



Program Directory for IBM Db2 Recovery Expert for z/OS

V03.02.00

Program Number 5655-W78

FMIDs H30R320, H30RKN0

for use with
z/OS

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Note

Before using this information and the product it supports, be sure to read the general information under 7.0, "Notices" on page 27.

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1.0 Introduction

This program directory is intended for system programmers who are responsible for program installation and maintenance. It contains information about the material and procedures associated with the installation of IBM Db2 Recovery Expert for z/OS. This publication refers to IBM Db2 Recovery Expert for z/OS as Db2 Recovery Expert.

The Program Directory contains the following sections:

- 2.0, “Program Materials” on page 4 identifies the basic program materials and documentation for Db2 Recovery Expert.
- 3.0, “Program Support” on page 7 describes the IBM support available for Db2 Recovery Expert.
- 4.0, “Program and Service Level Information” on page 9 lists the APARs (program level) and PTFs (service level) that have been incorporated into Db2 Recovery Expert.
- 5.0, “Installation Requirements and Considerations” on page 10 identifies the resources and considerations that are required for installing and using Db2 Recovery Expert.
- 6.0, “Installation Instructions” on page 18 provides detailed installation instructions for Db2 Recovery Expert. It also describes the procedures for activating the functions of Db2 Recovery Expert, or refers to appropriate publications.

Before installing Db2 Recovery Expert, read the *CBPDO Memo To Users* and the *CBPDO Memo To Users Extension* that are supplied with this program in softcopy format and this program directory; then keep them for future reference. Section 3.2, “Preventive Service Planning” on page 7 tells you how to find any updates to the information and procedures in this program directory.

Db2 Recovery Expert is supplied in a Custom-Built Product Delivery Offering (CBPDO, 5751-CS3). The program directory on the CBPDO tape is identical to the hardcopy format if one was included with your order. All service and HOLDDATA for Db2 Recovery Expert are included on the CBPDO tape.

Do not use this program directory if you install Db2 Recovery Expert with a Solution Pack. When you use one of those offerings, use the jobs and documentation supplied with the offering. The offering will point you to specific sections of this program directory as needed.

1.1 Db2 Recovery Expert Description

IBM Db2 Recovery Expert for z/OS, V3.2 (5655-W78) provides a simple, self-managing recovery solution that facilitates database recovery operations with minimal disruption. Db2 Recovery Expert for z/OS enables intelligent analysis of altered, incorrect, or missing database assets, including table spaces, tables, indexes, and data. It automates the process of rebuilding these assets to a specified point in time, often without taking the database or the business operations offline.

Db2 Recovery Expert for z/OS supplies a high availability solution for companies concerned with 24 x 7 operations. By taking advantage of the latest storage system replication features, Db2 Recovery Expert for z/OS can perform system-level backups quickly with little or no impact on running applications. Valuable host CPU and I/O time is saved by using the storage processor to make the copy instead of z/OS.

Db2 Recovery Expert for z/OS provides:

- Backup features that exploit sophisticated storage processor capabilities, enabling:
 - High application availability while data is quickly backed up to a consistent copy of production data
 - Reduction of CPU and I/O costs by using the storage processor to copy the data instead of z/OS
 - Reduced database administrator time and effort while executing fast replication processing
 - Automated validation at the time of backup to confirm the recovery of all objects or the complete Db2 subsystem
- Automated recovery features that can help:
 - Save valuable time when recovering entire Db2 subsystems from system backups using fast replication.
 - Significantly reduce downtime and the associated costs of this downtime when recovering database objects or groups of objects to a specific point in time from fast replication backups.
 - Simplify Db2 subsystem disaster recovery and restart.
- An "intelligent recovery manager" that can help to significantly reduce recovery time and effort by providing the information users need to quickly decide upon the best recovery point and the best recovery method for their use. The intelligent recovery manager can help users to:
 - Easily recover dropped objects, including recovering the data to a point in time before the drop.
 - Reduce manual efforts by identifying recovery points. The recovery manager analyzes the Db2 log to find quiet times or points of consistency for a single object or a group of objects that can be used for recovery points.
 - Generate SQL-based recoveries that can roll-forward or back-out changes to individual tables or groups of objects, a recovery process that is unique among IBM Db2 recovery tools.
 - Simplify the process of recovering an object or set of objects to a prior version of an application, even if the object's DDL has changed.
 - Quickly choose the most appropriate and cost-efficient method of recovery by analyzing all recovery assets and presenting several recovery plans or methods with a relative cost for each method.

Db2 Recovery Expert for z/OS, V3.2 includes the following enhancements:

- Provides users the capability to undo a transaction or transactions based on selection criteria. Recoveries will be done in a transactionally consistent manner where all operations of a transaction are undone.
- Allows a recovery to an alternate location. The user will be able to recover to either another object on the same subsystem or to an object on a different subsystem. Using this feature, they will be able to simulate a production problem or test out a recovery solution before executing it in their production environment. To provide that stated RTO objectives have been met, users want the ability to run a true recovery, but not have it affect their sensitive environments.

- Delivers an effective way to prioritize the recovery of applications. Through the use of application profile groupings, the user can define and utilize priorities in operations such as creating image copies, analyzing quiet times, and performing application and disaster recovery.
- With a single process, customers of both IBM IMS Recovery Expert, V2.2 and Db2 Recovery Expert, V3.2 will be able to create a Combined System Level Backup (CSLB) that includes one or more Database Management Systems (DBMSs) and is created at a consistent point in time for all DBMSs in the CSLB. The DBMSs in the CSLB can be all of the same type (all IMS or all Db2) or mixed (one or more IMS and one or more Db2). Data consistency for volumes included in the Combined SLB is provided using storage-based consistency. The CSLB can be used for disaster recovery, local object recovery, or local subsystem restore.

1.2 Db2 Recovery Expert FMIDs

Db2 Recovery Expert consists of the following FMIDs:

H30R320
H30RKN0

2.0 Program Materials

An IBM program is identified by a program number. The program number for Db2 Recovery Expert is 5655-W78.

Basic Machine-Readable Materials are materials that are supplied under the base license and are required for the use of the product.

The program announcement material describes the features supported by Db2 Recovery Expert. Ask your IBM representative for this information if you have not already received a copy.

2.1 Basic Machine-Readable Material

The distribution medium for this program is physical media or downloadable files. This program is in SMP/E RELFILE format and is installed by using SMP/E. See 6.0, "Installation Instructions" on page 18 for more information about how to install the program.

Figure 1 describes the program file content for Db2 Recovery Expert.

Figure 2 on page 5 describes the program file content for Db2 Recovery Expert Edition Identifier Module. You can refer to the *CBPDO Memo To Users Extension* to see where the files reside on the tape.

Notes:

1. The data set attributes in this table must be used in the JCL of jobs that read the data sets. However, because the data sets are in IEBCOPY unloaded format, their actual attributes might be different.
2. If any RELFILEs are identified as PDSEs, ensure that SMPTLIB data sets are allocated as PDSEs.

Figure 1 (Page 1 of 2). Program File Content Db2 Recovery Expert

Name	ORG	RECFM	LEN	BLK SIZE
SMPMCS	SEQ	FB	80	6400
IBM.H30R320.F1	PDS	FB	80	8800
IBM.H30R320.F2	PDSE	U	0	6144
IBM.H30R320.F3	PDS	FB	80	8800
IBM.H30R320.F4	PDS	FB	80	8800
IBM.H30R320.F5	PDS	FB	80	8800
IBM.H30R320.F6	PDS	FB	80	8800

Figure 1 (Page 2 of 2). Program File Content Db2 Recovery Expert

Name	ORG	FORM	REL	BLK SIZE
IBM.H30R320.F7	PDS	FB	80	8800
IBM.H30R320.F8	PDS	VB	133	6233
IBM.H30R320.F9	PDS	FB	80	8800
IBM.H30R320.F10	PDS	FB	80	8800
IBM.H30R320.F11	PDS	FB	80	8800
IBM.H30R320.F12	PDS	FB	80	8800
IBM.H30R320.F13	PDS	FB	80	8800

Figure 2. Program File Content for Db2 Recovery Expert Edition Identifier Module

Name	ORG	FORM	REL	BLK SIZE
SMPMCS	SEQ	FB	80	6400
IBM.H30RKN0.F1	PDS	FB	80	8800
IBM.H30RKN0.F2	PDSE	U	0	6144
IBM.H30RKN0.F3	PDS	FB	80	8800

2.2 Optional Machine-Readable Material

No optional machine-readable materials are provided for Db2 Recovery Expert.

2.3 Program Publications

The following sections identify the basic publications for Db2 Recovery Expert.

Figure 3 identifies the basic unlicensed publications for Db2 Recovery Expert.

Publications can be obtained from the following IBM Publications Center websites:
<https://www-05.ibm.com/e-business/linkweb/publications/servlet/pbi.wss>

Figure 3. Basic Material: Unlicensed

Publication Title	Form Number	Media Format
IBM Db2 Recovery Expert for z/OS License Information	SC19-3685	https://www-03.ibm.com/software/sla/sladb.nsf
IBM Db2 Recovery Expert for z/OS User's Guide	SC27-4569	https://www.ibm.com/support/knowledgecenter/SSAUTW_3.2.0/topics/kc_welcome.html

2.3.1 Optional Program Publications

No optional publications are provided for Db2 Recovery Expert.

2.4 Program Source Materials

No program source materials or viewable program listings are provided for Db2 Recovery Expert.

2.5 Publications Useful During Installation

You might want to use the publications listed in Figure 4 during the installation of Db2 Recovery Expert.

Figure 4. Publications Useful During Installation

Publication Title	Form Number	Media Format
<i>IBM SMP/E for z/OS User's Guide</i>	SA23-2277	https://www.ibm.com/support/knowledgecenter/SSLTBW_2.1.0/com.ibm.zos.v2r1.gim/gim.html
<i>IBM SMP/E for z/OS Commands</i>	SA23-2275	https://www.ibm.com/support/knowledgecenter/SSLTBW_2.1.0/com.ibm.zos.v2r1.gim/gim.html
<i>IBM SMP/E for z/OS Reference</i>	SA23-2276	https://www.ibm.com/support/knowledgecenter/SSLTBW_2.1.0/com.ibm.zos.v2r1.gim/gim.html
<i>IBM SMP/E for z/OS Messages, Codes, and Diagnosis</i>	GA32-0883	https://www.ibm.com/support/knowledgecenter/SSLTBW_2.1.0/com.ibm.zos.v2r1.gim/gim.html

3.0 Program Support

This section describes the IBM support available for Db2 Recovery Expert.

3.1 Program Services

Contact your IBM representative for specific information about available program services.

3.2 Preventive Service Planning

Before you install Db2 Recovery Expert, make sure that you have reviewed the current Preventive Service Planning (PSP) information. Review the PSP Bucket for General Information, Installation Documentation, and the Cross Product Dependencies sections. For the Recommended Service section, instead of reviewing the PSP Bucket, it is recommended you use the IBM.ProductInstall-RequiredService fix category in SMP/E to ensure you have all the recommended service installed. Use the **FIXCAT(IBM.ProductInstall-RequiredService)** operand on the **APPLY CHECK** command. See 6.1.10, "Perform SMP/E APPLY" on page 22 for a sample APPLY command.

If you obtained Db2 Recovery Expert as part of a CBPDO, HOLDDATA is included.

If the CBPDO for Db2 Recovery Expert is older than two weeks by the time you install the product materials, you can obtain the latest PSP Bucket information by going to the following website:

<http://www14.software.ibm.com/webapp/set2/psearch/search?domain=psp>

You can also use S/390 SoftwareXcel or contact the IBM Support Center to obtain the latest PSP Bucket information.

For program support, access the Software Support website at <https://www.ibm.com/support/home/>.

PSP Buckets are identified by UPGRADEs, which specify product levels; and SUBSETs, which specify the FMIDs for a product level. The PSP SUBSET name reflects the FMID that was updated and the corresponding CBPDO weekly service tape that was used to supply the integrated PTFs, (for example: FMID/YYWW, where YY is the year and WW is the week of the CBPDO weekly service tape).

The UPGRADE and SUBSET values for Db2 Recovery Expert are included in Figure 5.

UPGRADE	SUBSET	Description
5655W78	H30R320/2043	Db2 Recovery Expert
5655W78	H30RKN0/2043	Db2 Recovery Expert Edition Identifier

3.3 Statement of Support Procedures

Report any problems which you feel might be an error in the product materials to your IBM Support Center. You may be asked to gather and submit additional diagnostics to assist the IBM Support Center in their analysis.

Figure 6 on page 8 identifies the component IDs (COMPID) for Db2 Recovery Expert.

<i>Figure 6. Component IDs</i>			
FMID	COMPID	Component Name	RETAIN Release
H30R320	5697H7400	Db2 Recovery Expert	320
H30RKN0	5697H7400	Db2 Recovery Expert Edition Identifier	KN0

4.0 Program and Service Level Information

This section identifies the program and relevant service levels of Db2 Recovery Expert. The program level refers to the APAR fixes that have been incorporated into the program. The service level refers to the PTFs that have been incorporated into the program.

4.1 Program Level Information

APAR fixes against this release of Db2 Recovery Expert have been incorporated into this product package. For a list of included fixes, examine the ++VER statement in the product's SMPMCS.

4.2 Service Level Information

PTFs containing APAR fixes against this release of Db2 Recovery Expert have been incorporated into this product package. For a list of included PTFs, examine the ++VER statement in the product's SMPMCS.

Frequently check the Db2 Recovery Expert PSP Bucket for HIPER and SPECIAL attention PTFs against all FMIDs that you must install. You can also receive the latest HOLDDATA, then add the **FIXCAT(IBM.PRODUCTINSTALL-REQUIRESERVICE)** operand on your APPLY CHECK command. This will allow you to review the recommended and critical service that should be installed with your FMIDs.

5.0 Installation Requirements and Considerations

The following sections identify the system requirements for installing and activating Db2 Recovery Expert. The following terminology is used:

- *Driving system*: the system on which SMP/E is executed to install the program.
The program might have specific operating system or product level requirements for using processes, such as binder or assembly utilities during the installation.
- *Target system*: the system on which the program is configured and run.
The program might have specific product level requirements, such as needing access to the library of another product for link-edits. These requirements, either mandatory or optional, might directly affect the element during the installation or in its basic or enhanced operation.

In many cases, you can use a system as both a driving system and a target system. However, you can make a separate IPL-able clone of the running system to use as a target system. The clone must include copies of all system libraries that SMP/E updates, copies of the SMP/E CSI data sets that describe the system libraries, and your PARMLIB and PROCLIB.

Use separate driving and target systems in the following situations:

- When you install a new level of a product that is already installed, the new level of the product will replace the old one. By installing the new level onto a separate target system, you can test the new level and keep the old one in production at the same time.
- When you install a product that shares libraries or load modules with other products, the installation can disrupt the other products. By installing the product onto a separate target system, you can assess these impacts without disrupting your production system.

5.1 Driving System Requirements

This section describes the environment of the driving system required to install Db2 Recovery Expert.

5.1.1 Machine Requirements

The driving system can run in any hardware environment that supports the required software.

5.1.2 Programming Requirements

Figure 7. Driving System Software Requirements

Program Number	Product Name	Minimum VRM	Minimum Service Level will satisfy these APARs	Included in the shipped product?
5650-ZOS	z/OS	V02.02.00	N/A	No

Note: SMP/E is a requirement for Installation and is an element of z/OS but can also be ordered as a separate product, 5655-G44, minimally V03.06.00.

Note: Installation might require migration to new z/OS releases to be service supported. See <https://www.ibm.com/it-infrastructure/z/zos>.

5.2 Target System Requirements

This section describes the environment of the target system required to install and use Db2 Recovery Expert.

Db2 Recovery Expert installs in the DBS (P115) SREL.

5.2.1 Machine Requirements

The target system can run in any hardware environment that supports the required software.

5.2.2 Programming Requirements

5.2.2.1 Installation Requisites

Installation requisites identify products that are required and *must* be present on the system or products that are not required but *should* be present on the system for the successful installation of this product.

Mandatory installation requisites identify products that are required on the system for the successful installation of this product.

Db2 Recovery Expert has no mandatory installation requisites.

Conditional installation requisites identify products that are *not* required for successful installation of this product but can resolve such things as certain warning messages at installation time.

Db2 Recovery Expert has no conditional installation requisites.

5.2.2.2 Operational Requisites

Operational requisites are products that are required and *must* be present on the system or products that are not required but *should* be present on the system for this product to operate all or part of its functions.

Mandatory operational requisites identify products that are required for this product to operate its basic functions.

<i>Figure 8. Target System Mandatory Operational Requisites</i>	
Program Number	Product Name and Minimum VRM/Service Level
5655-V93	IBM Tools Base For z/OS V01.04.00* - HTCZ110, (IBM Tools Customizer for z/OS)
Any one of the following:	
5615-DB2	Db2 for z/OS V11.01.00
5697-P43	Db2 for z/OS Value Unit Edition V11.01.00
5650-DB2	Db2 for z/OS V12.01.00
5770-AF3	Db2 for z/OS Value Unit Edition V12.01.00

Note: *IBM Tools Base for z/OS, (5655-V93) is a mandatory operational requisite for Db2 Recovery Expert. IBM Tools Base for z/OS is a no-charge product that must be separately ordered. Tools Base contains IBM Tools Customizer for z/OS, FMID HTCZ110, which must be installed in order to customize Db2 Recovery Expert. Refer to the IBM Tools Base for z/OS, Program Directory (GI10-8819) for installation instructions.

Conditional operational requisites identify products that are *not* required for this product to operate its basic functions but are required at run time for this product to operate specific functions.

<i>Figure 9 (Page 1 of 2). Target System Conditional Operational Requisites</i>		
Program Number	Product Name and Minimum VRM/Service Level	Function
n/a	EMC Symmetrix 6 or later running with microcode 5x67 or later	Required for BVC and SNAP backups
n/a	Microcode 5x67 with patch 14882, 5x68 with patch 18954, or 5x69, or later, for use of Enginuity Consistency Assist (ECA).	Required for BVC and SNAP backups
n/a	The EMC SNAP library must be level 5.5, or later, to use ECA with SNA	Required for BVC and SNAP backups
5650-ZOS	z/OS V02.02.00 or higher, DFSMSHsm, DFSMSdss and FlashCopy V01.00.00	Use of FlashCopy system level backups requires FlashCopy 1

Figure 9 (Page 2 of 2). Target System Conditional Operational Requisites

Program Number	Product Name and Minimum VRM/Service Level	Function
5650-ZOS	z/OS V02.02.00 or higher, DFSMSHsm, DFSMSdss and FlashCopy V02.00.00	Required for object level recovery using system level backups (Db2 System Backup and FlashCopy Backups). Object Level Recovery using FlashCopy system level backups require FlashCopy 2.
5650-ZOS	z/OS V02.02.00 or higher, DFSMSdss Encryption Facility	DFSMSdss requirement to perform encryption during offloads
5650-ZOS	z/OS V02.02.00 or higher, IBM Cryptographic Services Facility (ICSF)	DFSMSdss requirement to perform encryption during offloads
Any one of the following product combinations:		
5615-DB2	Db2 for z/OS V11.01.00	
5655-W87	IBM Db2 Utilities Suite for z/OS V11.01.00	
or		
5697-P43	Db2 for z/OS Value Unit Edition V11.01.00	
5655-W87	IBM Db2 Utilities Suite for z/OS V11.01.00	
or		
5650-DB2	Db2 for z/OS V12.01.00	
5655-W87	IBM Db2 Utilities Suite for z/OS V12.01.00	
or		
5770-AF3	Db2 for z/OS Value Unit Edition V12.01.00	
5655-W87	IBM Db2 Utilities Suite for z/OS V12.01.00	

5.2.2.3 Toleration/Coexistence Requisites

Toleration/coexistence requisites identify products that must be present on sharing systems. These systems can be other systems in a multisystem environment (not necessarily sysplex), a shared DASD environment (such as test and production), or systems that reuse the same DASD environment at different time intervals.

Db2 Recovery Expert has no toleration/coexistence requisites.

5.2.2.4 Incompatibility (Negative) Requisites

Negative requisites identify products that must *not* be installed on the same system as this product.

Figure 10. Target System Negative Requisites

Program Number	Product Name and Minimum VRM/Service Level
5697-DFM	IBM Db2 Fast Copy Solution Pack for z/OS V01, SAP Identifier (H30RKN0)

5.2.3 DASD Storage Requirements

Db2 Recovery Expert libraries can reside on all supported DASD types.

Figure 11 lists the total space that is required for each type of library.

Figure 11. Total DASD Space Required by Db2 Recovery Expert

Library Type	Total Space Required in 3390 Trks
Target	8991
Distribution	9710

Notes:

- For non-RECFM U data sets, IBM recommends using system-determined block sizes for efficient DASD utilization. For RECFM U data sets, IBM recommends using a block size of 32760, which is most efficient from the performance and DASD utilization perspective.
- Abbreviations used for data set types are shown as follows.
 - U** Unique data set, allocated by this product and used by only this product. This table provides all the required information to determine the correct storage for this data set. You do not need to refer to other tables or program directories for the data set size.
 - S** Shared data set, allocated by this product and used by this product and other products. To determine the correct storage needed for this data set, add the storage size given in this table to those given in other tables (perhaps in other program directories). If the data set already exists, it must have enough free space to accommodate the storage size given in this table.
 - E** Existing shared data set, used by this product and other products. This data set is *not* allocated by this product. To determine the correct storage for this data set, add the storage size given in this table to those given in other tables (perhaps in other program directories). If the data set already exists, it must have enough free space to accommodate the storage size given in this table.

If you currently have a previous release of this product installed in these libraries, the installation of this release will delete the old release and reclaim the space that was used by the old release and any service that had been installed. You can determine whether these libraries have enough space by deleting the old release with a dummy function, compressing the libraries, and comparing the space requirements with the free space in the libraries.

For more information about the names and sizes of the required data sets, see 6.1.8, “Allocate SMP/E Target and Distribution Libraries” on page 22.

3. All target and distribution libraries listed have the following attributes:

- The default name of the data set can be changed.
- The default block size of the data set can be changed.
- The data set can be merged with another data set that has equivalent characteristics.

4. All target libraries listed have the following attributes:

- These data sets can be SMS-managed, but they are not required to be SMS-managed.
- These data sets are not required to reside on the IPL volume.
- The values in the "Member Type" column are not necessarily the actual SMP/E element types that are identified in the SMPMCS.

5. All target libraries that are listed and contain load modules have the following attributes:

- These data sets can be in the LPA, but they are not required to be in the LPA.
- These data sets can be in the LNKLST.
- These data sets are not required to be APF-authorized.
- Db2 Recovery Expert requires that the SMPLTS data set must be a PDSE. If your existing SMPLTS is a PDS, you will need to allocate a new PDSE and copy you existing SMPLTS into it and then change the SMPLTS DDDEF entry to indicate the new PDSE data set.

The following figures describe the target and distribution libraries required to install Db2 Recovery Expert. The storage requirements of Db2 Recovery Expert must be added to the storage required by other programs that have data in the same library.

Note: Use the data in these tables to determine which libraries can be merged into common data sets. In addition, since some ALIAS names may not be unique, ensure that no naming conflicts will be introduced before merging libraries.

Figure 12 (Page 1 of 2). Storage Requirements for Db2 Recovery Expert Target Libraries

Library DDNAME	Member Type	Target Volume	T Y P E	O R G	R E C F M	L R E C L	No. of 3390 Trks	No. of DIR Blks
SARYBASE	SAMP	Any	U	PDS	FB	80	6	2
SARYDBRM	MAC	Any	U	PDS	FB	80	440	100
SARYDENU	SAMP	Any	U	PDS	FB	80	517	10
SARYEXP	DATA	Any	U	PDS	FB	80	517	10
SARYGUIW	DATA	Any	U	PDS	FB	80	199	3
SARYLOAD	MOD	Any	U	PDSE	U	0	6587	N/A
SARYMENU	MSG	Any	U	PDS	FB	80	156	20

Figure 12 (Page 2 of 2). Storage Requirements for Db2 Recovery Expert Target Libraries

Library DDNAME	Member Type	Target Volume	T Y P E	O R G	R E C F M	L R E C L	No. of 3390 Trks	No. of DIR Blks
SARYNOTC	DATA	Any	U	PDS	VB	133	11	2
SARYPENU	PNL	Any	U	PDS	FB	80	254	150
SARYSAMP	SAMP	Any	U	PDS	FB	80	142	8
SARYSLIB	SKL	Any	U	PDS	FB	80	156	15
SARYTENU	TBL	Any	U	PDS	FB	80	6	4

Figure 13. Storage Requirements for Db2 Recovery Expert Distribution Libraries

Library DDNAME	T Y P E	O R G	R E C F M	L R E C L	No. of 3390 Trks	No. of DIR Blks
AARYBASE	U	PDS	FB	80	6	2
AARYDBRM	U	PDS	FB	80	440	100
AARYDENU	U	PDS	FB	80	517	10
AARYEXP	U	PDS	FB	80	360	10
AARYGUIW	U	PDS	FB	80	200	3
AARYLOAD	U	PDSE	U	0	7707	N/A
AARYMENU	U	PDS	FB	80	82	20
AARYNOTC	U	PDS	VB	133	11	2
AARYPENU	U	PDS	FB	80	254	150
AARYSAMP	U	PDS	FB	80	142	8
AARYSLIB	U	PDS	FB	80	100	15
AARYTENU	U	PDS	FB	80	6	4

5.3 FMIDs Deleted

Installing Db2 Recovery Expert might result in the deletion of other FMIDs. To see which FMIDs will be deleted, examine the ++VER statement in the SMPMCS of the product.

If you do not want to delete these FMIDs at this time, install Db2 Recovery Expert into separate SMP/E target and distribution zones.

Note: These FMIDs are not automatically deleted from the Global Zone. If you want to delete these FMIDs from the Global Zone, use the SMP/E REJECT NOFMID DELETEFMID command. See the SMP/E Commands book for details.

5.4 Special Considerations

Non-z/OS Hardware and Software Requirements:

Refer to the IBM Db2 Recovery Expert for z/OS User's Guide, SC27-4569 for detailed information about the non-z/OS hardware and software requirements for this product.

PDSE Considerations:

Db2 Recovery Expert uses the "partitioned data set extended" or PDSE format for the SARYLOAD target library. There are some operational differences between PDS and PDSE data sets. The PDS format may be shared by more than one z/OS system and no special precautions are necessary. However the PDSE format may only be shared by z/OS systems which are part of a sysplex or which are connected using Global Resource Serialization (are in a GRS complex). If z/OS systems share use of a PDSE data set outside of a sysplex or GRS environment, you may experience severe problems when the data set is updated. This is due to the fact that PDSE directory information is cached in storage, and when the data set is updated from one system the other system(s) have no knowledge of the update, and their cached directory information will be incorrect.

You must take care not to share the SARYLOAD data set between z/OS systems unless they are in a sysplex or are connected in a GRS complex. If you need to share the content of the SARYLOAD data set, a separate copy must be created for each z/OS system.

6.0 Installation Instructions

This chapter describes the installation method and the step-by-step procedures to install and to activate the functions of Db2 Recovery Expert.

Please note the following points:

- If you want to install Db2 Recovery Expert into its own SMP/E environment, consult the SMP/E manuals for instructions on creating and initializing the SMPCSI and the SMP/E control data sets.
- You can use the sample jobs that are provided to perform part or all of the installation tasks. The SMP/E jobs assume that all DDDEF entries that are required for SMP/E execution have been defined in appropriate zones.
- You can use the SMP/E dialogs instead of the sample jobs to accomplish the SMP/E installation steps.

6.1 Installing Db2 Recovery Expert

6.1.1 SMP/E Considerations for Installing Db2 Recovery Expert

Use the SMP/E RECEIVE, APPLY, and ACCEPT commands to install this release of Db2 Recovery Expert.

6.1.2 SMP/E Options Subentry Values

The recommended values for certain SMP/E CSI subentries are shown in Figure 14. Using values lower than the recommended values can result in failures in the installation. DSSPACE is a subentry in the GLOBAL options entry. PEMAX is a subentry of the GENERAL entry in the GLOBAL options entry. See the SMP/E manuals for instructions on updating the global zone.

Figure 14. SMP/E Options Subentry Values

Subentry	Value	Comment
DSSPACE	(200,200,500)	3390 DASD tracks
PEMAX	SMP/E Default	IBM recommends using the SMP/E default for PEMAX.

6.1.3 SMP/E CALLLIBS Processing

Db2 Recovery Expert uses the CALLLIBS function provided in SMP/E to resolve external references during installation. When Db2 Recovery Expert is installed, ensure that DDDEFs exist for the following libraries:

- CSSLIB
- SCCNOBJ
- SCEEBND2
- SCEECPP
- SCEELIB
- SCEELKED
- SCEELKEX
- SCEEOBJ
- SCLBSID
- SCSFMOD0
- SDSNLOAD
- SIEASID
- SISPLOAD

Note: CALLLIBS uses the previous DDDEFs only to resolve the link-edit for Db2 Recovery Expert. These data sets are not updated during the installation of Db2 Recovery Expert.

6.1.4 Sample Jobs

The following sample installation jobs are provided as part of the product to help you install Db2 Recovery Expert:

Figure 15 (Page 1 of 2). Sample Installation Jobs

Job Name	Job Type	Description	RELFILE
ARYALA	SMP/E	Sample job to allocate and initialize a new SMP/E CSI data set (Optional)	IBM.H30R320.F13
ARYALB	SMP/E	Sample job to allocate SMP/E data sets (Optional)	IBM.H30R320.F13
ARYRECEV	RECEIVE	Sample RECEIVE job	IBM.H30R320.F13
ARYREC1	RECEIVE	Sample RECEIVE job for Edition identifier module	IBM.H30RKN0.F3
ARYALLOC	ALLOCATE	Sample job to allocate target and distribution libraries	IBM.H30R320.F13
ARYDDDEF	DDDEF	Sample job to define SMP/E DDDEFs	IBM.H30R320.F13
ARYAPPLY	APPLY	Sample APPLY job	IBM.H30R320.F13
ARYAPP1	APPLY	Sample APPLY job for Edition identifier module	IBM.H30RKN0.F3

Figure 15 (Page 2 of 2). Sample Installation Jobs

Job Name	Job Type	Description	RELFILE
ARYACCEP	ACCEPT	Sample ACCEPT job	IBM.H30R320.F13
ARYACC1	ACCEPT	Sample ACCEPT job for Edition identifier module	IBM.H30RKN0.F3

You can access the sample installation jobs by performing an SMP/E RECEIVE (refer to 6.1.7, “Perform SMP/E RECEIVE” on page 22) then copy the jobs from the RELFILES to a work data set for editing and submission. See Figure 15 on page 19 to find the appropriate relfile data set.

You can also copy the sample installation jobs from the tape or product files by submitting the following job. Depending on your distribution medium, use either the //TAPEIN or the //FILEIN DD statement and comment out or delete the other statement. Before you submit the job, add a job card and change the lowercase parameters to uppercase values to meet the requirements of your site.

```
//STEP1 EXEC PGM=IEBCOPY
//SYSPRINT DD SYSOUT=*
//*****
/* Make the //TAPEIN DD statement below active if you install*
/* from a CBPDO tape by uncommenting the DD statement below. *
//*****
/*TAPEIN DD DSN=IBM.H30R320.F13,UNIT=tunit,
/* VOL=SER=volser,LABEL=(5,SL),
/* DISP=(OLD,KEEP)
/*TAPEIN2 DD DSN=IBM.H30RKN0.F3,UNIT=tunit,
/* VOL=SER=volser,LABEL=(x,SL),
/* DISP=(OLD,KEEP)
//*****
/* Make the //TAPEIN DD statement below active if you install*
/* from a product tape received outside the CBPDO process *
/* (using the optional SMP/E RECEIVE job) by uncommenting *
/* the DD statement below. *
//*****
/*TAPEIN DD DSN=IBM.H30R320.F13,UNIT=tunit,
/* VOL=SER=30R320,LABEL=(14,SL),
/* DISP=(OLD,KEEP)
/*TAPEIN2 DD DSN=IBM.H30RKN0.F3,UNIT=tunit,
/* VOL=SER=30RKN0,LABEL=(4,SL),
/* DISP=(OLD,KEEP)
//*****
/* Make the //FILEIN DD statement below active for *
/* downloaded DASD files. *
//*****
/*FILEIN DD DSN=IBM.H30R320.F13,UNIT=SYSALLDA,DISP=SHR,
/* VOL=SER=filevol
/*FILEIN2 DD DSN=IBM.H30RKN0.F3,UNIT=SYSALLDA,DISP=SHR,
/* VOL=SER=filevol
```



```

//OUT      DD DSNAME=jcl-library-name,
//          DISP=(NEW,CATLG,DELETE),
//          VOL=SER=dasdvol,UNIT=SYSALLDA,
//          SPACE=(TRK,(20,10,5))
//SYSUT3   DD UNIT=SYSALLDA,SPACE=(CYL,(1,1))
//SYSIN    DD *
          COPY INDD=xxxxIN,OUTDD=OUT
          COPY INDD=yyyyIN2,OUTDD=OUT
/*

```

See the following information to update the statements in the previous sample:

If using TAPEIN/TAPEIN2:

tunit is the unit value that matches the product package.

volser is the volume serial that matches the product package.

x is the tape file number that indicates the location of the data set name on the tape.

See the documentation that is provided by CBPDO for the location of IBM.H30R320.F13 and IBM.H30RKN0.F3 on the tape.

If using FILEIN/FILEIN2:

filevol is the volume serial of the DASD device where the downloaded files reside.

OUT:

jcl-library-name is the name of the output data set where the sample jobs are stored.

dasdvol is the volume serial of the DASD device where the output data set resides.

SYSIN:

xxxxIN is either TAPEIN or FILEIN depending on your input DD statement.

yyyyIN2 is either TAPEIN2 or FILEIN2 depending on your input DD statement.

6.1.5 Allocate SMP/E CSI (Optional)

If you are using an existing CSI, do not execute this job.

If you are allocating a new SMP/E data set for this install, edit and submit sample job ARYALA to allocate the SMP/E data set for Db2 Recovery Expert. Consult the instructions in the sample job for more information.

Expected Return Codes and Messages: You will receive a return code of 0 if this job runs correctly.

6.1.6 Initialize CSI zones (Optional)

If you are using an existing CSI, do not execute this job.

Edit and submit sample job ARYALB to initialize SMP/E zones for Db2 Recovery Expert. Consult the instructions in the sample job for more information.

Expected Return Codes and Messages: You will receive a return code of 0 if this job runs correctly.

6.1.7 Perform SMP/E RECEIVE

If you have obtained Db2 Recovery Expert as part of a CBPDO, use the RCVPDO job in the CBPDO RIMLIB data set to receive the Db2 Recovery Expert FMIDs, service, and HOLDDATA that are included on the CBPDO package. For more information, see the documentation that is included in the CBPDO.

You can also choose to edit and submit sample job ARYRECEV to perform the SMP/E RECEIVE for Db2 Recovery Expert. Consult the instructions in the sample job for more information.

Expected Return Codes and Messages: You will receive a return code of 0 if this job runs correctly.

You can also choose to edit and submit sample job ARYREC1 to perform the SMP/E RECEIVE for Db2 Recovery Expert Edition Identifier Module. Consult the instructions in the sample job for more information.

Expected Return Codes and Messages: You will receive a return code of 0 if this job runs correctly.

6.1.8 Allocate SMP/E Target and Distribution Libraries

Edit and submit sample job ARYALLOC to allocate the SMP/E target and distribution libraries for Db2 Recovery Expert. Consult the instructions in the sample job for more information.

Expected Return Codes and Messages: You will receive a return code of 0 if this job runs correctly.

6.1.9 Create DDDEF Entries

Edit and submit sample job ARYDDDEF to create DDDEF entries for the SMP/E target and distribution libraries for Db2 Recovery Expert. Consult the instructions in the sample job for more information.

Expected Return Codes and Messages: You will receive a return code of 0 if this job runs correctly.

6.1.10 Perform SMP/E APPLY

Possible problems and troubleshooting issues to consider:

You may see error messages "IEW2971T C406 INSUFFICIENT ABOVE THE LINE STORAGE WAS AVAILABLE TO CONTINUE BINDER PROCESSING" at the APPLY. Please make sure that your region size for the binder is not limited. You can search for the "IEW2278I B352 INVOCATION PARAMETERS - ...SIZE=(1500K,100K)..." messages to determine the limit.

If your APPLY step fails with error messages "GIM20201S SMP/E COULD NOT OBTAIN ENOUGH STORAGE FOR PROCESSING" or "IEW2971T C406 INSUFFICIENT ABOVE THE LINE STORAGE WAS AVAILABLE TO CONTINUE BINDER PROCESSING", please don't try to perform the same APPLY again. The next APPLY attempt should be to a new CSI where the APPLY had not failed previously. If you can't use a new CSI, then dummy delete the FMID H30R320 that failed during the previous APPLY attempt so the CSI as no entries for the FMID H30R320. More details about the dummy delete procedure may be

found at https://www.ibm.com/support/knowledgecenter/en/SSLTBW_2.2.0/com.ibm.zos.v2r2.gim2000.vermex4.htm

If your APPLY step fails with error messages GIM20201S or IEW2971T, please make sure that GROUPEXTEND was not enabled. Please follow the procedure described below, specifically perform the APPLY of SOURCEID(PUT15*), SOURCEID(PUT16*), etc. separately.

To avoid possible storage problems mentioned above, we recommend to break the APPLY into separate steps:

- APPLY only the base FMID
- ACCEPT the base FMID
- APPLY SOURCEID(PUT15*)
- APPLY SOURCEID(PUT16*)
- ...
- APPLY SOURCEID(PUTnn*)

Statement GROUPEXTEND should not be specified at any step. Such procedure requires more steps, but it is much more reliable and helps to prevent storage errors depending on the limitations of your environment.

1. Ensure that you have the latest HOLDDATA; then edit and submit sample jobs ARYAPPLY and ARYAPP1 to perform an SMP/E APPLY CHECK for Db2 Recovery Expert and Db2 Recovery Expert Edition Identifier Module, respectively. Consult the instructions in the sample jobs for more information.

The latest HOLDDATA may identify HIPER and FIXCAT APARs for the FMIDs you will be installing. An APPLY CHECK will help you determine if any HIPER or FIXCAT APARs are applicable to the FMIDs you are installing. If there are any applicable HIPER or FIXCAT APARs, the APPLY CHECK will also identify fixing PTFs that will resolve the APARs, if a fixing PTF is available.

You should install the FMIDs regardless of the status of unresolved HIPER or FIXCAT APARs. However, do not deploy the software until the unresolved HIPER and FIXCAT APARs have been analyzed to determine their applicability. That is, before deploying the software either ensure fixing PTFs are applied to resolve all HIPER or FIXCAT APARs, or ensure the problems reported by all HIPER or FIXCAT APARs are not applicable to your environment.

To receive the full benefit of the SMP/E Causer SYSMOD Summary Report, do *not* bypass the PRE, ID, REQ, and IFREQ on the APPLY CHECK. The SMP/E root cause analysis identifies the cause only of *errors* and not of *warnings* (SMP/E treats bypassed PRE, ID, REQ, and IFREQ conditions as warnings, instead of errors).

Here are sample APPLY commands:

- a. To ensure that all recommended and critical service is installed with the FMIDs, receive the latest HOLDDATA and use the APPLY CHECK command as follows

```
APPLY S(fmid,fmid,...) CHECK
FORFMID(fmid,fmid,...)
SOURCEID(RSU*)
FIXCAT(IBM.ProductInstall-RequiredService)
GROUPEXTEND .
```

Some HIPER APARs might not have fixing PTFs available yet. You should analyze the symptom flags for the unresolved HIPER APARs to determine if the reported problem is applicable to your environment and if you should bypass the specific ERROR HOLDS in order to continue the installation of the FMIDs.

This method requires more initial research, but can provide resolution for all HIPERs that have fixing PTFs available and are not in a PE chain. Unresolved PEs or HIPERs might still exist and require the use of BYPASS.

- b. To install the FMIDs without regard for unresolved HIPER APARs, you can add the BYPASS(HOLDCLASS(HIPER)) operand to the APPLY CHECK command. This will allow you to install FMIDs even though one or more unresolved HIPER APARs exist. After the FMIDs are installed, use the SMP/E REPORT ERRSYSMODS command to identify unresolved HIPER APARs and any fixing PTFs.

```
APPLY S(fmid,fmid,...) CHECK
FORFMID(fmid,fmid,...)
SOURCEID(RSU*)
FIXCAT(IBM.ProductInstall-RequiredService)
GROUPEXTEND
BYPASS(HOLDCLASS(HIPER),HOLDFIXCAT) .
..any other parameters documented in the program directory
```

This method is quicker, but requires subsequent review of the Exception SYSMOD report produced by the REPORT ERRSYSMODS command to investigate any unresolved HIPERs. If you have received the latest HOLDDATA, you can also choose to use the REPORT MISSINGFIX command and specify Fix Category IBM.ProductInstall-RequiredService to investigate missing recommended service.

If you bypass HOLDS during the installation of the FMIDs because fixing PTFs are not yet available, you can be notified when the fixing PTFs are available by using the APAR Status Tracking (AST) function of ServiceLink or the APAR Tracking function of ResourceLink.

2. After you take actions that are indicated by the APPLY CHECK, remove the CHECK operand and run the job again to perform the APPLY.

Note: The GROUPEXTEND operand indicates that SMP/E applies all requisite SYSMODs. The requisite SYSMODs might be applicable to other functions.

Expected Return Codes and Messages from APPLY CHECK: You will receive a return code of 0 if these jobs runs correctly.

Expected Return Codes and Messages from APPLY: You will receive a return code of 0 if these jobs runs correctly.

6.1.11 Perform SMP/E ACCEPT

Edit and submit sample jobs ARYACCEP and ARYACC1 to perform an SMP/E ACCEPT CHECK for Db2 Recovery Expert and Db2 Recovery Expert Edition Identifier Module, respectively. Consult the instructions in the sample jobs for more information.

To receive the full benefit of the SMP/E Causer SYSMOD Summary Report, do *not* bypass the PRE, ID, REQ, and IFREQ on the ACCEPT CHECK. The SMP/E root cause analysis identifies the cause of *errors* but not *warnings* (SMP/E treats bypassed PRE, ID, REQ, and IFREQ conditions as warnings rather than errors).

Before you use SMP/E to load new distribution libraries, it is recommended that you set the ACCJCLIN indicator in the distribution zone. In this way, you can save the entries that are produced from JCLIN in the distribution zone whenever a SYSMOD that contains inline JCLIN is accepted. For more information about the ACCJCLIN indicator, see the description of inline JCLIN in the SMP/E Commands book for details.

After you take actions that are indicated by the ACCEPT CHECK, remove the CHECK operand and run the job again to perform the ACCEPT.

Note: The GROUPEXTEND operand indicates that SMP/E accepts all requisite SYSMODs. The requisite SYSMODS might be applicable to other functions.

Expected Return Codes and Messages from ACCEPT CHECK: You will receive a return code of 0 if these jobs runs correctly.

If PTFs that contain replacement modules are accepted, SMP/E ACCEPT processing will link-edit or bind the modules into the distribution libraries. During this processing, the Linkage Editor or Binder might issue messages that indicate unresolved external references, which will result in a return code of 4 during the ACCEPT phase. You can ignore these messages, because the distribution libraries are not executable and the unresolved external references do not affect the executable system libraries.

Expected Return Codes and Messages from ACCEPT: You will receive a return code of 0 if these jobs runs correctly.

6.1.12 Run REPORT CROSSZONE

The SMP/E REPORT CROSSZONE command identifies requisites for products that are installed in separate zones. This command also creates APPLY and ACCEPT commands in the SMPPUNCH data set. You can use the APPLY and ACCEPT commands to install those cross-zone requisites that the SMP/E REPORT CROSSZONE command identifies.

After you install Db2 Recovery Expert, it is recommended that you run REPORT CROSSZONE against the new or updated target and distribution zones. REPORT CROSSZONE requires a global zone with ZONEINDEX entries that describe all the target and distribution libraries to be reported on.

For more information about REPORT CROSSZONE, see the SMP/E manuals.

6.2 Activating Db2 Recovery Expert

6.2.1 Product Customization

The publication *IBM Db2 Recovery Expert for z/OS User's Guide* (SC27-4569) contains the necessary information to customize and use Db2 Recovery Expert.

7.0 Notices

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At the time of this publication, the ++VER statement in the product's SMPMCS contain a list of APAR/PTF fixes, but ongoing problem reporting may result in additional APARs being created. To identify and obtain current product service requirements, always contact the IBM Customer Support Center or use S/390 SoftwareXcel to obtain the current "PSP Bucket".

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