



Wrapper for DB2 Workgroup Server Edition on Linux

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Introduction

The IBM Integrated Runtime (IR) product contains DB2 Express Edition. Some of the larger Independent Software Vendors (ISV), Solution Developers (SD), and Solution Integrators (SI) want a mechanism to use the IBM IR deployment framework to deliver DB2 Workgroup Server Edition (WSE) and to take advantage of the increased capability of the DB2 product or its licensing terms.

This document is targeted at the ISV or other developer who wants to create a wrapper for the DB2 WSE product for use in a solution for the Linux platform.

The instructions provided in this document assume that the developer is logged in as the `root` user.

Methodology

This paper is separated into several sections to assist with the following tasks:

- Generating a response file
- Building the wrapper
- Testing the wrapper

Each section might include the following components:

- **Description** – A general description of the section or exercise.
- **Interactions** – The dependencies of the component in the solution, and the products that are depending on the component. Descriptions of interactions between other components within the solution and the subject component.
- **Control** – How to start and stop the component, and the methods that you use to determine if the component is running.
- **Configuration** – A description of the methods that you use to configure the component.
- **Problem Determination** – How to determine the causes of problems with the component.
- **Additional Information** – Where to find additional information about the component.

- **Exercises** – Hands-on exercises with the component. Exercises are separated into four types:
 - Installation Exercises – The components are installed in these exercises.
 - Configuration Exercises – The components are configured in these exercises.
 - Control Exercises – The components are controlled in some way in these exercises.
 - Optional Exercises – Some additional features or functions of the components are used in these exercises.

Conventions

This document uses the following conventions to illustrate various types of information.

- All exercises are numbered, and each step within the exercise is numbered. It is important to complete the steps and exercises in the order they are provided. If an exercise or step is not required, it is indicated as optional.
- Throughout the exercises, informational text is formatted like this current paragraph.
- Commands are shown in the following font and format and should be typed exactly as shown, including letter case:

Type this exactly - This command should be typed as though on a single command line. If part of the line is already present, do not type it. For example the drive d:\> may already be displayed in the command prompt and there is no need to type it again.

```
install.bat d:\
```

- Code samples are shown in the following font and format.

```
<html>  
<body>  
<p>This is sample code.</p>  
</body>  
</html>
```

DB2 WSE CD

The source for creating the DB2 WSE application is on a DB2 WSE product CD that you can purchase from IBM through the Partner World O.E.M. sales channel. You must purchase an appropriate license to bundle DB2 WSE with a solution. Please contact a channel sales representative for licensing issues.

CD Contents

The DB2 WSE CD could have a tar file named `DB2WSE8.1.tar` or have contents similar to the following directory structure:

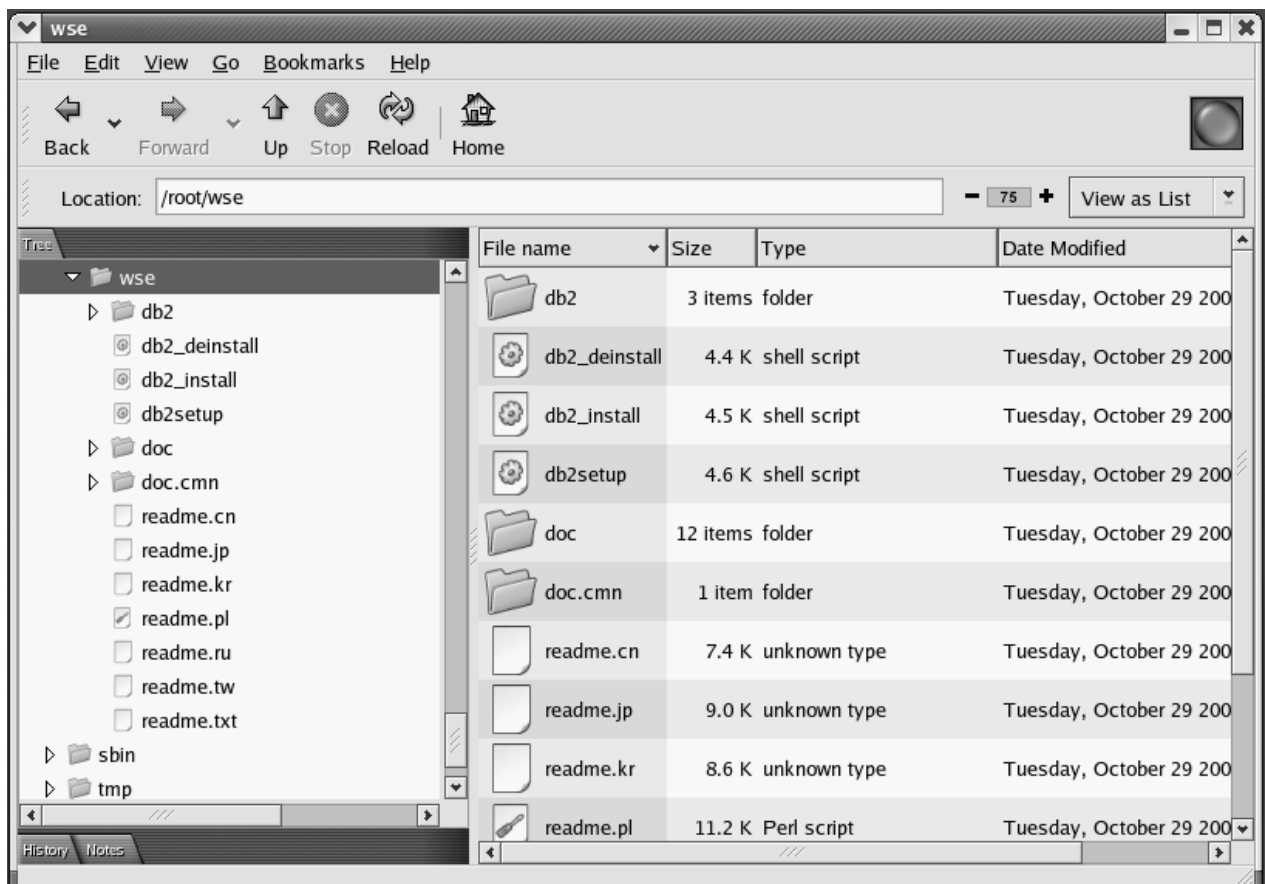


Figure 1 Directory structure of the installation image or CD

If the CD has the directory structure, create a TAR file using the following command:

```
tar cvf DB2WSE8.1.tar /mnt/cdrom
```

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If you have the TAR file on CD and it is not named `DB2WSE8.1.tar`, rename it to `DB2WSE8.1.tar`. For the remainder of this document this product image file is referred to as `DB2WSE8.1.tar`.

A TAR file is used for this application because of the presence of symbolic links in the installation image or CD.

Response file

A DB2 response file installation helps you install DB2 without interactive user input. Response files contain installation choices and configuration data that are otherwise provided by the user interactively on the installation Graphical User Interface (GUI). This is useful because it automates the process and helps you embed the DB2 installation process transparently inside the installation program. The response file installation is one of the ways DB2 provides a complete solution for your embedded database needs.

A sample response file named `db2wse.rsp` is available on the DB2 WSE installation CD in the `db2/linux/samples/` directory.

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```
*-----
* Generated response file used by the DB2 Setup wizard
* generation time: 2/26/04 10:01 AM
*-----
* Product Installation
LIC_AGREEMENT      = ACCEPT
PROD               = WORKGROUP_SERVER_EDITION
INSTALL_TYPE       = CUSTOM
COMP               = DB2_CONTROL_CENTER
COMP               = SQL_PROCEDURES
COMP               = FIRST_STEPS
COMP               = INSTANCE_SETUP_SUPPORT
COMP               = RELATIONAL_CONNECT_FOR_DB2
COMP               = CONFIGURATION_ASSISTANT
COMP               = DB2_SAMPLE_DATABASE_SOURCE
COMP               = CLIENT_APPLICATION_ENABLER
COMP               = REPLICATION
COMP               = JAVA_SUPPORT
COMP               = DB2_ENGINE
COMP               = COMMUNICATION_SUPPORT_TCPIP
*-----
* Das properties
*-----
DAS_CONTACT_LIST   = LOCAL
* DAS user
DAS_USERNAME       = dasusr1
DAS_GROUP_NAME     = dasadm1
DAS_HOME_DIRECTORY = /home/dasusr1
DAS_PASSWORD       = 24525534235326231349
ENCRYPTED           = DAS_PASSWORD
*-----
* Instance properties
*-----
INSTANCE           = inst1
inst1.TYPE         = wse
inst1.WORDWIDTH    = 32
* Instance-owning user
inst1.NAME         = db2inst1
inst1.GROUP_NAME   = db2grp1
inst1.HOME_DIRECTORY = /home/db2inst1
inst1.PASSWORD     = 24525534235326231349
ENCRYPTED           = inst1.PASSWORD
inst1.AUTOSTART    = YES
inst1.AUTHENTICATION = SERVER
inst1.SVCENAME     = db2c_db2inst1
inst1.PORT_NUMBER  = 50000
* Fenced user
inst1.FENCED_USERNAME = db2inst1
inst1.FENCED_GROUP_NAME = db2grp1
inst1.FENCED_HOME_DIRECTORY = /home/db2inst1
inst1.FENCED_PASSWORD =
* Contact properties
CONTACT            = contact1
contact1.CONTACT_NAME = db2inst1
contact1.EMAIL      = db2inst1@spz.rchland.ibm.com
contact1.PAGER      = false
contact1.INSTANCE   = inst1
*-----
```

Figure 2 Partial content of a generated response file

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The first step of the response file installation process is to create a response file. When installing DB2 using the interactive setup utility, you are prompted to make installation choices and provide necessary configuration data before installation takes place. Using the following instructions, you can configure DB2 to create a response file that contains the choices you make. Later, during the application development, you can encode a process to replace the response file variables (for example, *DB2 user id*) with text that you can use to prompt the user during the deployment of the solution.

Create the response file

1. In Nautilus, double-click **db2setup** to start the DB2 WSE installation program. Alternatively, execute `db2setup` from the command line.
2. Choose the custom installation option. Then check the response file generation option.

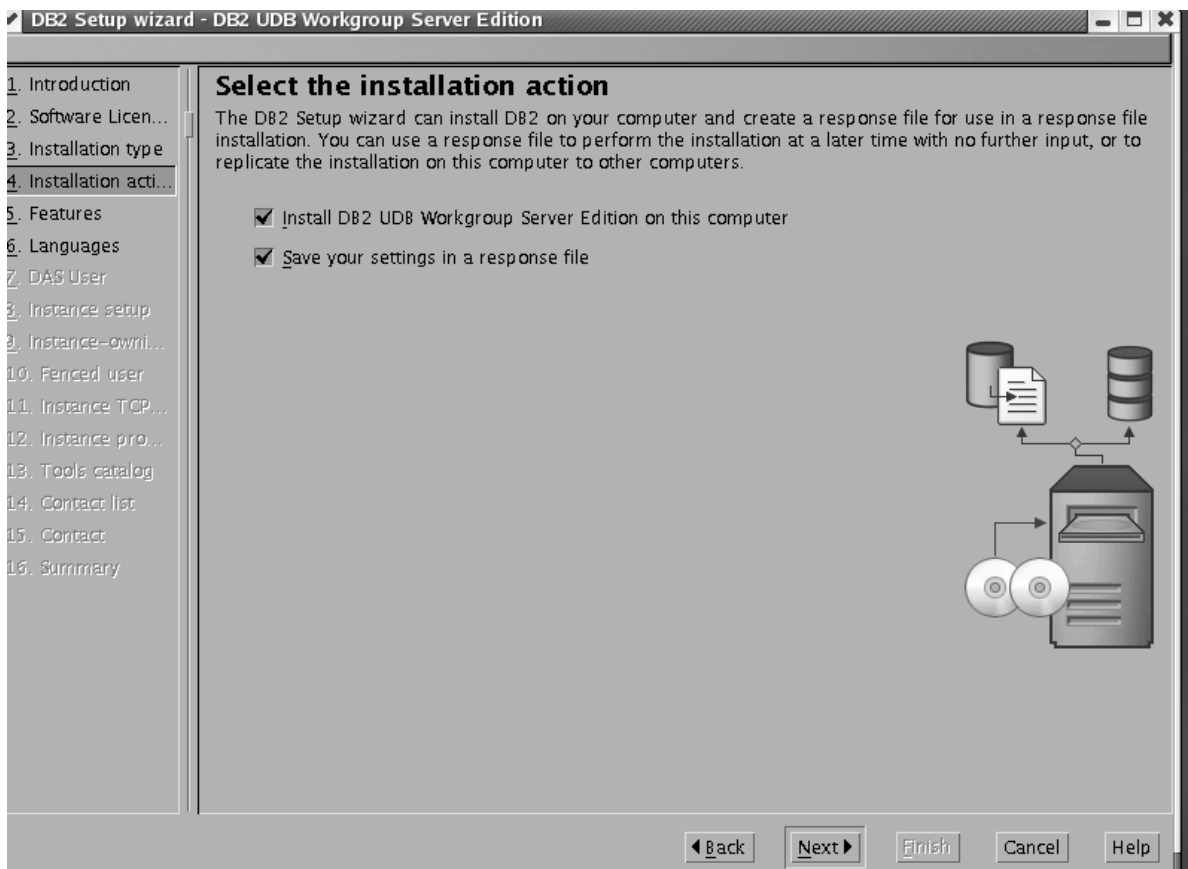


Figure 3 Select the checkbox to generate the option file

3. Select the desired options and complete the installation of DB2 WSE.
4. Examine the installed copy of DB2 WSE and verify that it is setup the way you want it.
5. This process leaves the response file `db2wse.rsp` in the `root` directory.

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6. Modify the response file as illustrated in the following steps:
 - a. Delete the following line from Instance Properties:
`ENCRYPTED=inst1.FENCED_PASSWORD`
 - b. Remove the password value for `inst1.FENCED_PASSWORD` from Instance Properties.
7. Verify that the values of `inst1.NAME`, `inst1.GROUP_NAME`, and `inst1.HOME_DIRECTORY` are the same as `inst1.FENCED_USERNAME`, `inst1.FENCED_GROUP_NAME`, and `inst1.FENCED_HOME_DIRECTORY`, respectively. For the purpose of this white paper an assumption is made that the user runs stored procedures and user functions under the normal db2 user id. Hence, a separate fenced user id is not required. This installation does not set up a fenced user in the default deployment parameter.

Creating the DB2 WSE application

In IBM Integrated Runtime terminology, an *application* is one of the components of a *solution*. Examples of applications include DB2 or the actual application program package written by a developer. Applications are contained in *application wrappers*, and one or more application wrappers combine within a *solution wrapper* to make a complete solution.

You must create an application wrapper for DB2 WSE and then package it into a test solution. Since the wrapper for the DB2 Express Edition is similar to the DB2 Workgroup Server Edition, it makes a good starting point. In this project, you modify a copy to create a wrapper for DB2 WSE.

Copy the DB2 EE project

1. Start the Solution Developer by clicking **Menu > Extras > Other > Solution Developer**.

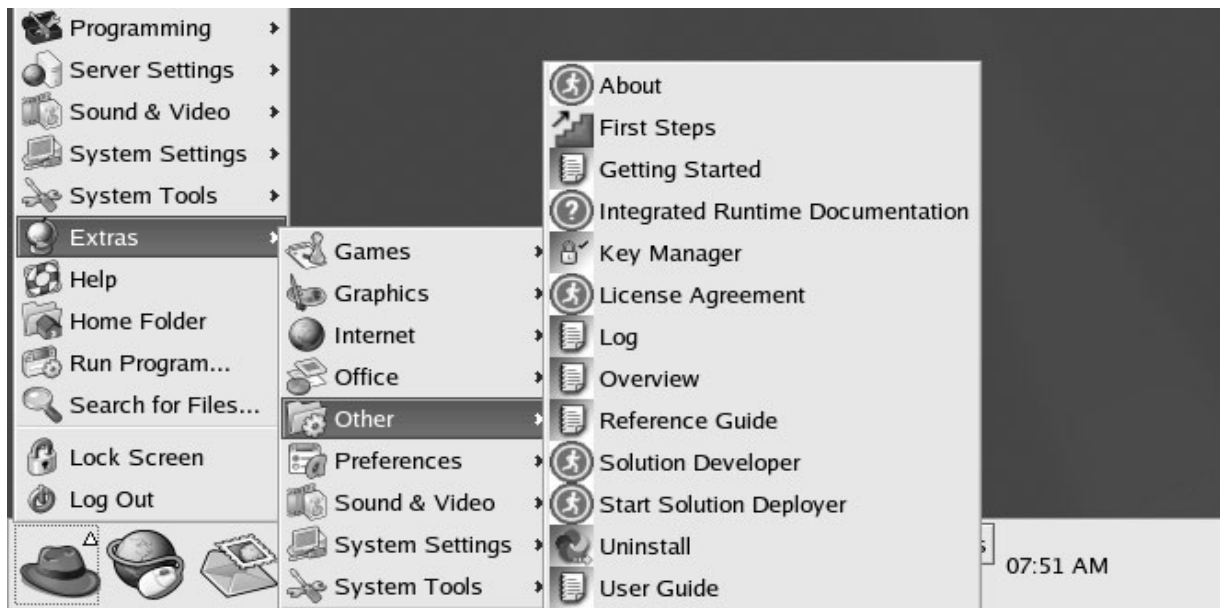


Figure 4 Solution developer

2. Right-click **IRU_DB2Express8_1Lnx** and select **Copy**.
3. Right-click and select **Paste**.
4. Enter the new name for the application in the dialog box. For the remainder of this document, IRU_DB2WSE8_1Lnx is the name of the application.
5. The following tree structure appears in Solution Developer:

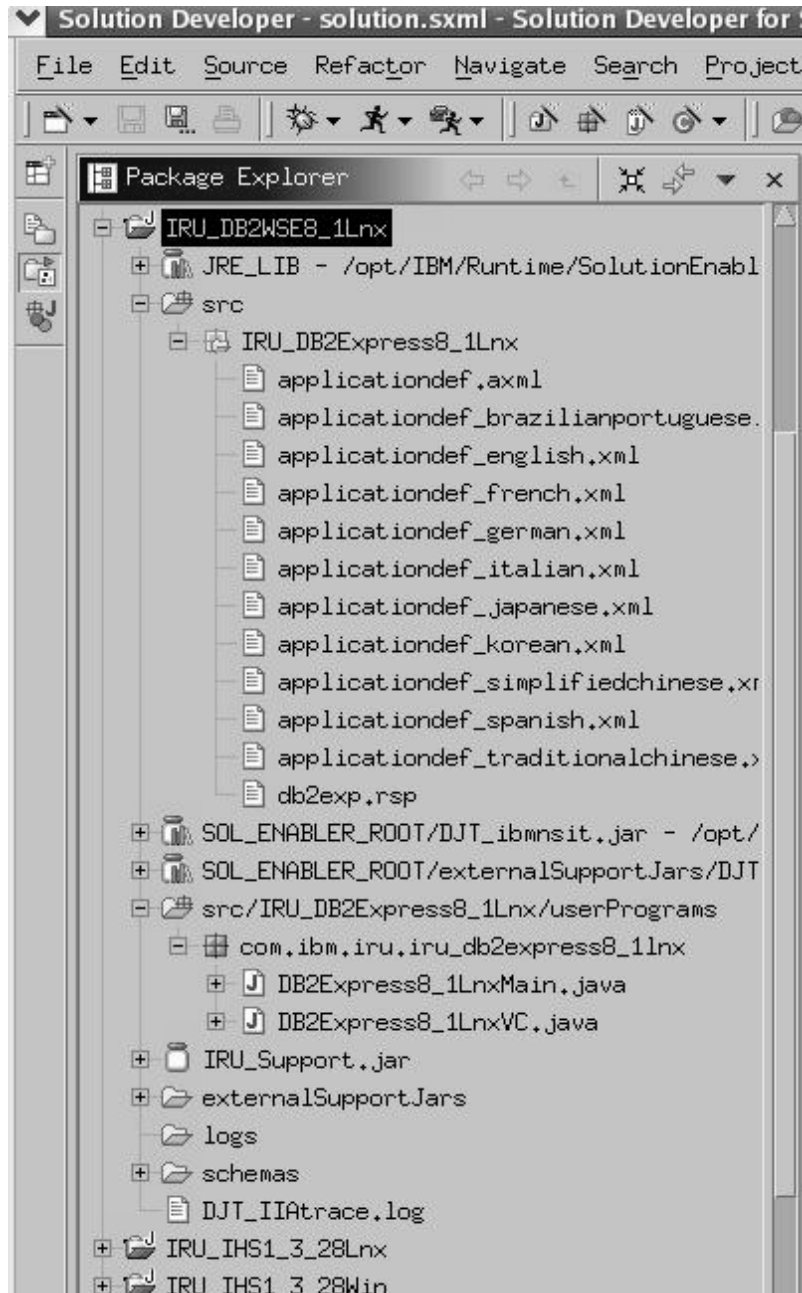


Figure 5 Structure of the new project after the copy operation

Modify the IRU_DB2WSE8_1Lnx project

Modify the copied files to fit in the new project. The following operations need to be done:

1. Delete the response file db2exp.rsp from src/IRU_DB2Express8_1Lnx. Copy db2wse.rsp from the root directory to the same location of deleted response file, db2exp.rsp. You

can select **File > Import > File System** to import the file instead of using the copy and paste method.

2. Open applicationdef.xml in an editor and make the following changes:
 - a. Search for and replace all occurrences of db2exp.rsp with db2wse.rsp.
 - b. Search for and replace the string `Express` (ignore case) with the string `WSE`.
 - c. The previous search and replace renames the Java packages incorrectly. Convert all occurrences of an uppercase WSE to lowercase in any package or path name (for example, change `com.ibm.iru.iru_db2WSE8_1lnx` to `com.ibm.iru.iru_db2wse8_1lnx`.
Do not change the program names. Leave them as uppercase `DB2WSE8_1LnxMain` and `DB2WSE8_1LnxVC`.
 - d. Change `<file>DB2WSE8.1Pruned.tar</file>` to `<file>DB2WSE8.1.tar</file>`. This sets the image file name to `DB2WSE8.1.tar` as shown in the following example:


```
<fileList id="media" includeAllFilesInSoftwareImageRoot="false">
  <file>DB2WSE8.1.tar</file>
</fileList>
```
 - e. Check that the application id is successfully changed from `IRU_DB2Express8_1Lnx` to `IRU_DB2WSE8_1Lnx`.
 - f. Modify the value of tag `<defaultData>` under `<stringVariable>` elements in the application according to `db2wse.rsp` setting as indicated in the following table. You might have different values in the `db2wse.rsp` file. If so, please substitute values in the "Changed to" column of the following table according to your `db2wse.rsp`. For example, value of `inst1.PORT_NUMBER` is set to 50000 in the response file used in this document, if you have different value for `inst1.PORT_NUMBER` use that value instead of 50000

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Keyword	Original	Change to (according to db2wse.rsp file)
DAS_USERNAME	<defaultData>db2admin</defaultData>	<defaultData>dasusr1</defaultData>
DAS_GROUP_NAME	<defaultData>db2admin</defaultData>	<defaultData>dasadm1</defaultData>
DAS_HOME_DIRECTORY	<defaultData>/home/db2admin</defaultData>	<defaultData>home/dasusr1</defaultData>
Db2inst1.FENCED_USERNAME Db2inst1.NAME	<defaultData>db2inst</defaultData> <cidFileAssociation responseFileName="db2wse.rsp keyword="db2inst.FENCED_USERNAME"/> <cidFileAssociation responseFileName="db2wse.rsp keyword="db2inst.NAME"/>	<defaultData>db2inst1</defaultData> <cidFileAssociation responseFileName="db2wse.rsp keyword="inst1.FENCED_USERNAME"/> <cidFileAssociation responseFileName="db2wse.rsp keyword="inst1.NAME"/>
Db2inst1.FENCED_PASSWORD Db2inst1.PASSWORD	<cidFileAssociation responseFileName="db2wse.rsp keyword="db2inst.FENCED_PASSWORD"/> <cidFileAssociation responseFileName="db2wse.rsp keyword="db2inst.PASSWORD"/>	<cidFileAssociation responseFileName="db2wse.rsp keyword="inst1.FENCED_PASSWORD"/> <cidFileAssociation responseFileName="db2wse.rsp keyword="inst1.PASSWORD"/>
Db2inst1.FENCED_GROUP_NAME Db2inst1.GROUP_NAME	<defaultData>db2inst</defaultData> <cidFileAssociation responseFileName="db2wse.rsp keyword="db2inst.FENCED_GROUP_NAME"/> <cidFileAssociation responseFileName="db2wse.rsp keyword="db2inst.GROUP_NAME"/>	<defaultData>db2grp1</defaultData> <cidFileAssociation responseFileName="db2wse.rsp keyword="inst1.FENCED_GROUP_NAME"/> <cidFileAssociation responseFileName="db2wse.rsp keyword="inst1.GROUP_NAME"/>
Db2inst1.FENCED_HOME_DIRECTORY Db2inst1.HOME_DIRECTORY	<defaultData>/home/db2inst</defaultData> <cidFileAssociation responseFileName="db2wse.rsp keyword="db2inst.FENCED_HOME_DIRECTORY"/> <cidFileAssociation responseFileName="db2wse.rsp keyword="db2inst.HOME_DIRECTORY"/>	<defaultData>/home/db2inst1</defaultData> <cidFileAssociation responseFileName="db2wse.rsp keyword="inst1.FENCED_HOME_DIRECTORY"/> <cidFileAssociation responseFileName="db2wse.rsp keyword="inst1.HOME_DIRECTORY"/>
Contact1.CONTACT_NAME	<defaultData>db2admin</defaultData>	<defaultData>db2inst1</defaultData>
Contact1.EMAIL	<defaultData>db2admin@linux</defaultData>	<defaultData>db2inst1@linux</defaultData>
Db2inst1.SVCNAME	<defaultData>db2cdbinst1</defaultData> <cidFileAssociation responseFileName="db2wse.rsp keyword="db2inst1.SVCNAME"/>	<defaultData>db2c_db2inst1</defaultData> <cidFileAssociation responseFileName="db2wse.rsp keyword="inst1.SVCNAME"/>
db2inst1.PORT_NUMBER	<defaultData>50001</defaultData> <cidFileAssociation responseFileName="db2wse.rsp keyword="db2inst1.PORT_NUMBER"/>	<defaultData>50000</defaultData> <cidFileAssociation responseFileName="db2wse.rsp keyword="inst1.PORT_NUMBER"/>

3. Rename the packages

- a. Expand the src/IRU_DB2Express8_1Lnx/userPrograms folder, right-click the com.ibm.iru.iru_db2express8_1lnx package and select **Refactor > Rename**. Enter com.ibm.iru.iru_db2wse8_1lnx for the new name and click **OK**.
- b. Expand the com.ibm.iru.iru_db2wse8_1lnx folder. Using the process in 3a, rename DB2Express8_1LnxMain to DB2WSE8_1LnxMain and DB2Express8_1LnxVC to DB2WSE8_1LnxVC.

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- c. Click the **Navigator** tab, navigate to the src/IRU_DB2Express8_1Lnx directory, right-click the src/IRU_DB2Express8_1Lnx directory and rename it to IRU_DB2WSE8_1Lnx.
 - d. Select the **Package Explorer** tab to return to the Package Explorer view.
4. Modify the project build path
- a. Right-click the IRU_DB2WSE8_1Lnx project, select **Properties > Java Build Path**. The properties editor window appears. Click the **Source** tab. Click the folder with a caution sign next to it and click the **Edit** button to edit the path.

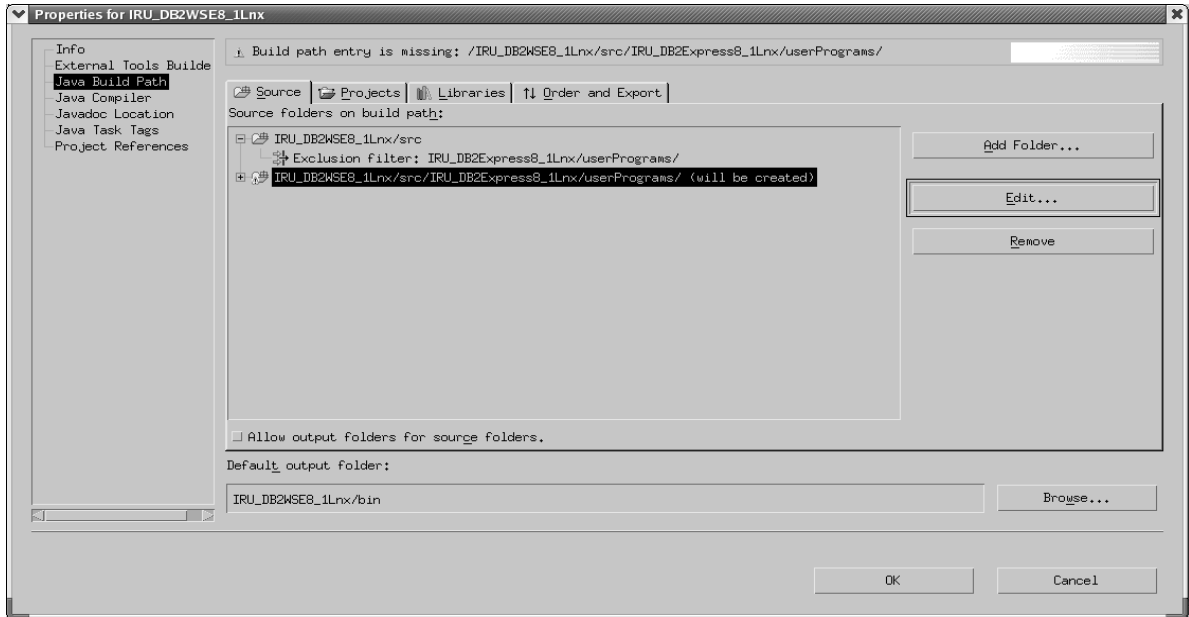


Figure 6 Edit the properties for the project

- b. Edit the path, replacing Express with WSE so that the source folder is src/IRU_DB2WSE8_1Lnx/userPrograms. Click **OK**.

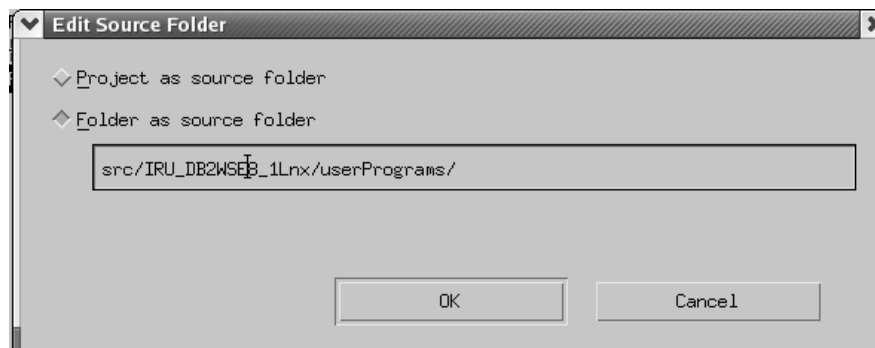


Figure 7 Edit the source folder location

- c. Highlight the exclusion filter for IRU_DB2WSE8_1Lnx/src and click **Edit**. Click **Edit** again, browse to and select the `userPrograms` folder, and click **OK**, on the next three windows that appear. IRU_DB2Express8_1Lnx/userPrograms changes to IRU_DB2WSE8_1Lnx/userPrograms. Click **OK**.
 5. Modify the Entry and Main programs
 - a. In the Package Explorer panel of the Solution Developer perspective, expand the `src/IRU_DB2WSE8_1Lnx/userPrograms` folder and then expand the `com.ibm.iru.iru_db2wse8_1lnx` package.
 - b. Double-click `DB2WSE8_1LnxVC.java` and change


```
setRpmPackage("IBM_db2das81-8.1.0");
```

 to


```
setRpmPackage("IBM_db2wssg81-8.1.0");
```
 - c. Double-click `DB2WSE8_1LnxMain.java` and change the following entries as specified:
 1. `setLogFileName("DB2Express8_1LnxMain.log");`
to
`setLogFileName("DB2WSE8_1LnxMain.log");`
 2. `setRpmPackage("IBM_db2das81-8.1.0");`
to
`setRpmPackage("IBM_db2wssg81-8.1.0");`
 3. `String command = "tar xf ++ "DB2Express8.1.tar" -C +";`
to
`String command = " tar xf ++ "DB2WSE8.1.tar" -C +";`
 4. `command = "/bin/bash" + "exp/db2setup -r " +";`
to
`command = "/bin/bash" + "wse/db2setup -r" +";`
 5. `command = "mkdir -p " + ...+ "exp/db2/linux/db2_deinstall...";`
to
`command = "mkdir -p " + ...+ "wse/db2/linux/db2_deinstall...";`
6. Define the software image root
 - a. In the Package Explorer panel of the Solution Developer perspective, expand the `src` and `IRU_DB2WSE8_1Lnx` folders.
 - b. Right-click `applicationdef.xml` and select **properties > Application Software Image Root**.
 - c. Browse to and select the directory that contains the `DB2WSE8.1.tar` file for DB2 WSE. Click **OK**.
7. Open the `applicationdef_english.xml` file in an editor. Change the root element `<IRU_DB2Express8_1Lnx>` to `<IRU_DB2WSE8_1Lnx>`. , You can also change the name field in this file from `DB2 Universal Database Express Edition - Runtime` to `DB2 Universal Database Workgroup Server Edition - Runtime`. This string is appears in multiple locations by the Deployer.
8. Build the application
 - a. Right-click the application project and select **Solution Enabler Tools > Build Application Definition**.
9. Verify that no error messages appear on the console during the build.

Create a test solution

1. Right-click in the Package Explorer panel of the Solution Developer perspective. Select **New-> Default Solution Project Template**.
2. Name the project, for example, DB2WSE_TestMarch1, and click **Next**.
3. Enter values for the rest of the attributes as shown in figure 8:

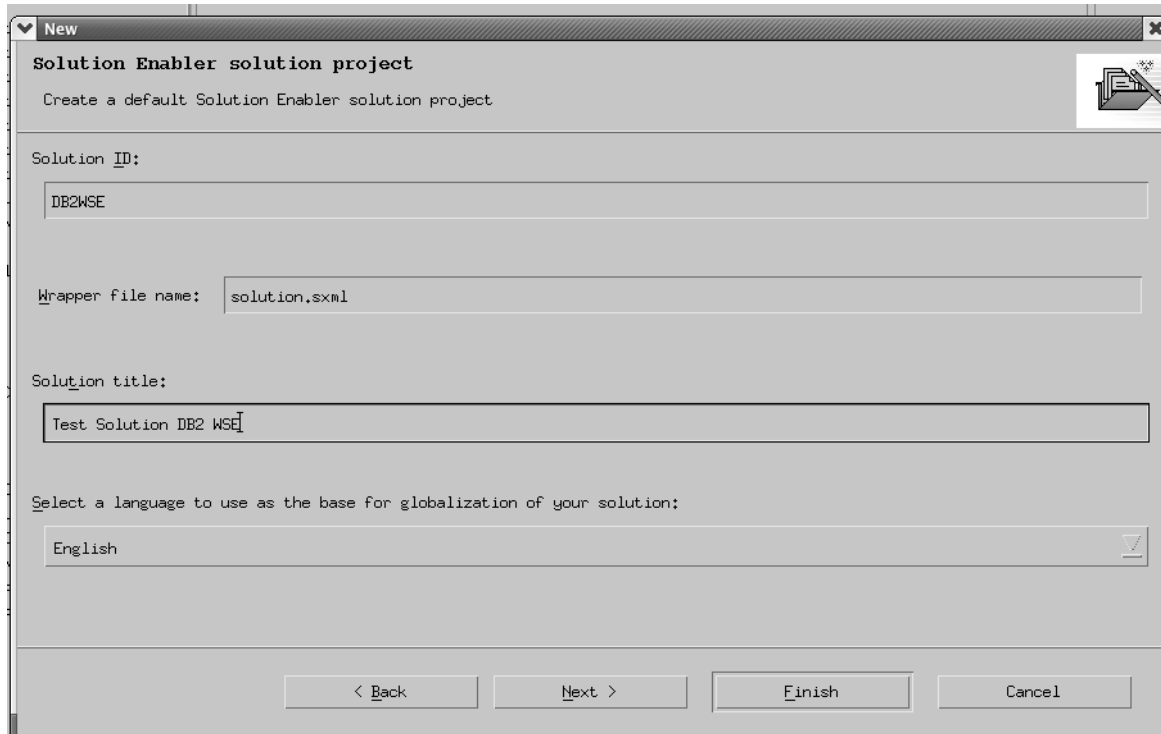


Figure 8 Creating a test solution

4. Click **Next**.
5. For the export destination, click **Browse** and select **/opt/IBM/Runtime/SolutionEnabler**. Click **Next**.
6. Select the IRU_DB2WSE8_1Lnx application to include in the solution and click **Finish**.
7. The solution.xml file opens in an editor. Find the <description> tag and replace "Put your description here" with "A Test wrapper for DB2 WSE". Modify the value of the <operating system> tag from Windows to Linux and change the application file name under the <tasks> element from IRU_DB2WSE8_1Lnx_win.ser to IRU_DB2WSE8_1Lnx_linux.ser.
8. Build the solution
 - a. Right-click the solution project and select **Solution Enabler Tools -> Build Solution**.
9. Verify that no error messages appear on the console during the build.

Deploy the solution

1. Export the solution
 - a. Right-click the solution project and select **Export**.
 - b. Select **Solution Developer** and click **Next**.
 - c. Accept the default settings.

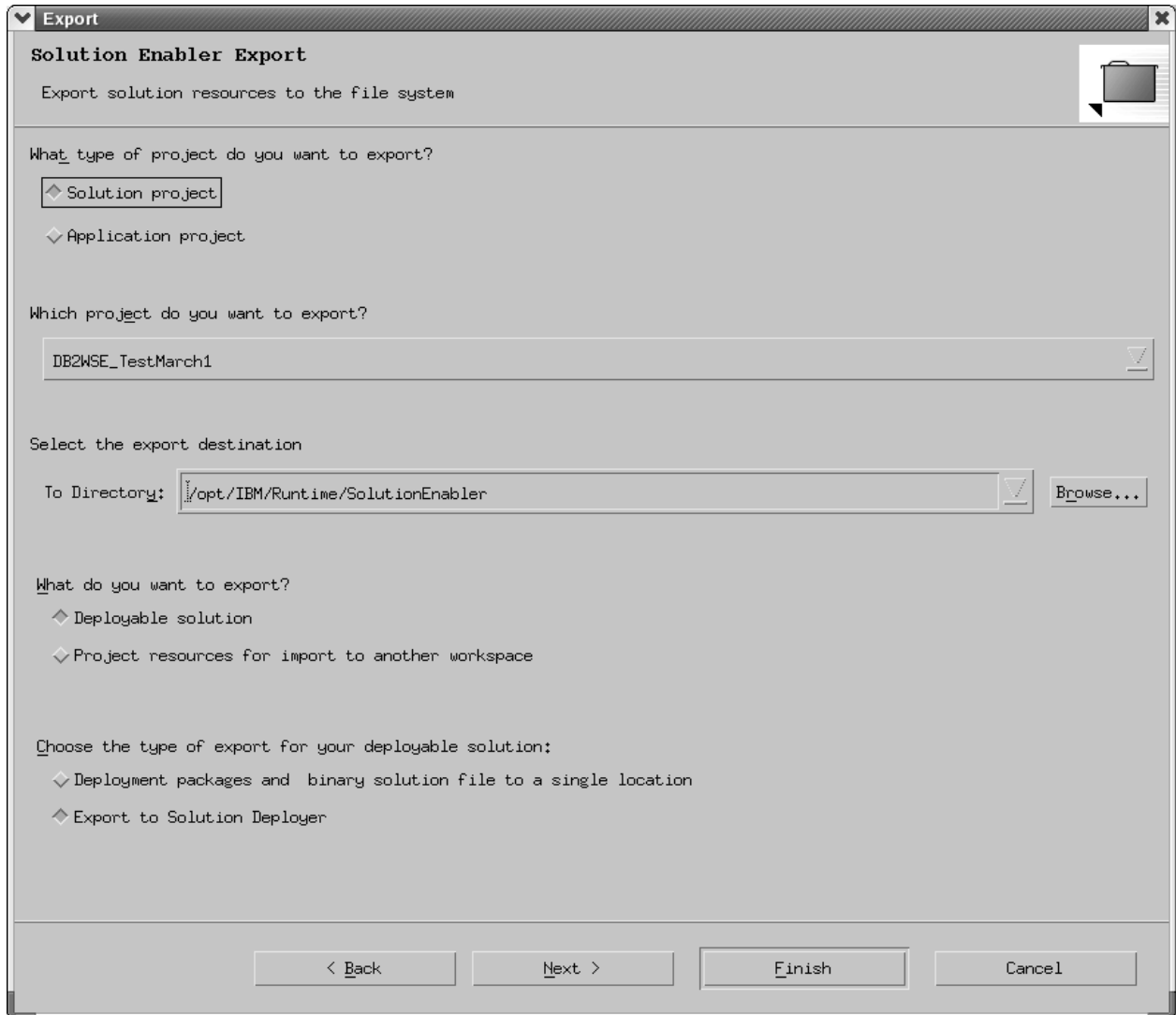


Figure 9 Solution export dialog box

- d. Click **Finish**.

When you click finish, the `DB2WSE.ser` file shows up in `/opt/IBM/Runtime/SolutionEnabler` and the user jar file is placed in the installed location of the IBM Integrated Runtime. You can now deploy the solution.

2. Start Solution Deployer from the Start menu.
3. Click **File > Open**.
4. Navigate to the DB2WSE.ser file and click **OK**.

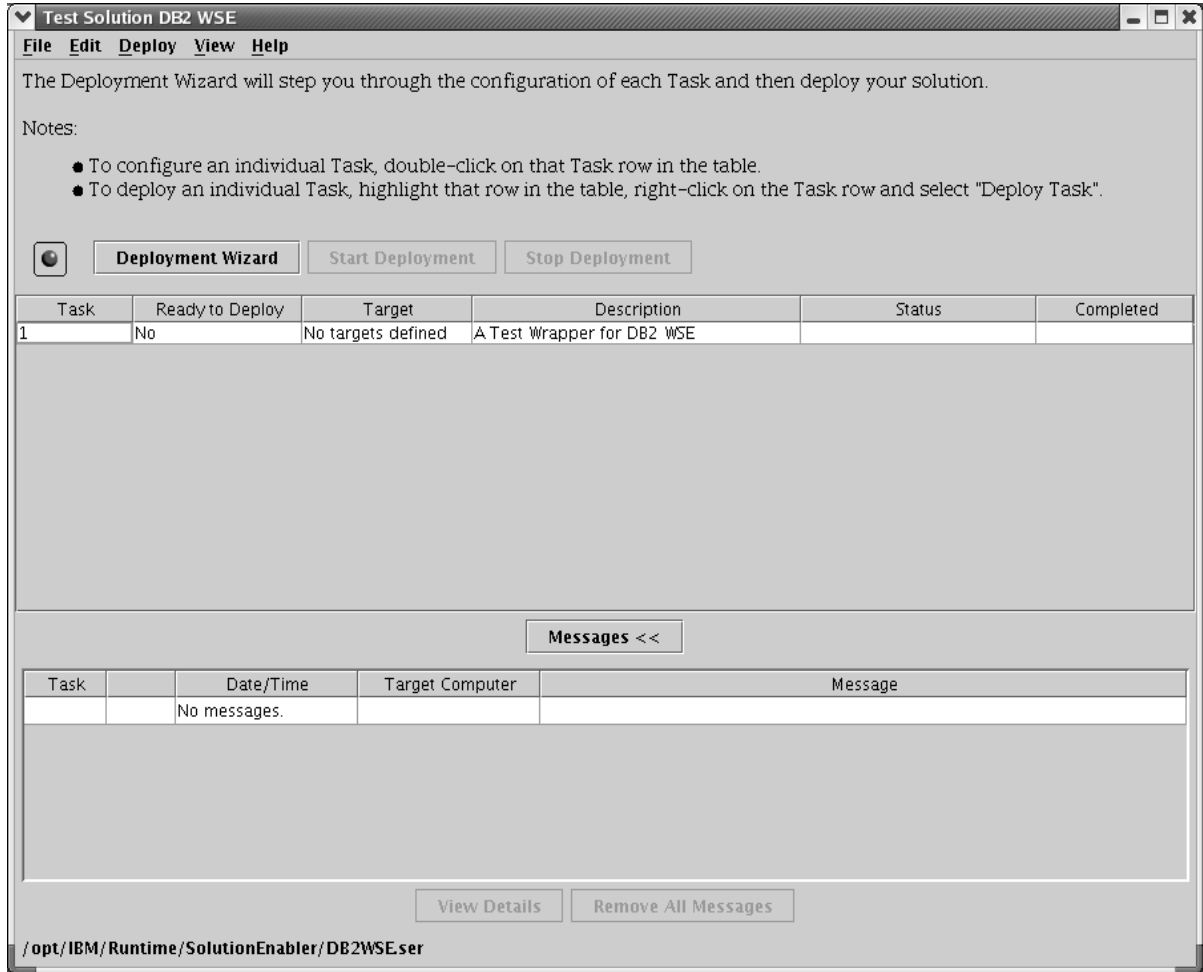


Figure 10 Solution deployer interface

5. Configure the deployment task
 - a. Right-click task 1 and select **Configure Task 1**.
 - b. In the Task 1 configuration window, click **Target Hostnames**.
 - c. Enter localhost in the **New Target Hostname** field and click **Add**.
 - d. Click **DB2** on the Deployment Parameters panel and enter the passwords.
 - e. Click **DB2** under the Deployment Packages and click **Create Package**.
 - f. Browse to the location of the DB2 WSE installation image (DB2WSE8.1.tar) or CD and click **OK**.
 - g. This operation takes some time because the entire installation image is archived into a JAR file and placed in the installed location of the IBM Integrated Runtime.



Figure 11 Deployment package completion

6. When the previous step is complete, click **OK** and then **OK** again. The Start Deployment button is now active and the “Ready to deploy” state for the task changes to **Yes**. Click **Start Deployment**.

The DB2 WSE deployment starts.

When deployment is complete, the icon stops moving and the following message is displayed:

```
DJT03000: The deployment was successful for IBM DB2 Universal Database Workgroup Server  
Edition - Runtime 8.1.
```

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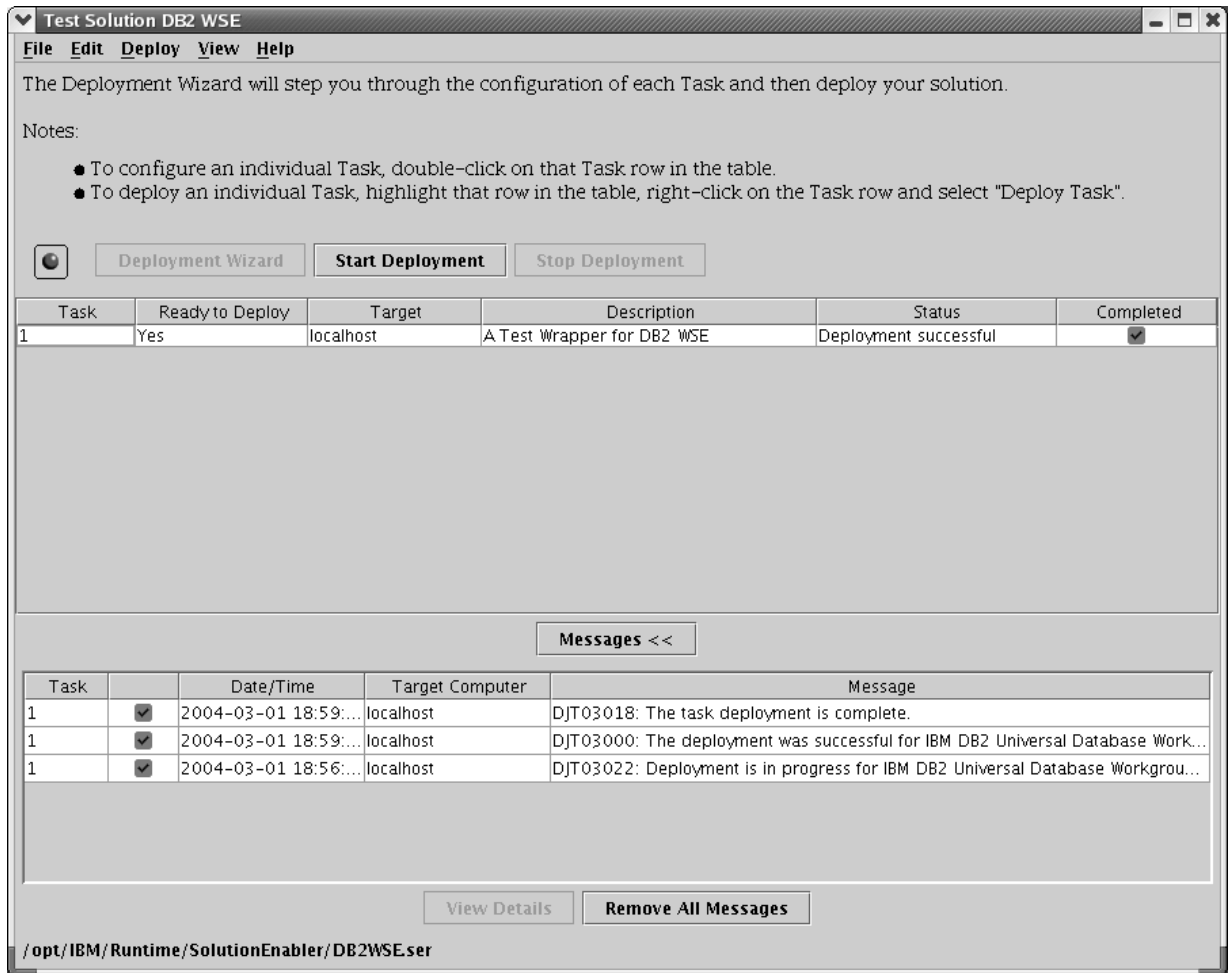


Figure 12 Successful deployment

In addition, the entry in the Status column of the task table changes to Deployment successful.

You now have a complete DB2 WSE installation.

If you installed DB2 WSE and chose to generate a response file on the same computer you were attempting this deployment, the following message appears:

DJT03066: IBM DB2 Universal Database Workgroup Server Edition - Runtime 8.1 is already installed on the target computer.

If your intention was to test deployment, uninstall DB2 WSE and retry the deployment.

Troubleshooting

Here are some activities that you could perform to debug any problems.

- Test the version checker entry program by running it in the Solution Developer. You might have to configure the JRE to get it to work. Perform the following steps:
 1. Click **Window > Preferences** to open the preferences editor.
 2. Expand **Java > Installed JRE > Search**.
 3. Browse to the installation location of IBM Integrated Runtime.
 4. Select **DJTJRE** and click **OK**. Wait for the workspace to recompile.
 5. Run the Version Checker as a regular Java program.
- Use the command `/opt/IBM/Runtime/SolutionEnabler/DJT_Deployer -leavefiles` to do the deployment. The log files and intermediate files are left on the machine. You can then examine them for clues for the failure.
- Important file are `/opt/IBM/Runtime/SolutionEnabler/DJT_IIAtrace.log` and `/opt/IBM/Runtime/SolutionEnabler/DJT_SolutionEnabler.log`.
- If you used the `-leavefiles` option, additional logs are located in the `/opt/IBM/Runtime/SolutionEnabler/logs` directory. Notice the edited response file in that directory. It is created from the options entered during the Deployer task configuration. Check the file and ensure that the responses are correct.
- If you make any changes to the application wrapper or any of the XML files, remember to rebuild and export the solution.

Summary

This document illustrates how easy it is to package a new application into the delivery structure of the IBM Integrated Runtime product. IBM Integrated Runtime is a middleware solution that pays for itself through productivity gains alone. It truly takes care of deployment issues and helps you concentrate on your application. Buy it now by visiting <http://www-306.ibm.com/software/smb> and selecting your geography.

Appendix A

To verify that the installation of DB2 WSE is successful, perform the following test:

1. Log on to the system as a user with SYSADM authority. Use the same user id that was set up during the installation of DB2 (for example, db2admin or db2inst1).
2. Enter the `db2samp1` command to create the SAMPLE database. This command might take few minutes to process. There is no completion message; when the command prompt returns, the process is complete.
3. The SAMPLE database is automatically cataloged with the database alias SAMPLE when it is created.
4. Start the database manager by entering the `db2start` command.
5. Enter the following DB2 commands from a DB2 command window to connect to the SAMPLE database, retrieve a list of all the employees that work in department 20, and reset the database connection:
 - a. `db2 connect to sample`
 - b. `db2 "select * from staff where dept = 20"`
 - c. `db2 connect reset`
6. When you have verified the installation, you can remove the SAMPLE database to free up disk space. Enter the `db2 drop database sample` command to drop the SAMPLE database.

References

- [1] Response file installation of DB2 overview (Windows)
<http://publib.boulder.ibm.com/infocenter/db2help/topic/com.ibm.db2.udb.doc/start/t0007299.htm>

- [2] Making the DB2 files available for a response file installation
<http://publib.boulder.ibm.com/infocenter/db2help/index.jsp?topic=/com.ibm.db2.udb.doc/start/t0007299.htm>

- [3] Creating a response file using the DB2 Setup wizard
<http://publib.boulder.ibm.com/infocenter/db2help/index.jsp?topic=/com.ibm.db2.udb.doc/start/t0007299.htm>

- [4] Installing IBM DB2 Universal Database Express Edition Transparently with Your Application
<http://www-106.ibm.com/developerworks/db2/library/techarticle/0306gao/0306gao.html>

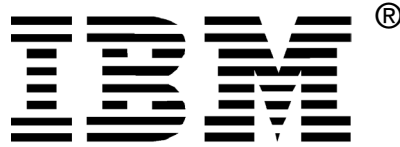
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