IBM Software Group

Developing a Real-life Solution Using IBM Express Runtime Developer

IBM Virtual Innovation Center

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Objectives

The objective of this module is to demonstrate how to:

- Create an Express Runtime solution containing:
  - Trade J2EE Application (Trade)
  - IBM WebSphere Application Server – Express V6.0
  - DB2 Universal Database (UDB) Express V8.2
  - IBM HTTP Server
  - Console for Express Runtime
- Develop the solution wrapper
- Develop the application wrapper for Trade

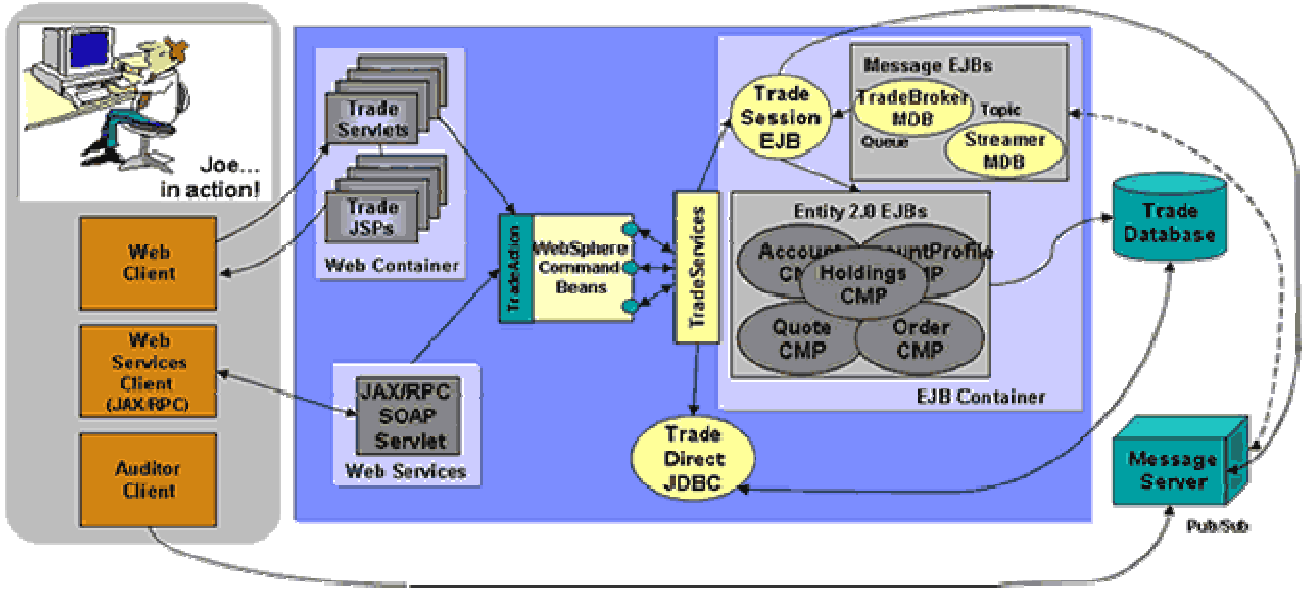
Agenda

- Trade application
- Creating solutions with Express Runtime Developer
  - Application projects
  - Solution projects
  - Creating user programs
- Creating the Trade solution
  - Trade application project
  - Trade solution project
- Testing the solution project

Overview of the Trade application

Trade

- Trade is a complete Java 2 Platform, Enterprise Edition (J2EE) V1.4 application
- It was created by IBM*



* - Trade Version 6 is J2EE 1.4 compliant, but is not yet available externally.

Details of the Trade application

- Trade uses many aspects of J2EE V1.4 and of WebSphere Application Server - Express V6.0.
  - Servlets, JavaServer Pages (JSPs), Enterprise JavaBeans (EJBs), Java Database Connectivity (JDBC), Java Messaging Service (JMS), Web Services
- This presentation uses Trade to illustrate how you can use IBM Express Runtime to create a complete solution that contains a J2EE application and the IBM middleware to support it.

Creating solutions with Express Runtime Developer

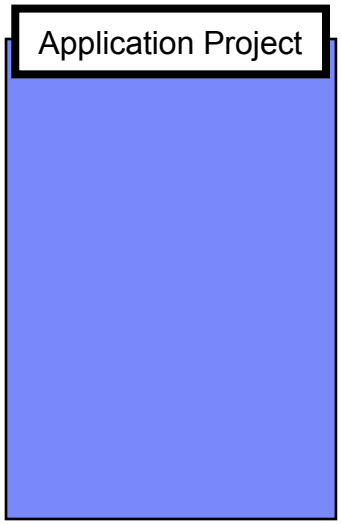
Express Runtime Developer

- An Eclipse-based tool
- Installation provides:
  - Rational Web Developer
    - Alternatively installs into an existing Eclipse 3.0 environment
  - Express Runtime development plug-ins
- Express Runtime Developer has two types of projects:
  - Application project
  - Solution project

Application projects

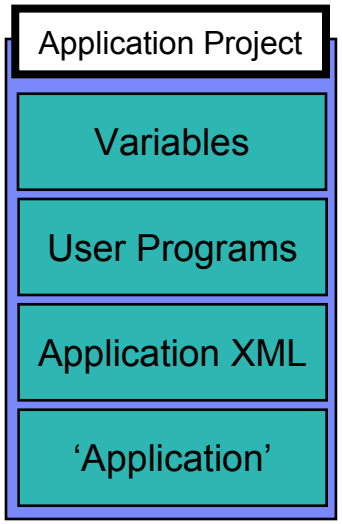
Application projects

- Responsible for deploying an application
  - Installation
  - Configuration
  - Verification
- Applications can be:
  - Middleware components
    - WebSphere Application Server - Express, DB2 UDB Server Express, IBM HTTP Server
  - Real applications
    - Trade, your application



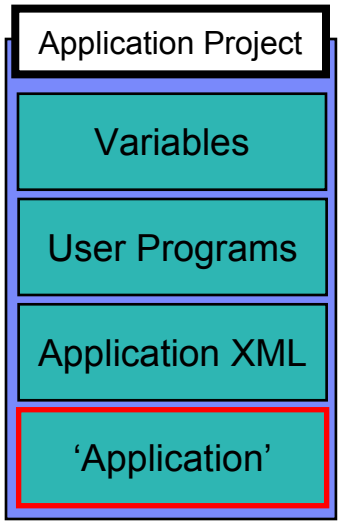
Application project: Contents

- The application itself
- Application XML
  - Defines the contents and behaviour of the project
- User programs
  - Check prerequisites
  - Silently invoke installers and scripts
  - Verify the success
- Variables
  - Values to be provided at deployment time



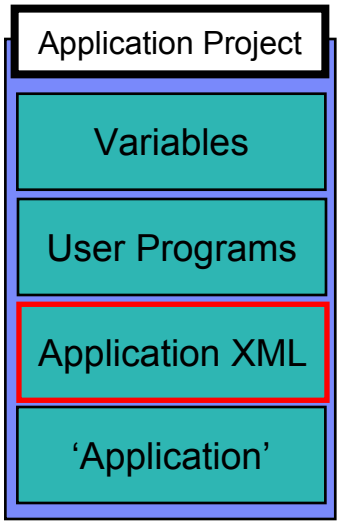
The ‘application’

- All files related to the application itself
- For example:
  - Enterprise archive resource (EAR) file
  - Static content such as images



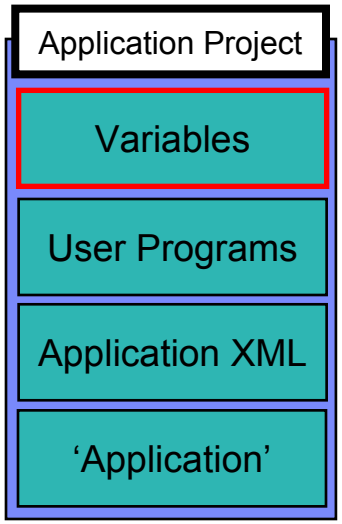
Application XML

- Defines all of the pieces of the Application project
  - Variables
    - Including validation checking
  - User programs
  - Names
- Operating system support
- Language support
- Named application.axml by default
- Edit using wizards (not raw Extensible Markup Language (XML))



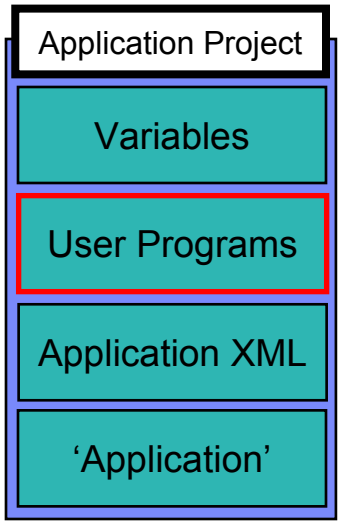
Variables

- Actually part of the application XML
- Define values that the Deployment Wizard asks for when the solution is deployed
- Can be associated with response files
  - When the deployer enters a value, the response file is automatically updated with this value.
- Can have validation defined
  - The Deployment Wizard checks that the deployer provides valid values.



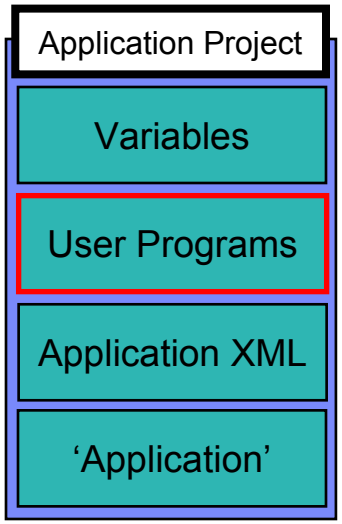
User programs: Part one

- These are the engine of your application project
- Responsible for deploying the application
- Often they invoke such installation procedures as silent installers or scripts:
  - InstallShield Multiplatform (ISMP)
    - Installs WebSphere Application Server - Express and IBM HTTP Server
  - InstallShield Professional (ISS)
  - Configuration, Installation, and Distribution (CID)
    - Installs DB2 UDB Express
  - Configuration scripts
    - wsadmin, ANT (installs WebSphere Application Server - Express applications and configures WebSphere Application Server - Express)



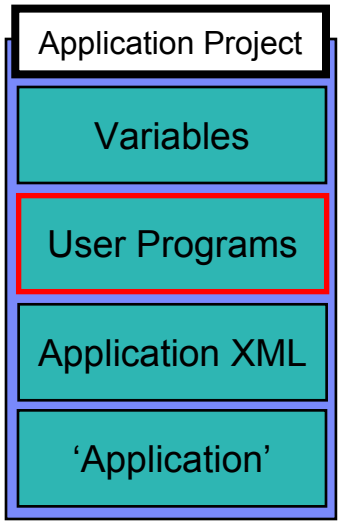
User programs: Part two

- User programs can also be used for:
  - Prerequisite checking
  - Variable manipulation
  - Copying files
  - Verifying installation success
  - Anything you like



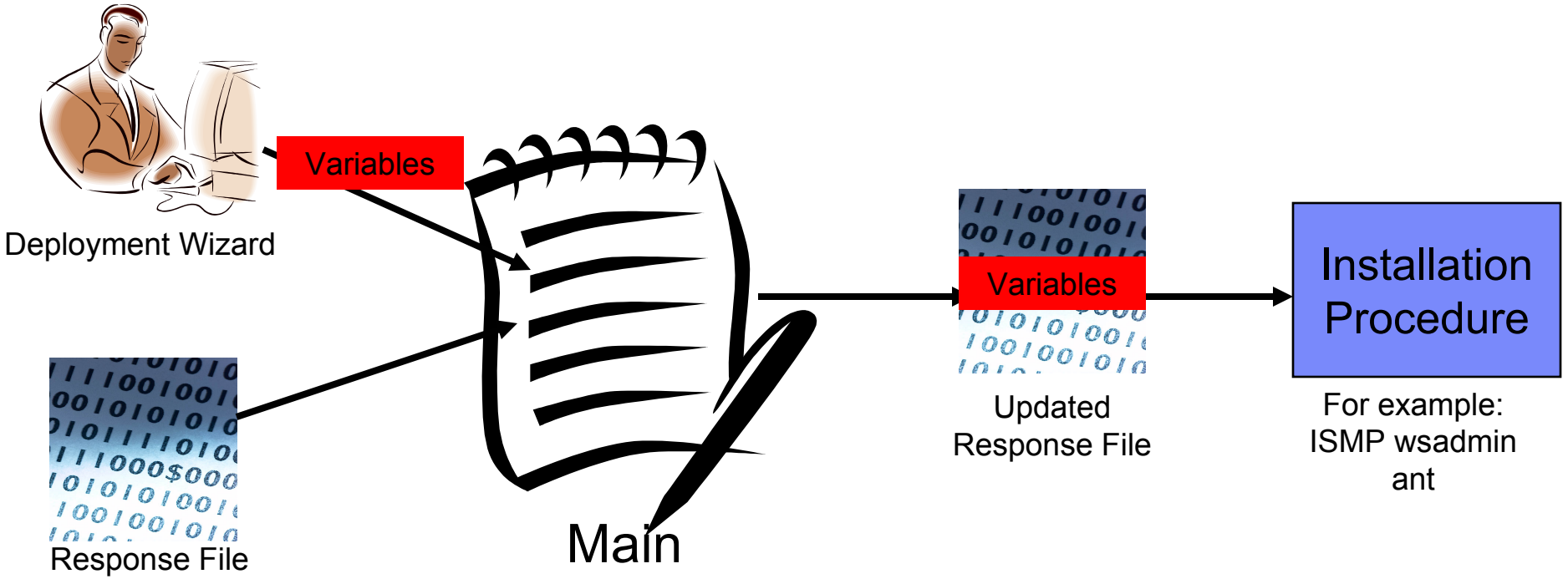
User programs: Part three

- Four types of user program can be defined
  - Predeployment Checkers (PDC). The most important benefit of the PDC is to determine if the conditions are not right for deployment. Then the application image is not transferred over the network to the target machine.
  - Entry
  - Main
  - Exit
- They execute in the order previously shown
  - Main is compulsory
  - PDC, Entry, and Exit are optional



Typical main user program

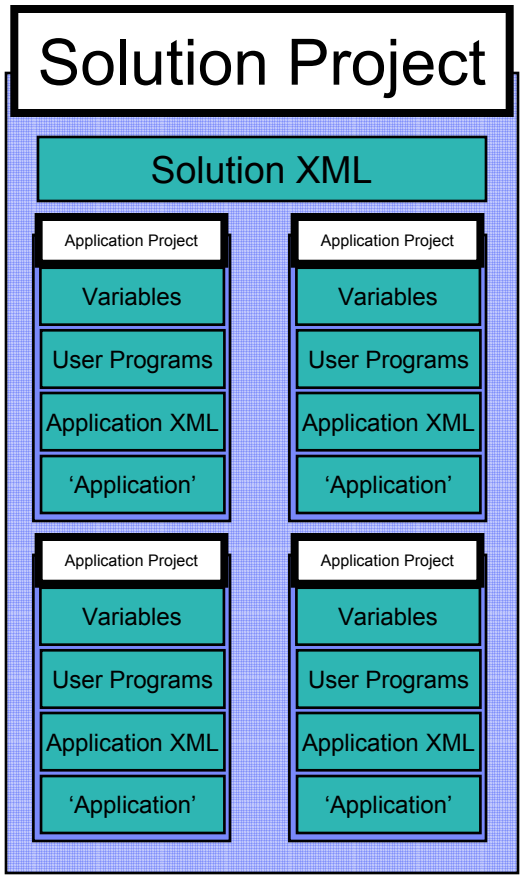
- Takes input from an initial response file
- Reads additional variables provided by the Deployment Wizard
- Updates the response file with variables
- Invokes the installation procedure



Solution projects

Solution projects

- Responsible for defining a solution
  - Consist of multiple applications
    - Each defined in an application project
- Share variables between applications
  - Deployer only enters shared values once
- Define Install Tasks
- Define application groupings
- Validate variables
  - Check deployer values are valid for the solution



Writing user programs

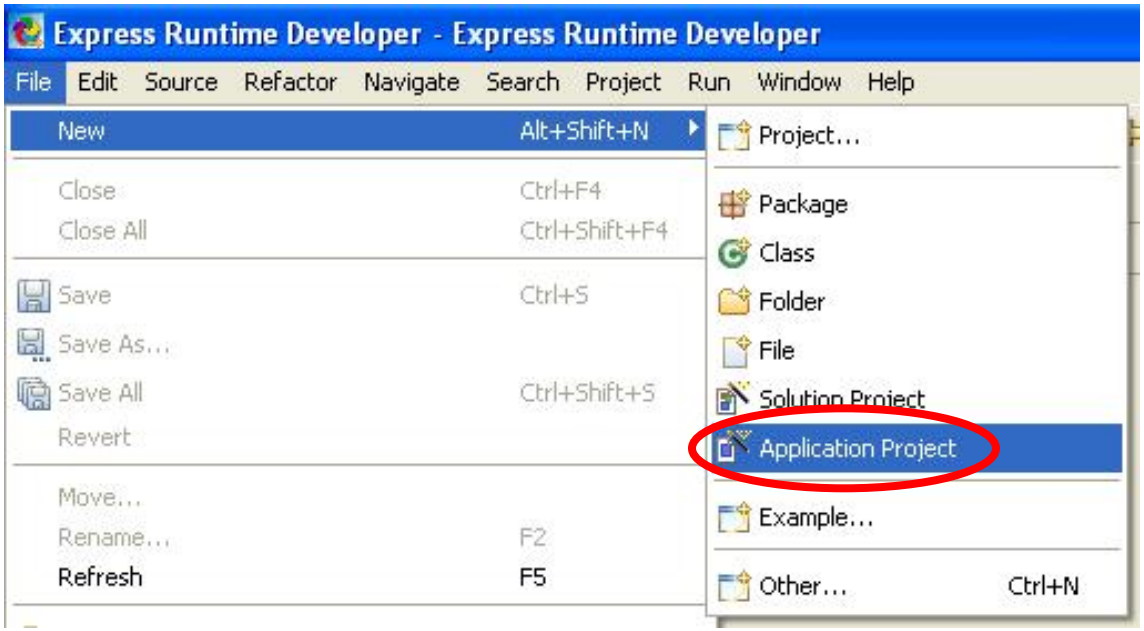
Writing user programs

- Typically written in Java
- Java user programs can use Express Runtime support application programming interfaces (APIs)
  - Simplify user program development
- JavaDoc for support API classes is available in **<ER_install>\Runtime21\SolutionEnabler\Support_Framework\index.html**
- Sample Application Project contains examples
  - (See Express Runtime Developer project IRU2_1SampleWin)

Creating the Trade solution: The application project

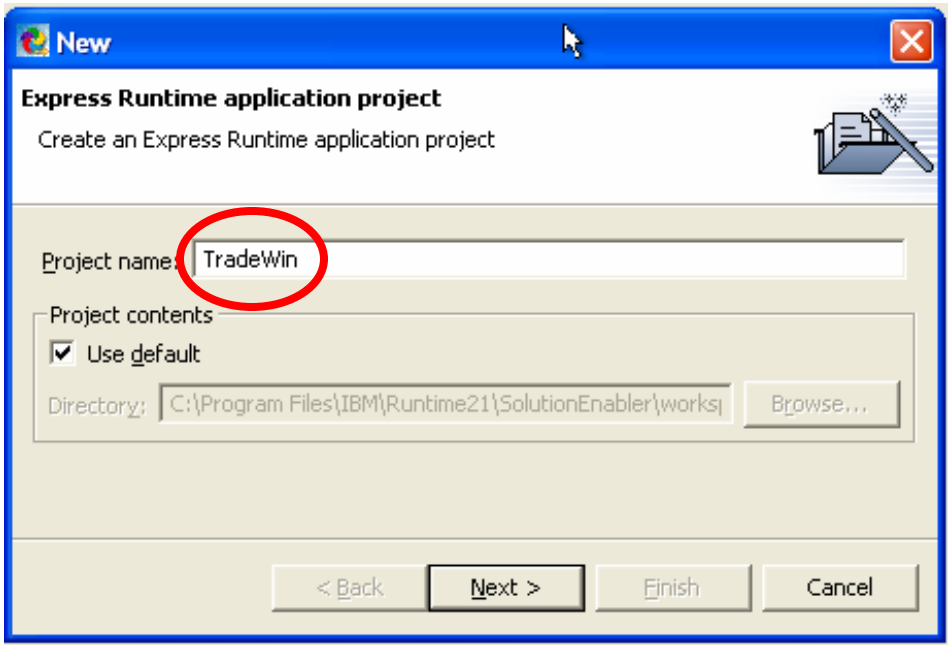
Create the Trade application project: Wizard part 1

- Create a new Application Project. Select **File -> New -> Application Project** (we do it from within Express Runtime Developer perspective)



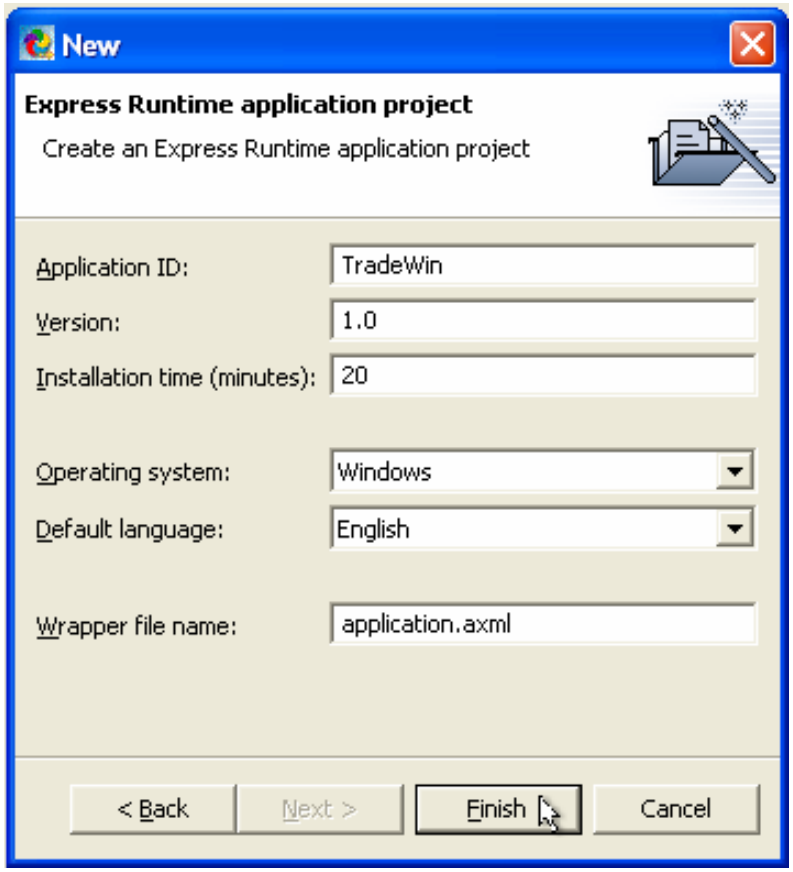
Create the Trade application project: Wizard part 2

- Enter the project name.



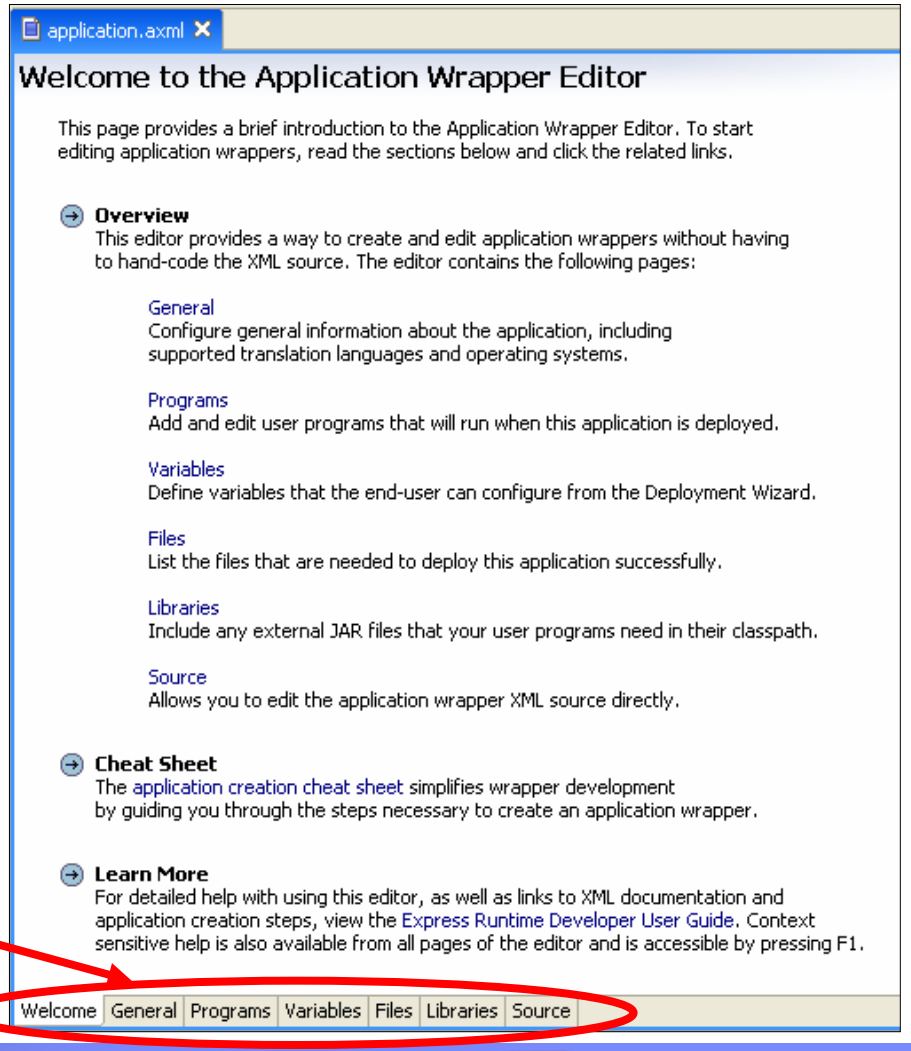
Create the Trade application project: Wizard part 3

- Enter the details of the project.

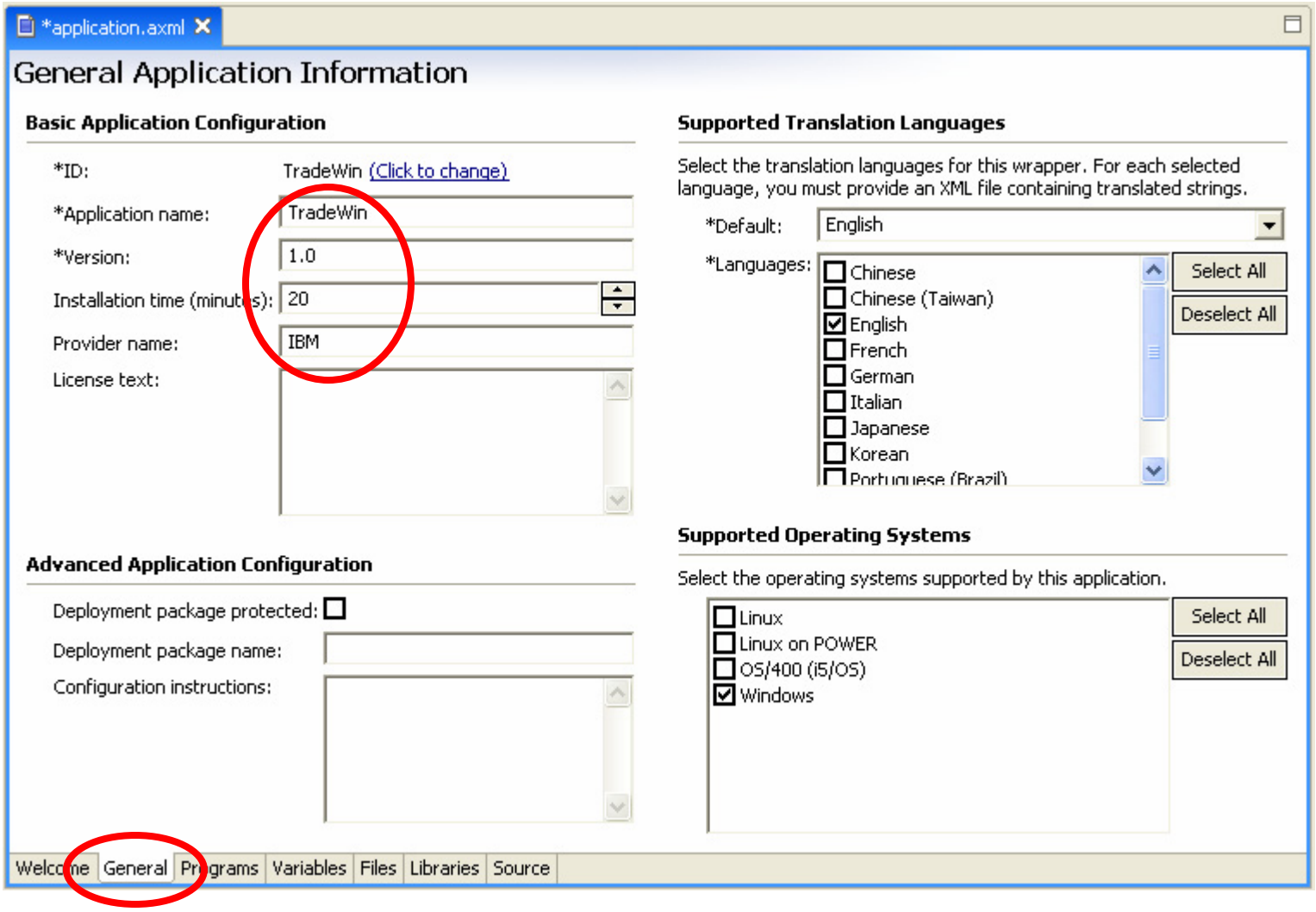


Trade application XML Editor

- The Editor allows you to edit the application wrapper using wizards and graphical input.
  - You do not have to edit the raw XML
- The Welcome page has useful links.
- The Cheat Sheet guides you through creating an application.
- Use the tabs to configure different pieces of the wrapper

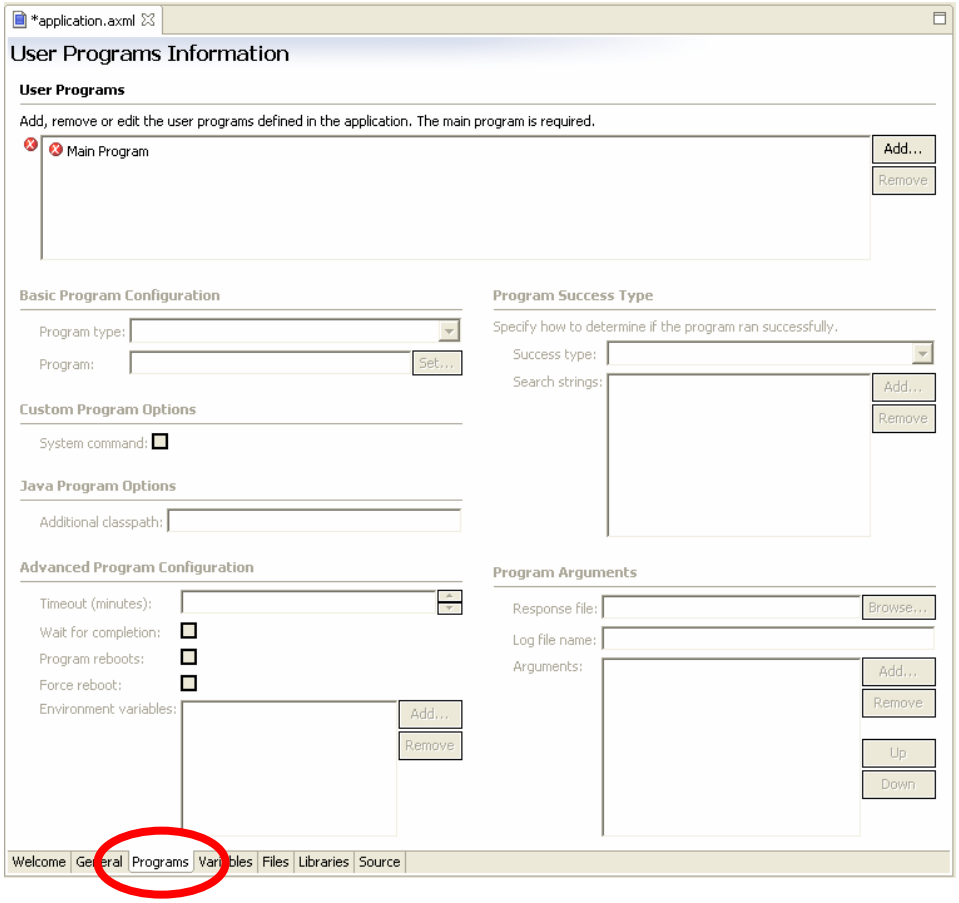


Trade application XML Editor: General tab



Trade application XML Editor: Programs tab

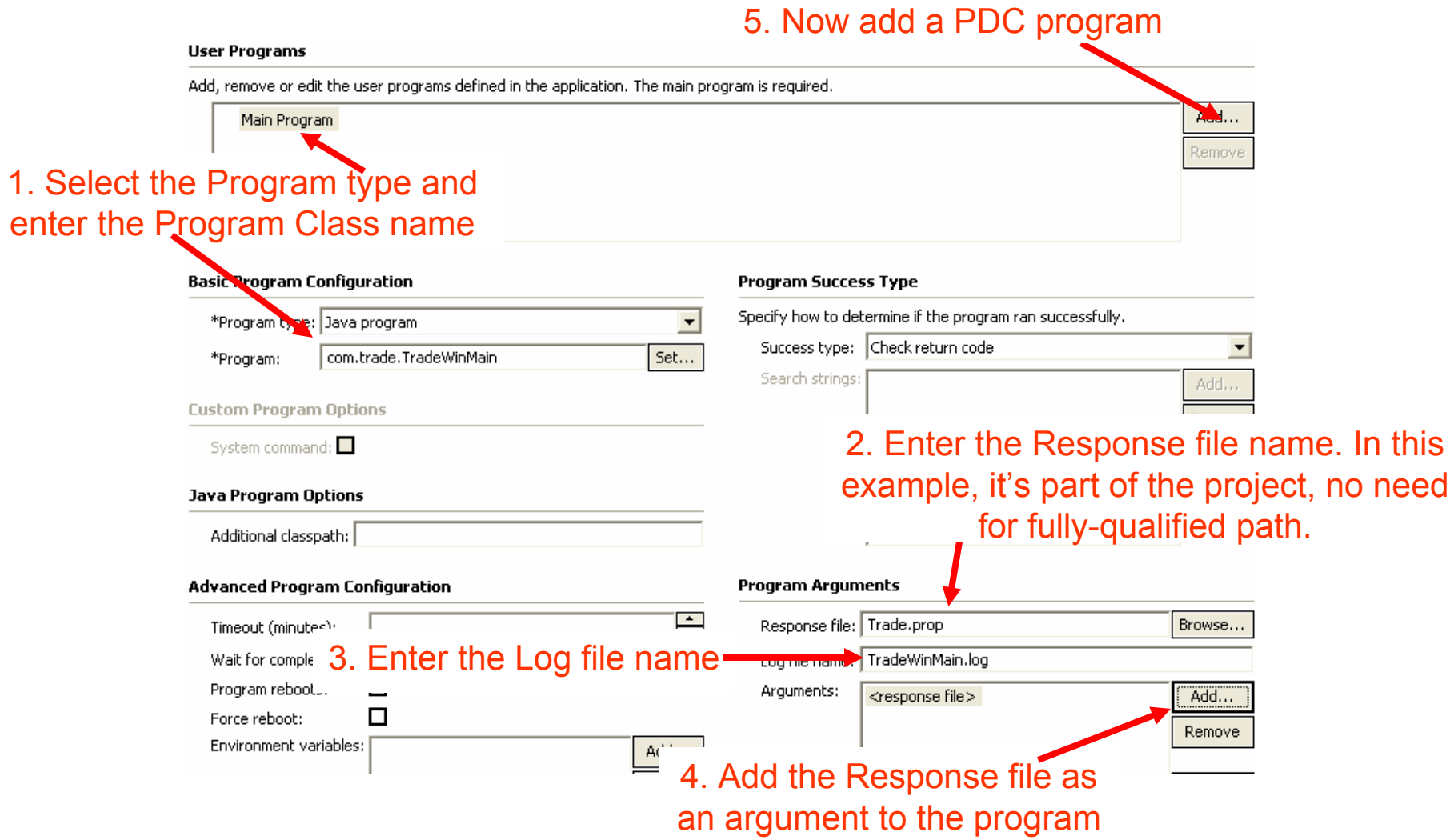
- This is where user programs are defined.
- A main user program is required, but no program is associated by default.
- Define the user programs for Trade from this tab.



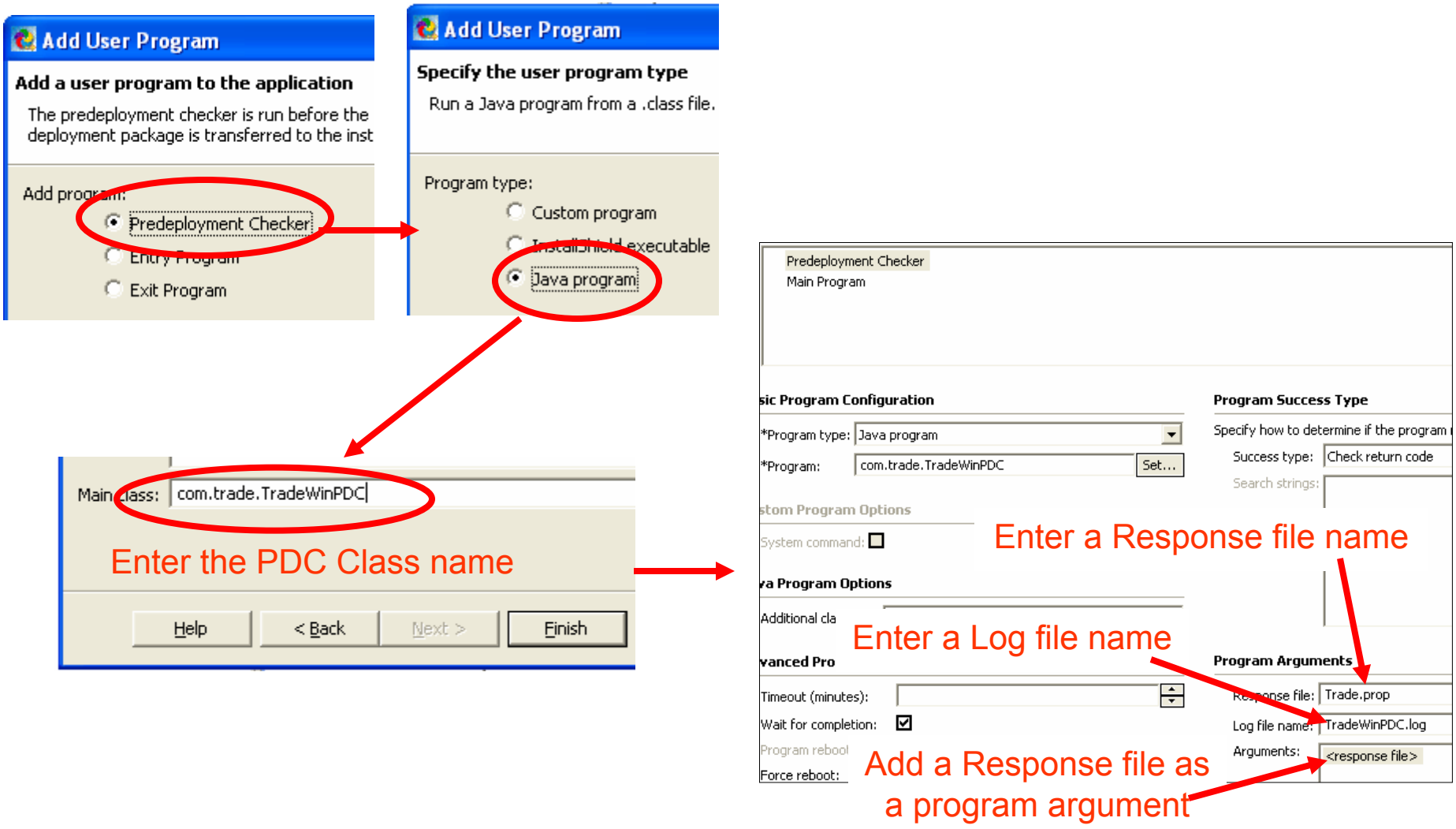
User programs for Trade

- Trade uses two user programs
  - Predeployment Checker
  - Main: Installation program
- PDC performs predeployment checks
  - Is WebSphere Application Server - Express is installed, is DB2 installed? Is the IBM HTTP Server installed?
  - Is Trade already installed?
- Main deploys the Trade application
  - Create DB2 table
  - Invoke wsadmin scripts to configure WebSphere Application Server - Express
    - Configure resources and install the EAR file

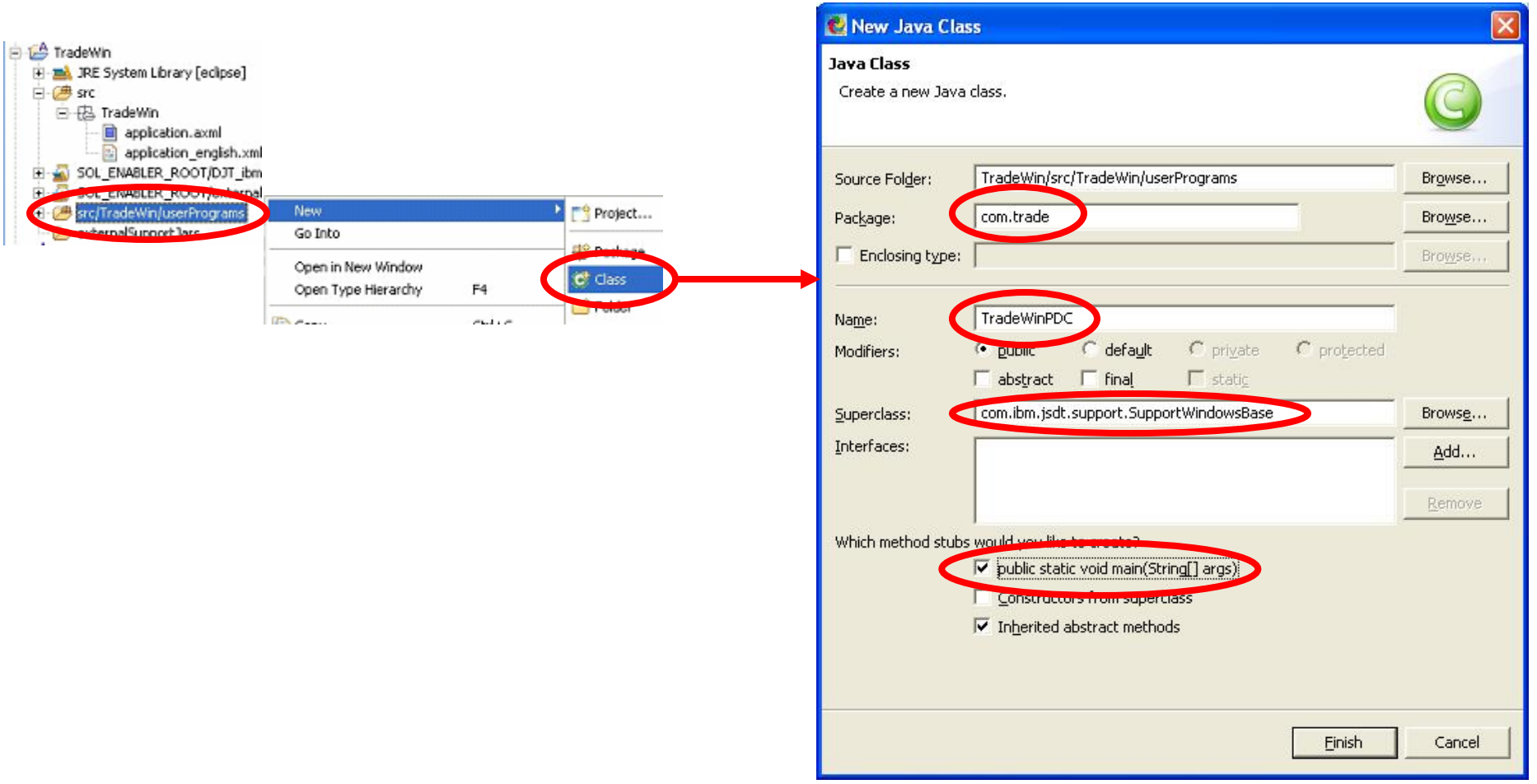
Define the Trade main user program



Define the Trade PDC



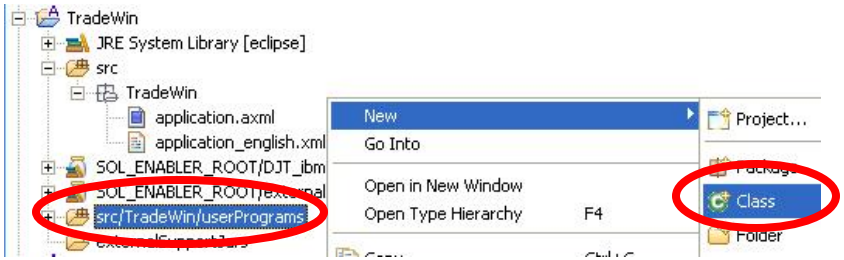
Create the PDC userProgram class

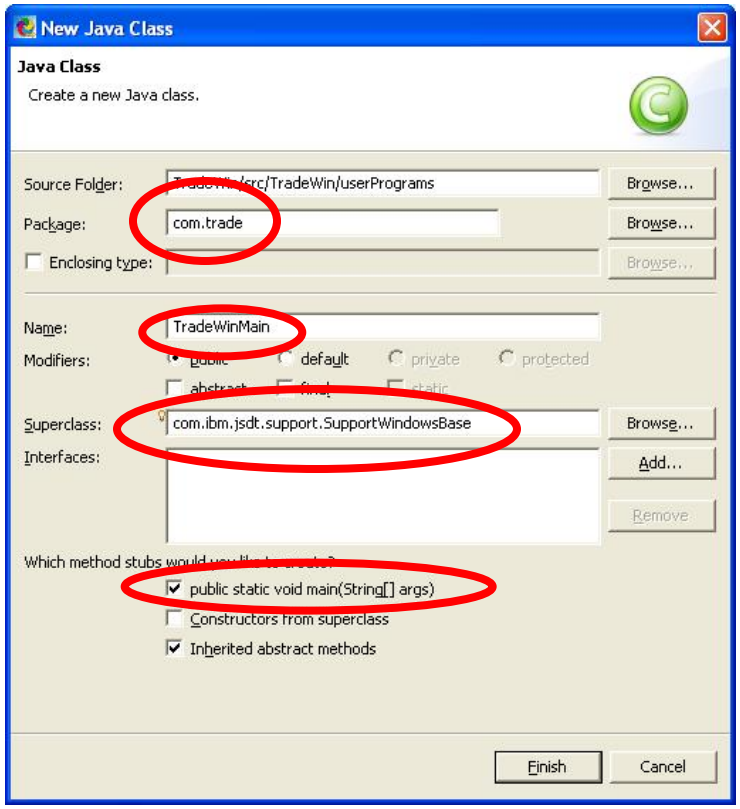


Trade PDC (com.trade.TradeWinPDC)

- Create or paste code that:
  - Performs simple prerequisite checks
    - Determine if WebSphere Application Server - Express is installed
    - Determine if DB2 UDB Express is installed
    - Verify that Trade is not installed already
  - Returns zero return code if successful

Create the Main userProgram class



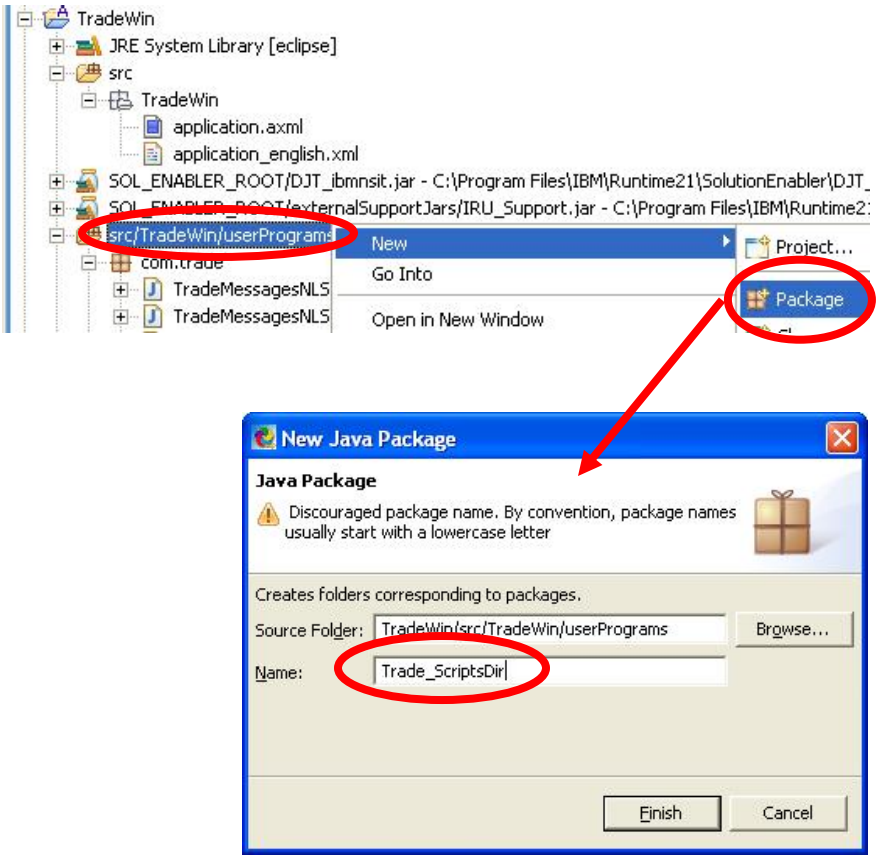


Trade Main (com.trade.TradeWinMain)

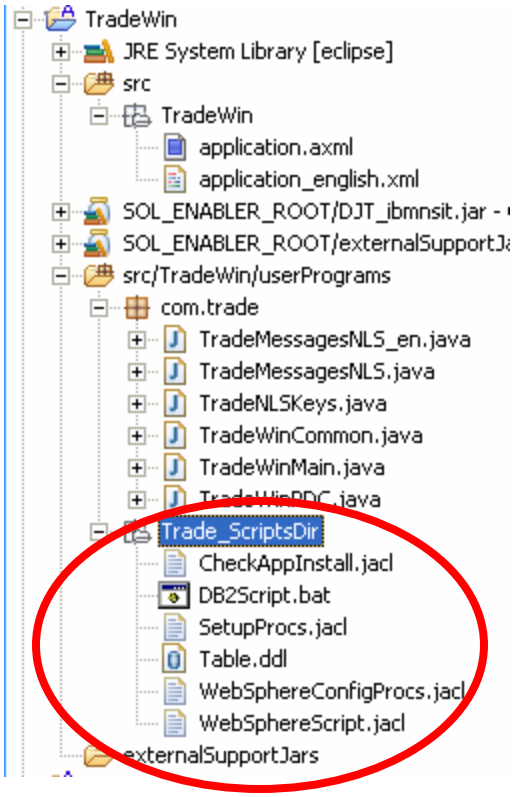
- Create or paste code that:
  - Takes values from the initial response file
  - Takes values from the Deployment Wizard
  - Determines the installation location of WebSphere Application Server - Express and DB2 UDB Express
  - Copies the **Trade.ear** into the **installableApps** directory
  - Invokes the DB2 script
    - Uses the **db2cmd** command with script to create Trade database
  - Invokes the WebSphere Application Server - Express script
    - Configures WebSphere Application Server - Express and deploys the Trade application
    - Uses the wsadmin script interface to WebSphere Application Server - Express with JACL script

Add scripts that are used by userPrograms

- Create a Scripts directory inside userPrograms

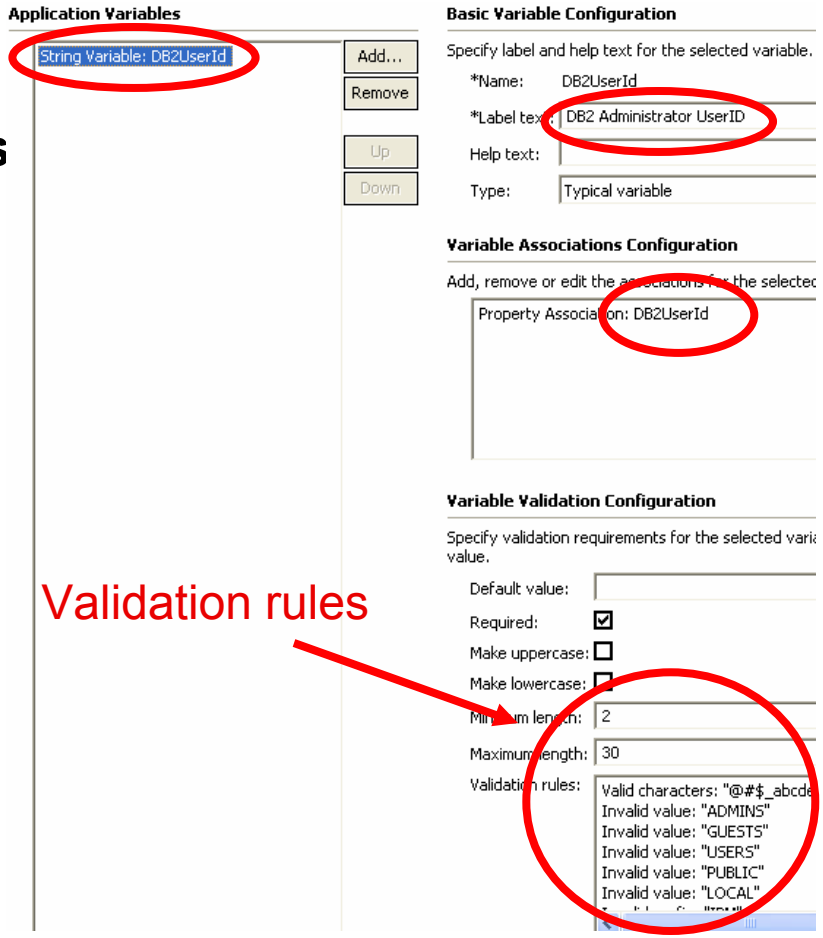


- Copy the previously developed scripts for your application into this directory



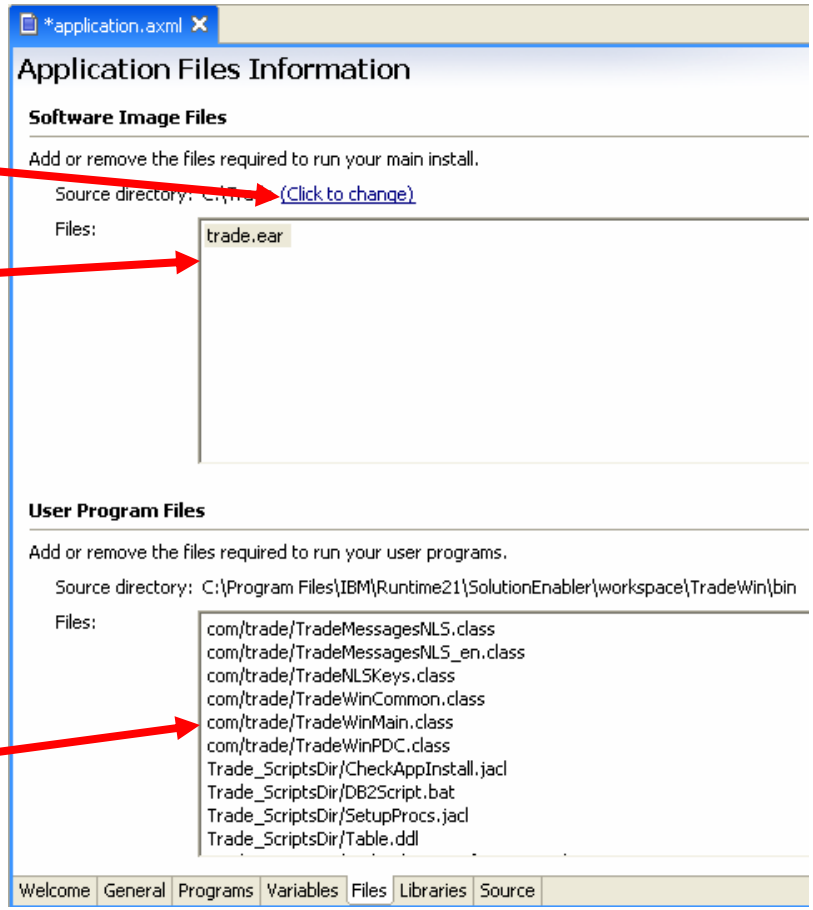
Variables tab

- **Add variables here**
- **Specify the validation rules for the variable's value**

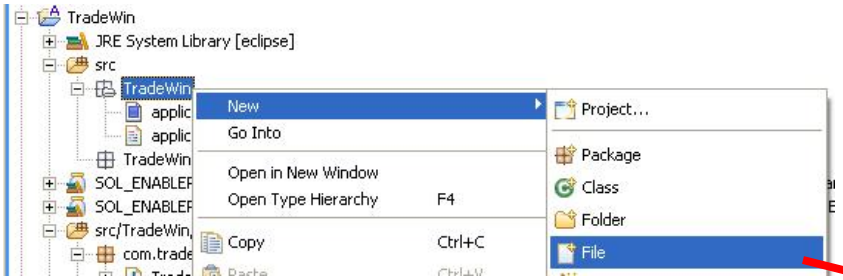


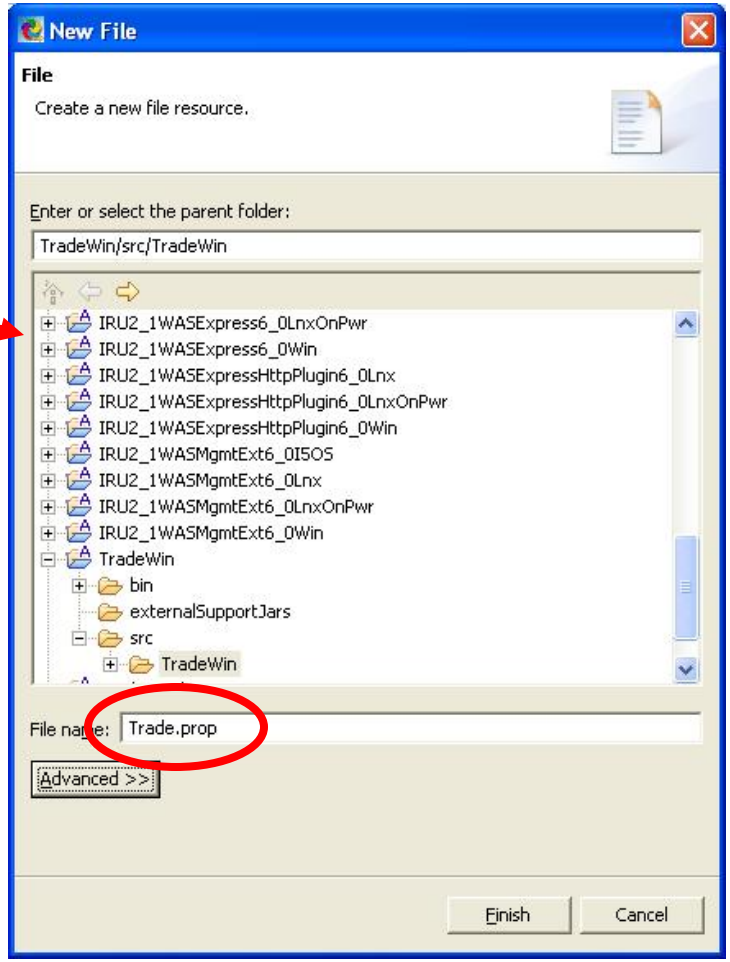
Files tab

- Copy the trade.ear file into a directory, for example c:\Trade.
- Set Source directory by clicking the link
- Add the application file (EAR in our example) to the Software Image files.
- Add all compiled user programs and any script files required by them.



Create the response file: Trade.prop

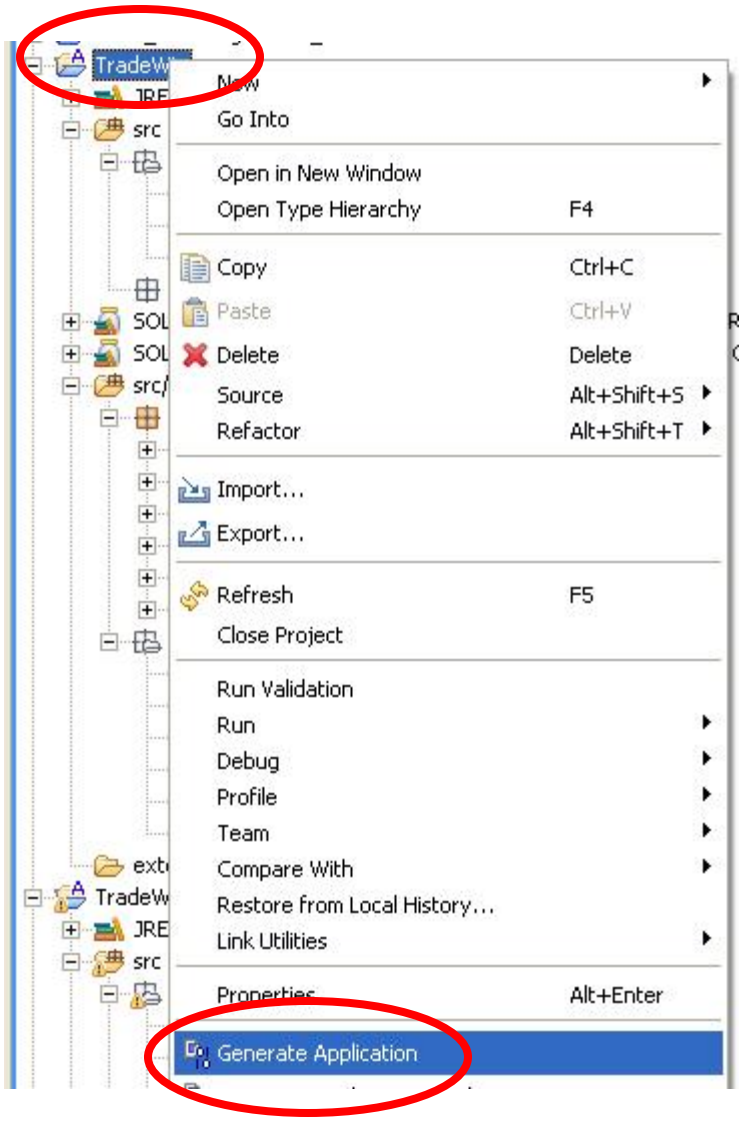


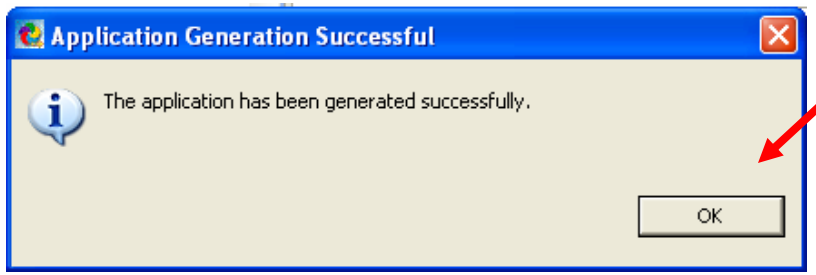


- Add the appropriate response values to Trade.prop.

Generate the application

- Save all files first.
- Select Generate Application from the context menu.



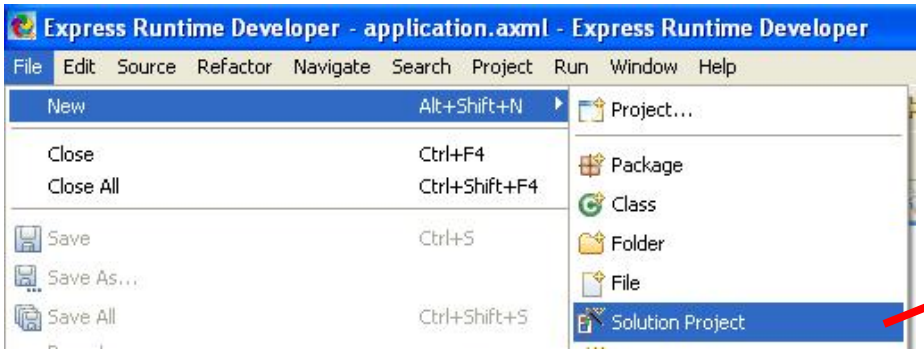


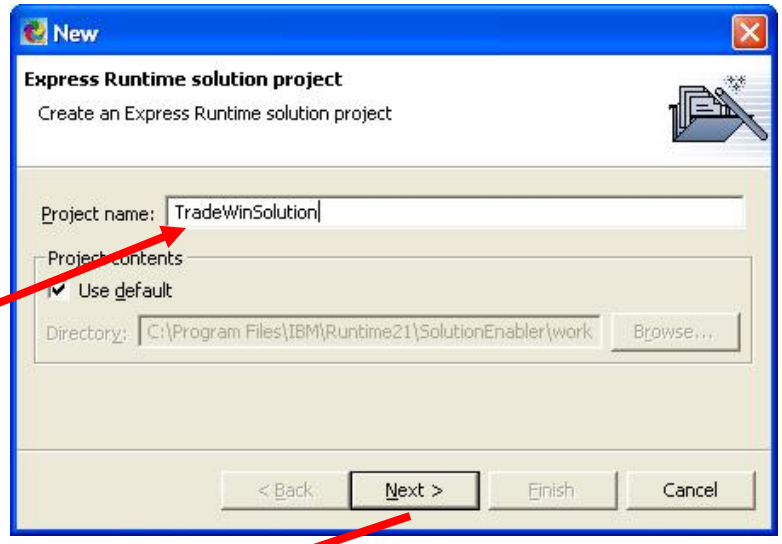
Generate the deployment packages

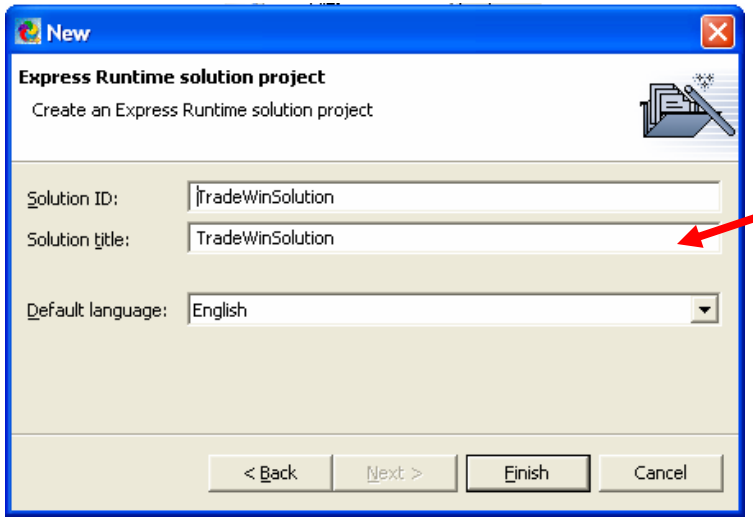
- Select Generate Deployment Packages from the application project context menu.

Creating the Trade solution project

Create the Trade solution project: Wizard

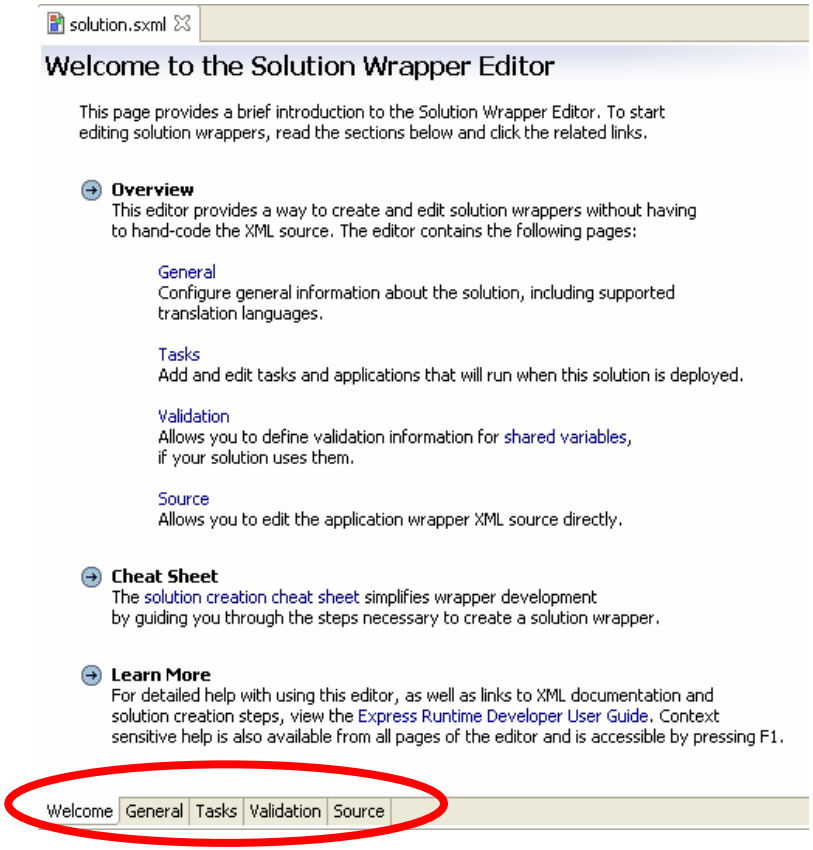






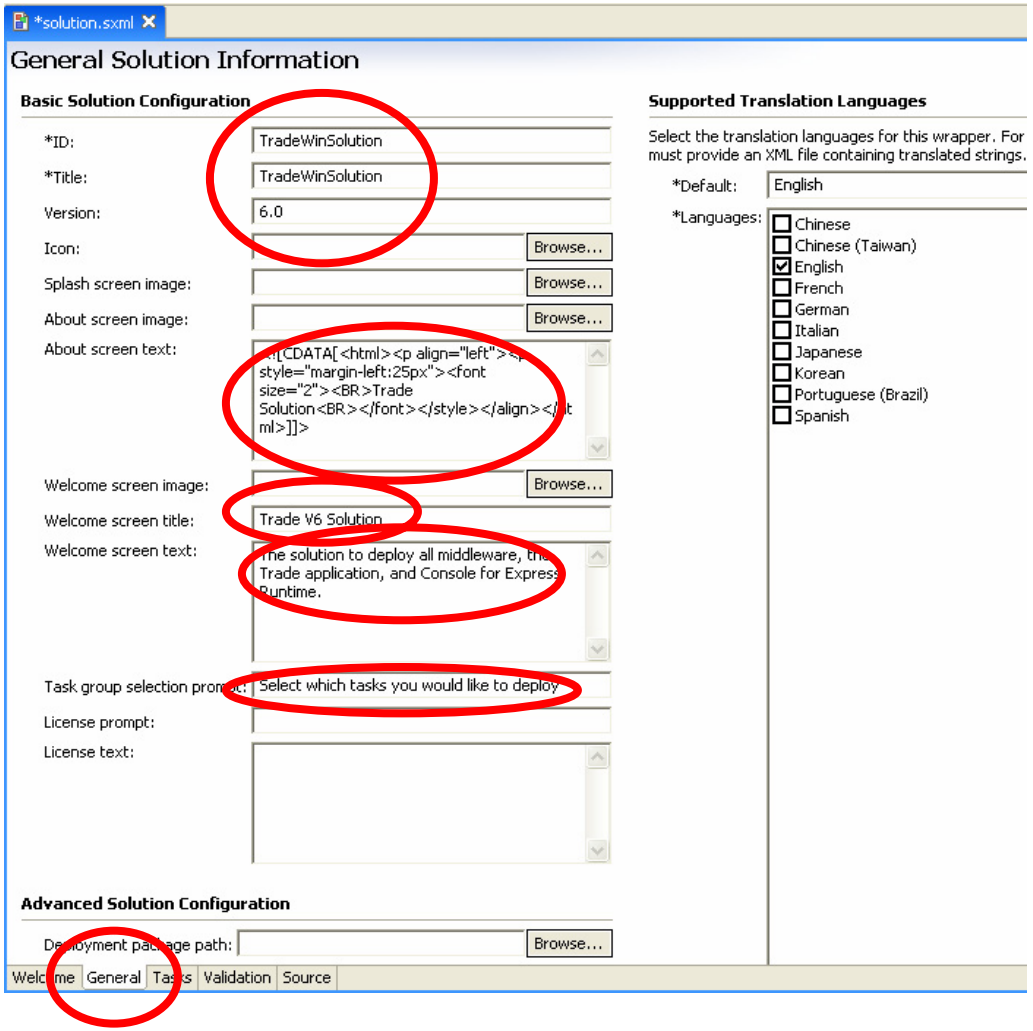
Trade Solution Wrapper XML Editor

- **Access the configuration details by switching between tabs**



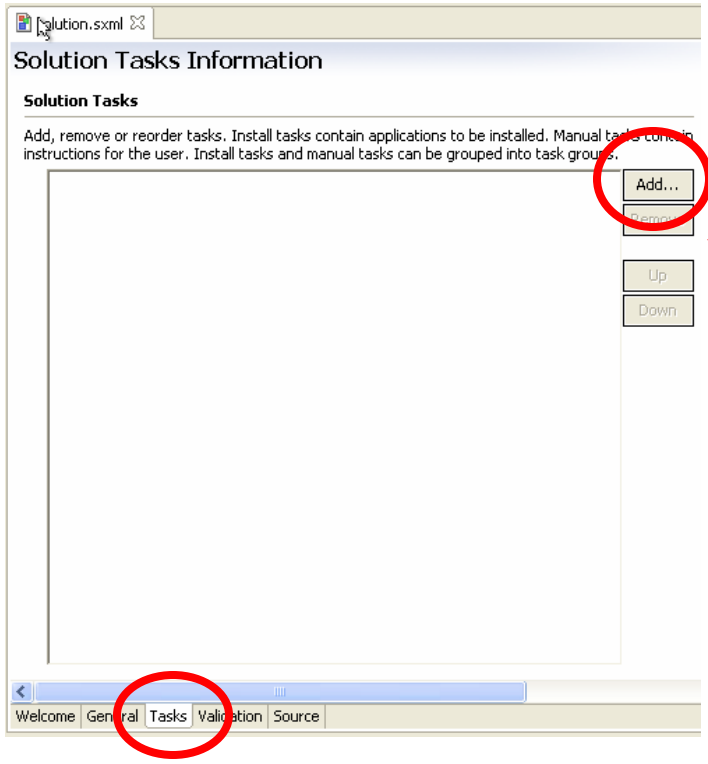
General tab

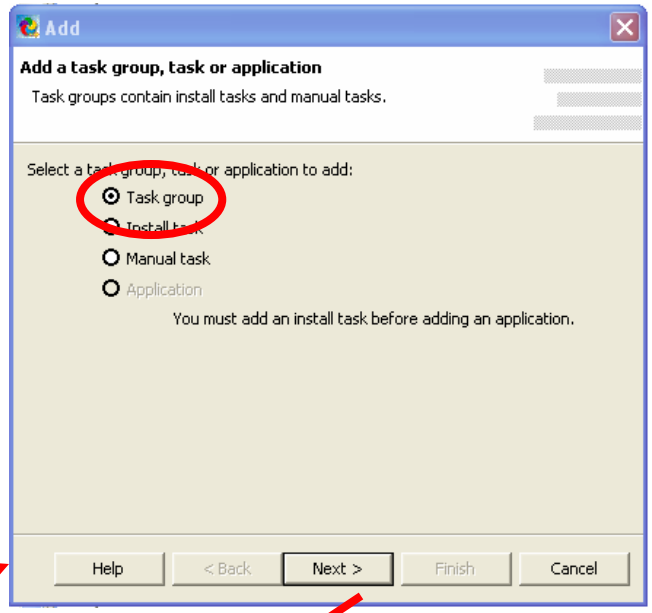
- Provide general information about this solution, such as the name, images, and so on.

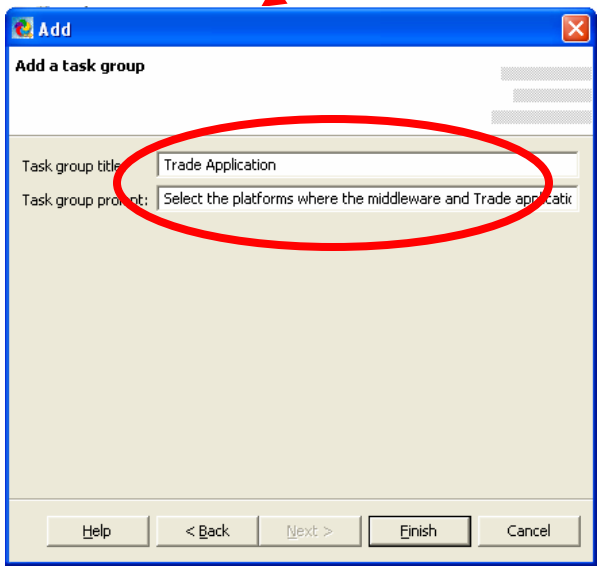


Tasks tab

- Create the Task group to group your applications in the solution.

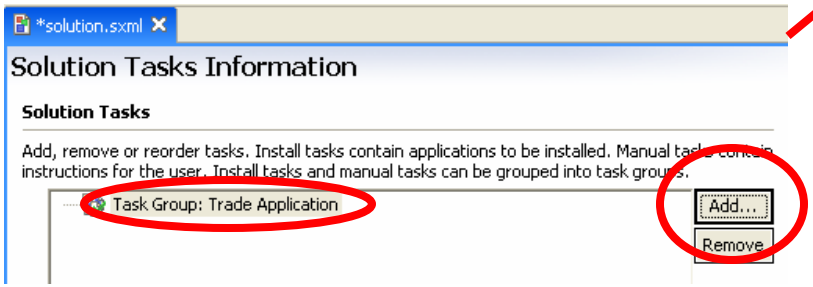


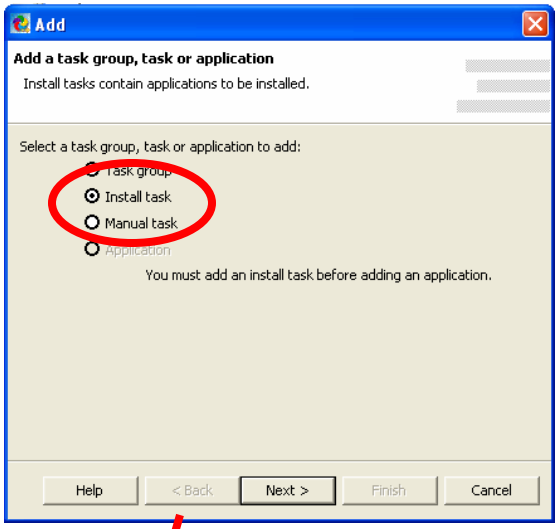


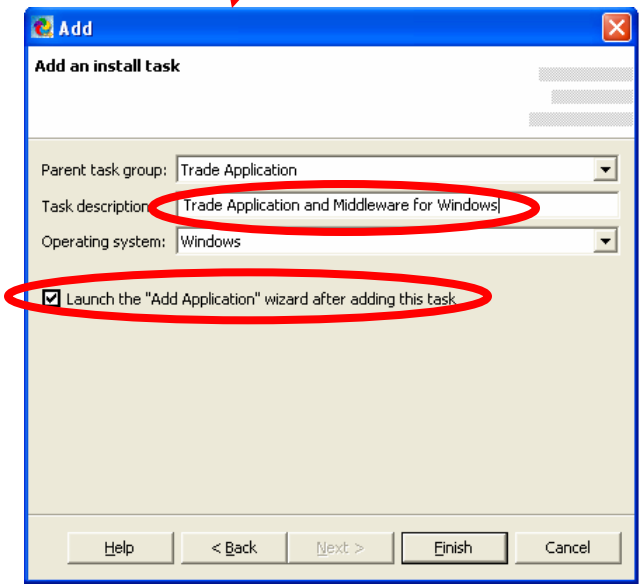


Tasks tab

- Create Install task under Task group to define the installation process for your applications.
- You may specify several installation tasks.

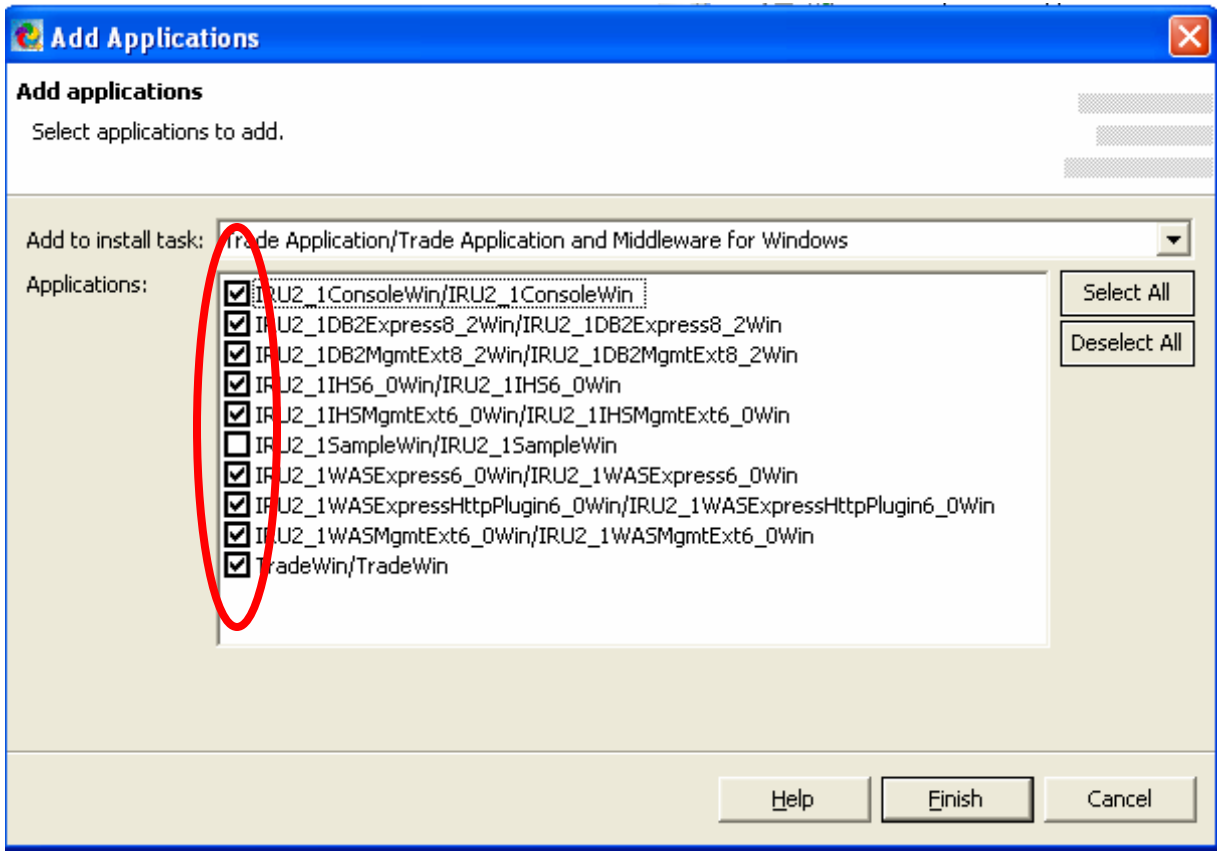






Add applications to the Install Task

- Add all middleware for Windows and TradeWin applications to your installation task.

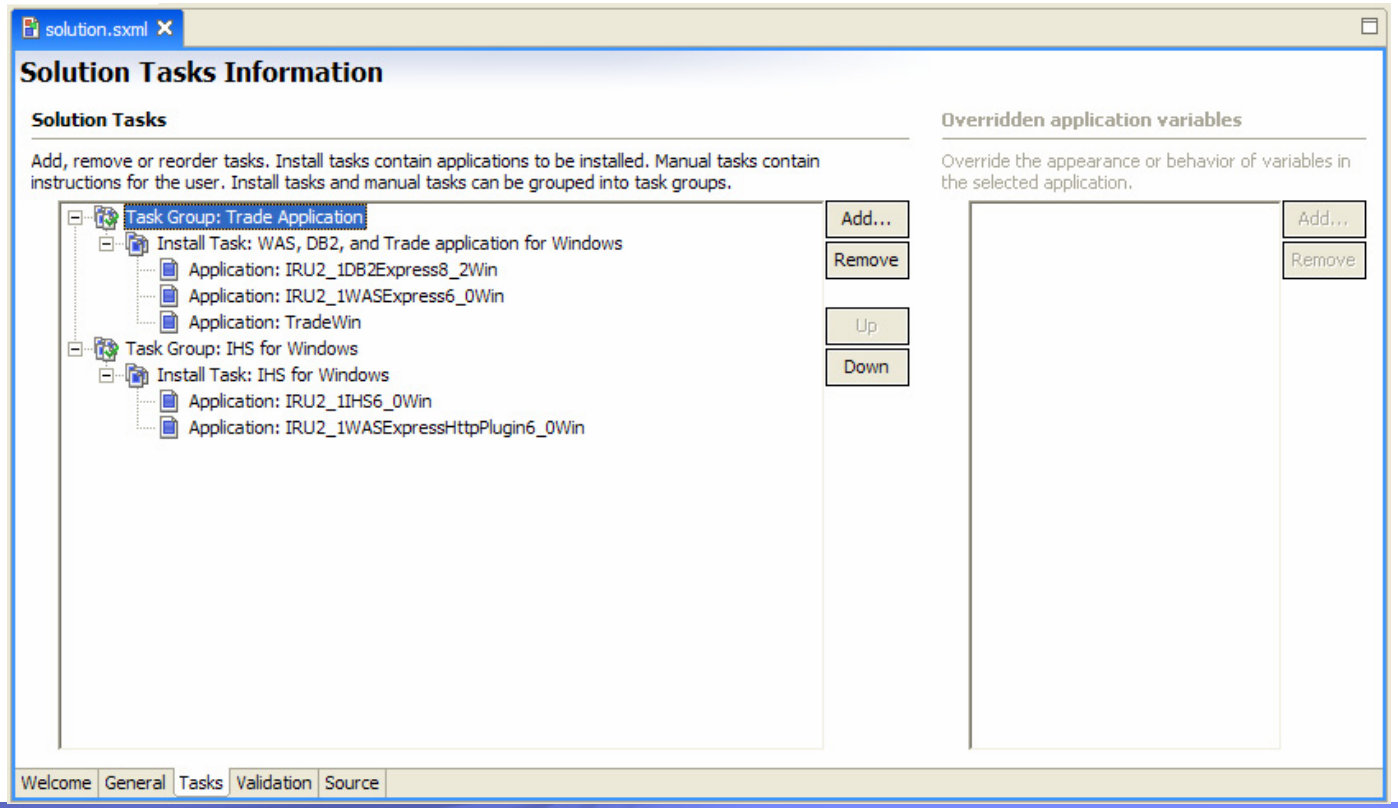


Order applications correctly

- **Make sure you place applications in the correct order. For example, you can't install TradeWin application without installing WebSphere Application Server - Express first.**

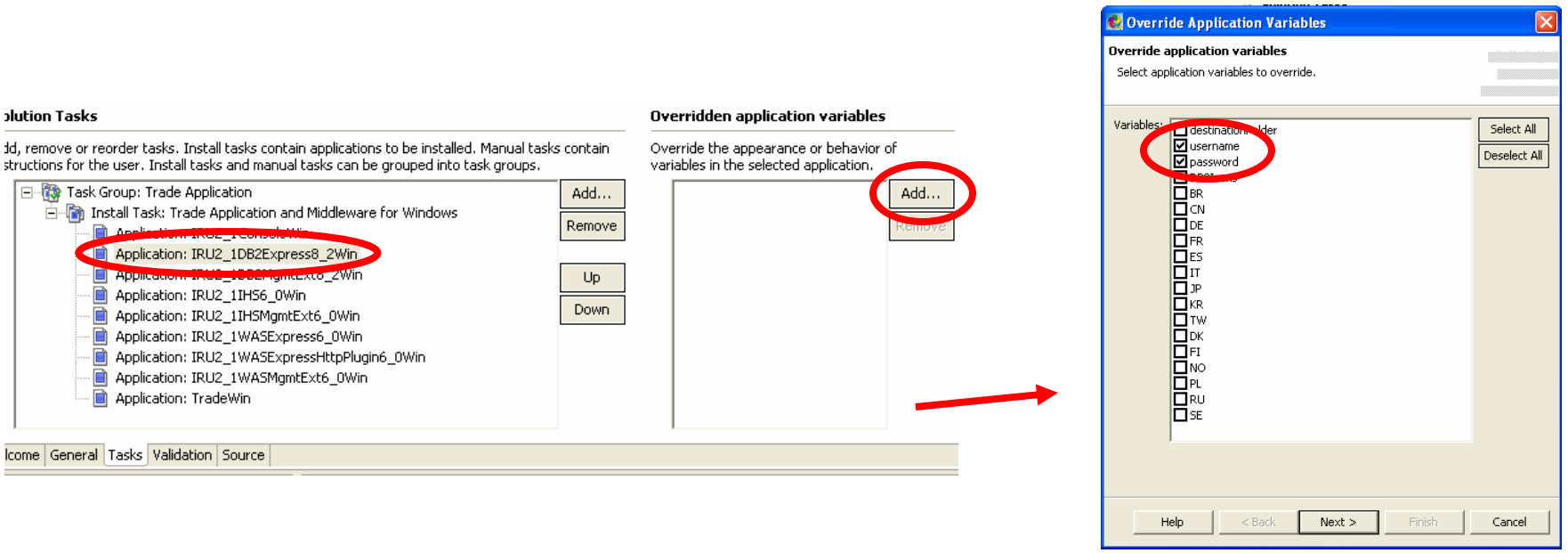
Add applications to multiple Install Task: Optional step

- If you want to support deployment to the multiple systems, you need to separate all applications into several installation tasks. In this example we can deploy WebSphere, DB2, and TradeWin applications on one system and IBM HTTP Server on another system.



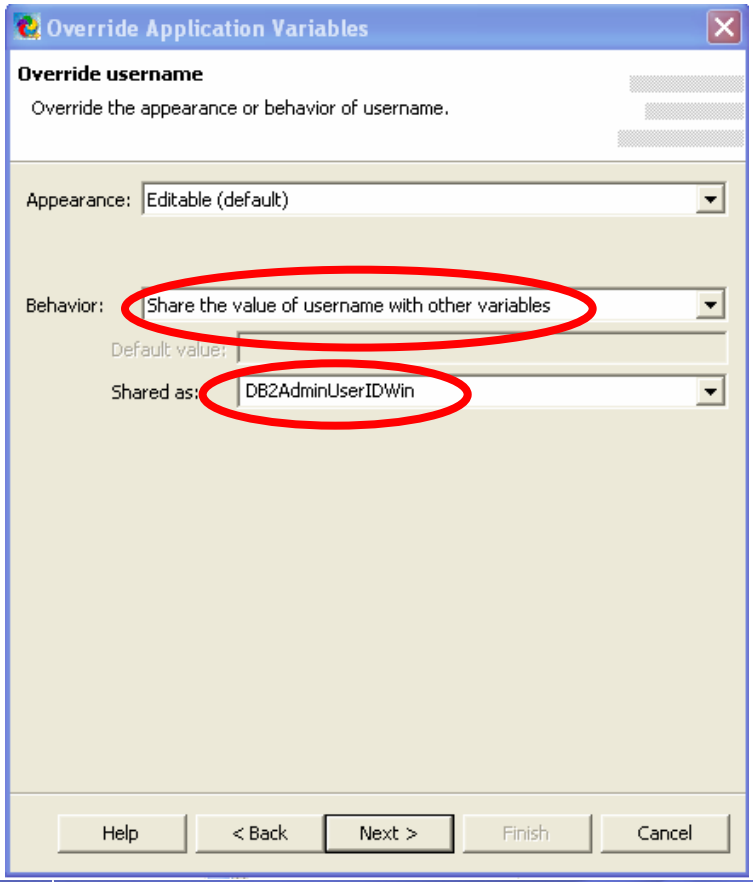
Add variable sharing

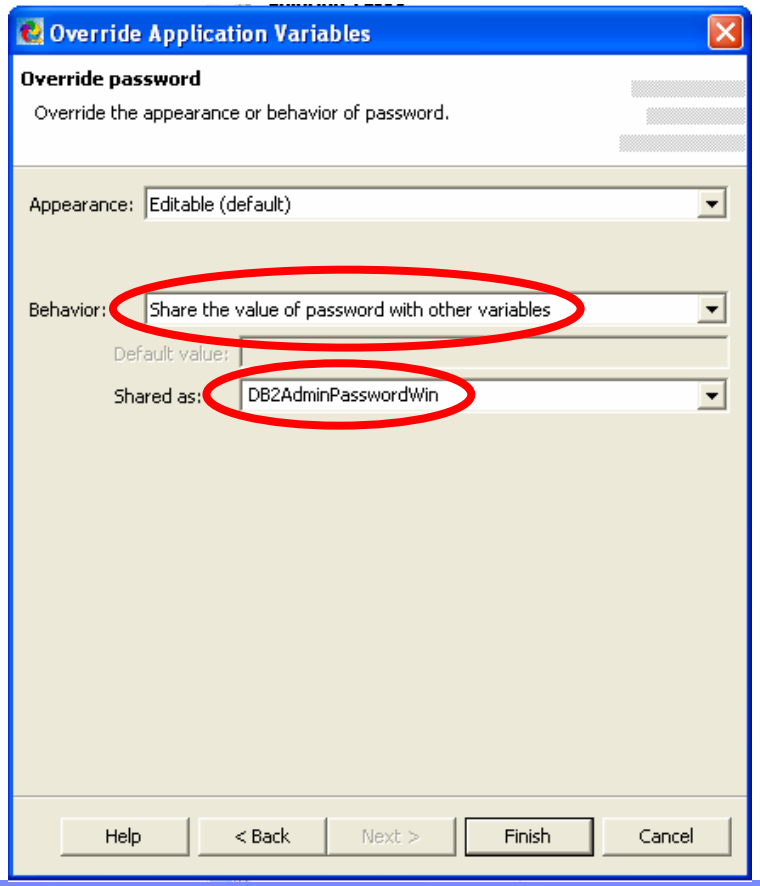
- Sharing a variable enables 2 or more fields to share the same value, usually across other application wrappers. Shared variables have their own validation rules.



Example: Variable overrides

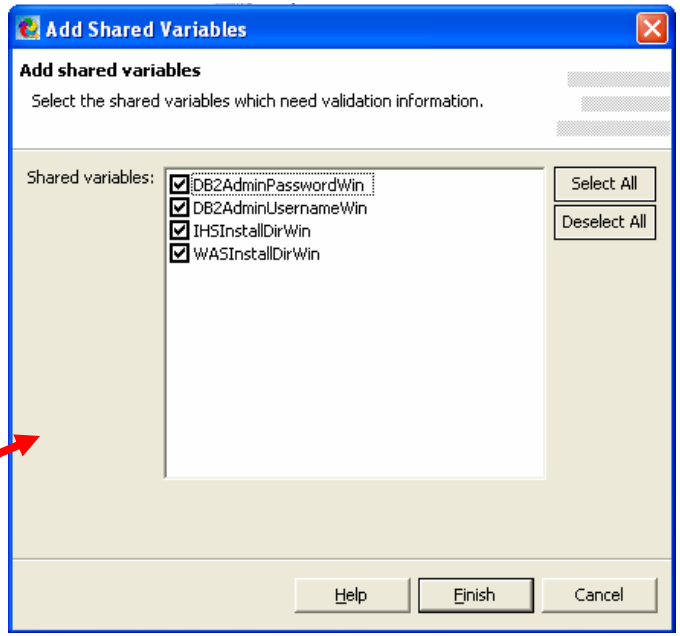
- You create an alias for a shared *value*. Specify alias in the Shared as box.

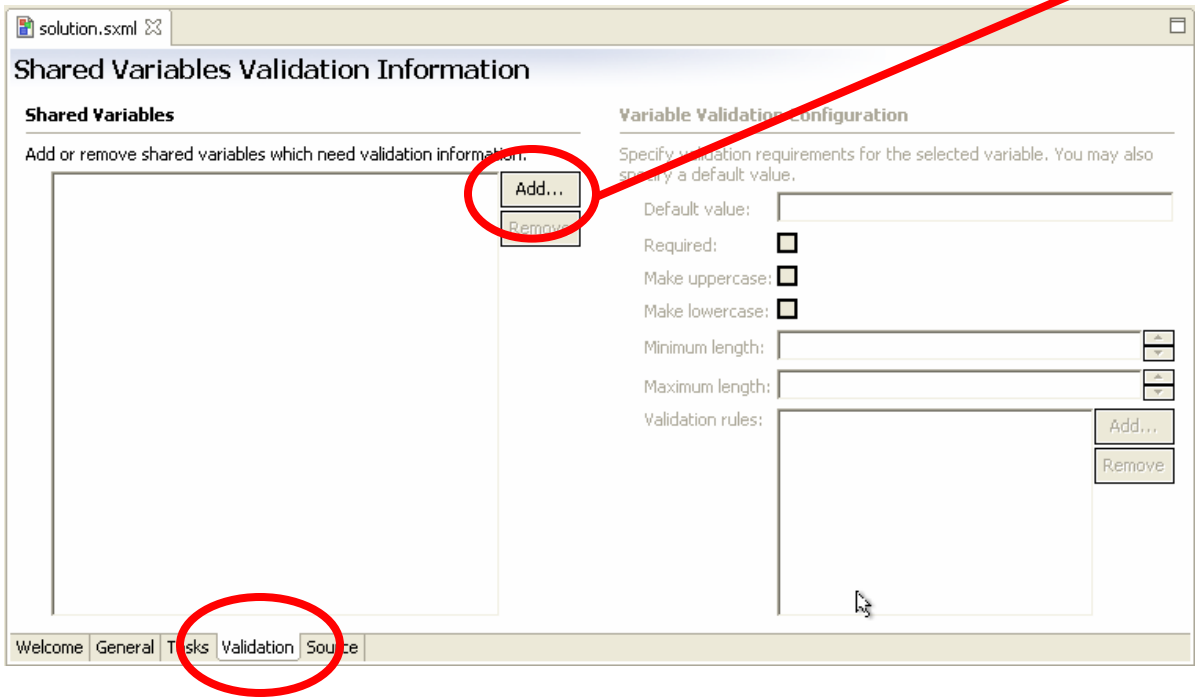




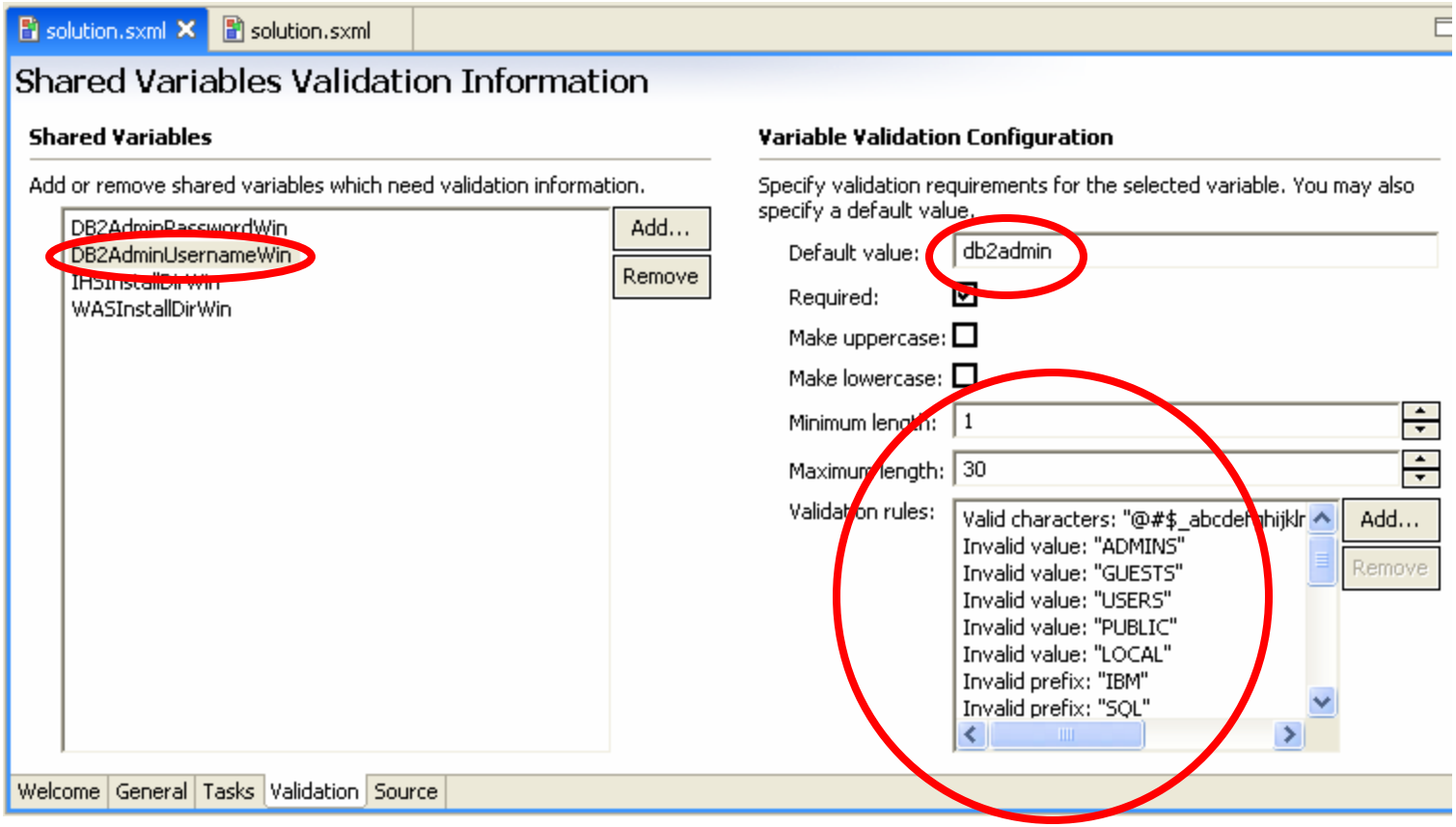
Validation tab

- Add all variables that have to be validated by the Deployment Wizard.



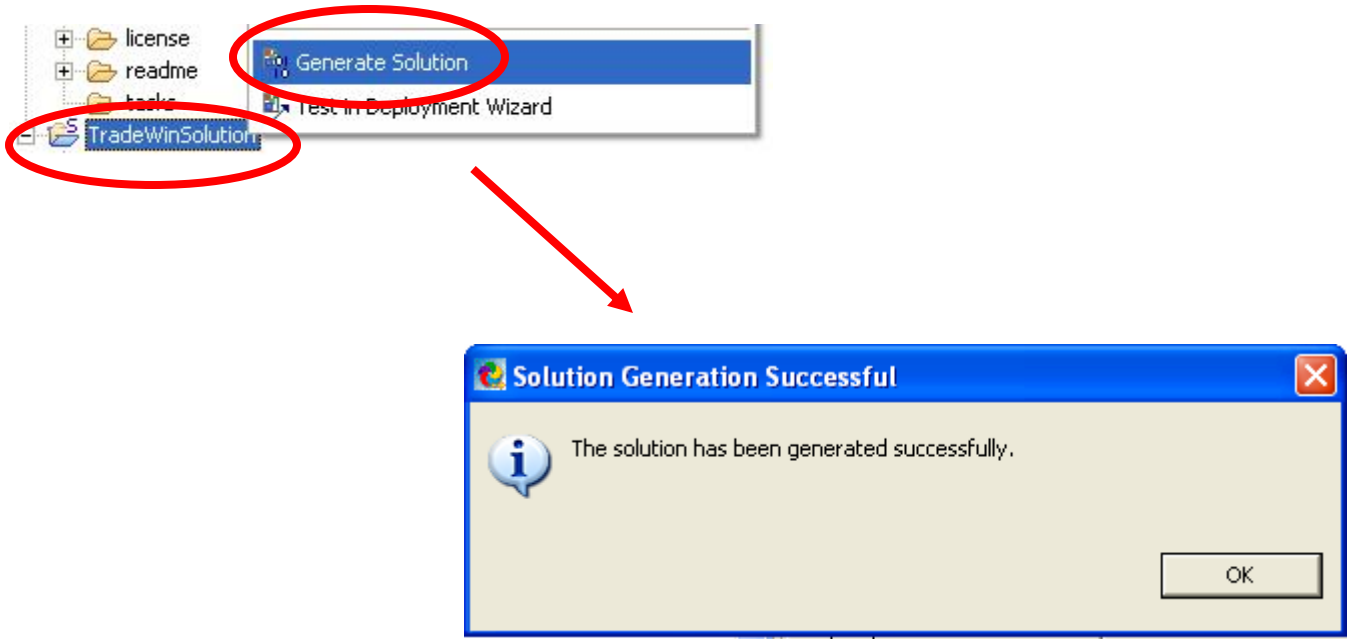


Add appropriate validation rules



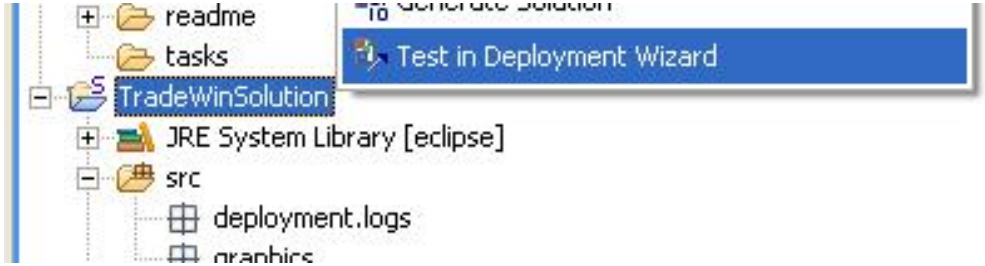
Generate Solution

- Select Generate Solution from the solution context menu.



Test solution

- Select Test in Deployment Wizard from the solution context menu to test your solution.



End of the module