openCRX Installation Guide for IBM DB2 v9.5 (EXPRESS C)

Version 2.0 / 2.1



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1 About this Book

This book describes how to setup an openCRX database instance for IBM DB2.

1.1 Who this book is for

The intended audience are openCRX database administrators.

1.2 What do you need to understand this book

This book describes the installation of openCRX for IBM DB2. The book assumes that you are familiar with DB2 installation and configuration.

1.3 Tips, Warnings, etc.

We make use the following pictograms:



Information provided as a "Tip" might be helpful for various reasons: time savings, risk reduction, etc.



You should carefully read information marked with "Important". Ignoring such information is typically not a good idea.



Warnings should not be ignored (risk of data loss, etc.)

2 Prerequisites

As a first step you must download the following software packages:

- Download and install openCRX SDK Installer. It is available from http://www.opencrx.org/sdk.htm
 The SDK contains DB2 scripts required to install the openCRX database in the directory <SDK_Install_Dir>\opencrx-x.x.x\core\src\sql
- Download DB2 Express-C data server from http://www-306.ibm.com/software/data/db2/express/download.html
- Download DB2 Data Server Driver for JDBC and SQLJ from http://www-306.ibm.com/software/data/db2/express/download.html



Please ensure that you install the **correct JDBC driver** (i.e. matching JDK, DB2 version, etc.) and **one JDBC driver** only! Ignoring this wisdom leads to problems as the connection to the database will fail.

As a next step you must install **IBM DB2** (please refer to the appropriate documentation from IBM for installation details).

This document assumes that you use the **DB2 Control Center** for database administration.

3 Upgrading from previous versions

If you already have DB2 for openCRX installed, upgrade the database as explained below. You can then skip the rest of this document.



Backup your database BEFORE you run any of the following scripts!

3.1 The SQL Script upgrade-from-...

In a first step you must upgrade your database. open CRX distributions provide an SQL script of the form

upgrade-from-<version from>-to-<version to>.sql

If you have installed openCRX 1.11.0, for example, and you want to upgrade to version 2.0.0 you have to run the script upgrade-from-1.11.0-to-2.0.0.sql on your database instance.

3.2 The SQL Script migrate-from-...

In a second step you must migrate your database. openCRX distributions often times provide an SQL script of the form

migrate-from-<version from>-to-<version to>.sql

If you have installed openCRX 1.11.0, for example, and you want to upgrade to version 2.0.0 you have to run the script upgrade-from-1.11.0-to-2.0.0.sql on your database instance.

3.3 The SQL Script drop-from-...

Next you can drop unused tables from your database. openCRX distributions often times provide an SQL script of the form

drop-from-<version from>-to-<version to>.sql

If you have installed openCRX 1.11.0, for example, and you want to drop tables not used by openCRX 2.0.0 you can run the script drop-from-1.11.0-to-2.0.0.sql on your database instance. Alternatively, you can also rename such tables, e.g. from transition_type to _unused_transition_type. Also, it goes without saying that you should never drop a table before you made a backup!

3.4 The SQL Script dbcreate-views.sql

Most new openCRX versions make use of new/changed views, i.e. if an openCRX distribution includes an SQL script of the form

dbcreate-views.sql

then you must run that script. If you have installed openCRX 1.11.0, for example, and you want to upgrade to openCRX 2.0.0 you should run the script dbcreate-views.sql on your database instance. Make sure that old views are indeed dropped and new views properly created.

3.5 The SQL Script dbcreate-indexes.sql

Most new openCRX versions make use of new/changed indexes, i.e. if an openCRX distribution includes an SQL script of the form

dbcreate-indexes.sql

then you should run that script. If you have installed openCRX 1.11.0, for example, and you want to upgrade to openCRX 2.00.0 you should run the script dbcreate-indexes.sql on your database instance.

3.6 Populate Preferences

The last step involves deleting old preferences and populating the table with new ones. Run the SQL script **populate-preferences.sql** to do this.

4 Create the database

As a first step you must create the database. This can be done with the DB2 Control Center. Start the Control Center and navigate to the appropriate instance and select Databases. Right-click and select Create Database from the pop-up menu as shown below:

B Control Center							
Control Center Selected Edit View Tools Help							
12 😚 18 📼 🍃 👰	°¦2 °i7 °i2 ⊡ ≫ i⊒ I °i2 i⊒ < 0						
Dbject View							
Control Center		DPM70 - D	B2 - Databases				
🖨 🗠 🛅 All Systems							
📄 🖃 🗐 DPM70			SDB DPM70 DB2 Loci				
🖻 🗁 Instances							
🖨 🔍 🖓 DB2							
🖨 – 🗁 Databases							
	Open New Contr	ol Center					
🗄 🧰 All Databases	Create Database	•	Standard				
	Add		With Automatid graintenance				
	Register with XS	R	From Backup				
	Refresh		1 of 1 items displayed				
		🗀 Data	abases				
		Actions:					
		Creat	e New Database				

Figure 1: Create a new database

Enter CRX_CRX as database name and select 32K as page size (experienced DB2 DBAs might want to create multiple table spaces for optimization reasons). Click Next:

🔓 Create Database Wizard						
1. Name Specify a name for your new database						
2. Storage 3. Region	This wizard helps you create and tailor a new database. To create a basic database, type a new name, select a drive, and click Finish. If you want to tailor the database to your requirements, click Next to continue. <u>Task Overview.</u>					
4. Summary	Database name					
	Default path	D:\				
	Alias					
	Comment					
	📃 Enable data	base for <u>X</u> ML (Code set will be set to UTF-8)				
	📃 <u>R</u> estrict acc	ess to system catalogs				
	💿 Let DB2 mar	nage my storage (automatic storage)				
	🔘 <u>I</u> want to ma	nage my storage manually				
	Default bufferpo	ol and table space page size 32 KB 💌				
		<u>N</u> ext ▶ <u>F</u> inish Cancel				

Figure 2: Create schema CRX_CRX

Specify storage options (if any) and click Next:

🔒 Create Da	ıtabase Wizard 🛛 🔀
1. Name	Specify where to store your data
2. Storage 3. Region 4. Summary	In an <u>automatic storage database</u> , the data is stored in one or more storage paths. If you do not specify additional storage paths, the database path specified on the Name page is used as the single storage path. If you clear the checkbox, the database path will not be used as a storage path. In this case, you must specify one or more storage paths in the storage paths list.
	If you do not want to create an automatic storage database, return to the Name page and click the radio
	✓ Use the database path as a storage path: D:\ Image: District of the database path as a storage path: D:\
	Storage Path
	Change
	Remove
	0 of 0 items di ↓ Z 🔆 🕀 🛱 View
	▲ <u>B</u> ack <u>N</u> ext ► <u>F</u> inish Cancel

Figure 3: Specify Storage options

Specify Region options (we strongly recommend the UTF-8 code set):



If you want/need **UTF-8** support you should select code set **UTF-8**

🔒 Create Da	atabase Wizard	
1. Name	Specify the	locale for this database.
2. Storage 3. Region	The locale (territory strings are compare	and code set) determines the set of characters your database uses. It also determines how different characte d.
4. Summary	Database locale	
	Country/Region	default 🖌
		Territory US
		Code set UTF-8
	△ NOTE:	
	Databases enabl	ed for XML must use code set UTF-8. Other values will disable XML functions
	Collating Sequence	
	⊙ System	Character strings are sorted according to the code set you specify above.
	O Identity	Character strings are sorted according to their hexadecimal value.
	O Identity_16bit	Character strings are sorted using the Compatibility Encoding Scheme for UTF-16: 8-Bit specification (CESU-8)
	○ UCA400_N0	Character strings are sorted using the Unicode Collation Algorithm 4.0.0, with normalization on.
	○ UCA400_LTH	Character strings are sorted as per UCA400_NO, but using the Royal Thai dictionary rules for the Thai characters.
	<u> </u>	Character strings are sorted using the DB2 version 2 collating sequence.
	⊖ N <u>L</u> SChar	Character strings are sorted using System with additional rules for the specific codeset/territory.
		▲ <u>Back</u> <u>Next</u> <u>Finish</u> Cance

Figure 4: Specify Region options

Verify the settings and then click Finish:

🔓 Create Database Wizard						
1. Name Review the actions that will take place when you click Finish						
2. Storage 3. Region	When you click Finish, the wizard creates a database and the necessary table spaces. To change any of the parameters, go back to the appropriate page in this wizard. To view the equivalent command, click Show Command					
4. Summary	Create database CRX_CRX					
	Automatic storage database: Yes Table space prefetch size: Automatic Default Automatic Storage User Table Space Default Automatic Storage Catalog Table Space Default Automatic Storage Temporary Table Space Default database page size: 32 KB Restrict system catalog access: No Territory: US Code set: UTF-8 (XML enabled) Public to the CMETERM					
	Collating type: SYSTEM Storage paths: D:\ Show Command					
	Eack <u>Finish</u> Cancel					

Figure 5: Verify settings

Next we need to create a new user. Navigate to the newly created database and look for the entry User and Group Objects. Right-click the subentry DB Users and then select Add from the pop-up menu as shown below:



Figure 6: Create New User - step 1

Enter	SYSTEM	and select the appropriate authorities (the user must be ab	le
to con	nect to th	e database!):	

🔒 Add User 🛛 🔀						
DPM70 - DB2 - CRX_CRX						
Table Space Function Procedure Method Pag						
Database	Schema	Table	Index	View		
Specify a user name	». You can select a	a user name from t	he list or type o	ine in.		
User SYSTEM		~				
Choose the appropri	ate authorities to g	grant to the selecte	d user.			
Authorities						
Connect to da	itabase					
Create tables						
Create packages						
Register routir	nes to execute in c	database manager	's process			
☑ Database adr	ninistrator authority)				
Create schem	as implicitly					
Access to the	load utility					
✓ Create external routines						
Connect to guiesced database						
Security administrator authority						
OK Cancel Apply Reset Show SQL Help						

Figure 7: Create New User – step 2

Please note that passwords are managed by the operation system.



In case you did not select page size 32K when you initially created the database, you may want to create a Buffer Pool **BP32K** (Page Size of 32K) and 2 Table Spaces **CRXTS32** and **CRXTMPSPC32** a as follows (default Table Spaces rely on 4K page sizes, insufficient for openCRX):

Listing 1: Creating Buffer Pools and Table Spaces with 32K Page Size

CREATE BUFFERPOOL BP32K IMMEDIATE SIZE 250 AUTOMATIC PAGESIZE 32 K ; CREATE LARGE TABLESPACE CRXTS32 PAGESIZE 32K MANAGED BY AUTOMATIC STORAGE AUTORESIZE YES BUFFERPOOL BP32K; CREATE SYSTEM TEMPORARY TABLESPACE CRXTMPSPC32 PAGESIZE 32K MANAGED BY AUTOMATIC STORAGE BUFFERPOOL BP32K;

You have completed creating the database **CRX_CRX**.

5 Install the openCRX Database Schema Objects

After creating the schema you are now ready to install the openCRX database schema objects. The following scripts must be executed in the order given below:

- dbcreate-tables.sql
- dbcreate-views.sql
- dbcreate-indexes.sql
- populate-preferences.sql



Do not execute any other scripts included in the distribution.

Navigate to the newly created database. Right-click on it and then select Query from the pop-up menu to open a command editor as shown below:



Figure 8: Open Command Editor



You may want to create **Buffer Pool(s)** and **Table Space(s)** of a larger size (e.g. 32K) than the default size of 8K as some openCRX tables have large column sizes (see *Listing 1: Creating Buffer Pools and Table Spaces with 32K Page Size* for information on how to do that). Otherwise you will receive error messages running the script *dbcreate-tables.sql* similar to the one below:

DB21034E The command was processed as an SQL statement because it was not a valid Command Line Processor command. During SQL processing it returned: SQL0286N A default table space could not be found with a page size of at least "xxxxx" that authorization ID "xxxxx" is authorized to use. SQLSTATE=42727

Copy/paste the database script **dbcreate-tables.sql** and execute by clicking on the button Execute:



Figure 9: Execute script dbcreate-tables.sql

Similarly, execute the remaining scripts in the following order:

dbcreate-views.sql



DB21034E The command was processed as an SQL statement because it was not a valid Command Line Processor command. During SQL processing it returned: SQL1585N A system temporary table space with sufficient page size does not exist. SQLSTATE=54048

- **dbcreate-indexes.sql** (hint: you can ignore error messages of the following sort: Duplicate key name 'xxx' Error 1061).
- populate-preferences.sql

The scripts should run without errors and after execution you should be able to inspect all the newly created tables, views, and indexes:



Figure 10: Verify creation of tables, views, and indexes

6 Next Steps

If you have completed successfully the database installation you are ready to use the openCRX database **CRX_CRX**. The application server installation guides explain how to connect the application server to the openCRX database instance.