

# Migration Guidelines for Appeon Web (Web only)

Appeon® for PowerBuilder® 2016  
FOR WINDOWS & UNIX & LINUX

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# 1 About This Book

## 1.1 Audience

This book is written for developers who want to develop new Web applications or deploy their existing SAP® PowerBuilder® applications to the Web with Appeon® for PowerBuilder®.

## 1.2 How to use this book

There are seven chapters in this book.

Chapter 1: About This Book

A general description of this book.

Chapter 2: Web RAD with PowerBuilder and Appeon

Introduces rapid Web application development using PowerBuilder and Appeon for PowerBuilder.

Chapter 3: Migration Process

Describes the methodology of Web conversion based on an existing PowerBuilder application.

Chapter 4: Migration FAQ

Frequently asked questions and answers regarding the deployment of PowerBuilder applications to the Web with Appeon for PowerBuilder.

Chapter 5: Building and Migrating Distributed Applications

Specific instructions for the Web migration of distributed applications.

Chapter 6: Enhancing an application with Web or Appeon features

Describes the key enhancement features that you can add in the PowerBuilder application to make them effective in the deployed application.

Chapter 7: Migration Tutorial

Walks you through the entire process of deploying a small PowerBuilder application to the Web.

## 1.3 Related documents

Appeon provides the following user documents to assist you in understanding Appeon for PowerBuilder and its capabilities:

- Introduction to Appeon:  
Gives general introduction to Appeon for PowerBuilder and its editions.
- Getting Started (for Appeon Mobile):  
Guides you through installing PowerBuilder and Appeon for PowerBuilder, and developing and deploying a mobile application.

- **New Features Guide:**  
Introduces new features and changes in Appeon for PowerBuilder.
- **Appeon Mobile Tutorials:**  
Gives instructions on deploying, running, and debugging the mobile application, distributing native mobile apps, and configuring the Appeon Server cluster.
- **Appeon Mobile (Offline) Tutorials:**  
Gives instructions on setting up the Appeon Mobile (Offline) environment, and configuring, deploying, running, updating, and debugging the offline application.
- **Appeon Installation Guide:**  
Provides instructions on how to install Appeon for PowerBuilder successfully.
- **Mobile UI Design & Development Guide:**  
Introduces general guidelines on designing and developing the mobile app and UI.
- **Migration Guidelines for Appeon Web:**  
A process-oriented guide that illustrates the complete diagram of the Appeon Web migration procedure and various topics related to steps in the procedure, and includes a tutorial that walks you through the entire process of deploying a small PowerBuilder application to the Web.
- **Supported PB Features:**  
Provides a detailed list of supported PowerBuilder features which can be converted to the Web/Mobile with Appeon as well as which features are unsupported.
- **Appeon Developer User Guide:**  
Provides instructions on how to use the Appeon Developer toolbar in Appeon for PowerBuilder.
- **Workarounds & API Guide:**  
Provides resolutions for unsupported features and various APIs to facilitate you to implement the features (including Web and mobile) that are not easy or impossible to implement in the PowerBuilder IDE.
- **Appeon Workspace User Guide:**  
Gives a general introduction on Appeon Workspace and provides detailed instructions on how to use it.
- **Appeon Server Configuration Guide:**  
Provides instructions on how to configure Appeon Server Monitor, establish connections between Appeon Servers and database servers, and configure AEM for maintaining Appeon Server and the deployed applications.
- **Web Server Configuration Guide:**



Describes configuration instructions for different types of Web servers to work with the Appeon Server.

- **Troubleshooting Guide:**

Provides information on troubleshooting issues; covering topics, such as product installation, application deployment, AEM, and Appeon application runtime issues.

- **Appeon Performance Tuning Guide:**

Provides instructions on how to modify a PowerBuilder application to achieve better performance from its corresponding Web/mobile application.

- **Testing Appeon Web Applications with QTP:**

Provides instructions on how to test Appeon Web applications with QTP.

## **1.4 If you need help**

If you have any questions about this product or need assistance during the installation process, access the Technical Support Web site at <http://www.appeon.com/support>.

## 2 Web RAD with PowerBuilder and Appeon

Developers can utilize PowerBuilder and Appeon for PowerBuilder to achieve rapid Web application development (Web RAD). Web RAD with PowerBuilder and Appeon greatly reduces the software development life cycle and I.T. development complexity, while preserving end-user productivity.

### 2.1 Traditional approach to Web development

In order to write even a small Web application with traditional methods, it takes a great deal of time, and the resulting Web application usually has an oversimplified user interface. Web application developers must master various new skills, such as ASP/JSP/PHP, Ruby, Python, Perl, JavaScript, Ajax, XML, HTML, Java, .NET, and J2EE when using Microsoft or Java technologies.

### 2.2 Advantages of Appeon for Web RAD

Using PowerBuilder and Appeon to develop powerful Web applications has the following advantages:

#### 2.2.1 Provides the fastest path to the Web

Appeon for PowerBuilder achieves unparalleled reductions in project cycle time and costs by eliminating the traditional Web application design, coding, and testing effort associated with rewriting applications for the Web. When your objective is to build a new application, Appeon provides the most productive development approach for building enterprise-class applications that adhere to the most stringent Web standards.

#### 2.2.2 Provides the best Web GUI possible

Appeon Web applications precisely replicate the desktop application user interface with HTML running in standard Windows Web browsers. Appeon graphical capabilities make the end user far more productive than any possible rewrite and eliminates all user-retraining time and costs.

#### 2.2.3 Minimizes business risks

Appeon for PowerBuilder greatly reduces business risks associated with building new software applications, because the time-tested PowerBuilder program code and DataWindows run at the core of the Web application.

#### 2.2.4 Leverages current organizational skills

Appeon for PowerBuilder:

- Relies solely on PowerBuilder skills and IDE to develop and maintain the application.
- Reuses the existing application source code and database, preserves investments in designing, building and testing the application UI, application business logic, data-access logic, and the database.

- Operates upon a single set of native PowerBuilder source code for deployment to both desktop and Web environments.

## 2.3 Leveraged functionality with server components

Appeon's support to .NET/COM components enables you to access enhanced Web functionality. When developing new Web applications with PowerBuilder and Appeon, you can use the .NET/COM components in Appeon Server as a bridge to access many other functions on the Web and some Client Server application features that may even transcend the Web limitations. For detailed description, refer to Section 2.3.8, "Calling .NET/COM server components (.NET only)" in *Workarounds & API Guide*.

## 2.4 Appeon Web RAD methodology

Web RAD (Rapid Application Development) with PowerBuilder and Appeon is for writing a new PowerBuilder application and converting it to the Web using Appeon for PowerBuilder.

There are three steps in an Appeon Web development project:

Step 1: Analyze the project requirements. According to these requirements, lay out the function specifications that should be met for the project.

Step 2: Develop a new PowerBuilder application and implement the functions in it with PowerBuilder programming that conforms to the Appeon PowerBuilder coding standards.

During the coding process, utilize the Code Insight tool in Appeon Developer to make sure the new code does not contain unsupported features.

While you develop a new PowerBuilder application, keep in mind one of the more recent and stringent standards, the Section 508 Amendment to the Rehabilitation Act. Refer to the whitepaper available at [http://www.sybase.com/content/1035234/PB\\_508\\_Compliance\\_wp.pdf](http://www.sybase.com/content/1035234/PB_508_Compliance_wp.pdf) for details of the standard.

Step 3: Migrate the PowerBuilder application to the Web with Appeon for PowerBuilder by following the migration process described in [Chapter 3, Migration Process](#).

Most of the time and effort in Appeon Web RAD methodology is spent working in the PowerBuilder IDE to code the desktop PowerBuilder application.

### 2.4.1 Appeon-standard PowerBuilder coding

Appeon PowerBuilder coding standards are recommended ways to write PowerBuilder code so that it can be recognized and translated into corresponding Web languages (HTML, JavaScript and XML) by Appeon.

The Appeon PowerBuilder coding standards are laid out in Supported PB Features for Appeon Web (Web only). When coding the new PowerBuilder application, you should refer to this document to ensure the Appeon PowerBuilder coding standards are followed.

After writing the new PowerBuilder application, use the Appeon Developer toolbar integrated into the PowerBuilder IDE to automatically convert the PowerBuilder application to the Web. Some further modifications to the PowerBuilder application may be needed in order to make the application fully functional. Finally, convert the PowerBuilder application and deploy the Web application to servers for production use. For detailed instructions on Web deployment, refer to Chapter 6, *Deploying PowerBuilder Applications* in *Appeon Developer User Guide*.

## 3 Migration Process

### 3.1 Introduction

Instead of providing detailed instructions on each step, this chapter emphasizes the overall process. Each section may reference other places within this document or other Appeon documents and support information.

If your goal is to write a completely new PowerBuilder application and deploy it to the Web, first refer to [Chapter 2, \*Web RAD with PowerBuilder and Appeon\*](#), and then refer to instructions in this chapter for migrating the new PowerBuilder application to the Web.

The following figure illustrates the general process of deploying an existing PowerBuilder application to the Web. The process is divided into two phases:

- Phase One: Planning - Evaluating strategies for your Web migration objective.

Step 1: [Install required software](#)

Step 2: [Understand the general limitations of the Appeon solution](#)

Step 3: [Define migration objective](#)

- Phase Two: Implementation - Implementing your Web migration objective.

Step 4: [Upgrade the original PowerBuilder application](#)

Step 5: [Prepare the target PowerBuilder application](#)

Step 6: [Pre-configure for Web application](#)

Step 7: [Remove or workaround unsupported features](#)

Step 8: [Enhance the application with Web or Appeon features](#)

Step 9: [Trial deployments](#)

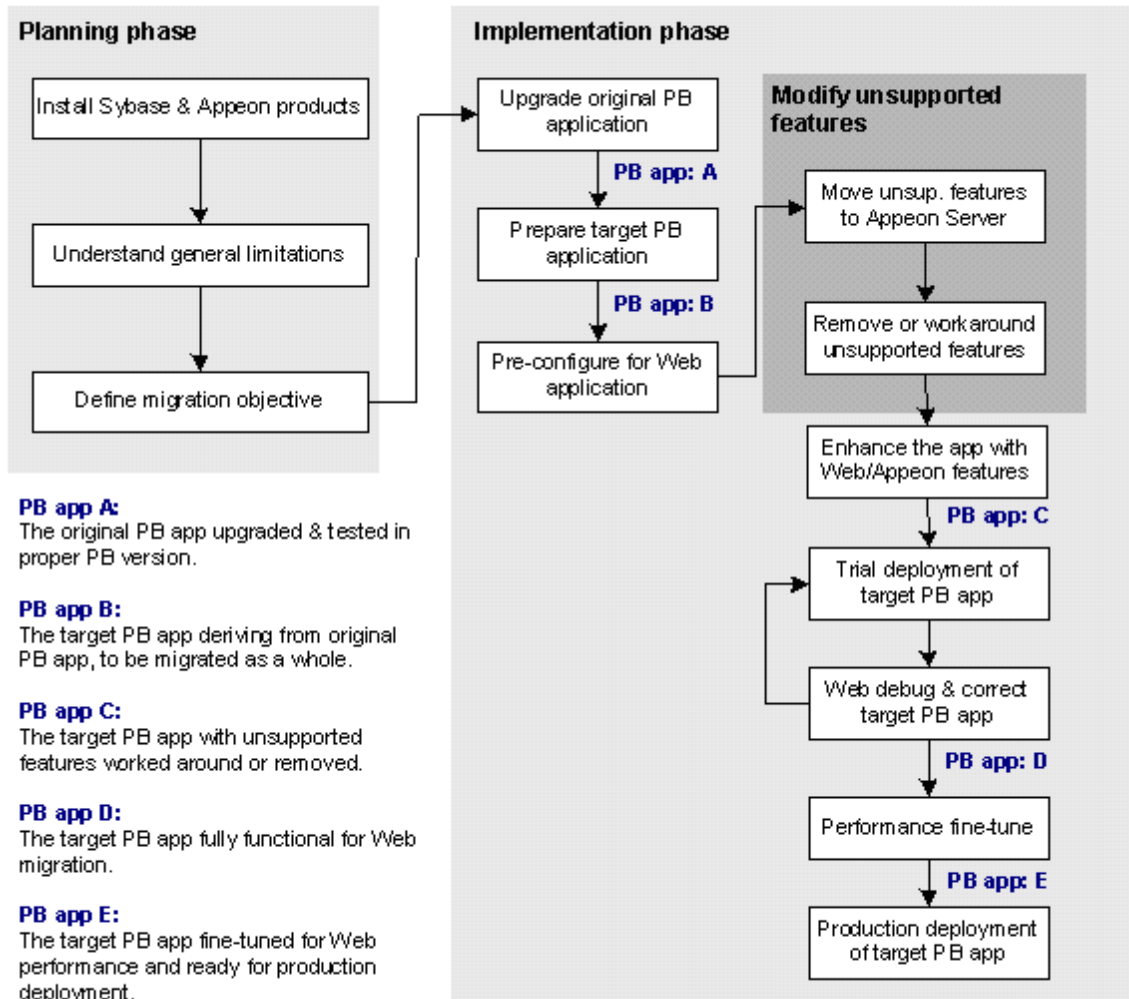
Step 10: [Debug Web application](#)

Step 11: [Performance fine-tune](#)

Step 12: [Go-live deployment](#)

Step 13: [Go live](#)

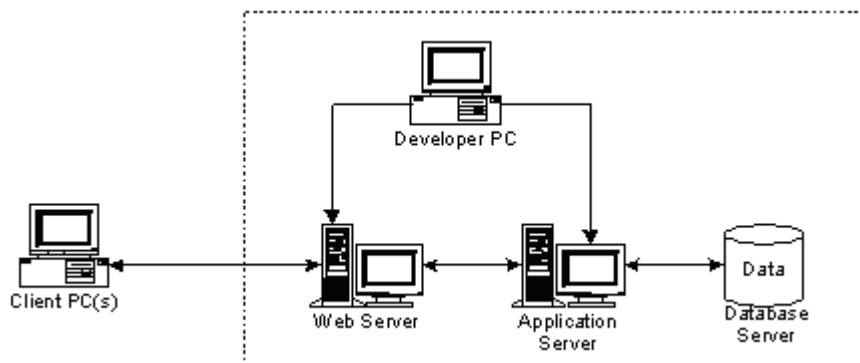
**Figure 3.1: Apeon Web Migration Process**



### 3.2 Installing required softwares

The first step in the Web migration process is to set up the software environment.

**Figure 3.2: Apeon for PowerBuilder works in a standard n-Tier Web architecture**



The following softwares should be installed to support the architecture:

- Windows Server 2008 SP2, Windows Server 2008 R2, Windows Server 2012, Windows 7, or Windows 8/8.1
- Microsoft Internet Explorer 8.0 or above, Microsoft Edge, Google Chrome, Mozilla FireFox, or Opera
- SAP PowerBuilder
- Database that your application uses
- Application Server (any of the following types):
  - SAP EAServer
  - Microsoft .NET Framework & Microsoft IIS
  - Oracle WebLogic
  - IBM WebSphere
  - TmaxSoft JEUS
  - JBoss
- Apeon for PowerBuilder, which includes:
  - Apeon Server (Which includes Apeon Enterprise Manager, Apeon Server Status Monitor, and Apeon Server Web Component)
  - Apeon Developer (Windows only)
  - Apeon Server Web Component
  - Apeon Help (Windows only)
  - SAP EAServer (Only provided in Apeon for EAServer editions)

For detailed instructions on installing the required softwares, refer to Installation Guide for .NET.

### 3.3 Understanding the general limitations of the Apeon solution

There are some general limitations in the migration capabilities of Apeon for PowerBuilder. These limitations affect how well a PowerBuilder application is suited for Web migration with Apeon. It is very important to be aware of these limitations in advance.

**Table 3.1: Limitations of the Apeon solution**

Limitation	What it limits...	Try to work around the limit by...
Coding style	Apeon recommends not using certain coding styles such as generic code.	Avoiding the coding styles that do not work well with Apeon based on

Limitation	What it limits...	Try to work around the limit by...
		advice in Supported PB Features for Apeon Web (Web only).
Database	<p>Apeon for PowerBuilder supports the following database types:</p> <p>SAP ASE, SAP ASA/SQL Anywhere, SAP HANA, Microsoft SQL Server, Oracle, IBM DB2, SAP IQ, MySQL, Informix, Teradata, or PostgreSQL</p> <p>For details, see Installation Guide for .NET.</p>	Always using the supported database types.
Unsupported features	The Supported PB Features for Apeon Web (Web only) provides a list of supported and unsupported features.	Working around unsupported features by following the Chapter 6, <i>Workarounds for Unsupported Features</i> in <i>Workarounds &amp; API Guide</i> .

For more information regarding the limitations, we recommend you read Chapter 2, *Basic Requirements and Recommendations* in *Supported PB Features for Apeon Web (Web only)*.

### 3.4 Defining migration objective

There are three typical migration objectives:

- Convert an existing PowerBuilder application to the Web.
- Extract a portion from an existing PowerBuilder application, such as a set of Windows and key functions, and migrate that portion to the Web.
- Migrate some DataWindows from the original PowerBuilder application to the Web.

#### 3.4.1 Defining migration objective for non-PFC application

Step 1: Calculate the total size of the PBLs that make up the original PowerBuilder application.

Step 2: Identify the major unsupported features in the existing PowerBuilder application.

Step 3: Briefly assess the amount of work needed to modify the unsupported features in the existing PowerBuilder application. The assessment standards are as follows:

- The more complex the PowerBuilder application is, the more difficult it is to modify its unsupported features. The complexity can be characterized by advanced coding techniques including deep inheritance, etc.

If there is a large amount of business logic on the Client-side (e.g. in Windows and behind controls) and the logic is complex (e.g. it fires 20 events before the business rule is

completed), then your application will most likely benefit from moving the business logic into n-Tier NVOs. This takes additional work and needs to be factored in.

- The more unsupported features the PowerBuilder application has, the more effort it takes to modify them.

[Section 3.8, “Modifying unsupported features”](#) provides methods on working around unsupported features.

Step 4: Decide the migration objective:

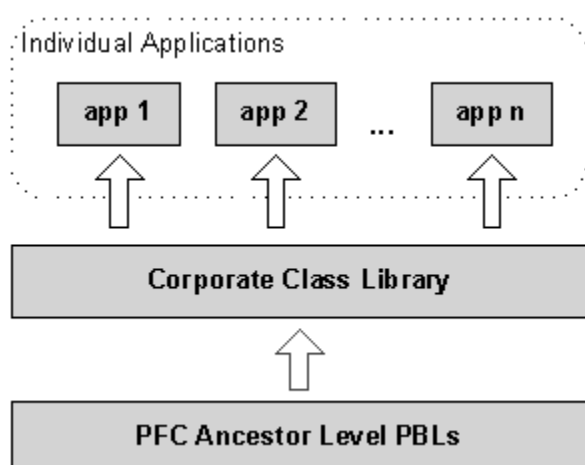
- If it is imperative that your company move business to the Web quickly, select the first migration objective and deploy the entire PowerBuilder application to the Web; otherwise select the second or third migration objective.
- Based on the assessments in the previous step, if substantial effort is required to modify the unsupported features in the original PowerBuilder application, you may want to consider converting part of the application to the Web (objective 2). Regardless of the approach taken, it will always take less work to deploy a PowerBuilder application to the Web with Apeon than to rewrite it with J2EE/.NET, as PowerBuilder is highly productive, especially for your PowerBuilder team.
- The third possible objective is to deploy only your application DataWindows to the Web (separately from the application). This involves building a much smaller new PowerBuilder application and reusing the existing DataWindows. This is a logical solution when some key reporting functionality or data needs to be available on the Web in a very short time and it would otherwise take significant effort to deploy the entire application.

### 3.4.2 Defining migration objective for PFC application

#### 3.4.2.1 Corporate PFC architecture

The following diagram illustrates the typical architecture for PFC applications.

**Figure 3.3: Typical PFC applications architecture**



The Corporate Class Library extends the PFC Ancestor Level, and contains customized and enhanced functionality for reuse by various applications within the entire corporate



class library. The PFC Extension Level PBLs are included in the Corporate Class Library, and utilized to extend the PFC Ancestor Level. For example, corporate analysts may add intermediate extension level(s) between the PFC Ancestor Level and the Extension Level, or they can use the existing PFC Extension Level.

Depending on the business need and corporate complexity, sometimes the PFC Ancestor Level is extended further into several layers containing corporate departmental standards and business rules. These several layers are all included in the Corporate Class Library.

### 3.4.2.2 Defining migration objective progressively

If your PFC application's architecture has a large corporate layer, Apeon recommends that you first aim to migrate a small application to the Web or portion of your existing PFC application to get your framework working on the Web, then expand to deploy a larger portion of your application or the entire application. This progressive approach prevents you from being confronted by many problems at the same time; otherwise, you may be overwhelmed with unsupported features that exist in both the application and the Corporate Class Library.

Step 1: Deploy a small PFC application that consists of the following three parts:

- A small amount of application-specific logic separated from the Individual Application.
- Corporate Class Library
- PFC Ancestor Level

In this step, the application-specific logic should be kept small and simple so you can focus on migrating the PFC Ancestor Level and the Corporate Class Library onto the Web. The PFC Ancestor Level and Corporate Class Library are more important because they are the base classes for all corporate applications.

Step 2: Gradually increase the size and complexity of Individual Applications, and change your focus to fixing the Individual Applications for Web deployment.

## 3.5 Upgrading the original application

Apeon for PowerBuilder 2016 supports PowerBuilder 9, 10, 10.5, 11, 11.5, 12, 12.5, and 12.6. Any PowerBuilder source code that is intended for deployment to the Web **MUST** first be upgraded to be 100% compatible with the required PowerBuilder version. If your application is not upgraded, you will encounter runtime errors with the deployed Web application.

### 3.5.1 Upgrading obsolete PBLs

When loading PBLs from a previous version (e.g. PowerBuilder 5) into a later version, many error messages may appear in the PowerBuilder Output window. Since inheritance propagates are an issue from the ancestor object to all its descendant objects, some of the errors reported may actually come from a single source.

One common type of error found when upgrading PowerBuilder applications is string corruption. To correct these errors, edit the source code (by selecting *Edit Source* from the

context menu on the error item displayed in the Output window). Errors will disappear when performing a Full Build to the application target.

### 3.5.2 Upgrading PFC applications

PFC applications intended for Apeon Web migration **must** be upgraded to be compliant with PFC 9 or later. Some legacy PFC applications are based on the PFC 5.0 PBLs that have been migrated to the newer version, and you should upgrade those applications to use the new PFC 9 or later PBLs.

The PFC PFCOLD.PBL library contains obsolete objects that are not supported for Apeon Web migration. If the original PowerBuilder application is a PFC application that uses objects in the PFCOLD.PBL library, you should remove the objects when upgrading the application to PFC 9 or later.

## 3.6 Preparing the target application

In this step, you need to process the original PowerBuilder application to create the target application. This work focuses on transforming the original PowerBuilder application into a target application that complies with Apeon architectural guidelines set in Supported PB Features for Apeon Web (Web only).

### 3.6.1 Special processing required for PFC applications

Apeon supports most PFC features. As such, under most situations the existing PFC code can also work under the Apeon environment without any modifications. However, there are a few features that are not supported. For that handful of unsupported features, Apeon would devise a workaround or alternate implementation of those features. Then, the PFC framework would be enhanced with any auto-sensing feature that would detect whether the PFC framework is being run as Client/Server or as Apeon Web. If Client/Server, then for those features that Apeon does not support it will execute the original Client/Server implementation. If Web, then only for those features that Apeon does not support it will execute the modified implementation. Refer to [Processing PFC Applications](#) for detailed instructions on how to modify the unsupported PFC features.

After modifying these unsupported features, you can deploy the PFC application just as how you deploy a normal PowerBuilder application.

### 3.6.2 Processing application based on migration objectives

The following table shows what processing tasks you need to perform based on your migration objective.

**Table 3.2: Process application based on migration objectives**

If you plan to migrate...	Do the following...
Entire original application	1. Test the original PowerBuilder application and correct any applications functionality or user interface problems.  Note: This step is for detecting and removing problems that may have existed in legacy PowerBuilder applications

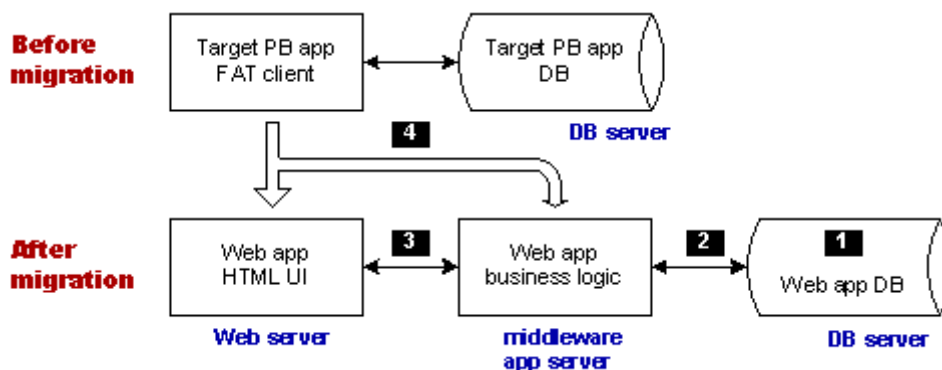
If you plan to migrate...	Do the following...
	or problems caused by upgrading legacy PowerBuilder applications.  2. Perform a full build and optimize the original PowerBuilder application in PowerBuilder IDE.
A portion of the original application	1. Extract the desired portion from the original PowerBuilder application into a new PowerBuilder application target.  2. Test the application to ensure there are no bugs and that it functions as expected.  3. Perform a full build and optimize this "extracted" portion of your application in the PowerBuilder IDE.
Some DataWindows in the original application	1. Create a new PowerBuilder application target in the same workspace that holds the original PowerBuilder application.  2. Move the desired DataWindow objects from the original PowerBuilder application to the new PowerBuilder application target.  3. Add Windows, Menus, and a general UI for the application. Code simple business logic to the new PowerBuilder application in order to make it fully functional.  4. Test the new PowerBuilder application and correct any problems with its functionality and user interface.  5. Perform a full build and optimize the new PowerBuilder application in the PowerBuilder IDE.

### 3.7 Pre-configuring for the Web applications

#### 3.7.1 Why is pre-configuration necessary

The following illustration of the Appeon migration solution helps explain why these pre-configurations are necessary.

Figure 3.4: Before and after Appeon Web migration



Before the Web migration, the heavy client of the target PowerBuilder application interacts with the Database Server. If the application is distributed, the client also interacts with the application server that hosts and executes important business logic for the target application.

After the Web migration, the Web application has an n-Tier Web architecture involving Apeon Server as the middleware to hold business logic. This structure is called Browser Server, because the Web application is accessed via Web browsers such as Internet Explorer.

Making the prospective Web application function in an n-Tier Web environment requires more than just hosting the HTML user interface and the business logic on the servers.

### 3.7.2 Four pre-configuration tasks

As indicated by the numbers in [Section 3.7.1, “Why is pre-configuration necessary”](#), four pre-configuration steps are necessary:

Task #1: Manually set up the Web application database server (non-Apeon task). This task is no different from setting up the PowerBuilder application database server.

Task #2: Manually set up communication between the back-end DB server and the middleware Apeon Server. Specifically, set up JDBC data sources (non-Apeon task).

Refer to Chapter 4, *Database Connection Setup in Apeon Server Configuration Guide for .NET* or in Apeon Server Configuration Guide for J2EE for instructions on this task.

Task #3: Set up communication between the Web application UI (hosted on the Web server) and the Web application business logic (hosted on Apeon Server). This is done via the Web server configuration for the application (Apeon task). This task is not required if Apeon Server and Web server are set up on the same machine, because the communication will be automatically set.

Refer to Web Server Configuration Guide for instructions on this task.

Task #4: Configure Apeon Developer so that it has sufficient information to automate the task of converting and deploying the target PowerBuilder application (Apeon task).

Refer to Apeon Developer User Guide for instructions on this task.

## 3.8 Modifying unsupported features

Some PowerBuilder features cannot be supported because:

1. There are architectural differences between desktop applications and Web applications. The functionality in a Web application is often limited with regards to desktop applications.
2. The current version of Apeon for PowerBuilder does not support every PowerBuilder programming feature.

Unsupported features, if not modified, will be commented out in the generated Web files. The code that contains the unsupported features and other code that is dependent on those unsupported features will stop working.

This step involves modifying the unsupported features that have some functional impact on the running of the application. Some cosmetic features, such as "Border" property, can be ignored during the modification process if they will not affect the application.

### 3.8.1 How to identify unsupported features

Three primary sources of information can guide you in identifying Apeon-unsupported features in the PowerBuilder applications:

- **Unsupported Features Analysis (UFA) report** - This tool is included in the Apeon Developer toolbar. It scans the PowerBuilder application for its unsupported features and assists you in making changes to unsupported features. For instructions on how to use the UFA, refer to Chapter 5, *Using UFA Tool* in *Apeon Developer User Guide*.
- **Code Insight** - This tool is also included in the Apeon Developer toolbar. It helps you directly identify unsupported code in the PowerBuilder painter. For instructions on how to use the Code Insight, refer to Chapter 13, *Developing with Code Insight* in *Apeon Developer User Guide*.
- **Supported PB Features for Apeon Web (Web only)** - This Help file is a searchable HTML file that can be launched by clicking the Apeon Help button in the Apeon Developer toolbar. It lists the supported and unsupported features in details and provides recommendations for writing convertible PowerBuilder code following the Apeon coding standards.

### 3.8.2 Feature modification methods

You can modify unsupported code by following the instructions in Chapter 6, *Workarounds for Unsupported Features* in *Workarounds & API Guide*. The Guide provides examples of some common unsupported features and ways to work around them.

The following two modification methods are included in *Workarounds & API Guide*, and worth highlighted here because of their importance:

- (EAServer only) Encapsulating unsupported features into PowerBuilder non-visual user objects (NVOs) and deploying the NVOs to Apeon Server.

This method can work around a vast number of unsupported features (both browser limitations and Apeon limitations). Refer to [Section 5.1, “Moving unsupported features to Apeon Server as n-Tier NVOs”](#) for instructions on this method.

- (Windows only) Using the Apeon workaround for distributed DataWindows.

Apeon Workaround PBL provides two objects *apeondatawindow* and *apeondatastore*, and four functions *GetFullState*, *SetFullState*, *GetChanges* and *SetChanges*, for supporting distributed DataWindows. Refer to [Section 5.3, “Migrating distributed applications with distributed DataWindows”](#) for instructions on this method.

## 3.9 Enhancing the application with Web or Apeon features

This is an optional step. Some enhancement features can be automatically included in the deployed application, but some features require you to make changes in the PowerBuilder application first. The following lists the key enhancement features that you should add in the PowerBuilder application to make them effective in the deployed application:

- Apeon Server open interfaces that can be called to manage all the applications run at Apeon Server

- Apeon client functions that can be called to get client information or enable Apeon DataWindow menu
- Integration with other applications via CommandLine argument, or HyperLink controls

[Chapter 6, \*Enhancing an application with Web or Apeon features\*](#) provides you instructions on how to implement a number of Web or Apeon features in the deployed application.

## 3.10 Trial deployments and debugging

Having completed the previous steps, the target PowerBuilder application is ready for the first trial deployment.

Trial deployments are the intermediate deployments before the final go-live deployment. For detailed instructions on deployment and running of Apeon Web applications, refer to the Apeon Developer User Guide.

### 3.10.1 Special deployment steps for distributed applications

Special deployment steps are required for distributed applications with or without distributed DataWindows. Refer to [Chapter 5, \*Building and Migrating Distributed Applications \(EAServer Windows only\)\*](#) for instructions on deploying distributed applications.

### 3.10.2 Debugging deployed applications

There may be issues in the trial deployment. For example, a feature in the Web application may work differently from the target PowerBuilder application or not work at all. These issues are usually caused by unsupported features or known issues (documented in the *Apeon Release Bulletin*). Since UFA cannot detect every single different feature between Client/Server application and Browse/Server application, it is possible that your application contains an unsupported feature.

It is essential to debug the Web application and find the cause of the problem. You can use Apeon Debugger to debug an Apeon Web application. For detailed instructions, refer to Chapter 7, *Debugging Apeon Web Applications* in *Apeon Developer User Guide*.

After modifying the target PowerBuilder application according to the debugging result, perform another trial deployment to see if the Web errors still exist in the Web application. The "Trial deployment -> Debug Web application" process may need to be repeated many times before the Web application functions properly.

## 3.11 Fine-tuning the runtime performance

Given the architectural differences between Client/Server applications and Web applications, each of these has advantages and disadvantages. Typically, Web applications offer better server scalability, while Client/Server applications provide a superior user experience (i.e. rich GUI) and better runtime performance.

Apeon Web applications offer the rich PowerBuilder GUI with the scalability of n-Tier Web architecture. The rich PowerBuilder GUI ensures that the superior user experience and high user productivity is preserved. The server scalability is comparable to J2EE applications or .NET applications, if not better, since Apeon moves more processing

from the server to the Client. The Apeon Performance Tuning Guide has laid out the PowerBuilder programming features and coding styles that lead to poor Web performance, and it provides suggestions/workarounds. Refer to the Apeon Performance Tuning Guide for more information.

### 3.12 Go-live deployment

Go-live deployment deploys the target PowerBuilder application to your production servers.

Check the following settings in the Apeon Developer Application Profile **before** starting the final deployment to your production servers:

- Set the Web file generation mode to Release - This encrypts the JavaScript code in the Web application, thereby protecting your organizations business rules and intellectual property.
- Turn off the "Performance Analyzer compliance" option - The data is not encrypted during transmission at runtime, therefore, this option is recommended to use only at the test or development stage.
- Turn off all Report options - This will reduce the size of Web files and boost the runtime performance of the deployed Web application.
- Check that the required database types are properly configured and selected.
- Check that the required additional files (such as INI files, .NET/COM components, image files, DLL/OCX files) are properly configured or selected.

Refer to the Apeon Developer User Guide for detailed instructions on how to perform application deployment.

Check the following settings in Apeon Enterprise Manager **after** performing the final deployment to your production servers:

- Configure and ensure that transaction objects and data sources in AEM can be successfully connected.
- Check that Run Mode for the go-live application is set to Normal Mode.
- Check Configuration Summary for the go-live application to ensure they apply to the go-live environment, such as DLL/OCX configurations, 32-bit/64-bit IE compatibility etc.
- Change the AEM default username and password as appropriate to ensure the security of AEM

Refer to Apeon Server Configuration Guide for .NET or Apeon Server Configuration Guide for J2EE for detailed instructions on how to configure AEM.

### 3.13 Go live

Go-live is the last step in the Web migration process for the application to go live successfully without serious problems, Apeon strongly recommends you have done the following tasks in all related areas to reduce the likelihood of go-live problems:

#### Unsupported Features:

- Ensure there are no unsupported features in the application. At a minimum, the UFA report should not list any unsupported features.

#### Performance fine-tune:

- Read and follow the best practices defined in the Apeon Performance Tuning Guide.

#### Functionality:

- Verify all application functionality is working properly. Functionality should be tested on all the browser version(s) that will be supported. For example, IE 7 32-bit, IE 8 32-bit, IE 8 64-bit etc. Please note: if the application uses third-party DLLs/OCXs/OLEs then 64-bit version of those files need to be packaged in order for the Web application to run correctly on 64-bit browsers.

#### Hardware/Software configuration:

- Select appropriate hardware to install Apeon Server. Apeon can give some suggestions based on the # of users, but in general use the most powerful server that customer has budget for.
- Configure IIS settings properly. Apeon can give some suggestions based on the # of users and type of hardware that will be used.
- Understand the Web browser and system configuration/settings requirements and ensure that all users are aware of these requirements and that their browser settings are correct. If third-party DLLs/OCXs/OLEs are used the Web browser and system settings will need to be significantly changed, so if possible for ease of deployment and user satisfaction it is most preferred to avoid any third-party DLLs/OCXs/OLEs.

#### Performance and scalability:

- Verify the application response time over "realistic" network connection. What we mean by realistic is to use the same network connection (bandwidth and latency) that the average user will use. Test all application functionality to ensure that the application performs well.
- Verify the application scalability. There are two ways to do this. One is to use a scalability testing tool such as LoadRunner. The other option (and more preferred) would be to do a partial beta test. Essentially, get a group of users together to simultaneously use the system to see if any problems. The problems you are looking for is significant degradation in performance when multiple users on the system and/or system instability (e.g. IIS or database stops responding or crashes).

#### Beta test and controlled roll-out:

- Perform a beta test. Roll out the application to a smaller group of real users to see if any major problems. Expectations should be set with the users that this is a "beta" not a "live" situation. The users should be prepared that problems are likely to happen and they



should be able to tolerate downtime of the system for several days or longer to correct any problems that are found.

- Perform a controlled roll-out. After the beta test has run for sufficient time with no major problems then increase the # of users.

**Now go live!** After the controlled-rollout has run for sufficient time with no major problems then go live.

## 4 Migration FAQ

### 4.1 How do I rapidly build a new Web application with Apeon for PowerBuilder?

Step 1: Create a new application.

Quickly create a new PowerBuilder Client/Server application workspace in your PowerBuilder IDE.

Step 2: Code for the application.

Enable the Apeon Code Insight tool that is included in Apeon Developer toolbar, and then write code. With the Code Insight, you can get instant information on whether the new code is supported by Apeon.

Step 3: Migrate the application automatically with Apeon Deployment Wizard.

After previous steps, your PowerBuilder application now contains features that are 100% supported by Apeon. You do not need to modify any unsupported features. You can easily migrate your Client/Server application to Browser/Server application with the deployment wizard in Apeon Developer toolbar.

### 4.2 Does Apeon support every PowerBuilder feature?

The current version of Apeon does not support all PowerBuilder syntax. Unsupported PowerBuilder syntax falls into two categories:

Category 1: PowerBuilder features that are Client/Server architecture specific, and cannot be implemented in n-Tier Web applications.

Unsupported features in this category must be reworked for n-Tier architecture.

Category 2: PowerBuilder features that are currently unsupported by Apeon, but will possibly be supported in the future.

[Section 3.8, “Modifying unsupported features”](#) gives you high-level instructions on how to modify unsupported features. Chapter 6, *Workarounds for Unsupported Features in Workarounds & API Guide* provides examples on some common unsupported features and ways to work around them.

### 4.3 Do Apeon-deployed Web applications support external resources?

Apeon supports using external resources in Web applications, such as INI and image files, OCX and OLE controls, etc.

### 4.4 Why classify my application into types?

The PowerBuilder-to-Web process can be simple or complex depending on the type of application being migrated. Apeon provides guidelines for different types of applications. Once you have identified the type of application, follow the specific guidelines to get your application on the Web even faster.

## 4.5 What are the different application types?

PowerBuilder applications can be classified as one of three types.

Type 1 applications meet the following requirements and can be automatically deployed to the Web:

- The application does not contain any functionality that cannot be implemented on the Web.
- The application does not contain any unsupported features.
- These types of applications tend to be below 50 MB (application PBLs including Framework).

Type 2 applications contain some functionality that cannot be implemented on the Web, and/or some unsupported features. The size of the application may be large, and/or the user objects in the application may have complex interdependencies. Modify the objects or code in the application and make it compliant with Supported PB Features for Apeon Web (Web only).

Type 3 applications contain functions that cannot be implemented on the Web but are critical to the functionality of the application and have very complex frameworks that do not align well with Apeon supported features, such as PFC-based applications. Depending on the business requirements and project scope, the developer can leverage the RAD capabilities of PowerBuilder to get an application on the Web much faster than a typical J2EE or .NET rewrite while preserving the rich PowerBuilder GUI.

## 4.6 What are the recommendations for converting the different application types?

The following are recommendations for handling the different types of applications.

Type 1 applications: This type is ready to be migrated. There is no additional work to do. Apeon reads the PowerBuilder PBLs and generates the n-Tier Web application. The Web application will have DataWindows, business logic, and UIs identical to the original PowerBuilder application.

Type 2 applications: The developer needs to remove the unsupported features and Client Server specific functions from the application that cannot be implemented on the Web to ensure that the Web deployed application functions in the same manner as the PowerBuilder application. If the application is large and complex, Apeon suggests splitting it into smaller applications to simplify the debugging of the application. Remove as many minor and unnecessary features as possible. Simplify the code and object interdependencies to make the application more straightforward. The DataWindows and a good portion of the PowerBuilder source code can be utilized. The amount of PowerBuilder source code that can be reused depends on the actual application's complexity and the user's requirements.

Type 3 applications: These generally cannot be migrated to the Web as-is, but the DataWindows and other useful objects can be exported and used to rapidly build a more straightforward PowerBuilder application using standard PowerBuilder programming.

The ultimate aim of the guidelines is to help you modify the PowerBuilder application and make it well supported by Apeon. The existing DataWindows may be used. Depending on the application type, modify a fraction, a part, or all of the PowerBuilder source code.

## 4.7 What are the basic requirements for rewriting complex applications?

The Supported PB Features for Apeon Web (Web only) outlines a set of requirements and recommendations that should be followed. See Supported PB Features for Apeon Web (Web only) for more information. Essentially, you must re-code portions of the application to make the application more straightforward (by, for example, removing complex object interdependencies and reducing the number of DataWindows and DataStores in a given Window).

## 4.8 When would I need to modularize my application?

If the application is a Type 2 or Type 3 application, you may need to split the application into smaller applications and deploy them separately depending on the actual migration requirements.

## 4.9 What are the benefits of modularizing my application?

The following are advantages of splitting an application into smaller applications:

- Smaller applications have better performance when deployed to the Web.
- It is easier and more efficient to debug smaller applications and rework the unsupported features.
- It allows several developers to work on one project simultaneously and improves developer productivity because one or more developers can specialize on particular modules. The modules can each be deployed to the Web and linked together through a unified HTML interface.

## 4.10 What are the basic principles for modularizing an application?

The following are the basic principles for splitting an application into smaller applications (modularizing):

The functionality of each small application should be independent from the others. Each application to be deployed should be able to execute an independent and practical task. Following this principle, it is better to integrate closely related functional points in a small application and remove the loose object references. For example, to split a purchase order application into smaller parts, the order management logic (module) can be placed in a small application and the relevant supplier information management logic in another small application.

On the basis of the first principle, try to balance the complex objects evenly across all the small applications.

The applications should be as small as possible.

## 4.11 Can you give an example of the modularization process?

The following example highlights the process of modularization of an application:

A purchase order application needs to be deployed to the Web. It is a large and complex application that provides the following functionalities at a high-level:

- Order Input
- Order Management
- Supplier Management
- Resource Planning
- Reporting

According to business requirements, the most urgent application functions that must be brought on to the Web as soon as possible are Order Input, Order Management, and Reporting.

Based on the above business requirements, the first phase of the conversion process should involve extracting the Order Input, Order Management and Report functionalities from the original application and importing them back into PowerBuilder. This creates a new smaller application.

Using Supported PB Features for Appeon Web (Web only) and Appeon Code Examples, you can work around or modify the unsupported source code in the smaller application to bring it into compliance and deploy it to the Web.

## 5 Building and Migrating Distributed Applications (EAServer Windows only)

Appeon Server for Windows EAServer edition supports migrating distributed applications regardless of whether they contain server DataStores. If your non-distributed application is large and contains complex logic or many unsupported features, consider building a distributed application out of it by moving a portion of business logic to the server.

The migration process for distributed applications is essentially the same as outlined in [Chapter 3, \*Migration Process\*](#). However, you should carefully read the instructions in this chapter, and perform special preparation or deployment process to ensure successful migration. Refer to:

- [Section 5.1, “Moving unsupported features to Appeon Server as n-Tier NVOs”](#) for details on the advantages, restrictions, and guidance of n-Tier NVO usage in distributed applications.
- [Section 5.2, “Migrating distributed applications without distributed DataWindows”](#) for special preparation tasks required for migration of distributed applications without distributed DataWindows.
- [Section 5.3, “Migrating distributed applications with distributed DataWindows”](#) for special workaround techniques for supporting the GetFullState, SetFullState, GetChanges and SetChanges functions. Note that the workaround techniques only work with Appeon Server for EAServer on Windows.

### 5.1 Moving unsupported features to Appeon Server as n-Tier NVOs

#### 5.1.1 Strategy

When an application contains unsupported features, you can encapsulate some of them into PowerBuilder non-visual user objects (NVOs) and deploy the NVOs to the EAServer hosting Appeon Server. These NVOs can be called by Appeon Web applications as well as any other Web application or PowerBuilder application.

This n-Tier NVO support allows the user to program powerful PowerBuilder features into the application. If an existing PowerBuilder application is deployed to the Web, the n-Tier NVO technique can work around a vast number of unsupported features (both browser limitations and Appeon limitations).

#### 5.1.2 Advantages of n-Tier NVO usage

With n-Tier NVOs, you can work around:

- A large amount of unsupported DataWindow (DW) syntax (functions, events, properties, dot notation and expressions) in conjunction with the Appeon distributed DataWindow technique (Windows only) (support of DW Get/SetFullState, Get/SetChanges)
- Some unsupported non-visual PowerBuilder system objects

- Some unsupported system functions

N-Tier NVOs can also:

- Remove Web browser limitations by running PowerBuilder NVO code inside the EAServer hosting Appeon Server
- Connect to DLLs
- Connect to other PowerBuilder NVOs & Java/EJBs in the EAServer hosting Appeon Server.
- Connect to EJBs in SAP EAServer, Oracle WebLogic, IBM WebSphere, TmaxSoft JEUS, JBoss, and other J2EE-compliant application servers through PowerBuilder 9.0 PBNI/EJB support
- Connect to remote Web Services or .NET components
- Create and expose Web Services from PowerBuilder NVOs using the EAServer Web Services Toolkit
- Connect to C++ Classes/DLLs through PBNI and vice-versa
- Connect to Messaging Systems through Message Queues (JMS, MQSeries, Tibco)
- Create XML result sets for sending to other companies/departments using PowerBuilder 9.0 XML DataWindow or PBDOM functionality
- Consume XML result sets from other companies/departments using PowerBuilder 9.0 XML DataWindow or PBDOM functionality
- Create PDF DataWindow files and/or manipulate text files using the PowerBuilder 9.0 DataWindow SaveAs (PDF) functionality
- Move logic and processing from the client to the server. The more you move to the server, the faster the client will run and the lighter and less complex the Web files will be. For example, there was an application from a large Japanese conglomerate that took more than ten seconds to execute a DataWindow Update. The complex validation rules in the Update were consolidated into n-Tier NVOs, and the DataWindow Update now only takes one second.

### 5.1.3 Restrictions in n-Tier NVOs usage

Typically, what is encapsulated into n-Tier NVOs is the application business logic that is not related to the visual aspects of the application. Not all of PowerBuilder's unsupported features can be encapsulated into NVO components that run in Appeon Server working with EAServer on Windows.

There are restrictions for n-Tier NVOs by EAServer and Appeon. For detailed information, refer to Section 4.1.1, “N-Tier PowerBuilder NVOs (EAServer + Windows Only)” in *Supported PB Features for Appeon Web (Web only)*.

## 5.1.4 Steps for moving unsupported features or business logic to Appeon Server

Step 1: Create new PowerBuilder NVO objects; add user functions, events and/or properties to them as necessary. Place unsupported code or business logic in these functions/events.

Step 2: Deploy the NVOs holding unsupported features to the EAServer hosting Appeon Server that is used for Web deployment of the target PowerBuilder application. To deploy an EAServer component from a PowerBuilder NVO, use the EAServer Component Project wizard in PowerBuilder.

Step 3: Generate stubs and skeletons of the server NVO components that you have deployed in the previous step.

Step 4: Make sure the Bind Thread property of each server component is enabled in the Properties | Instances tab.

Step 5: Build the EAServer Proxy objects in the target application Client. The Proxy objects act as agents for Server NVO Components. To define an EAServer Proxy object, use the EAServer proxy object generator in the PowerBuilder Project painter.

Step 6: At the target application Client, modify the Connection object properties and connect to the deployment Appeon Server.

Step 7: Instantiate the Server NVO Components and call their methods to replace the original unsupported code in the target PowerBuilder application.

Step 8: Run and debug the target application in PowerBuilder to ensure the application client works correctly with Server NVO Components, then perform a full build and optimize the application target in the PowerBuilder IDE.

For more information on deploying and using EAServer components from PowerBuilder NVOs, refer to *PowerBuilder Help* and SAP EAServer documentation.

## 5.2 Migrating distributed applications without distributed DataWindows

### 5.2.1 Generating Stub/Skeleton in EAServer

Stubs and skeleton files allow communication between a client and a component in EAServer, regardless of the client and the server component types. For example, a Java or C++ client can be used to interact with a PowerBuilder NVO component in EAServer.

Stubs and skeletons for an Appeon Web application are the counterparts to EAServer Proxy objects and EAServer Component objects in an n-Tier PowerBuilder application. Both the n-Tier PowerBuilder application and the Appeon Web application call NVO components in an EAServer. The Proxy object allows the PowerBuilder client to access the NVO components on EAServer. Stubs allow the Appeon Web application to establish communication with the EAServer and access its NVO components on Appeon Server.

For detailed instructions, refer to Section 7.9, “How to deploy NVO to EAServer 6.1” in *Workarounds & API Guide*.



## 5.2.2 Deploying the application

After the stubs and skeletons are generated as required for its n-Tier NVOs, the migration of a distributed application that does not contain distributed DataWindows is similar to that of a normal Client/Server application. You only need to create an application profile for the client application of the distributed application, and deploy the application profile using the Appeon Deployment Wizard.

## 5.3 Migrating distributed applications with distributed DataWindows

### 5.3.1 Benefits in using distributed DataWindows

"Distributed DataWindows" refers to the use of DataWindow/DataStore objects in a distributed environment. In a distributed PowerBuilder application, a DataWindow control at the client can associate with a DataStore object in EAServer. The client DataWindow control is responsible for the visual representation of data and deals with user operations, while the DataStore object in EAServer is responsible for transactions. The state of the client DataWindow control is synchronized with the state of the DataStore object in EAServer and vice versa, using relevant DataWindow functions.

There are two benefits to using distributed DataWindow technology with Appeon:

- Provides more scalability by separating user interface and business logic.
- Works around Appeon unsupported DataWindow functions by moving the functions in server DataStore objects.

### 5.3.2 Workaround required if you use distributed DataWindows

If you use distributed DataWindows in the application and plan to migrate the DataWindows to the Web, you must use the workaround provided by Appeon for the distributed DataWindows via:

1. Deriving distributed DataWindows and DataStore objects from *appeondatawindow* and *appeondatastore*.
2. Deriving PowerBuilder GetFullState, SetFullState, GetChanges and SetChanges functions from corresponding Appeon functions.

Because the workaround only works with Appeon Server installed to EAServer on Windows, you should avoid using the distributed DataWindow technique if you plan to deploy the application to an Appeon Server running on other application servers.

#### 5.3.2.1 Why the workaround is required

PowerBuilder GetFullState, SetFullState, GetChanges and SetChanges functions use BLOB (Binary Large Object) parameters for passing DataWindow or DataStore object specifications. Appeon supports BLOB, but it cannot directly interpret the BLOB DataWindow or DataStore object specifications. Appeon workarounds help to interpret the BLOB DataWindow or DataStore object specifications.

### 5.3.2.2 Main workaround steps

Step 1: Apply the workaround *apeondatawindow* objects and *apeondatastore* objects provided by Apeon to your application.

For step-by-step instructions on how to apply them, refer to Section 6.6.1, “Apeon GetFullState/SetFullState/GetChanges/SetChanges (Windows only)” in *Workarounds & API Guide*.

Step 2: In PowerBuilder, deploy the server DataStores that are inherited from *apeondatastore* to Apeon Server.

You also need to deploy the *apeondatawindow* and *apeondatastore* objects to the Apeon Server.

Step 3: Generate stubs and skeletons for the server DataStores in the application by following the instructions in Section 7.9, “How to deploy NVO to EAServer 6.1” in *Workarounds & API Guide*.

### 5.3.2.3 Workaround limitations

When using the *apeondatawindow* and *apeondatastore* objects to work around the distributed DataWindow technique, there are some limitations regarding the use of Apeon GetFullState, SetFullState, GetChanges, and SetChanges functions.

**Table 5.1: Limitations of Apeon workaround**

Limitation/Difference in	Limitation/Difference Description
DataWindow styles	The workaround works with DataWindows or DataStores of all styles, except for OLE and Treeview.
Return value of the functions	The return value of Apeon SetFullState may have different meaning from that of PowerBuilder system SetFullState function.
	The Apeon GetChanges function always returns -1 if it fails. In PowerBuilder, the function can return more error numbers (-1, -2 and -3).
	The Apeon SetChanges function can return -1 and -3, but cannot return 2 and -2.
DataWindow ImportString function	If using the DataWindow ImportString function in a distributed DataWindow environment, keep the date display format the same at the client and Apeon Server machines. In addition, the date/time format configuration in AEM should be kept the same as the system date/time configuration on Apeon Server.
State information initialization of a DataWindow/DataStore	In PowerBuilder, the state information of a DataWindow/DataStore is initialized whenever you set its DataObject property. However, if using <i>apeondatawindow</i> and <i>apeondatastore</i> , the state information is initialized only when you change the DataObject property to a different DataWindow object.
Truncation of characters in certain cases	When applying Apeon SetChanges to a target DataWindow/DataStore, if a column of Char type in the source DataWindow/

<b>Limitation/Difference in</b>	<b>Limitation/Difference Description</b>
	DataStore has defined more characters than its corresponding column in the target DataWindow/DataStore, characters from the source column that exceed the length limit of the target column are truncated, but in PowerBuilder the extra characters are preserved.
Un-modified or modified data	When calling PowerBuilder GetFullState and GetChanges, changed (but not accepted) data in a DataWindow control is treated as un-modified data, but if using the Appeon <i>appeondatawindow</i> and <i>appeondatastore</i> , changed (but not accepted) data is treated as modified data.

## 6 Enhancing an application with Web or Appeon features

The following table gives you a general idea on how to enhance applications with Web or Appeon features.

**Table 6.1: Enhance a deployed application with Web/Appeon features**

Type of the Feature	Description of the Feature	How to add it in the deployed application
Typical Web features	<ul style="list-style-type: none"> <li>• Accessibility of the application via URLs or SAP Sybase Enterprise Portal</li> <li>• Firewall compatibility. The Web file transfer is HTTP over port 80.</li> <li>• SSL and digital certificate security</li> <li>• Superior scalability. Typical applications support 60-80 concurrent users per server CPU that maps to 300-500 named/end users per server CPU.</li> <li>• More...</li> </ul>	<p>Such features are automatically added in the deployment application, with no need for any special coding.</p> <p>Refer to <a href="#">Section 6.3, “Loading an application in SAP Sybase Enterprise Portal”</a> for details on how to load the application in Enterprise Portal.</p>
Appeon Server open interfaces	Use Appeon Server open interfaces to manage Appeon-deployed Web applications using PowerBuilder code.	<p>The interface(s) should be called in the PowerBuilder application to take effect in the deployed application.</p> <p>Refer to <a href="#">Section 6.1, “Appeon Server open interfaces”</a> for details.</p>
Appeon client functions	Use Appeon client functions to get client information or server information, or use Appeon enhanced features in the applications.	<p>The client function(s) should be called in the PowerBuilder application to take effect in the deployed application.</p> <p>Refer to <a href="#">Section 6.2, “Appeon client functions”</a> for details.</p>
Web integration	<ul style="list-style-type: none"> <li>• Provides flexible &amp; open Java, .NET, &amp; Web Services integration</li> <li>• Connectivity to Java/EJB, PB NVO, C/C++ DLL, COM/ActiveX Components on Application Servers</li> <li>• Connectivity to Web Services, J2EE, and .NET</li> </ul>	<p>There are different ways for implementing the integration of an Appeon Web application with other applications.</p> <p>Refer to <a href="#">Section 6.4, “Single sign-on”</a> and <a href="#">Section 6.5, “Integrating Appeon Web applications with JSP/ASP”</a> for details.</p>

Type of the Feature	Description of the Feature	How to add it in the deployed application
	<ul style="list-style-type: none"> <li>Connectivity to Messaging Queues (MQSeries, JMS, etc.)</li> </ul>	

## 6.1 Appeon Server open interfaces

Appeon Server open interfaces give you the opportunity to manage services provided by Appeon Server through PowerBuilder code. You can easily manage Appeon-deployed Web applications with the open interfaces below:

- `getAllClients`
- `getAllSessions`
- `getSessionByID`
- `getSessionCount`
- `killAllSessions`
- `killSessions`
- `rollbackAllTransactions`

### 6.1.1 Description of the open interfaces

Refer to Chapter 5, *Appeon Server open interfaces in Workarounds & API Guide* for the syntax of Appeon Server open interfaces. Note that you can write code for calling the interface in the PowerBuilder application, but the code does not take effect in the PowerBuilder application; it only takes effect in the Appeon-deployed application.

#### 6.1.1.1 `getAllClients`

`getAllClients` gets the IP addresses of all client machines which corresponds to the active sessions that are opened for the specified application in the specified Appeon Server.

#### 6.1.1.2 `getAllSessions`

`getAllSessions` returns the detail information of active sessions with XML format, which are opened for the specific application in the specific Appeon Server.

#### 6.1.1.3 `getSessionByID`

`getSessionByID` returns the detail information of the specified session with XML format.

#### 6.1.1.4 `getSessionCount`

With `getSessionCount` method, you can get the following three types of information.

- The total number of active sessions opened for the specified application in the specified Appeon Server.
- The total number of active sessions in a specified Appeon Server.

- The total number of sessions opened for the specified application in an Apeon Server cluster.

To get the number of sessions in an Apeon Server cluster, you need to first configure the cluster in AEM.

By using the `GetSessionCount` method, you can easily get the total number of active sessions in a specified Apeon Server using PowerBuilder code and apply the information in other open interfaces such as `KillSession` to manage the sessions. For example, you can first call `GetSessionCount` and then call `KillSession` in the PowerBuilder application to make the deployed application kill all sessions in Apeon Server when there are up to 100 active sessions in the server.

#### **6.1.1.5 killAllSessions**

`killAllSessions` kills all active sessions in an Apeon Server or an Apeon Server cluster and rolls back all associated transactions. To kill all sessions in an Apeon Server cluster, you need to first configure the cluster in AEM.

#### **6.1.1.6 killSessions**

`killSessions` kills the specified session(s) in an Apeon Server or an Apeon Server cluster and rolls back the associated transactions. To kill sessions in an Apeon Server cluster, you need to first configure the cluster in AEM.

#### **6.1.1.7 rollbackAllTransactions**

`rollbackAllTransactions` rolls back all transactions in an Apeon Server or an Apeon Server cluster. To roll back all transactions in an Apeon Server cluster, you need to first configure the cluster in AEM.

### **6.1.2 Applying Apeon Server open interfaces in Apeon-deployed applications**

To apply an Apeon Server open interface in an Apeon-deployed Web application, you only need to perform the following two steps.

1. Call the Apeon Server open interface in the PowerBuilder application. For how to call Apeon Server open interfaces in a PowerBuilder application, refer to Section 5.2, “Calling Apeon Server open interfaces via EJB component” in *Workarounds & API Guide* or Section 5.3, “Calling Apeon Server open interfaces via .NET component” in *Workarounds & API Guide*.
2. Deploy the PowerBuilder application to Apeon Server the same way you would deploy a normal PowerBuilder application.

## **6.2 Apeon client functions**

Apeon client functions are a set of PowerBuilder functions encapsulated in Apeon workaround PBLs. You can add Apeon client functions in your PowerBuilder applications to achieve the following in Apeon-deployed applications:

- Get client information, such as the IP address, or the browser type of the client

- Get server information, such as total numbers of the active session on a cluster or a single Appeon server.
- Use Appeon Web enhanced features, such as Appeon DataWindow menu, PDF print, and LDAP Logon.

### 6.2.1 Description of Appeon client functions

The following table provides the client functions and their return values. Note that some Appeon client functions are just interfaces provided by the Appeon system; they have empty function bodies and empty return values for the PowerBuilder applications.

**Table 6.2: Client functions with their return values**

Functions	Return value when executed in PowerBuilder	Return value when executed in Appeon application
AppeonGetAppeonUserName()	None. This function has no effect in PowerBuilder.	The user name typed into the Appeon Login dialog.
AppeonGetBrowserVersion()	None. This function has no effect in PowerBuilder.	The version of the Internet Explorer browser that runs the current Web application.
AppeonGetClientID()	The unique session identifier for PowerBuilder client.	The unique session identifier for the Web client.
AppeonGetCacheDir()	None. This function has no effect in PowerBuilder.	The cache directory that is used by the current Web application.
AppeonGetClientIP()	The IP address of PowerBuilder client machine.	The IP address of the Web client.
AppeonGetClientType()	"PB"	"WEB" if the application runs on a Web browser, or "MOBILE" if the application runs on a mobile device.
AppeonGetHttpInfo (string attribute)	None. This function has no effect in PowerBuilder.	The HTTP header information from a particular request.
AppeonGetIEHandle()	None. This function has no effect in PowerBuilder.	The Internet Explorer handle for the current Web application.
AppeonGetIEURL()	None.	The URL of the current Appeon application.

Functions	Return value when executed in PowerBuilder	Return value when executed in Apeon application
	This function has no effect in PowerBuilder.	
ApeonGetOSType()	The type of the OS that runs the PowerBuilder client application.	The type of the OS that runs the current Web application.
ApeonGetRemainingdays (String as_type, ref string as_error)	None. This function has no effect in PowerBuilder.	The remaining day(s) of license or technical support.
ApeonGetServerType()	None. This function has no effect in PowerBuilder.	Returns 1 if the application runs on an Apeon Server that is installed to a J2EE Server (such as WebLogic). Returns 2 if the application runs on an Apeon Server that is installed to a Microsoft .NET Framework \IIS.
ApeonIsIn64Browser	None. This function has no effect in PowerBuilder.	Returns "true" if the application runs on a 64-bit IE browser. Returns "false" if the application runs on a 32-bit IE browser.
ApeonLDAPLogon (string as_username, string as_password)	None. This function has no effect in PowerBuilder.	Login username and password for the LDAP server.
ApeonPopupMenu (Datawindow adw_dw, Integer nx, Integer ny)	None. This function has no effect in PowerBuilder.	None. At the execution of the function, ApeonDataWindow menu is displayed at the specified position on the specified DataWindow control. ApeonPopupMenu has higher priority than ApeonPopupMenuOn.
ApeonPopupMenuOn (Datawindow adw_dw, Boolean ab_show)	None. This function has no effect in PowerBuilder.	None. At the execution of the function, ApeonDataWindow menu pops up when you right



Functions	Return value when executed in PowerBuilder	Return value when executed in Apeon application
		click on the specified DataWindow.
ApeonPrint2File (datawindow adw, string asoutpath, string asoutname, long alouttype)	None. This function has no effect in PowerBuilder.	Integer. Returns 1 if it succeeds in printing the specified DataWindow/DataStore as a PDF or an image file of BMP, JPG or GIF format, otherwise, returns -1.
ApeonSwitchRealTimeCalc	None. This function has no effect in PowerBuilder.	Returns 0 (default value) if need to perform real-time calculation. Returns 1 if no need to perform real-time calculation.

## 6.2.2 Using Apeon Client functions

Although the main purpose of Apeon Client functions is to implement certain functionalities in Apeon-deployed applications, you must call the functions in your PowerBuilder application to make the functions effective.

To use Apeon Client functions in Apeon-deployed applications, refer to Section 2.3.2, “Apeon Client Functions” in *Workarounds & API Guide* for more detail.

## 6.3 Loading an application in SAP Sybase Enterprise Portal

SAP Sybase Enterprise Portal (EP) is an open and scalable portal framework that provides an intuitive, secure and customized environment for end-users; rapid development and deployment tools for developers; and an easy-to-use console for administrators. Apeon-deployed applications can run in SAP Sybase Enterprise Portal or Unwired Accelerator.

### 6.3.1 Restrictions on supporting Enterprise Portal

Apeon supports Enterprise Portal 6.1 Info Edition and Enterprise Edition. Be aware of the following restrictions when you load Apeon Web applications in Enterprise Portal:

- Only ONE Apeon Web application can be viewed inside one EP Page. Multiple Apeon Web applications can be viewed within multiple pages. For example, you can have Sales App Demo on one EP Page and Apeon Code Examples on another EP Page and both function correctly.
- Exiting from Apeon Web applications do not close Internet Explorer.
- Only one response window is allowed for an Internet Explorer browser at a given time.

### 6.3.2 Tasks required to load the application in Enterprise Portal

You need to perform the following four tasks to get a deployed application loaded in the portal after the application migration:

Task #1: Add the application into a portlet. Create an HTML element in the portlet and assign the URL of the Appeon-deployed application to the HTML element.

Task #2: Add the application into a page. Create a new page, add the application into it, and approve the application.

Task #3: Add the page into a page group. Create a new page group and add the page created in task #2 into the page group.

Task #4: Create accounts for viewing the application. Create accounts and assign rights to the accounts for running the application.

For step-by-step instructions on conducting each of the preceding tasks, refer to the relevant documentation provided by SAP Sybase Enterprise Portal (available at <http://www.sybase.com/products/archivedproducts/enterpriseportal/technicalsupport>).

### 6.4 Single sign-on

Single sign-on can be implemented in the Appeon deployed Web applications using the following two methods:

- Using a server component to manage user information
- Applying command line argument

For detailed steps of using the above methods, refer to Section 7.13, “How to log in the Appeon Web application with single sign-on” in *Workarounds & API Guide*.

### 6.5 Integrating Appeon Web applications with JSP/ASP

You can integrate Appeon Web applications with JSP/ASP applications using the following three methods:

- Applying Appeon CommandParm and Hyperlink features
- Using Internet Explorer frame
- Integration through intermediate n-Tier server

For detailed steps of using the above methods, refer to Section 7.17, “How to integrate Appeon Web applications with JSP/ASP” in *Workarounds & API Guide*.

## 7 Processing PFC Applications

Appeon supports most PFC features. As such, under most situations the existing PFC code can also work under the Appeon environment without any modifications. However, there are a few features that are not supported. For that handful of unsupported features, Appeon would devise a workaround or alternate implementation of those features. Then, the PFC framework would be enhanced with any auto-sensing feature that would detect whether the PFC framework is being run as Client/Server or as Appeon Web. If Client/Server, then for those features that Appeon does not support it will execute the original Client/Server implementation. If Web, then only for those features that Appeon does not support it will execute the modified implementation.

After modifying these unsupported features, you can deploy the PFC application just as how you deploy a normal PowerBuilder application.

### 7.1 Auto-Sensing Environment

The general idea of making PFC work for both PowerBuilder and Appeon is calling a global function to judge the application's running environment. This global function will help to judge whether to run the original PFC code or Appeon compliant code.

The global function "appeongetclienttype" is included in the Appeon Workarounds PBL. You will need to first add the `appeon_workarounds.pbl` library to your application and then call the `appeongetclienttype` global function. For detailed instructions, refer to Chapter 2, *Appeon Workarounds PBL Reference in Workarounds & API Guide*.

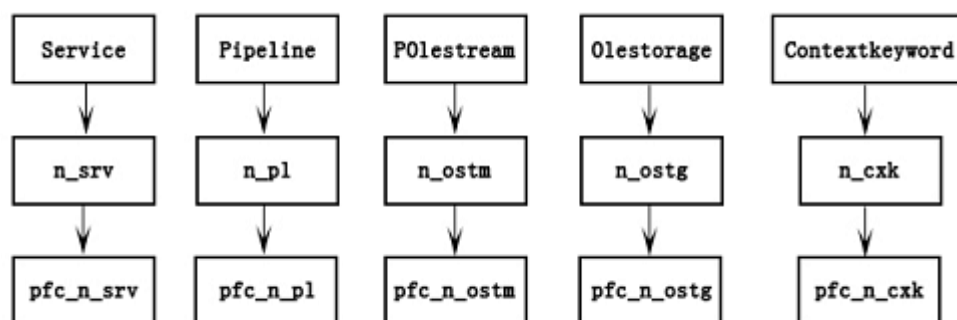
### 7.2 Suggested Modifications to PFC

The following sections give detailed suggestions for how to modify current PFC codes so that those Appeon unsupported or modified PFC features work in both PowerBuilder and in Appeon. Code modifications are only made where absolutely necessary and the "Auto-Sensing Environment" feature will be used to ensure under no circumstance are existing Client/Server users affected by any Appeon modifications. Appeon suggested modification will follow the following format:

```
IF appeongetclienttype() = "PB" then
  Original code in PFC
else
  Appeon compliant code in PFC
End if
```

### 7.3 Unsupported user objects

PFC framework contains the following user objects as unsupported (in the last two lines):

**Figure 7.1: Unsupported User objects in PFC**

**Recommendation:** Although these user objects are defined, they are not referred to in PFC framework, therefore you do not need to modify them and you should avoid referring to these objects in your application.

## 7.4 Unsupported standard class objects

These four standard class objects are unsupported:

- Contextinformation
- Classdefinition
- Scriptdefinition
- Variabledefinition

**Recommendation:** Avoid referring to the following object functions, this can reduce the impact on the functionality:

- pfcmain.pbl\pfc\_w\_master\of\_setresize
- pfcapsrv.pbl\pfc\_n\_cst\_security\of\_setsecurity
- pfcapsrv.pbl\pfc\_n\_cst\_metaclass\of\_findmatchingevent
- pfcapsrv.pbl\pfc\_n\_cst\_metaclass\of\_findmatchingvariable
- pfcapsrv.pbl\pfc\_n\_cst\_metaclass\of\_getancestorclasses
- pfcapsrv.pbl\pfc\_n\_cst\_metaclass\of\_isfunctiondefined
- pfcapsrv.pbl\pfc\_n\_cst\_metaclass\of\_iseventimplemented
- pfcapsrv.pbl\pfc\_n\_cst\_metaclass\of\_iseventdefined
- pfcapsrv.pbl\pfc\_n\_cst\_metaclass\of\_isancestorclass

If you really need to use Classdefinition, try to use the following workaround:

Original script:

```
lb_defined = inv_metaclass.of_isFunctionDefined &
(lpo_tocheck.ClassDefinition, "of_PostUpdate", ls_args)
```

## Modified script:

```
If lpo_tocheck.TriggerEvent("pfc_descendant") = 1 Then
  lb_defined = True
Else
  lb_defined = False
End if
```

## 7.5 Unsupported object properties

**Table 7.1: Unsupported object properties that need no modification**

Object	Properties	Calls	Suggestion
Application	ToolbarUserControl	4	Need no modification.
	ToolbarText	5	
	ToolbarPopupMenuText	3	
	DwMessageTitle	4	
	DdeTimeOut	3	
OLEControl	ClassShortName	1	Need no modification.
	ClassLongName	1	
Transaction	Lock	3	Need no modification.
	Sqlreturndata	1	
Message	Returnvalue	1	Need no modification.
	Number	1	
	Handle	1	
Connection	Trace	2	Need no modification.
	Options	2	
	Connectstring	2	
GraphicObject	Classdefinition	1	Need no modification.

**Table 7.2: Unsupported object properties that need modification**

Object	Properties	Calls	Suggestion
Window	Classdefinition	1	<p>Need modification.</p> <p>Calling this property has no impact on the functionality. However, it has impact on the position and size of the control in a DataWindow when the DataWindow is zoomed in or zoomed out. Refer to the detailed information below.</p> <p>DETAILED INFORMATION</p> <p>Location: Of_setresize(boolean) function of pfc_w_master in pfcmain.pbl</p> <p>Apeon Unsupported Code: Lcd_class = this.ClassDefinition</p> <p>Line Number: 45</p>

Object	Properties	Calls	Suggestion
			<p>Change the code to:</p> <pre> if ApeonGetClientType( ) = 'PB' then   classdefinition lcd_class   lcd_class = this.ClassDefinition   li_vars = UpperBound ( lcd_class.VariableList )   For li_v = 1 to li_vars     If lcd_class.VariableList[li_v].Name = "width"     then &amp;       li_origwidth = Integer       ( lcd_class.VariableList[li_v].InitialValue )     If lcd_class.VariableList[li_v].Name = "height"     then &amp;       li_origheight = Integer       ( lcd_class.VariableList[li_v].InitialValue )     If li_origwidth &gt; 0 And li_origheight &gt; 0 then     &amp;       Exit     Next     inv_resize.of_SetOrigSize ( li_origwidth,     li_origheight )   else     inv_resize.of_SetOrigSize ( this.width,     this.height )   end if </pre>
PowerObject	Classdefinition	7	<p><b>Need modification</b></p> <p>This property is often used for detecting a function of a object.</p> <p>It is suggested to modify the whole code segment, calling a function no matter whether it exists or not. Refer to the detailed information below.</p> <p><b>DETAILED INFORMATION</b></p> <p>Location 1: Of_validation(powerobject) function of pfc_n_cst_luw in pfcapsrv.pbl</p> <p>Apeon Unsupported Code: Lcd_class = this.ClassDefinition</p> <p>Line Number: 123</p> <p>Change the code to:</p> <pre> if ApeonGetClientType( ) = 'PB' then   lb_defined =   inv_metaclass.of_isFunctionDefined   &amp; (lpo_tocheck.ClassDefinition,   "of_validation", ls_args) else   lb_defined = True End if </pre> <p>Location 2: Of_updatespending(powerobject) function of pfc_n_cst_luw in pfcapsrv.pbl</p> <p>Apeon Unsupported Code: Lb_defined = inv_metaclass.of_isFunctionDefined</p>

Object	Properties	Calls	Suggestion
			<p>(lpo_tocheck.ClassDefinition, "of_UpdatesPending", ls_args)</p> <p>Line Number: 130</p> <p>Change the code to:</p> <pre data-bbox="684 454 1394 680"> if ApeonGetClientType( ) = 'PB' then   lb_defined =   inv_metaclass.of_isFunctionDefined   &amp; (lpo_tocheck.ClassDefinition,   "of_UpdatesPending", ls_args) Else   lb_defined = True End if </pre> <p>Location 3: Of_updateprep(powerobject) function of pfc_n_cst_luw in pfcapsrv.pbl</p> <p>Apeon Unsupported Code: Lb_defined = inv_metaclass.of_isFunctionDefined (lpo_tocheck.ClassDefinition, "of_UpdatePrep", ls_args)</p> <p>Line Number: 122</p> <p>Change the code to:</p> <pre data-bbox="684 1084 1394 1310"> if ApeonGetClientType( ) = 'PB' then   lb_defined =   inv_metaclass.of_isFunctionDefined   &amp; (lpo_tocheck.ClassDefinition,   "of_UpdatePrep", ls_args) else   lb_defined = True End if </pre> <p>Location 4: Of_update(powerobject,boolean,boolean) function of pfc_n_cst_luw in pfcapsrv.pbl</p> <p>Apeon Unsupported Code: Lb_defined = inv_metaclass.of_isFunctionDefined (lpo_tocheck.ClassDefinition, "of_Update", ls_args)</p> <p>Line Number: 145</p> <p>Change the code to:</p> <pre data-bbox="684 1677 1394 1904"> if ApeonGetClientType( ) = 'PB' then   lb_defined =   inv_metaclass.of_isFunctionDefined   &amp; (lpo_tocheck.ClassDefinition, "of_Update",   ls_args) Else   lb_defined = True End if </pre> <p>However, with the suggested changes made, only DataWindows placed directly on windows would update. For DataWindows placed on tab pages to</p>

Object	Properties	Calls	Suggestion
			<p>update correctly, add the code to the Case statement in the function to call of_update() on UserObject and Tab controls to make updates on tab pages work correctly.</p> <p>Location 5: Of_postupdate(powerobject) function of pfc_n_cst_luw in pfcapsrv.pbl</p> <p>Apeon Unsupported Code: Lb_defined = inv_metaclass.of_isFunctionDefined (lpo_tocheck.ClassDefinition, " of_PostUpdate ", ls_args)</p> <p>Line Number: 123</p> <p>Change the code to:</p> <pre data-bbox="683 752 1394 949"> if ApeonGetClientType( ) = 'PB' then   lb_defined =inv_metaclass.of_isFunctionDefined   &amp; (lpo_tocheck.ClassDefinition,   "of_PostUpdate", ls_args) else   lb_defined = True End if </pre> <p>Location 6: Of_isselfupdatingobject(powerobject) function of pfc_n_cst_luw in pfcapsrv.pbl</p> <p>Apeon Unsupported Code: Lb_defined = inv_metaclass.of_isFunctionDefined (apo_control.ClassDefinition, "of_Update", ls_args)</p> <p>Line Number: 60</p> <p>Change the code to:</p> <pre data-bbox="683 1317 1394 1514"> if ApeonGetClientType( ) = 'PB' then   lb_defined =inv_metaclass.of_isFunctionDefined   &amp; (apo_control.ClassDefinition, "of_Update",   ls_args) else   lb_defined =True End if </pre> <p>Location 7: Of_accepttext(powerobject,boolean) function of pfc_n_cst_luw in pfcapsrv.pbl</p> <p>Apeon Unsupported Code: Lb_defined = inv_metaclass.of_isFunctionDefined (lpo_tocheck.ClassDefinition, "of_AcceptText", ls_args)</p> <p>Line Number: 128</p> <p>Change the code to:</p> <pre data-bbox="683 1917 1394 2000"> if ApeonGetClientType( ) = 'PB' then   lb_defined =   inv_metaclass.of_isFunctionDefined </pre>



Object	Properties	Calls	Suggestion
			<pre>&amp; (lpo_tocheck.ClassDefinition, "of_AcceptText", ls_args) else   lb_defined = True End if</pre>
DataWindow control	Hsplitscroll	1	<p>Need modification.</p> <p>Refer to the detailed information below.</p> <p>Location: Of_position(dragobject,boolean) function of pfc_n_cst_dropdown in pfcapsrv.pbl</p> <p>Apeon Unsupported Code: If ldw_object.hsplitscroll</p> <p>Line Number: 237</p> <p>Change the code to:</p> <pre>if ApeonGetClientType( ) = 'PB' then   li_hsplit = Integer (ldw_object.Describe ("DataWindow.HorizontalScrollSplit"))   li_hpos1 = Integer (ldw_object.Describe ("DataWindow.HorizontalScrollPosition"))   li_hpos2 = Integer (ldw_object.Describe ("DataWindow.HorizontalScrollPosition2"))   if ldw_object.hsplitscroll then     if li_hsplit &gt; 4 and li_pointerx &gt; li_hsplit then       li_hpos = li_hpos2 - li_hsplit - of_GetSystemSetting (DW_HSPLITBAR_WIDTH)     else       li_hpos = li_hpos1     End if   else     li_hpos = li_hpos1   End if else   li_hpos = 0 End if</pre>

## 7.6 Unsupported object functions

**Table 7.3: Unsupported object functions that need no modification**

Object	Functions	Calls	Suggestion
NonVisualObject	GetContextService	1	Need no modification.
Window	Settoolbar	5	Need no modification.
	Gettoolbar	3	
	Gettoolbarpos	2	
	Settoolbarpos	2	
SingleLineEdit	Canundo	1	Need no modification.
RichTextEdit	Canundo	1	Need no modification.
OLEControl	UpdateLinksDialog	1	Need no modification.
	PasteSpecial	1	

Object	Functions	Calls	Suggestion
	Paste	1	
	Cut	1	
	Copy	1	
EditMask	Canundo	1	Need no modification.
DataStore	ReselectRow	1	Need no modification.

## 7.7 Unsupported object events

**Table 7.4: Unsupported object events that need no modification**

Object	Events	Suggestion
RichTextEdit	PrintHeader	Need no modification.
	FileExists	
ListView	Sort	Need no modification.
Application	SystemError	Need no modification.

## 7.8 Unsupported system functions

**Table 7.5: Unsupported system functions that need no modification**

System functions	Calls	Suggestion
ShowHelp	18	Need no modification.
FindClassDefinition	6	Need no modification.

## 7.9 Unsupported Shared variables

**Table 7.6: Unsupported shared variables that need no modification**

Shared variables	Calls	Suggestion
snv_property	5	Need no modification.

## 7.10 Unsupported Function not found

**Table 7.7: Unsupported functions that need no modification**

Functions	Calls	Suggestion
dwObject.GetChild	1	Need no modification.

**Table 7.8: Unsupported functions that need no modification**

Functions	Calls	Suggestion
dwObject.Print	3	Need modification. Refer to the detailed information below. DETAILED INFORMATION Location 1: Pfc_print() event of pfc_u_dw in pfcmain.pbl Apeon Unsupported Code: Li_rc = lds_selection.Print(true, true) Line Number: 75

Functions	Calls	Suggestion
		<p>Change the code to:</p> <pre data-bbox="528 309 1134 703"> if IsValid (lds_selection) then   If ApeonGetClientType( ) = 'PB' then     li_rc = lds_selection.Print (true, true)   else     li_rc = lds_selection.Print (true)   end if   destroy lds_selection else   If ApeonGetClientType() = 'PB' then     li_rc = this.Print (true, true)   else     li_rc = this.Print (true)   end if end if                     </pre> <p>Location 2: Pfc_print() event of pfc_n_ds in pfcmain.pbl</p> <p>Apeon Unsupported Code: Li_rc = lds_selection.Print(true, true)</p> <p>Line Number: 87</p> <p>Change the code to:</p> <pre data-bbox="528 958 1102 1352"> if IsValid (lds_selection) then   if ApeonGetClientType( ) = 'PB' then     i_rc =lds_selection.Print (true, true)   else     li_rc = lds_selection.Print (true)   end if   destroy lds_selection else   If ApeonGetClientType() = 'PB' then     li_rc = this.Print (true, true)   else     li_rc = this.Print (true)   end if end if                     </pre>

## 7.11 Unsupported calls

**Table 7.9: Unsupported calls**

Unsupported calls	Suggestion
<p>Calling the SQLPreview event by Update or ReselectRow functions is unsupported.</p>	<p>Need modification. Refer to the detailed information below.</p> <p><b>DETAILED INFORMATION</b></p> <p>Location: Of_setupdatestyle function of the Pfc_n_cst_dwsrv_linkage object in pfc_dwsrv.pbl</p> <p>Add the following code:</p> <pre data-bbox="504 1872 1011 2033"> if ai_style = TOPDOWN_BOTTOMUP then   ai_style = BOTTOMUP end if if ai_style = BOTTOMUP_TOPDOWN then   ai_style = BOTTOMUP end if                     </pre>

Unsupported calls	Suggestion
Dynamically calling overloaded function of an uncertain object is unsupported.	<p>Need modification. Refer to the detailed information below.</p> <p><b>DETAILED INFORMATION</b></p> <p>Location: Of_update(powerobject,boolean,boolean) function of pfc_n_cst_luw in pfcapsrv.pbl</p> <p>Apeon Unsupported Code: li_rc = lpo_tocheck.Function Dynamic of_Update (ab_accepttext, ab_resetflag, lpo_updaterequestor)</p> <p>Line Number: 147</p> <p>Change the code to:</p> <pre> u_dw   ldw_update n_ds   lds_update u_lvs  llvs_update u_tvsv ltvsv_update if ApeonGetClientType( ) = 'PB' then   If lb_defined then     li_rc = lpo_tocheck.Dynamic of_Update (ab_accepttext, ab_resetflag, lpo_updaterequestor)     if li_rc &lt; 0 Then       Return -1       Continue     End if   else     if lb_defined then       Choose Case Typeof ( lpo_tocheck)       Case DataWindow!         ldw_update = lpo_tocheck         li_rc = ldw_update.of_Update (ab_accepttext, ab_resetflag, lpo_updaterequestor)         if li_rc &lt; 0 then Return -1         Continue       Case ListView!         llvs_update = lpo_tocheck         li_rc = llvs_update.of_Update (ab_accepttext, ab_resetflag, lpo_updaterequestor)         If li_rc &lt; 0 Then return -1         Continue       Case TreeView!         ltvsv_update = lpo_tocheck         li_rc= ltvsv_update.of_Update (ab_accepttext, ab_resetflag, lpo_updaterequestor)         if li_rc &lt; 0 Then return -1         Continue       Case DataStore!         lds_update = lpo_tocheck         li_rc= lds_update.of_Update (ab_accepttext, ab_resetflag, lpo_updaterequestor)         if li_rc &lt; 0 Then return -1         Continue       End choose     End if   end if </pre>

## 7.12 Differently behaved features

**Table 7.10: Differently behaved features**

Object	Suggestion
MDI frames	<p data-bbox="587 398 1362 432">Need modification. Refer to the detailed information below.</p> <p data-bbox="379 450 560 483">WorkspaceX</p> <p data-bbox="587 450 1342 524">Location: Of_setposition () function of pfc_w_statusbar in pfcwnsrv.pbl</p> <p data-bbox="587 542 810 575">Line Number: 72</p> <p data-bbox="587 595 919 629">Suggested Modifications:</p> <p data-bbox="587 649 1337 723">Step 1: Add the rect structure variable to the pfcwnsrv.pbl with the following format.</p> <p data-bbox="587 743 981 777">global type rect from structure</p> <p data-bbox="587 797 699 831">long left</p> <p data-bbox="587 851 695 884">long top</p> <p data-bbox="587 904 715 938">long right</p> <p data-bbox="587 958 743 992">long bottom</p> <p data-bbox="587 1012 699 1046">end type</p> <p data-bbox="587 1066 1187 1140">Step 2: Declare a local external function in the pfc_w_statusbar.</p> <p data-bbox="587 1160 1366 1234">Function long GetWindowRect (long hwnd , ref rect lpRect) Library "user32"</p> <p data-bbox="587 1254 1286 1328">Step 3: Rewrite the scripts in the Current PFC into the following:</p> <pre data-bbox="587 1348 1358 2040"> long ll_bottompos, ll_rtn, ll_TopPos, ll_LeftPos rect lr_WinRect ll_rtn = getwindowrect (handle (iw_parentwindow), lr_WinRect) ll_LeftPos = PixelsToUnits (lr_WinRect.Left, XPixelsToUnits!) ll_TopPos = PixelsToUnits (lr_WinRect.Top, YPixelsToUnits!) ll_bottompos = PixelsToUnits (lr_WinRect.bottom, YPixelsToUnits!) If ApeonGetClientType( ) = 'PB' then // The Y Position of the Status Bar is the Bottom of // the Frame Window minus the MicroHelpHeight minus // the MicroHelpBorderHeight. ll_microhelp_ypos = &amp; (iw_parentwindow.y + iw_parentwindow.height + li_ypos_extra) - &amp; (iw_parentwindow.mdi_1.microhelpheight + ii_borderheight)  // The desired X Position of the Status Bar is the // Frame Right End minus the StatusBar window. Also // subtract the extra spacing on win95. ll_desiredstatubar_xpos = &amp; </pre>

Object	Suggestion
	<pre> iw_parentwindow.x + iw_parentwindow.workspacewidth() + &amp; ii_borderwidth - (ii_winmaxwidth + 12 + li_xpos_extra)  // The Frame X Position. ll_frame_xpos = iw_parentwindow.x + (2*ii_borderwidth) + 16 if ll_desiredstatubar_xpos &lt; ll_frame_xpos then // Status Bar would extend to the left of the frame. this.move(ll_frame_xpos , ll_microhelp_ypos) // Make the Statubar the width of the frame. this.width = workspacewidth(iw_parentwindow) - (20 + li_xpos_extra) else // Normal as large as defined Status Bar window. this.move(ll_desiredstatubar_xpos , ll_microhelp_ypos) this.width = ii_winmaxwidth end if else // The Y Position of the Status Bar is the Bottom of // the Frame Window minus the MicroHelpHeight minus // the MicroHelpBorderHeight. ll_microhelp_ypos = &amp; (ll_TopPos + iw_parentwindow.height + li_ypos_extra) - &amp; (iw_parentwindow.mdi_1.microhelpheight + ii_borderheight) // The desired X Position of the Status Bar is the // Frame Right End minus the StatusBar window. // Also subtract the extra spacing on win95. ll_desiredstatubar_xpos = &amp; ll_LeftPos + iw_parentwindow.workspacewidth() + &amp; ii_borderwidth - (ii_winmaxwidth + 12 + li_xpos_extra) ll_frame_xpos = ll_LeftPos + (2*ii_borderwidth) + 16 if ll_desiredstatubar_xpos &lt; ll_frame_xpos then // Status Bar would extend to the left of the frame. this.move(ll_frame_xpos , ll_bottompos - 70) // Make the Statubar the width of the frame. this.width = iw_parentwindow.workspacewidth() - (20 + li_xpos_extra) else // Normal as large as defined Status Bar window. this.move(ll_desiredstatubar_xpos , ll_bottompos - 70) this.width = ii_winmaxwidth end if end if end if </pre>
MDI frames	<p>Resize Service</p> <p>Need modification. Refer to the detailed information below.</p> <p>Step 1: Change the wintype property for the w_examplemain object from MDI to main.</p> <p>Step 2: Modify the pfc_open event in the n_exampleappmanager of the appexmfe.pbl as shown below:</p> <p>Current scripts in PFC:</p> <pre> Open ( w_examplemain) Apeon compliant scripts in PFC </pre>

Object	Suggestion
	<pre>Open ( w_frame) opensheet(w_exemplemain, w_frame, 0, layered!)</pre> <p>Step 3: Copy the following scripts from the pfc_preopen event for the w_exemplemain object in the appxmfe.pbl to the pfc_preopen event for the w_frame object in the exmmain.pbl and then comment out the following scripts in this event.</p> <pre>// Set the frame window with the application manager. gnv_app.of_SetFrame(w_exemplemain) gnv_app.of_SetMicrohelp(true) // Enable the Status Bar Services of_SetStatusBar(true) if IsValid(inv_statusbar) then   inv_statusbar.of_SetBorderType(0)   inv_statusbar.of_SetGapWidth(40)   inv_statusbar.of_Register ('debugsrv', 'bitmap', 'dbsvc.gif', 80)   inv_statusbar.of_Register ('sqlspysrv', 'bitmap', 'sssvcoff.gif', 80)   inv_statusbar.of_Register ('debuglogwin', 'bitmap', 'dlgwnoff.gif', 80)   inv_statusbar.of_Register ('sqlspywin', 'bitmap', 'sswinoff.gif', 80)   if gnv_app.ienv_object.Win16 then     inv_statusbar.of_SetGDI(true)     inv_statusbar.of_SetUser(true)   end if   inv_statusbar.of_SetTimer(true) end if</pre>
Any	<p>ClassName</p> <p>Need modification. Refer to the detailed information below.</p> <p><b>DETAILED INFORMATION</b></p> <p>Location: Of_updatespending(powerobject) function of pfc_n_cst_luw in pfcapsrv.pbl</p> <p>Apeon Unsupported Code: If ClassName(la_rc) = 'integer' or ClassName(la_rc)='long' Then</p> <p>Line Number: 133</p> <p>Change the code to:</p> <pre>if ApeonGetClientType( ) = 'PB' then   If ClassName(la_rc) = 'integer' or ClassName(la_rc) = 'long' Then     // Functionality was found.     If la_rc &lt; 0 Then Return -1     If la_rc &gt;= 1 Then       lb_updatespending = True       If TypeOf (lpo_tocheck) = DataWindow! Then         la_rc = lpo_tocheck.Function Dynamic of_IsRoot()         If ClassName(la_rc) = 'boolean' Then           lb_updatespending = la_rc         Else           Return -1         End If       End If     End If   End If   lb_performedtest = True</pre>

Object	Suggestion
	<pre>End If else If ClassName(la_rc) = 'integer' or ClassName(la_rc) = 'long' or ClassName(la_rc) = 'number' Then If la_rc &lt; 0 Then Return -1   If la_rc &gt;= 1 Then     lb_updatespending = True   If TypeOf (lpo_tocheck) = DataWindow! Then     la_rc = lpo_tocheck.Dynamic of_IsRoot()     If ClassName(la_rc) = 'boolean' then       lb_updatespending = la_rc     else       Return -1     End if   End If End If lb_performedtest = True End If end if</pre>



## 8 Migration Tutorial

### 8.1 Introduction

This tutorial is a series of five exercises in which you convert and deploy the Apeon tutorial PowerBuilder application to the Web. By following the tutorial, you will get hands-on experience in Web migration using Apeon for PowerBuilder.

The Apeon tutorial PowerBuilder application is a small program involving database interaction. The application is used in the tutorial as the target PowerBuilder application to be worked on for a complete Web migration.

This tutorial is a simplified and practical example of the Apeon Web migration methodology laid out in [Chapter 3, Migration Process](#). It can serve as a starting point for any developer who wants to convert their existing PowerBuilder applications. After the successful migration of the tutorial application, you can try to convert more complex, real PowerBuilder applications into a more complicated network environment.

How you will proceed:

Lesson 1	Load the Apeon tutorial application into PowerBuilder.
Lesson 2	Configure Apeon Developer.
Lesson 3	Analyze the tutorial application for unsupported features.
Lesson 4	Deploy the tutorial application to the Web.
Lesson 5	Run the Web application.

What you will learn:

Lesson 1	How to create a PowerBuilder workspace, load application PBL files, set up an ODBC data source, and run the application from the PowerBuilder IDE.
Lesson 2	Add the application profile, the Apeon Server profile, the Web server profile, the deployment profile, the data source profile, and the transaction object mapping in the Apeon Developer Configuration Wizard.
Lesson 3	Perform unsupported feature analysis, perform a Full build, and optimize the tutorial application.
Lesson 4	Deploy the tutorial application to the Web using the Apeon Deployment Wizard.
Lesson 5	Run the deployed Web application in the Web browser.

How long it will take:

You can complete the entire tutorial in ninety minutes. Each lesson has also been designed so that you can stop after any lesson and continue at another time.

#### 8.1.1 Preparing for the tutorial

The following preparations are required before starting this tutorial:

- Set up one Workstation.

This tutorial assumes the most simplified network environment. Only one physical machine is used for all the different roles in the n-Tier Web architecture: Client PC, Web Server, Application Server, Database Server, and Developer PC.

Refer to Installation Guide for .NET for specific system requirements.

- Install other required softwares:

Windows Server 2008 SP2, Windows Server 2008 R2, Windows Server 2012, Windows 7, or Windows 8/8.1

SAP PowerBuilder 9.0, 10.2, 10.5, 11.2, 11.5, 12.0, 12.5, or 12.6

Internet Explorer 8.0 or later, Microsoft Edge, Google Chrome, Mozilla FireFox, or Opera.

Microsoft .NET Framework 4.x & IIS 6.0, 7.0, 7.5, or 8.0

Note:

1. IIS is included with Windows, but not installed by default, you will need to install IIS first.
  2. IIS will be used as both the application server and the Web server in this tutorial.
  3. If Apeon Server is installed to the other application servers (such as WebLogic, WebSphere, JBoss, or JEUS), you can still follow the steps in this tutorial for configuring and deploying the Apeon tutorial application while paying close attention to the parts specified as working differently for different application servers.
- Install Apeon for PowerBuilder (on .NET) edition

Install Apeon Server and Apeon Developer components. The demo application that the tutorial uses will be automatically installed during the Apeon Developer installation.

If you intend to install Apeon Server and Apeon Developer on different machines, most of the instructions in this tutorial, with the exception of some settings associated with Apeon Server, such as Apeon Server profile and data sources, will still be relevant. For instructions, refer to the Apeon Developer User Guide.

### 8.1.2 Relevant files

The tutorial will use the following files:

File Name	appeontutor.pbl	appeontutor.db
Location	\appeondemo\Tutorial (e.g. C:\Users\Public\Documents\Apeon\Developer2016\ApeonDemo\Tutorial)	
Description	The PowerBuilder Library (application source code) used in the tutorial.	The SAP ASA/SQL Anywhere database file used for the tutorial application.

## 8.2 Loading the Tutorial PowerBuilder Application

This tutorial starts with two files: *appeontutor.pbl* and *appeontutor.db*. The *appeontutor.pbl* file contains the source code for the Apeon tutorial PowerBuilder application. First, follow the instructions to make the tutorial application run in PowerBuilder.

In this section, you will learn how to:

- [Create a new PowerBuilder Workspace](#)
- [Load the tutorial PBLs into the Workspace](#)
- [Configure the ODBC data source for the tutorial application](#)
- [Run the tutorial application](#)

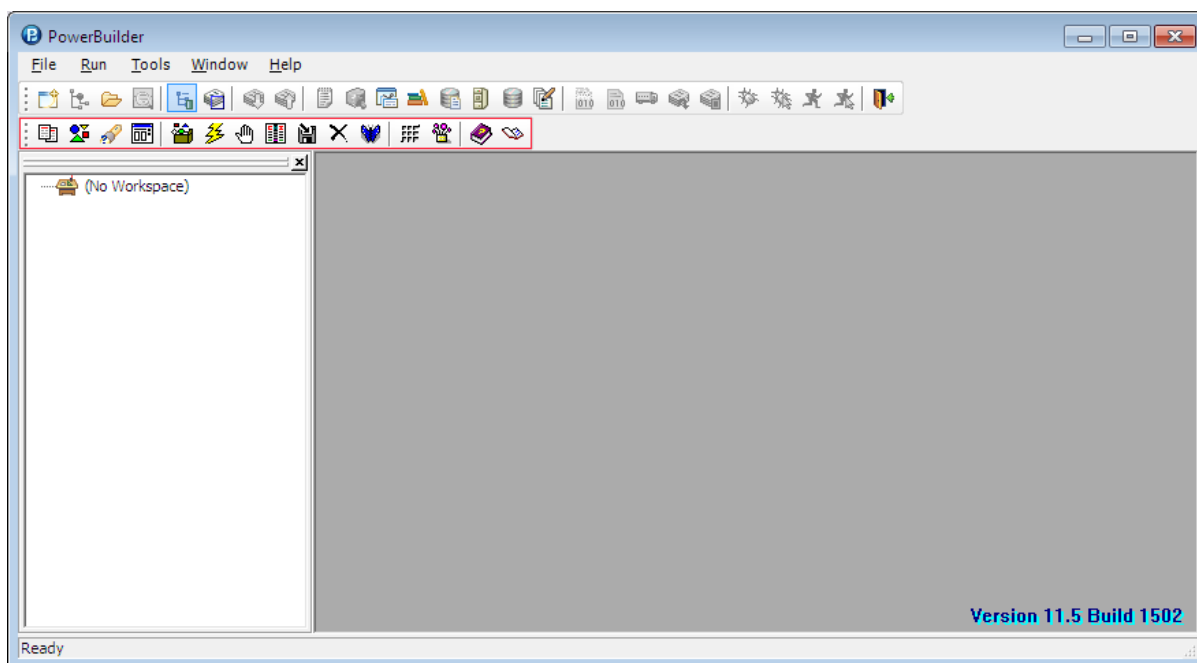
### 8.2.1 Creating a Workspace

You can have only one PowerBuilder Workspace open at a time, but you can add as many targets or applications to the Workspace as you want, including opening and editing objects in multiple targets.

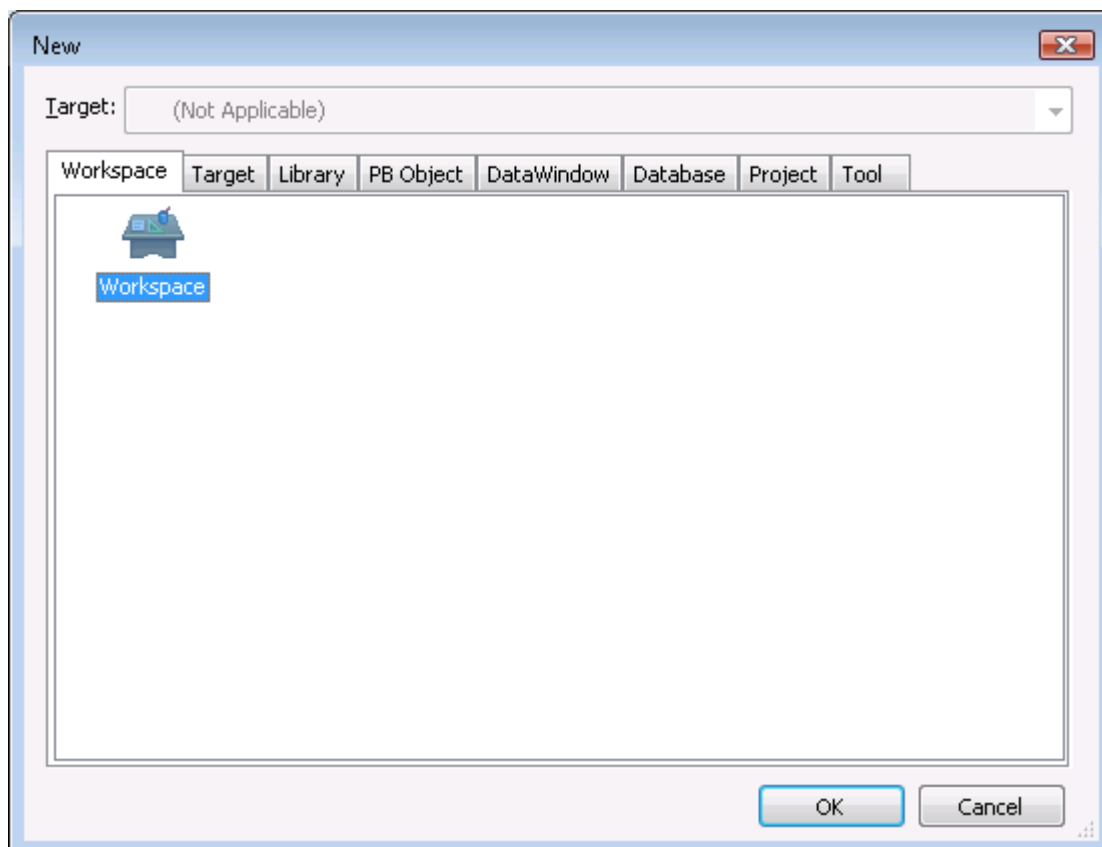
To create a new Workspace for the Apeon tutorial PowerBuilder application:

Step 1: Start PowerBuilder. The PowerBuilder IDE starts with the Apeon Developer toolbar loaded.

**Figure 8.1: Apeon Developer tool bar loaded into PowerBuilder**



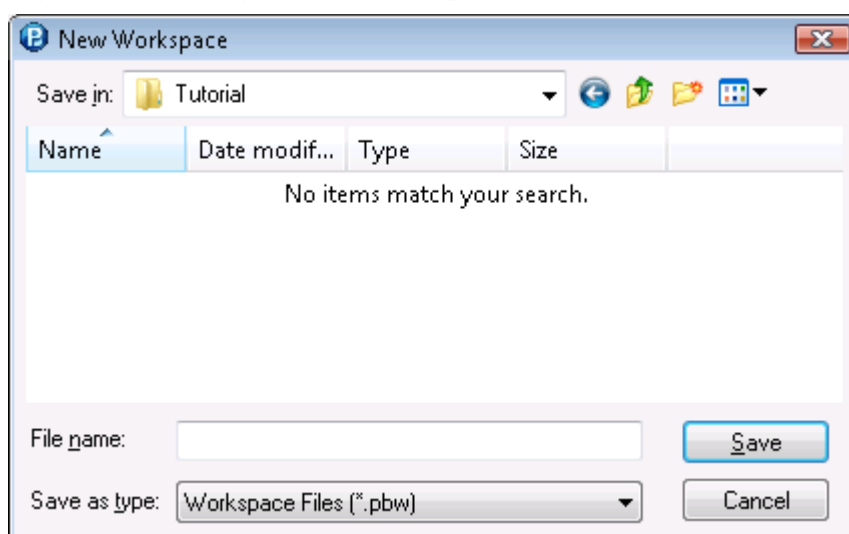
Step 2: Select **File** > **New** from the PowerBuilder menu bar, and the New dialog box appears.

**Figure 8.2: Adding a new Workspace**

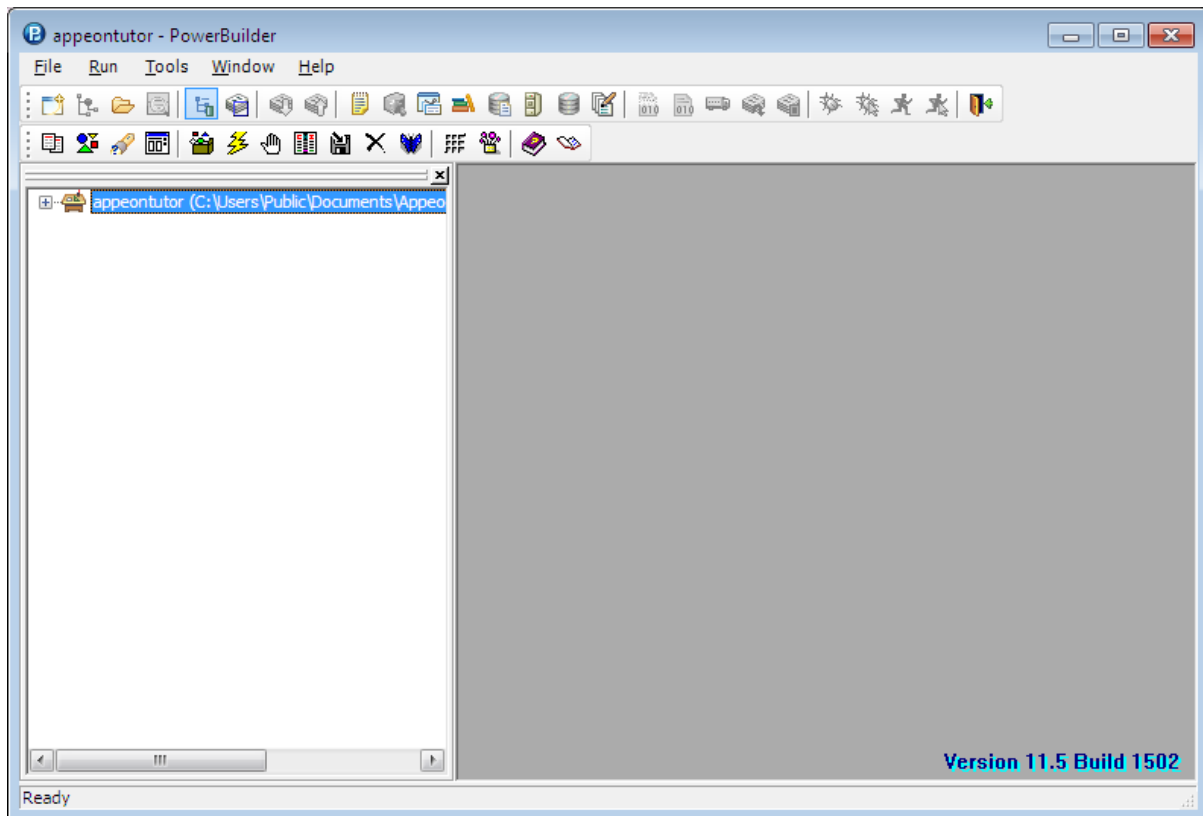
Step 3: Select the **Workspace** icon in the **Workspace** tab and click **OK**.

The New Workspace dialog box displays. Navigate to the %Apeon% \Developer2016\apeondemo\Tutorial folder, for example, C:\Users\Public\Documents \Apeon\Developer2016\ApeonDemo\Tutorial.

Type *apeontutor* in the **File name** text box and click **Save**.

**Figure 8.3: Naming the new Workspace**

The *apeontutor* workspace has been added and appears as the top item in the PowerBuilder system tree.

**Figure 8.4: Newly created Workspace**

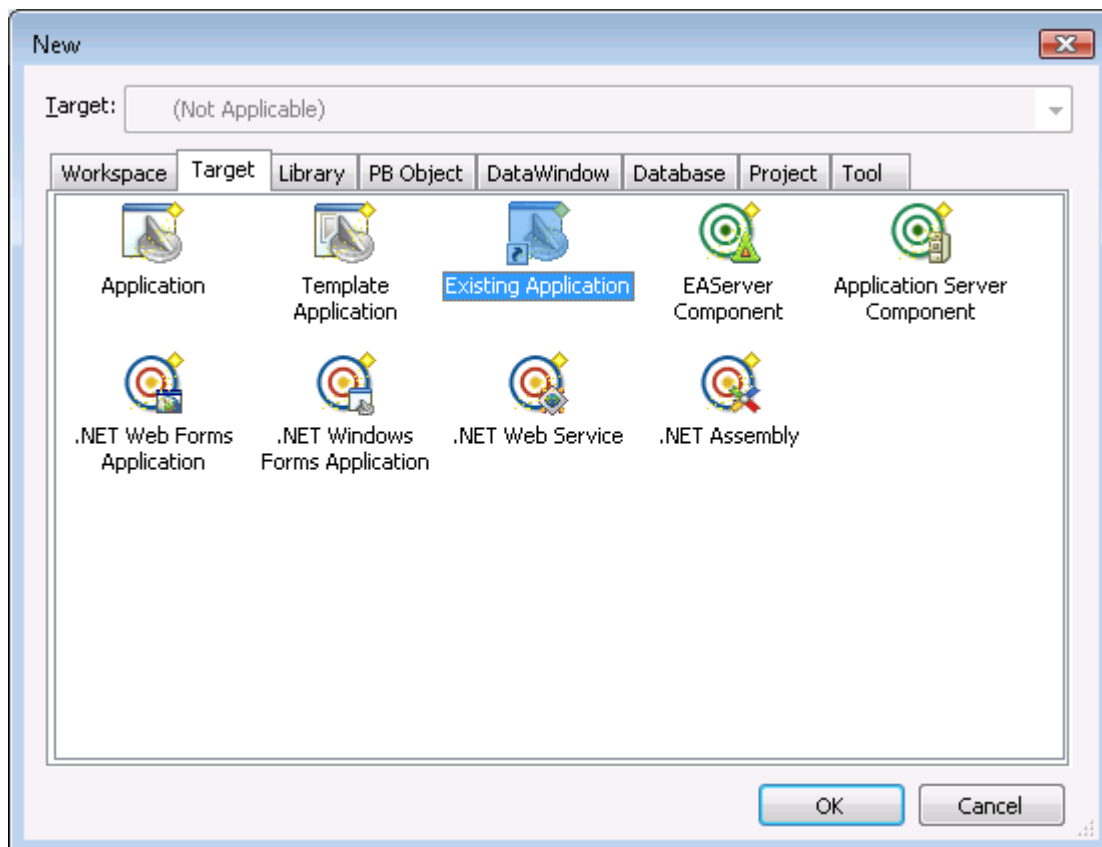
### 8.2.2 Loading the tutorial PBL file

A PowerBuilder Library (\*.pbl file) is a collection of compiled object definitions and source objects (including scripts) stored in the same location. The PowerBuilder painters and wizards store various objects in libraries, such as Applications, Windows, DataWindows, Menus, Functions, Structures, and User Objects.

Now load the PBL file of the Appeon tutorial application into the newly created Workspace:

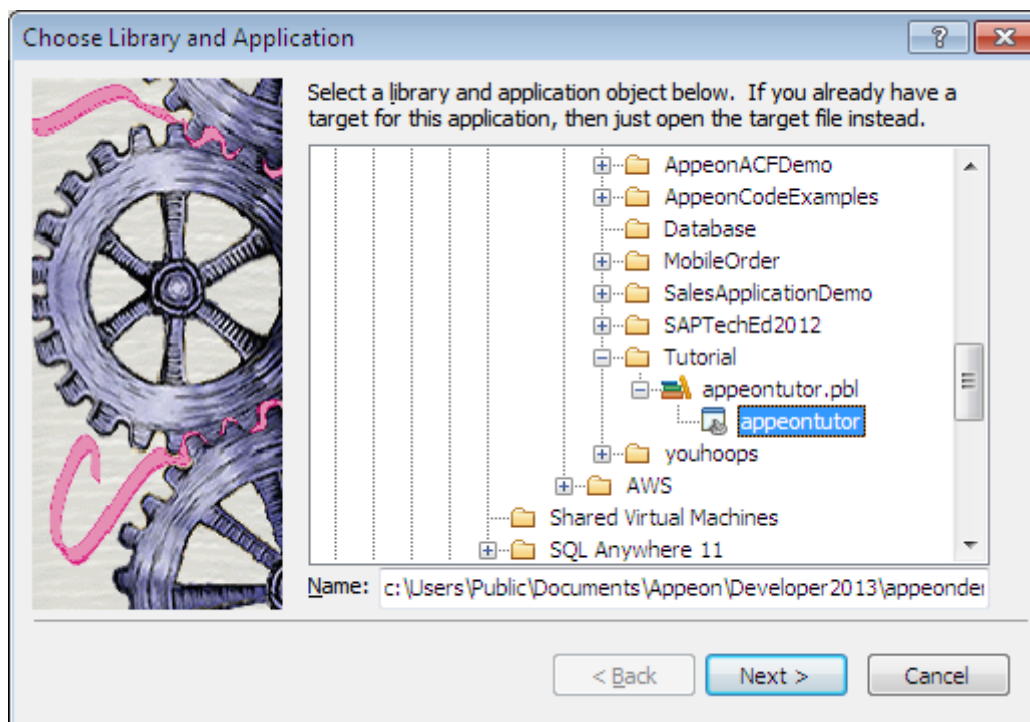
Step 1: Select **File** > **New** from PowerBuilder menu bar, and the New dialog box appears.

Click the **Target** tab if it is not already selected.

**Figure 8.5: Target tab**

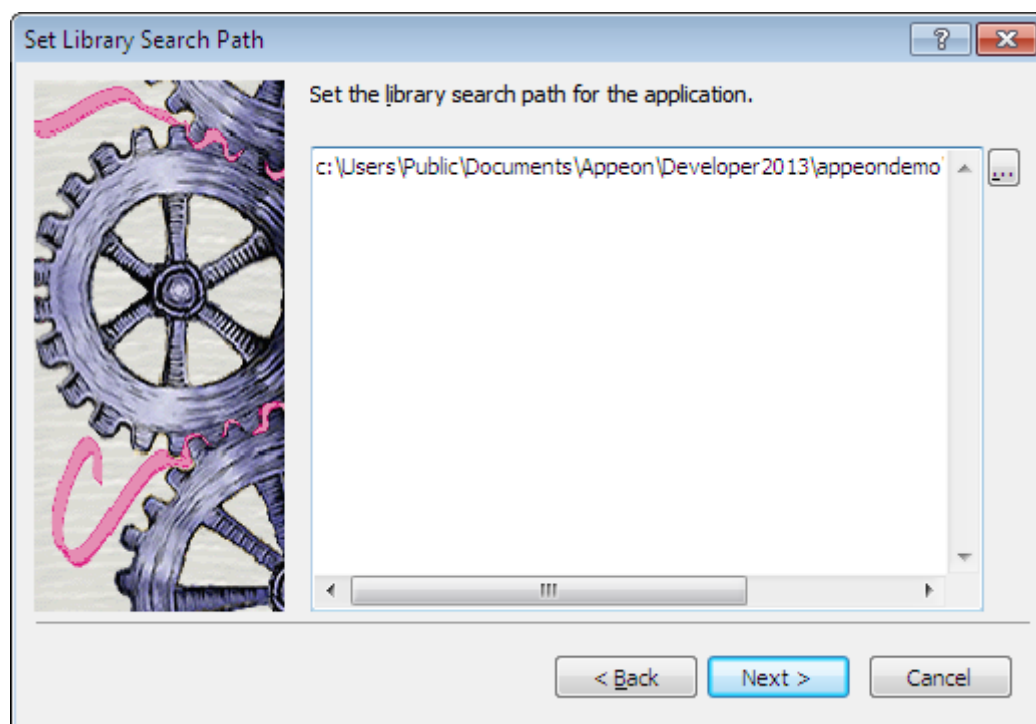
Step 2: Select the **Existing Application** icon and click **OK**. Now the Choose Library and Application dialog box is displayed.

Select the *appeontutor* application under the *appeontutor.pbl*, and click **Next**.

**Figure 8.6: Choose Library and Application**

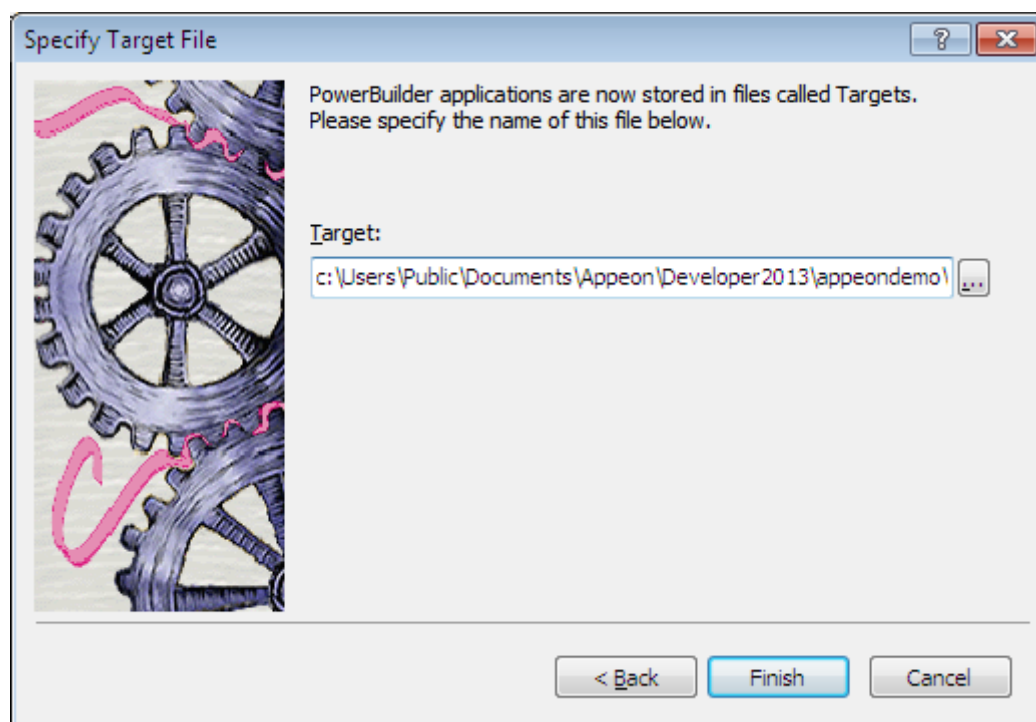
Step 3: Click **Next** in the **Set Library Search Path** dialog box.

**Figure 8.7: Set Library Search Path**

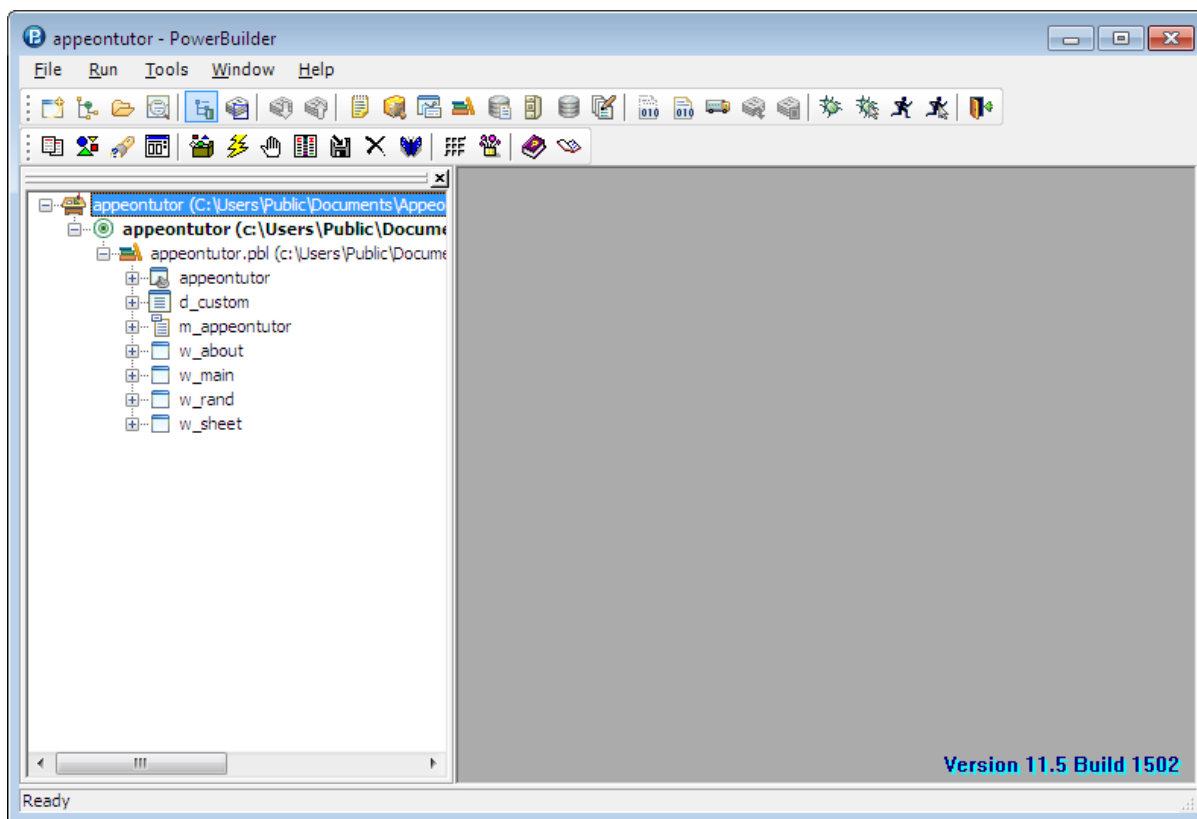


Step 4: Click **Finish** in the **Specify Target File** dialog box.

**Figure 8.8: Specify Target File**



Step 5: The Appeon tutorial PowerBuilder application has now been added to the *appeontutor* Workspace and is displayed in the system tree.

**Figure 8.9: Newly added "appeontutor" Workspace**

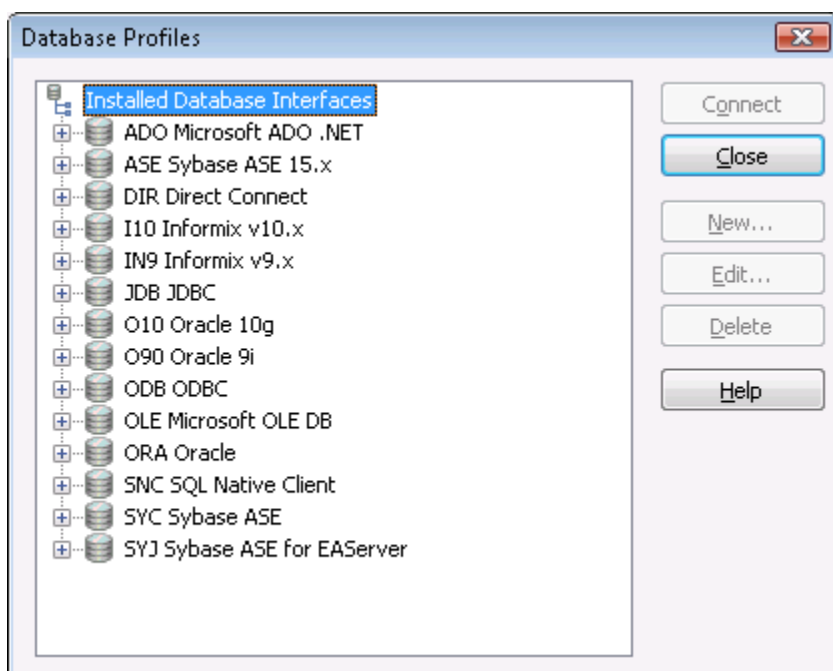
### 8.2.3 Configuring ODBC data source

An ODBC data source stores the parameters used to connect to the indicated data provider through the Open Database Connectivity interface. By setting up the ODBC data source that identifies the SAP ASA/SQL Anywhere database file for the Apeon tutorial PowerBuilder application, the tutorial application is able to establish a connection with the SAP ASA/SQL Anywhere database through a reference to the ODBC data source name.

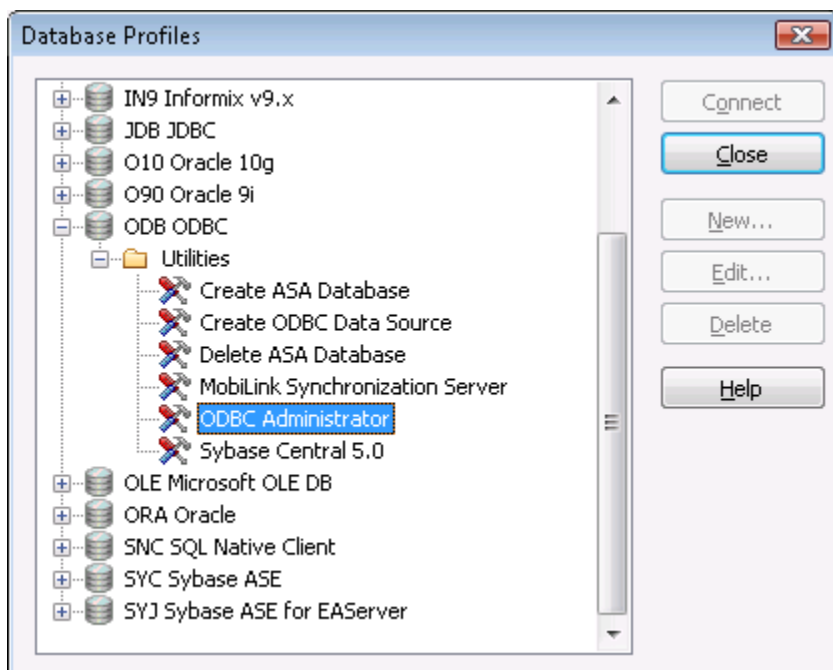
To set up the ODBC data source for the tutorial application:

Step 1: Select **Tools > Database Profile** from the PowerBuilder menu bar, and the Database Profiles dialog box displays.

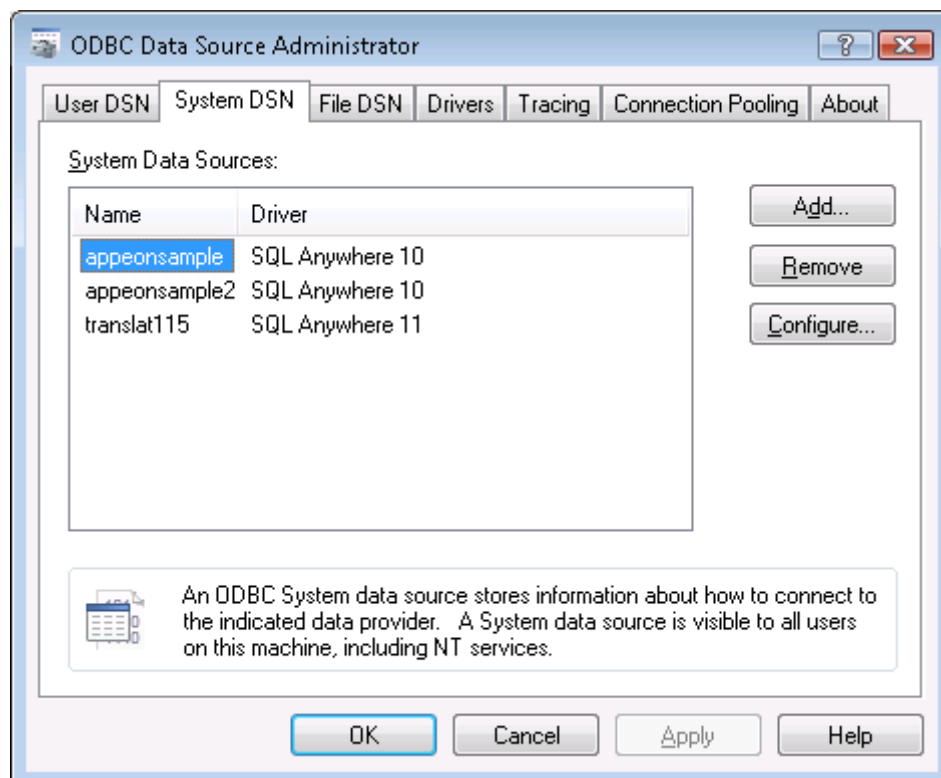


**Figure 8.10: Database Profiles**

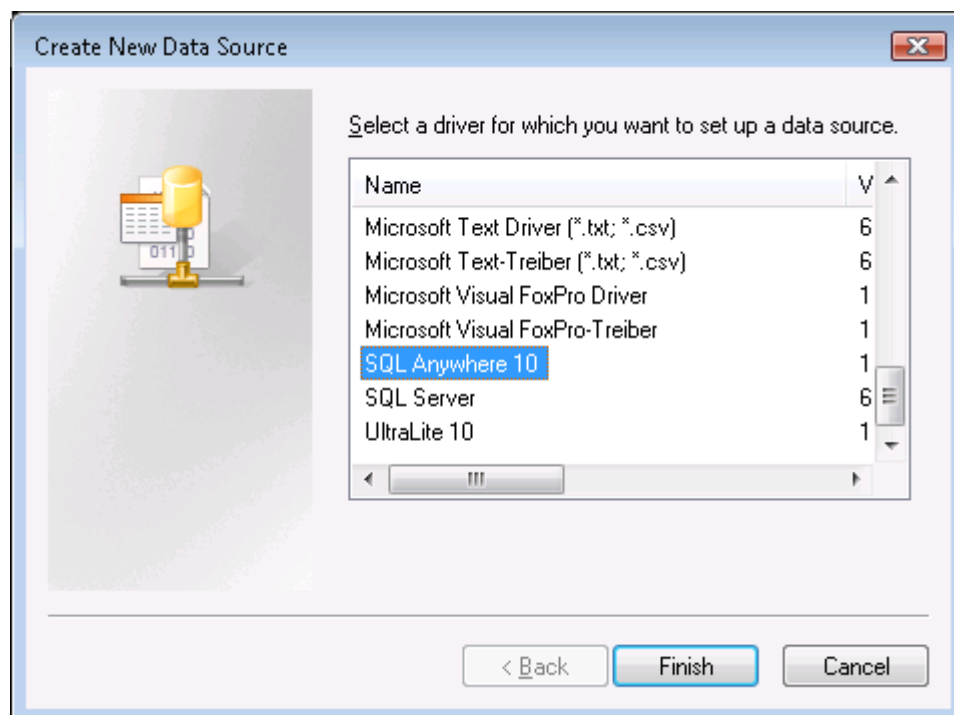
Step 2: Choose **ODB ODBC > Utilities**, and then double click **ODBC Administrator**.

**Figure 8.11: Database Profiles**

Step 3: Select the **System DSN** tab in the **ODBC Data Source Administrator** dialog box and click **Add**.

**Figure 8.12: ODBC Data Source Administrator**

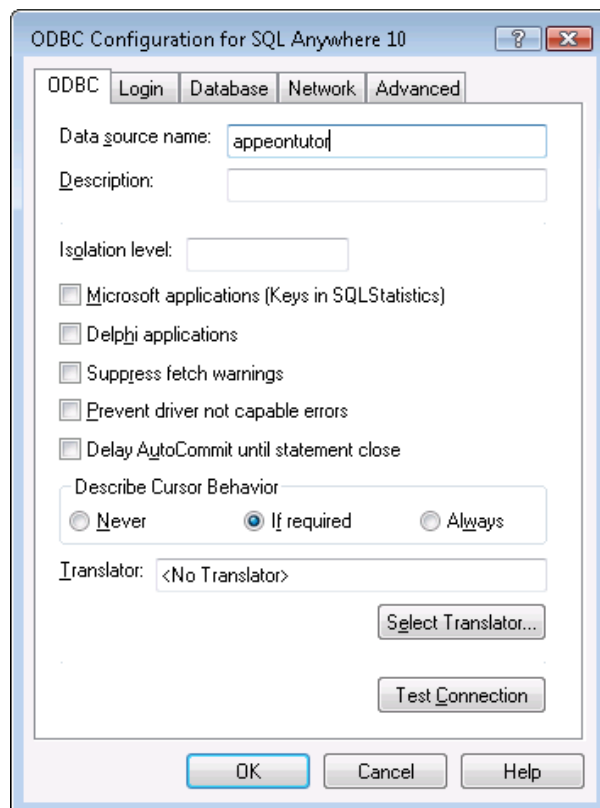
Step 4: Select the **SQL Anywhere 10** driver to connect to the *apeontutor.db* database file. Select **SQLAnywhere 10** and click **Finish** in the **Create New Data Source** dialog box.

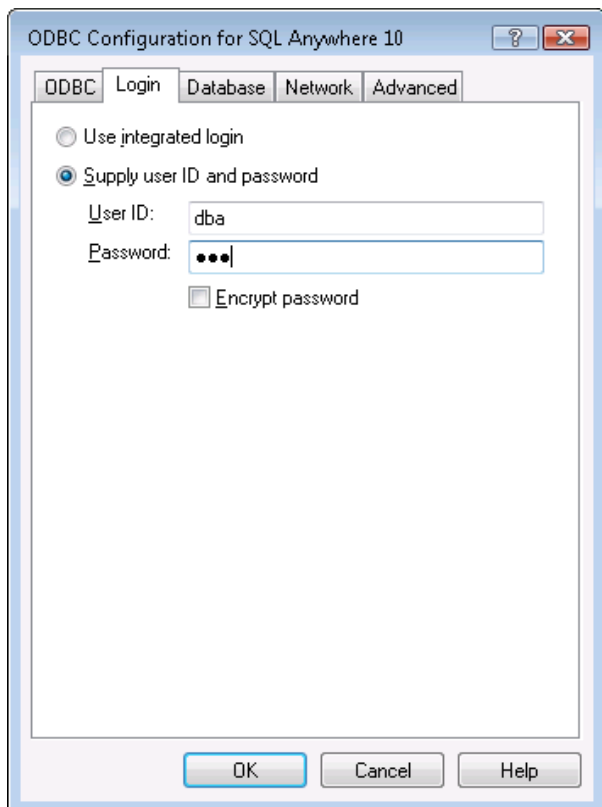
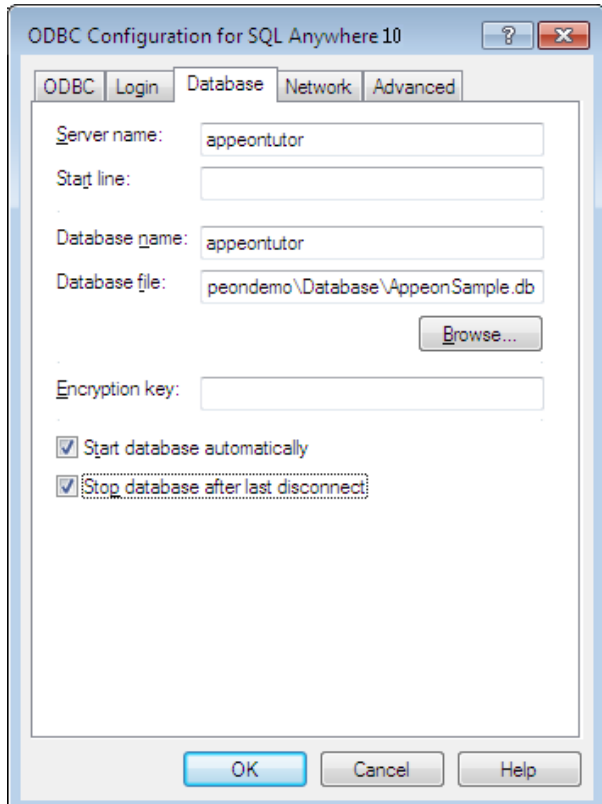
**Figure 8.13: Create a Data Source**

Step 5: The ODBC Configuration for SQL Anywhere dialog box is displayed. Type the necessary settings into the different tabs as specified in the following table, and leave other fields at their default settings.

**Table 8.1: Data source settings**

In this tab...	In this field...	You should...
ODBC	Data source name	Type <i>appeontutor</i>
Login	User ID	Type <i>dba</i> (case sensitive)
	Password	Type <i>sql</i> (case sensitive)
Database	Server name	Type <i>appeontutor</i>
	Database name	Type <i>appeontutor</i>
	Database file	Click <b>Browse</b> to select the <i>AppeonSample.db</i> file. For example, C:\Users\Public\Documents\Apeon\Developer2016\appeondemo\Database\AppeonSample.db.

**Figure 8.14: ODBC tab**

**Figure 8.15: Login tab****Figure 8.16: Database tab**

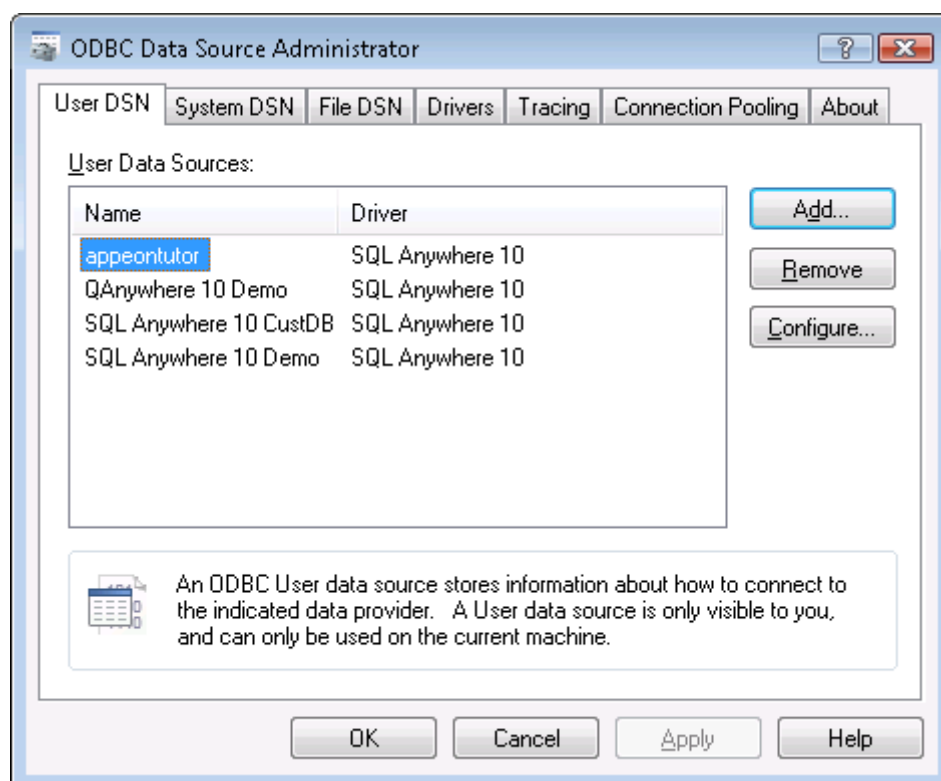
Step 6: Go back to the **ODBC** tab and click **Test Connection**. Ensure the connection test is successful before continuing.

Step 7: Click **OK** to close the ODBC Configuration for SQL Anywhere dialog box.

The *appeontutor* is added as a system data source under the System DSN tab.

Step 8: Click **OK** to close the dialog box and click **Close** to exit the Database Profiles dialog box.

**Figure 8.17: ODBC Data Source Administrator**

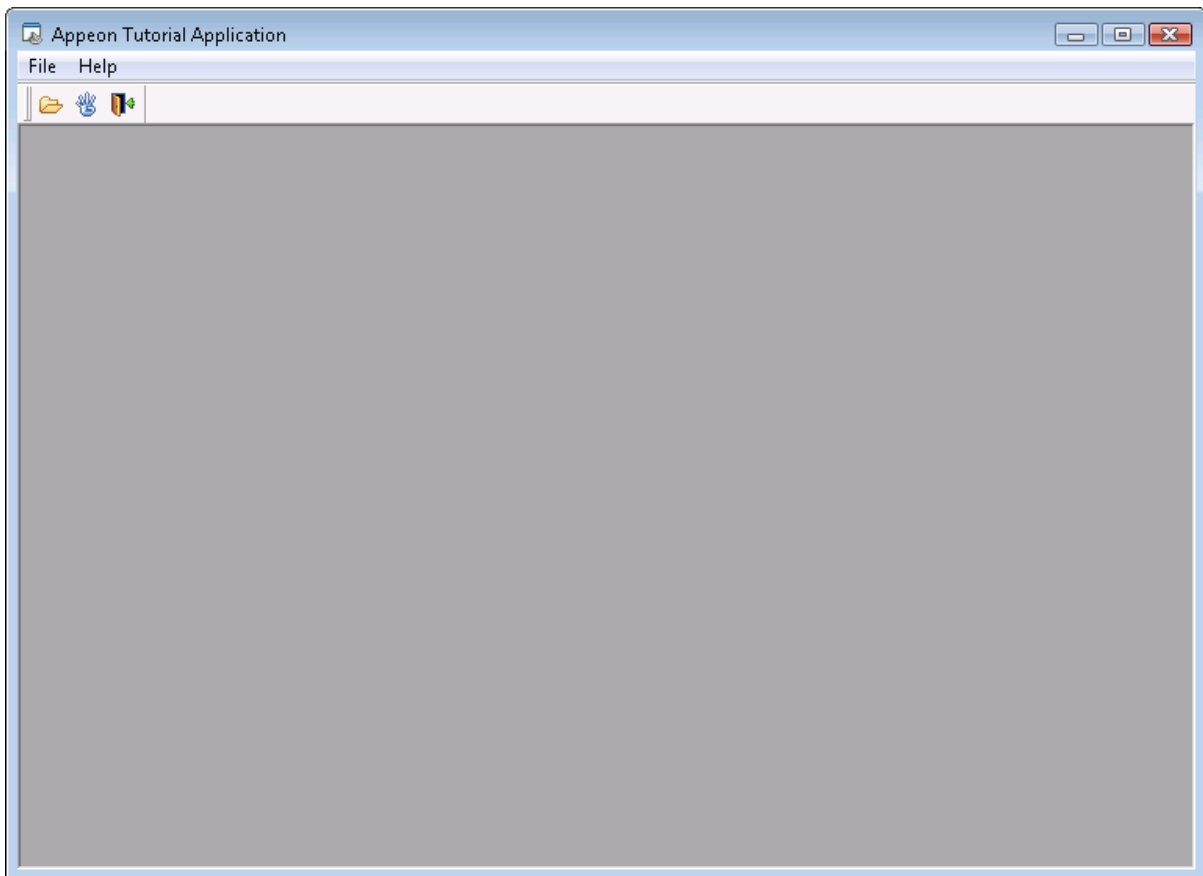


## 8.2.4 Running the tutorial application

The database connection parameters (PowerBuilder Transaction properties) have been preset in the tutorial PowerBuilder application that will connect to the data source named *appeontutor*. You can run the tutorial application in PowerBuilder now.

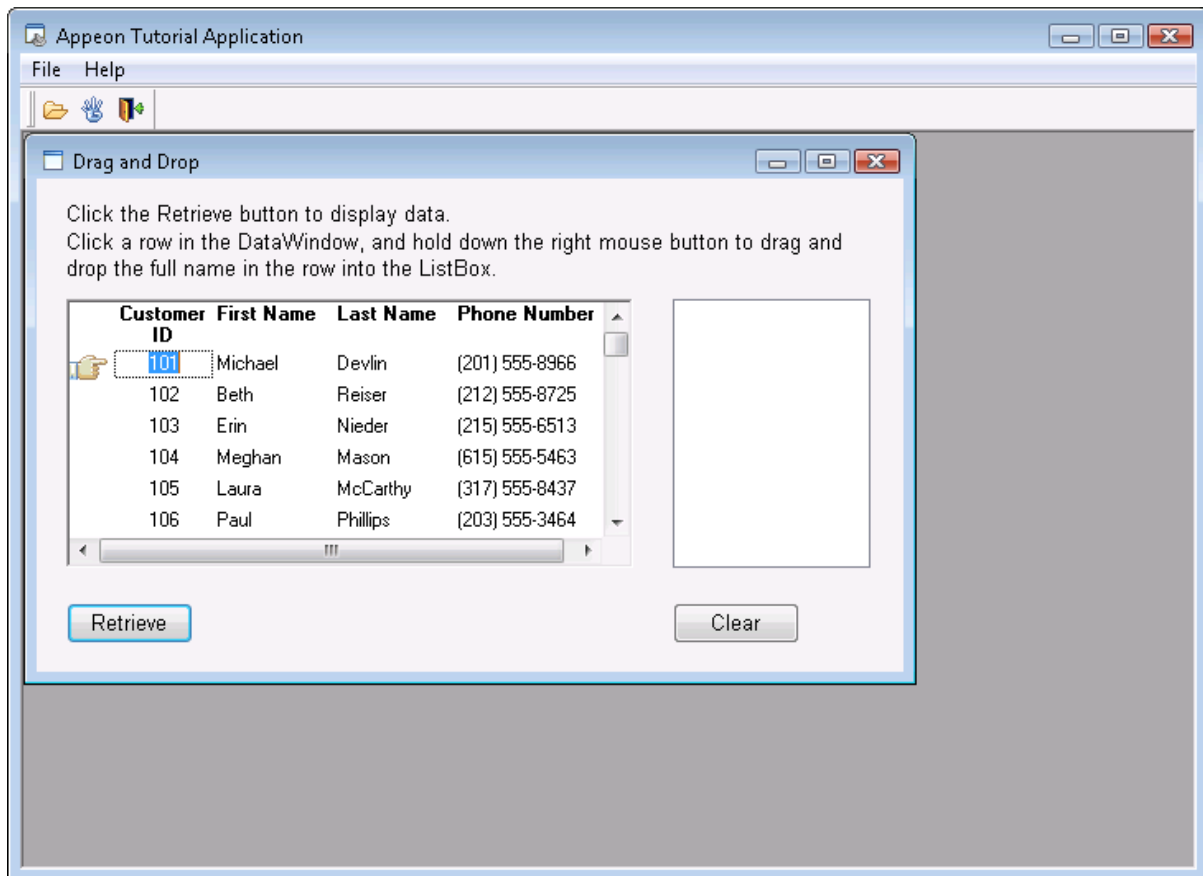
To run the Apeon tutorial PowerBuilder application:

Step 1: In the PowerBuilder IDE, choose **Run > Run appeontutor** from the PowerBuilder menu bar, or click the **Run** icon in PowerBar1. The Apeon tutorial PowerBuilder application starts.

**Figure 8.18: Appeon Tutorial Application**

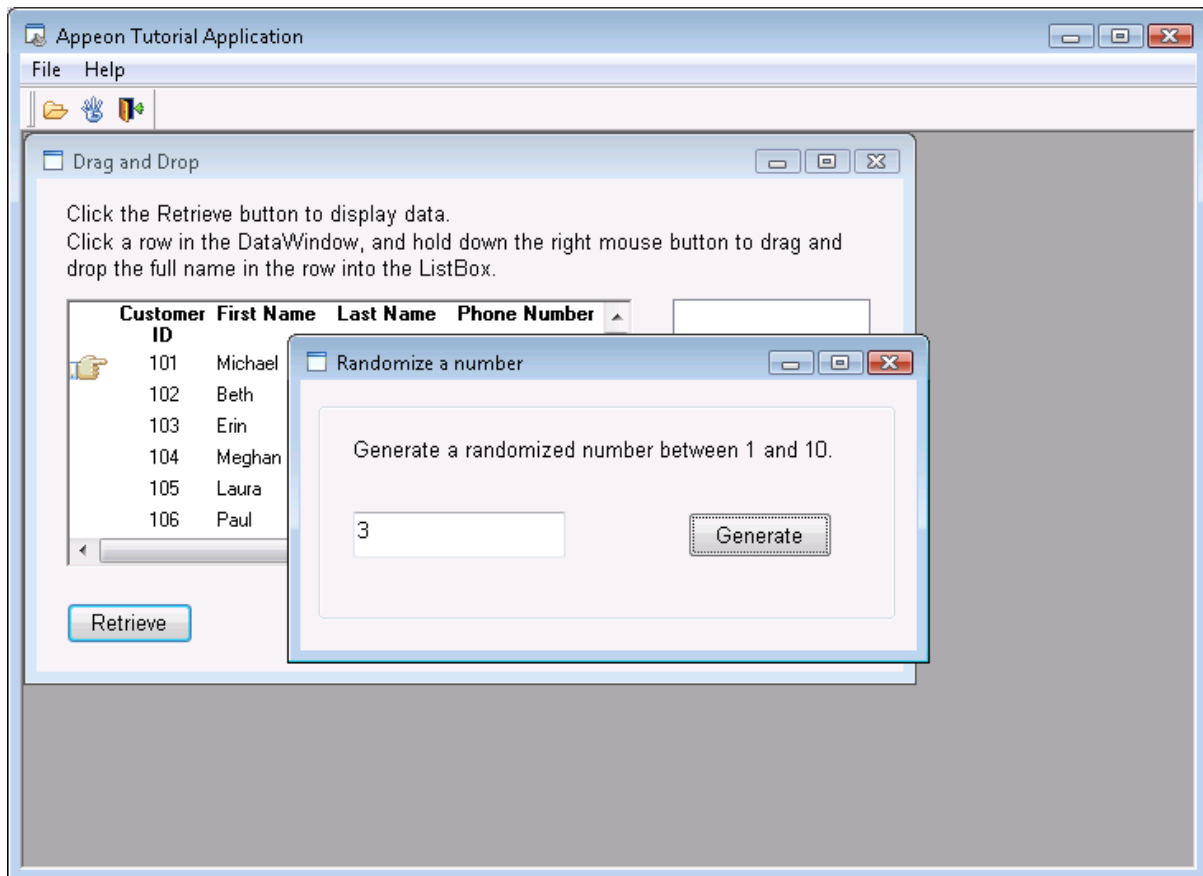
Step 2: In the Appeon Tutorial Application, select **File > Drag and Drop** to open the Drag and Drop window.

The Appeon tutorial PowerBuilder application has an MDI window, two sheet windows, and an About window. In the Drag and Drop window, click the **Retrieve** button to display data. Click a row in the DataWindow and hold down the right mouse button to drag and drop the full name in the row into the right ListBox. Click the **Clear** button to reset the ListBox.

**Figure 8.19: Drag and Drop**

Step 3: Select **File > Randomize** to open the Randomize a number window.

This window uses the PowerBuilder *Randomize* and *Rand* functions to randomly generate an integer between 1 and 10, and display it in a window.

**Figure 8.20: Randomize a number**

Step 4: Close the tutorial application, and return to the PowerBuilder IDE.

### 8.3 Configuring Apeon Developer

Apeon Developer, a component of Apeon for PowerBuilder, extends the capabilities of PowerBuilder, allowing a new or existing PowerBuilder application to be converted into a *bona fide* Web Application, using only PowerBuilder skills.

Apeon Developer provides a set of tools that enable the entire PowerBuilder-to-Web process to take place within the PowerBuilder IDE. These tools are accessed via a toolbar in the PowerBuilder IDE. The Apeon Developer toolbar automatically loads each time PowerBuilder is opened.


**Figure 8.21: Apeon Developer toolbar**

The Apeon tutorial PowerBuilder application should run through the following configuration tasks before Apeon Developer can automate the task of Web conversion and deployment of the tutorial application.

- [Configuring basic settings](#)

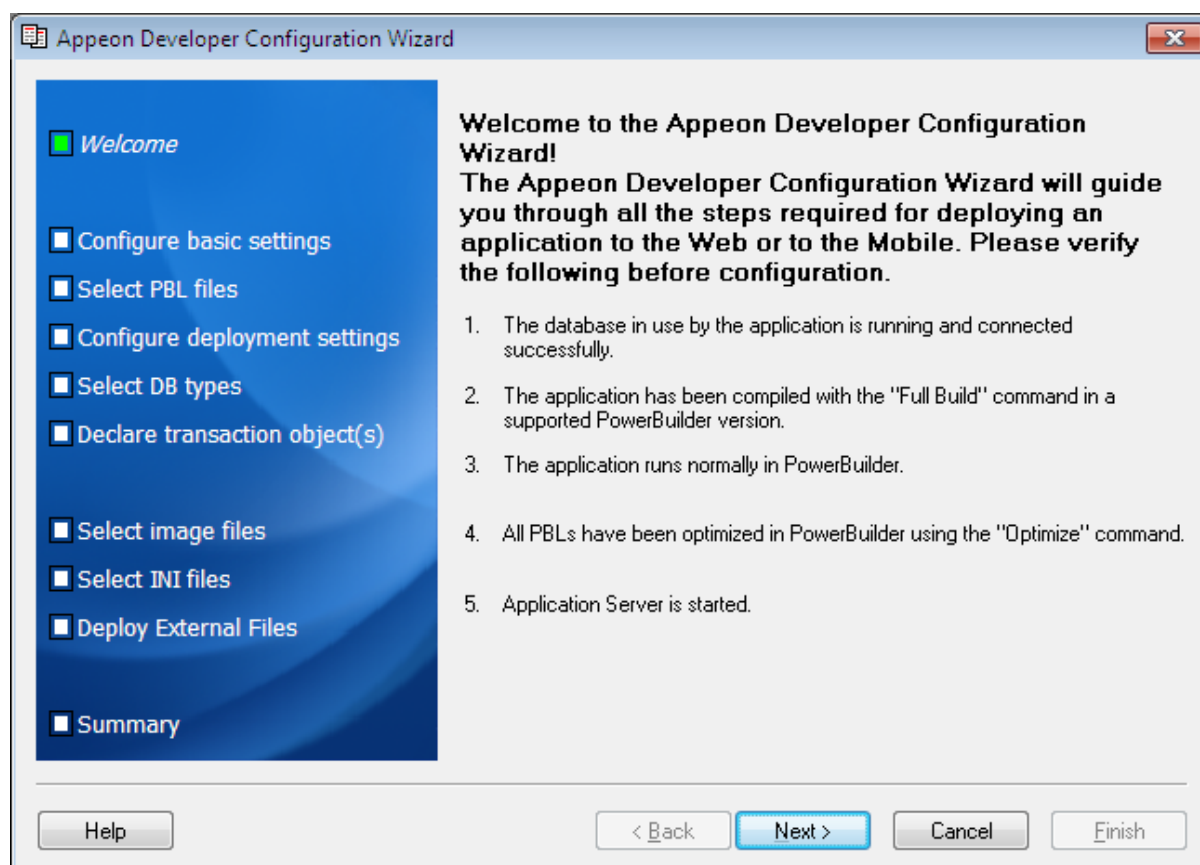


- [Selecting PBL file\(s\)](#)
- [Configuring deployment settings](#)
- [Selecting DB Type\(s\)](#)
- [Declaring transaction object\(s\)](#)

All these configuration tasks can be completed within the Apeon Developer Configuration Wizard. To access this wizard, click the **Config Wizard** button (  ) on the Apeon Developer toolbar.

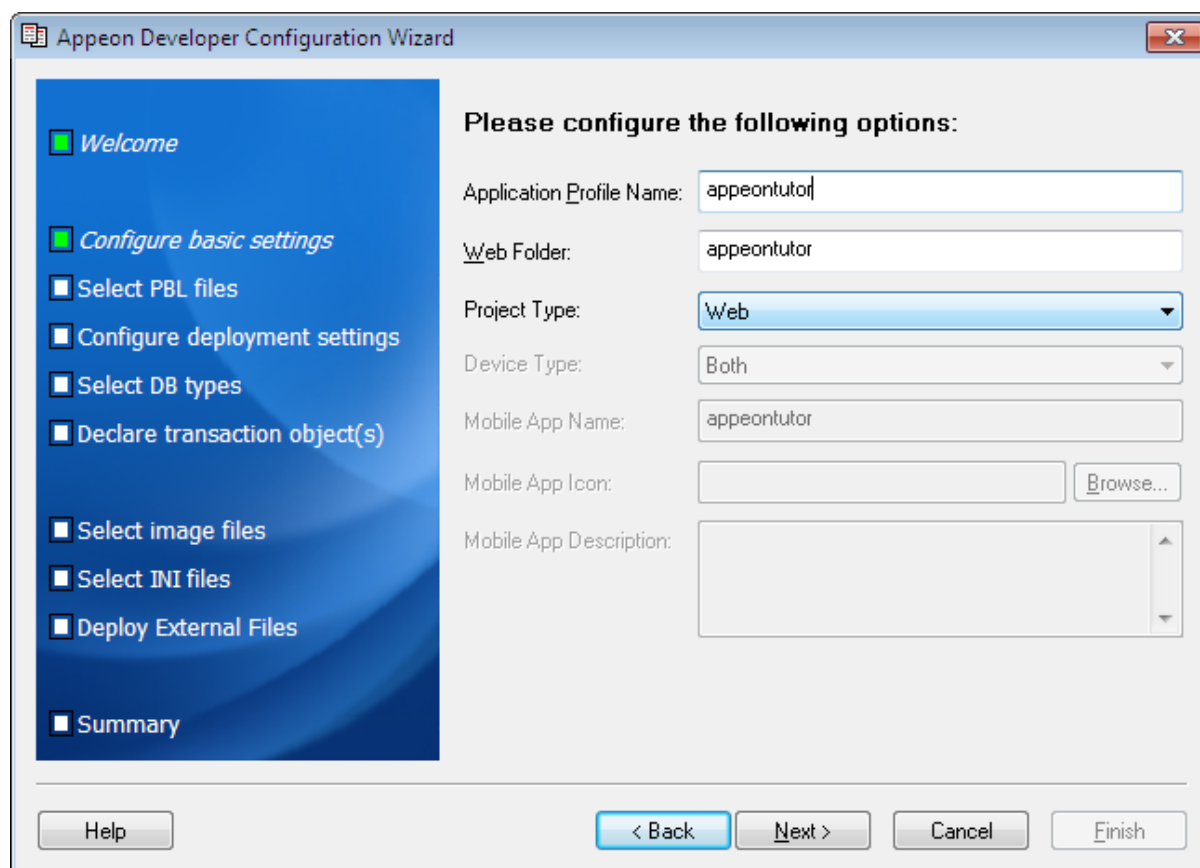
Read the requirements on the Welcome screen and click **Next** to proceed.

**Figure 8.22: Welcome page**



### 8.3.1 Configuring basic settings

The basic settings refers to the settings of an application that are essential for deployment, including the application profile name, Web folder, and project type.

**Figure 8.23: Configure basic settings window**

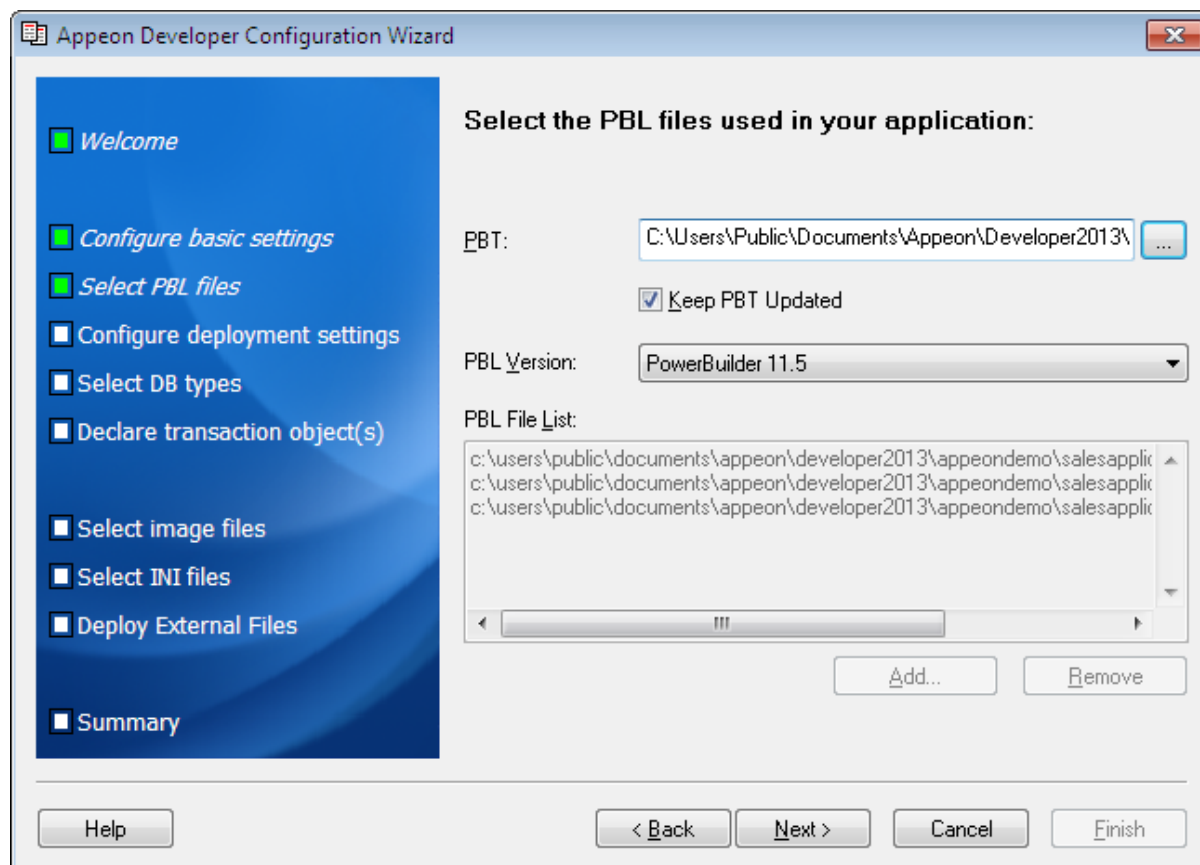
Step 1: Specify the settings as follows:

- In the **Application Profile Name** field, input *appeontutor*.
- In the **Web Folder** field, input *appeontutor* (This field is automatically filled with what you enter in the **Application Profile Name** field, so you may just need to check it.).
- Select **Web** from the **Project Type** dropdown list box.

Step 2: Click **Next** to proceed.

### 8.3.2 Selecting PBL file(s)

Specify the version and the location of source code of the PowerBuilder application.

**Figure 8.24: Select PBLs**

Step 1: Verify that *apeontutor.pbt* is currently selected in the PBT field. Or click the browse (...) button to select the *apeontutor.pbt* file.

When the *apeontutor.pbt* file is selected, the *apeontutor* PBL file is automatically added to the PBL File List.

Step 2: Check the **Keep PBT Updated** checkbox.

Step 3: Choose a PowerBuilder version from the **PBL Version** dropdown list box.

Step 4: Click **Next** to proceed.

### 8.3.3 Configuring deployment settings

The deployment settings associate the Apeon Server(s) and Web server(s) as a group used for application deployment. In this tutorial, the deployment profile will associate *Apeon Server Tutor* and *Web Server Tutor*.

In this section, you will learn:

- [Starting Apeon Server and Web server](#)
- [Adding an Apeon Server profile](#)
- [Adding a Web server profile](#)
- [Selecting a deployment profile](#)

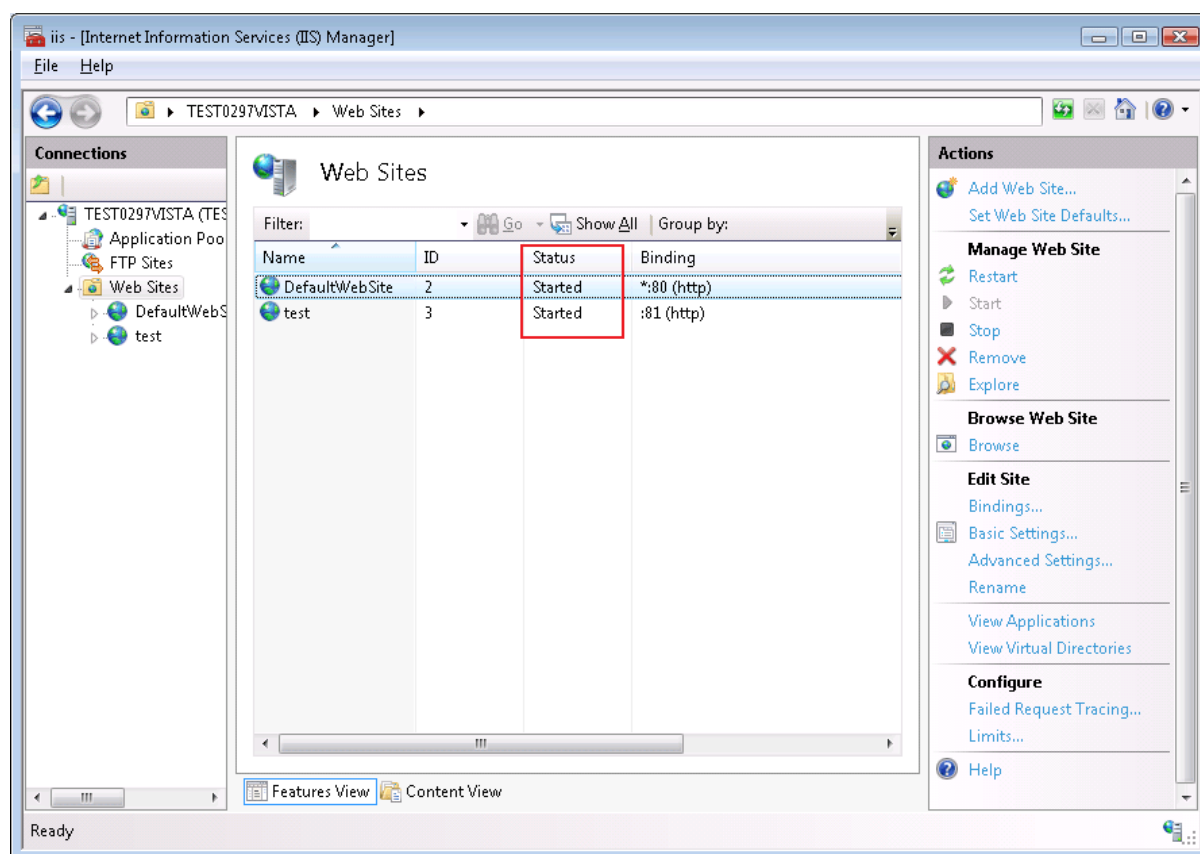
### 8.3.3.1 Starting Apeon Server and Web server

When adding the Apeon Server profile and Web server profile, you need to verify the connection to the Apeon Server and the Web server; therefore, you should start them before configuration. If you want to start Apeon Server installed to EAServer, WebLogic, WebSphere, JBoss, or JEUS, refer to Installation Guide for .NET for detailed instructions. In this tutorial, IIS will be used as both the Apeon Server and the Web server. Therefore, you only need to start IIS. Refer to the following steps for how to start the IIS/Apeon Server.

Select Windows **Start > Programs > Apeon for PowerBuilder 2016 > Apeon Server for .NET > IIS Manager**.

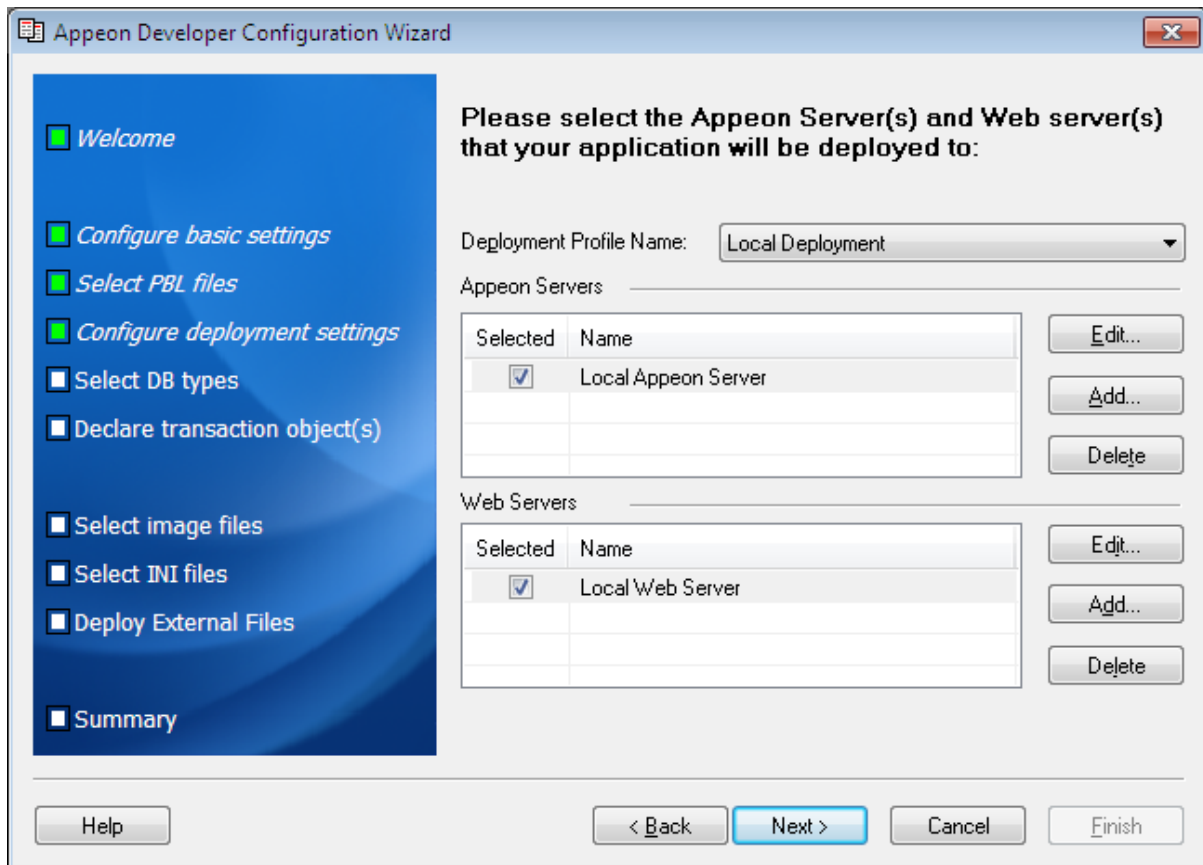
Make sure that the Web Site where Apeon Server is installed is started, as shown in the following figure. If not, please select the name listed on the **Web Site** page and click **Start** on the Actions pane to start it. If it is started, the Start menu will be grayed out. The following figure indicates that Apeon Server and Web server are ready for use.

**Figure 8.25: IIS/Apeon Server**



### 8.3.3.2 Adding an Apeon Server profile

Each Apeon Server profile contains settings of an Apeon Server/application server used by the Apeon deployment.

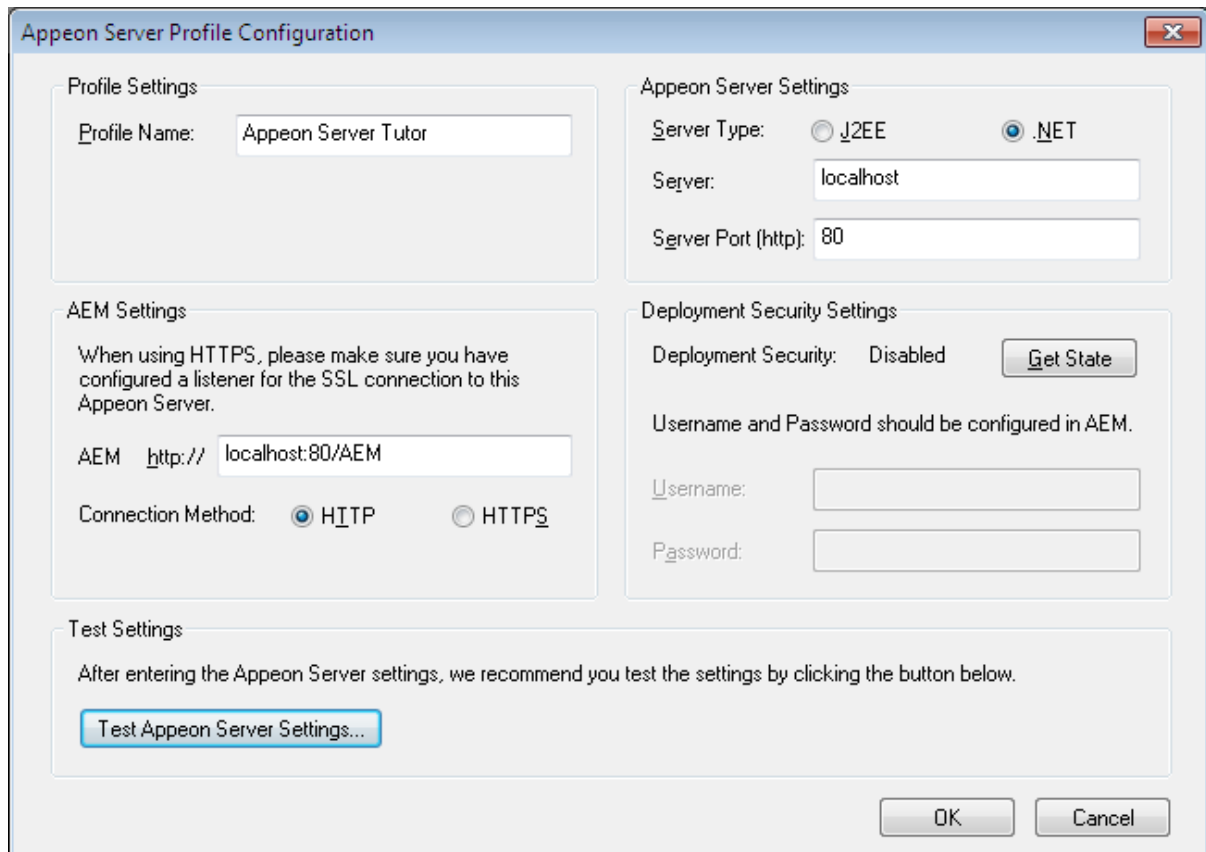
**Figure 8.26: Apeon Server profile**

To add the Apeon Server profile for the deployment of the tutorial application:

Step 1: Click the **Add** button in the **Apeon Servers** group box.

The Apeon Server Profile Configuration dialog box appears.

**Figure 8.27: Appeon Server Profile Configuration**



The following table lists instructions for how to specify the properties for an Appeon Server profile.

**Table 8.2: Instructions for creating an Appeon Server profile**

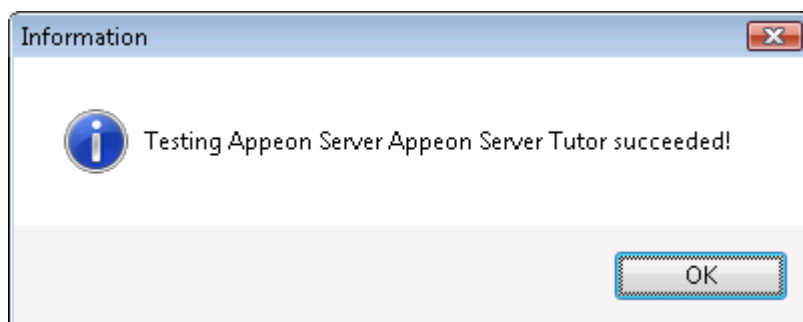
Property	Instructions
Profile Name	Input "AppeonServerTutor" as the name of the Appeon Server profile.
Server	Input "localhost". To deploy to a remote Appeon Server, enter the IP address or machine name of the remote server.
Server Type	Make sure that .NET is selected. If Appeon Server is installed to EAServer, WebLogic, WebSphere, JBoss, or JEUS, then select "J2EE".
Server Port (http)	Input "80". If Appeon Server is installed to EAServer, input "9988"; if installed to WebLogic, input "7001"; if installed to WebSphere, input "9080"; if installed to JEUS, input "8088"; if installed to JBoss, input "8080". To deploy to a remote Appeon Server, enter the HTTP port of the remote server.
AEM URL	The URL for Appeon Enterprise Manager (AEM) will be automatically generated after Server and Server Port are specified.

Property	Instructions
Connection method	Leave it as default.
Deployment Security	Leave it as default.
Username	Leave it as default.
Password	Leave it as default.

Step 2: Click **Test Appeon Server Settings**.

Appeon Developer will try to connect to Appeon Server with the parameters you specified. Make sure the test is successful before you continue.

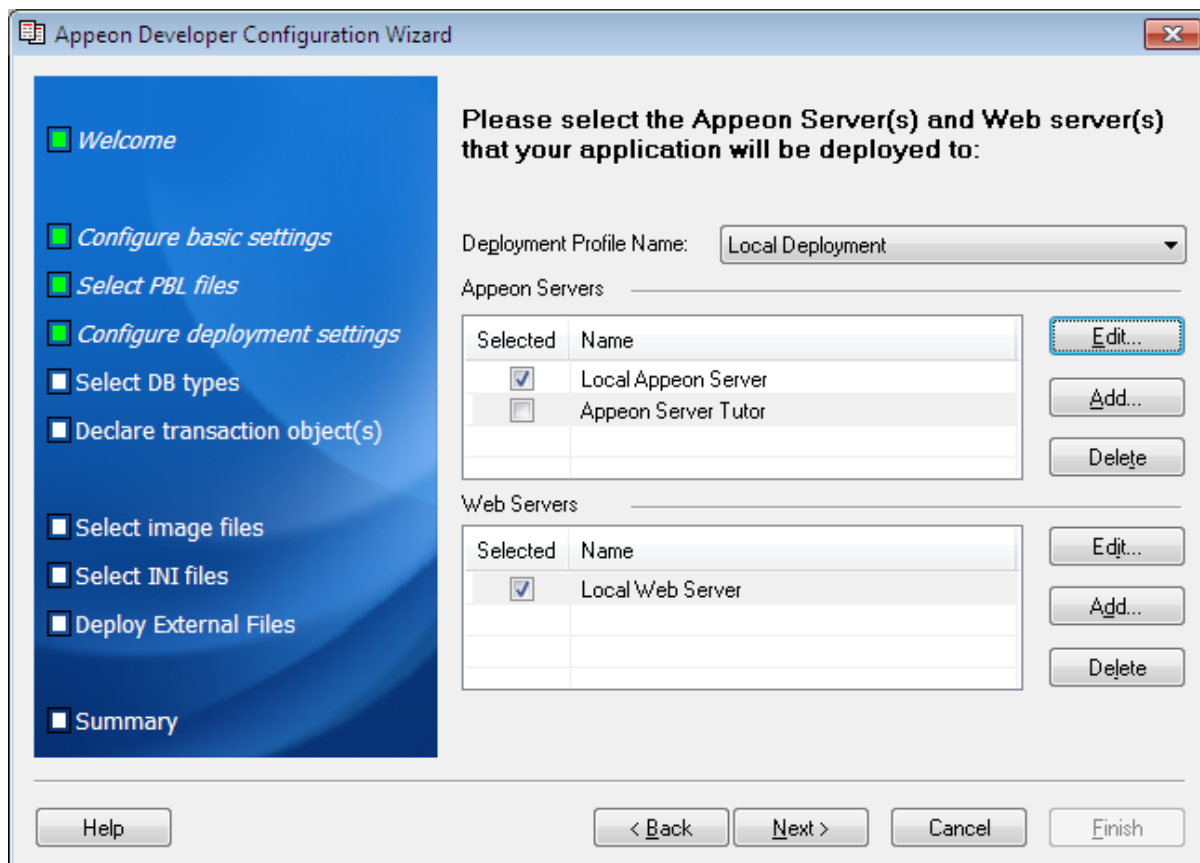
**Figure 8.28: Test connection**



Step 3: Click **OK**.

*Appeon Server Tutor* is added to the Appeon Servers list.

**Figure 8.29: Appeon Server Tutor is added**



### 8.3.3.3 Adding a Web server profile

Each Web server profile contains settings of a Web server used by the Apeon deployment. Since IIS will be used for the deployment of the Apeon tutorial PowerBuilder application, you need not to start it because IIS/Apeon Server is already running.

To add the Web server profile for the deployment of the tutorial application:

Step 1: Click the **Add** button in the **Web Servers** group box.

The Web Server Profile Configuration dialog box appears.

**Figure 8.30: Web Server Profile Configuration window**

The following table lists instructions for how to specify the properties for a Web server profile.

**Table 8.3: Instructions for creating a Web Server profile**

Property	Instructions
Profile Name	Input "Web Server Tutor" as the name of the Web Server profile.
File Transfer Type	Select Local Server.  To deploy to a remote Web Server, select Remote Server, and then specify the FTP Port, FTP Username and FTP Password of the remote server.
HTTP Server	Input "localhost".



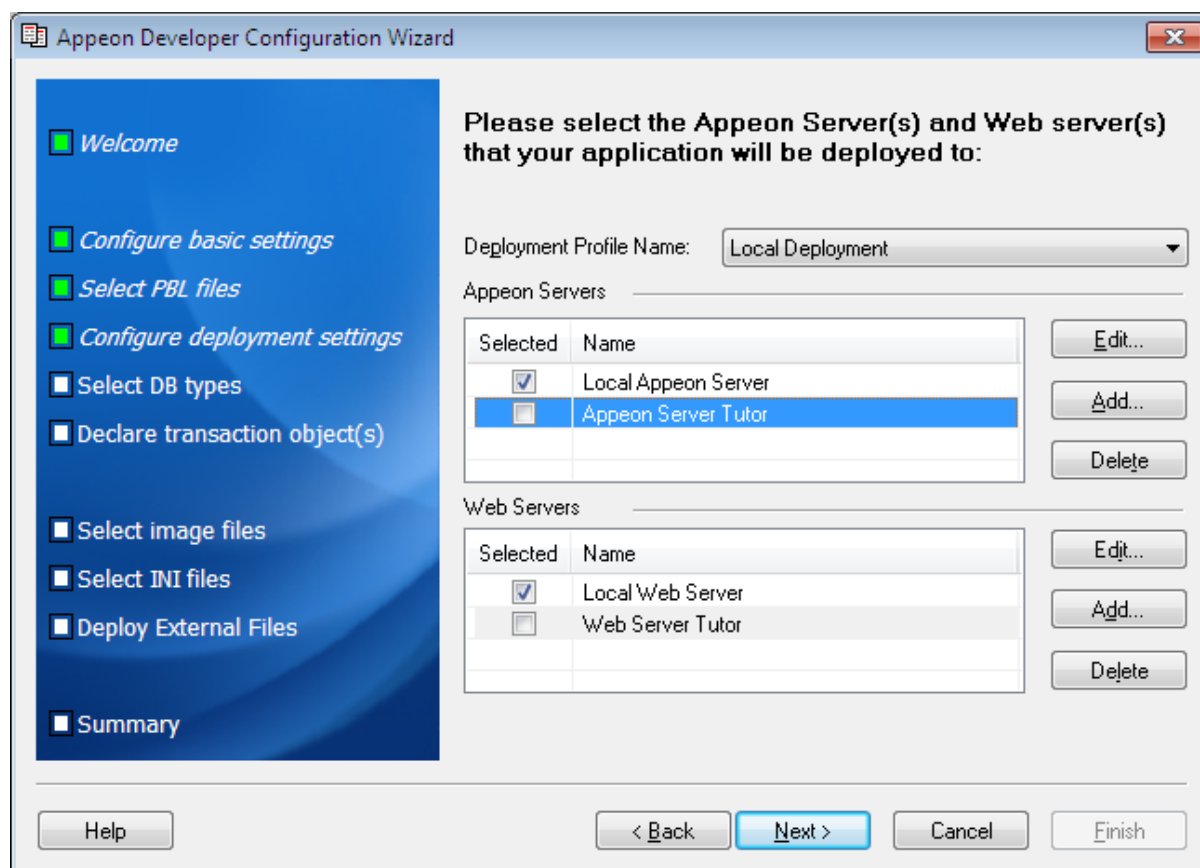
Property	Instructions
	To deploy to a remote Web Server, enter the IP address or machine name of the remote server.
Server Type	<p>Select Microsoft IIS.</p> <p>If using EAServer HTTP server, then select EAServer; if using WebLogic HTTP server, select WebLogic; if using WebSphere HTTP server, select WebSphere; if using JEUS HTTP server, select JEUS; if using JBoss HTTP server, select JBoss.</p>
HTTP Port	<p>Input "80".</p> <p>If Apeon Server is installed to EAServer, then Input "9988"; if installed to WebLogic, then input "7001"; if installed to WebSphere, then input "9080"; if installed to JEUS, then input "8088"; if installed to JBoss, then input "8080".</p> <p>To deploy to a remote Web Server, enter the HTTP port of the remote server.</p>
Web Root Path	Click <b>Browse</b> to navigate to the path to the IIS Web site home directory (for example: C:\Inetpub\wwwroot).

Step 2: Click **Test Web Server Settings**.

Apeon Developer will try to connect to the Web server with the IP (localhost) and port (80). Make sure the test is successful before you continue.

Step 3: Click **OK**.

*Web Server Tutor* is added to the Web Servers list.

**Figure 8.31: Web Server Tutor is added**

#### 8.3.3.4 Selecting a deployment profile

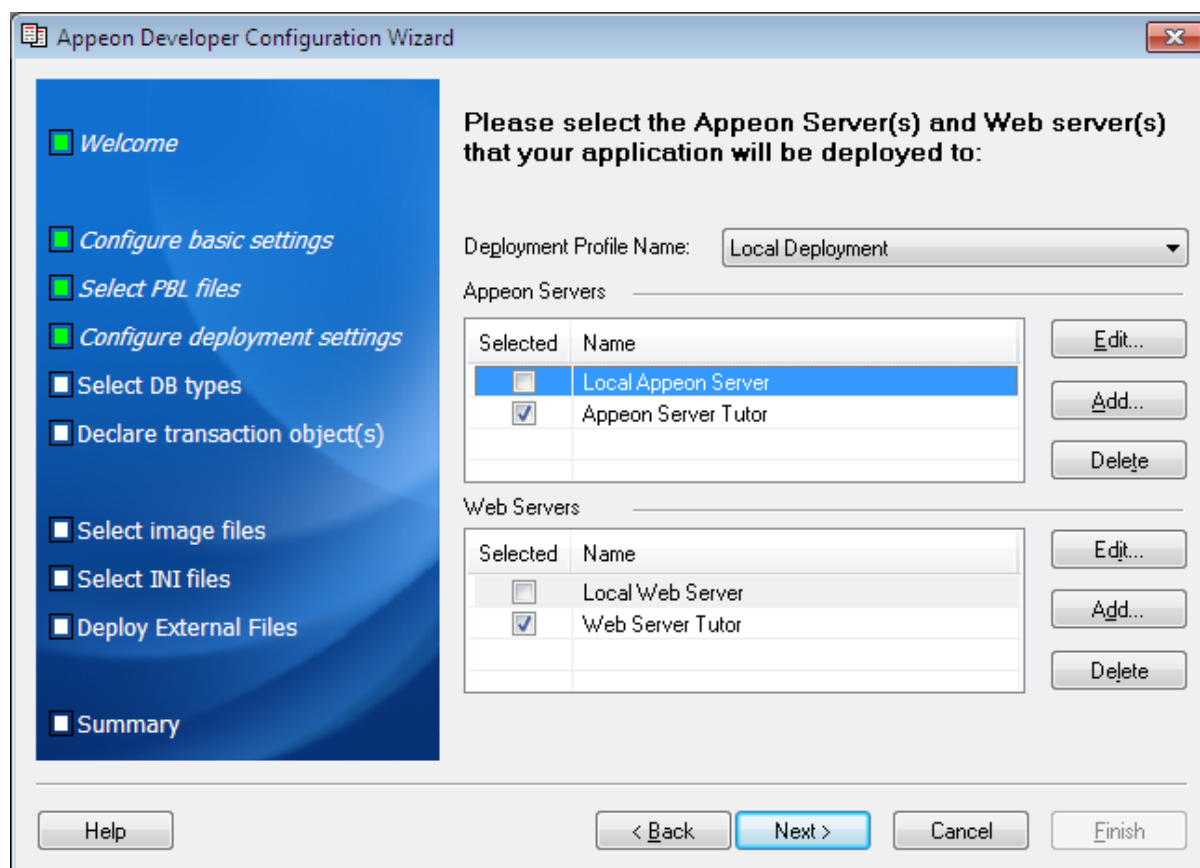
A deployment profile associates Apeon Server(s) and Web server(s) as a group used for Web deployment.

Step 1: In the Deployment Profile Name list box, select *Local Deployment*.

If no deployment profile is available, create one by following instructions in the Apeon Developer User Guide.

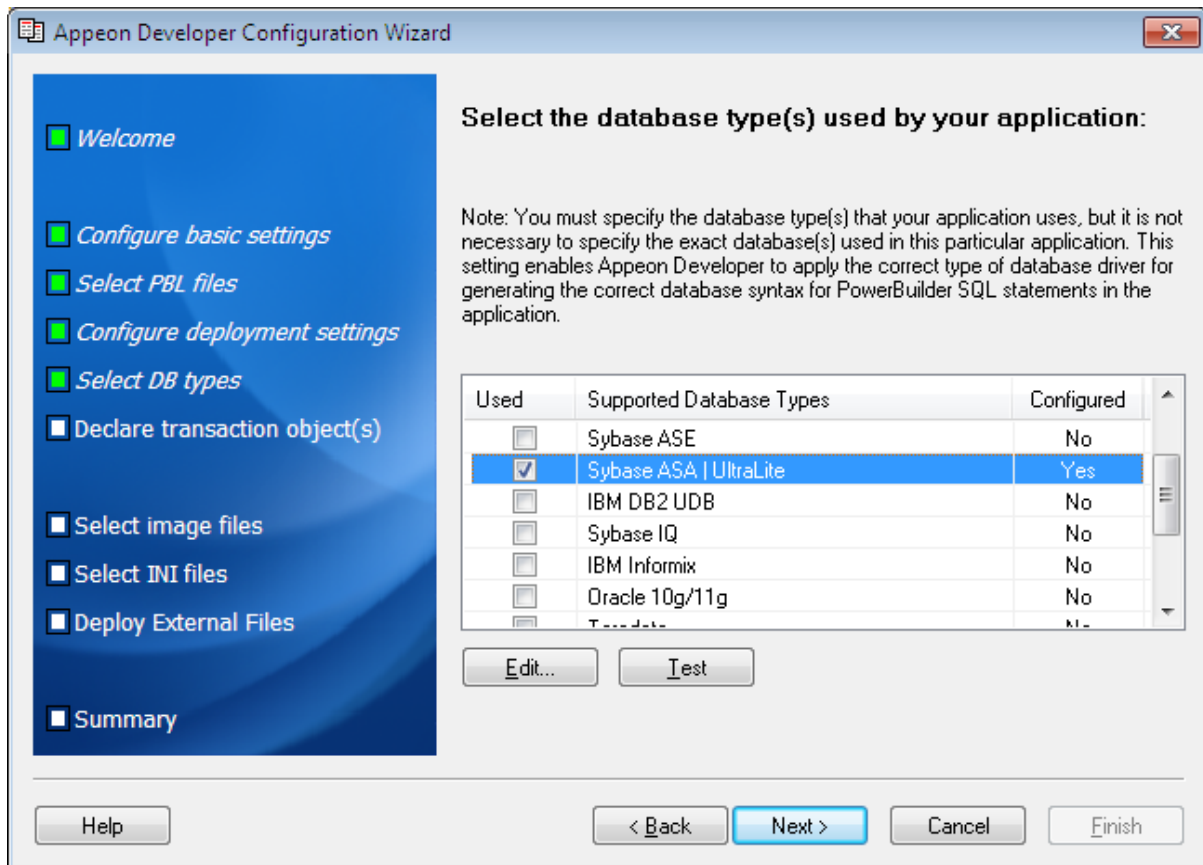
Step 2: Select *Apeon Server Tutor* in the Apeon Servers list and select *Web Server Tutor* in the Web Servers list.

Step 3: Click **Next** to proceed.

**Figure 8.32: Deployment Profile**

### 8.3.4 Selecting DB Type(s)

Select the database type used by the application. In this tutorial, the database type is *SAP ASA / UltraLite*. Select the Used column of *SAP ASA / UltraLite*.

**Figure 8.33: DB Type**

If SAP ASA | UltraLite is not configured (The Configured column is "No"), you should select it and click the **Edit** button to create a profile for it. The Database Type Profile Configuration window will be displayed.

**Figure 8.34: Database Type Profile Configuration window**

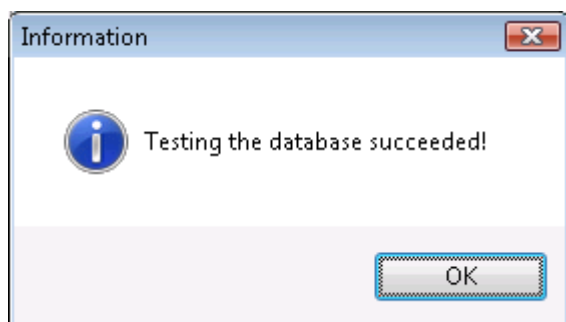
Step 1: Select the Outer Join Syntax that PowerBuilder will format from the drop-down list for Database in the Database Type Profile Configuration window.

Step 2: Specify the following settings for ODBC interface in the Database Type Profile Configuration window.

**Table 8.4: Database type profile settings**

In this field	You should
ODBC Interface	Choose the <b>ODBC Interface</b> radio button.
Data Source	Choose appeontutor from the dropdown list. If appeontutor is not available, please choose the Apeon demo database (appeonsampleforserver or appeonsample2forserver), or any other SAP SQL Anywhere data source.
User ID	Leave this field blank.
Password	Leave this field blank.

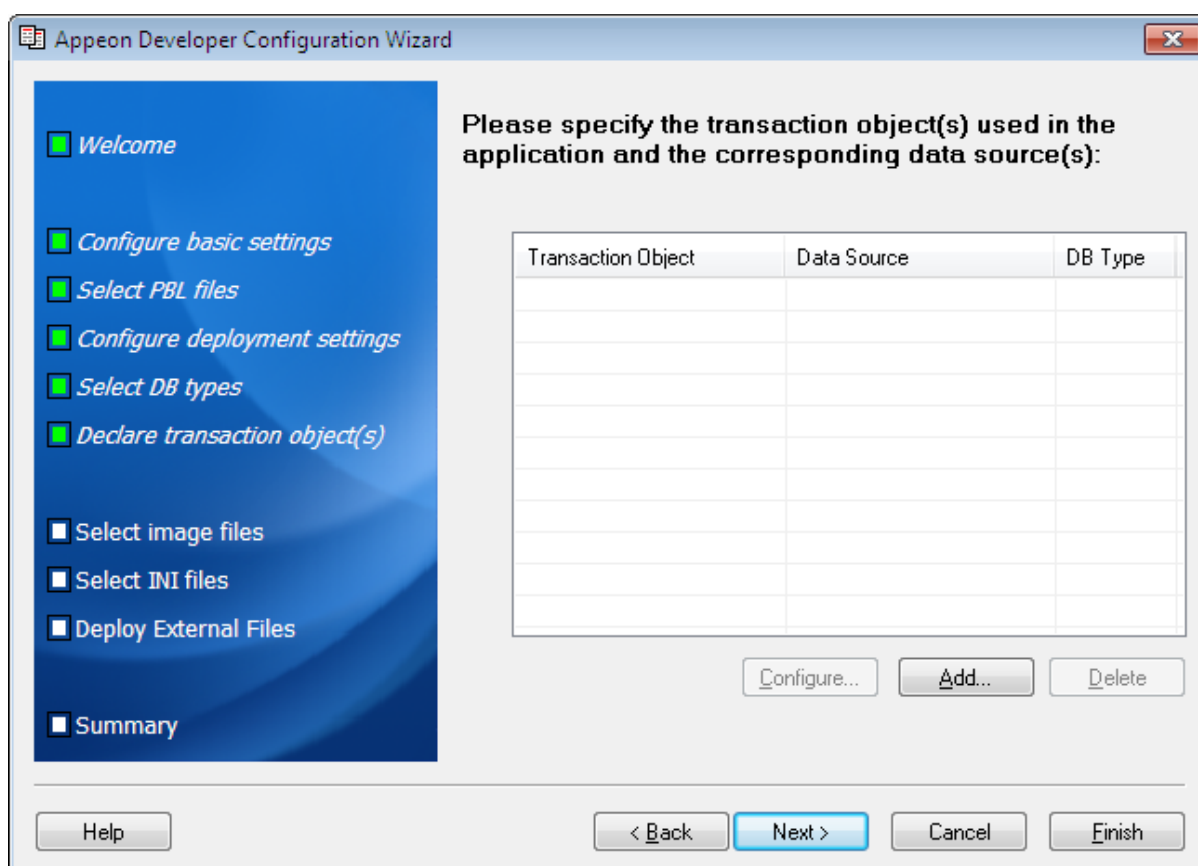
Step 3: Click **Test** to verify that the connection is successful.

**Figure 8.35: Test successful**

Step 4: Click **OK**.

### 8.3.5 Declaring transaction object(s)

When the tutorial PowerBuilder application is deployed to the Web, Apeon Server handles the database connection using data sources rather than transaction objects defined in the PowerBuilder application. You must associate the transaction objects used by the Apeon tutorial PowerBuilder application with proper data sources.

**Figure 8.36: Transaction object mappings**

The Apeon tutorial application uses the SQLCA transaction object which connects to the *apeontutor* database. To associate the SQLCA transaction object with the proper data source:

Step 1: Click **Add**. The Add Transaction Object dialog box is displayed.

**Figure 8.37: Add transaction object mappings**

**Add Transaction Object**

Transaction Object:

Database Type:

Data Source:

If your Apeon Server is the .NET edition, you can also select, edit, add, or delete the data source in the below Data Source group box.

Data Source

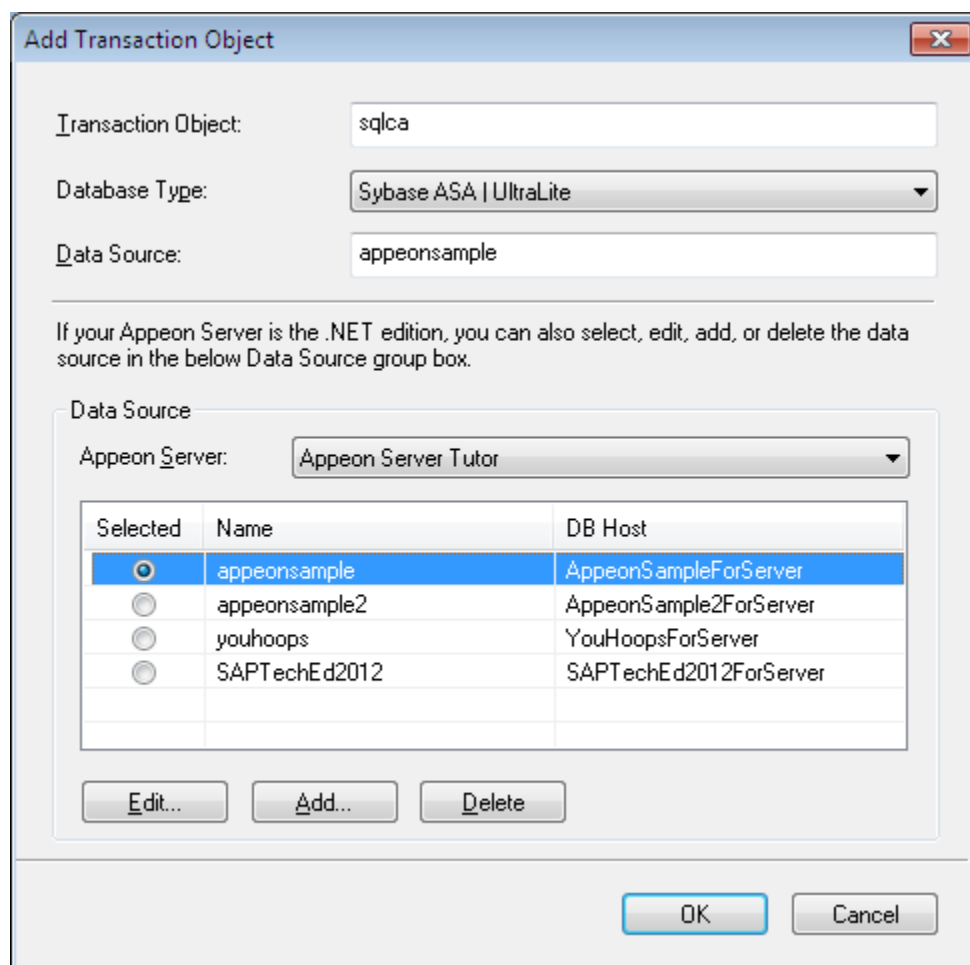
Apeon Server:

Selected	Name	DB Host

Step 2: Select *SAP ASA | UltraLite* from the **Database Type** dropdown listbox.

Step 3: Select *Apeon Server Tutor* from the **Apeon Server** list. The existing data sources in Apeon Server will be displayed.

Note: the data source tool is available for Microsoft .NET Framework, and not available for EAServer, WebLogic, WebSphere, JBoss, or JEUS. You should go to the corresponding application server administration console to configure the data source for EAServer, WebLogic, WebSphere, JBoss, or JEUS. For detailed instructions, refer to Chapter 4, *Database Connection Setup in Apeon Server Configuration Guide for J2EE*.

**Figure 8.38: Data sources in the Appeon Server**

The following steps show you how to create a data source that links to the appeontutor ODBC data source using the ODBC driver.

Step 4: Click **Add** to create a data source. The Add dialog box is displayed.



**Figure 8.39: Add a data source**

The following table provides instructions for how to specify the data source settings.

**Table 8.5: Instructions to specify data source settings**

Settings	Instructions
Name	Input "appeontutor" as the name of the data source.
Driver	Select "ODBC Driver" as the driver type for the data source .
ODBC Data Source	<p>Select "appeontutor" as the data source name.</p> <p>This will connect to the <i>appeontutor</i> ODBC data source that was created in <a href="#">Section 8.2.3, "Configuring ODBC data source"</a>.</p> <p>If the database type is SAP ASA/SQL Anywhere and the database file resides in an NTFS folder, please grant the "NETWORK SERVICE" or "Everyone" user with full controls over that folder.</p>

Settings	Instructions
User Name	Type "dba".
Password	Type "sql".

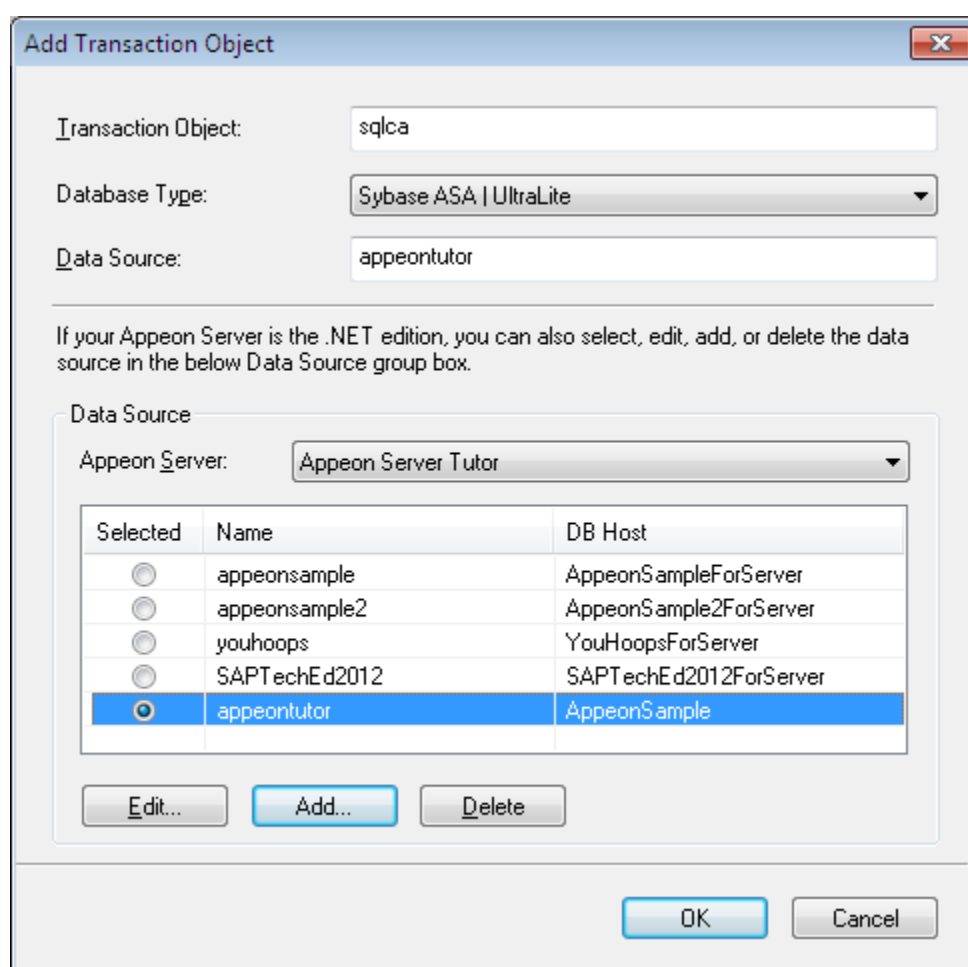
Step 5: Click **Test** to verify the connection to the *appeontutor* data source.

Step 6: Click **OK** to close the Add dialog box.

The *appeontutor* data source has been added.

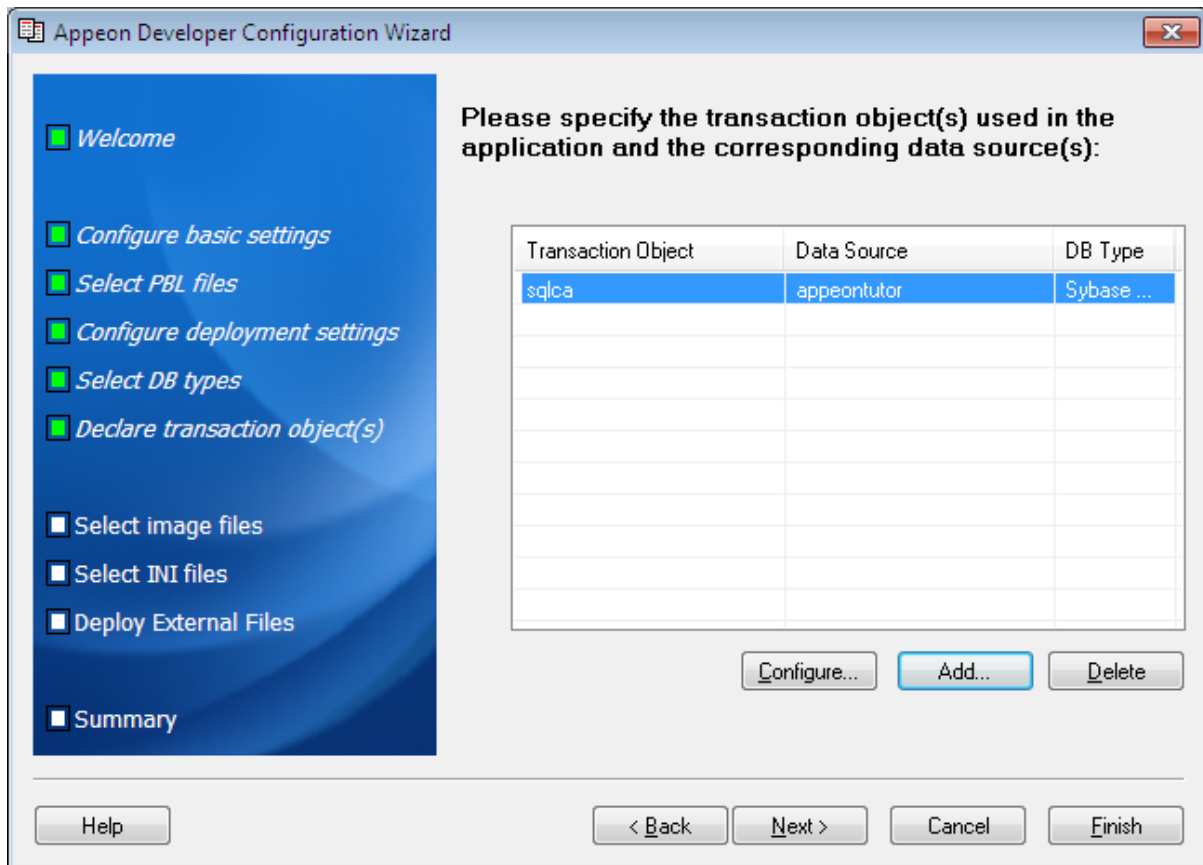
Step 7: Select the **Selected** button of the *appeontutor* data source.

**Figure 8.40: appeontutor is added**

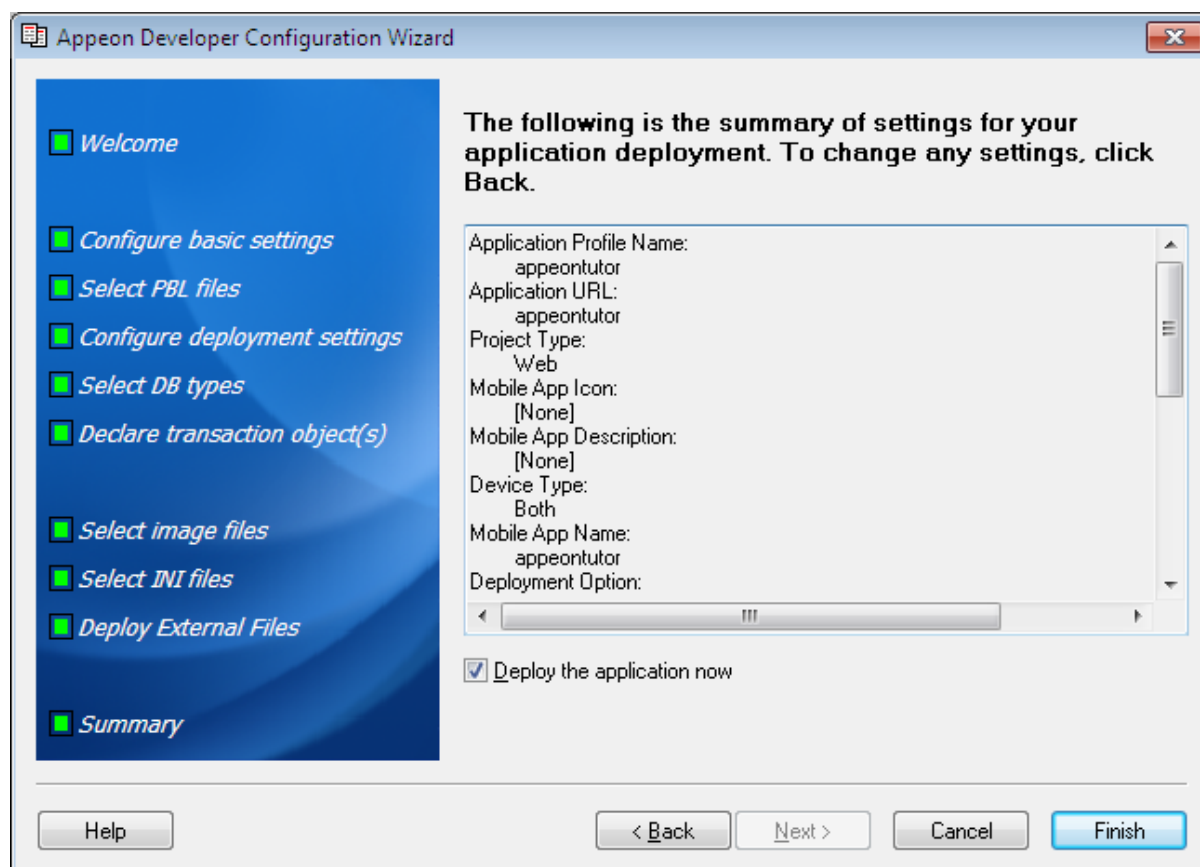


Step 8: Click **OK** to close the Add Transaction Object dialog box.

The "sqlca" transaction object is added.

**Figure 8.41: sqlca is added**

Step 9: Click **Next** through the rest of settings, until you get to the Summary page.

**Figure 8.42: Summary**

Step 10: Click **Finish** on the **Summary** page to close the wizard.

The Apeon tutorial application is successfully configured.

The Apeon Deployment Wizard will be launched, if you keep the "Deploy the application now" option on the Summary page as selected. Refer to [Section 8.5, "Deploying the Tutorial PowerBuilder Application"](#) for how to use it.

## 8.4 Analyzing Unsupported Features

This chapter shows you how to use the UFA tool to analyze the Apeon tutorial PowerBuilder application for unsupported features and optimize and full build the tutorial application.

In this chapter, you will learn how to:

- [Perform unsupported feature analysis on the tutorial application](#)
- [Optimize and full build the tutorial application](#)

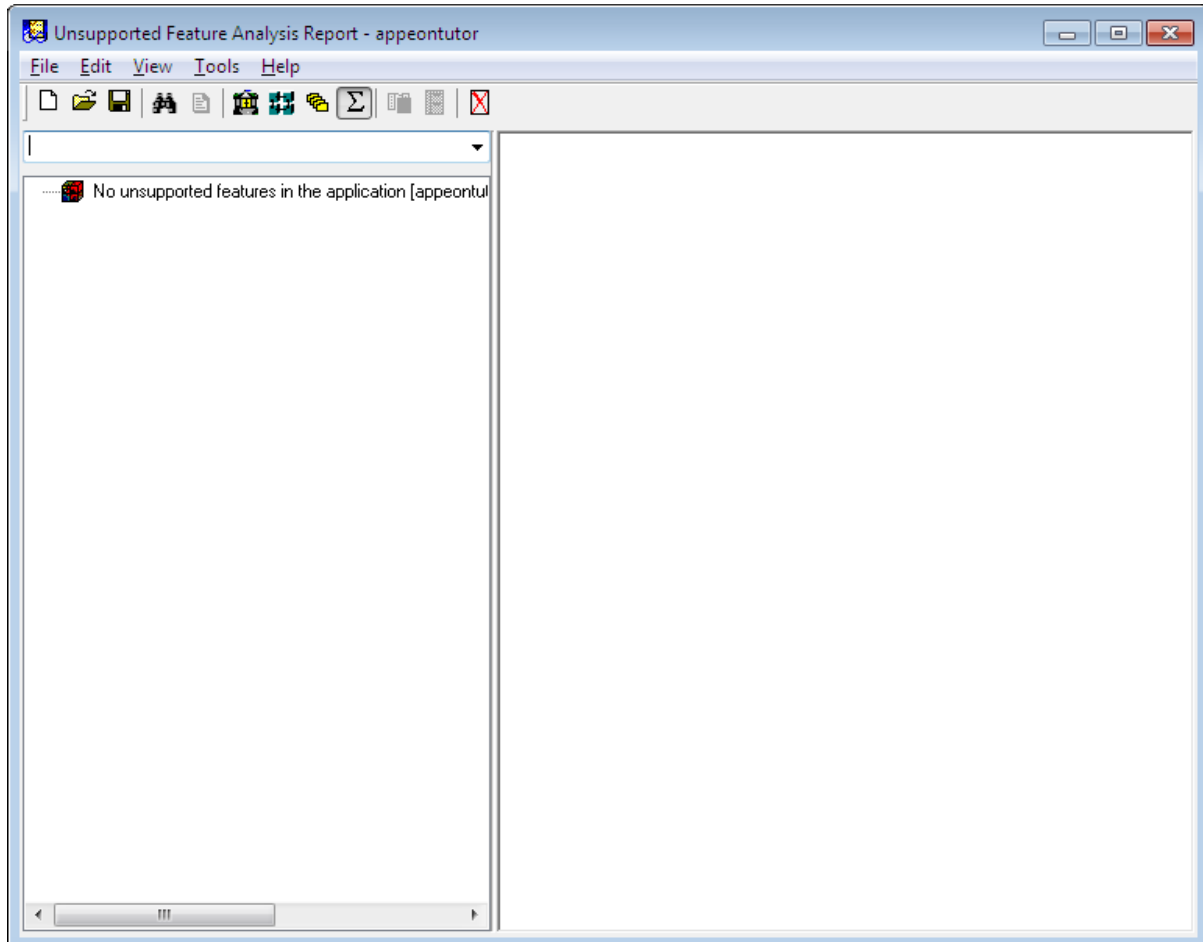
### 8.4.1 Unsupported features analysis

Apeon provides an unsupported feature analysis (UFA) tool to handle the Apeon unsupported source code in a PowerBuilder application.

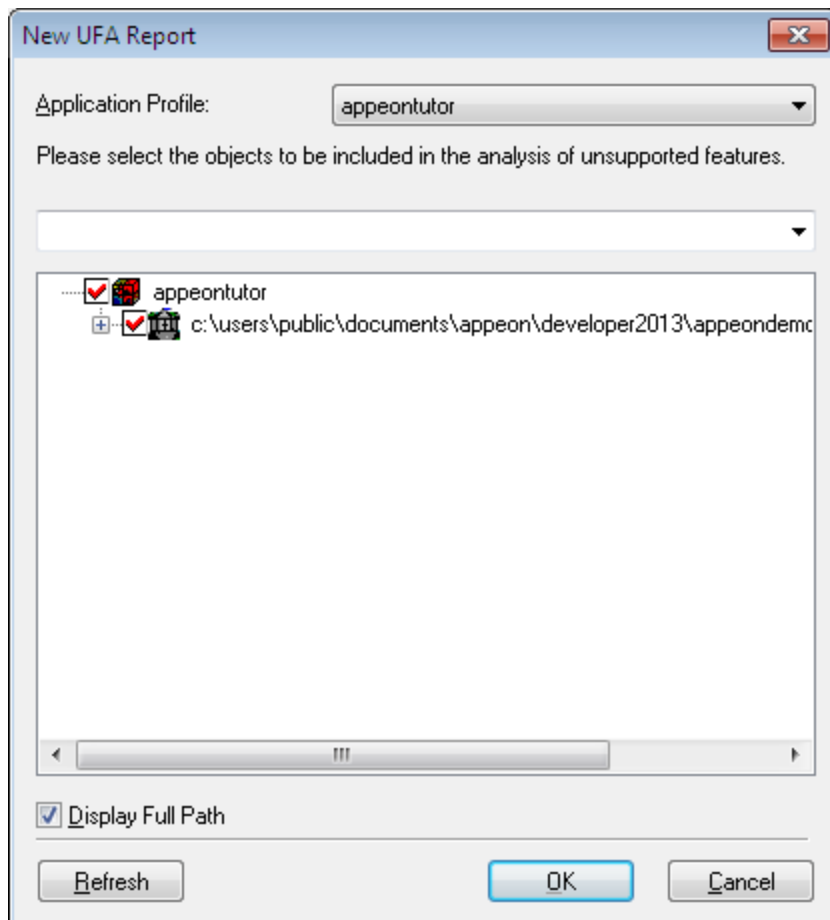
To perform Unsupported Features Analysis to the tutorial application, perform the following steps:

Step 1: In the PowerBuilder IDE, click the **Analyze** button (🚀 or 📄) on the Apeon Developer toolbar. The Unsupported Feature Analysis Report window (UFA Report window) appears.

**Figure 8.43: UFA Report window**

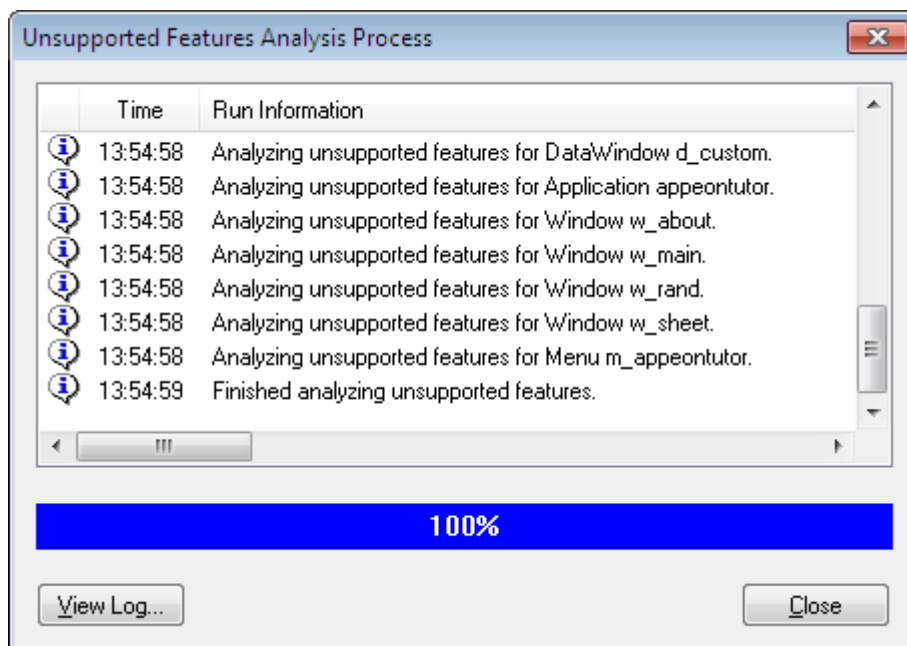


Step 2: Select the **File > New Report** menu in the UFA Report window. The New UFA Report dialog box will appear.

**Figure 8.44: New UFA Report dialog box**

Step 3: Click the **OK** button to analyze the entire application.

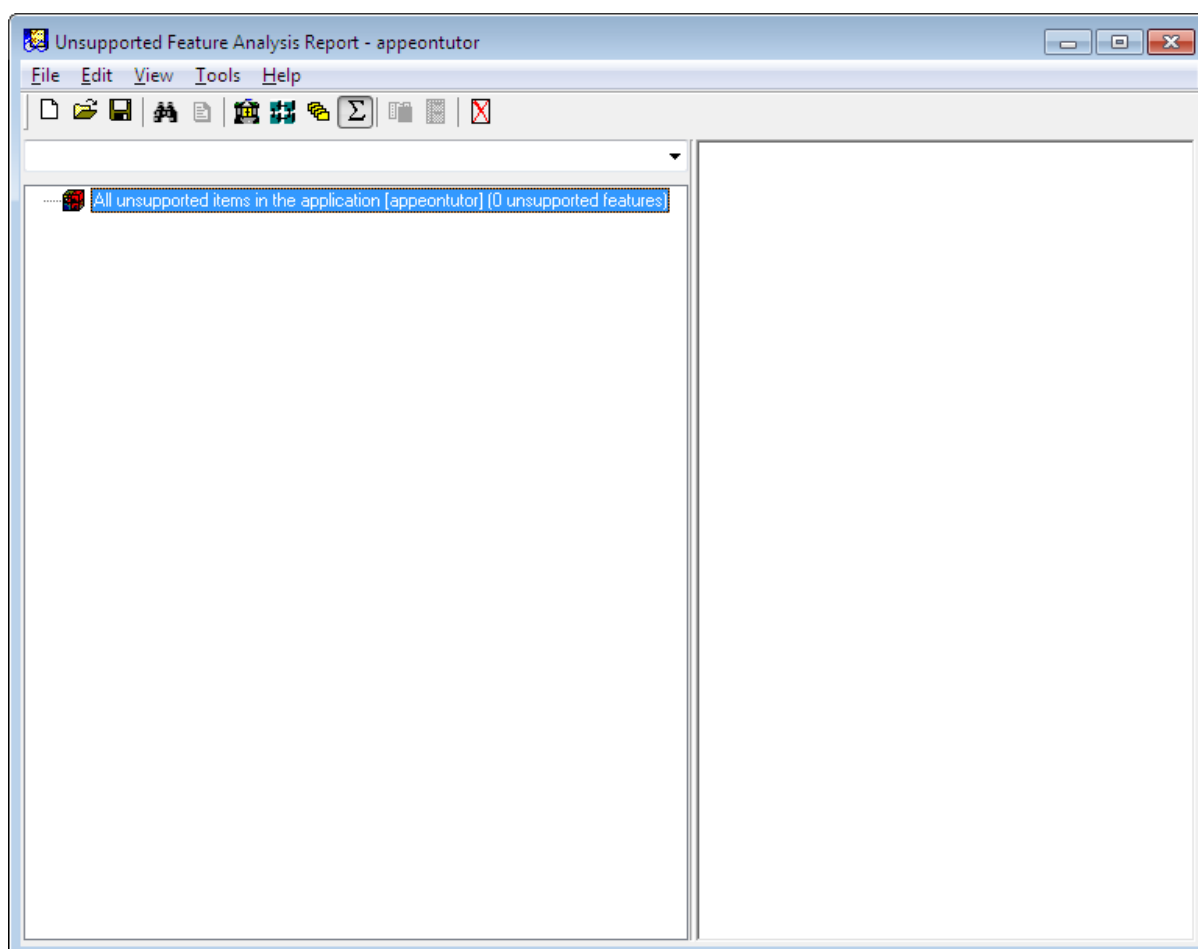
The Unsupported Features Analysis Status dialog box is displayed. This shows the progress of the Unsupported Features Analysis.

**Figure 8.45: Unsupported Features Analysis Process dialog**

After the feature analysis is completed, click the **Close** button and the UFA Report is loaded into the UFA Report Window. You can view the analysis result in the left treeview and modify the unsupported features by following the instructions in the Chapter 6, *Workarounds for Unsupported Features in Workarounds & API Guide*, which is also available at [http://www.appeon.com/support/documents/appeon\\_online\\_help/workarounds\\_and\\_api\\_guide/](http://www.appeon.com/support/documents/appeon_online_help/workarounds_and_api_guide/). The Guide provides examples of some common unsupported features and ways to work around them.

In this tutorial, the application contains no unsupported features.

**Figure 8.46: UFA Report window**

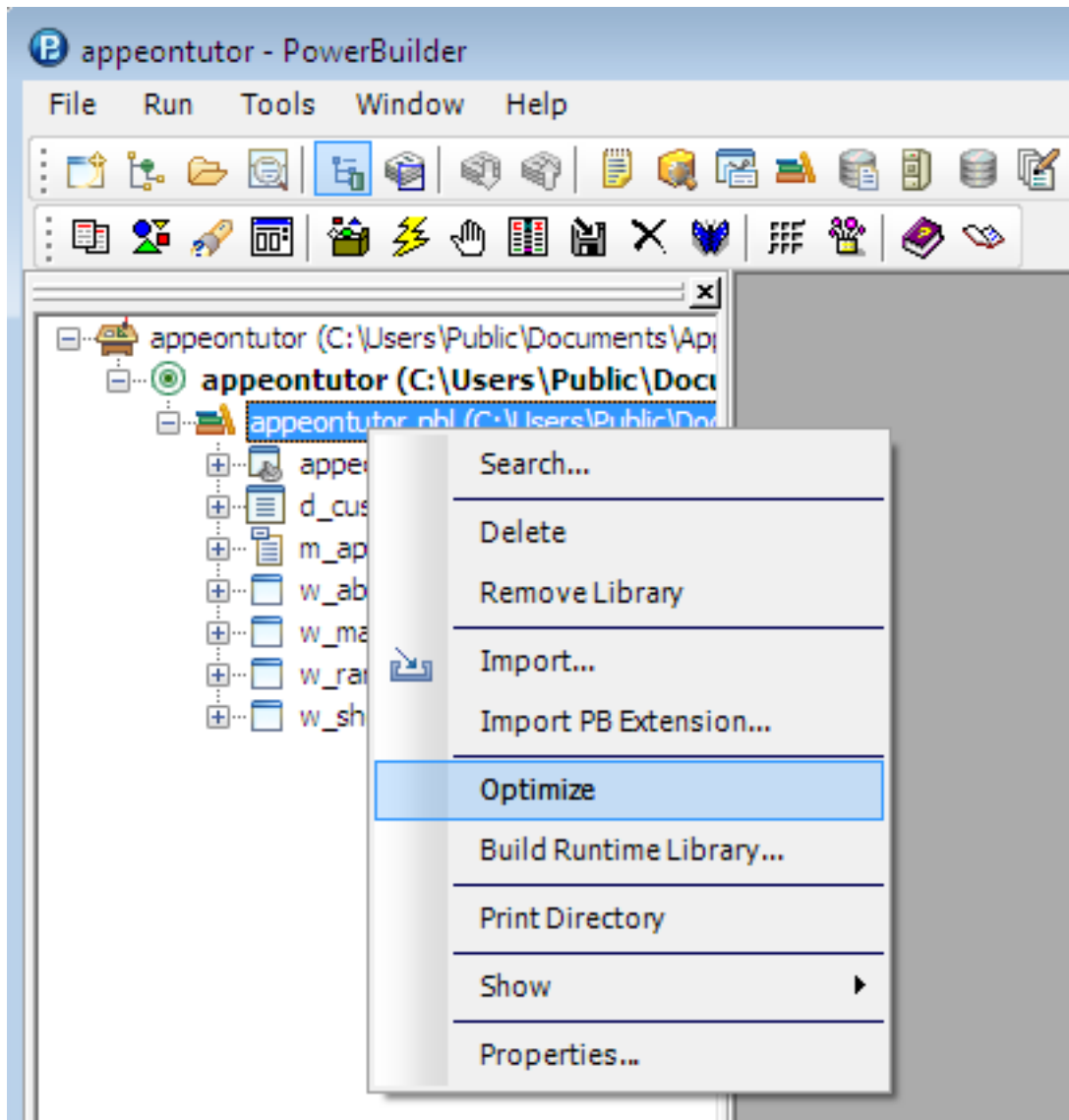


## 8.4.2 Optimizing and full build

Before any PowerBuilder application is converted by Appeon, ensure the PBLs have been optimized. You must also "full build" the PowerBuilder application successfully before Appeon will be able to convert it.

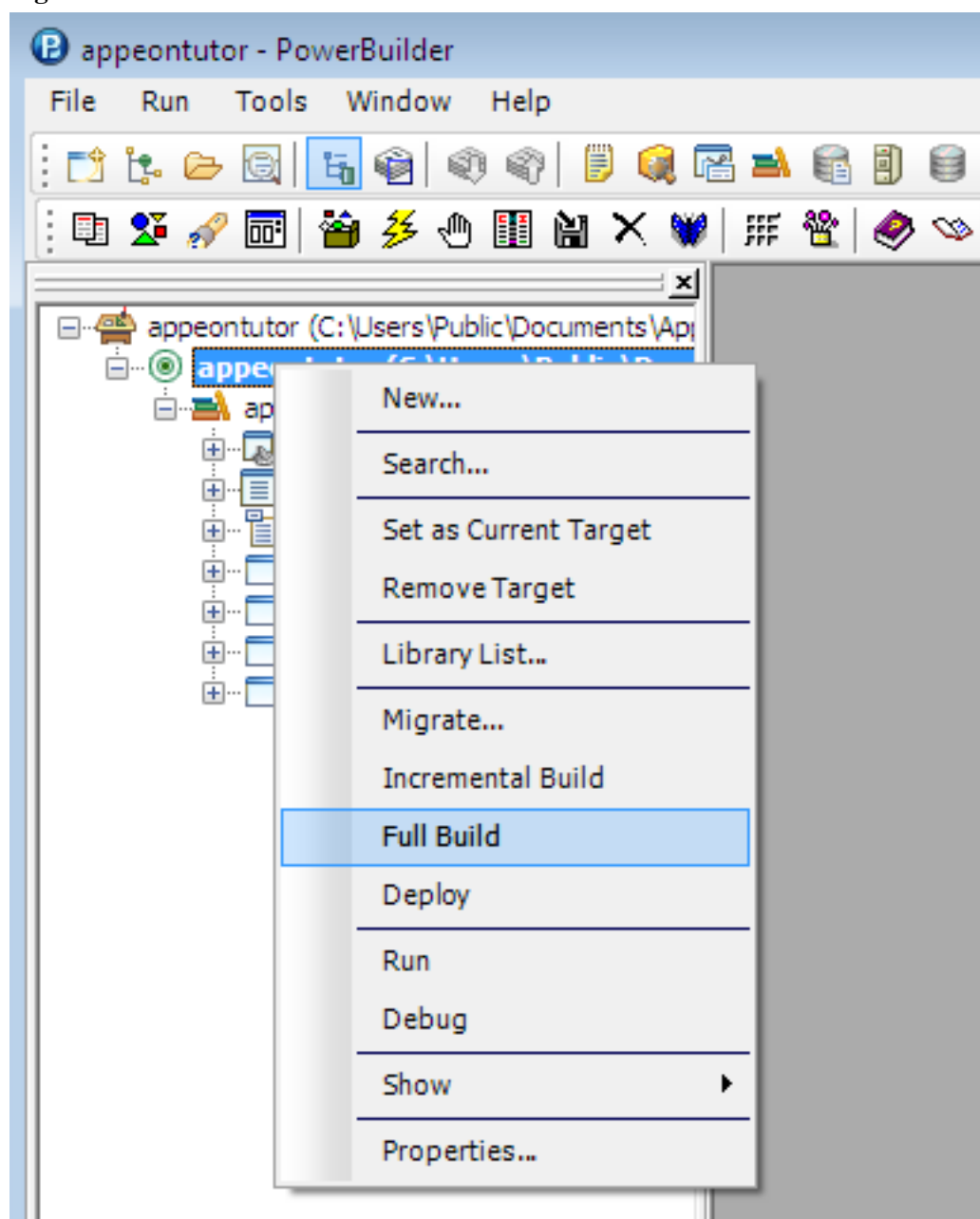
To optimize and full build the tutorial application:

Step 1: Right click on *appeontutor.pbl* in the PowerBuilder system tree. Click **Optimize**.

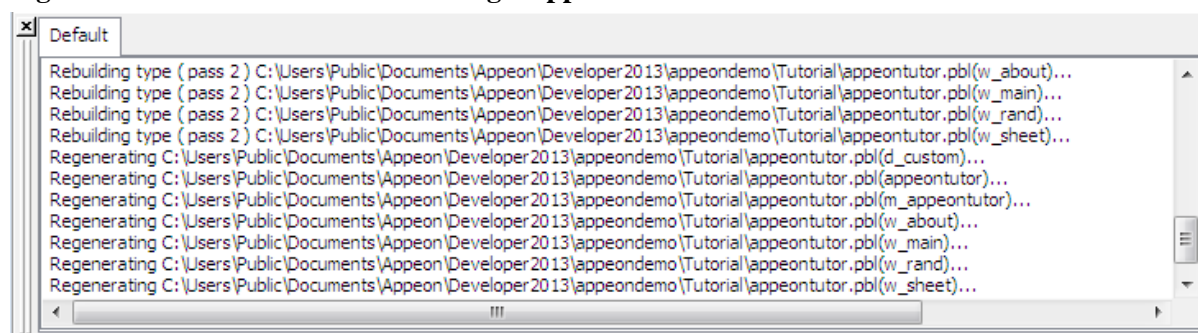
**Figure 8.47: Optimize**

Step 2: Right click on the *apeontutor* Target in the system tree and select **Full Build** from the context menu.



**Figure 8.48: Full Build**

Step 3: The full build process begins. Some information is displayed in the Output window. Make sure that when the full build is complete, no error messages occur in the Output window.

**Figure 8.49: Finished Full Build of target apeontutor**

## 8.5 Deploying the Tutorial PowerBuilder Application

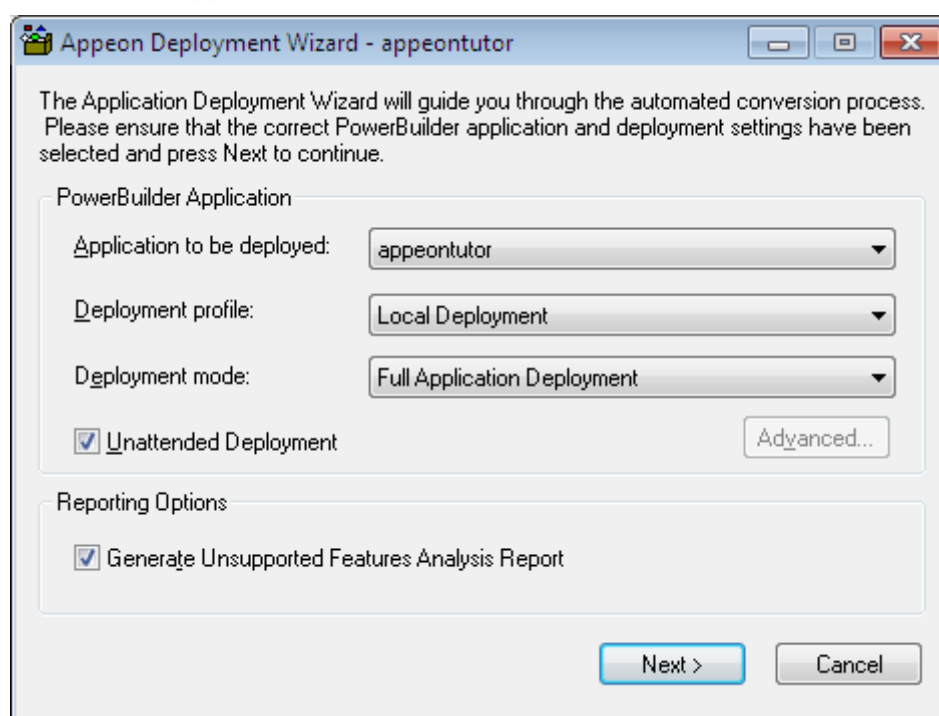
In the previous lessons, the Apeon tutorial PowerBuilder application has undergone careful analysis for unsupported features. Now you will launch the Apeon Deployment Wizard to convert the tutorial application onto the Web automatically.

To deploy the tutorial application onto the Web automatically:

Step 1: Make sure Apeon Server is started. For details, refer to [Section 8.3.3.1, “Starting Apeon Server and Web server”](#).

Step 2: Within the PowerBuilder IDE, click the **Deploy** button (📦) in the Apeon Developer toolbar. The Apeon Deployment Wizard starts.

**Figure 8.50: Apeon Deployment Wizard**



The start page of the Wizard displays the following information:

- Application to be deployed - The current application (appeontutor) is selected by default from the list of applications that are defined in Apeon Developer application profiles.
- Deployment profile - Make sure the deployment profile, *Local Deployment*, is selected.
- Deployment mode - Since it is the first time the tutorial application will be deployed, the *Full Application Deployment* mode will be selected by default. For subsequent deployments, the *Incremental Application Deployment* will be selected by default.
- Unattended Deployment - Check this option so that the entire deployment process is automatic.

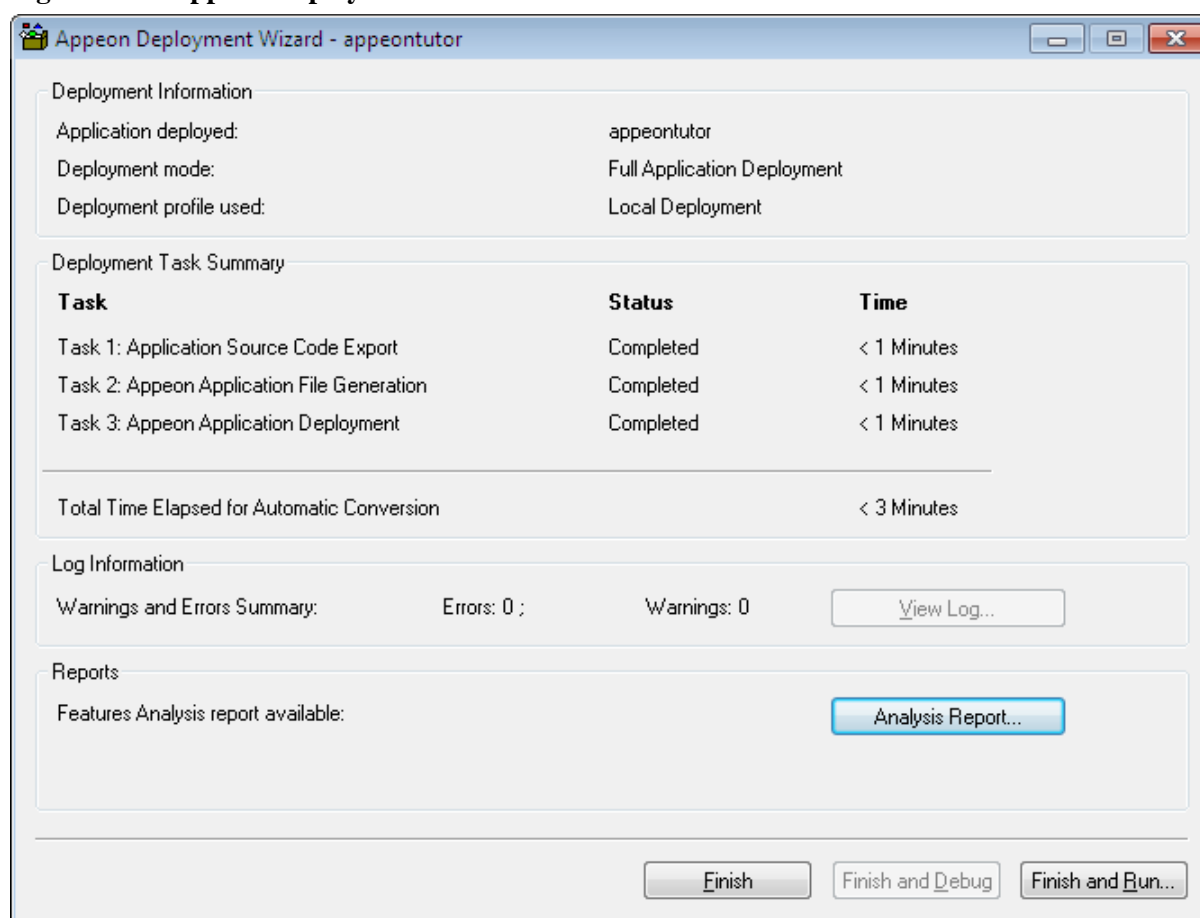
Step 3: Click **Next** to start the automatic Web deployment process. The Apeon Deployment Wizard will perform three tasks:

1. PowerBuilder application source code export and analysis (Task 1: Application Source Code Export).
2. Parsing of the PowerBuilder source code (PBL files) into Web application files that are stored on the local machine (Task 2: Apeon Application File Generation).
3. Transfer of local Web files to the Web Server by using either file copy or FTP, and uploads DataWindows to the Apeon Server (Task 3: Apeon Application Deployment).

When the deployment process is complete, the report dialog box is displayed.

Step 4: Click **Finish**.

**Figure 8.51: Apeon Deployment Wizard**



## 8.6 Running the Web Application

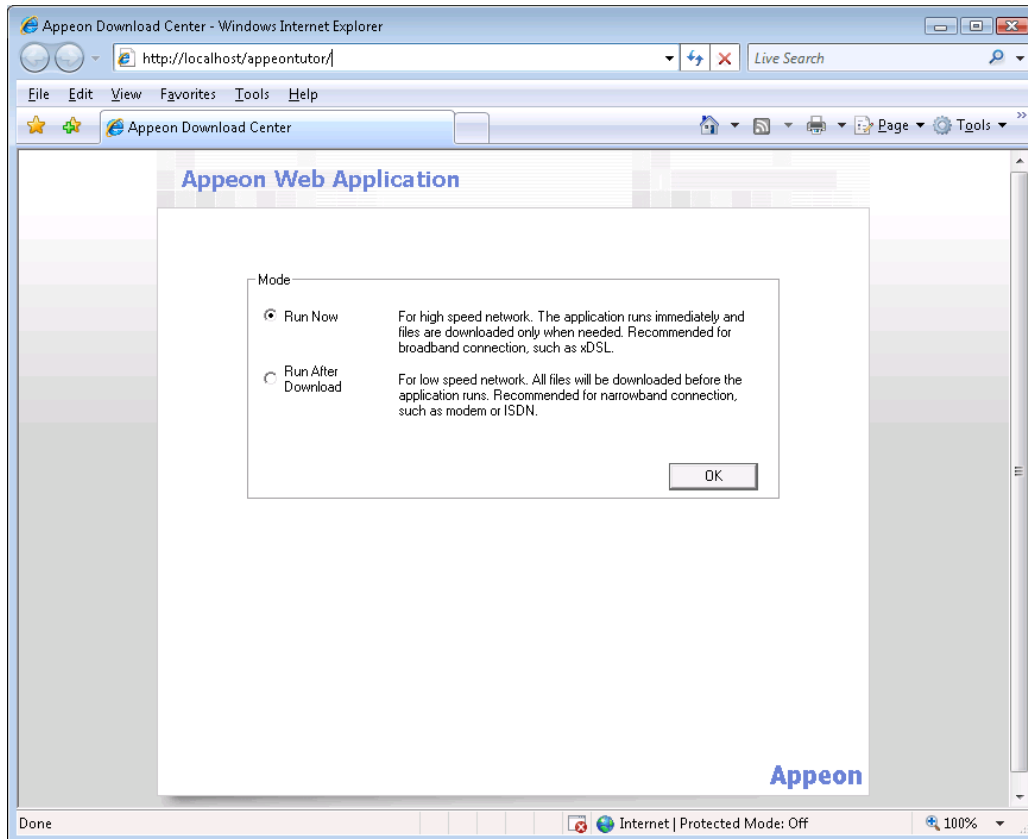
The Apeon tutorial PowerBuilder application has been converted into a standard Web application with proper database connection which can now be run.

To launch the Web application after the tutorial application has been converted:

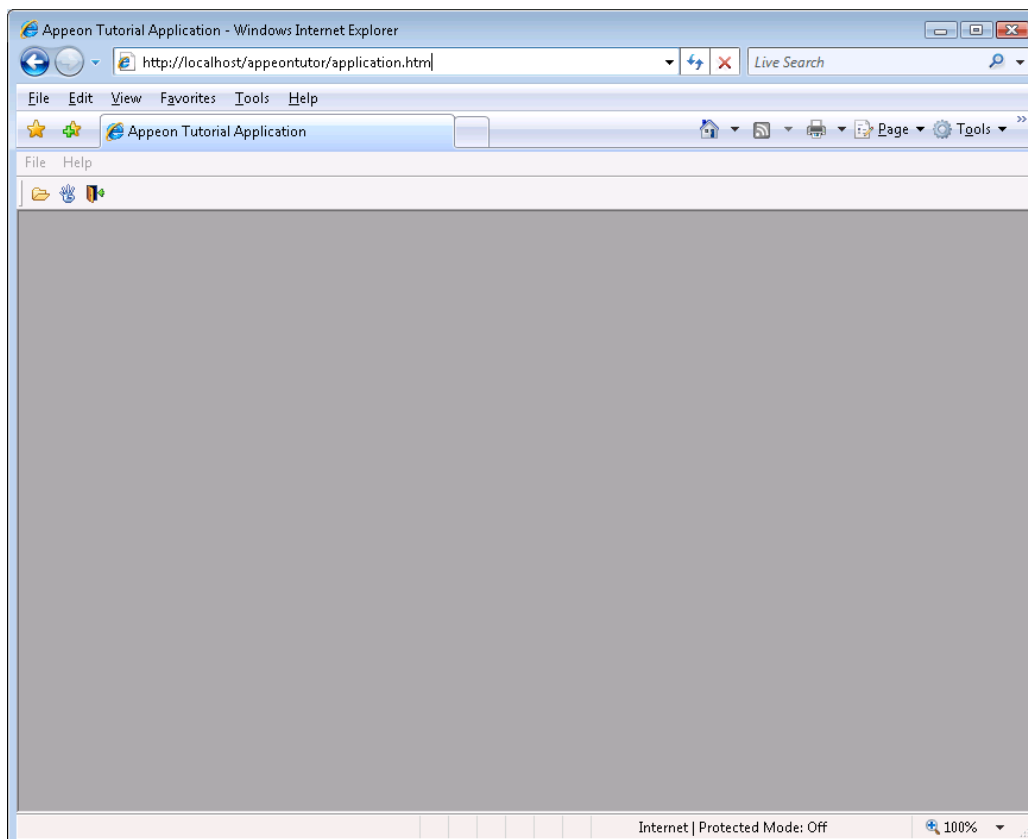
Step 1: Make sure Apeon Server is running.

Step 2: Click the **Run** button (⚡) in the Apeon Developer toolbar and select the *appeontutor* application in the popup window, or manually open a browser window and type `http://localhost/appeontutor/` into the Address bar and press **Enter**.

The Web application starts.

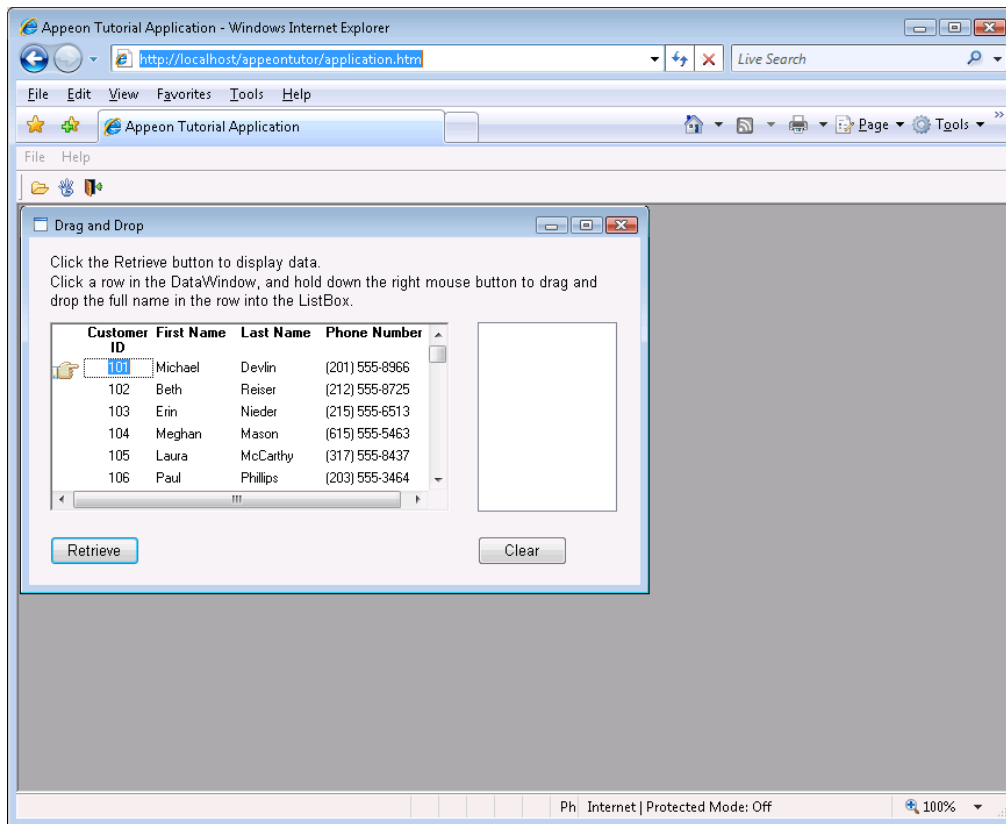
**Figure 8.52: Application starts**

Click **OK** to run the Web application now.

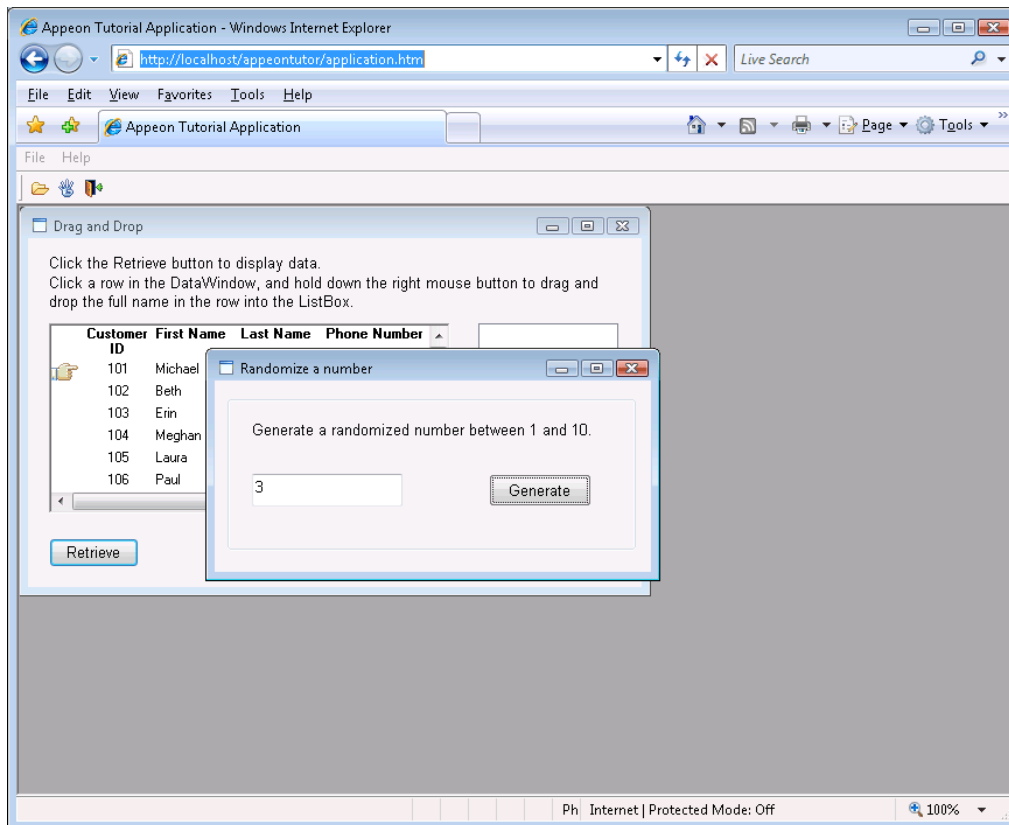
**Figure 8.53: Application starts**

Step 3: Open the **Drag and Drop** window.

**Figure 8.54: Drag and Drop**



Step 4: Open the **Randomize a number** Window.

**Figure 8.55: Randomize a number Window**

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