saved as a version of the strategy. The versions appear beneath the strategy, ordered from least recent to most recent.

The Recovery Strategy Services panel reappears, showing the new strategy version. This version contains the JCL to create image copies of the specified objects.

10. Submit the JCL by typing S next to the strategy version, pressing Enter, and following the prompts.

The image copies of the user data are created.
Back Up the DB2 Subsystem and Create the Restore JCL

Backing up a DB2 subsystem consists of creating a transportable package that contains copies of the DB2 subsystem libraries, catalog, directory, and archive logs.

Follow these steps:
1. Specify the subsystem data to back up (see page 124).
2. Generate the backup JCL (see page 127).
3. Back up the data and generate the restore JCL for this data (see page 130).

Specify the Subsystem Data to Back Up

Create a disaster recovery strategy that specifies which subsystem data to back up. You can back up the DB2 catalog and directory, the archive logs, and the BSDS data sets. You can also back up other libraries that are needed for disaster recovery. For example, you can back up the JCL library, data sets with SQL statements, and IDCAMS commands. You can also back up other items that are not on the first load of data sets to restore at the recovery site. You can also copy the PTDB, which is the CA Technologies product suite database.

Note: For more information about the fields on each panel, see the online help.

Follow these steps:
1. Select Disaster Recovery on the Main Menu and press Enter.
2. Type C (Create) in the O field on the first line.
   
   Note: This procedure focuses on creating a strategy. However, you can also use this panel to update and delete existing strategies.

   Enter a name and description for the strategy and press Enter.

   The Disaster Recovery - Review Objects panel appears, showing all objects that are included in the strategy.

3. Specify the data sets to include in the disaster recovery. Fields are provided for you to enter the DB2 system libraries, the QMF libraries, and so on. You can delete and insert lines as needed by using the D (Delete), I (Insert), and Inn (Insert nn) commands in the CMD field.

   The following fields require more explanation:

   New Archive Log Prefix 1 and 2

   Specifies a high-level qualifier for each archive log that is shown. The unique identifier for each log is appended to its qualifier to name the new log to be used at the recovery site.

   Note: Each log requires a unique designation that distinguishes between copy 1 and copy 2. Also, if you are backing up a data sharing group, all members of the group are detected and included in the list of archive logs.
**Backup BSDS Dataset names 1 and 2**

Specifies fully qualified data set names for the BSDS backups.

**Note:** Each BSDS requires a unique designation that distinguishes between BSDS 1 and BSDS 2. You can specify an explicit data name. You can also specify a Generation Data Set (GDG) name.

Review the data sets that you have entered, type Y in the Review Global Options field, and press Enter.

The Disaster Recovery Options panel appears.

4. Set the options for your disaster recovery strategy.

The following fields require more explanation:

**Image Copies used at DR site**

Specifies the type of archive log copies that you intend to use at the disaster recovery site when restoring the subsystem. If you select local copies, the resulting backup JCL specifies LOCALSITE in the RECOVERY control statement. If you select remote copies, the resulting JCL specifies RECOVERYSITE.

**Volume XREF/Skip DNS Member**

Specifies the member containing the volume cross-reference to use. This cross-reference associates the volume serial numbers at the local site with the volume serial numbers at the remote site. Associating these numbers gives you the same data set placements when recovering your subsystem.

For a local recovery, specify **NONE**. You do not need a cross-reference.

For a remote recovery, enter the member name directly in this field. You can also enter **S** to generate a selection list of the available volume cross reference/skip DNS members.

**Backup Device Name**

Specifies where to write the backup data set containing the backup JCL. The backed up data and the restore JCL are also written to this device.

**Alias Name for Backup**

Specifies the first qualifier for the backup data set name. The rest of the name is `ssid.PRADR.RECOVERY.JCL`.

**Nbr of Days back**

Specifies how many days worth of archive logs to copy to the backup data set. Use this field only when you have CA Recovery Analyzer make copies of the archive logs. (The Archive Log Copy Options fields on this panel control whether the archive logs are copied.) If your site uses an alternate method to copy the archive logs for the recovery site, enter **1** in this field.
Use which archive logs at DR

Indicates which archive logs you plan to use at the disaster recovery site.

**Note**: If you specify options 1, 2, or E, the archive logs are not copied during the subsystem backup. You are responsible for ensuring that log copies are available at the recovery site.

2 Archive Logs From 1

Specifies whether to create two remote archive logs from a single current archive log. If you have dual archive logging, consider using this option. It is quicker to create two copies from a single log than to create two copies from two separate logs.

Press Enter.

If you specified S in the Volume XREF Member field, the Disaster Recovery Vol Xref panel appears. Go to Step 5.

If you specified NONE in the Volume XREF Member field, the Archive Log Copy Options panel appears. Skip to Step 6.

5. Create a model that specifies the volumes to cross-reference:

   a. Type C (Create) in the O field on the first line. Enter a name for the model and, optionally, a description. Press Enter.

   The Enter Rcvy Site Volumes to XREF Local Site window appears.

   b. Enter the recovery site volume serial identifier next to each volume to recover. Press F3 (End).

   The Disaster Recovery Options panel reappears with the message "Volume XREF Updated."

   c. Press Enter.

   The Archive Log Copy Options panel appears.

6. Specify which log archive copies to create.

   The following fields require more explanation:

   **LP/LB/RP/RB**

   Specifies which archive log copies to create (local primary, local backup, remote primary, remote backup) during the subsystem backup.

   If you specified 1, 2, or E in the Use which archive logs at DR field in Step 4, do not specify any copy types here. You are responsible for ensuring that log copies are available at the recovery site.

   If you specified any other option in the Use which archive logs at DR field, select at least one primary copy (LP or RP).
PLC Cntl Cards

(Optional) Specifies the PDS that contains the CA LogCompress control statements. Complete this field only when you use CA LogCompress to make your offsite copies of the archive logs. (You would have selected CA LogCompress in the Use which archive logs at DR field on the Disaster Recovery Options panel in Step 4.)

Press Enter.

If you entered U in an SMS field, the Archive Log SMS Information window appears. Go to Step 7.

If you did not enter U in an SMS field, the Disaster Recovery - Review Objects panel reappears. Go to Step 9.

7. Specify the SMS class, data, and management parameters for the displayed copy type. Press Enter.

The Archive Log Copy Options panel reappears.

8. Press Enter again.

The Disaster Recovery - Review Objects panel reappears.

9. Press F3 (End).

The Disaster Recovery Services panel reappears. The new strategy appears in the list. You can now use the strategy to generate the backup JCL.

Generate the Backup JCL

Analyze your disaster recovery strategy to create a set of backup members. Each member contains the JCL to back up a portion of your subsystem.

Analyzing your strategy creates the following backup members:

ssid@DNS

(Optional) Generates an ssid#DNS member that contains JCL to clean up the MVS catalog and remove old data sets at the recovery site. This member is not needed when you are performing a local recovery.

ssid@DSN

Backs up the system files, copying any DB2 or system libraries that were specified in the strategy. This member also generates an ssid#DSN member to restore these files.
ssid@CDC

Backs up the DB2 catalog and archives the current active log.

This member also generates the following recovery members: ssid#DBC, ssid#RDC, ssid#PRA, and ssid#ASG. These members build the DB2 catalog structure, restore the catalog contents from the backup, restore CA Recovery Analyzer, and realign the storage group definitions.

ssid@ARC

Backs up the bootstrap data sets and the archive logs. A data sharing environment has one ssid@ARC member for every member in the group.

This member also generates the ssid#ARC and ssid#CAN members to restore these items.

ssid@JCL

Backs up the restore members and saves them to the same data set that contains the @ sign members.

ssid@TPL

(Optional) Creates a list of tapes that are needed for the recovery. The list cross-references the volumes and data set names for you. The list is saved to the data set that you specified on the Disaster Recovery Options panel.

The ssid@TPL member is generated only when you requested a tape pull list on the Disaster Recovery Options panel.

Follow these steps:

1. Select Disaster Recovery on the Main Menu and press Enter.
2. Type A (Analyze) in the O field next to the strategy.
   
   **Note:** If you are backing up a data sharing group, analyze the strategy on the least busy subsystem in the group. This “master” subsystem backs up the DB2 catalog that the group uses and generates JCL to rebuild the catalog structure.

   Press Enter.

   The Disaster Recovery Options panel appears, showing the selections that were made when the strategy was created.

3. Review the selections and press Enter.

   The Archive Log Copy Options panel appears, showing the selections that were made when the strategy was created.

4. Review the selections and press Enter.

   The Disaster Strategy Options panel appears.
5. Specify your job options:
   - Copy DB2 Catalog Tables—Y (to generate the ssid@CDC member)
   - Copy Archive Logs—Y (to generate the ssid@ARC member)
   - MVS Catalog Cleanup—Y or S (to generate the ssid@DNS member)
   - Copy System Datasets—Y (to generate the ssid@DSN member)

   Also specify appropriate values in the remaining fields.

   **Note:** For more information about these fields, see the online help panels.

   **Important!** If you use a GDG base in the Dataset Name field, the GDG causes the
   CNTL library to expand with each run of the strategy. This expansion can cause the
   job to exceed available extents.

   Press Enter.

   If you entered a GDG base in the Dataset Name field, the Disaster Recovery File
   Allocation window appears. Go to Step 6.

   If you did not enter a GDG base, the Disaster Strategy Options panel reappears. Skip
   to Step 7.

6. Change the space allocations for the GDG data sets, if needed, and press Enter.

   The Disaster Strategy Options panel reappears.

7. Press Enter.

   The backup members are generated. They appear on the Disaster Recovery Services
   panel, beneath their disaster strategy.

   **Note:** If you back up a data sharing group, a full set of backup members is
   generated for the "master" subsystem. For the other group members, only
   ssid@CDC, ssid@ACT, and ssid@ARC are generated.

8. (Optional) View the JCL in the data set members or run a CHECK utility on the
   members to verify that they are usable. The members typically do not require
   changes.

   You can now submit the members to back up the subsystem.
Back Up the Data and Generate the Restore JCL

Submit the backup members (the “@ sign” jobs) to back up your subsystem. These members also generate the restore JCL for the subsystem (the “# sign” jobs). A #README member is also generated, containing instructions to follow at the disaster recovery site. The restore JCL and the #README are saved to the same data set as the “@ sign” jobs.

Follow these steps:

1. Select Disaster Recovery on the Main Menu and press Enter.
   The Disaster Recovery Services panel appears, showing your disaster recovery strategy with the backup members beneath it.

2. Type S (Submit) next to each backup member. Press Enter.
   Note: When you submit multiple members simultaneously, CA Recovery Analyzer executes them in the correct order as long as each member uses the same job name. If you use different job names, submit the members individually. Submit them in the following order, and submit all same-named members together (for example, all ssid@CDC members): ssid@DNS, ssid@DSN, ssid@CDC, ssid@ARC, ssid@JCL, ssid@TPL.
   The subsystem is backed up. The restore members are generated and saved to the same data set as the backup members. The #README member is also generated and saved to the data set.

Store the Backups and the Restore JCL

After you back up your subsystem data and generate the restore members, copy the data set and store it in a secure location. Also store the user data at a secure location.

You are now prepared to restore the DB2 subsystem and user data.
How to Perform Disaster Recovery

As a database administrator, you are expected to perform disaster recovery. The ability to recover quickly from any DB2 database outage—software problems, user error, hardware error, site disaster—is critical. The recovery of DB2 subsystem data and application data is complex. CA Recovery Analyzer can simplify the process by generating the JCL to perform much of the recovery work for you. Automating the recovery process can greatly reduce time, effort, and human error.

This scenario explains how to perform disaster recovery (DR). Specifically, it explains how to use CA Recovery Analyzer to restore a DB2 subsystem and its user data, either locally or remotely.

**Note:** This scenario assumes that you have already used CA Recovery Analyzer to back up the DB2 subsystem and user data, and to generate the restore JCL (see page 121). This scenario also assumes that you have already recovered the operating system.

**Important!** These instructions do not provide an in-depth review of disaster recovery. These instructions also do not discuss every possible way to perform disaster recovery. We assume that you are familiar with disaster recovery concepts and requirements. You are responsible for verifying that your disaster recovery plan adheres to all required compliance standards. You are also responsible for testing your disaster recovery plan and verifying that it works as intended.

The following illustration shows how a database administrator can use CA Recovery Analyzer to perform disaster recovery:
Important! Test these procedures often to ensure that your disaster recovery plan works.

To perform disaster recovery, the database administrator performs the following steps:

1. Review the prerequisites (see page 132).
2. Restore the DB2 subsystem (see page 133).
3. Restore the user data (see page 133).
4. Verify the recovery (see page 134).

Prerequisites

Before you follow these instructions to perform a disaster recovery, verify the following items:

- You have the necessary authorizations. See the following recommendations:
  - Verify that you can start and stop DB2 with the various parameters. In particular, verify that you can start DB2 in maintenance mode and in read/write mode. However, verify your ability to use other parameters too.
    
    For example, you may find that you can use this command:
    
    ```bash
    /!ssidSTOP DB2,MODE(FORCE)
    ```
    
    But that you cannot use this command:
    
    ```bash
    /ssidSTOP DB2
    ```
    
    - Verify that you are authorized to use IDCAMS DELETE and IDCAMS DEFINE.
    - Verify that you are authorized to define the SMS classes (storage class, data class, and so on).

- The DB2 subsystem backup and restore JCL that CA Recovery Analyzer generated are available at your recovery site.

- The user data backups are available at your recovery site.

- The operating system has been recovered.
Restore the DB2 Subsystem

You can restore a subsystem at your disaster recovery site by submitting the restore JCL that CA Recovery Analyzer generated for you. CA Recovery Analyzer also generated a #README member and saved it to the same data set as the restore JCL. The #README contains full recovery instructions for your subsystem.

To restore the DB2 subsystem, follow the instructions in the #README.

After you restore the subsystem, you can restore the user data.

Restore the User Data

If you used a recovery strategy to back up the user data, you can use the same strategy to recover the data. Instead of requesting image copy jobs when you analyze the strategy, request recovery jobs.

Note: If you did not use a recovery strategy to back up the data, do not use these instructions. Instead, use the utility of your choice to recover the user data.

Follow these steps:

1. Select Strategy Services on the Main Menu and press Enter.
2. Revise the strategy to request recovery jobs instead of image copy jobs:
   a. Type U (Update) next to the strategy and press Enter.
   b. Type Y in the Review Options field and press Enter.
   c. Select Global Options and press Enter.
3. Set the global recovery options:
   ■ Recovery Point—C (Recover to the current point in time; that is, the latest point in the logs at your recovery site.)
   ■ Recover Via Logonly—N (No, do not recover by using Logonly processing.)
   ■ Image Copy Before—N (No, do not take an image copy before starting recovery.)
   ■ Image Copy After—Y (Yes, take an image copy after the recovery completes and set a new recovery point.)
   ■ Image Copy Retain—Y (Yes, place all image copies on one tape.)
   Press F3 (End).
   You return to the Options Selection Menu.
4. Press F3 (End) again.
   The Strategy Recovery - Review Objects panel reappears.
5. Press F3 (End) again until you return to the Recovery Strategy Services panel.

6. Analyze the strategy by typing A next to it, pressing Enter, and following the prompts.
   The recovery jobs are generated and appear below the strategy. Each recovery job has a Device Utilization Report at the beginning. This report shows which objects are included in that job, their image copy names, and the volume name where those image copies are stored.

7. Execute each recovery job by typing S next to it, pressing Enter, and following the prompts.
   The user data is recovered. New image copies of the recovered objects are created.

**Verify the Recovery**

After you restore the DB2 subsystem and the user data, verify that the recovery was successful and that all objects are available.

**Follow these steps:**

1. Verify that the recovery was successful:
   - Create some objects and execute SQL queries against those objects.
   - Perform some binds.
   
   If you can perform these tasks, the recovery was successful.

2. Verify the object availability:
   a. Select Special Recovery Services on the Main Menu and press Enter.
   b. Select Display Restricted and Advisory Table / Index Spaces and press Enter.
   c. Type X in the following fields:
      - GBP recovery pending (GRECP)
      - LPL entries present (LPL)
      
      Press Enter.
      
      The Restricted Objects List appears, showing any objects with a status of GRECP (group buffer pool recovery pending) or LPL (logical page list).
   d. Remove the restrictive status from these objects by entering the appropriate commands in the Cmd field. Press F1 for a list of valid commands.
   e. Repeat Steps a through d until no objects appear in the Restricted Objects List.

   The recovered objects are now available and ready for use.
Chapter 16: Special Recovery Services

This section contains the following topics:

- Display Restricted and Advisory Table/Index Spaces (see page 135)
- Copy Data Sets Using DSN1COPY XLAT (see page 137)
- Recover a Broken Page (see page 138)
- Recover an Error Range (see page 139)
- Scan the ICF Catalog for Data Sets (see page 139)
- Display and Resolve Indoubt Threads (see page 140)
- Create and Register a Full-Pack Backup (see page 140)
- Review the Special Recovery Services JCL (see page 142)
- Submit the Special Recovery Services JCL (see page 142)

Display Restricted and Advisory Table/Index Spaces

You can display a list of restricted and advisory tablespaces and indexspaces. You can filter this list to display only spaces that have specific status codes.

Follow these steps:

1. Type 5 (Special Recovery Services) on the Main Menu and press Enter.
   The Special Recovery Services panel appears.

2. Type 1 (Display Restricted and Advisory Table/Index Spaces) and press Enter.
   The Restricted and Advisory Objects Selection panel appears. This panel lets you select status codes so that you can search for spaces with matching codes.

3. Type an X next to each appropriate status code and press Enter.
   Note: If you select nothing, every status (including RW) appears in the list.
   CA Recovery Analyzer scans for matching objects and displays the following wait message:
   PRA now retrieving restricted object list
   When the scan is finished, the Restricted Objects List panel appears.

4. Enter the appropriate command next to each object. The following commands are valid:

   **STARTRW**
   Selects this object for a start read/write (occurs immediately).

   **STARTRO**
   Selects this object for a start read-only (occurs immediately).
**STARTRFW**
Selects this object for a start access force (occurs immediately).

**STARTUT**
Selects this object for a start utility only (occurs immediately).

**STOP**
Selects this object for a stop (occurs immediately).

**IMCOPY**
Selects this object for an image copy.

**RECOVER**
Selects this object for a recovery.

**CHECK**
Selects this object for the CHECK utility.

**REPCOPY**
Selects this object for a repair of the copy pending flag.

**REPCHECK**
Selects this object for a repair of the check pending flag.

**REPRECV**
Selects this object for a repair of the recover pending flag.

**TERM**
Selects this object for termination of a CA utility that is active on it.

Press PF3 (End).

If you entered a command that takes effect immediately, the Restricted and Advisory Objects Selection panel reappears. You can now press PF3 (End) repeatedly to exit.

If you entered any other command, the Restricted Spaces - Review Objects panel appears. Go to Step 5.

5. Review the information that is displayed on this panel and press PF3 (End).
   The Job Built Via Restricted DB Scan panel appears.
6. Set your recovery options and specify a data set name for the saved job.

**Important!** The Stop & Start Spaces field gives you the option to stop and start spaces using ACCESS (FORCE). This option can compromise the integrity of your data. Use ACCESS (FORCE) only if you understand the implications.

Press Enter.

The job is submitted for execution. The Percent Complete window appears.

7. Review the Quick Recover - Recovery Point Error panel, if it appears, and press Enter.

The Percent Complete window appears. The job generates. You can now review or submit the JCL.

**More information:**

- Review the Special Recovery Services JCL (see page 142)
- Submit the Special Recovery Services JCL (see page 142)

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**Copy Data Sets Using DSN1COPY XLAT**

CA Recovery Analyzer supports DSN1COPY automatic translation features. DSN1COPY lets you copy data sets and translate them from one format to another (for example, from a DB2 image copy data set to a DB2 VSAM data set). You can define the data set to translate, an output data set, and other copy parameters.

CA Recovery Analyzer reads the data sets and retrieves the DBID, PSID, and all OBIDs in the space, finds the new DBID and all OBIDs, and then calls DSN1COPY with the XLAT parameters.

**Note:** You cannot automatically translate a tablespace containing tables with rows of identical length. In this situation, review the table row data to determine which table OBID correlates to which image copy OBID. You can then enter the old and new OBIDs on the Image Copy Data Set Recovery panel.

**Follow these steps:**

1. Type 5 (Special Recovery Services) on the Main Menu and press Enter.
   - The Special Recovery Services panel appears.

2. Type 2 (DSN1COPY XLAT and Recover) and press Enter.
   - The Image Copy Data Set Recovery panel appears.
3. Specify your input and output parameters and optionally enter your translation parameters, and then press Enter.

   **Note:** For descriptions of the fields on this product panel, press PF1 to access the online help.

   The Translate Recover Options panel appears.

4. Select your job generation options and press Enter.

   The DSN1COPY job generates. You can now review or submit the job JCL.

**More information:**

- Review the Special Recovery Services JCL (see page 142)
- Submit the Special Recovery Services JCL (see page 142)

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### Recover a Broken Page

You can recover a broken page.

**Follow these steps:**

1. Type 5 (Special Recovery Services) on the Main Menu and press Enter.

   The Special Recovery Services panel appears.

2. Type 3 (Broken Page Recovery) and press Enter.

   The Broken Page Recovery window appears.

3. Complete the fields in this panel and press Enter.

   The Broken Page Recover Options panel appears.

4. Select the appropriate options and press Enter.

   The JCL generates. You can now review or submit the JCL.

**More information:**

- Review the Special Recovery Services JCL (see page 142)
- Submit the Special Recovery Services JCL (see page 142)
Recover an Error Range

DB2 keeps an error range record of any unreadable tracks it encounters while processing. You can recover a specified error range.

**Follow these steps:**

1. Type 5 (Special Recovery Services) on the Main Menu and press Enter.
   The Special Recovery Services panel appears.
2. Type 4 (Error Range Recovery) and press Enter.
   The Error Range Recovery window appears.
3. Complete the fields in this panel and press Enter.
   The Error Range Recover Options panel appears.
4. Select the appropriate options and press Enter.
   The JCL generates. You can now review or submit the JCL.

**More information:**

- Review the Special Recovery Services JCL (see page 142)
- Submit the Special Recovery Services JCL (see page 142)

Scan the ICF Catalog for Data Sets

You can scan the ICF catalog to report on all data sets on a volume.

**Follow these steps:**

1. Type 5 (Special Recovery Services) on the Main Menu and press Enter.
   The Special Recovery Services panel appears.
2. Type 5 (Scan ICF Catalog And Report on Data Sets on a Volume) and press Enter.
   The Scan ICF for Volume window appears.
3. Select the appropriate option and press Enter.
   If you entered Y in the Volume list field, the Select MVS VOLSER to Scan window appears. Go to Step 4.
   If you entered a VOLSER in the Volume to Scan For field, the Volume Scan on ICF panel appears. Skip to Step 5.
Display and Resolve Indoubt Threads

4. Type $ next to the volume to scan and press Enter.
   The Volume Scan on ICF panel appears.
5. Select the appropriate options and press Enter.
   The JCL generates. You can now review or submit the JCL.

More information:

Review the Special Recovery Services JCL (see page 142)
Submit the Special Recovery Services JCL (see page 142)

Display and Resolve Indoubt Threads

You can display a list of allied or database access indoubt threads on the subsystem and can resolve them.

Note: For more information about indoubt threads, see your IBM DB2 user guides.

Follow these steps:

1. Type 5 (Special Recovery Services) on the Main Menu and press Enter.
   The Special Recovery Services panel appears.
2. Type 6 (Display And Resolve Indoubt Threads) and press Enter.
   The Indoubt Thread List window appears.
3. Enter the appropriate command next to each thread and press PF3 (End).
   The Special Recovery Services menu reappears.

Create and Register a Full-Pack Backup

You can perform a full-pack backup using the CA Recovery Analyzer full-pack backup JCL, and then use the backup as a valid recovery point for processing. CA Recovery Analyzer lets you specify DFSMSdss for the backup, then generates the JCL to perform the backup. The backup is registered in the CA Recovery Analyzer SYSCOPY table so that it can be used for recovery.

Note: Use the CA Recovery Analyzer full-pack backup JCL for a valid recovery.
Follow these steps:

1. Type 5 (Special Recovery Services) on the Main Menu and press Enter.
   The Special Recovery Services panel appears.

2. Type 7 (Full Pack Backup Registration Processing) and press Enter.
   The Full Pack Backup Services panel appears.
   **Important! Perform options 1–4 on this panel in order.**

3. Enter a data set name in the DSN high level for work data sets field, then type 1
   (Get All Subsystem RBAs) and press Enter.
   The Full Pack Backup - Get All RBAs panel appears.

4. Define a data set and member name, verify the JOB statement, and press Enter.
   The Full Pack Backup Services panel reappears.
   **Note:** If the generated JCL appears instead, press PF3 (End) to display the Full Pack
   Backup Services panel.

5. Type 2 (Backup a Selected Volume) and press Enter.

6. Complete the fields in this window and press Enter.
   The Full Pack Backup - Backup Pack window appears.

7. Define a data set and member name, verify the JOB statement, and press Enter.
   The Full Pack Backup Services panel reappears.
   **Note:** If the generated JCL appears instead, press PF3 (End) to display the Full Pack
   Backup Services panel.

8. Type 3 (Register The Copied Files to PRA) and press Enter.
   The Full Pack Backup Details window appears.

9. Specify the backup program that was used and press Enter.
   The Full Pack Backup - Register Copies panel appears.

10. Define a data set and member name, verify the JOB statement, and press Enter.
    The Full Pack Backup Services panel reappears.
    **Note:** If the generated JCL appears instead, press PF3 (End) to display the Full Pack
    Backup Services panel.

The copies are registered, and the data sets you backed up in the previous step are
associated with the RBAs you retrieved at the beginning of this procedure. You can
now select the backups as a valid recovery point on the Select Recovery Point
window.
11. Type 4 (Clean up generated work files) and press Enter.
   The Full Pack Backup - Clean Up Files panel appears.

12. Complete the fields on this panel and press Enter.
   The Full Pack Backup Services panel reappears. You can now review and submit the JCL that was generated in Steps 4, 7, 10, and 12.

   **Note:** If the generated JCL appears instead, press PF3 (End) to display the Full Pack Backup Services panel.

**More information:**

- Review the Special Recovery Services JCL (see page 142)
- Submit the Special Recovery Services JCL (see page 142)

---

### Review the Special Recovery Services JCL

After you generate the job, you can review the resulting JCL before you submit it for execution.

**Note:** If you entered Y in the Edit Dataset after Generation field when you generated the job, the JCL appears automatically after the job is generated. The following instructions explain how to review the JCL when you do not enter Y in this field.

**Follow these steps:**

1. Access the data set member where you saved the JCL output. You specified this name when you generated the job.
2. View or edit the JCL, then press PF3 (End).
   You exit the data set member.

### Submit the Special Recovery Services JCL

After you generate a job and review the resulting JCL, you can submit the JCL for execution.

**Note:** If you entered S in the Edit Dataset after Generation field when you generated the job, the JCL is automatically submitted for execution. The following instructions explain how to submit the JCL if you did not enter S in this field.
Follow these steps:

1. Access the data set member where you saved the JCL output. You specified this name when you generated the job.

2. Type `submit` on the command line and press Enter.
   
   The JCL is submitted.
Chapter 17: Strategy Reporting Services

This section contains the following topics:

- Strategy Reporting Services Overview (see page 145)
- How to Verify that Your Recovery Strategies Provide Complete Object Coverage (see page 146)

Strategy Reporting Services Overview

The strategy reporting services analyze the recovery strategies on a subsystem. The analysis generates reports showing which objects belong to multiple strategies, which objects belong to no strategies, and which strategies would generate errors. This feature is useful for verifying that your strategies do not overlap and that all critical spaces are included in a recovery strategy. You can also generate a report showing which strategies will generate errors when they are analyzed.

The following reports are available:

- Objects Eliminated from Report
  Shows the objects that are excluded from the report because their recovery strategies were not included in the report strategy.
  This report identifies the recovery strategy and the objects within the strategy that were eliminated from this report. The report also indicates whether the objects were added to the strategy by direct selection or by autobuild. The report also shows why each object was eliminated from the report.

- Duplicate Spaces in Strategies
  Shows the objects that are duplicated in the recovery strategies that were analyzed.
  This report identifies the duplicate objects and the strategies in which they are duplicated.

- Spaces missing from Strategies
  Lists all tablespaces that are not included in any of the recovery strategies that you analyzed.
How to Verify that Your Recovery Strategies Provide Complete Object Coverage

Analyze Strategies Errors

Summarizes the errors that would be generated by analyzing the strategies included in the report.

This report identifies the strategy, the error type that would occur, and the objects within the strategy that would cause the error. The report also shows the recovery point that was selected for that strategy and the reason for the error.

Note: For more information about these errors, see Selected Recovery Point Errors and Remedies (see page 169).

How to Verify that Your Recovery Strategies Provide Complete Object Coverage

As a DBA, you are responsible for recovering objects quickly. The ability to recover is critical in any DB2 shop. Without ready recovery capabilities, tables, tablespaces, databases, and entire DB2 subsystems can be offline for costly periods of time. CA Recovery Analyzer can help you ensure that you have the recovery strategies to get your DB2 subsystem back online quickly and reliably.

You can create recovery strategies that specify a group of DB2 objects to recover and the recovery options to use. You can save these strategies for later use. This scenario explains how to verify that your existing recovery strategies can recover all necessary objects. To verify your strategy coverage, create a reporting strategy that analyzes your recovery strategies and generates reports on the following items:

- Spaces that are not included in any recovery strategy
- Objects that are explicitly excluded from recovery
- Spaces that are duplicated between recovery strategies
- Errors that would occur upon strategy analysis

Note: This scenario assumes that you have already created recovery strategies (see page 35).
The following illustration shows how a database administrator can verify complete strategy coverage:

How to Verify that Your Recovery Strategies Provide Complete Object Coverage

Important! Verify your strategies often to ensure the recoverability of your objects.

To verify strategy coverage, the database administrator performs the following steps:
1. Create a reporting strategy (see page 148).
2. Analyze the strategy (see page 149).
3. Generate the strategy reports (see page 150).
4. Review the strategy reports (see page 150).
Create a Reporting Strategy

Create a strategy that analyzes all recovery strategies in your subsystem. The analysis generates reports showing which objects belong to multiple strategies, which objects belong to no strategies, and which strategies would generate errors.

**Note:** The following procedure focuses on creating a reporting strategy. However, you can also update, copy, and delete strategies from this panel.

**Follow these steps:**

1. Select the Reporting Services option on the Main Menu and press Enter.
2. Type `C` (Create) in the `O` field on the first line. Enter a name for the strategy and, optionally, a description.
   
   Press Enter.
3. Select your reporting and strategy options:
   - Specify `I` (Include) next to Show the Included/Excluded strategy list.
   - Specify `Y` next to each Generate the... Report field.
   
   **Note:** For the purposes of this scenario, we are generating all report types. In other circumstances, you might generate only one or two reports.

   - (Optional) Specify `Y` next to Generate the JCL for each strategy. When you generate an Analyze Strategies Error Report, the selected recovery strategies are analyzed for errors. However, the output from each recovery strategy (that is, the recovery JCL) is not saved. Specifying `Y` in this field saves the recovery JCL to a data set so that you can use it later.

   - (Optional) Enter a data set name in the Output DSN field. This field is required when you specify `Y` in the Generate the JCL for each strategy field.

   **Notes:**
   - The JCL from each recovery strategy is saved to a different member in the data set. By default, the strategy name is used as the member name. If this member name is already in use, a unique name is generated.
   - We do not recommend specifying a GDG for the CNTL library because the library expands with each run of the strategy. This expansion can cause the job to exceed available extents.

   - Specify `Y` next to each Explode... field.
   - Specify whether to use SQL access only for the catalog unload.

   Press F3 (End).

   The Enter Strategies to Include window appears.
4. Verify that the Strategy and Creator fields both specify an asterisk (*). We want to include all recovery strategies in the analysis.

   Press F3 (End).

   The Strategy Reporting Services panel reappears with a message confirming that your strategy was saved.

5. Press F3 (End) again.

   The first Strategy Reporting Services panel reappears, showing the new strategy. You can now analyze the strategy.

### Analyze the Reporting Strategy

Analyzing a reporting strategy produces a JCL job. This job generate the strategy reports.

Each time that you analyze a strategy, the analysis is saved as a version of the strategy. The versions are listed under the strategy from least recent to most recent. You can generate multiple versions of a strategy, specifying different options each time.

**Follow these steps:**

1. Type A (Analyze) in the O field next to the strategy. Press Enter.

   The Strategy Scan Options panel appears.

2. Select your options:

   - (Optional) Type Y next to Edit Dataset after Generation. Use this option only when you want to view the JCL before submitting it.
   - Specify a data set name for the generated output.
   - Edit the JOB statement as needed.

   Press Enter.

   The strategy is analyzed. The resulting JCL job is written to a version, which appears on the Strategy Reporting Services panel underneath its strategy. You can now submit the version JCL to generate the reports.
Generate the Strategy Reports

After you analyze the reporting strategy, submit the resulting version JCL to generate the strategy reports.

**Note:** The following procedure focuses on submitting strategy versions. However, you can also browse, edit, and view the version JCL from this panel.

**Follow these steps:**

1. Type **S** (Submit) next to the strategy version (or versions, if you want to submit more than one).
   
   Press Enter.

   The Confirm Strategy Submit window appears.

2. Type **Y** (Yes) to submit the selected version. If you select multiple versions, you can also type **A** to submit all selected versions. Press Enter.

   The strategy reports are generated. You can now view the reports.

Review the Strategy Reports

When you submitted the reporting strategy JCL, the reports were generated and written to SYSOUT.

View the reports and adjust your recovery strategies to include missing objects, remove duplicate objects, and resolve potential recovery errors.
Chapter 18: Recovering to a Point in Time

This section contains the following topics:

- How to Recover to a Point in Time (see page 151)
- How to Complete the Point in Time Recovery (see page 155)

How to Recover to a Point in Time

Point in time recovery lets you specify a conditional restart point on a DB2 system to start over at a certain point when something goes awry. This is particularly important when the entire applications load on a DB2 system is a large scale system such as SAP.

You can create and start a new recovery or recover large applications using a conditional restart point.

To recover to a point in time, do the following:

1. Define a conditional restart point (see page 151).
2. Analyze the resulting strategy (see page 152).
3. Review the recovery JCL (see page 152).
4. Submit the recovery JCL (see page 153).

Define a Conditional Restart Point

Before you execute a point in time recovery, you must define a conditional restart point for a DB2 system, which removes all activity that occurred past a specified point in time. The objects that changed after the specified point in time are discovered and recovered to their state at the conditional restart point. Restarting from this point corrects errors or erroneous actions that occurred after that point.

Follow these steps:

1. Type 7 (Point in Time Recovery) on the Main Menu and press Enter.

   The Point in Time Strategy Services panel appears.

2. (Optional) Enter selection criteria in the Strategy and Creator fields and press Enter.

   The Point in Time Strategy Services panel displays a list of strategies that match the selection criteria.
3. Type **C** (create) in the first line, or type **U** (update) in the **O** (Option) field next to the strategy you want to process, and press Enter.
   The Point in Time Recovery Create/Update Strategy panel appears.
4. Complete the fields and press PF3 (End).
   The conditional restart point is defined and the Point in Time Strategy Services panel appears. You can now analyze the strategy.

More information:

Analyze the Point in Time Strategy (see page 152)

Analyze the Point in Time Strategy
After you define a conditional restart point, you must analyze the strategy to generate the JCL necessary to perform the point in time recovery. You can then submit the JCL to execute the recovery job.

To analyze the point in time strategy, type **A** (analyze) next to the strategy on the Point in Time Strategy Services panel and press Enter.

The point in time recovery strategy is analyzed, the JCL is generated, and the Point in Time Recovery Create/Update Strategy panel reappears. You can now review and submit the JCL.

More information:

Review the Point in Time Recovery JCL (see page 152)
Submit the Point in Time Recovery JCL (see page 153)

Review the Point in Time Recovery JCL
After you analyze a strategy, you can review the resulting JCL before you submit it for execution.

**Note:** If you entered **Y** in the **Edit Dataset after Generation** field when you created or updated the strategy, the JCL appears automatically after the strategy is analyzed. The following instructions explain how to review the JCL when you do not enter **Y** in this field.

The following instructions assume that you are viewing the list of available strategies on the Recovery Strategy Services panel, Strategy Reporting Services panel, or Point in Time Strategy Services panel.
Follow these steps:

1. Type one of the following values next to a strategy version:
   
   **B (Browse)**
   
   Lets you browse the JCL.
   
   **E (Edit)**
   
   Lets you edit the JCL.
   
   **V (View)**
   
   Lets you view the JCL. You cannot save any changes.
   
   Press Enter.
   
   The JCL appears.

2. View or edit the JCL, then press PF3 (End).

   The previous panel reappears.

Submit the Point in Time Recovery JCL

After you define a conditional restart point, analyze the strategy, and review the resulting JCL, you can submit the JCL. The JCL restores the DB2 system back to the conditional restart point you have defined.

**Important!** After you submit the recovery job, review the results to verify that the DB2 system has been recovered as required. If the recovery is not acceptable, you can restore the BSDS and LOG configuration to its prerecovery state using the job provided in the JCL data set.

These instructions assume that the Point in Time Strategy Services panel is already displayed.
Follow these steps:

1. Type S next to the strategy version with the PITRJOB member. Press Enter.
   
   **Note:** You can select multiple strategies for submission.
   
   The Confirm Strategy Submit window appears.

2. Enter one of the following values:
   
   **Y (Yes)**
   
   Submits the selected version.

   **N (No)**
   
   Does not submit the version. This value is the default.

   **A (All)**
   
   Submits all versions that you selected without additional confirmation.

   Press Enter.

   A message appears, indicating that your job has been submitted. The following processing occurs based on the conditional restart information that you defined:

   - The conditional restart date and time (retro restart) are converted to a time-of-day clock value.
   - The checkpoint immediately preceding this time is found and the start RBA or LRSN of this checkpoint is the actual time to which the system is regressed.
   - The logs are scanned from retro time to current time to find all objects that changed.
   - The changed objects are divided into the following classes:
     - Catalog and directory objects
     - CA utility objects
     - All other objects, such as your applications
   - Strategies are created and analyzed and job streams are created for the changed objects.

   In addition, the action taken and data used by PITRJOB are displayed in SYSPRINT and PRAERRPT print files.

3. Review SYSPRINT and PRAERRPT for errors and warnings, then press PF3 (End).

   The generated JCL data sets are displayed for execution.

   **Important!** Execute the other members of the JCL data set to complete the point in time recovery.
How to Complete the Point in Time Recovery

After you have defined a conditional restart point, analyzed the strategy, and submitted the point in time recovery JCL, you must follow these steps to complete the recovery.

To complete the point in time recovery, do the following:

1. Shut down DB2 systems.
2. Clean up the coupling facility for datashare systems.
3. Submit the BSDS and log backup jobs to save the BSDS and log environment for return to current state if a different restart point must be selected.
4. Submit DSNJU003 to establish the conditional restart point.
5. Submit a job to delete extraneous archive logs.
   - If they are not deleted, archive logs that follow the conditional restart point will cause duplicate data set names when future logs are created.
6. Change ZPARMS to DEFER ALL and restart DB2.
7. Submit the catalog and directory, CA utility, and user object recovery jobs.
8. (Optional) Submit the CA Log Analyzer job (product must be available) to recover to the last CI on non-datashare systems.
   - The conditional restart point on non-datashare systems is at the beginning of the last CI of the log. When CA Log Analyzer is used, the recovery is extended to find all log records between CI start and recovery end (current time). This is applicable only to non-datashare systems where conditional restart rounds down the end point to precede the current time point.
10. Change ZPARMS to RESTART ALL and restart DB2.
11. Run PRA#LOAD to reload CA Recovery Analyzer tables in synchronization with the restarted system.
12. Submit the conditional restart cancel job to remove the point in time recovery conditional restart RBA or LRSN from the BSDS.
Appendix A: Generated JCL Samples

This section contains the following topics:

JCL Sample Overview (see page 157)
Tablespace and Indexspace Recovery JCL (see page 158)
Storage Group Recovery JCL (see page 161)
Bootstrap Data Set Recovery JCL (see page 165)

JCL Sample Overview

This appendix shows sample JCL for the following functions:

- Recovering a tablespace and indexspace (see page 158)
- Recovering a storage group (see page 161)
- Recovering a single bootstrap data set (see page 165)

Each sample is followed by descriptions of the major steps or key JCL statements for that sample. Where the same statements appear repeatedly (such as the same STEPLIBs), vertical ellipses are inserted to indicate that redundant statements have been omitted. To see the JCL in full, you can choose any option and elect to edit the JCL.

Note: In most circumstances, you do not need to edit the JCL because the information you specify on the various panels and windows generates the appropriate JCL. If you must edit the JCL, review JCL coding syntax. See the IBM JCL Guide and the IBM JCL Reference.
Tablespace and Indexspace Recovery JCL

The following output was generated during the generation step of a strategy. When you analyze a strategy and edit the data set after generation, you see output that is similar to the following:

```
//MIG JOB (TD20-230-TS0),'TDxxx',CLASS=A,
  MSGCLASS=X,MSGLEVEL=(1,1),REGION=4096K
//********************************************************************
//*                                                                  *
//*            C A,   I N C .                                        *
//*                                                                  *
//*            R E C O V E R Y     A N A L Y Z E R  rXX              *
//*                                                                  *
//******  ************************************************************
//*                                                                  *
//* JCL Generated:                                                  *
//*                                                                  *
//* Strategy Recovery:                                               *
//*     Strategy: FASTUNLD                                           *
//*     Creator: USER02                                              *
//*     Date: YYYY/MM/DD                                              *
//*     Time: HH:MM                                                  *
//*     Desc: RECOVER MY TABLESPACE AND IX                           *
//*                                                                  *
//********************************************************************
//JOBLIB DD DSN=Dxxx.PRIVATE.DSNEXIT,DISP=SHR
  DD DSN=DSN.VXXX.DSNLOAD,DISP=SHR
//********************************************************************
//DCMD15 EXEC PGM=PTLDRIVM,PARM='EP=PRL#CMDS/Dxxx',COND=(4,LT)
//STEPLIB DD DSN=PTIPROD.xxxxxxx.CDBALOAD,DISP=SHR
  DD DSN=Dxxx.PRIVATE.DSNEXIT,DISP=SHR
  DD DSN=DSN.XXXX.DSNLOAD,DISP=SHR
//PTILIB DD DSN=PTIPROD.xxxxxxx.CDBALOAD,DISP=SHR
  DD DSN=Dxxx.PRIVATE.DSNEXIT,DISP=SHR
  DD DSN=DSN.XXXX.DSNLOAD,DISP=SHR
//PTIPARM DD DSN=PTIPROD.xxxxxxx.CDBAPARM,DISP=SHR
//********************************************************************
//PRAREPRT DD SYSOUT=*                                           *
//SYSPRINT DD SYSOUT=*                                          *
//SYSIN DD *
SW -STOP DATABASE(PDSTPLRE)   SPACENAM(ACU)                      */
```
//DCMD25 EXEC PGM=PTLDRIVM,PARM='EP=PRL#CMDS/Dxxx',COND=(4,LT)
                    :
                    :
//SYSIN DD *
SU -START DATABASE(PDSTPLRE) SPACENAM(ACT) ACCESS(UT) /*

//RCVR35 EXEC PGM=DSNUTILB,REGION=4M,PARM='Dxxx,PRA_RECV_PDXXXX',  
//             COND=(4,LT) :
                    :
                    :
//SYSIN DD *
RECOVER TABLESPACE PDSTPLRE.ACT TORBA X'0000071C0000'

RECOVER INDEX(ALL)  TABLESPACE PDSTPLRE.ACT
                WORKDDN (SYSUT1)
                SORTDEVT SYSDA
                SORTNUM 3 /
//DCMD55 EXEC PGM=PTLDRIVM,PARM='EP=PRL#CMDS/Dxxx',COND=(4,LT)
                    :
                    :
//SYSIN DD *
SW -STOP DATABASE(PDSTPLRE) SPACENAM(ACT) /*

//DCMD65 EXEC PGM=PTLDRIVM,PARM='EP=PRL#CMDS/Dxxx',COND=(4,LT)
                    :
                    :
//SYSIN DD *
RW -START DATABASE(PDSTPLRE) SPACENAM(ACT) ACCESS(Rw) /*
/*

In the previous sample, a job step name with a #### suffix indicates that CA Recovery Analyzer generated the step number when it generated the JCL.

The following statements appear in the JCL:

**MIG**

Defines a JOB statement.

**DOC BOX**

Displays the strategy name, creator, description, and date and time the recovery JCL was generated.

**JOBLIB**

Defines a JOBLIB statement (DB2 load libraries).
DCMD####
Defines an EXEC statement to stop the tablespaces for alters and contention purposes. (DCMD stands for Dynamic Command Processor.)

STEPLIB
Defines a STEPLIB statement.

PTILIB
Defines a PTILIB statement to establish connectivity with the CA library needed for this job step.

PTIPARM
Defines a PTIPARM statement to establish connectivity with the CA parameter library needed for this job step.

PRAREPRT
Defines a PRAREPRT statement to establish connectivity with the Report Facility.

SYSPRINT
Defines a SYSPRINT statement to identify the print output destination.

SYSIN
Defines a SYSIN statement. The syntax specified in this DD statement tells the Dynamic Command Processor to stop the tablespace and wait for the space to fully stop before continuing.

DCMD####
Defines an EXEC statement to start the tablespace in UT mode (restricting it to utility access only).

RCVR####
Defines an EXEC statement to recover the tablespace with the DB2 subsystem ID and your utility ID prefixed with PRA_RECV_.

DCMD####
Defines an EXEC statement to stop the tablespace.

DCMD####
Defines an EXEC statement to start the tablespace in RW mode (restoring program access).
Storage Group Recovery JCL

The following output was generated during the generation step of the storage group recovery. When you analyze a storage group and choose to generate JCL and edit the data set after generation, you see output that is similar to the following example:

//MIG JOB (TD20-230-T50), 'TDxxx', CLASS=A,
// MSGCLASS=X, MSGLEVEL=(1,1), REGION=4096K
//(*******************************************************************************/
//*                                                                  *
//*            C A,    I N C .                                        *
//*                                                                  *
//*            R E C O V E R Y     A N A L Y Z E R rXX              *
//*                                                                  *
//*                                                                  *
//(*******************************************************************************/
//* JCL Generated:
//* Storage Group Recovery
//* Rec Stg: PRASG
//* New Vol: DBA014
//* New Stgr: 
//* Date: YYYY/MM/DD
//* Time: HH:MM
//*******************************************************************************/

//JOBLIB DD DSN=Dxxx.PRIVATE.DSNEXIT,DISP=SHR
//      DD DSN=Dxxx.VXXX.DSNLOAD,DISP=SHR
//ALTR5 EXEC PGM=PTLDRIVM,PARM='EP=PRL#ALTR/Dxxx'
//*
//STEPLIB DD DSN=PTIPROD.xxxxxxx.CDBALOAD,DISP=SHR
//      DD DSN=Dxxx.PRIVATE.DSNEXIT,DISP=SHR
//      DD DSN=Dxxx.VXXX.DSNLOAD,DISP=SHR
//PTILIB DD DSN=PTIPROD.xxxxxxx.CDBALOAD,DISP=SHR
//      DD DSN=Dxxx.PRIVATE.DSNEXIT,DISP=SHR
//      DD DSN=Dxxx.VXXX.DSNLOAD,DISP=SHR
//PTIPARM DD DSN=PTIPROD.xxxxxxx.CDBAPARM,DISP=SHR
//*
//PRAREPRT DD SYSOUT=*  
//SYSPRINT DD SYSOUT=*  
//SYSIN DD *
ALTER STOGROUP PRASG
ADD VOLUMES(DBA014)
X
/*
//DCMD20 EXEC PGM=PTLDRIVM,PARM='EP=PRL#CMDS/Dxxx',COND=(4,LT)
  :
  :
//SYSIN    DD *
SW  -STOP DATABASE(DSNDB04) SPACENAM(PARIXCHI) PART (01)
SW  -STOP DATABASE(DSNDB04) SPACENAM(PARIXCHI) PART (02)
SW  -STOP DATABASE(DSNDB04) SPACENAM(PRACHI2) PART (01)
SW  -STOP DATABASE(DSNDB04) SPACENAM(PRACHI2) PART (02)
SW  -STOP DATABASE(PRADB) SPACENAM(POMPEII)
SW  -STOP DATABASE(PRADB) SPACENAM(LOGAPPLY)
/*
//DCMD30 EXEC PGM=PTLDRIVM,PARM='EP=PRL#CMDS/Dxxx',COND=(4,LT)
  :
  :
//SYSIN    DD *
SU  -START DATABASE(DSNDB04) SPACENAM(PARIXCHI) PART (01) ACCESS(UT)
SU  -START DATABASE(DSNDB04) SPACENAM(PARIXCHI) PART (02) ACCESS(UT)
SU  -START DATABASE(DSNDB04) SPACENAM(PRACHI2) PART (01) ACCESS(UT)
SU  -START DATABASE(DSNDB04) SPACENAM(PRACHI2) PART (02) ACCESS(UT)
SU  -START DATABASE(PRADB) SPACENAM(POMPEII) ACCESS(UT)
SU  -START DATABASE(PRADB) SPACENAM(LOGAPPLY) ACCESS(UT)
/*
//RCVR40
EXEC PGM=DSNUTILB,REGION=4M,PARM='Dxxx,PRA_RECV_PDXXX',
  //         COND=(4,LT)
  :
  :
//SYSIN    DD *
RECOVER TABLESPACE DSNDB04.PRACHI2 DSNUM 001
TABLESPACE DSNDB04.PRACHI2 DSNUM 002
TABLESPACE PRADB.POMPEII
TABLESPACE PRADB.LOGAPPLY
RECOVER INDEX
  (PDxxxxx.PARIXCHI2) PART 001
  SORTDEVT SYSDA
  SORTNUM 3
RECOVER INDEX
  (PDxxxxx.PARIXCHI2) PART 002
  SORTDEVT SYSDA
  SORTNUM 3
/*
//DCMD100 EXEC PGM=PTLDRIVM,PARM='EP=PRL#CMDS/Dxxx',COND=(4,LT)
  :
  :
The following statements appear in the JCL:

**MIG**

Defines a JOB statement.

**DOC BOX**

Displays the name of the storage group being recovered, the new volume to add to the storage group or the new storage group which all spaces will be altered, and the date and time of the generation.

**JOBLIB**

Defines a JOBLIB statement (DB2 load libraries).

**ALTR####**

Defines an EXEC statement for the step that alters the storage group with the new volume.

**STEPLIB**

Defines a STEPLIB statement.

**PTILIB**

Defines a PTILIB statement to establish connectivity with the CA library needed for this job step.

**PTIPARM**

Defines a PTIPARM statement to establish connectivity with the CA parameter library needed for this job step.
PRAREPRT
Defines a PRAREPRT statement to establish connectivity with the Report Facility.

SYSPRINT
Defines a SYSPRINT statement to identify the print output destination.

DCMD####
Defines an EXEC statement to stop the tablespaces and indexspaces associated with the storage group for this example.

DCMD####
Defines an EXEC statement to start the tablespaces and indexspaces in UT mode (restricted to utility access only).

RCVR####
Defines an EXEC statement to recover all tablespaces, tablespace indexes, and individual indexes.

DCMD####
Defines an EXEC statement to stop the tablespaces and indexspaces.

DCMD####
Defines an EXEC statement to start the tablespaces and indexspaces in RW mode (restoring program access).
Bootstrap Data Set Recovery JCL

The following output was generated during the generation step of the bootstrap data set recovery. When you perform a bootstrap data set recovery and choose option 2 on the Generation Panel (Generate the JCL and Edit), you see output that is similar to the following example:

```
//MIG JOB (TD20-230-TSO),'TDxxx',CLASS=A,
// MSGCLASS=X,MSGLEVEL=(1,1),REGION=4096K
//*********************************************************
//* JCL GENERATED:                                       *
//*********************************************************
//* DATE: YYYY/MM/DD                                      *
//* TIME: HH:MM                                          *
//* TYPE: -BOOT STRAP DATASET RECOVERY-                  *
//JOBLIB DD DSN=Dxxx.PRIVATE.DSNEXIT,DISP=SHR
// DD DSN=DSN.VXXX.DSNLOAD,DISP=SHR
//*   * * * *  DB2 MUST BE DOWN TO EXECUTE THIS STEP * * * *
//SNGLBSDS EXEC PGM=IDCAMS,REGION=512K
//SYSPRINT DD SYSOUT=*                                 *
//SYSOUT DD SYSOUT=*                                   *
//SYSIN DD *                                          *
DELETE (Dxxx.BSDS01.PTPRA) PURGE
SET MAXCC = 0
ALTER Dxxx.BSDS01 -
NEWNAME(Dxxx.BSDS01.PTPRA)
ALTER Dxxx.BSDS01.DATA -
NEWNAME(Dxxx.BSDS01.DATA.PTPRA)
ALTER Dxxx.BSDS01.INDEX -
NEWNAME(Dxxx.BSDS01.INDEX.PTPRA)
DEFINE CLUSTER -
 ( NAME(Dxxx.BSDS01) -
  VOLUMES(DBA002) -
  REUSE -
  TRACK(10 2) -
  SHAREOPTIONS(2 3) ) -
DATA -
 ( NAME(Dxxx.BSDS01.DATA) -
  RECORDSIZE(4089 4089) -
```

Appendix A: Generated JCL Samples 165
CONTROLINTERVALSIZE(4096) - 
FREESPACE(0 20) - 
KEYS(4 0) - 
INDEX - 
  ( NAME(Dxxx.BSDS01.INDEX) - 
  CONTROLINTERVALSIZE(1024) )

REPRO INDASET(Dxxx.BSDS02) - 
OUTDATASET(Dxxx.BSDS01) - 
REUSE 
/* 
//* 

The following statements appear in the JCL:

MIG
  Defines a JOB statement.

JOBLIB
  Defines a JOBLIB statement.

comment
  Indicates that DB2 must be down to execute this step.

SNGLBSDS
  Defines an EXEC statement to begin recovery of a single bootstrap data set through access methods services.

DELETE
  Clears the backup data set in preparation for holding a copy of the bad BSDS.

ALTER
  Copies the bad BSDS to the backup data set.

DEFINE
  Allocates a new data set for the BSDS.

REPRO
  Copies the good BSDS into the new BSDS.
Appendix B: Internal Tables, Skeletons, and Models

This section contains the following topics:

The internal tables, skeletons, and models are presented in the *Implementation Guide* for your reference.
Appendix C: Selected Recovery Point Errors and Remedies

This section contains the following topics:

Recovery Point Error Overview (see page 169)
PHASE: Merge Options (see page 169)
PHASE: Retrieve VCAT Volumes (see page 170)
PHASE: Read Only Share Check (see page 171)
PHASE: Validate Spaces Exist (see page 171)
PHASE: Validate New Stogroups/Volumes (see page 171)
PHASE: Retrieve Recovery Points (see page 172)
PHASE: Resolve Co-Req Objects (see page 177)
PHASE: Validate IC Space Quantities (see page 181)
PHASE: Build Image Copy Datasets (see page 181)
PHASE: Retrieve SYSUTI Quantities (see page 183)
PHASE: Explode Autobuild Spaces (see page 183)
PHASE: Explode Plans (see page 183)
PHASE: Explode Packages (see page 183)
PHASE: Check for Duplicate Recv (see page 184)
PHASE: Checking for Duplicate Utility IDs (see page 184)
PHASE: Check TS/IX Status (see page 185)
PHASE: Read ZPARM Information (see page 187)
PHASE: FDR Files Allocate and Open (see page 188)
PHASE: Validate Image Copy DSNs (see page 189)

Recovery Point Error Overview

You may see various types of errors on the Selected Recovery Point Errors panel.

PHASE: Merge Options

Stops/Starts overriden=Y

You specified to make an image copy of a space before or after the recovery using a non-DB2 utility (FDR, DFSMSdss, or DSN1COPY), but you did not specify to stop and start spaces as part of the recovery. You must do this because CA Recovery Analyzer automatically creates stop and start JCL steps in its recovery JCL.

If you are using non-DB2 utilities to make image copies, specify Y in the Start & Stop Spaces field on the Recovery Strategy Options panel. This stops the spaces before image copies are made.
More information:

Analyze a Recovery Strategy  (see page 65)

**PHASE: Retrieve VCAT Volumes**

**Spc Realloc/No Recover**
You have asked for a tablespace to be reallocated or you have asked for the space to be reallocated on a different volume, but you did not select the space for recovery. This would cause the space to be deleted and redefined without restoring the data.

**Prim/Secd Spc Quantities 0**
You have elected to recreate VCAT spaces as part of your recovery, but the underlying VSAM data set is migrated, so the space cannot be retrieved.

**Primary Space Quantity 0**
You have elected to recreate VCAT spaces as part of your recovery, but the underlying VSAM data set is migrated, so the space cannot be retrieved.

**Secondary Spc Quantity 0**
You have elected to recreate VCAT spaces as part of your recovery, but the underlying VSAM data set is migrated, so the space cannot be retrieved.

**MIGRAT DSN with No Vol**
You have asked for a space to be reallocated, but the space is currently migrated. To reallocate the space, you must specify the space to place the new volume.

**VCAT Realloc Vol= MIGRAT**
You have elected to recreate VCAT spaces as part of your recovery, but the space is currently migrated, so the space cannot be retrieved.

**SMS Locate on DSN Failed**
You have asked for a space to be reallocated and the space is flagged as a SMS managed space. CA Recovery Analyzer attempted to retrieve this information from the MVS catalog but the request failed.

**SMS Info not Available**
You have asked for a space to be reallocated and the space is flagged as a SMS managed space. Because PRA#LOAD has run last, the space is no longer SMS managed.
PHASE: Read Only Share Check

Database Not Found
A space was selected for recovery but the database no longer exists. You cannot recover this space because it has been dropped from the DB2 subsystem.

DB is Read Only Share
A space was selected for recovery (probably from an Autobuild node) but the database the space resides in is a Read Only Share database. DB2 does not let you recover a space when it is Read Only Share.
You must recover the space in the owner DB2 subsystem.

PHASE: Validate Spaces Exist

Space not found in Catlg
A space was selected for recovery, but the space was dropped from DB2 after the strategy was created. This space is not recoverable. Remove it from the strategy.

Empty TS Excluded
The indicated tablespace contains no tables. Because the Exclude Empty Tablespaces option is set to Yes in the PRA parmlib member, this space is excluded from all processing.

No Tables in Space
The indicated tablespace contains no tables. Because the Exclude Empty Tablespaces option is set to No in the PRA parmlib member, the space is included in all strategy processing and job generation.

PHASE: Validate New Stogroups/Volumes

PRA Data No Longer Avail
A space was selected for reallocation to a new volume or storage group, but the space information is no longer available in the CA Recovery Analyzer tables.
Check the generated JCL for accuracy of the new allocation quantities.

New Volume Not Found
MVS could not find the new volume entered for a space reallocation.
You must enter a valid volume serial for your job to run correctly.

New Volume is Offline
The new volume entered for a space reallocation has been found by MVS, but the volume is currently offline. No data can be retrieved from or written to this volume.
Old Device Not Available

CA Recovery Analyzer was attempting to test the compatibility between the old volume the space was on and the new volume the space is to be allocated on, but the old volume is no longer available to MVS. CA Recovery Analyzer bypasses the check.

Device Incompatible

The volume that a space exists on is not compatible with the new volume to reallocate the space. For example, a space currently exists on a 3380 disk pack and you requested reallocation of the space on a 3390.

Reallocate spaces onto compatible devices (3380 to 3380 and 3390 to 3390).

Storage Group Not Found

A space has been selected for reallocation via a new storage group, but the new storage group does not exist in this DB2 subsystem, or the storage group has been dropped.

You must enter a valid storage group to run the job successfully.

PHASE: Retrieve Recovery Points

Alt NL IX POR Has No Prev IC

A COPY YES index was selected for recovery to a prior log RBA but the object it indexes has been altered to NOT LOGGED and no LOGGED=N image copy is available. You cannot recover this object to the specified recovery point.

Recover this object and its co-requisite objects to a prior image copy or to a prior point in time when a LOGGED=N image copy is available for this object’s owning tablespace.

Alt NL POR Has No Prev IC

A NOT LOGGED base or LOB tablespace was selected for recovery to a prior log RBA but a LOGGED=N image copy is not available. You cannot recover this object to the specified recovery point.

Recover this object and its co-requisite objects to a prior image copy or to a prior point in time when a LOGGED=N image copy is available.

Base TS Alt NL Lob Ts Was NL

A base tablespace was selected for recovery to a prior log RBA in which it was NOT LOGGED, but one of its LOB tablespaces was already NOT LOGGED at that time. You cannot recover this object to the specified recovery point.

Recover this object and its co-requisite objects to a prior image copy or to a prior point in time before this base tablespace’s LOB was altered to NOT LOGGED.
Base Ts Alt Not Logged
A base tablespace that was previously LOGGED has been selected for recovery to the current point in time, but it has been altered to NOT LOGGED. You cannot recover this object to the current point in time.
Recover this object and its co-requisite objects to a prior image copy or to a prior point in time when this object was LOGGED.

Base Ts Altered Logged
A base tablespace that was previously NOT LOGGED was selected for recovery to the current point in time or to a prior log RBA but it has been altered to LOGGED. You cannot recover this object to the specified recovery point.
Recover this object and its co-requisite objects to a prior image copy or to a prior point in time when this object was NOT LOGGED.

BP/Vol Opt not allowed
You have selected optimization by volume, and you have also requested that the job be generated in Batch Processor control statements. This option is not permitted because the Batch Processor does not support retaining of tape drives. Optimization by volume has been discarded.

Common Quiesce not Found
On the Global Options panel, you entered O in the Recovery Point field to recover to a common quiesce point, but a common quiesce was not found.
On the Strategy Services panel, enter the Q line command next to the strategy to quiesce all spaces in the strategy.

Indx Owner Alt Logged
A COPY YES index was selected for recovery to the current point in time or to a prior log RBA, but the object it indexes has been altered to LOGGED. You cannot recover this object to the specified point in time.
Recover this object and its co-requisite objects to a prior image copy or to a prior point in time before this object was altered to NOT LOGGED.

Indx Owner Alt Not Logged
A COPY YES index was selected for recovery to the current point in time but the object it indexes has been altered to NOT LOGGED. You cannot recover this object to the current point in time.
Recover this object and its co-requisite objects to a prior image copy or to a prior point in time before this object was altered to NOT LOGGED.
**Lob Ts Altered Logged**

A LOB tablespace was selected for recovery to the current point in time or to a prior log RBA but it has been altered to LOGGED. You cannot recover this object to the specified recovery point.

Recover this object and its co-requisite objects to a prior image copy or to a prior point in time when this object was NOT LOGGED.

**Lob Ts Alt Not Logged**

A LOB tablespace was selected for recovery to the current point in time but it has been altered to NOT LOGGED. You cannot recover this object to the specified recovery point.

Recover this object and its co-requisite objects to a prior image copy or to a prior point in time before this object was altered to NOT LOGGED.

**LogApply NotLog Invalid**

A NOT LOGGED object was selected for recovery but an image copy was not available.

Modify the recovery strategy to specify an image copy for this object or to specify a point of recovery where this object and its co-requisites were altered to NOT LOGGED.

**NLOG IC is Shrlevel Chg**

A NOT LOGGED object was selected for recovery but the image copy specified for its recovery is a SHRLEVEL CHANGE copy, which is not valid for NOT LOGGED objects.

Modify the recovery strategy to specify a SHRLEVEL REFERENCE copy for this object's recovery.

**No Recover to RBA**

On the Global Options panel, you entered R in the Recovery Point field to recover to a specific RBA, but there is not a recovery to RBA available.

Select a different recovery point using the Recovery Point field on the Global Options panel.

**Log Apply Recover Only**

The tablespace selected for recovery is recoverable via DB2 log apply only. This is because there are no entries in SYSIBM.SYSCOPY for the given database, tablespace, and partition.

**Sel Copy not in SYSCOPY**

You have entered an image copy to recover to, but the image copy is not listed in SYSIBM.SYSCOPY.

Select a different recovery point using the Recovery Point field on the Global Options panel.
RBA not in SYSCOPI
You have entered an RBA to recover to, but the RBA is not listed in SYSIBM.SYSCOPI.
You can recover to RBAs not registered in the catalog, but if the tablespace is a child in
an RI relationship, the child goes into check pending status even if the parent is
recovered to the same RBA.

Partial RCV Point Found
The tablespace selected for recovery is not recoverable because the tablespace has
been recovered via Point in Time recovery and an image copy was not done afterwards.
The tablespace is not recoverable unless an image copy is done before the recovery or
another recovery point is selected.

Load Repl Log No found
The tablespace selected for recovery is not recoverable because the tablespace has
reloaded via load utility, logging was turned off, and an image copy was not taken after
the load. This tablespace is not recoverable via a recover utility.

Reorg Log No found
The tablespace selected for recovery is not recoverable because the tablespace has
been reorganized with logging turned off and an image copy was not taken after the
reorg. This tablespace is not recoverable.

Load Log No found
The tablespace selected for recovery is not recoverable because some data has been
loaded via a load utility, logging was turned off, and an image copy was not taken after
the load. This tablespace is not recoverable via a recover utility.

No Image Copy found
You have requested that a tablespace be recovered to the last full or incremental image
copy, but the image copy could not be found.
Select another recovery point.

IC is Shrlevel Chg
You requested that a space be recovered to the last full or incremental image copy, but
the image copy was made with SHRLEVEL (CHANGE). Image copies made with SHRLEVEL
(CHANGE) might contain uncommitted data, because changes can occur as the copy is
made. The image copy might be inconsistent.

No Quiesce Point Found
You have requested that a tablespace be recovered to the last quiesce point, but a
quiesce point could not be found for the database, tablespace, and partition.
Select another recovery point.
Quiesce not Recoverable
You have requested that a tablespace be recovered to the last quiesce point. A quiesce point was found, but an invalid recovery point has been found before the quiesce. For example, if you reload a table with log no and quiesce the tablespace, the quiesce point is not a valid recovery point.

Fallback Process Reqd
The recovery point selected for recovery requires utility fallback processing. This happens when image copy data sets are deleted. The utility attempts to go back to the previous image copy and read the log forward. This message indicates that utility fallback processing will occur and probably work.

Fallback Process Failed
This is the same as the Fallback Process Reqd message shown previously, but the fallback processing will fail because an invalid recovery point was detected while trying to find another full image copy. The utility abends if this occurs.

Opt by Vol Disabled
You have requested that a tablespace be recovered to current, you are requesting an image copy before the recovery, and you do not catalog your image copies. The volume serial of your image copy cannot be determined before the job starts, so optimizing by volume (preallocating the tape and retaining the tape) cannot be done in this situation.

Checkpoint RBA not Avail
On the Global Options panel, you entered K in the Recovery Point field to recover to the last checkpoint restart RBA, but a checkpoint RBA is not available.
Select a different recovery point.

No archive logs in BSĐS
CA Recovery Analyzer allocated and attempted to read the BSĐS defined in the setup member of high-level.CDBAPARM but found no archive logs.
Verify that the BSĐS is correct in the setup member and verify that it has archive logs. For assistance, contact CA Support at http://ca.com/support.

RBA precedes archive lgs
The RBA you specified for recovery to is less than the RBA of the earliest archive log in the BSĐS. The archive log might not be needed.

Archive log not catalged
The tablespace being recovered requires you to recover via archive logs, but one or more of the archive logs required for the recovery is no longer cataloged. If the recover utility cannot allocate the logs, the recovery fails.
**PHASE: Resolve Co-Req Objects**

**Alt NL IX POR Has No Prev IC**
A COPY YES index was selected for recovery to a prior log RBA but the object it indexes has been altered to NOT LOGGED and no LOGGED=N image copy is available. You cannot recover this object to the specified recovery point.

Recover this object and its co-requisite objects to a prior image copy or to a prior point in time when a LOGGED=N image copy is available for this object's owning tablespace.

**Alt NL POR Has No Prev IC**
A NOT LOGGED base or LOB tablespace was selected for recovery to a prior log RBA but a LOGGED=N image copy is not available. You cannot recover this object to the specified recovery point.

Recover this object and its co-requisite objects to a prior image copy or to a prior point in time when a LOGGED=N image copy is available.

**Aux Ts Not Selected**
A NOT LOGGED object was selected for recovery but its co-requisite auxiliary tablespace was not selected.

Modify the recovery strategy to include the co-requisite auxiliary tablespace.

**Aux Ts Not Valid**
A NOT LOGGED object was selected for recovery but the recovery options for its co-requisite auxiliary tablespace were not valid.

Determine the error from the Retrieve Recovery Points display and correct the recovery strategy.

**Aux Ts RBA not Base Ts RBA**
A NOT LOGGED auxiliary object was selected for recovery to an RBA but the specified RBA is different than the RBA specified for the owning base object.

Modify the recovery strategy to specify an identical RBA for all related base and auxiliary objects.

**Aux Ts Rcv Conflicts**
A NOT LOGGED object was selected for recovery but the recovery options for its co-requisite auxiliary tablespace conflict with its owning base tablespace or those of its co-requisite objects.

Correct the recovery strategy by specifying the same recovery option for each object in the recovery set.
**Recovery Point Error Overview**

**Base TS Alt NL Lob Ts Was NL**

A base tablespace was selected for recovery to a prior log RBA in which it was NOT LOGGED, but one of its LOB tablespaces was already NOT LOGGED at that time. You cannot recover this object to the specified recovery point.

Recover this object and its co-requisite objects to a prior image copy or to a prior point in time before this base tablespace’s LOB was altered to NOT LOGGED.

**Base Ts Alt Not Logged**

A base tablespace that was previously LOGGED has been selected for recovery to the current point in time, but it has been altered to NOT LOGGED. You cannot recover this object to the current point in time.

Recover this object and its co-requisite objects to a prior image copy or to a prior point in time when this object was LOGGED.

**Base Ts Altered Logged**

A base tablespace that was previously NOT LOGGED was selected for recovery to the current point in time or to a prior log RBA but it has been altered to LOGGED. You cannot recover this object to the specified recovery point.

Recover this object and its co-requisite objects to a prior image copy or to a prior point in time when this object was NOT LOGGED.

**Base Ts Not Selected**

A NOT LOGGED object was selected for recovery but its owning base tablespace was not selected.

Modify the recovery strategy to include the owning base tablespace.

**Base Ts Not Valid**

A NOT LOGGED object was selected for recovery but the recovery options for its owning base tablespace were not valid.

Determine the error from the Retrieve Recovery Points display and correct the recovery strategy.

**Base Ts Part Not Selected**

A NOT LOGGED object was selected for recovery but its owning base tablespace partition was not selected.

Modify the recovery strategy to include the base tablespace partition.
Base Ts Part Not Valid
A NOT LOGGED object was selected for recovery but the recovery options are invalid for its owning base tablespace partition.
Determine the error from the Retrieve Recovery Points display and correct the recovery strategy.

Base Ts Rcv Conflicts
A NOT LOGGED object was selected for recovery but the recovery options for its owning base tablespace conflict with those of its co-requisite objects.
Correct the recovery strategy by specifying the same recovery option for each object in the recovery set.

Indx Not Selected
A NOT LOGGED object was selected for recovery but its co-requisite COPY YES indexspace was not selected.
Modify the recovery strategy to include the missing COPY YES indexspace.

Indx Not Valid
A NOT LOGGED object was selected for recovery but the recovery options for its co-requisite COPY YES indexspace were not valid.
Determine the error from the Retrieve Recovery Points display and correct the recovery strategy.

Indx Owner Alt Logged
A COPY YES index was selected for recovery to the current point in time or to a prior log RBA, but the object it indexes has been altered to LOGGED. You cannot recover this object to the specified point in time.
Recover this object and its co-requisite objects to a prior image copy or to a prior point in time before this object was altered to NOT LOGGED.

Indx Owner Alt Not Logged
A COPY YES index was selected for recovery to the current point in time but the object it indexes has been altered to NOT LOGGED. You cannot recover this object to the current point in time.
Recover this object and its co-requisite objects to a prior image copy or to a prior point in time before this object was altered to NOT LOGGED.
Recovery Point Error Overview

**Lob Ts Altered Logged**

A LOB tablespace was selected for recovery to the current point in time or to a prior log RBA but it has been altered to LOGGED. You cannot recover this object to the specified recovery point.

Recover this object and its co-requisite objects to a prior image copy or to a prior point in time when this object was NOT LOGGED.

**Lob Ts Alt Not Logged**

A LOB tablespace was selected for recovery to the current point in time but it has been altered to NOT LOGGED. You cannot recover this object to the specified recovery point.

Recover this object and its co-requisite objects to a prior image copy or to a prior point in time before this object was altered to NOT LOGGED.

**LogApply NotLog Invalid**

A NOT LOGGED object was selected for recovery but an image copy was not available.

Modify the recovery strategy to specify an image copy for this object or to specify a point of recovery where this object and its co-requisites were altered to NOT LOGGED.

**NLOG IC is Shrlevel Chg**

A NOT LOGGED object was selected for recovery but the image copy specified for its recovery is a SHRLEVEL CHANGE copy, which is not valid for NOT LOGGED objects.

Modify the recovery strategy to specify a SHRLEVEL REFERENCE copy for this object’s recovery.

**Recovery Set Incomplete – See accompanying messages**

A recovery object set contains a NOT LOGGED tablespace but one or more of its co-requisite objects have not been selected for recovery, or have invalid recovery options specified. The accompanying messages on this panel identify the missing and invalid objects.

Modify the recovery strategy to include the missing object or correct the invalid recovery specification.

**Sysc Log Not Object Log**

A NOT LOGGED object was selected for recovery but the logging attribute of the specified image copy conflicts with the current logging attribute of the object.

Modify the recovery strategy to specify an image copy whose logging attribute matches the current logging attribute of the object.
**PHASE: Validate IC Space Quantities**

**Space Quantity Defaulted**
You have requested an image copy and default values were used for the image copy data set space allocations.

**PHASE: Build Image Copy Datasets**

**All IC Types turned off**
You have selected a tablespace for an image copy, and you have turned off IC types (Local Primary, Local Backup, Recovery Site Primary and Recovery Site Backup).

In the Advanced options via Global recovery options, select 1 for image copy options and then enter Y for one of the Image Copy Types (LP, LB, RP, or RB).

**GDG Not Last IC Qualif**
You have selected a tablespace for an image copy and you have requested a GDG entry as one of your IC data set qualifiers. The GDG option is valid only if it is the last qualifier.

In the profile, enter Y to change image copy qualifiers, and then move 17 to the end of the qualifier list.

**DSN expands past 44 char**
You have selected a tablespace for an image copy and you have requested a GDG entry as one of your IC data set qualifiers. When the GDG entry was expanded, the generated image copy data set name exceeded 44 characters.

In the profile, enter Y in the Change IC DSN Qualifier Order field to change image copy qualifiers, and then remove one or more of the qualifiers from the list to shorten the data set name.

**DSN exceeds 44 char**
You have selected a tablespace for an image copy but the image copy qualifiers you selected will cause the data set name to exceed 44 characters.

In the profile, enter Y in the Change IC DSN Qualifier Order field to change image copy qualifiers, and then remove one or more of the qualifiers from the list to shorten the data set name.

**Generated qualifier invl**
You specified a qualifier on the Image Copy Before or After DSN Qualifiers panel, but the image copy data set name is invalid because the qualifier as generated exceeds eight characters.

If you exclude the period between qualifiers (option 22), make sure that the generated qualifier does not exceed eight characters.

**Note:** For more information, see the “Profile” chapter.
IC Before/After XX No GDG base

You have selected a tablespace for an image copy and you have requested a GDG entry as one of your IC data set qualifiers. CA Recovery Analyzer validates GDGs to see if a base exists in the MVS catalog. A base could not be found for this tablespace's IC data set names.

Create a GDG base for the data sets or remove the GDG qualifier from your profile.

IC Before/After XX Already Catlg

You have selected a tablespace for an image copy and you have requested in your profile that you want to catalog your image copies, but the data set name generated or entered is already cataloged.

Change the number of the image copy in the Global Options or add IC qualifiers of date, time, timestamp or random number that make the data set name unique. XX denotes LP, LB, RP, or RB.

IC DSN Qualifer Invalid

On the Image Copy Before or After DSN Qualifiers panel, you entered a letter or an invalid number in one of the option fields.

Change the invalid qualifier to a number from 1 to 24.

backup type GDG DSN bef not ctlgd

You specified to make image copies before the recovery using GDGs, but you indicated that you do not want to catalog the image copies. When using GDGs, you must catalog the image copies.

On the Copy/Rcvr/Chk Opts for IBM/CA panel, change the Catl field to Y for the image copy backup type. Or, on the Image Copy Before DSN Qualifiers panel, change the image copy data set to not use GDGs.

Backup type is LP, LB, RP, or RB.

backup type GDG DSN aft not ctlgd

You specified to make image copies after the recovery using GDGs, but you indicated that you do not want to catalog the image copies. When using GDGs, you must catalog the image copies.

On the Copy/Rcvr/Chk Opts for IBM/CA panel, change the Catl field to Y for the image copy backup type. Or, on the Image Copy After DSN Qualifiers panel, change the image copy data set to not use GDGs.

Backup type is LP, LB, RP, or RB.
PHASE: Retrieve SYSUTI Quantities

Spc Qty not Available
CA Recovery Analyzer was attempting to determine the SYSUT1 DD space quantities required for an IBM RECOVER utility but had trouble finding the information required to complete this function.
Review SYSUT1 DD in the recover step for accuracy.

PHASE: Explode Autobuild Spaces

No Spaces Match Criteria
You specified selection criteria for recovery, but CA Recovery Analyzer found no spaces that match the selection criteria.
Respecify the selection criteria.

PHASE: Explode Plans

No Plans Match
CA Recovery Analyzer could not find any plans on the current subsystem that match the selection criteria you entered.

Plan not Found
CA Recovery Analyzer could not find the plan on the current subsystem that you specified.
Verify the name of the plan.

No Plan Dependencies
The plan you specified in your recover strategy does not have any spaces associated with it.

PHASE: Explode Packages

Package Not Found
CA Recovery Analyzer could not find the package on the current subsystem that you specified.
Verify the name of the package.
PHASE: Check for Duplicate Recv

Index Recovered Twice
You requested recovery of a tablespace and its indexes (by entering Y in the Include Indexes field on the Global Strategy Options panel), then also explicitly included the associated indexspace in your recovery. This results in the index being recovered twice.

Set the included indexes option to N or remove the indexspace from your recovery strategy to avoid recovering the index twice.

Runstats run twice
You requested recovery of a tablespace and its indexes (by entering Y in the Include Indexes field on the Global Strategy Options panel), then also explicitly included the associated indexspace in your recovery. This results in the index being recovered twice. You also requested that RUNSTATS be run as part of the recovery, and this results in RUNSTATS being run twice for the same tablespace.

Set the included indexes option to N or remove the indexspace from your recovery strategy.

PHASE: Checking for Duplicate Utility IDs

Ukwn ret f/display = xxxxx
An internal DB2 error occurred, in which xxxxx represents the return code from DB2.

nnnn Utl Act for xxxxxxx
The utility named nnnn is already active for user ID xxxxxxx. The value nnnn can be any of the following:
- COPY—The COPY utility
- RCVR—The RECOVER utility
- RNST—The RUNSTATS utility
- QUIE—The QUIESCE utility
- CHKD—The CHECK utility

Inv Retcde from -DISP UT
The -DISPLAY UT command resulted in an invalid return code.

Note: For information about DISPLAY utility return codes, see the IBM Utilities Guide.

Plat Util=COPY Active
The CA Quick Copy utility is active on the tablespace you selected for recovery.
Plat Util=LOAD Active
The CA Fast Load utility is active on the tablespace you selected for recovery.

Plat Util=REORGTS Active
The CA Rapid Reorg utility is active on the tablespace you selected for recovery.

Plat Util=REORGIX Active
The CA Rapid Reorg utility is active on the indexspace you selected for recovery.

Plat Util=BUILDIX Active
The CA Fast Index utility is active on the tablespace you selected for recovery.

Plat Util=UNLOAD Active
The CA Fast Unload utility is active on the tablespace you selected for recovery.

Plat Util=UNKNOWN Active
An unknown CA Database Management Solutions utility is active on the tablespace you selected for recovery.

**PHASE: Check TS/IX Status**

**st in Deferred/ Restart**
The tablespace, indexspace, or partition is marked for a deferred restart. Values for st can be TS or IX.

**st requires Indoubt proc**
Indoubt processing is required for the indexspace and tablespace, or for only the tablespace. Values for st can be TS or IX.

**st suffered open failure**
The tablespace, indexspace, or partition had an open data set failure. Values for st can be TS or IX.

**st in page set Rcvr pend**
The indexspace is in a page set recover pending state. Values for st can be TS or IX.

**st has a prob w/log RBA**
The tablespace or indexspace was implicitly stopped because of a problem with the log RBA in a page. Values for st can be TS or IX.

Look at the message log to determine the nature of the problem.
**st has a stop pending**

A stop is pending for the database, tablespace, indexspace, or partition. Values for *st* can be TS or IX.

**st in check pending stat**

The tablespace or a partition is in check pending status. Value for *st* can be TS.

**st in copy pending State**

The tablespace or a partition is in copy pending state. An image copy is required for the object. Value for *st* can be TS.

**st in recover pending st**

The tablespace, indexspace, or partition is in recover pending state. Values for *st* can be TS or IX.

**st is being Restarted**

The tablespace or indexspace is being restarted. Values for *st* can be TS or IX.

**st is Currently Stopped**

The database, tablespace, indexspace, or partition is stopped. Values for *st* can be TS or IX.

**st in Utility/ Read Only**

A utility that permits RO access is currently in process on the tablespace, indexspace, or partition. Values for *st* can be TS or IX.

**st in Utility/ Read Write**

A utility that permits RW access is currently in process on the tablespace, indexspace, or partition. Values for *st* can be TS or IX.

**st in Utility/ UT Status**

A utility that permits UT access is currently processing on the tablespace, indexspace, or partition.

**st is Started/ Read only**

The database, tablespace, indexspace, or partition is started for read-only processing.
**Recovery Point Error Overview**

**Appendix C: Selected Recovery Point Errors and Remedies**

*st in Utility Access only*
The database, tablespace, indexspace, or partition is started for utility processing only.

*st in Group BP rcvr Pend*
The database, tablespace, indexspace, or partition is in Group Buffer Pool recover pending status because of a group buffer pool failure.

*st in Logical Page List*
The database, tablespace, indexspace, or partition is in logical page list status. Some pages might not have been read from or written to the group buffer pool or DASD because of a failure.

**TS Aux Space in ACHKP**
CA Recovery Analyzer has detected that the auxiliary space belonging to this tablespace is in auxiliary check pending (ACHKP) status. The auxiliary space is unavailable for normal processing until this status is resolved.

Use CA Fast Check to check the auxiliary tablespace and remove the ACHKP flag.

**PHASE: Read ZPARM Information**

**Length Of Record Mismatch**
An inconsistency was found with the release level of DB2 you are running compared to what was specified at installation.

Check the version of DB2 you are running. For assistance, contact CA Support at [http://ca.com/support](http://ca.com/support).

**Get Failure In BSDS Read**
CA Recovery Analyzer was unable to successfully read the BSDS. An error occurred during a record fetch.

Verify that the BSDS is available. For assistance, contact CA Support at [http://ca.com/support](http://ca.com/support).

**BSDS File Open Failure**
The BSDS could not be opened. This could be because of a security violation or because the BSDS does not exist.

Verify that the BSDS is available.

**A Gen Cntrl Block Failed**
CA Recovery Analyzer was unable to build the internal control blocks that provide the read of the BSDS. An internal error occurred.

For assistance, contact CA Support at [http://ca.com/support](http://ca.com/support).
**BSDS Allocation Failure Reason 1=rsn_code1, 2=rsn_code2**

The allocation of the BSDS during ZPARM processing failed. The return code and reason codes determine the text you see. The text describes the nature of the error.

**DB2 SSID not in list**

The subsystem parameter passed to the batch program was not found in the CA parmlib member SETUP.

For assistance, contact CA Support at [http://ca.com/support](http://ca.com/support).

**PHASE: FDR Files Allocate and Open**

**Loadlib Open Failure**

The FDR load library specified in parmlib member PRA cannot be opened.

Determine the reason the load library cannot be opened. For assistance, contact CA Support at [http://ca.com/support](http://ca.com/support).

**Loadlib allocation fail**

**Reasons=reasons**

The FDR load library specified in parmlib member PRA cannot be found.

If FDR is installed under MVS at your site, remove the FDR load library name from parmlib member PRA; the libraries are located through MVS. Otherwise, correct the load library name in parmlib member PRA.

**CNTL file alloc fail**

**Reasons=reasons**

The FDR archive control file specified in parmlib member PRA cannot be allocated.

Determine the reason the file cannot be allocated. For assistance, contact CA Support at [http://ca.com/support](http://ca.com/support).
PHASE: Validate Image Copy DSNs

MVS Catalog Locate Fail
The LOCATE (SVC 26) function failed when CA Recovery Analyzer attempted to find the image copy data set name in the z/OS ICF catalog. This error may be due to a structural problem in the catalog.
Contact CA Support and provide the error code from DSLC_VSAM_RETCDE and any other error messages that appear in the job log.

IC [Bef Aft] [LP LB RP RB] No GDG Base
CA Recovery Analyzer cannot define a GDG base for this image copy data set because the Auto define GDG base for ICs field on the Recovery Strategy Options panel is set to 000.
Specify a different value in the Auto define GDG base for ICs field.

IC [Bef Aft] [LP LB RP RB] GDG Created
A GDG base does not exist but will be created for this image copy data set.
No action is required. This message is informational only.

IC [Bef Aft] [LP LB RP RB] Already Catlg
The data set name to be used for an image copy already exists. The utility job fails.
Change your image copy "before" and "after" DSN qualifiers so that CA Recovery Analyzer generates a unique data set name. These qualifiers are specified as part of your profile settings.

More information:
Define Profile Settings (see page 31)
Appendix D: CA Recovery Analyzer Health Checks

This appendix describes health checks for CA Recovery Analyzer. The product owner for all CA Recovery Analyzer health checks is CA_DB2.

Parameter Overrides for CA Recovery Analyzer Health Checks

The IBM Health Checker for z/OS lets you override selected default parameters by specifying desired defaults on the POLICY statement in the HZSPRMxx member of SYS1.PARMLIB. This is useful in changing values such as INTERVAL to a value more appropriate for your installation.

Note: For a complete list of parameters that can be overridden, see the IBM Health Checker for z/OS User’s Guide.

You can also write individual checks to support parameter overrides by using the PARM() parameter on the POLICY statement. These parameters can also be overridden by using the MODIFY command to pass the desired parameters to the IBM Health Checker for z/OS started task.

An example of an individual check follows. F is the short version of the MODIFY command:

F HZS,UPDATE,CHECK(CA_DB2, DB2_PRA_#LOAD_LAST_RUN@XMAN9999),PARM='PRA#LOAD_RANGE(8)'
DB2_PRA_PARM_LEVEL@xmanxxxx

Description
This CA Recovery Analyzer health check monitors the release level of the PRA parmlib member to determine whether it is current. This check runs daily.

Best Practice
Customize your PRA parmlib member. Also instruct each CA Recovery Analyzer user to refresh his or her individual profile from the updated parmlib member by using the REFPROM line command.

Parameters Accepted
None.

Debug Support
No.

Verbose Support
No.

Reference
For instructions on customizing the PRA parmlib member, see the CA Database Management Solutions for DB2 for z/OS Implementation Guide.

Messages
See the CA Database Management Solutions for DB2 for z/OS Message Reference Guide (AGT to PRR).
**DB2_PRA_TAPE_RETENTION@xmanxxxx**

**Description**

This CA Recovery Analyzer health check monitors the settings for the PRA parmlib parameter Retention Period For Tapes (RETENTION_PERIOD) or Expiration Date For Tapes (EXPIRATION_DATE). This check runs daily.

**Best Practice**

Setting the tape retention or expiration parameters to a user-specified value helps ensure that any tape files that are created, particularly image copies, will conform to local standards.

**Parameters Accepted**

The following parameters can be set in the PRA parmlib member:

- **Retention Period for Tapes**
  - This field specifies the number of days that tapes remain in the MVS catalog before they are automatically scratched.
  - **Default:** 0010

- **Expiration Date For Tapes**
  - This field specifies an expiration date for tapes generated by CA Recovery Analyzer. The tapes are automatically scratched after that date. The date must be in the format YYDDD or YYYYDDD.
  - **Note:** These two fields are mutually exclusive. Specify a value for only one of them.

**Debug Support**

No.

**Verbose Support**

No.

**Reference**

For instructions on setting PRA parmlib parameters, see the *CA Database Management Solutions for DB2 for z/OS Implementation Guide*.

**Messages**

See the *CA Database Management Solutions for DB2 for z/OS Message Reference Guide (AGT to PRR)*.
DB2_PRA_#LOAD_LAST_RUN@xmanxxxx

Description

This CA Recovery Analyzer health check monitors the interval, in hours, between the current time and the last time that PRA#LOAD was executed. If the number of hours exceeds the PRA#LOAD_RANGE value that you specify, an exception message is issued. Otherwise, an informational message is issued.

This check runs every eight hours. If the PRA#LOAD_RANGE value is exceeded, this check runs every four hours until the PRA#LOAD job is run.

Best Practice

PRA#LOAD must be run on every DB2 subsystem on which you plan to use CA Recovery Analyzer. Running PRA#LOAD regularly minimizes the time required to perform a recovery analysis because it enables CA Recovery Analyzer to retrieve object information from its own internal tables instead of the DB2 catalog tables.

Parameters Accepted

The following parameter can be set using the PARM parameter in the POLICY statement of SYS1.PARMLIB(HZSPRMxx):

PRA#LOAD_RANGE(nnn)

Specifies the maximum acceptable interval between PRA#LOAD job executions. If the interval between PRA#LOAD executions exceeds the specified interval, the DB2_PRA_#LOAD_LAST_RUN@xmanxxxx health check issues an exception message.

If you determine that PRA#LOAD must be executed more frequently (for example, if CA Recovery Analyzer users are unable to find newly created objects, or must sort through lists of dropped objects), you can specify a shorter interval for this parameter. The resulting health check exception messages will alert you when PRA#LOAD needs to be run.

Default: 24

Limits: 1–168 hours

Note: You can also change this parameter dynamically by using the MODIFY console command, as shown in the following example. F is the short version of the MODIFY command:

F hzsproc,UPDATE,CHECK=(CA_DB2, DB2_PRA_#LOAD_LAST_RUN@xmanxxxx),PARM='PRA#LOAD_RANGE(8)'

Debug Support

No.

Verbose Support

No.

Reference
For more information about PRA#LOAD, see The PRA#LOAD Batch Job (see page 20).

**Messages**

See the CA Database Management Solutions for DB2 for z/OS Message Reference Guide (AGT to PRR).

**More information:**

How Often to Run the PRA#LOAD Job (see page 22)
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