



IBM Software Group

What Is a Wrapper?

IBM Virtual Innovation Center



IBM Express Runtime

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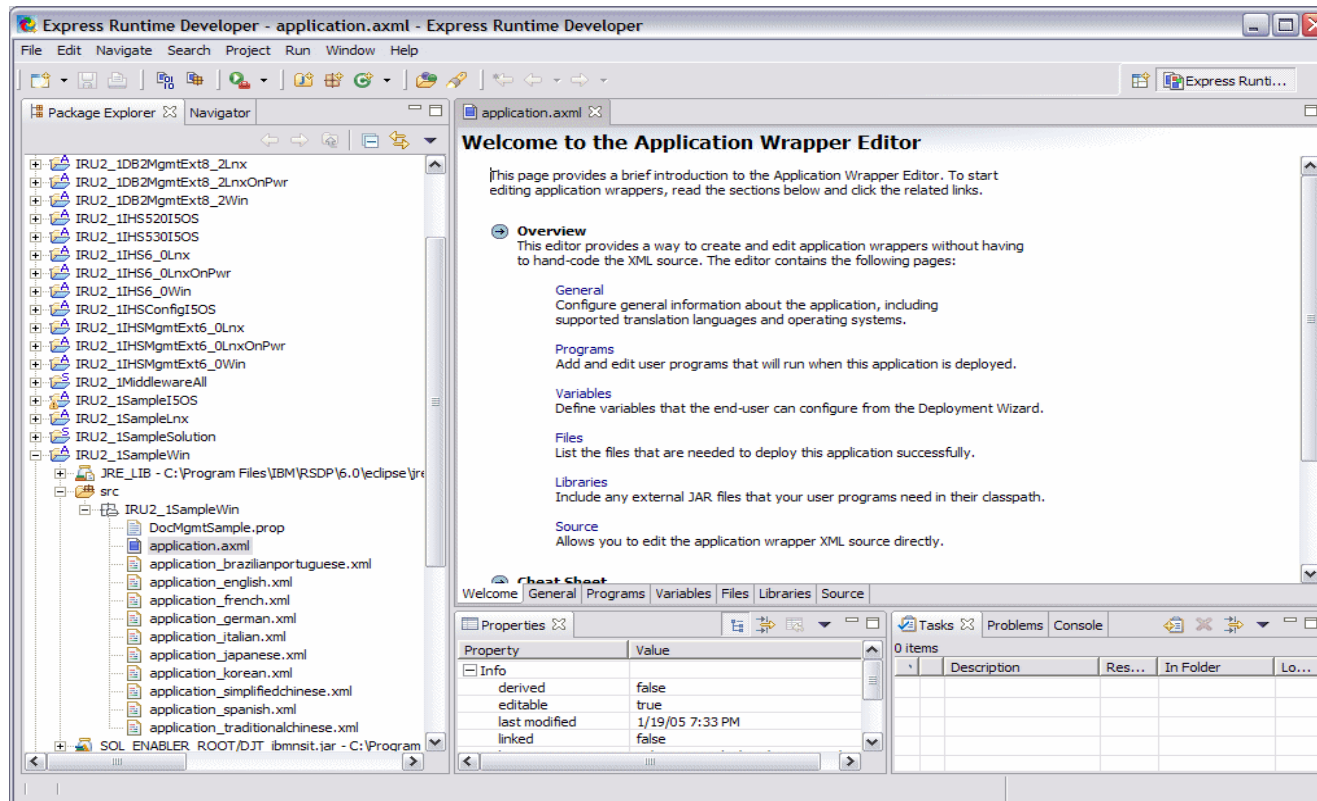
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Objectives

- The objective of this module is to explain the following concepts:
 - Definition of a wrapper
 - Exploration of the application wrapper and its elements
 - Exploration of the solution wrapper along with its elements

Express Runtime Developer

- Express Runtime installs and uses Express Runtime Developer to allow end-customers to tie their application with the middleware components quickly and efficiently.



Express Runtime Developer: Overview of the wrapper

- Developing a solution with Express Runtime Developer involves the use of a **wrapper**.
- A wrapper can be thought of as the “workflow” element responsible for controlling the flow of execution for deploying each component.
- For example, the wrapper can be used to:
 - Drive the installation of IBM Middleware components as well as the application of an end-customer
 - Execute DB2 scripts supplied by an end-customer to create tables required for application and populate the tables with data
 - Configure middleware components, such as WebSphere Application Server - Express, using Java Command Language (JACL) scripts supplied by an end-customer to access the newly created tables

A wrapper architecture

- A wrapper is a concept which is implemented with the following artifacts:
 - An XML file that defines the wrapper
 - One or more Java user programs: Express Runtime includes a set of [support application programming interfaces \(APIs\)](#) that your user program uses
 - Your application artifacts, such as an enterprise archive (EAR) file, GIF and HTML files, JACL scripts, and so on
 - Any additional Java archive (JAR) files used by your user programs, for example, jt400Native.jar for accessing IBM **E**server i5 or iSeries

Two types of wrappers

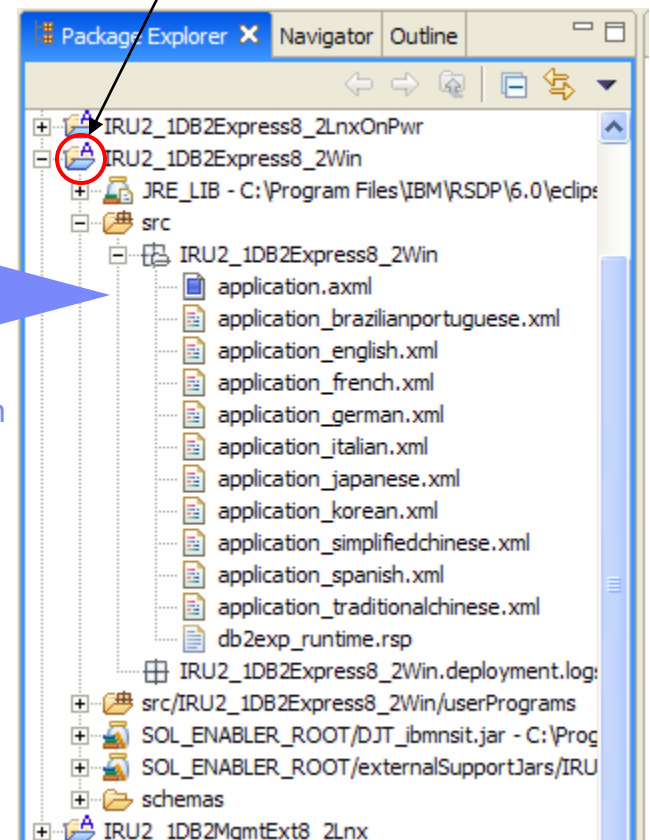
- Two types of wrappers are used in Express Runtime:
 - Application wrapper: Helps to integrate any application, such as an end-customer application or any middleware component, into a solution
 - Solution wrapper: Helps to seamlessly combine several applications into a complete solution
- Express Runtime comes with the pre-built wrappers for the IBM middleware and sample solutions. These wrappers, along with other required components, are installed as the sample projects in the Express Runtime Developer workspace.
- You use one solution wrapper for a given solution and one application wrapper for each application that solution contains.

Application wrapper

- An application wrapper must include an Extensible Markup Language (XML) file that is used to describe an application.
- One `application.xml` file is under the `src` folder in each application project in the Express Runtime Developer. The purpose of this XML file is to provide information specific to an application.

For example, for the IRU2_1DB2Express8_2Win application project, the application wrapper `application.xml` is placed under the `src` folder.

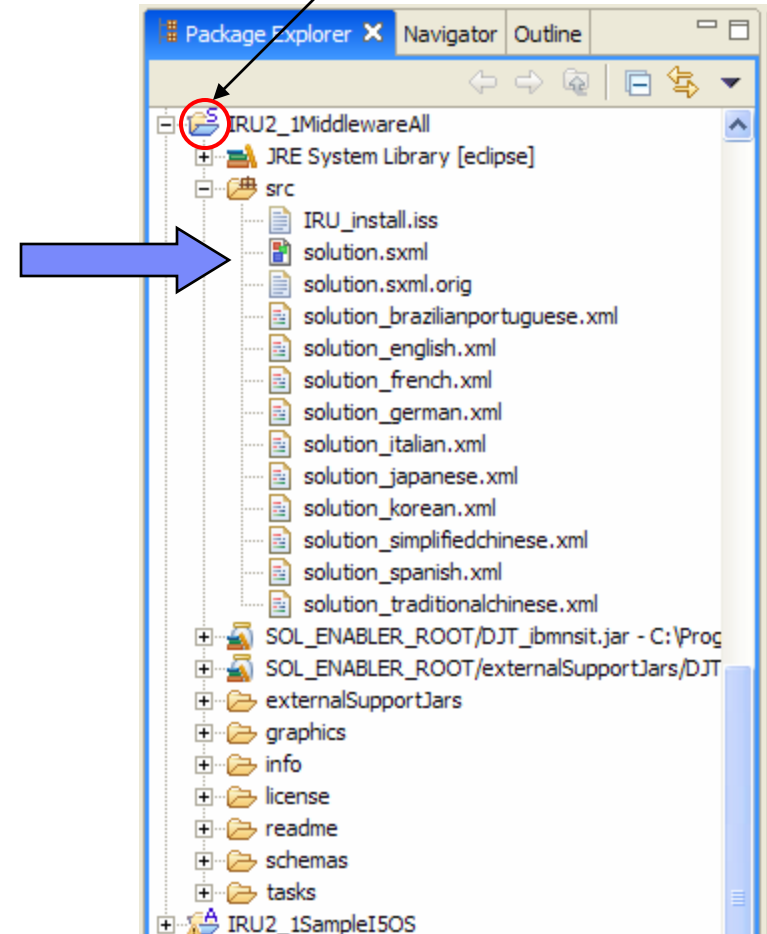
Letter "A" in the icon indicates an **Application** project



Solution wrapper

- A solution wrapper must include an XML file that is used to describe a solution.
- One `solution.xml` file is under the `src` folder in each solution project in the Express Runtime Developer. The purpose of this XML file is to provide information specific to a solution.

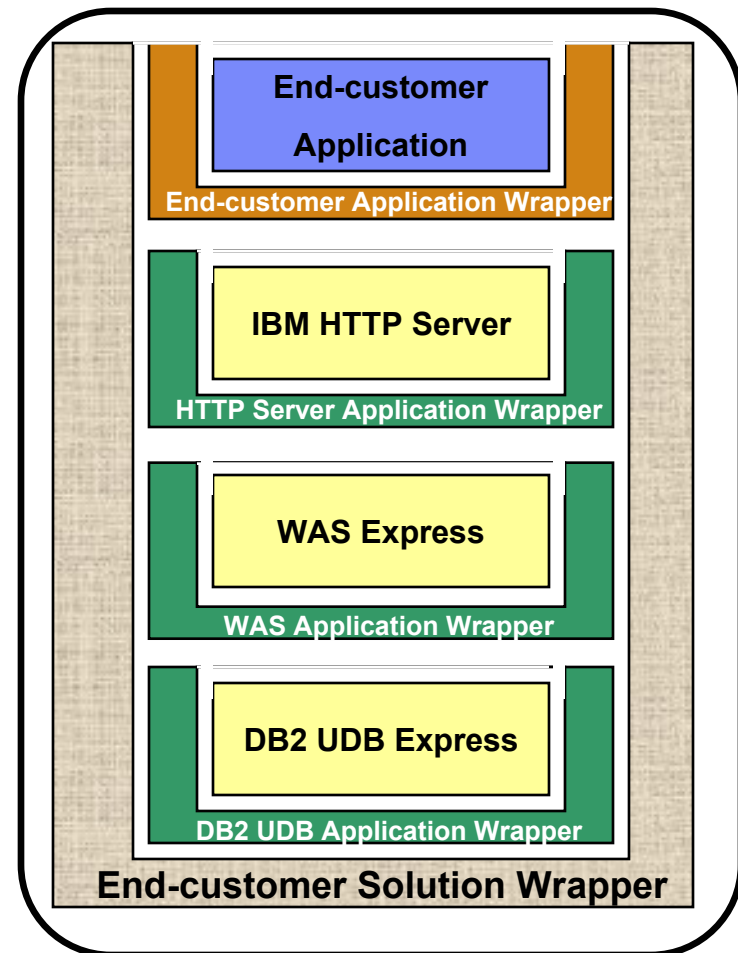
Letter "S" in the icon indicates a **Solution** project



Putting it all together

- For example, to deploy all middleware components along with an end-customer's application to a Windows system, your solution should contain:
 - Three pre-built applications, each with its wrapper: WebSphere Application Server-Express V6.0 on Windows, DB2 Universal Database (UDB) Express V8.2 on Windows and IBM HTTP Server 6.0 on Windows
 - An end-customer's application with its wrapper
- All of these applications are included in one solution. This solution is then used to deploy the middleware components and the end-customer's application to the Windows system.

Complete solution



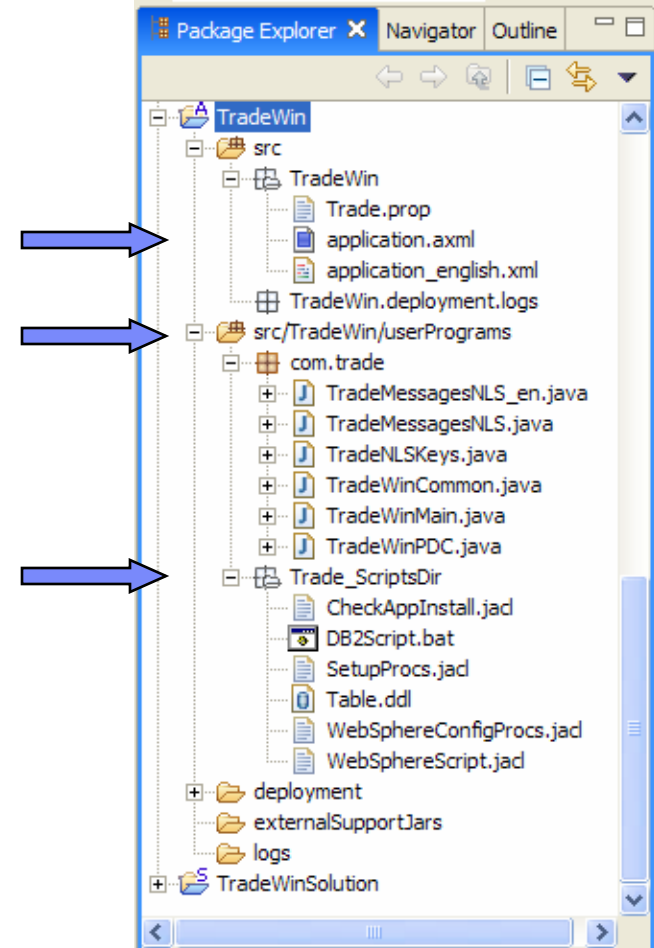
Application wrapper

Sample application wrapper

- We demonstrate the components of an application wrapper using the sample application called [TradeWin](#).
- TradeWin is a Java 2 Platform, Enterprise Edition (J2EE) application for WebSphere Application Server - Express V6.0.

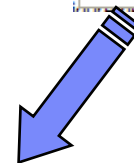
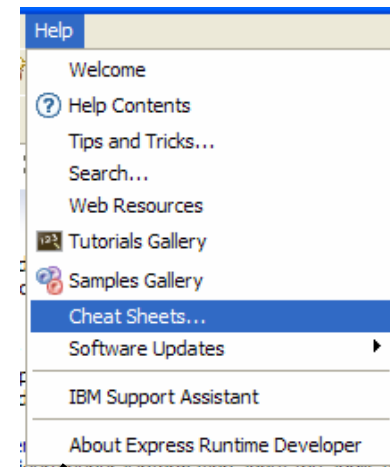
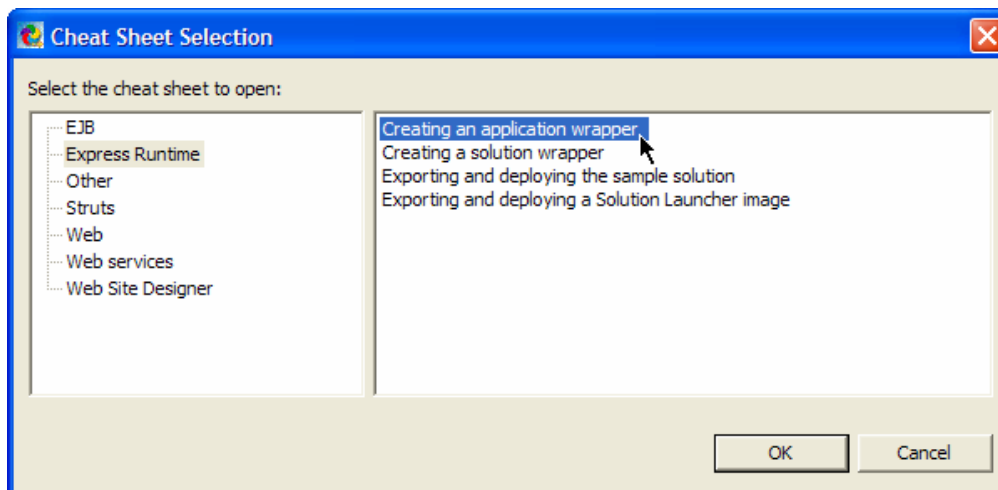
Components of an application wrapper

- This example shows the components of an application wrapper:
 - The application.xml file to describe the application
 - The user programs
 - Additional artifacts:
 - JACL script files for the application installation
 - DB2Script.bat and Table.ddl files to set up a database



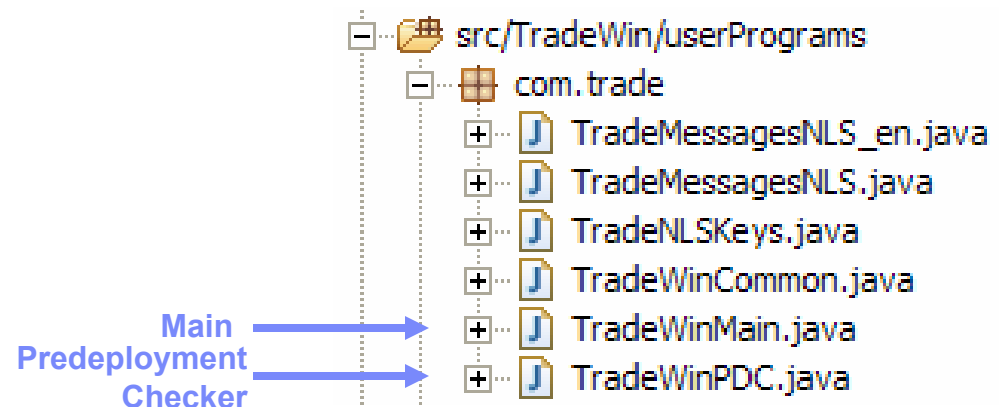
Creating an application wrapper: Step 1

- Create the application project.
- Refer to the Cheat Sheet for a description of the steps.



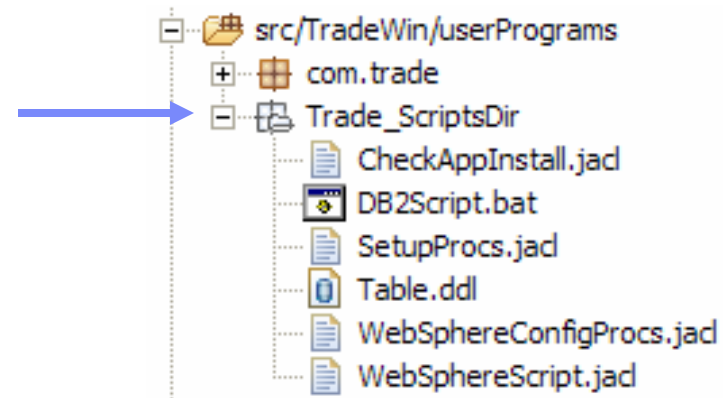
Creating an application wrapper: Step 2

- Develop the user programs.
- There are four types of user programs:
 - Main
 - Predeployment Checker
 - Entry
 - Exit
- **Main** is a required program.
- In our sample application, we use only two user programs: Main and Predeployment Checker.



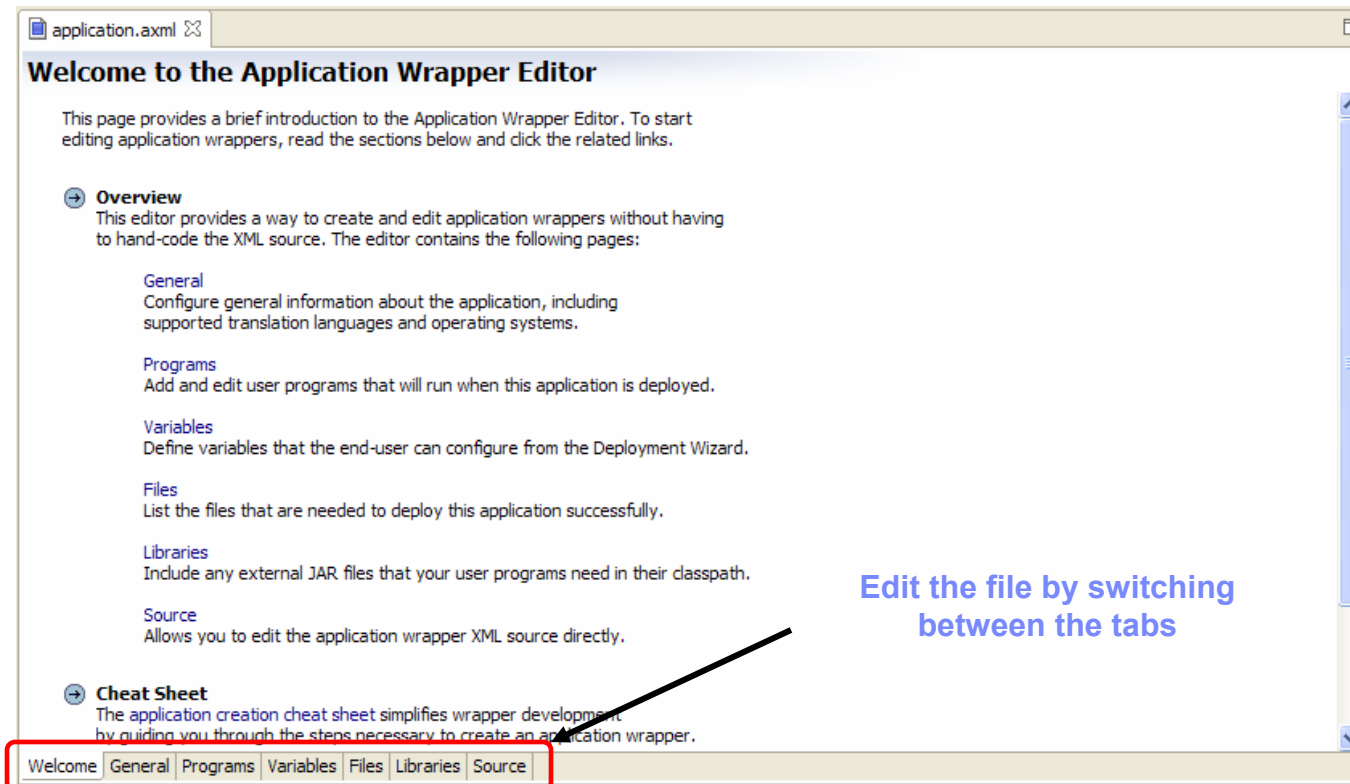
Creating an application wrapper: Step 3

- Develop or add to the application project any artifacts used by your application.
- For our TradeWin application, we add script files under the `Trade_ScriptDir` folder.
- If you need, include any external Jar files for your application.



Creating an application wrapper: Step 4

- Update the application.xml file.
- Edit it with the Application Wrapper Editor. It allows you to modify this file without knowing XML.



application.xml: General tab

- On this tab, you specify general information about your application, such as the name, supported languages, and supported platforms.

The screenshot shows the 'General Application Information' tab in the application.xml configuration tool. The window title is 'application.xml'. The tab is divided into two main sections: 'Basic Application Configuration' and 'Advanced Application Configuration'.

Basic Application Configuration:

- *ID: TradeWin (Click to change)
- *Application name: TradeWin
- *Version: 1.0
- Installation time (minutes): 20
- Provider name: IBM
- License text: (empty text area)

Advanced Application Configuration:

- Deployment package protected:
- Deployment package name: (empty text area)
- Configuration instructions: (empty text area)

Supported Translation Languages:

Select the translation languages for this wrapper. For each selected language, you must provide an XML file containing translated strings.

*Default: English

*Languages:

- Chinese
- Chinese (Taiwan)
- English
- French
- German
- Italian
- Japanese
- Korean
- Portuguese (Brazil)

Buttons: Select All, Deselect All

Supported Operating Systems:

Select the operating systems supported by this application.

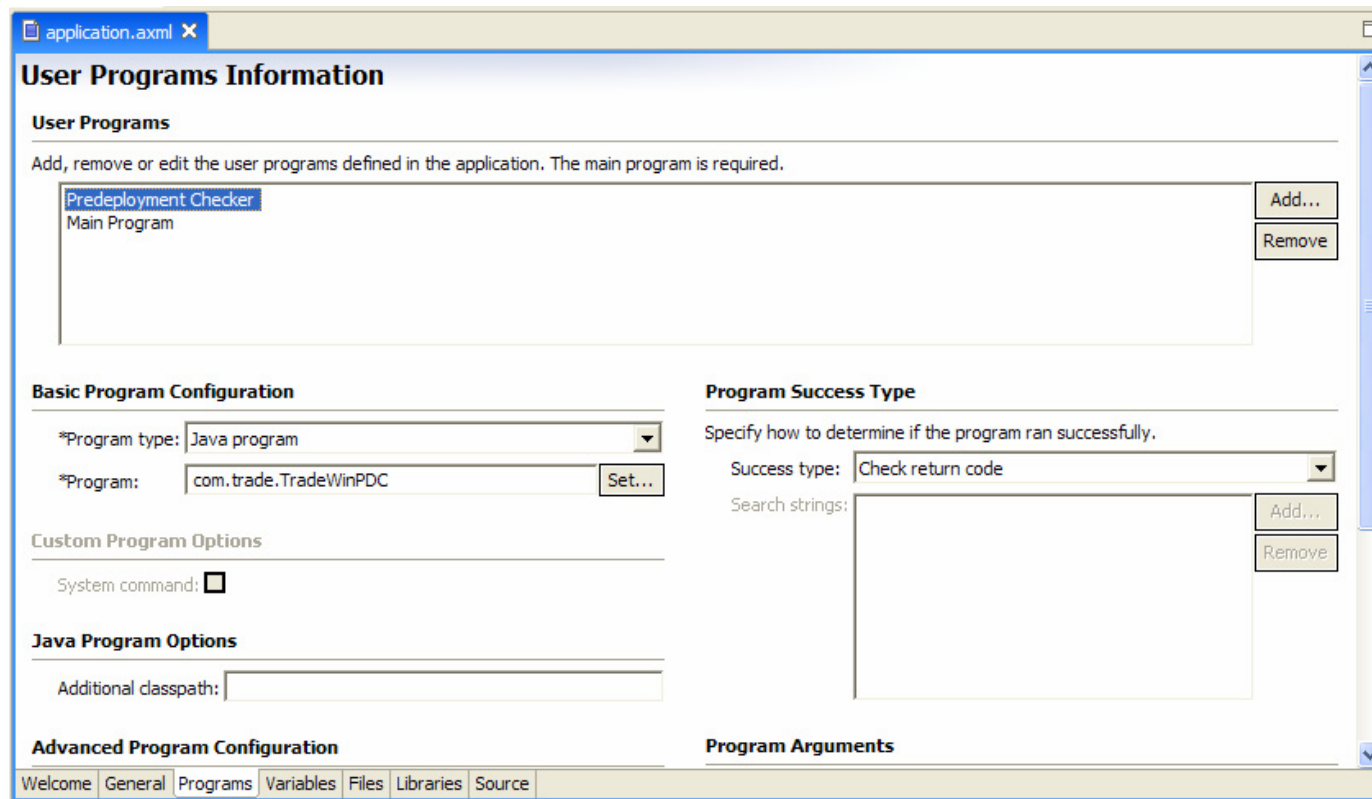
- Linux
- Linux on POWER
- OS/400 (i5/OS)
- Windows

Buttons: Select All, Deselect All

At the bottom of the window, there are tabs: Welcome, General (selected), Programs, Variables, Files, Libraries, Source.

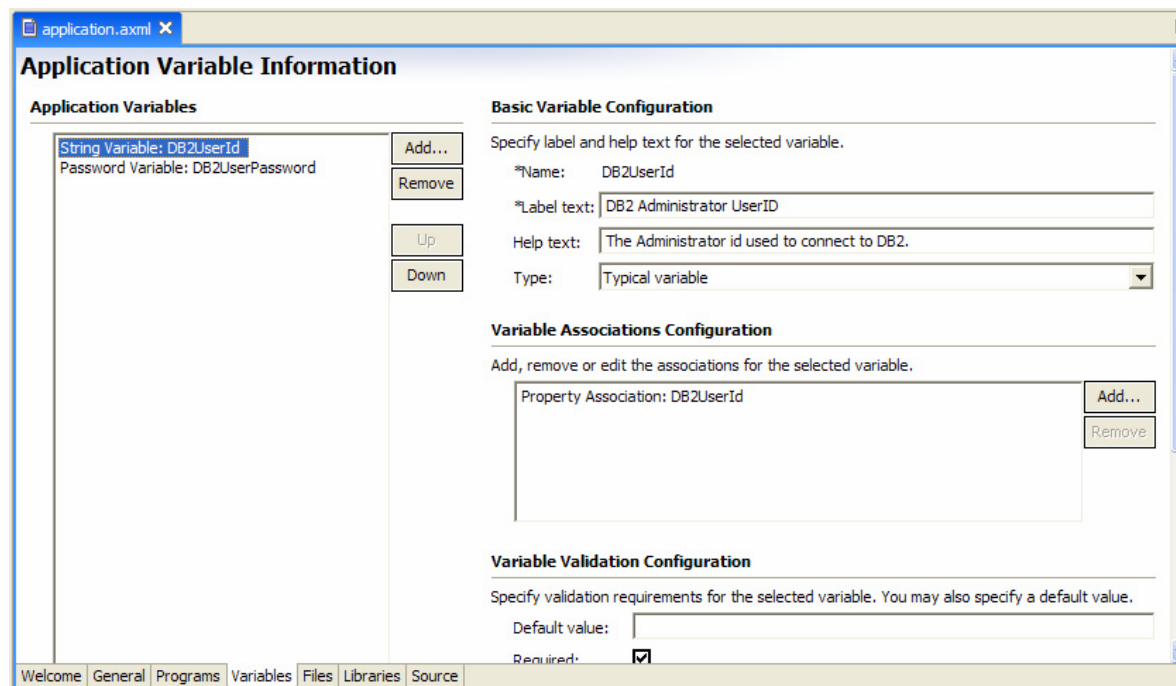
application.xml: Programs tab

- On this tab, you specify your user programs and their arguments.



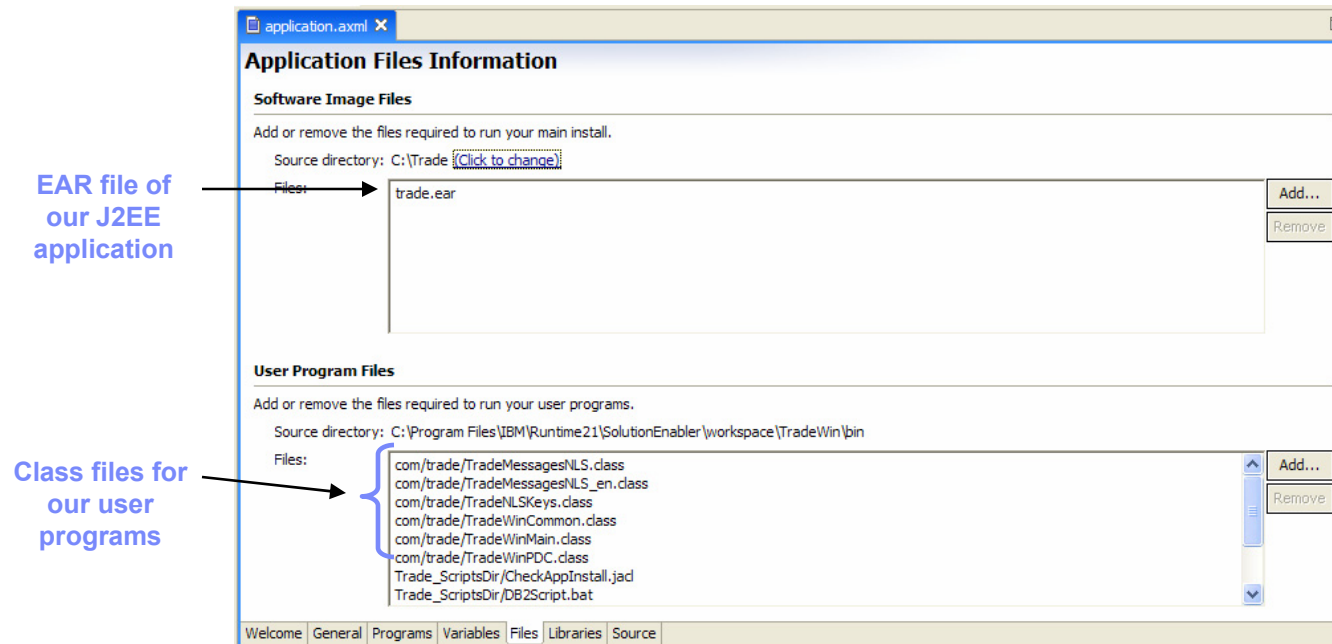
application.axml: Variables tab

- On this tab, you define the variables for you application. The customer sets these variables when they deploy this application.



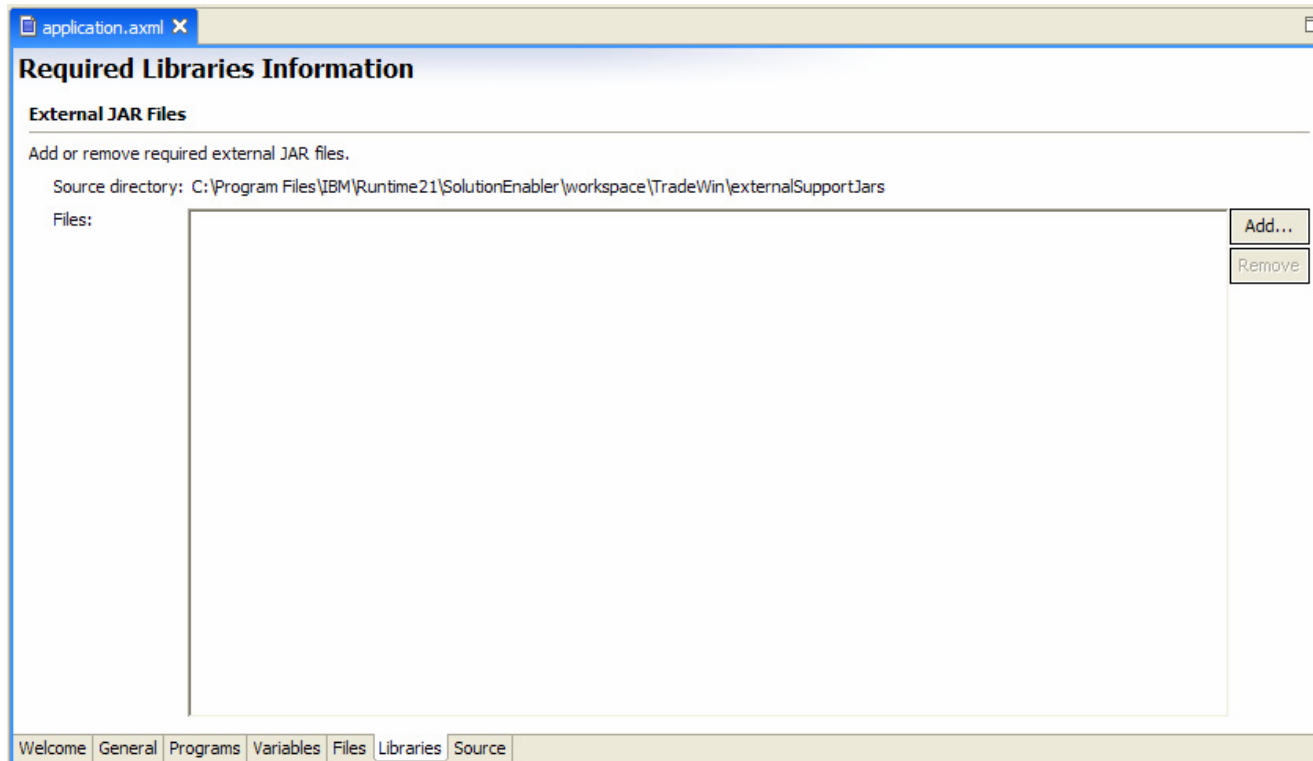
application.xml: Files tab

- On this tab, you specify all files for your application:
 - Class files of your user programs
 - Any additional artifacts, such as EAR file, script files, and so on



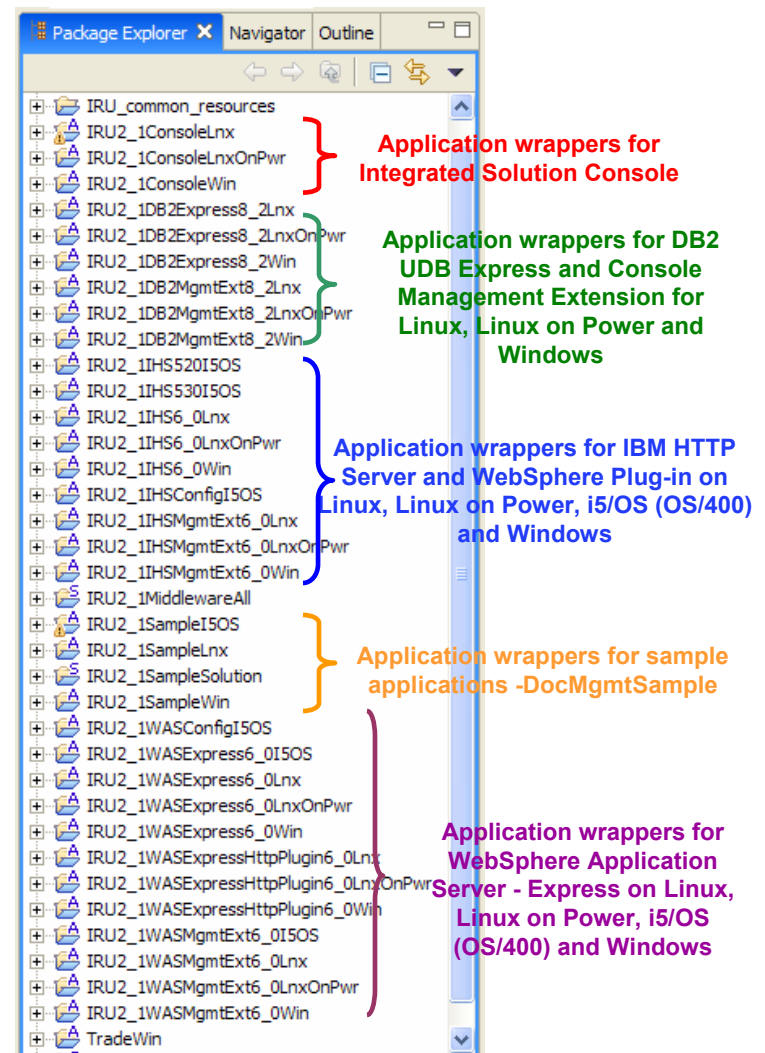
application.xml: Libraries tab

- Add any external JAR files on this tab.
- Our sample application doesn't need any.



Pre-built application wrappers

- You can find the following ready-to-use sample application wrappers in the Express Runtime Developer:
 - WebSphere Application Server - Express V6.0 on Windows, Linux, IBM POWER5 and IBM i5/OS
 - DB2 UDB Express Edition V8.2 and Console Management Extension on Windows, Linux and IBM POWER5 (DB2 is shipped with i5/OS, so there is no wrapper for deployment of DB2 to i5/OS.)
 - IBM HTTP Server 6.0 and WebSphere Plug-in on Windows, Linux, IBM POWER5 and i5/OS
 - Integrated Solution Console on Window, Linux and IBM POWER5



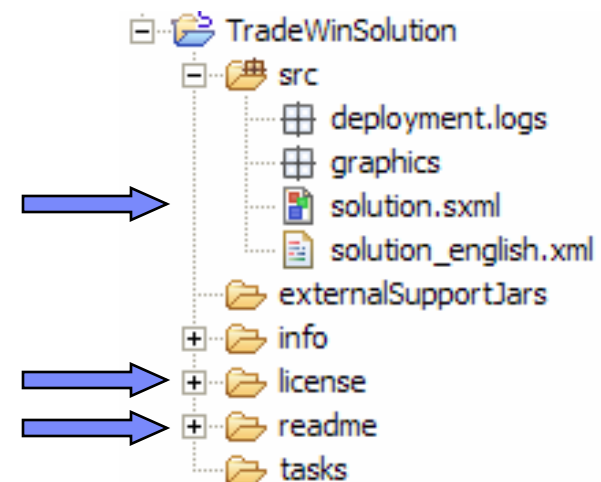
Solution wrapper

Sample solution wrapper

- We demonstrate the components of a solution wrapper using the sample solution called [TradeWinSolution](#).
- [TradeWinSolution](#) is a solution that includes:
 - WebSphere Application Server - Express V6.0 (Windows)
 - DB2 UDB Express V8.2 (Windows)
 - IBM HTTP Server V6.0 (Windows)
 - IBM WebSphere HTTP Plug-in
 - TradeWin application

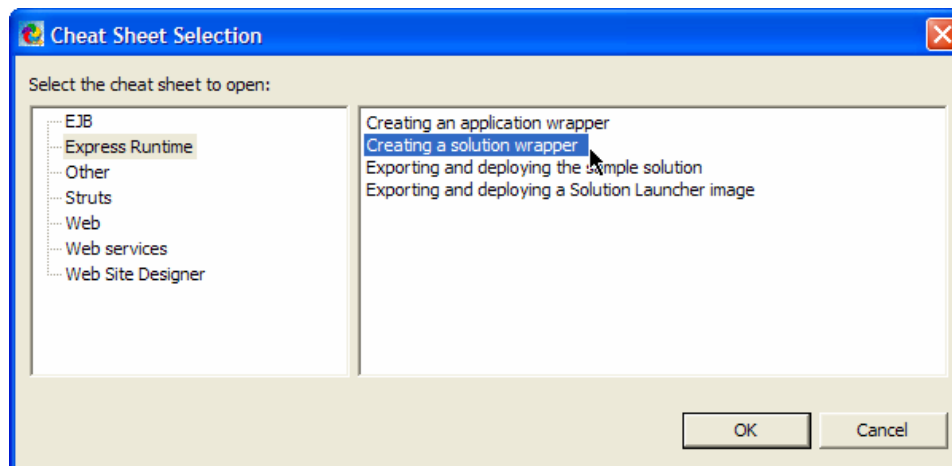
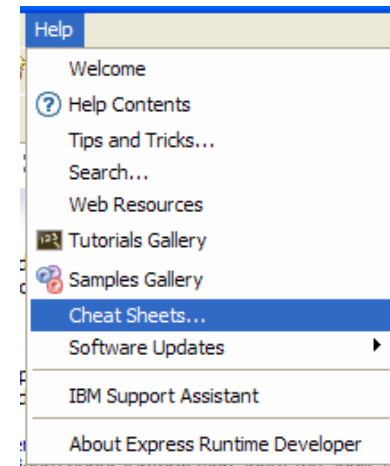
Components of a solution wrapper

- This example shows the components of a solution wrapper:
 - The `solution.xml` file describes the solution.
 - License information is available for supported languages.
 - The readme is available for supported languages.



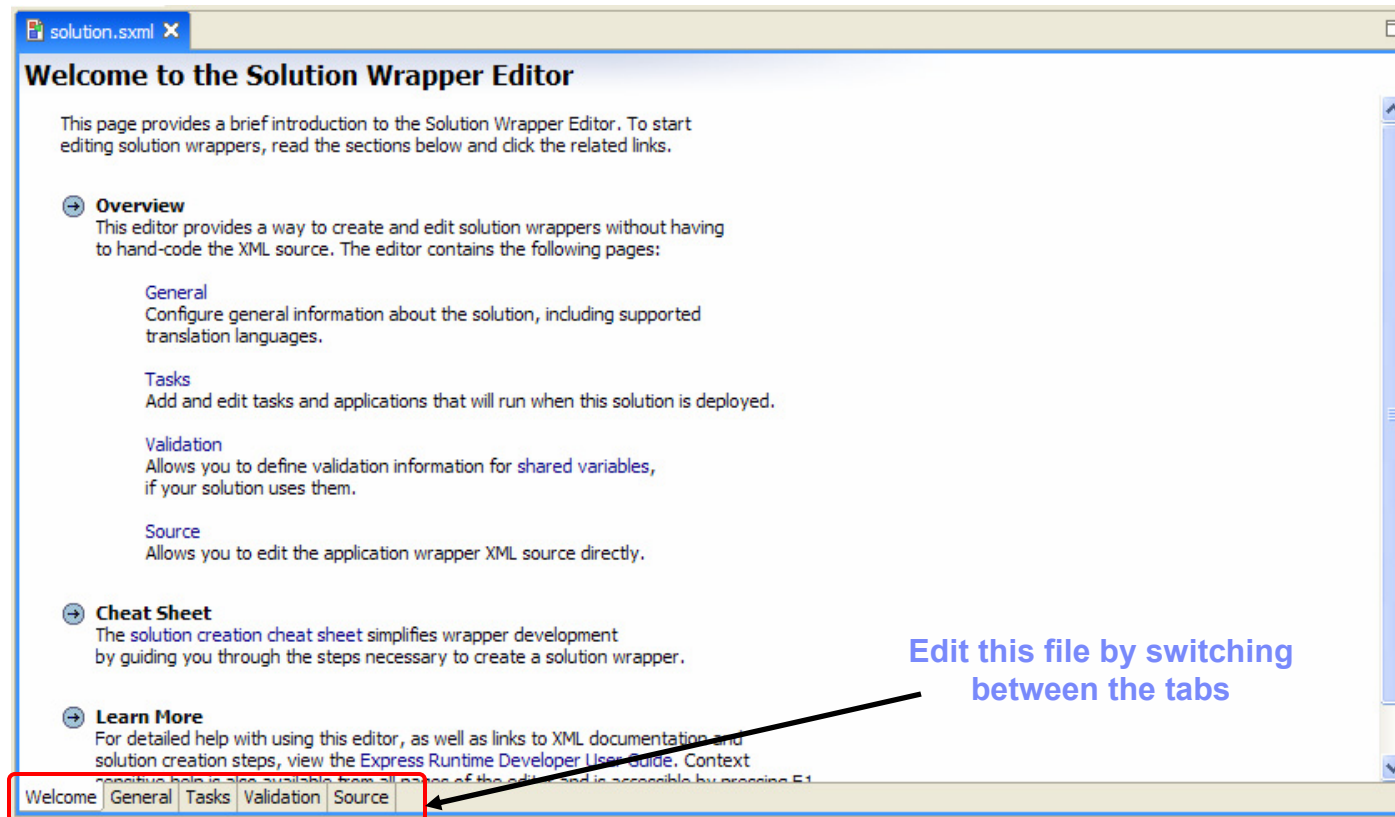
Creating a solution wrapper: Step 1

- Create the solution project.
- Refer to the Cheat Sheet for a description of the steps.



Creating a solution wrapper: Step 2

- Open the solution.sxml file in Solution Wrapper Editor.



solution.xml: General tab

- Specify general information about your solution on this tab, such as the name, version, supported languages, and so on.

The screenshot shows the 'General Solution Information' tab in the solution.xml configuration tool. The window title is 'solution.xml'. The tab is divided into two main sections: 'Basic Solution Configuration' and 'Supported Translation Languages'.

Basic Solution Configuration

- *ID: TradeWinSolution
- *Title: TradeWinSolution
- Version: 6.0
- Icon: [Browse...]
- Splash screen image: [Browse...]
- About screen image: [Browse...]
- About screen text:

```
<![CDATA[<html><p align="left"><p style="margin-left:25px"><font size="2"><BR>Trade Solution<BR></font></style></align></html>]]>
```
- Welcome screen image: [Browse...]
- Welcome screen title: Trade V6 Solution
- Welcome screen text: The solution to deploy all middleware, the Trade application, and Console for Express Runtime.

Supported Translation Languages

Select the translation languages for this wrapper. For each selected language, you must provide an XML file containing translated strings.

*Default: English

*Languages:

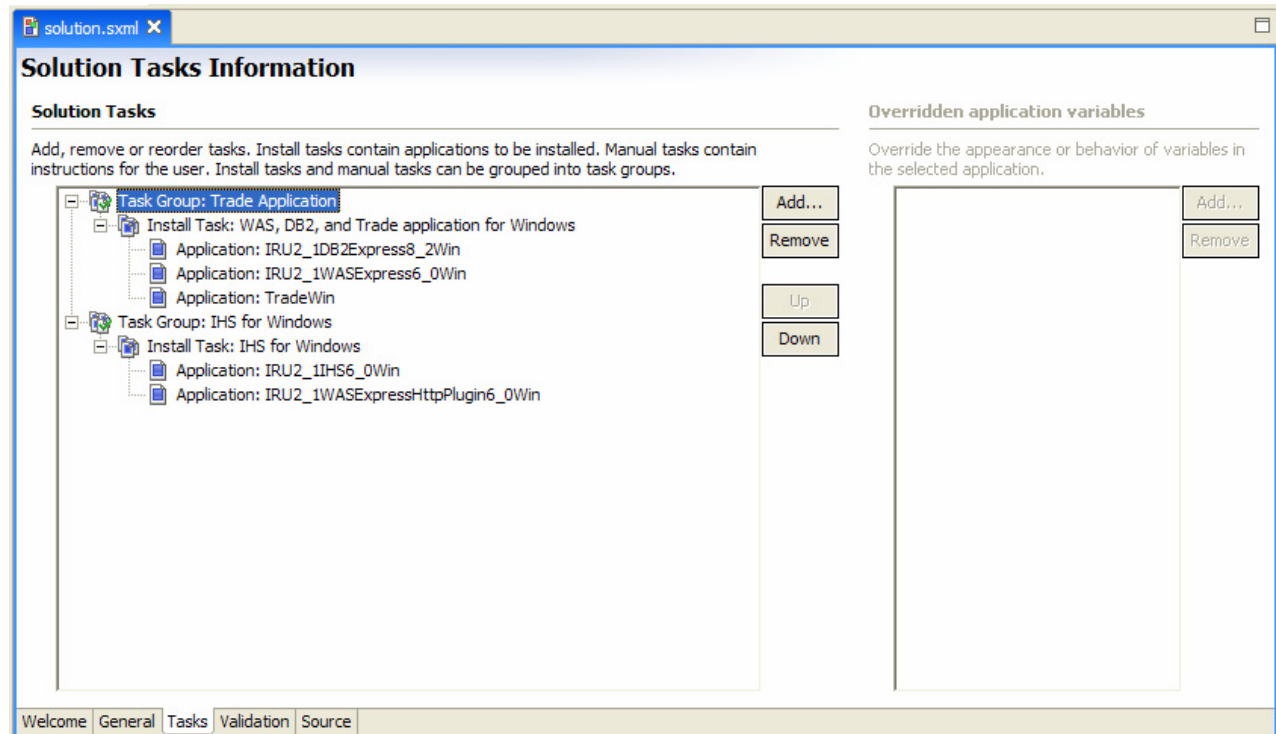
- Chinese
- Chinese (Taiwan)
- English
- French
- German
- Italian
- Japanese
- Korean
- Portuguese (Brazil)
- Spanish

Buttons: Select All, Deselect All

Navigation tabs: Welcome, General, Tasks, Validation, Source

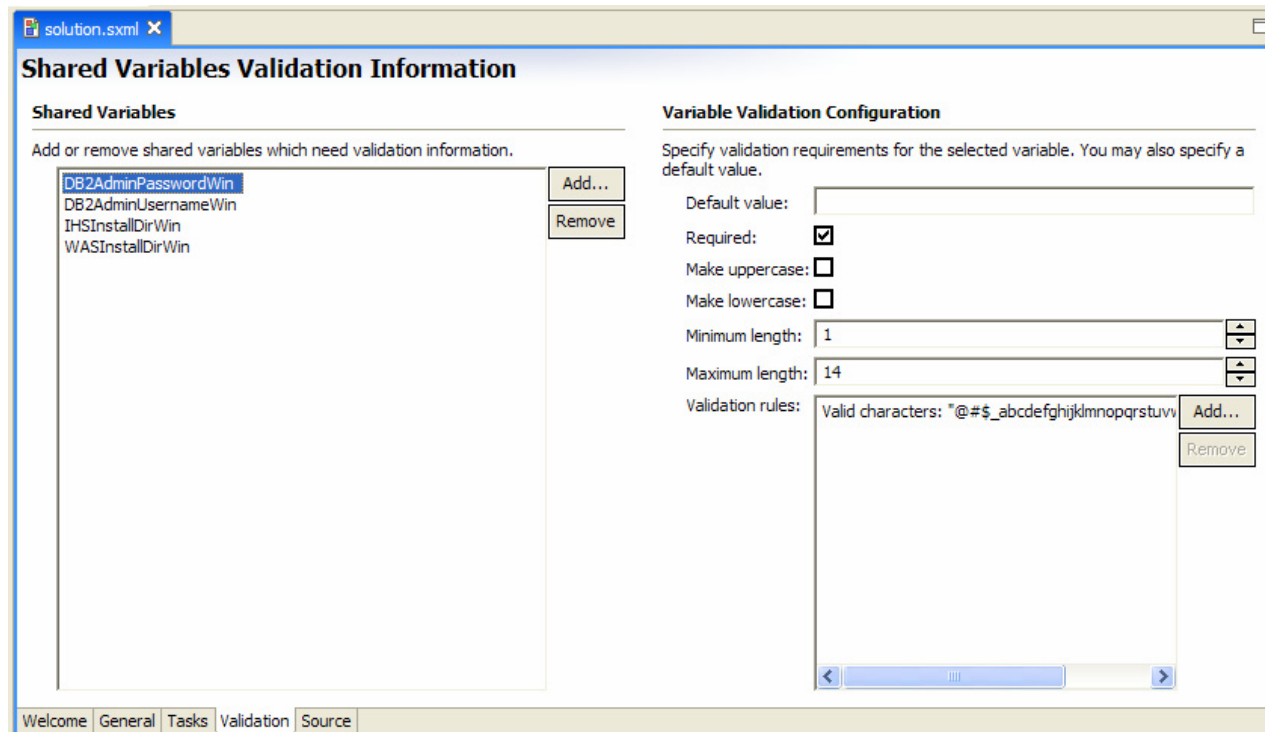
solution.xml: Tasks tab

- Add any application from the workspace that you want to include into this solution.
- Applications are grouped into the installation tasks. Each installation task can be deployed to a separate machine, supporting deployment of your solution to multiple systems.
- In our sample solution, we deploy:
 - WebSphere Application Server - Express, DB2 UDB Express, and TradeWin on one machine
 - IBM HTTP Server on another machine



solution.xml: Validation tab

- On this tab, add any variable that you want to share between all applications in your solution. Also add any validation rules for each variable.
- For example, add a DB2 administrator's password as a shared variable. Then a customer enters it only once during the deployment, saving time on typing it in several places.



Summary

Developing an application wrapper

- **Developing a wrapper for an application is the main development activity in Express Runtime.**
- **Use the editors in Express Runtime Developer to modify the XML files.**
- **Application wrappers for all middleware components can be used as is.**

Developing a solution wrapper

- **Create a solution based on the application and supported platform for the middleware.**
- **Before you start development, have a good understanding of the deployment requirements for the solution:**
 - Single system versus multiple systems
 - All four platforms versus a few selected platforms
- **The next module provides an example of developing a complete solution with the TradeWin application.**

End of the module