

SYBASE®

Core Features Guide

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**PowerDesigner® 15.2**

Windows

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## PART I

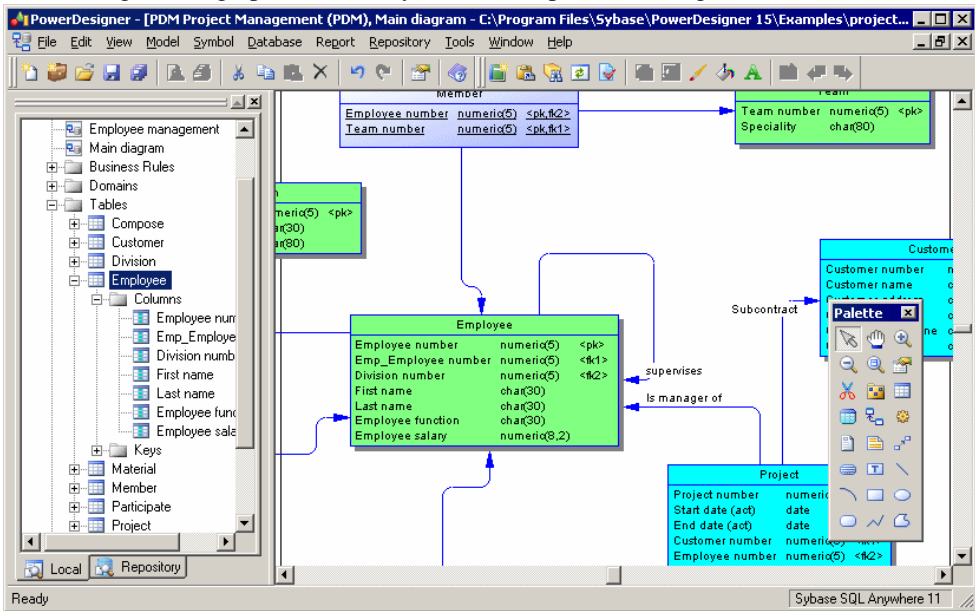
# The PowerDesigner Interface

The chapters in this part introduce you to the PowerDesigner® interface and the core concepts available for all kinds of models.



# CHAPTER 1 Getting Started with PowerDesigner

PowerDesigner is a graphical and easy-to-use enterprise modeling environment.



It provides:

- Integrated modeling through standard methodologies and notations:
  - Data (E/R, Merise)
  - Business (BPMN, BPEL, ebXML)
  - Application (UML)
- Automatic code generation through customizable templates:
  - SQL (with more than 50 supported DBMSs)
  - Java
  - .NET
- Powerful reverse engineering capabilities to document and update existing systems
- A scalable enterprise repository solution with strong security and versioning capabilities to aid multi-user development
- Automated, customizable reporting capabilities
- An extensible environment, permitting you to add new rules, commands, concepts and attributes to your modeling and coding methodologies

## The Welcome Page

The Welcome page gives you one-click access to all your recent projects, workspaces, and models, as well as providing a direct link to the New Model and New Project dialogs and a range of help materials. To suppress this page, select the **Do not show this page again** check box. You can redisplay it at any time by selecting **View > Welcome Page**.



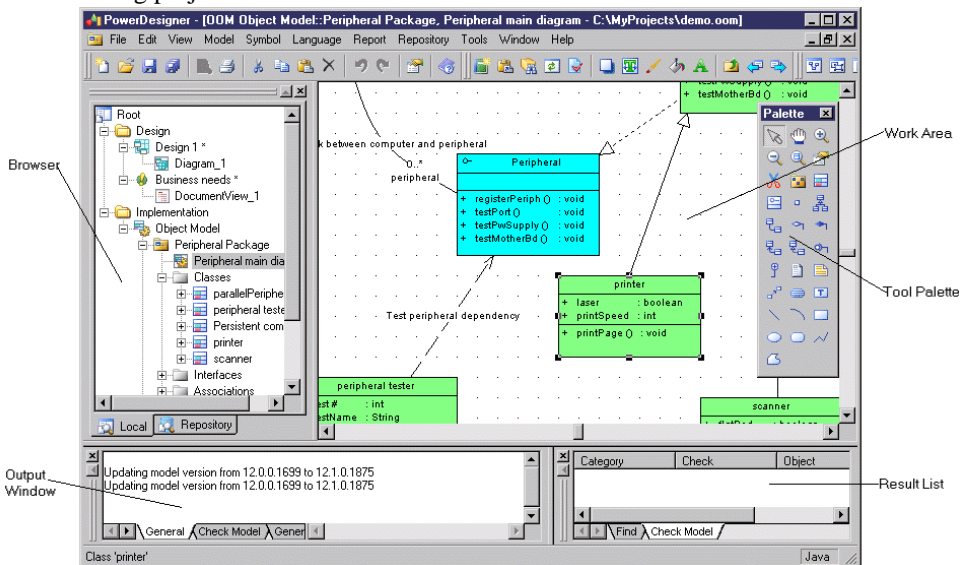
By default, the following items are available:

- **Getting Started**
  - **Create Model** - Opens the New Model dialog to let you create a model (see *Creating a Model* on page 12).
  - **Create Project** - Opens the New Project dialog to let you create a project (see *Creating a Project* on page 38).

- **Open Model or Project** - Opens a standard Open dialog to let you browse for a model or project to open.
- **Examples** - Opens the PowerDesigner Examples folder to let you select an example model to open.
- **Help** - Opens the PowerDesigner online help.
- **What's New in PowerDesigner** - Opens the PowerDesigner New Features Summary.
- **Documentation and Videos** - Opens a Web page listing the available PowerDesigner documentation and videos.
- **PowerDesigner Web Site** - Opens the PowerDesigner page on the Sybase website.
- **PowerDesigner Newsgroup** - Opens the PowerDesigner newsgroup page on the Sybase website.
- **Recent projects and workspaces** - Lists your most recent projects and workspaces. Click a project or workspace to open it.
- **Recent models** - Lists your most recent models. Click a model to open it.

## PowerDesigner Interface Overview

A typical PowerDesigner window contains various panes providing you with various views on your modeling project.



The following components are visible:

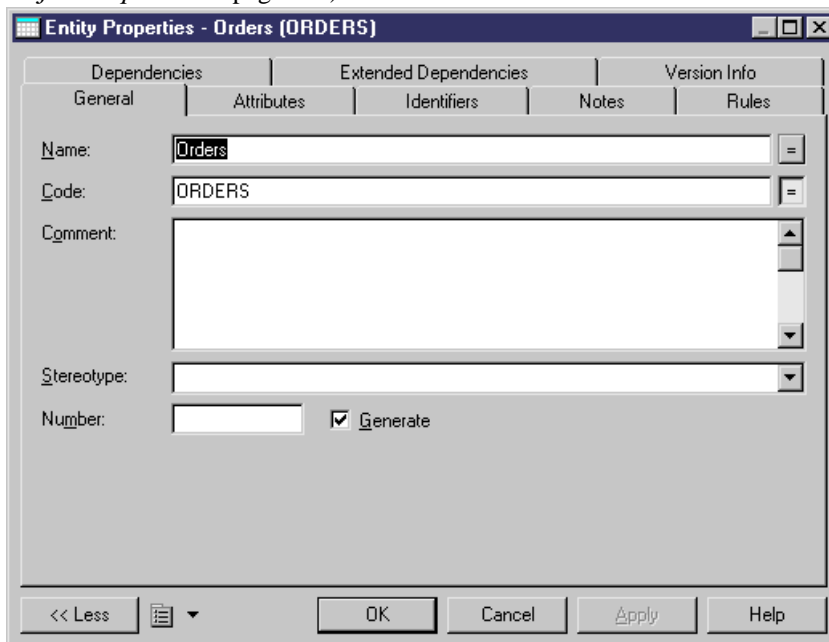
- The *Browser*- displays your models and the objects belonging to them, and allows you to rapidly navigate between them (see *Organizing Your Models in the Browser* on page 81). The Browser also has a tab that gives you access to a PowerDesigner repository (see the

*Working with the Repository* manual, where you can store all your models and associated files.

- The *canvas* - is the primary pane that displays your present model diagram (see *Diagrams* on page 167) or report outline (see *Chapter 6, Reports* on page 205).
- The *palette* - provides graphical tools to help you quickly build model diagrams. The tools available will change depending on the type of diagram (see *Creating an Object from the Palette* on page 101).
- The *Output* window - shows the progress of any PowerDesigner process, such as checking a model or generating or reverse engineering a database.
- The *Result List* - displays the results of a search or a model check.

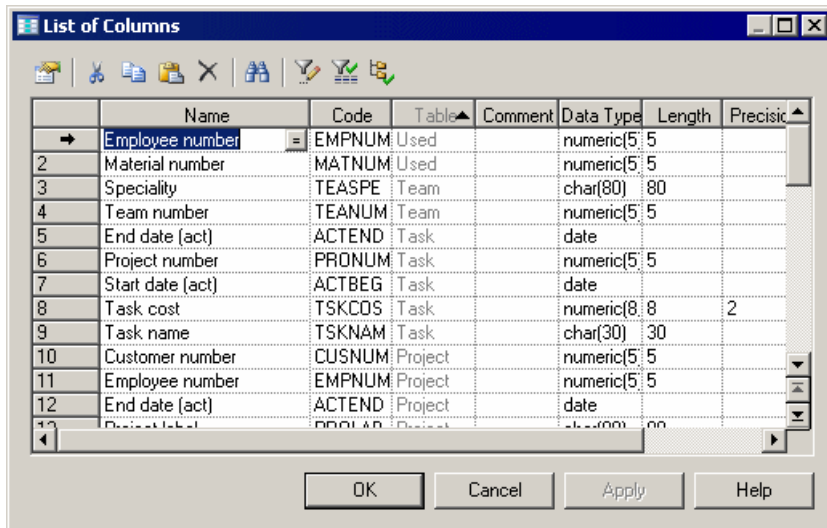
In addition, you will work extensively with:

- *Object property sheets* - which permit you to view and edit the object's properties (see *Object Properties* on page 104):



You can access an object's property sheet by double-clicking its symbol or browser entry, or right-clicking it and selecting **Properties**.

- *Object lists* - provide a spreadsheet-like presentation of, and allow for the easy creation and modification of objects in your model (see *Object Lists* on page 117):



Lists are available under the **Model** menu and on the property sheets of composite objects such as entities, tables, and classes, which contain subobjects.

The tools in the list toolbar allow you to create or add and to copy and delete objects in the list, and open their property sheets. You can Ctrl-click to select multiple objects in the list and then edit their properties simultaneously. Other tools allow you to control the columns displayed in the list and to filter the list.

## Modeling with PowerDesigner

PowerDesigner provides a unique set of enterprise modeling tools that bring together the standard techniques and notations of Business Process Modeling, Data Modeling and UML application modeling with other powerful features to assist you in analyzing, designing, building, and maintaining your applications, using software engineering best practices.

The PowerDesigner enterprise modeling solution enables you to closely integrate the design and maintenance of your application's core data layers with your project requirements, business processes, OO code, XML vocabularies, and database replication information. By providing you with a comprehensive set of models at all levels of abstraction, PowerDesigner helps you broaden the reach of your iterative design process to all aspects of your system architecture, from conception to deployment, and beyond.

PowerDesigner does not impose any particular software engineering methodology or process. Each company can implement its own workflow, defining responsibilities and roles, describing what tools to use, what validations are required, and what documents to produce at each step in the process.

A development team will comprise multiple user roles, including business analysts, analysts and designers, database administrators, developers, and testers, each of whom will use a different combination of PowerDesigner components:

- *Business Analysts* – define the architecture of the organization, the business requirements and high-level business flows.

They may use an Enterprise Architecture Model (EAM) *Enterprise Architecture Model (EAM)* for providing a big picture of the organization, for defining its structure, and analyzing high-level functions, processes, and flows. These architectural objects can be attached to implementation objects in any of the other models.

They may use a *Requirements Model (RQM)* for defining business requirements to be refined into technical requirements by Analysts and Designers. An RQM describes a project by listing and explaining precisely what features must be implemented during a development process, and who is responsible for them. These requirements can then be attached to any object in any of the other models in order to trace where, and how, they are met.

They may also use a *Business Process Model (BPM)* to define the high-level business process flows that describe existing and new systems, and to simulate business processes to reduce time and resource and increase revenue. A BPM represents your organization's processes in real business terms, and can be used as a design tool to identify your business needs, organize them in a hierarchy, display your processes graphically, and then generate components in process languages such as BPEL4WS.

- *Data Analysts and Designers* - will map technical requirements to business requirements. Going deeper into the analysis, you can define Use Cases (using an OOM, see below), and map them to requirements. You can write functional specifications and define more precisely the nature and details of each process, the application and its data structure. You will use a BPM, and additionally a *Conceptual Data Model (CDM)*, which is a platform-independent representation of a system, giving an abstract view of its static data structures. A PowerDesigner CDM permits real normalized data structures with many-to-many and super/sub-type relationships, and provides a clear view of business data across all systems, making system information accessible to business users, system architects, and business analysts.

- *Database Administrators* use the well-defined data structure to optimize, denormalize, and create the database. You will use a *Physical Data Model (PDM)*, which is a representation of a real database and associated objects running on a server with complete information on the structure of the physical objects, such as tables, columns, references, triggers, stored procedures, views, and indexes.

A PowerDesigner PDM can be used to generate all of the database code for any of the 50 supported RDBMSs. The PDM can be created by reverse engineering from a script or from a live server through a standard ODBC connection. By maintaining a PDM and a CDM, you can ensure that your final implementation exactly matches your system requirements, and that your analysis and design efforts are reflected exactly in your actual systems.

You may also use a *Logical Data Model (LDM)*, which can act as a bridge between a CDM and a PDM. More technically precise than a CDM, an LDM allows you to resolve many-

to-many and super/sub-type relationships, de-normalize your data structures, and define indexes, without specifying a particular RDBMS.

If you are responsible for database replication, you will also use an *Information Liquidity Model (ILM)*, which provides a global representation of the replication of information from a source database to one or several remote databases.

- *Developers* will write technical specifications in an RQM, and will model the application, defining object structures and behaviors, and Object/Relational mappings.

You will use an *Object-Oriented Model (OOM)*, which uses standard UML diagrams and notation to represent your objects and their interactions. It can be reverse-engineered from, and used to generate code for Java, .NET and many other languages. Close integration with your BPM, CDM, and PDM can greatly simplify the maintenance and development of your system.

You may also use an *XML Model (XSM)* to graphically model the complex structure of an XML file. Its diagram and tree views give you a global and schematic view of all the document elements, and this type of model can be used to generate DTDs, and XSDs directly from a PDM or OOM.

- *Team Leaders* will have an interest in all the models, and will want to ensure that all the requirements, design objects and documents are linked together via traceability links to allow for impact analysis and change management.

You will establish a *PowerDesigner Enterprise Repository* as a central point of storage. The repository supports metadata sharing, versioning, impact analysis, and reporting for models and other system documents, has a robust security model, and supports true enterprise scalability from a single repository instance.

You can ensure that up-to-date and accurate documentation is produced and widely available. The full-featured *Report Editor* allows you to automate the production of detailed reports (in RTF and HTML formats) on any or all of the components of your system for sharing design information within the project team and across the whole company.

A *Free Model (FEM)* can be used to create diagrams to explain the architecture of your system and applications, the use-case scenarios of applications, flowcharts, and other graphics.

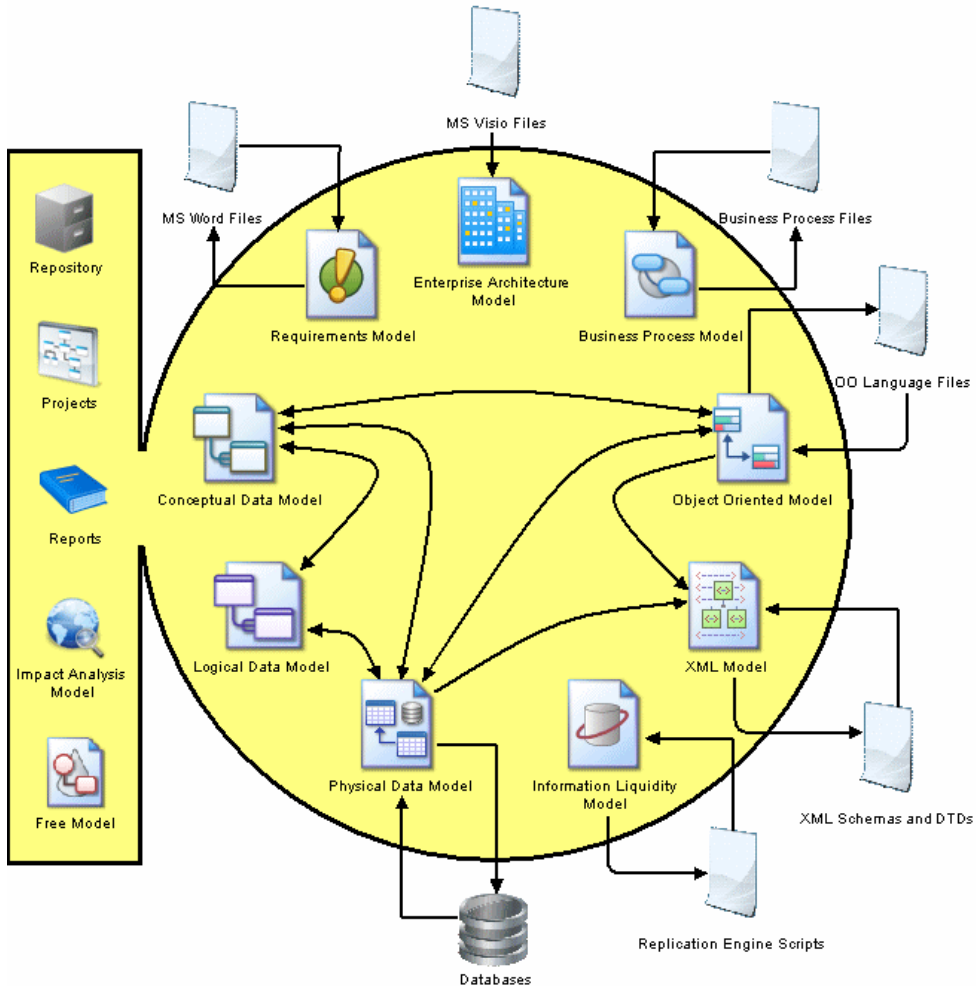
- *Testers* will use the RQM, CDM, and other models, together with the design documents to understand how the application should work and how it is developed.

## Linking and Synching

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PowerDesigner's sophisticated inter-model and code and database generation capabilities allow you to synchronize your models with each other and the applications they represent.

The following illustration shows the various file types that PowerDesigner can import and export and the kinds of inter-model generation (such as CDM to LDM and PDM and PDM to XSM and OOM) possible:



Additional forms of linking are provided by:

- Requirements traceability links - allow you to associate an object with a requirement. For more information, see the *Requirements Modeling* guide.
- Enterprise architecture objects – can be associated with objects in other models. For more information, see the *Enterprise Architecture Modeling* guide.
- Business process data – can be associated with objects in CDMs, PDMs, and OOMs. For more information, see the *Business Process Modeling* guide.
- Information liquidity inputs and outputs – are provided by BPMs, PDMs, and XSMs. For more information, see the *Information Liquidity Modeling* guide.
- Shortcuts and replications - allow you to reuse an object from one model in another. For more information, see *Chapter 11, Shortcuts and Object Replications* on page 355.

- Extended links and extended dependencies - allow you to link any object in any model to another. For more information, see *Creating Extended Dependencies* on page 334.

For detailed information about PowerDesigner's link and sync capabilities, see *Part II, Linking and Synchronizing Models* on page 329.

## PowerDesigner Documentation

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Full documentation is provided in the form of context-sensitive help (available by pressing F1) and as PDFs.

The following manuals are provided with your PowerDesigner installation:

- New Features Summary
- Installation Guide
- Core Features Guide
- Requirements Modeling
- Enterprise Architecture Modeling
- Business Process Modeling
- Data Modeling
- Information Liquidity Modeling
- Object-Oriented Modeling
- XML Modeling
- Working with the Repository
- Customizing and Extending PowerDesigner

This documentation is available:

- as online help by pressing F1
- as PDFs by selecting **Help > Online Documentation**
- for download from <http://sybooks.sybase.com>

Demonstration videos are also available. They can be installed with PowerDesigner (select **Help > Tutorial Videos**) or viewed from the installation CD.

For documentation of the PowerDesigner metamodel, click **Help > Metamodel Objects Help** (or click the **Find in MetaModel Objects Help** button at the bottom-right of the Version Info tab of the property sheet of any object).

## Creating a Model

---

You create a new model by selecting **File > New Model**.

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**Note:** A project can provide a convenient environment for working with multiple interconnected models and other files. For detailed information about working with projects, see *Chapter 2, Projects and Frameworks* on page 37.

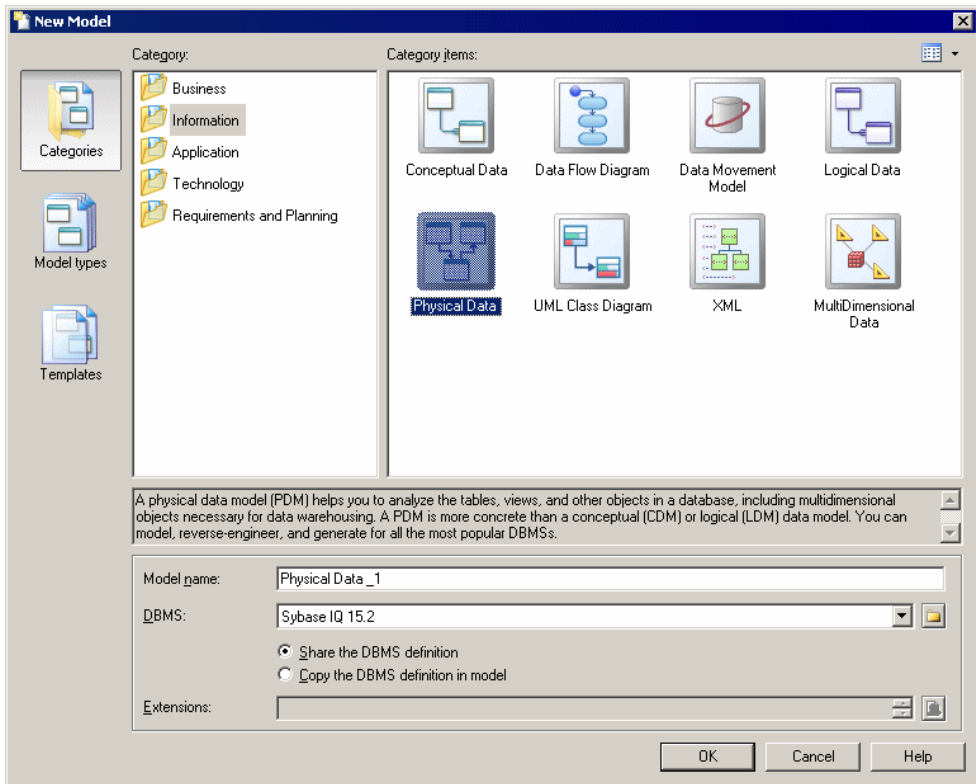
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**Note:** For information about creating new models in the PowerDesigner Eclipse and Visual Studio plugins, see *Creating a Model in Eclipse* on page 456 and *Creating a Model in Visual Studio* on page 471.

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The New Model dialog is highly configurable, and your administrator may have hidden options that are not relevant for your work or provided templates or predefined models to guide you through model creation. When you open the dialog, one or more of the following buttons will be available on the left hand side:









- **Categories** - which provides a set of predefined models and diagrams sorted in a configurable category structure.
- **Model types** - which provides the classic list of PowerDesigner model types and diagrams.
- **Template files** - which provides a set of model templates sorted by model type.




1. Select **File > New Model** to open the New Model dialog.
2. Click a button, and then select a category or model type ( as appropriate ) in the left-hand pane.

The following table lists the PowerDesigner model types:

Icon	Model definition	File ext	Back-up ext
	Requirements Model. A <i>requirements model (RQM)</i> helps you analyze any kind of written requirements and link them with users and groups who will implement them and with design objects in other models. You can use an RQM to represent any structured document (e.g. functional specification, test plan, business goals, etc.) and import and export hierarchies of requirements as MS Word documents.	.rqm	.rqb
	Enterprise Architecture Model. An <i>enterprise architecture model (EAM)</i> helps you analyze and document your organization and its business functions, along with the applications and systems that support them and the physical architecture on which they are implemented.	.eam	.eab

Icon	Model definition	File ext	Back-up ext
	Business Process Model. A <i>business process model (BPM)</i> helps you identify, describe, and decompose business processes. You can analyze your system at various levels of detail, and focus alternatively on control flow (the sequence of execution) or data flow (the exchange of data). You can use BPEL, BPMN, and many other process languages.	.bpm	.bpb
	Conceptual Data Model. A <i>conceptual data model (CDM)</i> helps you analyze the conceptual structure of an information system, to identify the principal entities to be represented, their attributes, and the relationships between them. A CDM is more abstract than a logical (LDM) or physical (PDM) data model.	.cdm	.cdb
	Logical Data Model. A <i>logical data model (LDM)</i> helps you analyze the structure of an information system, independent of any specific physical database implementation. An LDM has migrated entity identifiers and is less abstract than a conceptual data model (CDM), but does not allow you to model views, indexes and other elements that are available in the more concrete physical data model (PDM).	.ldm	.ldb
	Physical Data Model. A <i>physical data model (PDM)</i> helps you to analyze the tables, views, and other objects in a database, including multidimensional objects necessary for data warehousing. A PDM is more concrete than a conceptual (CDM) or logical (LDM) data model. You can model, reverse-engineer, and generate for all the most popular DBMSs.	.pdm	.pdb
	Information Liquidity Model. An <i>information liquidity model (ILM)</i> provides a global view of the movement of information in your organization. You can analyze and document where your data originates, where it moves to, and how it is transformed on the way, including replications and ETL.	.ilm	.ilb
	Object Oriented Model. An <i>object-oriented model (OOM)</i> helps you analyze an information system through use cases, structural and behavioral analyses, and in terms of deployment, using the Unified Modeling Language (UML). You can model, reverse-engineer, and generate for Java, .NET and other languages.	.oom	.oob
	XML Model. An <i>XML model (XSM)</i> helps you analyze an XML Schema Definition (.XSD), Document Type Definition (.DTD) or XML-Data Reduced (.XDR) file. You can model, reverse-engineer, and generate each of these file formats.	.xsm	.xsb
	Free Model. A <i>free model (FEM)</i> provides a context-free environment for modeling any kind of objects or systems. It is generally associated with a set of extensions, which allow you to define your own concepts and graphical symbols.	.fem	.feb

Icon	Model definition	File ext	Back-up ext
	Multi-Model Report. A <i>multimodel report (MMR)</i> is a PowerDesigner report that can document any number of models together and show the links between them. To create such a report, you must have at least one model open in the workspace, and you can add additional models at any time.	.mmr	.bmr

3. Select an item in the right-hand pane. Depending on how your New Model dialog is configured, these items may be first diagrams or templates on which to base the creation of your model.

Use the **Views** tool on the upper right hand side of the dialog to control the display of the items.

4. Enter a model name.

The code of the model, which is used for script or code generation, is derived from this name according to the model naming conventions.

5. [when available] Select a *resource file*, and specify whether to:

- **Share the *resource file* definition** – creates a link to the file in the `Resource Files\` directory. Changes made to the target affect all models that share it.
- **Copy the *resource file* definition in model** – makes a copy of the resource file and saves it with the model. Changes made to the target affect only the current model.

For more information about PowerDesigner resource files, and how to add extensions to them, see the *Customizing and Extending PowerDesigner* manual.

6. [optional] Click the **Select Extensions** button and attach one or more extensions to your model.
7. Click **OK** to create and open the model .

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**Note:** Sample models are available in the Example Directory.

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**Note:** For information about attaching XEMs to your model, see *Attaching Extensions* on page 15. For information about the diagrams that are available in these model types, see *PowerDesigner Models and Diagrams* on page 16.

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## Attaching Extensions

The Select Extensions dialog allows you to attach extensions to your model at creation time. Extended model definitions may contain additional types of objects or extensions to standard objects, along with additional generation targets and other extensions to PowerDesigner's standard capabilities.

1. Click the **Select Extensions** tool in the New Model dialog.
2. Review the different sorts of extensions available by clicking the sub-tabs and select one or more to attach to your model.

3. Select one of the following radio buttons:
  - **Share** – creates a link to the XEM file. Changes made to the target affect all models that share it.
  - **Copy** – creates a copy of the XEM and saves it with the model. Changes made to the target affect only the current model.
4. Click **OK** to close the dialog and return to the New Model dialog.

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**Note:** You can attach extensions to your model after creation by selecting **Model > Extended Model Definitions** and clicking the **Import an Extended Model Definition** tool.

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## PowerDesigner Models and Diagrams

PowerDesigner provides a wide range of models and diagrams for all your modeling needs.

- A *requirements model (RQM)* helps you analyze any kind of written requirements and link them with users and groups who will implement them and with design objects in other models. You can use an RQM to represent any structured document (e.g. functional specification, test plan, business goals, etc.) and import and export hierarchies of requirements as MS Word documents.
  - A *requirements document view* displays a list of written requirements in a hierarchic grid.
  - A *traceability matrix view* displays the links between requirements and objects from other types of models, external files or other requirements.
  - A *user allocation matrix view* displays the links between requirements and the users and groups who will fulfill them.
- An *enterprise architecture model (EAM)* helps you analyze and document your organization and its business functions, along with the applications and systems that support them and the physical architecture on which they are implemented.
  - A *process map* provides a graphical view of your business architecture, and helps you identify your business functions and high-level processes, independent of the people and business units who fulfill them.
  - An *organization chart* provides a graphical view of your organization as a tree structure, and helps you analyze and display the relationships between organization units (divisions, groups, teams, etc), individuals, and roles.
  - A *business communication diagram* provides a graphical view of your organization, and helps you analyze, the relationships, flows, and other connections between business functions, organization units, roles, and sites.
  - A *city planning diagram* provides a graphical view of the big picture of your enterprise architecture, using the metaphor of planning the infrastructure of a city to represent the organization of systems, applications, etc into architectural areas.
  - A *service-oriented diagram* provides a graphical view of your business and application services and the relationships between them, and helps you associate applications and

other application layer objects with business services and processes to assist with SOA design.

- An *application architecture diagram* provides a high-level graphical view of the application architecture, and helps you identify applications, sub-applications, components, databases, services, etc, and their interactions.
- A *technology infrastructure diagram* provides a high-level graphical view of the physical architecture required to support the application architecture.
- A *business process model (BPM)* helps you identify, describe, and decompose business processes. You can analyze your system at various levels of detail, and focus alternatively on control flow (the sequence of execution) or data flow (the exchange of data). You can use BPEL, BPMN, and many other process languages.
  - A *business process diagram* (or process flow diagram) provides a graphical view of the control flow (the sequence of execution) or data flow (the exchange of data) between processes at any level in your system.
  - A *process hierarchy diagram* (or functional decomposition diagram) provides a graphical view of the functions of a system and helps you decompose them into a tree of sub-processes.
  - A *process service diagram* provides a graphical view of the services, operations, and interfaces available in your system.
- A *conceptual data model (CDM)* helps you analyze the conceptual structure of an information system, to identify the principal entities to be represented, their attributes, and the relationships between them. A CDM is more abstract than a logical (LDM) or physical (PDM) data model.
  - A *conceptual data diagram* provides a graphical view of the conceptual structure of an information system, and helps you identify the principal entities to be represented, their attributes, and the relationships between them.
- A *logical data model (LDM)* helps you analyze the structure of an information system, independent of any specific physical database implementation. An LDM has migrated entity identifiers and is less abstract than a conceptual data model (CDM), but does not allow you to model views, indexes and other elements that are available in the more concrete physical data model (PDM).
  - A *logical data diagram* provides a graphical view of the structure of an information system, and helps you analyze the structure of your data system through entities and relationships, in which primary identifiers migrate along one-to-many relationships to become foreign identifiers, and many-to-many relationships can be replaced by intermediate entities.
- A *physical data model (PDM)* helps you to analyze the tables, views, and other objects in a database, including multidimensional objects necessary for data warehousing. A PDM is more concrete than a conceptual (CDM) or logical (LDM) data model. You can model, reverse-engineer, and generate for all the most popular DBMSs.
  - A *physical data diagram* provides a graphical view of your database structure, and helps you analyze its tables (including their columns, indexes, and triggers), views, and procedures, and the references between them.

- A *multidimensional data diagram* provides a graphical view of your datamart or data warehouse database, and helps you identify its facts, cubes and dimensions.
- An *information liquidity model (ILM)* provides a global view of the movement of information in your organization. You can analyze and document where your data originates, where it moves to, and how it is transformed on the way, including replications and ETL.
  - An *information liquidity diagram* provides a high-level graphical view of the liquidity of your information, including data sources, replications, and ETL operations.
  - A *data transformation diagram* provides a graphical view of the inputs, outputs, and steps involved in a data transformation task.
  - A *transformation control flow diagram* provides a graphical view of the order in which a series of data transformation tasks is linked together in a control flow.
- An *object-oriented model (OOM)* helps you analyze an information system through use cases, structural and behavioral analyses, and in terms of deployment, using the Unified Modeling Language (UML). You can model, reverse-engineer, and generate for Java, .NET and other languages.
  - A *use case diagram* is a UML diagram that provides a graphical view of the requirements of your system, and helps you identify how users interact with it.
  - A *class diagram* is a UML diagram that provides a graphical view of the classes, interfaces, and packages that compose a system, and the relationships between them.
  - An *object diagram* is a UML diagram that provides a graphical view of the structure of a system through concrete instances of classes (objects), associations (instance links), and dependencies.
  - A *composite structure diagram* is a UML diagram that provides a graphical view of the classes, interfaces, and packages that compose a system, including the ports and parts that describe their internal structures.
  - A *package diagram* is a UML diagram that provides a high-level graphical view of the organization of your application, and helps you identify generalization and dependency links between the packages.
  - A *sequence diagram* is a UML diagram that provides a graphical view of the chronology of the exchange of messages between objects and actors for a use case, the execution of an operation, or an interaction between classes, with an emphasis on their chronology.
  - A *communication diagram* is a UML diagram that provides a graphical view of the interactions between objects for a use case scenario, the execution of an operation, or an interaction between classes, with an emphasis on the system structure.
  - An *interaction diagram* is a UML diagram that provides a high-level graphical view of the control flow of your system as it is decomposed into sequence and other interaction diagrams.
  - An *activity diagram* is a UML diagram that provides a graphical view of a system behavior, and helps you functionally decompose it in order to analyze how it will be implemented.

- A *statechart diagram* is a UML diagram that provides a graphical view of a State Machine, the public behavior of a classifier (component or class), in the form of the changes over time of the state of the classifier and of the events that permit the transition from one state to another.
- A *component diagram* is a UML diagram that provides a graphical view of the dependencies and generalizations among software components, including source code components, binary code components, and executable components.
- A *deployment diagram* is a UML diagram that provides a graphical view of the physical configuration of run-time elements of your system.
- An *XML model (XSM)* helps you analyze an XML Schema Definition (.XSD), Document Type Definition (.DTD) or XML-Data Reduced (.XDR) file. You can model, reverse-engineer, and generate each of these file formats.
  - An *XML diagram* provides a graphical view of the elements that comprise an XML schema definition in a tree format.
- A *free model (FEM)* provides a context-free environment for modeling any kind of objects or systems. It is generally associated with a set of extensions, which allow you to define your own concepts and graphical symbols.
  - A *free diagram* provides a context-free graphical environment for modeling any kind of objects or systems.
- A *multimodel report (MMR)* is a PowerDesigner report that can document any number of models together and show the links between them. To create such a report, you must have at least one model open in the workspace, and you can add additional models at any time.
  - A *multimodel report (MMR)* is a PowerDesigner report that can document any number of models. To create such a report, you must have at least one model open in the workspace, and you can add additional models at any time.

## Saving a Model

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Each model is saved in a separate file, with an extension specific to its model type. When you save a model, PowerDesigner also automatically creates a backup copy.

1. Select **File > Save**.

*or*

Click the Save tool in the PowerDesigner toolbar.

*or*

Right-click the model in the Browser and select Save.

2. Right-click the model and select Close.

## Next Steps

Now that you are familiar with the PowerDesigner Interface, you will want to start experimenting with a particular type of model suitable to your needs:

- *Requirements Model (RQM)* - Now turn to the *Requirements Data Modeling* guide where you will learn how to:
  - Add, modify, promote and demote requirements in the requirements hierarchy
  - Allocate requirements to particular team members and add traceability links to other model components
  - Import requirements from a structured MS Word document
  - View traceability and user allocation reports
- *Enterprise Architecture Model (EAM)* - Now turn to the *Enterprise Architecture Modeling* guide where you will learn how to:
  - Create diagrams in the business, application, and technology layers
  - Import Visio diagrams
  - Export and Import objects to and from other models
- *Business Process Model (BPM)* - Now turn to the *Business Process Modeling* guide where you will learn how to:
  - Create Process Hierarchy, Business Process, Process Service, and Composite Process diagrams
  - Manipulate Service Description Objects
  - Generate an executable BPM, and implement processes
- *Conceptual Data Model (CDM), Logical Data Model (LDM), or Physical Data Model (PDM)* - Now turn to the *Data Modeling* guide where you will learn how to:
  - Create CDM entities and relationships between them
  - Create LDM or PDM tables, columns, primary keys, indexes, and references and define referential integrity
  - Create PDM views, triggers, and abstract data types
  - Create business rules, domains, and data items
  - Generate a PDM from your CDM or LDM
  - Reverse engineer from and generate to database scripts
  - Work with PDM multidimensional diagrams
- *Information Liquidity Model (ILM)* - Now turn to the *Information Liquidity Modeling* guide where you will learn how to:
  - Define databases, replication processes, event scripts, and other replication objects
  - Reverse engineer from and generate to the Replication Server® and Mobilink replication engines
- *Object-Oriented Model (OOM)* - Now turn to the *Object-Oriented Modeling* guide where you will learn how to:
  - Design class, use case, and other standard UML diagrams

- Generate a PDM with O/R mapping
- Create an EJB
- Deploy a component
- *XML Model (XSM)* - Now turn to the *XML Modeling* guide where you will learn how to:
  - Define elements, entities, and other components of an XML schema
  - Reverse engineer from and generate to DTD, XSD, and XDR files
  - Generate an XSM from a PDM or OOM

## Connecting to a Database

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PowerDesigner allows you to define *data connections* to access information in different database management systems (DBMSs) using Structured Query Language (SQL).

A data connection processes function calls and SQL requests coming from PowerDesigner and sends them to a data source, and returns results to PowerDesigner.

The PowerDesigner physical data model (PDM) and information liquidity model (ILM) allow you to define data connections for target databases in order to generate your models and reverse engineer your data sources. The PowerDesigner repository requires a database to store your models and other design documents.

See the *Physical Data Model* and *Information Liquidity Model* users guides, and *Working with the Repository*.

PowerDesigner supports various forms of connection, and your choice will depend on the interface that you have already installed:

You have...	Configure a connection of type...
ODBC driver	ODBC machine or file data source
DBMS client	Native connection profile
JDBC driver	JDBC connection profile

For information about connecting with an ODBC driver, see *Configuring ODBC machine and file data sources* on page 22.

For information about connecting with a DBMS client or JDBC driver, see *Configuring connection profiles* on page 24.

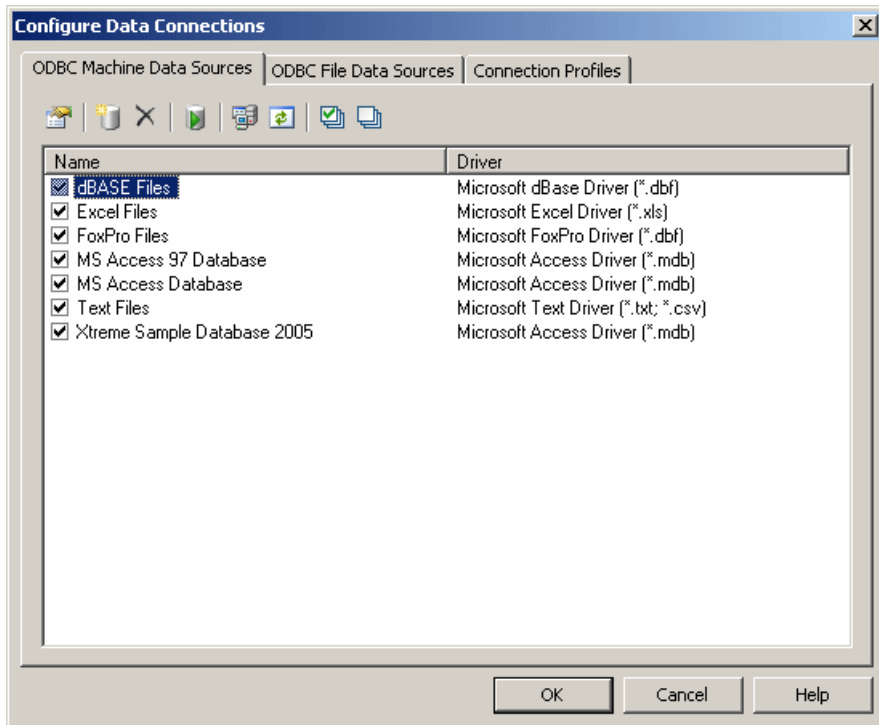
## Configuring ODBC Machine and File Data Sources

There are three types of Open Database Connectivity (ODBC) data sources:

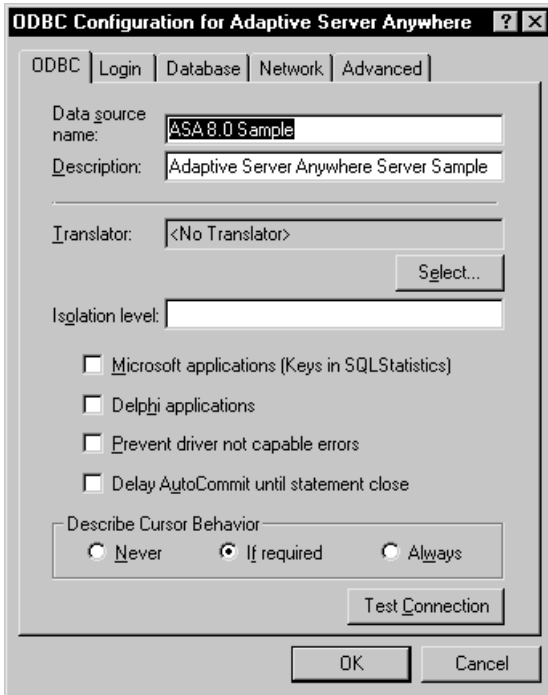
Data source	Description
Machine	Data source is created on the client machine, and is available to the user currently logged onto the system. Machine data sources are stored in the part of the registry containing settings for the current user.
System	Data source is created on the client machine, and is available to all users regardless of whether a user is logged onto the system or not. System data sources are stored in the part of the registry containing settings for the current machine.
File	Data source is stored as a file. A file data source has the extension .dsn. It can be used by different users if it is placed in the default location for file data sources. File data sources are usually managed by database administrators.

You define data sources using the Windows ODBC Administrator, which you can access directly from PowerDesigner:

1. Select **Database > Configure Connections** to open the Configure Data Connections window, and click the ODBC Machine Data Source or ODBC File Data Sources tab.



2. Click the Add Data Source tool (see *Data connection tools* on page 29) to open the Create New Data Source window, and select a File, User, or Machine data source as appropriate and click Next.
3. Select the appropriate driver for your DBMS and click Next and then Finish to access a driver-specific configuration dialog:

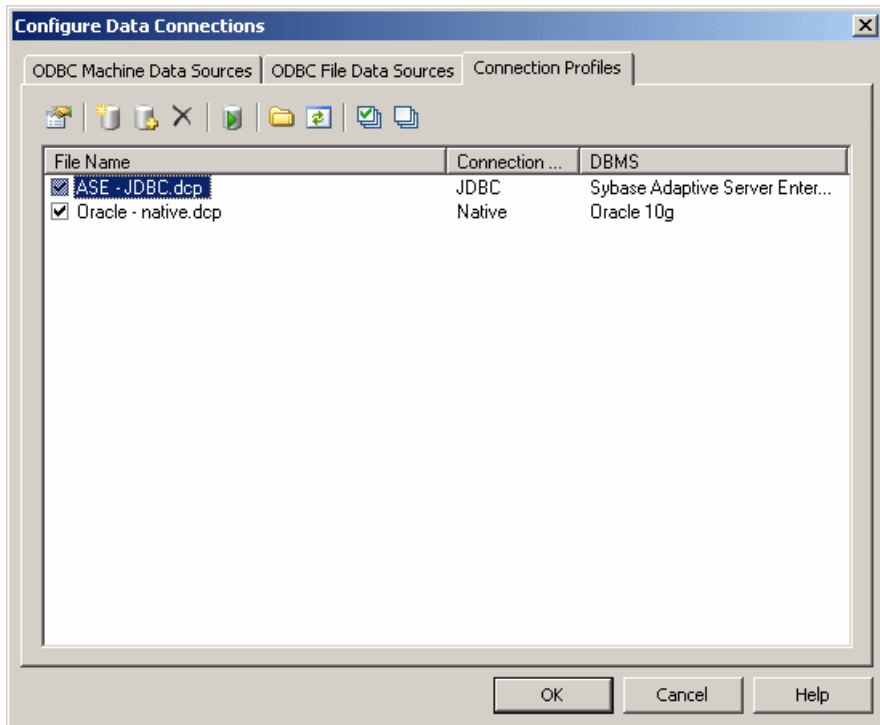


4. Enter the appropriate parameters and then click OK to return to the Configure Data Connections window.
5. Click OK to return to your model.

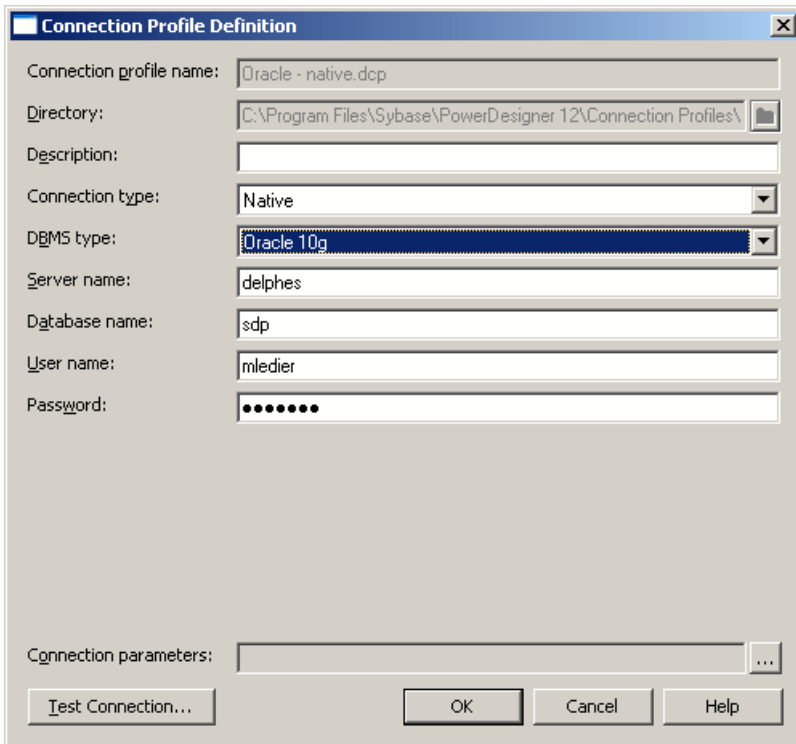
## Configuring Connection Profiles

Before you can connect to a database through a DBMS client or JDBC driver, you must create an appropriate connection profile.

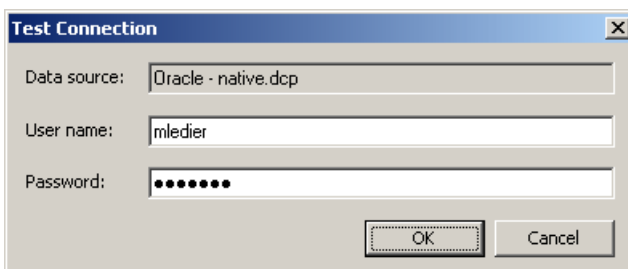
1. Select **Database > Configure Connections** to open the Configure Data Connections Window, and click the Connection Profiles tab:



2. Click the Add Data Source tool (see *Data connection tools* on page 29) to open a Connection Profile Definition window:



3. Enter the properties (see *Connection profile properties* on page 27) appropriate to your method of connection.
4. Click the Test Connection button to open the Test Connection window, and click OK to test your connection.



5. Click OK to close the profile definition, and return to the Configure Data Connections window
6. Click Ok to return to your model

### **Connection Profile Properties**

The following properties are available in the Connection Profile Definition window:

<b>Property</b>	<b>Description</b>
Connection profile name	Specifies the name of the connection profile.
Directory	Specifies the directory in which the .dcp connection file will be created. By default .dcp files are stored in the Connection Profiles directory directly beneath the PowerDesigner installation directory.
Description	Optional additional description of the connection profile.
Connection type	Specifies the type of connection profile. You can choose between: <ul style="list-style-type: none"> <li>• Native</li> <li>• JDBC</li> </ul> <p>The choice of connection type will affect the remaining fields to be completed.</p>
DBMS type	Specifies the DBMS to which the connection profile will connect. The list includes only those DBMSs supported for the specified connection type.
Server name	[Native only] Specifies the name of the database server to connect to.
Database name	[Native only] Specifies the name of the database to connect to.
User name	Specifies the username to use when connecting.
Password	Specifies the password to use when connecting.
JDBC driver class	[JDBC only] Specifies the driver class to use for the connection.
JDBC connection URL	[JDBC only] Specifies the connection URL to use for the connection.
JDBC driver jar files	[JDBC only] Specifies the driver jar file to use for the connection.
Connection parameters	Specifies advanced connection parameters. Click the parenthesis tool to the right of this field to access the Connection Parameters window.

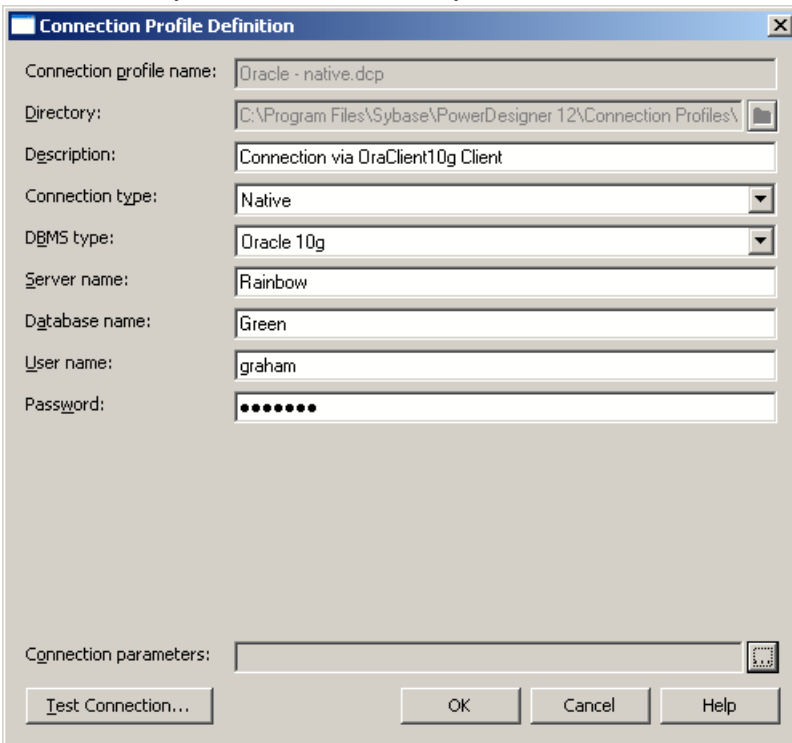
### **Connection Parameters Window**

You access this window by clicking the parenthesis tool to the right of the Connection parameters field in the Connection Profile Definition window.

1. Click the Add a Row tool to create a new parameter.
2. Enter a name and value pair in the two columns.
3. Click OK to return to the Connection Profile Definition window. All the parameters are listed in the read-only Connection parameters field.

## Native Connection Profile Example

In the example below, I have installed the Oracle DBMS client, and so create a Native connection to my database, "Green", on my server "Rainbow".



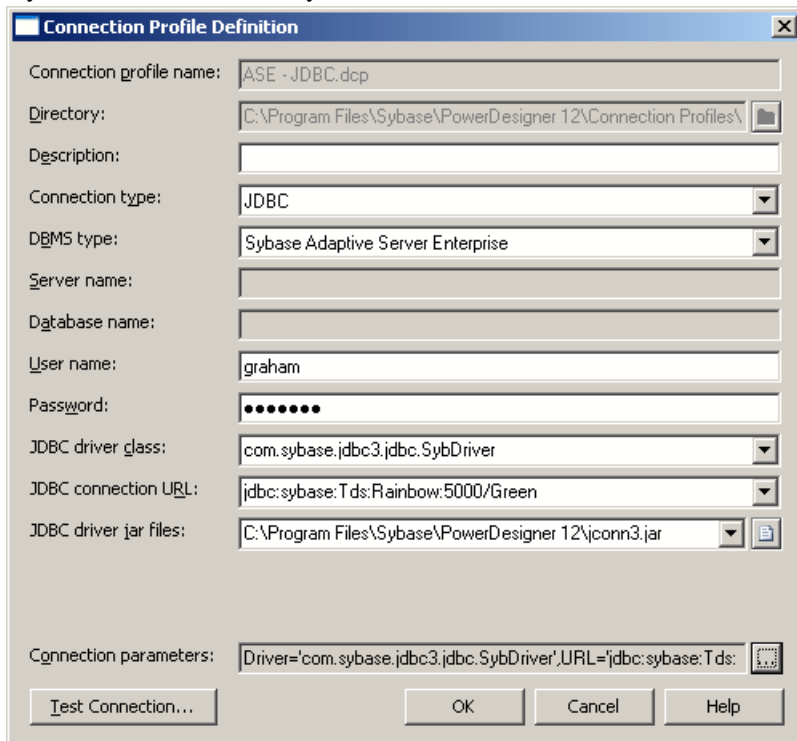
The screenshot shows the 'Connection Profile Definition' dialog box with the following fields and values:

- Connection profile name: Oracle - native.dcp
- Directory: C:\Program Files\Sybase\PowerDesigner 12\Connection Profiles\
- Description: Connection via OraClient10g Client
- Connection type: Native
- DBMS type: Oracle 10g
- Server name: Rainbow
- Database name: Green
- User name: graham
- Password: [masked with dots]
- Connection parameters: [empty]

Buttons at the bottom: Test Connection..., OK, Cancel, Help.






### JDBC Connection Profile Example






In the example below, I have installed the Sybase ASE JDBC driver. I specify the appropriate driver class in the jar file, and assemble the connection URL to create a JDBC connection to my database, "Green", on my server "Rainbow".



### Data Connection Tools

The following tools are available in the Configure Data Connections window:

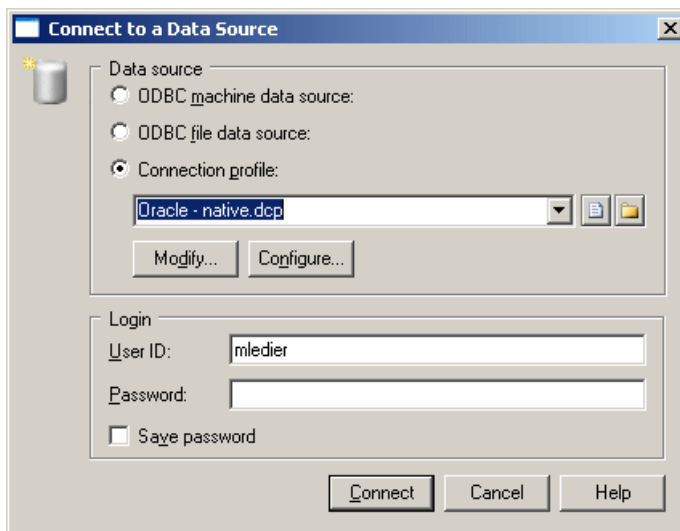
Tool	Description
	Properties – Opens the ODBC Setup or Connection Profile Definition dialog for the selected profile.
	Add Data Source – Creates a new connection.
	Browse Data Source File [ODBC file data sources and connection profiles] – Opens a file browser to select a .dcp profile file.
	Delete – Deletes the selected connection.
	Test Connection – Tests the selected connection.

Tool	Description
	ODBC Administrator [ODBC machine and file data sources] – Opens the ODBC Data Sources Administrator window.
	Change Connection Profiles Directory [Connection profiles] – Opens a file browser in which to search for profiles. The default directory is install_dir/Connection Profiles.
	Refresh – Refreshes the list of connections.
	Select All – Selects all the connections in the list. Connections that are selected will be displayed in lists in the PowerDesigner interface.
	Unselect All - Unselects all the connections in the list. Connections that are not selected will not be displayed in lists in the PowerDesigner interface.

## Connecting to a Data Source

When you connect to your database, PowerDesigner can communicate with it for reverse-engineering, generation or any other form of request.

1. Select **Database > Connect** to open the Connect to a Data Source window:



2. Select one of the following radio buttons, depending on your chosen method for connecting to your data source:
  - ODBC machine data source (see *Configuring ODBC machine and file data sources* on page 22)
  - ODBC file data source (see *Configuring ODBC machine and file data sources* on page 22) - use the tool to the right of the data source field to browse to a new file

- Connection profile (see *Configuring connection profiles* on page 24) - use the tools to the right of the data source field to browse to a new directory or file

You can use the Modify and Configure buttons to modify or configure your connection.

3. Enter your user ID and password, and then click Connect. If prompted by your data source, you may need to enter additional connection parameters.




---

**Note:** You stay connected until you disconnect or terminate the shell session.

---

## Running SQL Queries Against Your Database

You can use the Execute SQL Query dialog to query your database. The following tools are available in the Edit/Run Script editor toolbar:

Tool	Description
	Open Editor Contextual menu (shift + F11)
	Edit With (ctrl + E). Opens the previously defined default editor (see "Specifying text editors" in the Customizing your Modeling Environment). Click the down arrow to select another editor.
	Run (F5). Executes the current script
[n/a]	Insert Bookmark (ctrl + F2) – inserts a blue bookmark box at the cursor position. Press ctrl + F2 to delete the bookmark.
[n/a]	Go to Next Bookmark (F2)
[n/a]	Go to Previous Bookmark (shift + F2)

## PowerDesigner License Management

PowerDesigner is licensed as a package of modules, or types of model. Various packages are available, each regrouping some or all of the modules. Your permission to use these modules is controlled by the Sybase licensing system, SySam.

For detailed information about SySAM, visit <http://www.sybase.com/sysam>.

You can evaluate PowerDesigner by obtaining a fully featured trial version, which expires 15 days after installation. If you need more than 15 days to evaluate PowerDesigner, you can obtain an extension from Sybase, which will be provided as a standalone local license granted for a limited period of time.

To continue to use PowerDesigner after the trial period, you must purchase a regular license from Sybase or a reseller. The following types of license are available:

- *Standalone seat (local)* – the license is installed on a specific machine and cannot be used on other machines. PowerDesigner reviews the local license file and authorizes only the use of modules for which a valid license is present.

This license type is convenient for smaller teams as it does not require a license server, but does not allow you to centralize license management. For information about obtaining the license, see "Obtaining a license key file" in the Installing PowerDesigner chapter of the *Installation Guide*.

- *Standalone seat (served)* – the license is for a specific machine but, instead of being installed on that machine, it is served from a license server. You must be connected to the license server to obtain the license when you start PowerDesigner, and connect to the server at least once every 30 days in order to retain it.

This license type is convenient for larger teams, when you want the security of centralized license activation and management.

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**Note:** A 15 day grace period is granted for users with standalone licenses when the license server cannot be contacted or the license file cannot be read. There is no grace period for floating licenses.

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- *Floating license (served)* – licenses are not assigned to a specific machine, but can be requested from the license server by any machine, and are returned after use, or after 3 hours of inactivity. You must be connected to the license server in order to obtain a license, and must remain in contact (brief losses of contact only are permitted) in order to continue using it. If you lose contact with the server, you will be given 24 hours to save your work before PowerDesigner closes.

This license type is convenient for teams of all sizes, where usage patterns allow the sharing of licenses. For periods when you must be out of contact with the server, you can request a mobile license (see *Obtaining a mobile license* on page 34) for up to 30 days.

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**Note:** For information about setting up a license server, see the Installing PowerDesigner chapter of the *Installation Guide*.

---

## **License Management Wizard**

The License Management Wizard provides the same licensing options as the PowerDesigner setup program. Note that you do not need to be administrator on your machine to access the License Management Wizard. You may need to access the wizard when:

- *Moving from a trial license to a regular license* - Note that you may need to rerun the setup program before launching the wizard if you need to install additional modules.
- *Extending a trial license* – After having requested your extension (which will be in the form of a time-limited standalone local license) from Sybase
- *Obtaining a trial of a new package* – You will need to rerun setup to install the additional modules before launching the wizard.
- *Moving from a standalone local to a standalone served license* – You must be able to connect to the license server to make this change.
- *Moving from a standalone to a floating license* – You must be able to connect to the license server to make this change.

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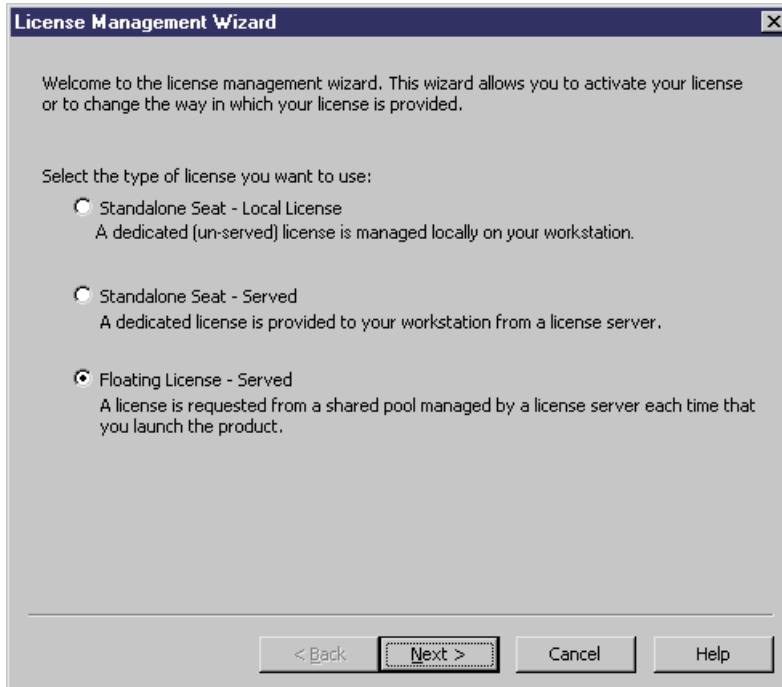
**Note:** The PowerDesigner plugin for Sybase Workspace, which is called Enterprise Modeling, is licensed with the other components of Workspace, and the following procedure

is not available for Workspace users. For more information about licensing in Workspace, see the Sysam documentation provided with Workspace.

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1. Select **Tools > License Parameters** to open the Wizard. Note that:

- If you have taken a mobile license, you will be prompted to return it before accessing the wizard
- If you are using a served license and the server cannot be contacted, an error message will be displayed and you will not be able to access the wizard



2. Select a type of license (see *PowerDesigner License Management* on page 31) and then click Next.
3. [if you select to use a local license] You will be required to provide a valid license key. Follow the instructions on the page to load the key and then click Finish to validate your license and exit the wizard:
4. [if you select to use a served license] Specify the name of the license server (and if your administrator has specified one, a port number):

Click Next, specify the PowerDesigner package that you want to use, and then click Finish to validate your license and exit the wizard.

---

**Note:** The list displays all the packages that are available on the server but does not necessarily mean that a license for a particular package is available. If there is no license

available for the package you have selected, you must either select an alternate package or click Cancel to restore your existing license configuration.

---

5. When you click Finish, the following changes occur:
  - If you are in trial mode, a license agreement dialog box is displayed.
  - If you have selected a standalone local license, the license file information is added to the license folder as a new license file.
  - If you have selected a served option (standalone or floating) a new license file is created to store the server name and port number.
  - If you have selected a different package, the new models of the package will be available the next time you start PowerDesigner.

## **Obtaining a Mobile License**

When you are using a floating license and will be out of contact with the license server, you can borrow a mobile license, which you can retain for up to 30 days.

1. Select **Tools > Take Mobile License**.  
A confirmation dialog box is displayed.
2. Click Yes to obtain a mobile license and click OK to confirm.

## **Returning a Mobile License**

When you no longer need the mobile license you should return it to the server to make it available to the general license pool.

If you do not return it before 30 days, it is automatically recovered, and you will not be able to use PowerDesigner before recontacting the server.

1. Select **Tools > Return Mobile License**.  
A confirmation dialog box is displayed.
2. Click Yes to return the mobile license and click OK to confirm.

## **Troubleshooting Licensing Problems**

In rare cases, PowerDesigner may repeatedly fail to obtain authorization from a local license file or the license server. If this happens, you can troubleshoot as follows:

1. Exit PowerDesigner and navigate to the following directory:  
C:\Documents and Settings\All Users\Application Data\PowerDesigner *x*
2. Move any file with the .lic extension this folder to a safe place.
3. Make a backup copy of the file sysam.properties, and open it in a text editor. Remove the lines starting "Pd.LicenseMode" and "Pd.Package" at the end of the file and save the file.
4. Restart PowerDesigner.

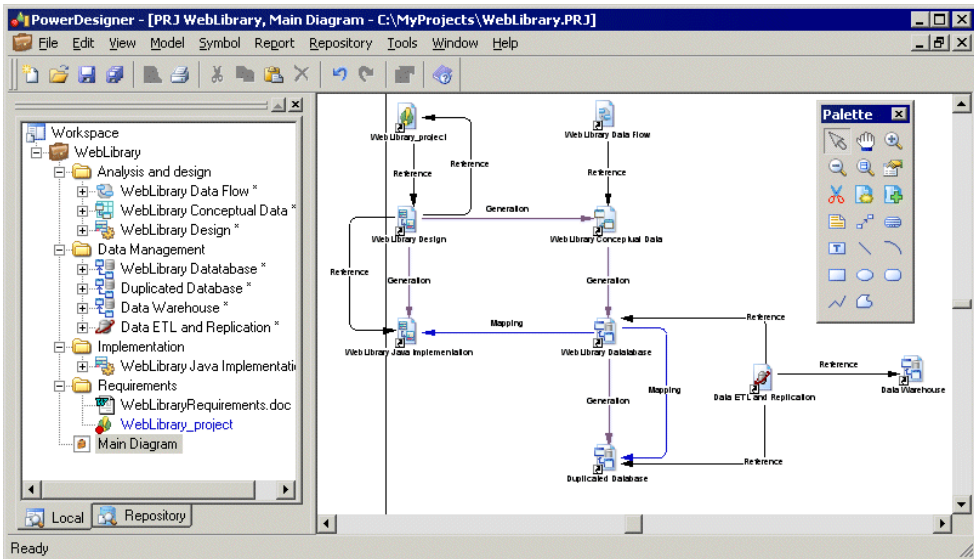
You will be prompted to open the License Management Wizard (see *License Management Wizard* on page 32). Re-load your local license key or select the appropriate served license type.



## CHAPTER 2 Projects and Frameworks

A project allows you to group together all the models and other types of documents you need for a particular modeling task, and save them as a simple entity in your repository.

A project can contain one or more project diagrams (see *Project Diagrams* on page 39), which show the connections between models and other documents:



Your project can also contain one or more framework diagrams and/or a framework matrix, which direct how your project must be modeled and list the documents that are needed (see *Completing Framework Diagrams and Matrices* on page 46).

You can create a project from scratch or from a template. PowerDesigner provides a set of predefined project templates, and you can also create your own (see *Project Templates* on page 70).

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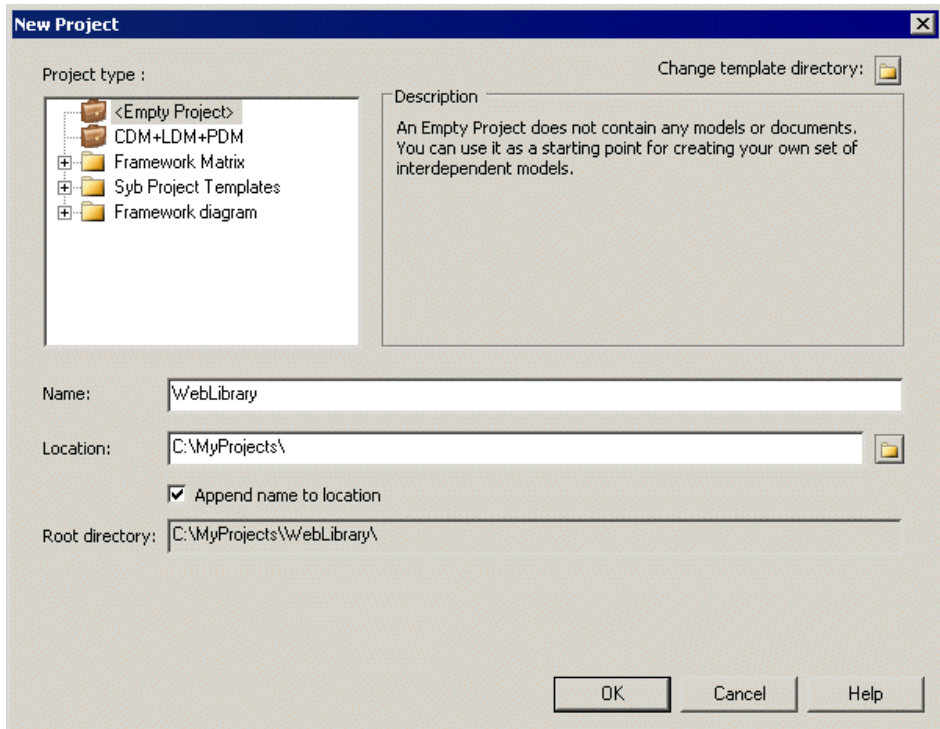
**Note:** Projects and framework diagrams and matrices are only available with Enterprise versions of PowerDesigner.

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## Creating a Project

Every project (.prj) contains at least one diagram, and any number of model or file documents. The project can also contain one or more framework diagrams, a framework matrix, and one or more dependency matrices.

1. Select **File > New Project** to open the New Project dialog box.



2. Select a type of project in the tree. You can choose to create:
  - An empty project.
  - A project based on a template (see *Project Templates* on page 70). Click the **Change Template Directory** tool to search for templates in another location.
3. Enter a project name and location, and select the **Append Name To Location** check box if you want to add the project name to the root directory.
4. Click **OK** to close the dialog box, and create the project.

The project opens. You can add models and other documents to your project (see *Building a Project* on page 39 and *Completing Framework Diagrams and Matrices* on page 46).

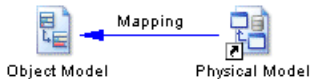
## Building a Project

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You build your project by creating (or adding existing) models and files. Project documents are listed in the Browser and displayed as icons in the project diagram. You can open a model or file by double-clicking its icon in the diagram or in the Browser.

In order to profit from the convenience of the project as a container, you should create (or place) all the associated models and files inside the project directory. However, you can also link to files outside the project directory. Such files are listed under the project node in the Browser, but display small shortcut icons on their symbols to indicate that they are located outside the project folder.

In the following example, Object Model is inside the project and Physical Model is outside the project:



You can, at any time, right-click a document in the Browser or its symbol in the diagram, and select Move to Project Directory to move it inside the project.

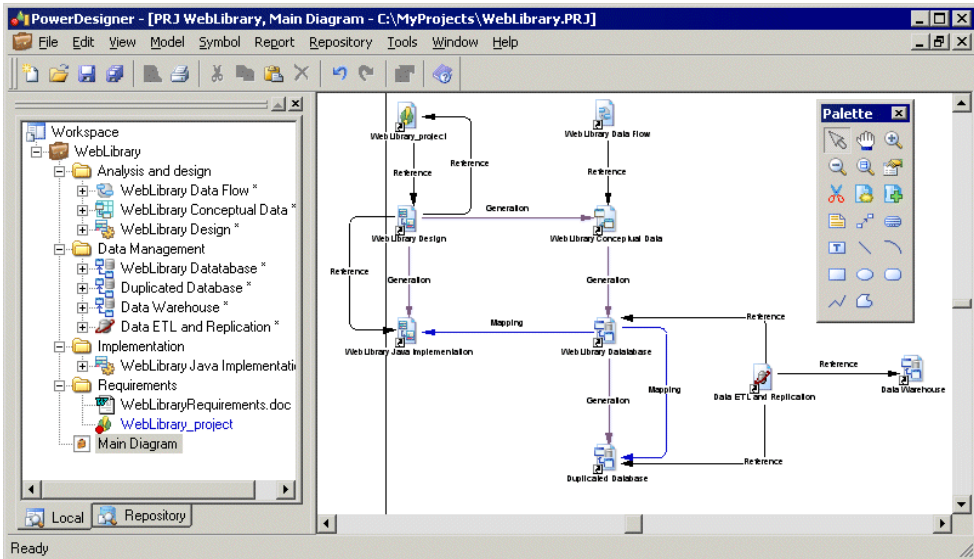
## Project Diagrams

A project diagram allows you to display project documents and the relationships between them.



You can create one or more project diagrams in an existing project to display different views of your project in any of the following ways:

- Right-click a project in the Browser, and select **New > Project Diagram**.
- Right-click the background of any project diagram, and select **Diagram > New Diagram > Project Diagram**.
- Select **View > Diagram > New Diagram > Project Diagram**.

In the following example, the models and other documents for the WebLibrary project are organized into sub-folders, and the connections between them (by reference, mapping, and generation) are displayed in the Main Diagram project diagram:



The following tools are available in the palette of a project diagram:

Tool	Description
	New Model – Creates a PowerDesigner model (PDM, OOM, LDM etc.). For more information, see <i>Creating Models in a Project</i> on page 40.
	Add Project Document – Adds an existing document to the project, which can be: <ul style="list-style-type: none"> <li>• A PowerDesigner model (PDM, OOM, LDM etc.).</li> <li>• An external file (PDF, text file etc.).</li> </ul> For more information, see <i>Adding existing model and file documents to a project</i> on page 41.
N/A	Dependency links, such as generation, mapping, reference, and file links, are automatically created between documents. These links cannot be created, but you may need occasionally to rebuild them (see <i>Rebuilding dependency links</i> on page 43).

## Creating Models in a Project

You can create new models in your project in any of the following ways:

- Click the **New Model** tool in the Palette, click in the diagram to open the New Model dialog box, enter a model name and any appropriate information, and then click **OK**.
- Right-click a project or a project folder, select **New > Model** to open the New Model dialog box, enter a model name and any appropriate information, and then click **OK**.

## Adding Existing Model and File Documents to a Project

You can add existing model or file documents to your project using the palette, Browser, or drag and drop.

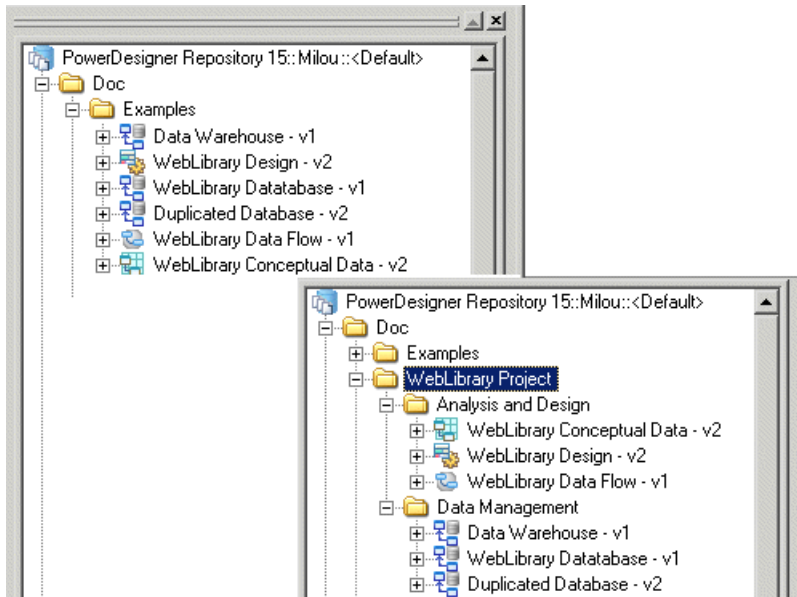
- Click the **Add Project Document** tool in the Palette, click in the diagram to open a standard Open dialog box, browse to and select one or more documents in your file system, and then click **Open**.
- Drag and drop one or more documents from:
  - The file system to the Browser or to the project diagram. If a folder has sub-folders, the hierarchy is preserved when it is added to the project. However, since projects are not synchronized with the file system, if you subsequently add files to these folders outside PowerDesigner, they will not automatically be displayed in the Browser.
  - A project diagram to another project diagram.
  - The Browser to the project diagram.
- Right-click a project or a project folder in the Browser, and select **Add** to open a standard Open dialog box, browse to and select one or more documents, and then click **Open**.

## Converting a Set of Repository Documents into a Project

You can retrieve a set of documents checked into the repository and convert them into a project to benefit from the convenience of the project as a container.

1. In the Repository Browser, create a project root folder to contain the project documents.
2. [optional] Create project sub-folders to organize documents according to your needs.
3. Drag and drop repository documents into these folders.
4. Right-click the project root folder, and select **Convert to Project** to convert it and all its contents into a project.

In the following example, repository documents in the Examples folder are transformed into the WebLibrary Project:



## Opening Project Documents

Once you have added a PowerDesigner model to a project, you should only open the model within the context of the project, as links between it and any other models in the project are managed by the project file. If you attempt to open the model outside of the project, you will be prompted to cancel the operation, and to open the project instead.

You can open a project document in the context of its project by double-clicking it in:

- a framework matrix or diagram
- a project diagram
- the Browser under its parent project

Similarly, models that belong to a project should only be checked in and out of the repository via the project.

## Viewing Dependency Links

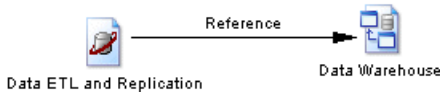
You can explore the details of any of the dependency links in your diagram by right-clicking it and selecting Show Dependencies.

Each type of link has its own viewer:

- Generation – displays the generation links between models in the Generation Links Viewer (see *The Generation Links Viewer* on page 350).
- Mapping – displays the mapping links between models in the Mapping Editor (see *The Mapping Editor* on page 396).

- Reference – displays the shortcuts and replications between models in the Shortcuts and Replications dialog box.

In the following example, right-clicking the reference link between Data ETL and Replication and Data Warehouse models opens the Shortcuts and Replications dialog box which displays Data Warehouse object shortcuts:

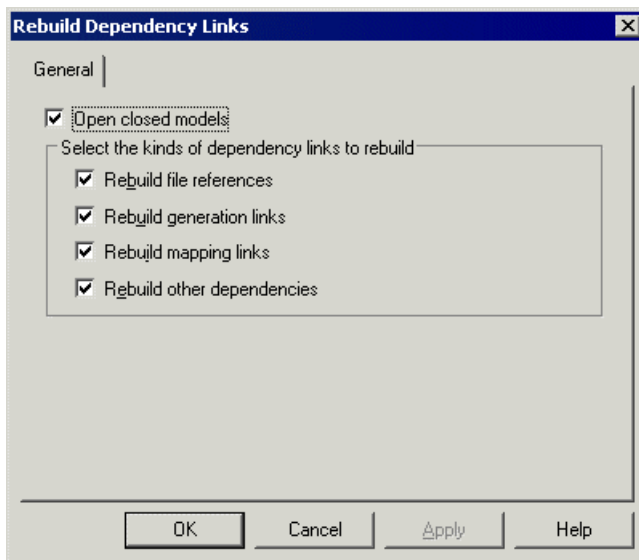


## Rebuilding Dependency Links

Dependency links are automatically generated in your project diagram when you add documents that are linked to each other by, for example, generation, mappings, shortcuts, etc.

Rebuilding dependency links can be useful to update:

- Links between closed models you add to your project.
  - Links deleted by error in your diagram.
1. Select **Tools > Rebuild Dependency Links** to open the Rebuild Dependency Links dialog box.



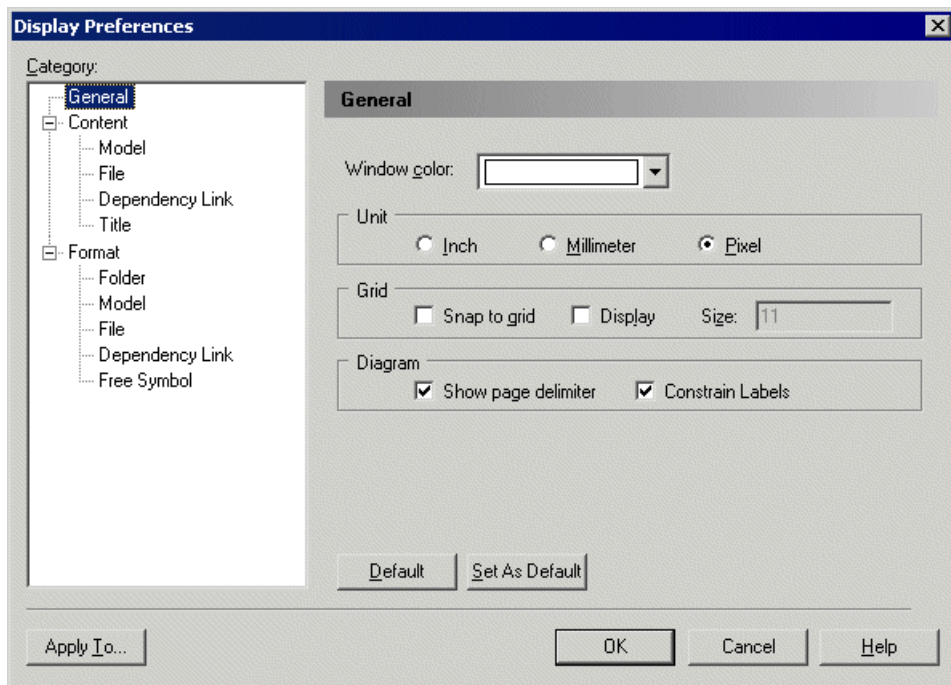
2. [optional] Clear the Open closed models check box to rebuild only those links in a limited number of models.
3. Select the check boxes that correspond to the dependency links you want to rebuild.
4. Click OK to close the dialog box and return to the diagram. Any missing links are updated in the diagram.

## Project and Framework Display Preferences

PowerDesigner display preferences allow you to customize the format of object symbols, and the information that is displayed on them.

To set project display preferences, select **Tools > Display Preferences** (or right-click the diagram background and select Display Preferences).

**Note:** For information about changing the format of symbols, see *Format Display Preferences* on page 301. Note that only framework architects (see *Designing Framework Diagrams and Matrices* on page 53), are allowed to modify the framework diagram and matrix format display preferences (see *Symbol Format Properties* on page 191).



To set display preferences for a particular object, select it under the Content category. The following table lists the display preferences available. The objects available to be customized in the Display Preferences window depend upon the current diagram type.

Preference	Description
Code	Displays the code of the object.
Comment	Displays the comment of the object.

Preference	Description
Completion status	[node and cell only] Displays a rectangle, which represents the work completion status according to the percentage entered in node and cell floating lists and property sheets.
Documents	[node and cell only] Displays the list of documents in the node or cell, instead of in floating lists.
Stereotype	Displays the stereotype of the object.
Type	[dependency link only] Displays the type of the dependency link, which can include mapping links, shortcut links, generation links, etc.

## Project Checks

You can check the validity of your project at any time with the Check Model command.

You can check a project in any of the following ways:

- Press F4, or
- Select **Tools > Check Project**, or
- Right-click the diagram background, and select **Check Project** from the contextual menu

The Check Project Parameters window opens, which allows you to specify the kinds of checks to perform, and the objects to apply them to. For detailed information about this window and correcting problems reported, see *Checking a Model* on page 92.

## Model and File Checks

The following checks are made on models and files:

Check	Description and Correction
Model and file location uniqueness	Multiple models or files cannot have the same location. Manual correction: Delete unnecessary model or file. Automatic correction: None.
Model location empty	[model only] There must be a path in the model document Location field. Manual correction: Save the model to specify a model location. Automatic correction: None.
External document URL not under a named path	A model or file is defined outside the project directory. Manual correction: Right-click the model or file, and select Move to Project Directory. Automatic correction: None.

Check	Description and Correction
Target models not in project	<p>[model only] One or more target models of a model contained in the project is missing.</p> <p>Manual correction: Add missing target model with appropriate dependency link.</p> <p>Automatic correction: Yes.</p>

### **Framework Node and Cell Checks**

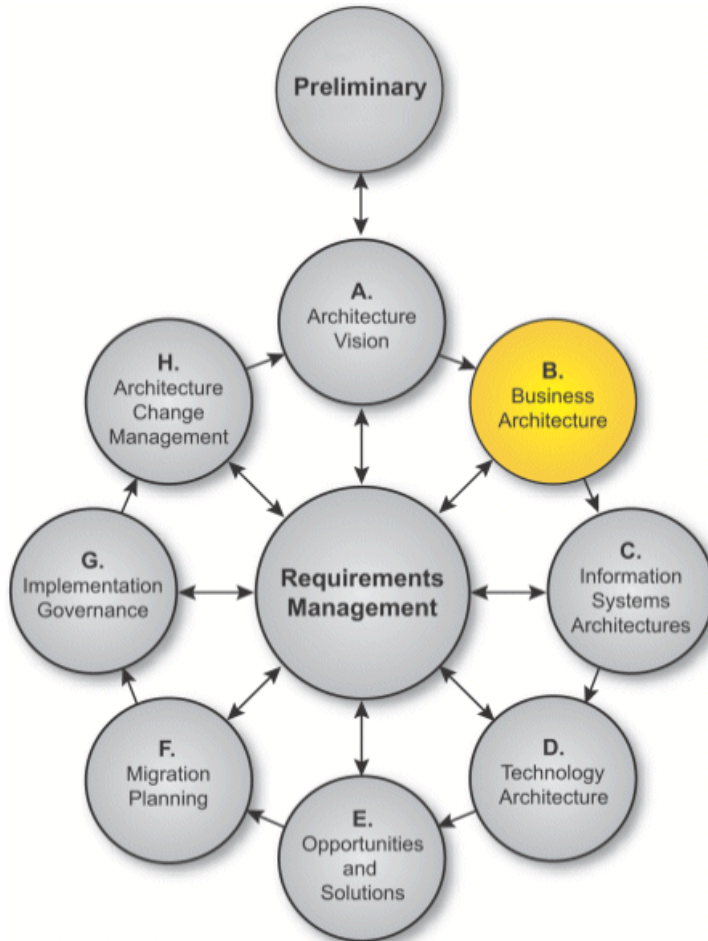
The following checks are made on framework diagram nodes and matrix cells:

Check	Description and Correction
Node/Cell name and code uniqueness	<p>Node and cell names and codes must be unique in the project.</p> <p>Manual correction: Modify the duplicate name/code.</p> <p>Automatic correction: Appends a number to the duplicate name/code.</p>
Documents not consistent with node/cell actions	<p>A document in a node and cell must be consistent with its source action.</p> <p>Manual correction: Modify the node's and cell's content according to its specified actions.</p> <p>Automatic correction: None</p>
Mandatory actions not executed	<p>A mandatory action in a node and cell must be executed.</p> <p>Manual correction: Execute the mandatory action.</p> <p>Automatic correction: None</p>
















## **Completing Framework Diagrams and Matrices**

Your project may contain one or more framework diagrams and/or a framework matrix, which direct how your project should be built.

- A framework diagram - lets you model a framework with nodes and links, which you can style as necessary.



- Framework matrix - lets you model a framework in a matrix, in which columns usually represent various aspects of the enterprise that can be described or modeled, and the rows represent various viewpoints from which the aspects can be described. Each cell formed by the intersection of a column and a row represents an aspect of the enterprise modeled from a particular viewpoint.

	What	How	Where
Planner's View	List of Business Objects 	List of Business Processes 	List of Business Locations 
Owner's View	Semantic Model 	Business Process Model 	Business Logistic System 
Designer's View	Logical Data Model 	Application Architecture 	Deployment Architecture 
Builder's View	Physical Data Model 	System Design 	Technology Architecture 
Subcontractor's View	Data Directory 	Programs 	Network Architecture 

PowerDesigner provides a set of predefined framework diagrams and matrices, and users with framework design rights can also create their own (see *Designing Framework Diagrams and Matrices* on page 53). You complete a framework diagram or matrix by creating (or adding existing) documents in nodes, cells, and additional areas according to predefined rules:

- Documents — can be of different types and can each be associated with multiple nodes, cells, and additional areas:
  - Model – a PowerDesigner model, such as a BPM or a PDM, created from scratch, based on a template, or generated from another model.
  - Diagram – a PowerDesigner model diagram, such as an OOM use case diagram.

- Dependency matrix – a grid that displays the links between model objects (see *Dependency Matrices* on page 178).
- List – a list of PowerDesigner model objects, such as BPM processes, or PDM tables.
- File – an external file, such as a .doc or .txt file.
- Nodes and cells [when active] — must be completed by particular kinds of documents.
- Additional areas [framework matrix only] — can be defined outside of the grid (for example, the global view in the FEAF framework matrix that is created at the end of the enterprise architecture implementation).

## Navigating in Framework Diagrams and Matrices

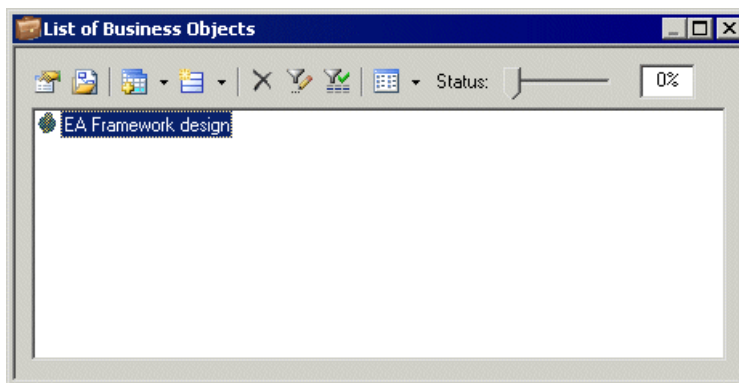
You can interact with framework diagram and matrix elements using various mouse actions.

- Hover over a framework element – to display its name and any comment.
- Click a node or cell – to open a floating list, which lets you manage the documents attached to the node or cell (see *Working with Floating Lists* on page 52).
- Right-click a node or cell – to opens contextual menu (see *Working with the Framework Node and Cell Contextual Menu* on page 53).
- Double-click a framework matrix element [framework architects only] – to open the property sheet of the element (see *Framework Matrix Properties* on page 74).

## Attaching a Document to a Framework Node or Cell

You can attach new (or existing) documents to each node of a framework diagram and cell of a framework matrix.

1. Open the framework diagram or matrix by double-clicking its Browser entry.
2. Click the node or cell to which you want to add the document to open its floating list, which displays the documents attached to it.



3. Click one of the following tools:
  - **New Document** – to create a document of the specified kind:

- Model [from scratch or based on a template] – creates the model and opens it in the diagram window.
- Model [generated from another PowerDesigner model] – opens the *Model Generation Options* dialog box to let you create a model (see *Generating a Model* on page 337).
- Diagram – opens a model selection dialog box to let you select a new or existing model to create the diagram.
- Dependency matrix – opens a model selection dialog box to let you select a new or existing model to create the dependency matrix (see *Dependency Matrices* on page 178).
- List – opens the List of *Objects* dialog box to let you create objects in a new or existing model.
- File – opens a standard Save As dialog box to let you enter a file name. Click Save to open the file in the application corresponding to the file extension.
- **Add Document**, and select:
  - **Attach Project Document** – to add documents already in the project. Select the type of document you want to attach.
  - **Add Document** – to add documents from outside the project. Select the type of document you want to add.

---

**Note:** You can also drag a project document from the Browser and drop it onto a node, a cell or a floating list, or right-click a node or a cell, and select the New Document, Attach Project Document, and Add Document commands. Documents can also be moved from one node or cell to another.

---

4. [optional – New Document only] Complete the creation of the new document by, for example, adding objects to the model or diagram, or entering text in the file, etc.

The document is displayed in the floating list.

### **Example: Creating a PDM from a Cell's Floating List**

In this example, we create a PDM, which has been specified as a requirement to complete a framework matrix cell.

1. Click a cell to open its floating list, which displays the documents attached to the cell.
2. Click the **New Document** tool, and then select **New PDM** to create the required PDM.

The new PDM document is displayed in the cell, and in the Browser in the folder specified by the framework architect.

For information about specifying a model as a requirement to complete a framework node or cell, see *Example: Specifying a Model action* on page 57.

### **Example: Creating a List of Processes from a Node's Contextual Menu**

In this example, we create a list of BPM processes, which has been specified as a requirement to complete a framework diagram node.

1. Right-click a node, and select **New > Document > List of processes** to open the List of Processes dialog.
2. Create an appropriate number of processes in the list, entering a name for each, and then click **OK** to close the dialog box.

The list of processes document is displayed in the node, and in the Browser under a BPM node in the folder specified by the framework architect.

For information about specifying a list as a requirement to complete a framework node or cell, see *Example: Specifying a List action* on page 59.

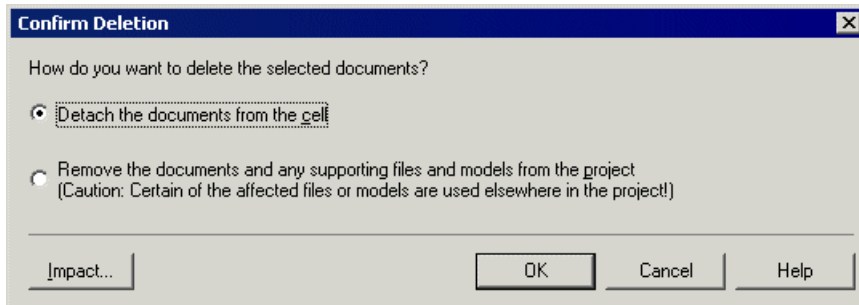
### **Deleting Documents from Framework Nodes and Cells**

You can delete documents from framework nodes and cells. You can choose to simply detach a document from the node or cell or completely remove it from the project.

1. Click a node or cell to open its floating list, select one or more documents in the list, and then click the **Delete** tool.

Alternatively, select one or more documents in a node or cell and press the **Del** key or right-click a document and select **Edit > Delete**.

The Confirm Deletion dialog box is displayed.



2. Choose one of the following delete options:
  - Detach the document from the node or cell - the document is detached from the node or cell but remains available in the project to be used elsewhere.
  - Remove the document and any supporting file or model from the project - their deletion from the project may affect files or models used elsewhere in the project.
3. Click **OK** to close the dialog box and confirm the deletion.

## Working with Floating Lists









You open a floating list by clicking a framework diagram node or matrix cell.

---

**Note:** Floating lists are not available when you select the Documents display preference (see *Project Display Preferences* on page 44).

---

Floating lists contain the following tools to let you manage project documents in the framework diagram and matrix:

Tool	Description
	Properties – opens the property sheet of the selected document.
	Open Document – opens the selected document.
	Add Document – contains the following tools: <ul style="list-style-type: none"> <li>• Attach Project Document – lets you select a document of the specified kind from inside the project.</li> <li>• Add Document – lets you select a document of the specified kind from outside the project.</li> </ul>
	New Document – creates a document of the specified kind.
	Delete – deletes the selected document from the node and cell. You can choose to: <ul style="list-style-type: none"> <li>• Detach the document from the node and cell.</li> <li>• Remove the document and any supporting file or model from the project.</li> </ul> For information see <i>Deleting Documents from a Framework Node and Cell</i> on page 51.
	Customize Columns and Filter – allows the definition of filter expression on the columns of the floating list (see <i>Customizing Object List Columns and Filtering Lists</i> on page 120).
	Enable/Disable Filter – enables or disables the filter.
	Views – controls the display of documents in the floating list. You can choose between: <ul style="list-style-type: none"> <li>• Large Icons – displays documents as large icons.</li> <li>• List – displays documents in multiple columns to optimize space.</li> <li>• Details – displays documents in a grid, which can be filtered.</li> </ul>
Status	Status – indicates the percentage of work completed in the node and cell.

## Working with the Framework Node and Cell Contextual Menu

The contextual menu available on framework nodes and cells allows you to perform various actions.

The contextual menu of a framework node and cell contains the following commands. For information about the additional commands available only in Framework Design Mode, see *Styling Framework Nodes and Cells* on page 69):

Command	Description
List of Documents	Opens the node's or cell's floating list.
New Document	Creates a document of the specified kind in the node or cell. An action must be specified in the node or cell in order for this command to be available.
Attach Project Document	Attaches a document from inside the project to the node or cell.
Add Document	Adds a document from outside the project to the node or cell.

## Designing Framework Diagrams and Matrices

Framework architects (users who have selected the Authorize Framework Design user profile when installing PowerDesigner) can create, design, and delete framework diagrams and matrices in projects, by enabling the Framework Design Mode.

Select **Tools > Framework Design Mode**.

In the framework matrix, you can alternately right-click the framework matrix top-left corner, and select **Framework Design Mode**. The design icon displays in the matrix top-left corner.

In the framework diagram, the tool palette displays in the diagram.

## Creating a Framework Diagram

Framework architects can create one or more framework diagrams to guide their modeling teams through building a project. You can specify actions for each node in the framework diagram that control what kind of document (model, diagram, model objects list etc.) must be attached to them.

1. Right-click a project in the Browser, and select **New > Framework Diagram** to open the framework diagram property sheet.
2. Enter a name for the framework diagram on the General tab, and click **OK** to close the property sheet.
3. Click the **Node** tool in the palette, click in the diagram, and create an appropriate number of framework diagram nodes.

4. Click the **Link** tool in the palette, click in the diagram, and create an appropriate number of framework diagram links between the nodes to express connections between them.
5. [optional] Decompose one or more nodes to analyze them in more detail (see *Decomposing a Framework Node* on page 54).
6. Create actions for each node to specify the types of documents that your modelers can attach to the node (see *Specifying Framework Node and Cell Actions* on page 55).
7. [optional] Select **File > Save As Template** to open the Project Template Wizard, and convert the project containing your framework diagrams into a template to allow it to be reused as the basis for future projects (see *Project Templates* on page 70).

### **Decomposing a Framework Node**

You can decompose one or more nodes in the framework diagram to analyze them in more detail. The decomposed node has its own sub-diagram, which models the links between its sub-nodes. Sub-nodes can, themselves, be decomposed into further sub-nodes, and so on until you obtain a sufficient level of detail.

You can decompose a node in a framework diagram in any of the following ways:

- Press **CTRL** and double-click the node symbol (this will open the sub-node directly)
- Open the property sheet of the node and, on the General tab, select the **Composite** check box.

Decomposed node symbols in a framework diagram carry a plus-sign symbol to indicate that they contain further detail

The sub-diagram of the decomposed node is empty at first. You have to create the appropriate number of nodes and links between them to show their connections (see *Creating a Framework Diagram* on page 53).

## **Creating a Framework Matrix**

Framework architects can create a framework matrix to guide their modeling teams through building a project. You can specify actions for each cell in the framework matrix that control what kind of document (model, diagram, model objects list etc.) must be attached to them.

1. Right-click a project in the Browser, and select **New > Framework Matrix Diagram** to open the framework matrix property sheet, or right-click the background of any project diagram, and select **Diagram > New Diagram > Framework Matrix**, or select **View > Diagram > New Diagram > Framework Matrix**.

---

**Note:** You can create only one framework matrix per project.

---

2. Enter a name for the framework matrix on the General tab (see *Framework Matrix Properties* on page 74).
3. Click the **Columns** tab, and create an appropriate number of framework matrix columns, entering a name for each.

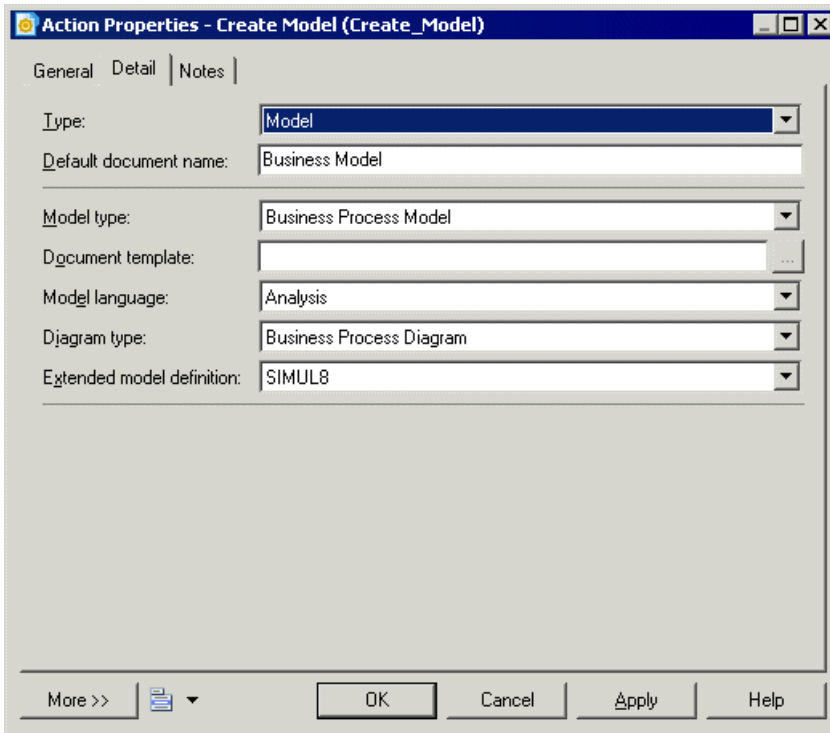
4. Click the **Rows** tab, and create an appropriate number of framework matrix rows, entering a name for each.
5. [optional] Click the **Additional Areas** tab, and create an appropriate number of additional areas, which will be displayed outside the main matrix grid, entering a name for each.
6. Click **OK** to close the property sheet and create your framework matrix.
7. Create actions for each cell to specify the types of documents that your modelers can attach to the cell (see *Specifying Framework Node and Cell Actions* on page 55).
8. [optional] Select **File > Save As Template** to open the New Template Wizard, and convert the project containing your framework matrix into a template to allow it to be reused as the basis for future projects (see *Project Templates* on page 70).

### Specifying Framework Node and Cell Actions

Actions control the types of documents that can be attached to nodes and cells when completing framework diagrams and matrices. You can specify one or more action types per node and cell.

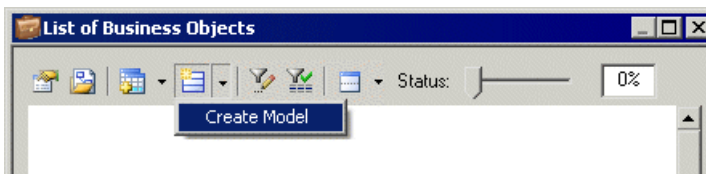
1. Double-click a node or a cell to open its property sheet.
2. On the **General** tab, enter a node or a cell name, and any other appropriate properties (see *Framework Node, Cell and Additional Area Properties* on page 75).
3. Click the **Actions** tab, and click the **Add a Row** tool to create a new action.
4. Double-click the action to open its property sheet.
5. On the **General** tab, enter an action name, and any other appropriate properties (see *Framework Action Properties* on page 77).
6. Click the **Detail** tab, and select one of the following types of actions as a means to populate the node or cell:
  - **Model** – a PowerDesigner model (see *Example: Specifying a Model Action* on page 57).
  - **Diagram** – a PowerDesigner model diagram (see *Example: Specifying a Diagram Action* on page 58).
  - **List** – a list of PowerDesigner model objects (see *Example: Specifying a List Action* on page 59).
  - **Model Generation** – a PowerDesigner model generated from another model (see *Example: Specifying a Model Generation Action* on page 61).
  - **Object Generation** – a PowerDesigner model populated with one type of objects generated from another model (see *Example: Specifying an Object Generation Action* on page 62).
  - **File** – an external file (see *Example: Specifying a File Action* on page 64).
  - **Matrix** – a PowerDesigner dependency matrix showing links between model objects (see *Example: Specifying a Matrix action* on page 65).

- **Script** - a VB script that can define any scriptable action (see *Example: Specifying a Script Action* on page 67).
7. Specify any other appropriate properties to refine the action (see *Framework Action Property Sheet Detail Tab* on page 78).



8. Click **OK** to close the action and node or cell property sheets and return to the framework diagram or matrix.

The action is now available for use by framework users (see *Attaching a Document to a Framework Node or Cell* on page 49). Note that only fully-defined actions are available for selection.



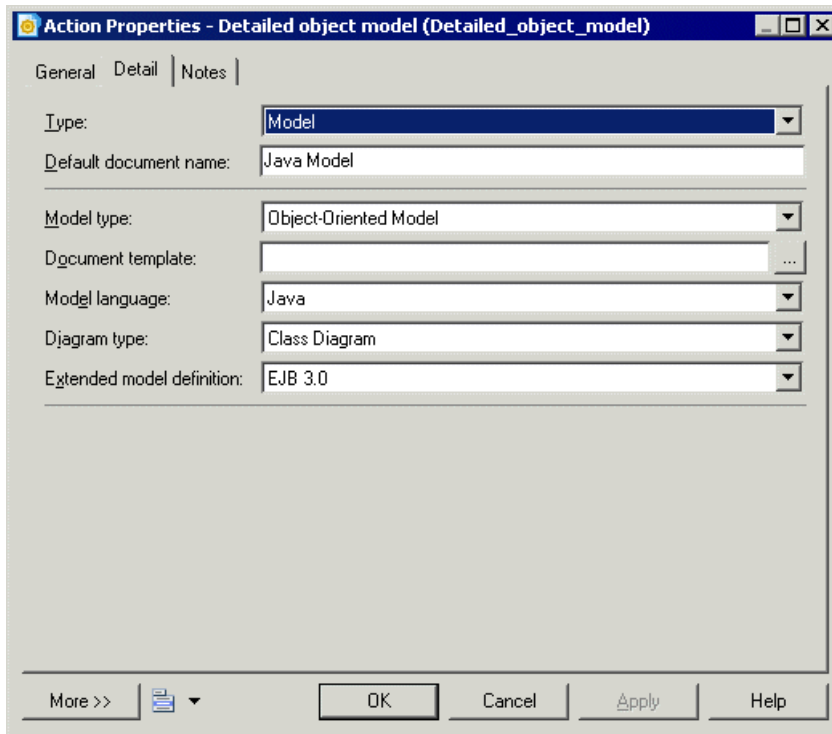
**Example: Specifying a Model Action**

The Model action lets a framework user (add or) create one or more models of the specified kind in the node or cell. The model will be displayed in the Browser under the project node and as a document in the node or cell to which it has been attached.

In the following example, we will specify an action in a framework diagram node that enables the user to create one or more Java OOMs with the EJB 3.0 xem attached.

1. Double-click a framework node to open its property sheet, and click the **Actions** tab.
2. Click the **Add a Row** tool to create a new action, and double-click it to open its property sheet.
3. On the **General** tab, enter "*Detailed object model*" in the Name field.
4. Select the **Multiple** check box to specify that more than one OOM can be attached to the node.
5. Click the **Detail** tab, and specify the following properties in the fields (see *Framework Action Property Sheet Detail Tab* on page 78):

Property	Select or enter
Type	<i>Model</i>
Default document name	<i>Java Model</i>
Model type	<i>Object-Oriented Model</i>
Document template	Leave blank
Model language	<i>Java</i>
Diagram type	<i>Class Diagram</i>
Extended model definition	<i>EJB3.0</i>



6. Click OK to close the action and node property sheets and return to the framework diagram.

The Model action is now available for use by framework diagram users (see *Attaching a Document to a Framework Node and Cell* on page 49).

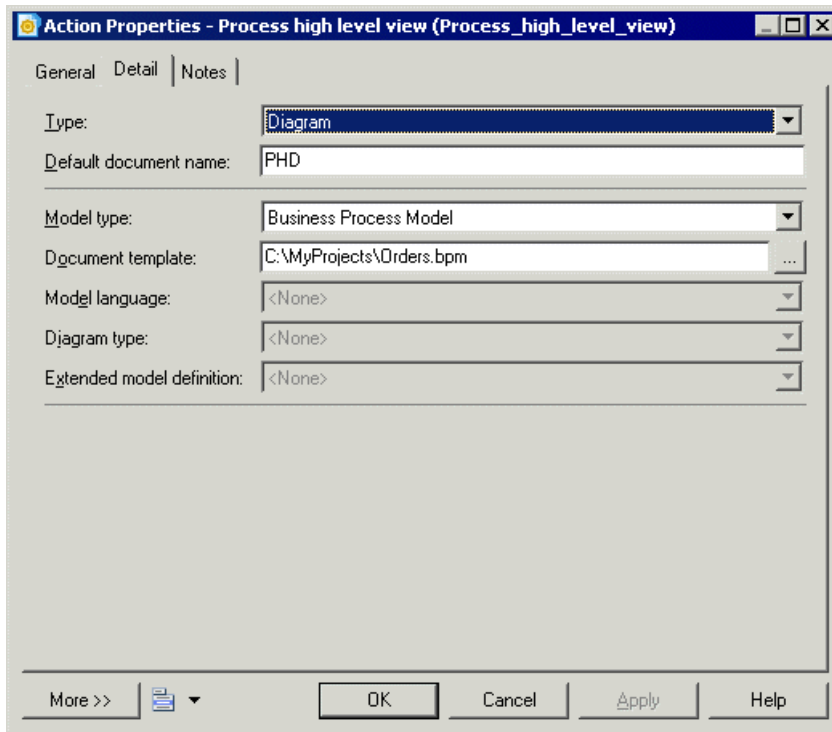
### **Example: Specifying a Diagram Action**

The Diagram action lets a framework user (add or) create one or more diagrams of the specified kind in the node or cell. The diagram will be displayed in the Browser under an existing or new model node and as a diagram in the node or cell to which it has been attached.

In the following example, we will specify an action in a framework matrix cell that enables the user to create exactly one BPM process hierarchy diagram from a previously defined template.

1. Double-click a framework cell to open its property sheet, and click the **Actions** tab.
2. Click the **Add a Row** tool to create a new action, and double-click it to open its property sheet.
3. On the **General** tab, enter "*Process high level view*" in the Name field.
4. Clear the **Multiple** check box to specify that exactly one BPM process hierarchy diagram can be attached to the cell.
5. Click the **Detail** tab, and specify the following properties in the fields (see *Framework Action Property Sheet Detail Tab* on page 78):

Property	Select or enter
Type	<i>Diagram</i>
Default document name	<i>PHD</i>
Model type	<i>Business Process Model</i>
Document template	Click the Ellipsis button to select the <i>Orders.bpm</i> template.  For information about creating model templates see <i>Model Templates</i> on page 97.



- Click **OK** to close the action and cell property sheets and return to the framework matrix.

The Diagram action is now available for use by framework matrix users (see *Attaching a Document to a Framework Node and Cell* on page 49).

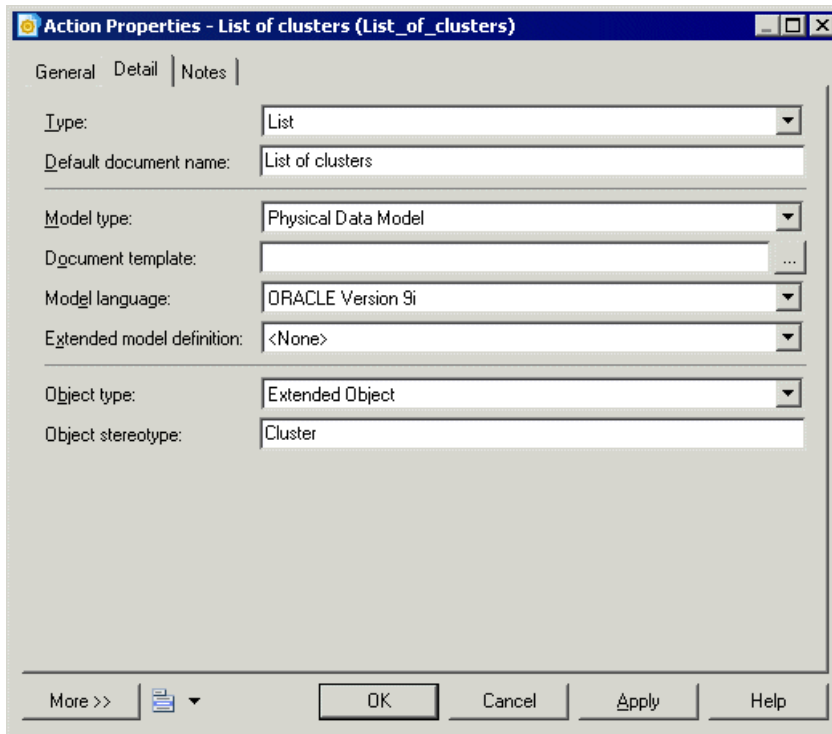
### **Example: Specifying a List Action**

The List action lets a framework user (add or) create one or more model object lists of the specified kind in the node or cell. The list will be displayed in the Browser under the appropriate model node and as a document in the node or cell to which it has been attached.

In the following example, we will specify an action in a framework diagram node that requires the user to create at least one list of PDM clusters.

1. Double-click a framework node to open its property sheet, and click the **Actions** tab.
2. Click the **Add a Row** tool to create a new action, and double-click it to open its property sheet.
3. On the **General** tab, enter "*List of PDM clusters*" in the Name Field.
4. Select the **Mandatory** check box to specify that at least one list of PDM clusters must be attached to the node.
5. Click the **Detail** tab, and specify the following properties in the fields (see *Framework Action Property Sheet Detail Tab* on page 78):

Property	Select or enter
Type	<i>List</i>
Default document name	<i>List of clusters</i>
Model type	<i>Physical Data Model</i>
Document template	Leave blank
Model language	<i>ORACLE Version 9i</i>
Extended model definition	<i>&lt;none&gt;</i>
Object type	<i>ExtendedObject</i>
Object stereotype	<i>Cluster</i>



6. Click **OK** to close the action and node property sheets and return to the framework diagram.

The List action is now available for use by framework diagram users (see *Attaching a Document to a Framework Node and Cell* on page 49).

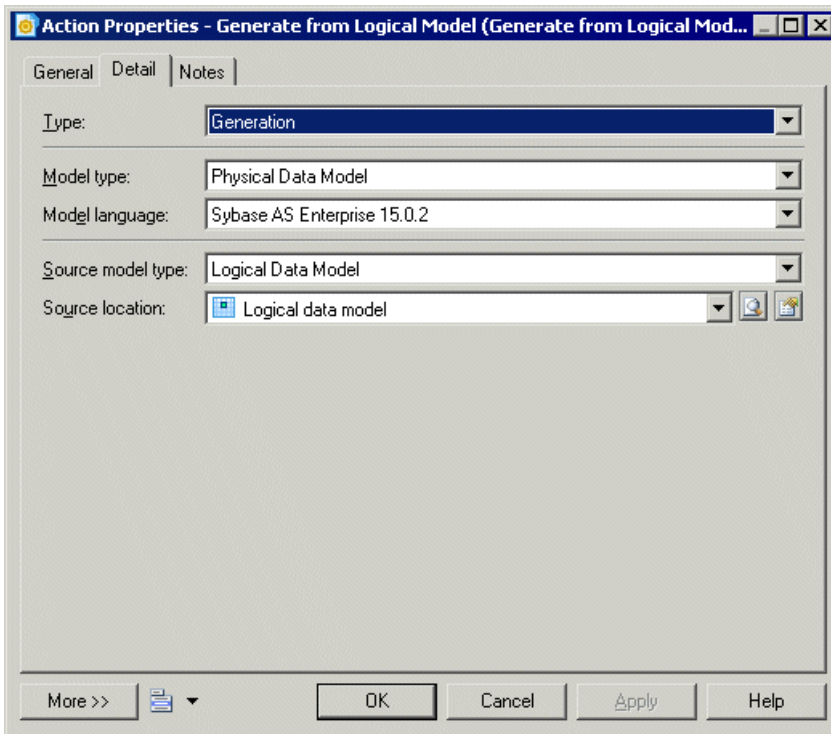
### **Example: Specifying a Model Generation Action**

The Model Generation action lets a framework user generate one or more models from another model. The generated model will be displayed in the Browser under the project node and as a document in the node or cell to which it has been attached.

In the following example, we will specify an action in a framework matrix cell that enables the user to generate exactly one Sybase AS Enterprise 15.0.2 PDM from a Logical Data Model.

1. Double-click a framework cell to open its property sheet, and click the **Actions** tab.
2. Click the **Add a Row** tool to create a new action, and double-click it to open its property sheet.
3. On the **General** tab, enter `Generate from Logical Model` in the Name field.
4. Clear the **Multiple** check box to specify that exactly one generated PDM can be attached to the cell.
5. Click the **Detail** tab, and specify the following properties in the fields (see *Framework Action Property Sheet Detail Tab* on page 78):

Property	Select or enter
Type	<i>Generation</i>
Model type	<i>Physical Data Model</i>
Model language	<i>Sybase AS Enterprise 15.0.2</i>
Source model type	<i>Logical Data Model</i>
Source location	<i>Logical data model</i>



- Click **OK** to close the action and cell property sheets and return to the framework matrix.

The Model Generation action is now available for use by framework matrix users (see *Attaching a Document to a Framework Node and Cell* on page 49).

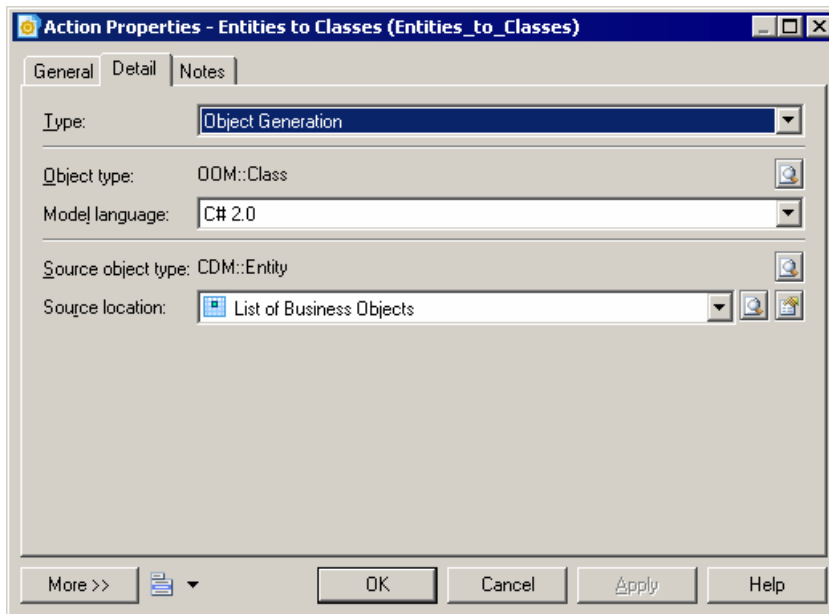
### **Example: Specifying an Object Generation Action**

The Object Generation action lets a framework user generate objects from one model to another. The generated model will be displayed in the Browser under the project node and as a document in the node or cell to which it has been attached.

In the following example, we will specify an action in a framework matrix cell that enables the user to generate exactly one Java OOM containing classes from a list of entities.

1. Double-click a framework cell to open its property sheet, and click the **Actions** tab.
2. Click the **Add a Row** tool to create a new action, and double-click it to open its property sheet.
3. On the **General** tab, enter `Classes` from `Entities` in the **Name** field.
4. Clear the **Multiple** check box to specify that exactly one generated OOM can be attached to the cell.
5. Click the **Detail** tab, and specify the following properties in the fields (see *Framework Action Property Sheet Detail Tab* on page 78):

Property	Select or enter
Type	<i>Object Generation</i>
Object type	Click the <b>Select Object</b> tool, navigate to <b>PdOOM &gt; Class</b> in the dialog, and click <b>OK</b> to select it.
Model language	<i>C# 2.0</i>
Source object type	Click the <b>Select Object</b> tool, navigate to <b>PdCDM &gt; Entity</b> in the dialog, and click <b>OK</b> to select it.
Source location	<i>List of Business Objects</i>



6. Click **OK** to close the action and cell property sheets and return to the framework matrix.

The Object Generation action is now available for use by framework matrix users (see *Attaching a Document to a Framework Node and Cell* on page 49).

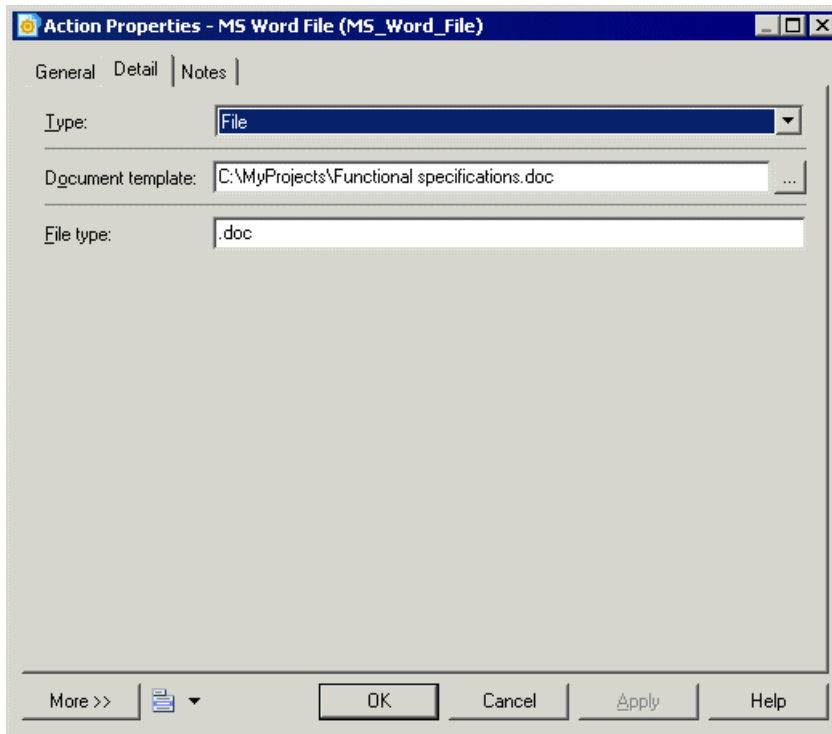
### **Example: Specifying a File Action**

The File action lets a framework user (add or) create one or more files of the specified kind in the node or cell. The file will be displayed in the Browser under the project node and as a document in the node or cell to which it has been attached.

In the following example, we will specify an action in a framework diagram node that requires the user to create at least one MS Word file from a predefined template.

1. Double-click a framework node to open its property sheet, and click the **Actions** tab.
2. Click the **Add a Row** tool to create a new action, and double-click it to open its property sheet.
3. On the **General** tab, enter "*MS Word File*" in the Name field.
4. Select the **Mandatory** check box to specify that at least one MS Word file must be attached to the node.
5. Click the **Detail** tab, and specify the following properties in the fields (see *Framework Action Property Sheet Detail Tab* on page 78).

Property	Select or enter
Type	<i>File</i>
Document template	Click the <b>Ellipsis</b> button to select the <i>Functional specifications.doc</i> template.
File type	<i>.doc</i>



6. Click **OK** to close the action and node property sheets and return to the framework diagram.

The File action is now available for use by framework diagram users (see *Attaching a Document to a Framework Node and Cell* on page 49).

### **Example: Specifying a Matrix Action**

The Matrix action lets a framework user (add or) create one or more dependency matrices of the specified kind in the node or cell. The dependency matrix will be displayed in the Browser under the project node and as a document in the node or cell to which it has been attached.

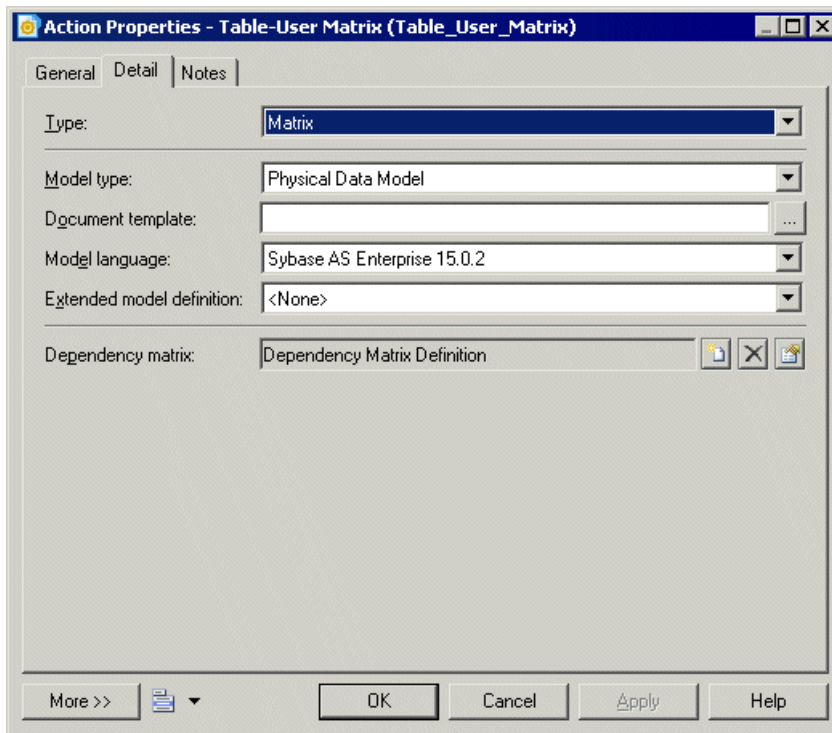
In the following example, we will specify an action in a framework matrix cell that enables the user to create exactly one dependency matrix between PDM tables and users connected by the Owner dependency.

1. Double-click a framework cell to open its property sheet, and click the **Actions** tab.
2. Click the **Add a Row** tool to create a new action, and double-click it to open its property sheet.
3. On the **General** tab, enter `Table-User Matrix` in the **Name** field.
4. Clear the **Multiple** check box to specify that only one dependency matrix can be attached to the cell.

5. Click the **Detail** tab, and specify the following properties in the fields (see *Framework Action Property Sheet Detail Tab* on page 78):

Property	Select or enter
Type	<i>Matrix</i>
Model type	<i>Physical Data Model</i>
Document template	Leave blank
Model Language	<i>Sybase AS Enterprise 15.0.2</i>
Extended Model Definition	<none>
Dependency matrix	<p>Click the <b>Create</b> tool to open the dependency matrix property sheet and specify the following values:</p> <ul style="list-style-type: none"> <li>• Matrix rows object type – <i>Table</i></li> <li>• Matrix columns object type – <i>User</i></li> <li>• Matrix cells dependency – <i>Owner</i></li> </ul>

6. Click **OK** to close the dependency matrix property sheet, and return to the action property sheet.



7. Click **OK** to close the action and cell property sheets and return to the framework matrix.

The Matrix action is now available for use by framework matrix users (see *Attaching a Document to a Framework Node and Cell* on page 49).

### **Example: Specifying a Script Action**

The Script action lets a framework user execute a script in the node or cell. You can use the script to create a project document and attach it to the node or cell.

In the following example, we will specify an action in a framework diagram node that enables the user to execute a script that generates a model from another model. The result of this example is the same as that of a Generation action, but the script is intended to demonstrate the possibilities that you can script in your own projects. You could, for example, write a script to connect to a live database and reverse engineer it into a cell. For information about writing scripts for use in your models and projects, see "Methods (Profile)" in the Extending your Models with Profiles chapter of the *Customizing and Extending PowerDesigner* manual.

Before you can specify a script action, you have to create a method script on the FrameworkAction metaclass in an extended model definition, and then attach it to your project. In this case, the following script is called GenerateModel, and will generate a PDM:

```
Sub %Method%(obj)

    ' This is a sample method that can be used in a script action
    ' It generates a PDM from a source cell CDM and attaches it to the
current cell
    ' Steps:
    ' 1- Get the source cell: found by its code "mySourceCell"
    ' 2- Get the source model: first document in the source cell
    ' 3- Generate a PDM from the source model
    ' 4- Attach the generated model to the current cell
    ' 5- Set current action as source action for the new document
    ' => That will prevent generating twice if the action is not
multiple

    If obj Is Nothing Then Exit Sub

    Dim sourceCell, targetCell, modelDoc, sourceModel, targetModel

    ' The script is defined on the action so the current cell is simply
the action parent
    Set targetCell = obj.Parent

    ' First check if we can execute the action on the current cell
    ' for non multiple actions, the CanExecute should return true only
the first time
    If obj.CanExecute(targetCell) Then
        ' Get Source cell
        Set sourceCell = FindCellByCode(targetCell.Parent,
"mySourceCell") ' See function code below End Sub statement

        ' Get source model (supposed to be the first in its artifact
```

```

document list)
    Set modelDoc = sourceCell.ArtifactDocuments.Item(0)
    Set sourceModel = modelDoc.TargetModelObject

    ' Generate PDM Model
    Set targetModel = sourceModel.GenerateModel (Nothing,
PdPDM.cls_Model)

    ' Attach generated model to current cell
    Set modelDoc = targetModel.SourceModelDocument
    targetCell.AttachDocument(modelDoc)

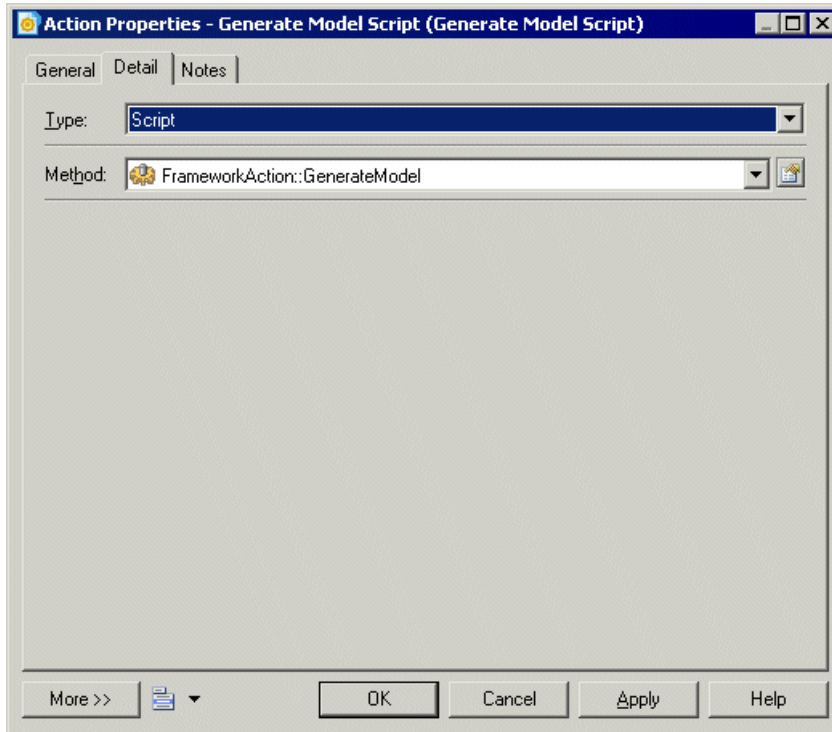
    ' Set current action as source for the new model document
    obj.SetAsSource(modelDoc)
Else
    ' In this sample, the action is supposed to be non-multiple
    ' Therefore, CanExecute fails if it's already a source action
for an existing document
    output "The action has already been executed"
End If
End Sub

' FindCellByCode function (Global Script function):
Function FindCellByCode (fmx, Code)
    Set FindCellByCode = Nothing
    Dim Cell
    For Each Cell In fmx.cells
        If Cell.Code = Code Then
            Set FindCellByCode = Cell
            Exit For
        End If
    Next
End Function
>>

```

1. Double-click a framework node to open its property sheet, and click the click the **Actions** tab.
2. On the **General** tab, enter `Generate Model Script` in the Name field.
3. Clear the **Multiple** check box to specify that exactly one generated model can be attached to the node.
4. Click the **Detail** tab, and specify the following properties in the fields (see *Framework Action Property Sheet Detail Tab* on page 78).

Property	Select
Type	Script
Method	GenerateModel



5. Click OK to close the action and node property sheets and return to the framework diagram.

The Script action is now available for use by framework diagram users (see *Attaching a Document to a Framework Node and Cell* on page 49).

## Styling Framework Nodes and Cells

Framework architects have access to additional commands that allow them to change the format of framework nodes and cells.

Command	Description
Format	Opens the Symbol Format dialog box to let you specify line and fill colours, fonts and formatting for each textual element, and an image for the node or cell (see <i>Symbol Format Properties</i> on page 191).
Change Image	Opens the Select Image dialog box to let you insert an image in the node or cell (see <i>Browsing for Images</i> on page 196).
Get Format	Copies the format of the selected node or cell for pasting in other nodes or cells.

Command	Description
Apply Format	Pastes a previously copied node or cell format into the selected node or cell.
Properties	Opens the property sheet of the selected node or cell.

For information about the standard commands available outside design mode, see *Working with the Framework Node and Cell Contextual Menu* on page 53.

## Project and Framework Templates

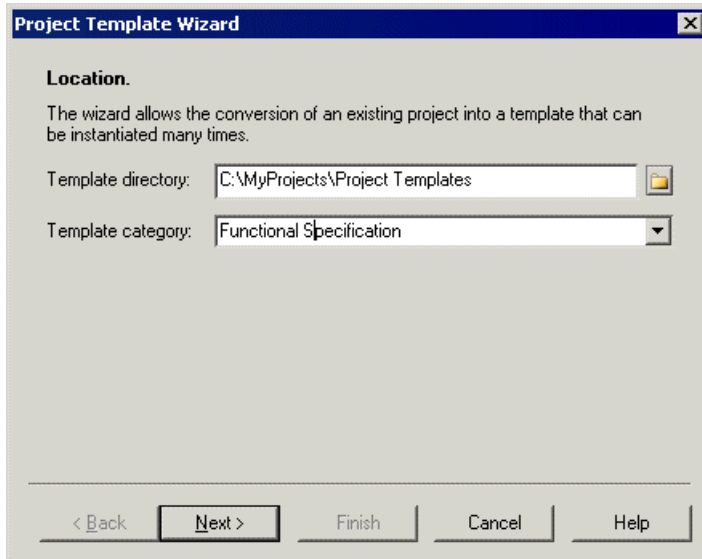
---

A project template can provide predefined content, rules, and formatting for your project, and can also include a framework matrix or framework diagram.

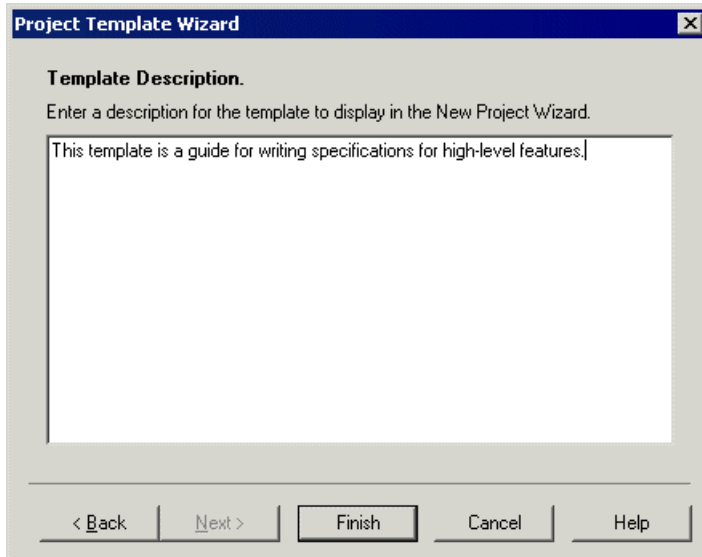
For example, you could create:

- A data project template - containing a CDM, LDM, and PDM targeting your preferred DBMS
- An application project template - containing an OOM with the UML diagrams required for your modeling practices, along with a PDM and XSM to handle data persistence and format
- A framework project template - containing a FEAF or other framework matrix

1. Create a project (see *Creating a Project* on page 38).
2. [optional] Add any appropriate models or files (see *Building a Project* on page 39).
3. [optional] Create one or more framework diagrams (see *Creating a Framework Diagram* on page 53).
4. [optional] Create a framework matrix (see *Creating a Framework Matrix* on page 54).
5. [optional] Specify any appropriate display preferences (see *Project Display Preferences* on page 44).
6. Select **File > Save As Template**
7. [optional] Specify a template directory in which to save the template. By default, the project template directory is selected. You can click the **Change Template Directory** tool to select another location.
8. Select a template category from the list or enter a template category name that will be available for when you create other projects. You can use the \ character to create sub-directories, or right-click the project in the Browser, and select **Save As Template** to open the Template Wizard.



9. Click **Next**, and enter a description for the new template that will be displayed in the New Project Wizard when you create projects with the new template. You can modify a template description by right-clicking a project template in the Browser, and selecting **Edit Template**.



10. Click **Finish** to close the wizard and create the template.

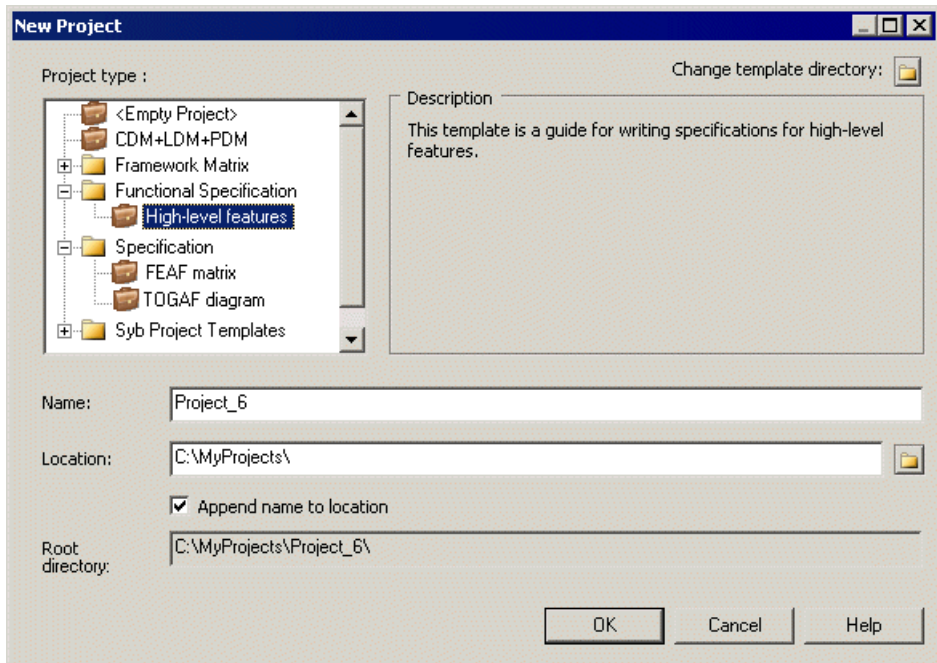
The project (.prj) and the models and files it contains are copied to the template directory.

---

**Note:** If any documents are outside the project and only attached to it they will not be copied to the template directory and thus may not be available to a user when she creates a project from the template.

---

11. [optional] Select **New > Project** to open the New Project dialog box. The template you have created is available for selection in the Project type tree.



## Project and Framework Properties

---

Projects, model and file documents, and framework diagrams and matrices have a variety of properties that you can configure to control their behavior.

### Project Properties

The Project property sheet displays the definition of the current project.

A project has the following properties:

Property	Description
Name	Specifies the name of the item, which should be clear and meaningful, and should convey the item's purpose to non-technical users.
Code	Specifies the technical name of the item, which is used for generating code or scripts.

Property	Description
Comment	Specifies a descriptive comment for the item.
Author	Specifies the author of the project. If you enter nothing, the Author field in diagram title boxes displays the user name from the project property sheet Version Info tab. If you enter a space, the Author field displays nothing.
Version	Specifies the version of the project. You can use this box to display the repository version or a user defined version of the project. This parameter is defined in the Title page of the project display preferences.
File name	Specifies the location of the project file. This field is empty if the project has never been saved.
Default diagram	Specifies the diagram displayed by default when opening the project.

### Model and File Document Properties

Model and file document property sheet are available by right-clicking the document's Browser entry or diagram symbol, and selecting Properties.

The General tab of a model or file document property sheet contains the following properties.

Property	Description
Name	Specifies the name of the item, which should be clear and meaningful, and should convey the item's purpose for non-technical user's. [model document] read-only.
Code	Specifies the technical name of the item, which is used for generating scripts. [model document] read-only.
Comment	Specifies a descriptive comment for the item.
Stereotype	Extends the semantics of an item derived from existing objects but specific to your needs. You can enter stereotypes directly in this field, or add stereotypes to the list by specifying them in your model's resource file or in an extended model definition.
Location	Specifies the path or URL to the document. [model document] read-only.
Extension	[read-only] Specifies the extension of the document name.
Inside project	[read-only] Specifies whether the document is part of the project or is simply referenced in the project.
Size	[read-only] Specifies the size of the document.
Creation date	[read-only] Specifies the date of creation of the document.

Property	Description
Modification date	[read-only] Specifies the date of the last modification of the document.

## Dependency Link Properties

You can view the properties of an object from its property sheet. To open a dependency link property sheet, double-click its diagram symbol.

The General tab of a dependency link property sheet contains the following properties:

Property	Description
Type	[read-only] Specifies the type of the dependency link, which can include generation links, reference links, mapping links, and file links.
Stereotype	[read-only] Extends the semantics of an object derived from existing objects but specific to your needs.
Influent object	[read-only] Specifies the source object of the dependency link. Click the Properties tool beside the list to open its property sheet.
Dependent object	[read-only] Specifies the target object of the dependency link. Click the Properties tool beside the list to open its property sheet.

## Framework Matrix Properties

Framework architects can modify a framework matrix properties from its property sheet by enabling the Framework Design Mode, and double-clicking the framework matrix top-left corner.

For more information on enabling the Framework Design Mode, see *Designing Framework Matrices and Diagrams* on page 53.

The General tab contains the following properties.

Property	Description
Name	Specifies the name of the item, which should be clear and meaningful, and should convey the item's purpose for non-technical user's.
Code	Specifies the technical name of the item, which is used for generating scripts.
Comment	Provides descriptive information about the framework matrix.
Stereotype	Sub-classification used to extend the semantics of the framework matrix. You can create stereotypes in the Profile category of the resource file attached to the current project.

In addition to the General tab, the framework matrix property sheet contains the following tabs:

- Rows tab – displays a sortable list of rows, in which you can create, edit or delete rows. See *Framework column and row properties* on page 75.
- Columns tab – displays a sortable list of columns, in which you can create, edit or delete columns. See *Framework column and row properties* on page 75.
- Cells tab – displays a list of cells, which is computed from the intersection of columns and rows or from the creation of additional areas. You can edit cells but you cannot delete them unless you delete the columns or rows to which they belong. See *Framework node, cell and additional area properties* on page 75.
- Additional Areas tab – displays the four additional areas available to the framework matrix. You can create, edit or delete additional areas. See *Framework node, cell and additional area properties* on page 75.

## Framework Column and Row Properties

Framework architects can modify a column or row properties from its property sheet by enabling the Framework Design Mode, and double-clicking a column or row header in the framework matrix.

For more information about enabling the Framework Design Mode, see *Designing Framework Matrices and Diagrams* on page 53).

The General tab contains the following properties.

Property	Description
Name	Specifies the name of the item, which should be clear and meaningful, and should convey the item's purpose for non-technical user's.
Code	Specifies the technical name of the item, which is used for generating scripts.
Comment	Provides descriptive information about the framework column or row.
Stereotype	Sub-classification used to extend the semantics of the column or row. You can create stereotypes in the Profile category of the resource file attached to the current project.
Help file	Specifies a location for the help file associated with the row or column.
Default folder	Specifies a default folder for the creation of the cell's documents. If no default folder is specified in the cell's property sheet, the row's default folder is used first, then the column's default folder.

## Framework Node, Cell and Additional Area Properties

Framework architects can modify a node, a cell and an additional area properties by enabling the Framework Design Mode, and double-clicking a node in the framework diagram and a cell or an additional area in the framework matrix.

For more information about enabling the Framework Design Mode, see *Designing Framework Diagrams and Matrices* on page 53.

The General tab contains the following properties.

Property	Description
Name	Specifies the name of the item, which should be clear and meaningful, and should convey the item's purpose for non-technical user's.
Code	Specifies the technical name of the item, which is used for generating scripts.
Comment	Provides descriptive information about the item.
Stereotype	Sub-classification used to extend the semantics of the item. You can create stereotypes in the Profile category of the resource file attached to the current project.
Help file	Specifies a location for the help file associated with the node and cell.
Default folder	Specifies a default folder for the creation of the node's and cell's documents.
Cell location	[framework matrix only - read-only] [cell] Specifies the name of the column and row for which the cell is the intersection. Click the Properties tool beside Row and Column fields to open their property sheet. [additional area] Specifies the location of the additional area: Left, Top, Right, or Bottom area.
Completion status	Controls the percentage of work completed in the node and cell. Enter a value between 1 and 100 in the box. This value is also displayed in the node's and cell's floating list and a rectangle on the node and cell shows the work progression if you have selected the Completion status display preference.
Inactive	[cell only] Specifies a cell which is not available.
Constrain content	Specifies a node and cell, whose content can only be completed by its defined actions.
Composite	[node only] Specifies whether the node is decomposed into sub-nodes displayed in sub-diagrams. When selected a Sub-Nodes tab is displayed in the property sheet to list these sub-nodes. If you deselect this property, then any sub-nodes that you have created will be deleted.

In addition to the General tab, the framework node and cell property sheet contains the following tabs:

- Actions tab – displays a list of actions, in which you can create, edit or delete actions (see *Framework Action Properties* on page 77).

- Documents tab – displays a list of documents, in which you can create or add existing documents, and also edit or delete documents (see *Attaching a Document to a Framework Node and Cell* on page 49).

## Framework Action Properties

Framework architects can modify an action properties from its property sheet by enabling the Framework Design Mode, and double-clicking an action on the Actions tab of a node or cell property sheet.

For more information about enabling the Framework Design Mode, see *Designing Framework Diagrams and Matrices* on page 53.

Property	Description
Parent	[read-only] Specifies the name of the parent node and cell to which the action belongs.
Name	Specifies the name of the action, which should be clear and meaningful, and should convey the item's purpose for non-technical user's.
Code	Specifies the technical name of the action, which is used for generating scripts.
Comment	Provides descriptive information about the action.
Stereotype	Sub-classification used to extend the semantics of the action. You can create stereotypes in the Profile category of the resource file attached to the current project.
Multiple	When selected, specifies that one or more documents of the selected type can be created.
Mandatory	When selected, specifies that at least one document of the selected type must be created.

## Framework Action Property Sheet Detail Tab

The Detail tab contains the following properties:

Property	Description
Type	<p>Specifies the nature of the document to attach to the framework nodes and cells. You can choose one of the following types:</p> <ul style="list-style-type: none"> <li>• Model – specifies a PowerDesigner model (see <i>Example: Specifying a Model Action</i> on page 57).</li> <li>• Diagram – specifies a PowerDesigner diagram (see <i>Example: Specifying a Diagram Action</i> on page 58).</li> <li>• List – specifies a PowerDesigner model object list (see <i>Example: Specifying a List Action</i> on page 59).</li> <li>• Generation – specifies a PowerDesigner model generated from another PowerDesigner model (see <i>Example: Specifying a Generation Action</i> on page 61).</li> <li>• File – specifies an external file (see <i>Example: Specifying a File Action</i> on page 64).</li> <li>• Matrix – specifies a PowerDesigner dependency matrix (see <i>Example: Specifying a Matrix Action</i> on page 65).</li> </ul>
Default document name	[Model, Diagram, and File only] Specifies the model, diagram or file name created by default in the Browser.
Model type	[not for File and Dependency Matrix] Specifies a model type to create, for example Enterprise Architecture Model.
Document template	[not for Generation and Dependency Matrix] Specifies the model or file template on which the model or file to create is based, for example a PDM, an LDM, or a .doc, a .xls etc. Click the Ellipsis button to browse for a file on your system.
Model language	[not for File and Dependency Matrix] Specifies a target language associated with the model to create, for example Analysis for a BPM or Java for an OOM. Select a model language in the list. If you do not specify a language, your system default model language is used.
Diagram type	[Model and Diagram only] Specifies a diagram type for the model, for example Class Diagram for an OOM, or Business Process Diagram for a BPM.
Extended model definition	[not for File and Dependency Matrix] Specifies an extended model definition attached to the model, for example SIMUL8 for a BPM.
Object type	[List only] Specifies the model object type in the list, for example entity, process, table, class etc.

Property	Description
Object stereotype	[List only] Specifies a stereotype to filter the metaclass, for example a <<cluster>> stereotype on an extended object in a PDM targeted for the Oracle Version 9i DBMS.
Dependency matrix	[Dependency Matrix only] Specifies a dependency matrix definition between model objects. Click the Create tool to create a new dependency matrix.
File type	[File only] Specifies the extension of the file to create, for example, .doc, .xsl, .txt, etc.
Source model type	[Generation only] Specifies the model type from which to generate the model, for example Business Process Model, Conceptual Data Model etc.
Source cell	[Generation only] Specifies the node and cell containing the model type from which to generate the new model.

## Framework Link Properties

Framework architects can modify a link properties from its property sheet by enabling the Framework Design Mode, and double-clicking a link in the framework diagram.

For more information about enabling the Framework Design Mode, see *Designing Framework Matrices and Diagrams* on page 53.

The General tab contains the following properties:

Property	Description
Name	Specifies the name of the item, which should be clear and meaningful, and should convey the item's purpose for non-technical user's.
Code	Specifies the technical name of the item, which is used for generating scripts.
Comment	Provides descriptive information about the link.
Stereotype	Sub-classification used to extend the semantics of the item. You can create stereotypes in the Profile category of the resource file attached to the current project.
First object	Specifies the node that the link leads from. You can click the Properties tool to the right of the list to view the properties of the selected object.
Second object	Specifies the node that the link leads to. You can click the Properties tool to the right of the list to view the properties of the selected object.



## CHAPTER 3 Models

Models are the basic work unit in PowerDesigner. You must create a model before you can begin modeling. You can group models together in projects and framework diagrams. You can break models down into packages to isolate a part of your model and make it easier to work with.

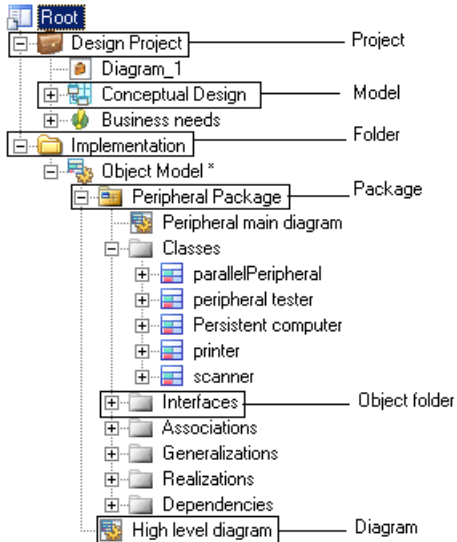
PowerDesigner provides various forms of sophisticated generation and reverse engineering for your models. For more information about:

- Generating another model from your model, see *Chapter 9, Getting Started with Linking and Synching* on page 331.
- Generating and reverse-engineering code for a particular model type, see the appropriate modeling guide.
- Customizing generation, including defining extended definitions to create additional generation targets, see the *Customizing and Extending PowerDesigner* book.

### Organizing Your Models in the Browser

---

The Browser provides a hierarchical view of all your model objects.



---

**Note:** To expand all nodes at once, press the numpad plus sign (+). To collapse all nodes at once, press the numpad minus sign (-).

---

A typical hierarchy of objects in a PowerDesigner Browser tree is as follows:

- *Workspace* - The root of every Browser tree is a special type of folder called a workspace, a virtual environment that contains and organizes all the information and files you create to support your designs. A workspace allows you to save your local design environment so that it is available next time you start a session. For more information, see *Workspaces* on page 82.
- *Projects* - Acts as containers for all your development artifacts, allowing you to save them as a single unit in the repository. Each project has a diagram that automatically calculates and displays the dependencies and other links between your models and other documents. For more information, see *Chapter 2, Projects and Frameworks* on page 37.
- *Folders* - Workspaces can contain user-defined folders, which allow you to organize models or other files into groups. For example, if you are working on two separate projects, but want to be able to access both of them from a single workspace, you could organize the files using folders. For more information, see *Folders* on page 85.
- *Models* - They are the basic design unit in PowerDesigner. Each model has one or more graphical views called diagrams and any number of model objects. For more information, see *Chapter 3, Models* on page 81.
- *Packages* - When you are working with large models, you may want to split them into smaller "sub-models" in order to avoid manipulating large sets of items. These sub-models are called packages, and can be used to assign different tasks or subject areas to different development teams. For more information, see *Packages* on page 89.
- *Diagrams* - Show the interaction of various model objects. You can create several diagrams in a model or in a package. For more information, see *Chapter 5, Diagrams and Symbols* on page 167.
- *Model objects* - Is a general term used for all items belonging to a model. Some model objects, such as a class in an Object-Oriented Model, have graphical symbols while others, such as business rules, do not appear in diagrams and can only be accessed from the Browser or from an object list. For more information, see *Chapter 4, Objects* on page 101.
- *Reports* - Can be automatically generated to document your models. For more information, see *Chapter 6, Reports* on page 205.

### **Dragging and Dropping**

You can drag and drop or copy objects in the Browser, or from the Browser to the diagram window.

### **Searching**

You can find the Browser entry for any object you see in a diagram by right-clicking the symbol and selecting **Edit > Find in the Browser** from the contextual menu, from the object's property sheet menu, or from the contextual menu in a Result list.

## **Workspaces**

A workspace contains all the information you need to perform a modeling task with PowerDesigner. It allows you to save your modeling environment in a file with a hierarchy of

folders and models. During a work session, every change in the folder or models hierarchy is saved locally in the workspace.

You can create several workspace files on your machine, but you can only work in one workspace at a time. Workspaces are saved in files with an .sws extension. They do not have property sheets

You can create the following new items in a workspace by right-clicking the workspace in the Browser and select *New item*:

- Models and multi-model reports
- Folders (see *Folders* on page 85)

In addition, you can add existing items (including external files, such as text files or MS Word files, and other PowerDesigner workspaces) to a workspace by right-clicking the workspace in the Browser, selecting Add, browsing to the item, and clicking OK. When you have external files referenced in a workspace, you can open with a double-click.

A PowerDesigner model is the basic work unit, and may contain multiple packages and diagrams. You can use folders in your workspace to organize your models.

---

**Note:** You can have a convenient environment for working with multiple interconnected models and other files by creating a project. For information, see *Chapter 2, Projects and Frameworks* on page 37.

---

### **Modifying the Filename of a Closed Item**

To modify the filename of closed models, multi-model reports, or any document type (workspaces or external files) you can right-click the item in the Browser and selecting Properties, the Document Properties dialog box allows you to directly modify the item filename.

---

**Note:** It is highly recommended to keep original models and their corresponding generated models in the same workspace.

---

### **Creating a Workspace**

By default, PowerDesigner opens with a workspace. Whether you want to model data in a CDM or generate a multi-model report, there will always be a workspace open in the PowerDesigner window.

To create a new workspace, you have to close the current workspace and a new workspace will be automatically created.

Select **File > Close Workspace**.

Confirmation boxes prompt you to save the models before closing the current workspace and opening a new work environment.

### Opening a Workspace

When you open an existing workspace, the hierarchy of folders and links to model and report files appear in the Browser. The models linked to the workspace are not open by default.

1. Select **File > Open Workspace**.

A confirmation message prompts you to save the current workspace.

A standard file selection dialog box opens.

2. Select a file with the SWS extension and click OK.

The new workspace displays the hierarchy of folders, models, and packages defined in this workspace.

### Saving a Workspace

We recommend that you save your workspace whenever you modify its structure by the creation, addition, modification or deletion of a model, report, or folder. When you save a workspace, you will be prompted to save also any changes to models it contains.

To save your workspace, do one of the following:

- To perform a standard save - select **File > Save Workspace** or right-click the workspace node in the Browser and select **Save**. You will be prompted to save any models that contain changes.
- To save the workspace under another name - select **File > Save Workspace As** to open a standard Save As dialog, or right-click the workspace node in the Browser and select **Save As**. You will be prompted to save any models that contain changes.
- To save the workspace and all the models it contains - select **File > Save All**, or click the **Save All** tool.

### Changing Workspace

You can change workspace during a work session.

1. Select **File > Open Workspace**.

A confirmation message prompts you to save the current workspace.

A standard file selection dialog box is displayed.

2. Select another workspace and click OK.

The new workspace environment is displayed.

### Deleting a Workspace

Deleting a workspace deletes the .sws file, but not the model or report files it contains. If you want to delete a workspace file, you have to use the standard file deletion procedure in Windows Explorer.

Right-click the workspace file in Windows Explorer and select Delete.

## Folders

A folder is a container object that can help you organize the hierarchy within your workspace. It can contain models, multi-model reports, and other folders. Folders are saved in the workspace file.

### Creating a Folder

You can create a folder in the Browser.

1. Right-click the workspace or the folder where you want to create a new folder and select **New > Folder**.

The new folder is created below the selected item in the tree structure.

2. Type a name in the highlighted area. Folder names must be unique in the folder hierarchy.

### Deleting a Folder

When you delete a folder, you detach the models and reports it contains from the workspace, but you do not delete the models and reports themselves.

---

**Warning!** Deleting a folder cannot be undone.

---

1. Select the folder in the tree view.
2. Click the Delete tool, select **Edit > Delete**, or right-click the node and select **Edit > Delete** from the contextual menu.

### Creating an Item in a Folder

You can create models, multi-model reports, and other folders in a folder.

Right-click the folder and select **New > New item** from the contextual menu.

The new item is created in the folder.

### Adding an Item to a Folder

You can add an item to a folder by copying or through drag and drop. Note that you cannot copy or move an open model into a folder.

---

**Note:** You can add several items simultaneously by selecting them using the ctrl key and dragging them to the target folder. However, if you select an unauthorized item or an open model, the drag and drop will fail.

---

1. Select an item.
2. Press the ctrl key and drag the item to the folder if you want to copy the item.

*or*

Press the shift key and drag the item to the folder if you want to move the item.

The new item is displayed in the folder.

## Model Files

You can create a new empty model by clicking the New tool, or populate a new model with existing data in one of the following ways:

- Import one or more existing PowerDesigner models
- Import one or more Rose or ERwin models
- Generate from another type of model or resource
- Reverse engineer from another type of model or resource
- Open a model from a previous version

For more information on the different methods of model creation, see the Getting Started chapter in the appropriate modeling guide.

### Opening a Model

You open models using the File menu or directly in the Browser.

By default, when you open a workspace, the models linked to workspace are closed, in order to save working memory. Simply double-click a model or right-click it and select **Open** to open it. To open a closed model as read-only, right-click it and select **Open as Read-only**.

1. Select **File > Open** from the PowerDesigner menu bar to open a file selection dialog.
2. [optional] To open the model as read-only, select the **Open as read-only** check box.
3. Browse to and select a model, and then click OK.

The model is added to the workspace and opened in the Browser.

### Saving a Model

When a model contains unsaved changes, an asterisk is appended to its name in the Browser. You can save a model or all the models in the workspace.

When you save a model or a multi-model report, PowerDesigner automatically assigns to the file a unique identifying number called GUID (Global Unique ID), and creates a backup copy of your file with the same identifying number. The GUID is used to identify documents in the Repository and during model generation.

The following formats are available when you save a model:

- XML - [default] Is larger and somewhat slower to load than binary, but the model file can be edited in a text editor outside of PowerDesigner. Recommended for small to medium-sized models.
- Binary - Is smaller and faster to load than XML, but cannot be edited outside of PowerDesigner. Recommended for large models.

To save your model, do one of the following:

- To perform a standard save - select **File > Save**, click the **Save** tool, or right-click the model entry in the Browser and select **Save** from the contextual menu. If you did not define a file

name when you created the new model, the Save As dialog box asks you to indicate a name and a path for the file of the new model.

- To save the model as a new model with the same GUID - select **File > Save As**, or right-click the model node in the Browser and select **Save As**. This allows you to create a backup version of a model with the same GUID as the original.
- To save the model as a new model with a new GUID - select **File > Save As New Model**, or right-click the model node in the Browser and select **Save As New Model**. This allows you to develop two separate models in parallel, starting from the same set of model objects. Note that if you check the new model into the Repository, the Update mode will not be available. External shortcuts located in the new model may also not work properly since the identity of the model has changed.
- To save the workspace and all the model it contains - select **File > Save All**, or click the **Save All** tool.

### Renaming a Model

You can rename a model in the Browser.

1. Select the model node in the Browser.
2. Click in the selection to make the name editable, press F2, or right-click the node and select Rename from the contextual menu.
3. Type a new name for the model and press Enter.

### Closing a Model

When you close a model you free up working memory, but the model remains available in the workspace to be re-opened.

1. Select the model node in the Browser.
2. Select **File > Close**, or right-click the node and select Close from the contextual menu.

If the model needs to be saved, a Save dialog box is displayed.

The node in the Browser is tagged with a red dot.



### Deleting a Model

When you delete a model, you detach it from the current workspace, but do not delete the corresponding file from your disk.

1. Select the model node in the Browser.
2. Click the Delete tool, press DEL, or right-click the node and select Detach From Workspace from the contextual menu.

The model node and all its related items are removed from the current workspace.

### **Adding Legacy Models to the Workspace**

Your current models can coexist with non-migrated V6 models like Process Analyst Models (PAM) or Warehouse Architect Models (WAM) and also external models like ERwin or Rational Rose.

This feature allows you to keep on working with the non-migrated or external model application together with PowerDesigner within the same workspace.

Right-click the workspace entry in the Browser and select Add from the contextual menu.

*or*

Drag the model from Windows Explorer, and drop it into the Browser.

*or*

Extract the model from the Repository (with the Add to workspace option selected and the Open document option deselected).

Each time you add a model to the workspace, PowerDesigner lets you choose for each one of them whether you want to:

- Add non-migrated V6 models and external models to the workspace and keep their original format
- Open non-migrated V6 models and external models as PowerDesigner models

When you choose to add a model to the workspace and keep its original format, the model opens in its associated application every time you want to open it.

For more information about:

- opening a PAM into a CDM, see chapter Working with Conceptual Data Models in the *Data Modeling* guide.
- opening a PAM into a BPM, see chapter Working with Business Process Models in the *Business Process Modeling* guide.
- importing a WAM into a PDM see chapter Working with Physical Data Model in the *Data Modeling* guide.

### **Model Properties**

You can modify the properties of a model from its property sheet. To open a model property sheet, double-click the model node in the Browser or right-click the model node, or the model diagram background, and select Properties from the contextual menu.

All model types share the following common properties:

Property	Description
Name	The name of the item which should be clear and meaningful, and should convey the item's purpose to non-technical users. By default, any new model is called Model <i>n</i>
Code	The technical name of the item used for generating code or scripts, which may be abbreviated, and should not generally include spaces
Comment	A comment is an optional label that describes a model and provides more information than the name
Filename	Location of the model file. This box is empty if the model has never been saved
Author	Author of the model. You can insert a name, a space, or nothing. If you insert a space, the Author field in the title box remains empty. If you intentionally leave the box empty, the Author field in the title box displays the user name from the Version Info page of the model property sheet
Version	Version of the model. You can use this box to display the repository version or a user defined version of the model. This parameter is defined in the model display preferences
Default diagram/ view	You can select from the list the diagram or view to display by default when you open the model

### **Sending a Model Via a Messaging Application**

PowerDesigner uses the messaging application programming interface (MAPI) to send model files by electronic mail.

This interface lets you use your internal messaging system to send model files directly to other team members. Make sure your current email software supports MAPI or verify your email software settings in **Control Panel > Internet Options**.

1. Select **File > Send** to open a profile selection dialog box.
2. Select a profile and click OK.

The file transfers to your internal messaging system, which may ask you for additional information, such as a destination.

### **Packages**

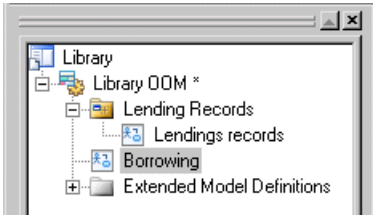
A package is a piece of a model. When working with large models, you can split them into smaller subdivisions in order to avoid manipulating the entire model at once. Packages can be used to organize your model into different tasks and subject areas, and to assign parts of it to different development teams.

You can create as many packages as you need in a model. The name of each package must be unique in the model. You can decompose a package into other packages, and there is no limitation to the decomposition depth.

Packages can contain the same kinds of items as models:

- Model objects
- Other packages
- Diagrams, in order to have different views of the contents of the package. Each package has a default diagram

In the example below, a package called "Lending Records" (with a diagram of the same name) has been added to the model "Library OOM":



Note that you cannot save a package individually. When you save the model you also save all the packages it contains.

### Creating a Package

You can create a package in any of the following ways:

- Use the package tool in the diagram palette
- Select **Model > Packages** to access the List of Packages, and click the Add a Row tool
- Right-click the model or package in the Browser and select **New > Package**

When you create a package in models with multiple kinds of diagrams, you may be required to specify the type of diagram to create in the package.

For general information about creating objects, see *Creating Objects* on page 101.

### Package Properties

You can modify an object's properties from its property sheet. To open a package property sheet, double-click its diagram symbol or its Browser entry.

---

**Note:** The same properties (except where noted) are also available for project folders.

---

The **General** tab contains the following properties:

Property	Description
Name	The name of the item which should be clear and meaningful, and should convey the item's purpose to non-technical users.
Code	The technical name of the item used for generating code or scripts, which may be abbreviated, and should not generally include spaces.

Property	Description
Comment	A comment is an optional label that describes a package and provides more information than the name.
Stereotype	Sub-classification used to extend the semantics of an object without changing its structure; it can be predefined or user-defined.
Default diagram	[package only] Specifies the diagram to display by default when you open the package.
Use parent namespace	[package only] Option that defines the package as being the area in which the name of an object must be unique in order to be used.

### **Controlling the Namespace of a Package**

PowerDesigner applies uniqueness checks on the names of objects. The *namespace* defines an area in which the name and the code of an object of a given type must be unique.

- For the CDM, PDM, ILM, and FEM - the entire model is, by default, a single namespace, and all the packages use their parent namespace. PowerDesigner applies checks on uniqueness at the model level.
- For the OOM, RQM and BPM – each package is, by default, a separate namespace. PowerDesigner applies checks on uniqueness at the package level.

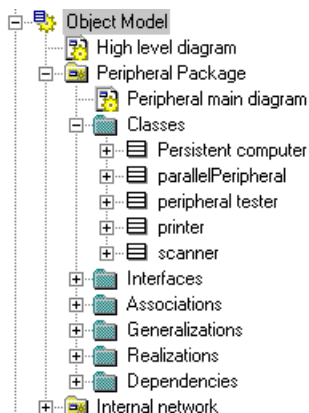
Depending on the type of model where you create a new package, the Use Parent Namespace check box is selected in the package property sheet.

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**Note:** The XML model does not support packages. For more information on namespaces in the XSM, see the *XML Modeling* guide.

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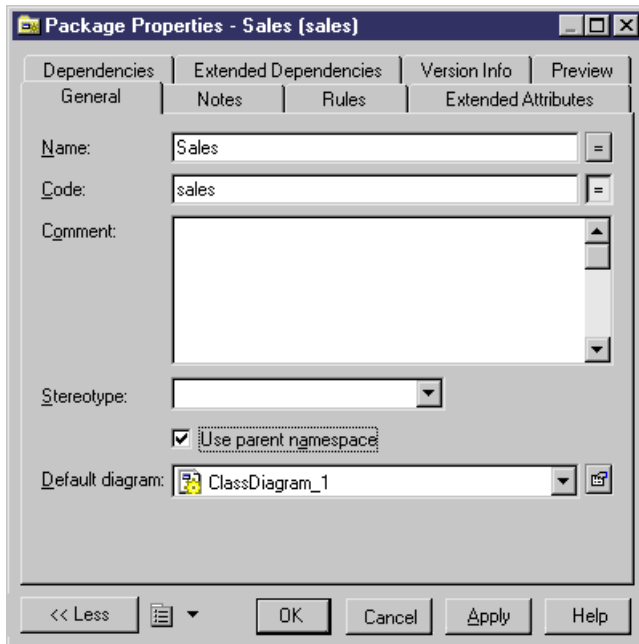
In the following example, the class Printer is located in the Peripheral Package of an OOM where each package is, by default, a separate namespace:



If you were to select the Use Parent Namespace check box in the property sheet of Peripheral Package, the internal names of objects in this package would no longer be prefixed by the

name of the package. The parent of the folder, in this case the model itself, becomes the namespace, and you could not create a Printer class in the Internal Network package, because PowerDesigner would verify its uniqueness in the entire model.

1. Open the property sheet of the package.
2. Select or clear the Use Parent Namespace check box.



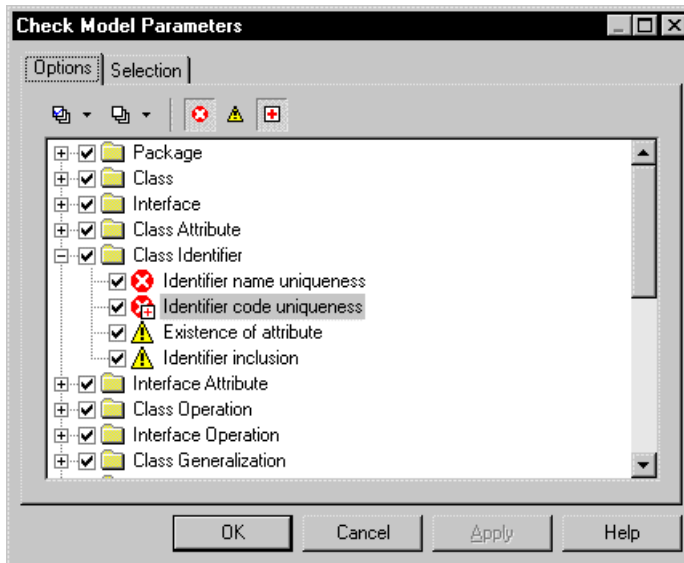
3. Click OK to return to the model diagram.

## Checking a Model

You can check the validity of your model at any time. We recommend that you check your model before generating code or another model from it. The Check model option is enabled by default in the Generate dialog box and, if an error is found, the generation is stopped.

1. Press F4, select **Tools > Check Model**, or right-click the diagram background and select Check Model from the contextual menu to open the Check Model Parameters dialog box.

The options tab lists the types of objects to be checked, and the individual checks to be performed are displayed with symbols indicating their severity:



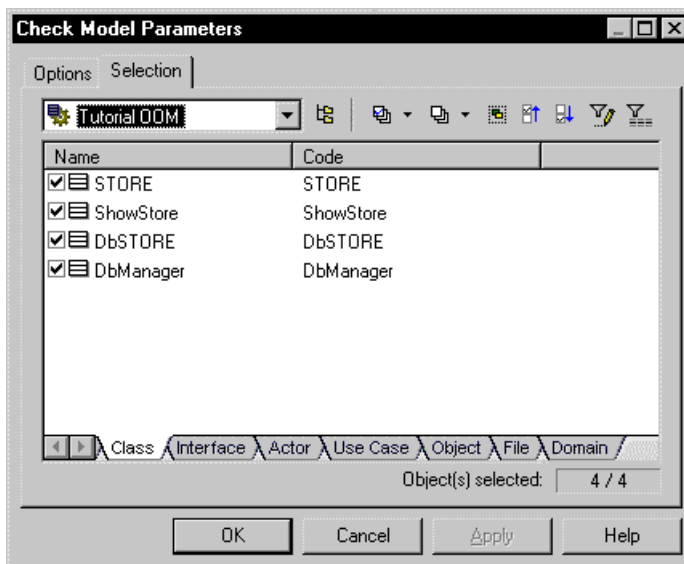
2. [optional] Select or deselect types of objects to check, and expand object nodes to enable, disable, vary the severity of, and enable or disable automatic correction of individual checks (see *Check model parameter tools* on page 94).

---

**Note:** Right-click a check in the Check Model Parameters dialog box and select Help from the contextual menu to display its documentation.

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3. [optional] Click the Selection tab, and select or deselect individual objects for checking. Sub-tabs are available for each type of object:



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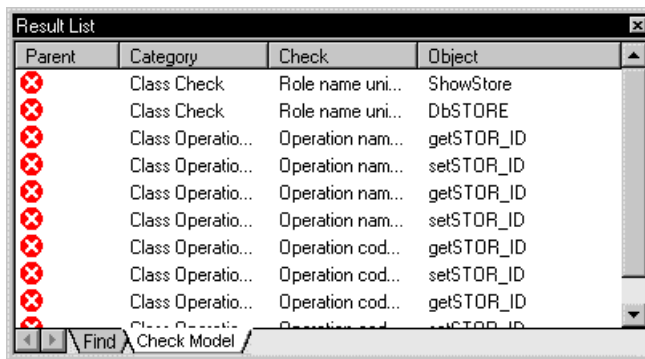
**Note:** If you have selected object symbols in your diagram before starting the model check, you can select them for checking by clicking the Use Graphical Selection tool in the Selection tab tool bar.

---

For more information about selecting objects in Selection tabs, see the *Adding an Item from a Selection List* on page 122.

4. [optional] Click Apply to save your selections so that they will be available for future model checks.
5. Click OK to launch the model check.


The Check Model Result List displays errors and warnings based on the check options you have defined. For information about how to correct errors, see *Correcting errors in the check model result list* on page 95.



## Check Model Parameter Tools

The following tools are available in the Check Model Parameters dialog box:









Tool	Description
	Select All – Click the arrow to the right of this tool to choose to select all checks, all error checks, or all warning checks.
	Deselect All - Click the arrow to the right of this tool to choose to deselect all checks, all error checks, or all warning checks.
	Error – Sets the selected check to error level. The check icon will change accordingly. When errors are encountered, any model generation is stopped.
	Warning - Sets the selected check to error level. The check icon will change accordingly. Warnings do not prevent generation from your model.

Tool	Description
	<p>Automatic correction – [enabled if automatic correction is available for the selected check] Enables automatic correction for the selected check. The check icon will change to bear a small red cross in its bottom-right corner.</p> <p>You should be aware of how automatic corrections can affect your models. For example, in a PDM, if a column code length is longer than the length specified in the <code>MaxColumnLen</code> field in the DBMS, then PowerDesigner can automatically truncate the code to the specified length. However, such truncation can make create duplicate names and PowerDesigner will automatically rename the duplicated column code. If you do not want this to occur, you should deselect automatic correction for column code uniqueness.</p> <p>All problems that can not be corrected automatically must be corrected manually. For example, in a PDM, PowerDesigner will not create a column for an existing index, and you will need to create the appropriate column.</p>

## Correcting Errors in the Check Model Result List

When errors and warnings are encountered during model checking, they are listed in the Check Model Result List pane. You can correct the problems either by invoking a automatic correction (if available) or by opening the property sheet of the affected object and correcting it manually.

The following tools are available to assist you in correcting problems with your model. If this toolbar is not displayed, select **Tools > Customize Toolbars**, select Check, and click OK.

Tool	Description
	Correct error – Opens the property sheet of the affected object to allow you to correct the error.
	Display help – Provides documentation for the error or warning.
	Check again – Re-performs the check, to allow you to verify your correction.
	Automatic correction – Only available if an automatic correction is defined for this kind of error. Performs the automated correction.
	First error – Goes to the first error in the list.
	Previous error - Goes to the previous error in the list.
	Next error - Goes to the next error in the list.
	Last error - Goes to the last error in the list.

**Note:** These and other options are also available by right-clicking an item in the Check Model Result List.

## Checking Generic Objects

Generic objects are available in all types of models and have standard checks defined for them. For model-specific checks, see the appropriate modeling guide.

### Business Rule Checks

PowerDesigner provides default model checks to verify the validity of business rules.

Check	Description and Correction
Business rule name and code uniqueness	Business rule names and codes must be unique in the model. Manual correction: Modify the duplicate name/code Automatic correction: Appends a number to the duplicate name/code
Unused business rule	The business rule you have created is not used in the model. Manual correction: Apply the business rule to an object in the model Automatic correction: None

### Extended Object/Link Checks

PowerDesigner provides default model checks to verify the validity of extended objects/links.

Check	Description and Correction
Extended object/link name and code uniqueness	Extended object and link names and codes must be unique in the namespace (model or package). Manual correction: Modify the duplicate name/code Automatic correction: Appends a number to the duplicate name/code

### File Checks

PowerDesigner provides default model checks to verify the validity of files.

Check	Description and Correction
Embedded file name uniqueness	Embedded file object names must be unique in the model. Manual correction: Modify the duplicate name/code Automatic correction: Appends a number to the duplicate name/code
Existence of external file location	External file objects should have a valid path location. Manual correction: Define a valid path location Automatic correction: None

### Replication Checks

PowerDesigner provides default model checks to verify the validity of replications.

Check	Description and Correction
Partial replication	<p>A replica object is partially synchronized with its replicated object.</p> <p>Manual correction: Modify the list of replicated attributes from the replication property sheet</p> <p>Automatic correction: Enforces the replication of de-synchronized attributes of the replica object in the replication property sheet</p>

## Using the Free Model

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A *free model (FEM)* provides a context-free environment for modeling any kind of objects or systems. It is generally associated with a set of extensions, which allow you to define your own concepts and graphical symbols.

For example, you could create a model to represent:

- how your models and documents relate to each other
- the organizations in your enterprise and how they interrelate
- a flowchart
- a hierarchy diagram
- the graphics you use in PowerPoint presentations and link them to the presentations they are used in
- the users in your Enterprise Repository and link them to symbols representing the groups they belong to
- an ORM model using ORM specific extended model definitions

You can enrich the diagrams in the Free Model by selecting different bitmaps for each symbol and add extended attributes to collect specific metadata. VBScript and the Generic Generator make it possible to program your own semantics into this model and create specific generated code or other output particular to your own interpretation.

## Model Templates

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A model template is a shell model that contains a set of model options, display preferences, extensions, and/or objects, which you can reuse in multiple models of the same type. For example, a BPM model template can be used to create other BPMs, but not an OOM or PDM. Model templates are stored in the model templates directory, which is, by default, the PowerDesigner installation directory.



You can make any model available as a model template by saving it to the model templates directory. Alternatively, you can manage your model templates from the New Model dialog (select **File > New Model**, or click the New Model tool, and then select the Templates button.

---

**Note:** The New Model dialog is highly customizable and its display is controlled by the Model Creation general options. If the **Enable model template files** option is deselected or if no valid template directory is selected then the Templates button will not be available. For information about these options, see *Customizing the New Model Dialog* on page 314.

---

The New Model dialog lists the model templates that are available, sorted by model type, and provides the following tools:

Tool	Description
	Copy Model as Model Template – allows you to select one or more models as model templates, and copies them to the model templates folder.
	Change Model Templates Folder – allows you to select a folder for use as the model templates folder.

For information about using the New Model dialog, see *Creating a Model* on page 12.

## Upgrading from Previous Versions of PowerDesigner

The resource files that customize PowerDesigner for particular target languages or DBMSs are constantly evolving. When you open a model created with a previous version of PowerDesigner, the resource file associated with the model will be automatically upgraded if possible. Note that it may be possible to upgrade a model created with v6.x or earlier but only upgrading from v7.x or later is supported.

## Replacing DBMSs from Previous Versions

All DBMSs stored in the installation directory are updated when you upgrade PowerDesigner.

For DBMSs copied to the model file in previous PowerDesigner versions, you will be invited to upgrade the DBMS when you open the old model. The following situations can occur:

- Shared DBMS - DBMS upgraded and message in the Output window. If you had customized your DBMS, and want to keep your changes, merge the current version DBMS with the previous version, using the merge feature available from the list of DBMSs (**Tools > Resources > DBMS**).
- Copied DBMS - A confirmation dialog invites you to replace the DBMS, and if you do so, a message appears in the Output window. If you had customized your DBMS, and want to keep your changes, create a new model using a current version DBMS fairly similar to your modified DBMS, and merge it with a model using the DBMS from a previous version.

If no matching DBMS is found then you will continue with the previous version.

## Replacing Object Languages from Previous Versions

All object languages stored in the installation directory are updated when you upgrade PowerDesigner.

For object languages copied to the model file in previous PowerDesigner versions, you will be invited to upgrade the object language when you open the old model. The following situations can occur:

- **Shared Object Language** - If the object language file is the original file delivered with PowerDesigner, the object language is automatically replaced as mentioned in the Output window. If the object language file is a renamed copy of an object language shipped with PowerDesigner, a message box appears to advise you to change object language.
- **Copied Object Language** - A message box appears to advise you to change object language. If you click Yes, the object language is automatically replaced in your model. You lose all the changes performed on the definition file. If you click No, the object language is not replaced and remains in the previous version format, you cannot generate for the target language. If you click Cancel the model is not opened.
- **Converting Generic Object Language** - If you had customized an object language from PowerDesigner v8.0 using the generic generation mechanism, the names of the templates may conflict with the public names defined in the current version. You can use the script `_PublicNames.pl` located in the `\Tools` directory to avoid conflicts with public names.



# CHAPTER 4 Objects

You populate your models with objects. The types of objects that you can create depend on the type of model that you are working with.

## Creating Objects

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Model objects are the building blocks of your models. They are listed as items in the Browser and often also appear as symbols in your diagrams.

There are two main types of objects:

- Ordinary Objects – such things as tables and entities, which are self-sufficient, and can be created in isolation from other objects
- Link Objects – such things as associations or dependencies, which link two ordinary objects, and cannot be created in isolation

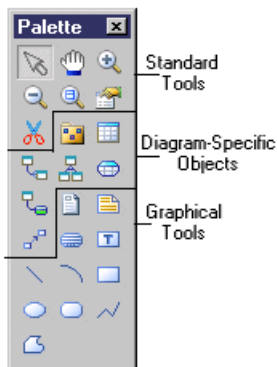
There is detailed information about each object in the relevant modeling guide. The following sections describe generic features available for all objects.

You can create objects:

- Directly in your diagram, using a Palette tool (only for objects that have symbols)
- From the Browser
- From an object list

## Creating an Object from the Palette









The Palette is a toolbar that lets you quickly create objects and links. Objects, such as OOM classes or PDM tables, can be created independently in any free space in the diagram, while links, such as OOM messages or PDM references are drawn between objects.



To create an object from the palette, simply select the appropriate tool and then click anywhere in the diagram. When you release the mouse button, the object is created, and you can click again elsewhere to create a second object and so on. To release the tool, simply right-click anywhere.



To create a link, select the appropriate link tool, and then click in the object from which you want the link to begin and again in the object in which you want the link to end. When you release the mouse button, the link is created.











The standard palette tools are as follows:

Icon	Action
	Pointer [default] – Selects, moves, and resizes individual symbols. Double-click to select all the objects in the diagram. To switch back to the Pointer from another tool, right-click anywhere in the diagram.
	Grabber – allows you to select, move and resize the entire diagram. Double-click to display the entire diagram, centered.
	Zoom in
	Zoom out
	Open the diagram of a composite object or packages
	Delete a symbol and, optionally, its associated object.
	Open the property sheet of an object
	Create a package

The central tool area in the palette depends on the model you are working with, and will contain tools to create all the objects relevant to that type of model. For details of these model-specific tools, see the appropriate modeling guide.

The standard graphical tools are as follows:

Icon	Action
	Insert an area where you can write free notes
	Draw one of the following: <ul style="list-style-type: none"> <li>• a graphical link between free symbols in the diagram</li> <li>• a note link between a note and an object</li> <li>• an extended dependency between objects (where possible)</li> </ul>

Icon	Action
	Insert a file symbol and object
	Insert a title box
	Insert text
	Draw a line
	Draw an arc
	Draw a rectangle
	Draw an ellipse
	Draw a rounded rectangle
	Draw a jagged line
	Draw a polygon

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**Note:** To revert to the previously selected tool, hold down **CTRL** and perform a double right-click.

To rename an object from its symbol, select it and then press F2. If the symbol carries additional editable properties (but not lists of sub-objects), you can navigate to the next with Tab (or the previous with Shift+Tab). Select the **Edit in place after creation** general option to have the name of each object that you create immediately selected for editing (see *General Options* on page 301).

---

## Creating an Object from the Browser

You can create any object in the Browser.

1. Right-click the model, package or object category where you want to create the object, and select **New > object type** to open a new default object property sheet (see *Object Properties* on page 104).
2. Type an object name and code in the General tab of the property sheet, and then add any other relevant properties in the remaining fields of this or the other tabs.
3. Click OK to confirm the creation of the object.

The object is created in the appropriate object category in the Browser, under the current model or package, and its symbol is added to the current diagram.

## Creating an Object from an Object List

You can create objects from an object list.

You can also create objects from the model object lists available by clicking **Model > object type** .

1. Select **Model > object type** to open the appropriate object list.
2. Click the Add a Row tool or, if the list is ordered, the Insert a row tool.

A new item is added at the end, or before the selected row, of the list.

3. Enter an object name and code and, for link objects, a source and destination object.
4. Repeat as necessary to create additional objects of the same type, and then click OK.

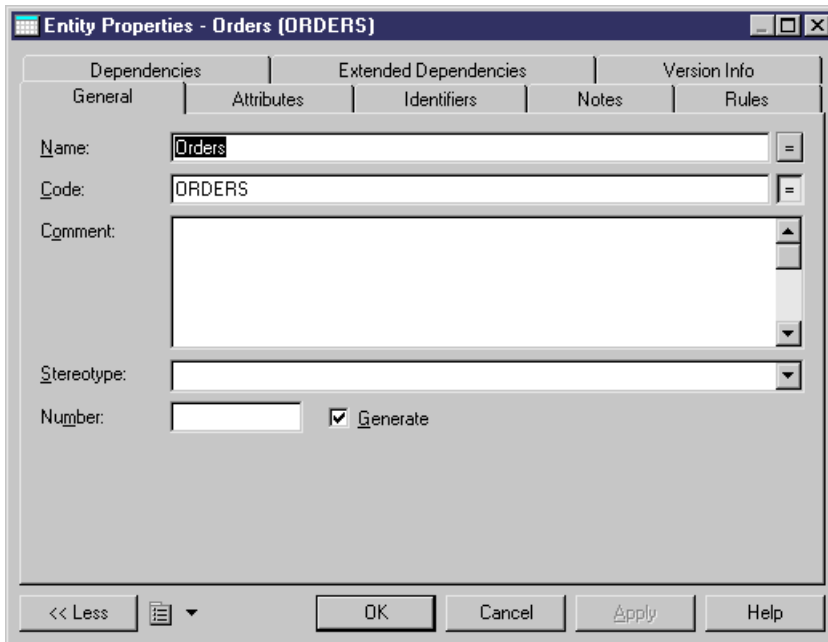
For more information about object lists, see *Object Lists* on page 117.

## Object Properties

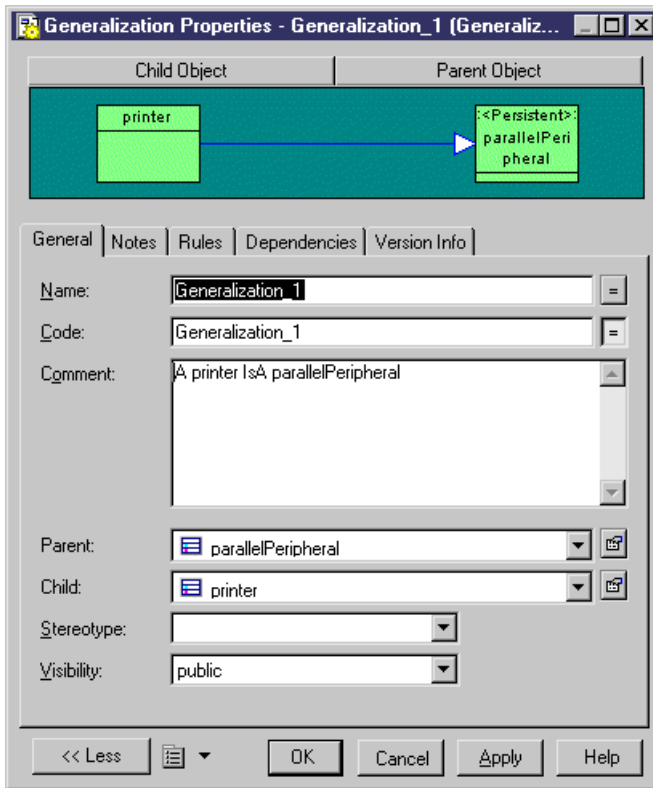
All model objects created in PowerDesigner have property sheets, which organize object properties on tabs.

You can open an object property sheet in any of the following ways:

- Double-click the object symbol or its entry in the Browser.
- Right-click the object symbol or its entry in the Browser, and select Properties from the contextual menu.
- Select the object in an object list or in the property sheet of its parent object, and click the Properties tool
- Select an object symbol and press Alt + Enter.



Property sheets of link objects display a picture of the link together with its extremities. Additional information, such as the cardinality value and the role, may also be displayed:



Property sheets allow you to assign extensive and sophisticated properties to objects. Most PowerDesigner objects have the following tabs and properties, but many others, specific to the particular object type, may be available:

- **General** – provides basic information about the object. Almost all objects have the following properties:
  - **Name** - clearly identifies the object. By default names can have up to 254 characters, and can include upper, lower, and mixed case strings.
  - **Code** – is used in scripts generated from the model. By default, codes are synchronized with names, but you can decouple them by clicking to deselect the equal sign button to the right of this field. You control this synchronization of codes with names with the **Name to Code mirroring** general option (see *Dialog Box General Options* on page 303) and can modify the transformations performed on codes with naming conventions (see *Naming Conventions* on page 315).
  - **Comment** – [optional] provides a more detailed description of the object. You can display (and edit) object comments on their many diagram symbols using the "Comment" Display Preference. This feature can be useful when importing an ERwin model into a CDM or PDM.

- **Notes** – lists additional information about the object. For more information, see *Notes Tab* on page 109.
- **Rules** – lists the business rules with which the object must comply. A business rule could be a government-imposed law, a customer requirement, or an internal guideline. For more information, see *Business Rules* on page 140.
- **Version Info** - provides details about the object owner, creation, and modification date and allows you to access help for the PowerDesigner metamodel metaclass on which the object is based. For more information, see *Displaying object version information* on page 114
- **Dependencies** - lists all the objects that depend on the object. For more information, see *Analyzing object dependencies* on page 115
- **Extended dependencies** - lists all the objects on which the object depends. For more information, see *Using extended dependencies* on page 334
- **Requirements** – lists the project requirements that the object is intended to satisfy. This tab is not visible by default. For more information, see *Attaching requirements to an object* on page 114

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**Note:** Use Ctrl + Page Down or Ctrl + Page Up to move to the next or to the previous tab and display the corresponding object type tab.

Property sheets open to the **General** tab by default. However, you can choose to open property sheets at the last accessed tab by selecting **Tools > General Options > Dialog**, and selecting the Keep Last Tab option in the Property Sheets groupbox.

---

You can control the form of the symbols, the background color, and the text format via the default display preferences. If you want changes to the display preferences to appear in link object property sheets, you must click the Set As Default button in the Display Preferences dialog, for each modification.

## Customizing a Property Sheet

Since PowerDesigner can hold a rich variety of information about your model objects, property sheets can become overloaded.

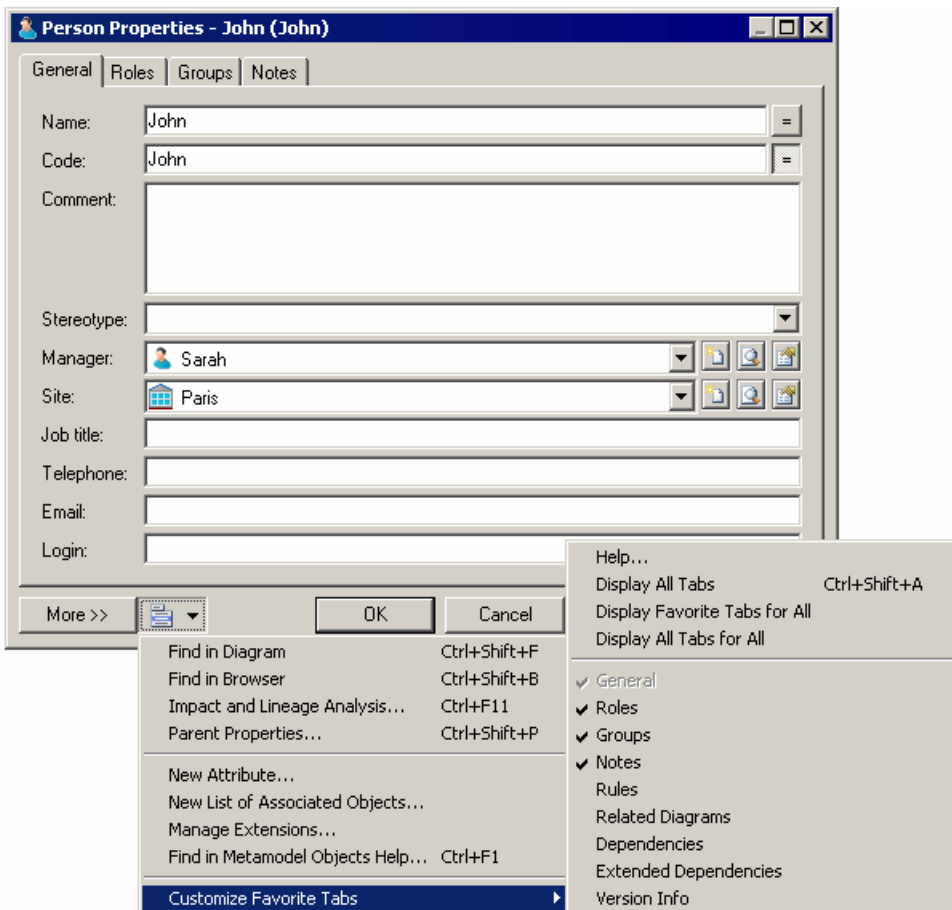
The More or Less button at the bottom left corner of the property sheet allows you to toggle between displaying all the available property sheet tabs, and a subset called "favorite" tabs.

You can customize your list of favorite tabs, and access various other property sheet features, from the property sheet menu, which is accessible from the bottom-left corner of all property sheets.

Command	Description
Find in Diagram	Finds the object in the diagram, found object is displayed centered and selected.
Find in Browser	Finds the object in the Browser and highlights it.
Impact Analysis	Opens the Impact Analysis dialog box.

Command	Description
Parent Properties	Opens the property sheet of the parent object.
New Attribute	Opens the New Attribute dialog, which lets you add new properties to your object property sheets. For more information, see <i>Adding a New Attribute to an Object</i> on page 147.
New List of Associated Objects	Opens the New List dialog, which lets you add new lists of associated objects to your object property sheets. For more information, see <i>Adding a New List to an Object</i> on page 149.
Manage Object Extensions	Opens the Manage Object Extensions dialog, which lets you access the metaclass on which the object is based in the Resource Editor. For more information, see <i>Managing Extensions</i> on page 150.
Find in Metamodel Objects Help	Opens the MetaModel Objects Help for the metaclass on which the object is based.
Customize Favorite Tabs	<p>Opens a sub-menu, which allows you to define favorite tabs:</p> <ul style="list-style-type: none"> <li>• Help – opens this help topic</li> <li>• Display All Tabs - Displays all available property tabs for the current property sheet</li> <li>• Display Favorite Tabs for All - Displays favorite tabs for all property sheets throughout all models</li> <li>• Display All Tabs for All - Displays all tabs for all property sheets throughout all models</li> </ul> <p>Beneath the sub-menu are listed all the tabs available for the present object. Favorite tabs have a check against them.</p> <p>Click a tab in the list to select or remove it from the list of favorite tabs. Note that the General tab cannot be unchecked.</p> <p>When you check or uncheck a tab such as Notes, Rules, and Dependencies, which are common to many objects, you are asked to confirm the change for all other objects. If you click No, only the current property sheet is modified.</p>

In the following example, all the tabs except Implementation are checked and are displayed:



Any changes in the display of tabs are immediately applied to the current property sheet but not to other property sheets that are currently open. The changes become the default setting for any property sheet of the same type.

**Note:** You can choose to display tabs on one or several rows in property sheets by selecting **Tools > General Options > Dialog**, and selecting the Tabs on one row option or the Tabs on one several rows option in the Property sheets groupbox.

## Notes Tab



The Notes tab in an object property sheet contains the sub-tabs Descriptions and Annotations, intended to hold additional information about the object.

- **Descriptions** - in general, includes important information that does not fit into the General tab. For example, a description of the Employee entity might read: *This entity has one*

*occurrence for each employee in our worldwide operations. This base should grow by 20 percent in 2002.*

- **Annotations** - contains notes regarding the implementation of a model or the objects it contains. For example, an annotation of the Employee entity might read: *Verify list of attributes with Director of Human Resources.*

Both are editable directly in the tab with the internal PowerDesigner RTF editor, which includes the following tools:

Tool	Description
	[ <b>Shift+F11</b> ] <b>Open Editor Menu</b> - provides various file and formatting options. For more information, see <i>Working with Textual Symbols</i> on page 201.
	[ <b>Ctrl+E</b> ] <b>Edit With</b> - Opens your default RTF editor. Click the down arrow beside this tool to select another editor. For information, see <i>Specifying Text Editors</i> on page 305.

You can insert the content of an existing text or RTF file in the RTF editor to use it as a standard for your descriptions or annotations. This can be very helpful to standardize objects notes as you can have a description or annotation RTF file for each object type, and open it when needed.

1. Open the object's property sheet and click the **Notes** tab.
2. Click the **Description** or **Annotation** sub-tab, depending on the kind of note you want to add.
3. Click the **Editor Menu** tool and select **Insert** to open a standard **Open** dialog.
4. Browse to the file you want to insert and click **Open**.

The content of the file is displayed in the RTF editor.

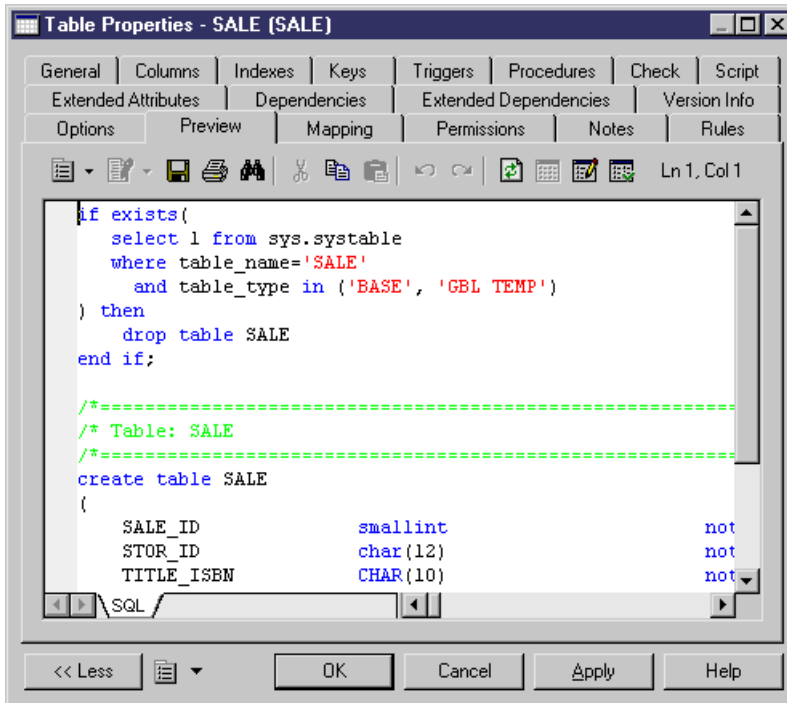
---

**Note:** To see which objects have notes, open the appropriate object list and review the [N]otes checkbox. For more information about customizing the display of a list, see *Customizing Object List Columns and Filtering Lists* on page 120.




---




## Preview Tab

Many objects have a **Preview** tab in their property sheets, that allow you to preview the code to be generated from the object. This provides an easy way to apply modifications to your code and update the model.



All or some of the following tools are available on this tab:

Tool	Description	Keyboard shortcut
	Open Editor Contextual Menu	Shift + F11
	Edit With contextual menu. This allows you to select an editor for the script	ctrl + E
	Refresh	F5

Tool	Description	Keyboard shortcut
	Select generation targets. This tool is available when at least one extended model definition flagged for generation is linked to the model and when it contains GeneratedFiles entries for the current object. When available, it displays the list of targets for the current object. If you add a generation target, the corresponding tab is added to the Preview tab. If you deselect a generation target, the corresponding tab disappears from the Preview tab	ctrl + F6
	Show generation options. If you select the Show Generation Options tool when available, the Generation Options dialog box is displayed. You can change generation options from this dialog box and see the impact on the code	ctrl + W
	Ignore generation options. If you click the Ignore Generation Options tool when available, the preview ignores generation options selected by using the Show generation options tool but uses a predefined set of options	ctrl + D

In the Preview tab, you can add and remove bookmarks at specific points in the code and then navigate forwards or backwards from bookmark to bookmark:

Keyboard shortcut	Description
ctrl + F2	Adds a new bookmark. A blue bookmark box is displayed. If you repeat this action from the same position, the bookmark is deleted and the blue marker disappears. Note that bookmarks are not printable and are lost if you use the Refresh, or Show Generation tools.
F2	Jumps to bookmark
shift + F2	Jumps to previous bookmark

For more information about how the Preview tab is used in the different modules, see the appropriate modeling guide.

### **Finding Text Using Regular Expressions**

You can use regular expressions to find script text displayed in the Preview or Script tab of a table property sheet, as well as in the Edit/Run Script editor, the Resource Editor, and various other windows.

In order to be able to search for text using regular expressions, you must select the Regular Expression check box in the dialog box and enter a regular expression in the Find What box.

Regular expressions can contain ordinary characters and the following *metacharacters*:

Character	Description
\	Matches a special character Examples: "n" matches "n". "\n" matches a newline character. "\\\" matches "\" and \"(\" matches "("
^	Matches the position at the beginning of the input string Examples: "^Win" matches strings beginning with "Win"
\$	Matches the position at the end of the input string Examples: "then\$" matches strings ending with "then"
*	Matches the preceding character zero or more times Examples: "zo*" matches "z" and "zoo"
+	Matches the preceding character one or more times Examples: "zo+" matches "zo" and "zoo", but not "z"
?	Matches the preceding character zero or one time Examples: "to?" matches either "t" or "to"
.	Matches any single character except the newline \n Examples: ".ork" matches "Work", "Fork" etc
[ ]	Matches any one of the enclosed character Examples: "[abc]" matches "a", "b", or "c" A range of character can be indicated with a dash "[a-z]"

For a complete list of metacharacters and their behavior in regular expressions, see the Visual Basic Documentation.

## Requirements Tab

You can attach one or more requirements to an object using the Requirements tab in the object property sheet. This tab is not displayed by default, and can only be used if one or more requirements models is open in the workspace.

---

**Note:** To display the Requirements tab, select **Tools > Model Options** and select the **Enable links to requirements** option.

---

1. Open the object's property sheet and click the **Requirements** tab.
2. Click the **Add Objects** tool to open a selection dialog.
3. Select a Requirements model and, optionally, a package to display a list of the requirements contained therein.
4. Select the requirements that you want to attach to the object and click **OK**.

The selected requirements appear in the Requirements tab.

5. [optional] Select the requirement in the list and click the **Properties** tool to open its shortcut property sheet. To open the property sheet of the requirement itself, click the **Target Object Properties** button to the right of the **Name** field.

---

**Note:** To access the property sheet of the requirement directly instead of passing by the shortcut, select **Tools > General Options > Dialog**, and select the **Target Object** radio button beside the **External Shortcut** option.

---

6. Click **OK** to close the property sheet and return to the model.

## Version Info Tab

PowerDesigner automatically manages version information about model objects on the read-only **Version Info** tab of the object's property sheet.

Property	Description
Creation User	Specifies the name of the User who created the object.
Creation Date	Specifies the date of creation of the object
Last Modification User	Specifies the Name of the user who made the last modification to the object.
Last Modification Date	Specifies the date of the last modification of the object
Replicated From	[replicated objects only] Specifies the name of the origin object from which the object was replicated.  Click the button to the right of this field to open the origin object property sheet

Property	Description
Generated From	<p>[generated objects only] Specifies the name of the origin object from which the object was generated.</p> <p>Click the button to the right of this field to open the origin object property sheet</p>

---

**Note:** In addition to the standard help accessible via **F1** or by clicking the **Help** button, you can obtain information about the PowerDesigner metamodel metaclass on which this object is based by clicking the small question mark button at the bottom right of the tab.

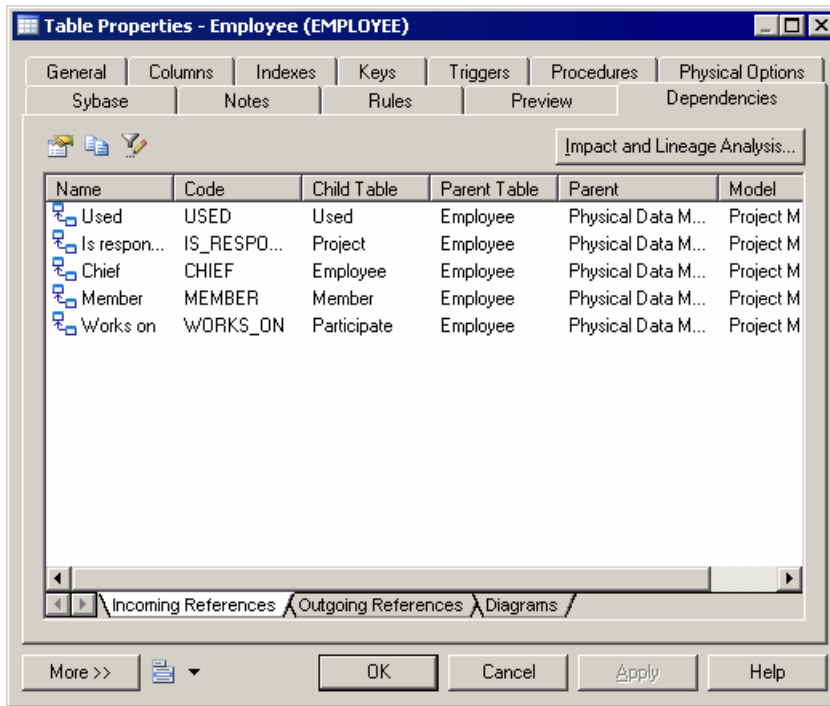
---

## Dependencies Tab

The PowerDesigner metamodel provides the capability to link objects to other objects in a variety of semantic ways. For example, when you create an external shortcut, or when you attach a business rule to an object, a dependency link is created between models or objects. The Dependencies tab of the object's property sheet displays these links.

Dependencies can be of two types:

- Internal, when the links are within a model. These dependencies are saved in the model and appear in the Dependencies tab of an object property sheet
- External, when the links exist between models. These dependencies are created during intermodel generation or external shortcut creation, they appear in the Dependencies tab if the related model is opened in the workspace. If the related model is not available, you can use the repository to retrieve external dependencies (see "Auditing repository activities" in the Repository Administration chapter in the *Working with the Repository* manual).



**Note:** The Dependencies tab of a model also lets you check the model origin (Generated From tab) and destination (Generated As tab).

## Object Namespaces

In PowerDesigner, each package can be a namespace. It is however possible to expand the namespace to the parent of a given package. You can cascade the expansion until you reach the level of the model itself.

Objects that appear in the Browser obey the general rules that follow:

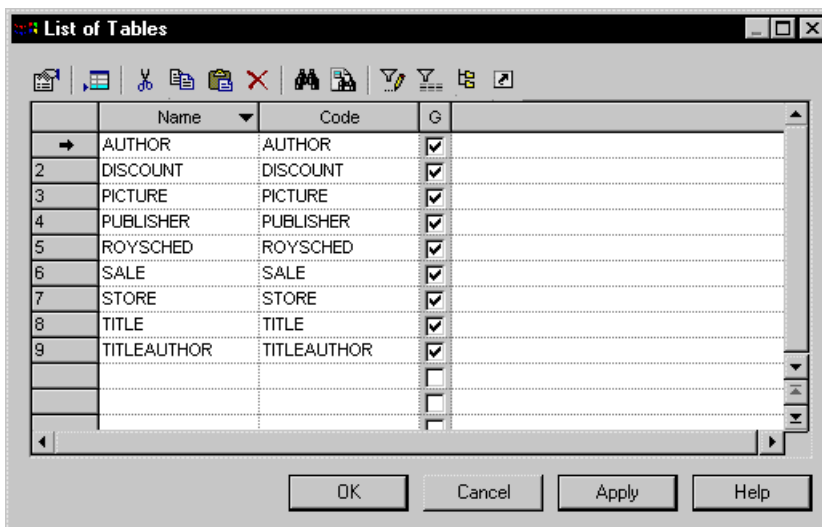
In Browser	Namespace	Uniqueness rule
Objects directly under a package or a model (table, process, class)	Model	Unique name and code in model
	Package	Unique name and code in package
Objects under parent object (column, attribute)	Not applicable	Unique name and code in parent
Linking objects (reference, relationship)	Not applicable	Unique name and code between same end objects (i.e., parallel links with same name and code are not allowed between same end objects)

However, you may encounter some exceptions to those rules. For example only the code of a reference allows to identify the object in the entire model, when the "Unique code" option is selected in the Model Options dialog box. PowerDesigner warns you when a general rule is not respected.

## Object Lists

PowerDesigner object lists provide a spreadsheet-like interface for manipulating large quantities of objects. They offer you an overview of the objects in your model and can save you time and effort in managing your metadata. While property sheets provide depth of detail for individual objects, lists allow you to select and manipulate multiple objects simultaneously to streamline creation and improve consistency.

Lists of all the major objects in your model are available under the **Model** menu or by right-clicking your model in the Browser and selecting **List of objects** . Each list shows all the objects of that type in the currently selected package or model, including those that do not have symbols in the current diagram:



The properties of the listed objects are organized in columns. You can order the list by a particular columns values by clicking on its column header. You can control which property columns are displayed, and also filter the list based on the values in any of the columns (see *Customizing object list columns and filtering lists* on page 120).

















You can select multiple items in a list by Ctrl-clicking them in the far-left, numbered column. To select all the items in a list, click the top-left corner box. When multiple items are selected, any edits you make to properties are applied to all the selected items.




---

**Note:** By default, you must click the **Apply** button to commit changes or the **OK** button to commit and close the list. To have changes committed immediately when you enter them in a field, enable the **Auto commit** general option (see *Dialog Box General Options* on page 303). You can always use the **Undo** tool to cancel the change.

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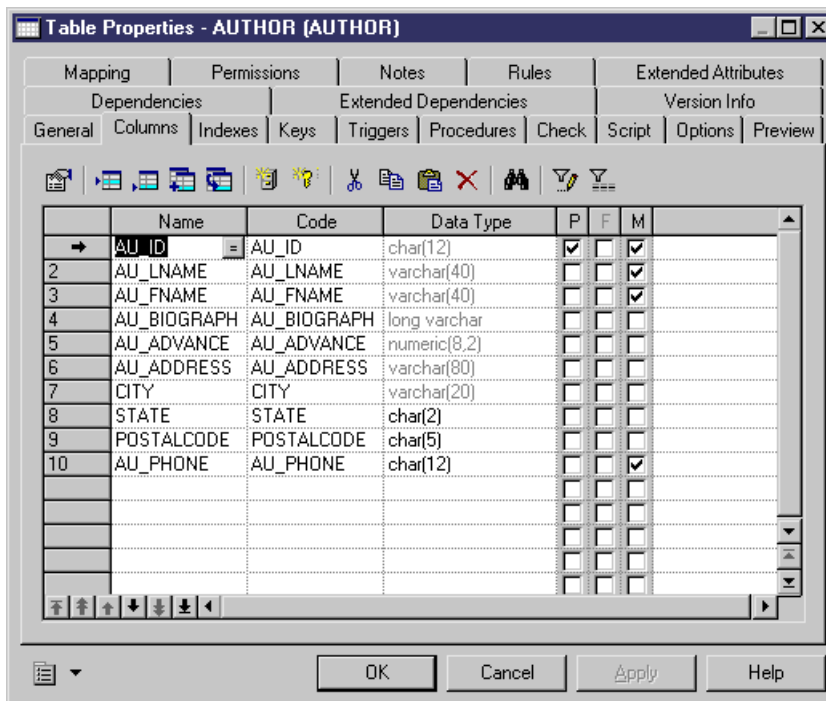
All or some of the following tools are available on object lists:

Tool	Description
	Opens the property sheet of the selected item (see <i>Object Properties</i> on page 104).
	[ordered lists only] Inserts a row before the selected row in the list.
	Adds a row at the end of the list.
	Opens an object selection dialog box to select objects and copy them to the list (see <i>Adding an Item from a Selection List</i> on page 122).
	Creates a new object and opens its property sheet to allow you to complete its definition.
	[CDM only] Opens an object selection dialog box to reuse objects. When you select an item you create a link to the original instead of copying it to the list.
	Cuts the row and stores it in the Clipboard.
	Copies the selected row to the Clipboard.
	Pastes the contents of the Clipboard.
	Deletes the row.
	Opens the Find dialog to search for an item in the list.
	Finds the object's symbol in the diagram.
	Opens the Customize Columns and Filter dialog to change the columns displayed in the list or define a filter (see <i>Customizing Object List Columns and Filtering Lists</i> on page 120).
	Enables/Disables the filter specified in the Customize Columns and Filter dialog.
	Includes objects in sub-packages in the list.
	Includes composite objects (such as sub-processes, sub-activities, sub states, etc.) in the list.

Tool	Description
	Includes object shortcuts (see <i>Shortcuts</i> on page 355) in the list. Shortcuts are grayed as they cannot be modified. When you include shortcuts whose target model is closed, some information may be unavailable.
	[Related Diagrams tab] Opens a target model or a diagram (see <i>Specifying Diagrams as Related Diagrams</i> on page 170).
	Opens an object selection list to change the target object of a shortcut

### Sub-Object Lists

Many objects have property sheets that contain sub-object lists, which list all of the child objects of that type belonging to the object. For example, the Columns tab in a table property sheet displays the list of columns in the selected table:

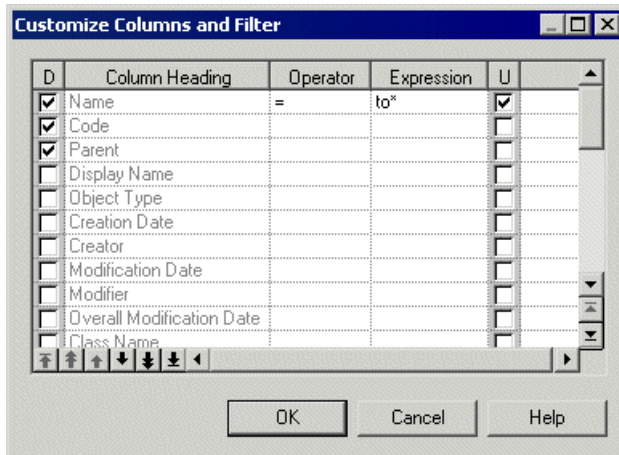


These lists provide the same features as the lists of objects available from the **Model** menu. Depending on the properties of the listed objects, the list may have a natural order that you can control. For example, a list of columns has such an order, and you can move objects in the list by selecting them and then clicking on one of the arrows at the bottom left corner of the list.

## Customizing Object List Columns and Filtering Lists

You can choose which property columns to display in object lists, reorder them, and filter the range of values that they display.

1. Click the **Customize Columns and Filter** tool on an object list toolbar to open the Customize Columns and Filter dialog.
2. Perform any of the following functions to filter the list:
  - Select columns to display - by checking the **[D]**isplay column checkbox.
  - Reorder the columns in the list - by using the arrows at the bottom left of the dialog. To move all the selected rows to the top of the list, press **SHIFT+ENTER**.
  - Define one or more filter expressions - by selecting an operator in the **Operator** column and entering an expression to filter by in the **Expression** column.



The **[U]**sed checkbox is automatically selected when you enter a filter expression. To disable the expression but keep it in memory, clear the checkbox.

3. Click **OK** to return to the list. The filter is applied by default, and the **Enable/Disable filter** tool is depressed. Click this tool to toggle between enabling and disabling the filter.

### Defining a Filter Expression

The Operator and Expression columns are used in multiple dialog boxes to filter a query.

The following operators are available

Operator	Description
=	[default] Equal to
>	Greater than
>=	Greater than or equal to

Operator	Description
<	Less than
<=	Less than or equal to
Not Equal	Different from
In List	Belongs to the list. For example "global", "Architecture", "proc*" finds any of these values.
Not In List	Does not belong to the list.
Between	In a range between two values. For example, (A, E) finds any values between A and E.
Not Between	Outside a range of two values. For example, (A, E) finds any values outside of the range between A and E.
Empty	Has no value. No expression is necessary with this operator.
Not Empty	Has a value. No expression is necessary with this operator.

You can use the following wildcards in the Expression column:

Wildcard	Description
*	Any string (from none to any number of characters). For example P* finds "protocol" and "Paris".
?	Any character. For example ????? finds "Table" and "inner" but not "Seller".
\	Escapes the special characters *, ?, and \ . For example, \? \ finds "?".

### Examples

The following examples show some possible combinations of operators and expressions:

Operator	Expression	Find
=	W*	Work, Washington
=	*CODE	AREA CODE, COUNTRY CODE, CITY CODE
>	1??	200, 405, 609
Between	0, 8	0,1,2,3,4,5,6,7,8
In List	*_emp_???, *_grp_???	div_emp_fun, _emp_idn, div_grp_fun, _grp_idn
=	*\?	Is this book ready for production?

## **Adding Items to and Reordering Items in a List**

If a list is ordered you can choose to add an item at the end or at a certain point in the list, and you can reorder the items in the list. When you add a new item to a list, it is created with a default name and code that you can edit. Objects are not actually created until you click Apply or OK.



---

**Note:** In general, you are not required to provide any specific properties when you create an object. However, when you create a link object, such as a reference, association link, or inheritance link, you must specify the source and the destination.

---







### **Adding Items at the End or at a Particular Point in a List**

The following tools are available for adding items to a list:

<b>Tool</b>	<b>Description</b>
	Add a Row - Adds an item to the end of the list. You can also add an item to the end of a list by clicking in any empty row.
	Insert a Row [ordered lists only] - Adds an item in the row above the selected row. You can always reorder items in an ordered list by selecting and dragging and dropping them or by using the arrow tools at the bottom left of the list.

### **Arranging Items in an Ordered List**

In ordered lists, you can drag and drop objects to reorder them, or use the following buttons at the bottom of the list:

<b>Tool</b>	<b>Description</b>
	Move the selected items to the top of the list.
	Move the selected items up one page
	Move the selected items up one line
	Move the selected items down one line
	Move the selected items down one page
	Move the selected items to the bottom of the list

## **Adding an Item from a Selection List**

Selection lists allow you to select items from a list in order to associate them with another object.






Most selection lists display objects contained in the current model or in individual packages contained in that model.







Other selection lists such as the following allow you to display both objects contained in the current model or its packages and objects contained in other models or other packages of these models:

- **Select Diagrams.** From this dialog box you can select the diagram to which you want to apply pre-defined display preferences.
- **Add Shortcuts.** From this dialog box you can select objects to include them as shortcut in your model or package.
- **Add Objects.** From this dialog box you can select objects to which you want to attach extended dependencies.

### **Object Selection**

The following tools are available in selection lists:

<b>Tool</b>	<b>Description</b>
-	Model list - Lets you specify a model as the basis for the list.
-	Package list - Lets you specify a package as the basis for the list.
-	Owner List - [PDMs only] Lets you specify a user as the basis for the list. The list will contain only objects owned by the specified user or by no user. If you select User <NONE>, then all the objects are displayed.
	<p>Include Sub-Packages - Includes objects contained in sub-packages (Include Sub-Packages) in the list.</p> <p>As this tool allows you to display all objects, regardless of their package, some objects in the list may have the same name and be difficult to identify. In this situation, you can use the Customize Columns and Filter tool, to display the Object Location column to identify where the objects are defined.</p>
	Include Composite-Objects - Includes composite objects, such as sub-process, sub-activity, sub state, in the list
	Include External Shortcuts - Includes shortcuts to objects in other models in the list. The model containing the original objects must be open for external shortcuts to be available for selection. When generating, external shortcuts are generated as ordinary objects.
	Select All - Selects all check boxes in the current object type tab. To select all check boxes in all object type tabs you can click the arrow and select All Lists or you can press the Ctrl key and click the Select All tool.
	Deselect All - Deselects all check boxes in the current object type tab. To clear all check boxes in all object type tabs you can click the arrow and select All Lists or you can press the Ctrl key and click the Deselect All tool.

Tool	Description
	Use Graphical Selection - Uses the graphical selection.
	Move Selected Items to Top - Moves all selected objects to the top of the list.
	Move Selected Items to Bottom - Moves all selected objects to the bottom of the list.
	Customize Columns and Filter - Opens the Customize Columns and Filter dialog (see <i>Customizing Object List Columns and Filtering Lists</i> on page 120), which allows you to define a filter expression to apply to the selection list.
	Enable/Disable Filter - Applies the filter defined in the Customize Columns and Filter dialog to restrict the list of objects available for selection to those meeting its criteria. The currently defined filter is displayed in the Filter box underneath the object list.
	Use Filter for Selection - Applies the filter defined in the Customize Columns and Filter dialog to select all objects meeting its criteria from the list. This selection by criteria is persistent for as long as the tool is applied.
Ctrl + selection tool	Applies the action of the selection tool to all object types in the different tabs.

### **Saving Object Selections**

In some selection lists, you can save sets of object selections in your model, so that you can reuse them easily. Note that in case of reverse engineering from a live data source, object selections are saved into separated files, as you can reverse a database without having any model open in the Workspace.

To save a selection, enter a name in the Selection list at the bottom of the Selection tab then click the Save tool beside the list. The selection is saved as part of the model file. For live reverse engineering, you have to select a folder before being able to save the object selection into a separated file.

For more information about live database reverse engineering, see the "Reverse Engineering a Database into a PDM" chapter in the *Data Modeling* guide.

### **Confirming Object Selections**

In a selection list, the display of your object selection may be modified whenever you perform one of the following actions:

- Change the folder selection using the Model or Package list
- Deselect the Include Sub-Packages/Sub-Objects tool
- Deselect the Include Shortcuts tool

- Apply a filter using the Enable Filter tool
- Change the database or owner in the Reverse Engineering from a data source dialog box

In this case, some objects that have already been selected will no longer be displayed, and a dialog box opens offering you the following options:

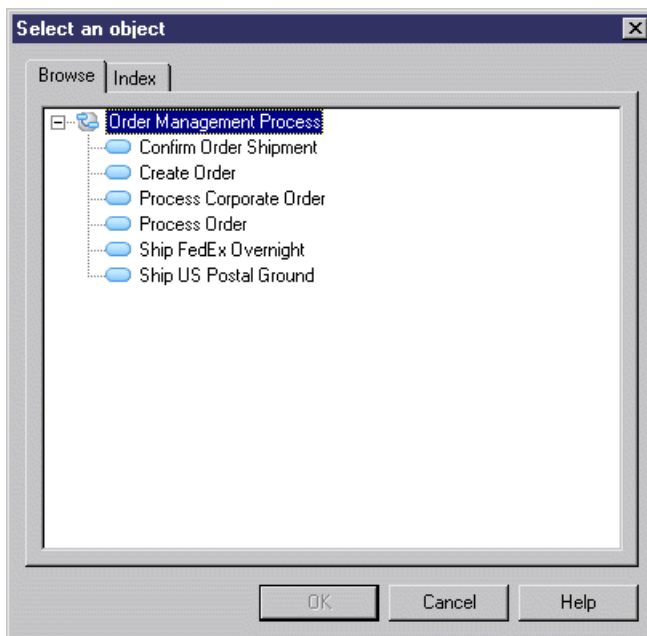
- Select only the objects displayed - Other objects that are no longer displayed are deselected.
- Keep the hidden objects in the selection – All the previously selected objects are retained, including those that are no longer shown. This allows you to take into account object selections you have made in several packages for example.
- Cancel - The commit of the selection list is canceled and the selection page now displays all objects and sub-objects in the model to let you modify your selection if necessary.

When you confirm your selection by clicking OK, the confirmation dialog box will not be displayed again, while you continue to edit your selection, even if you again modify your parameters.

## Selecting an Object from a Selection Tree

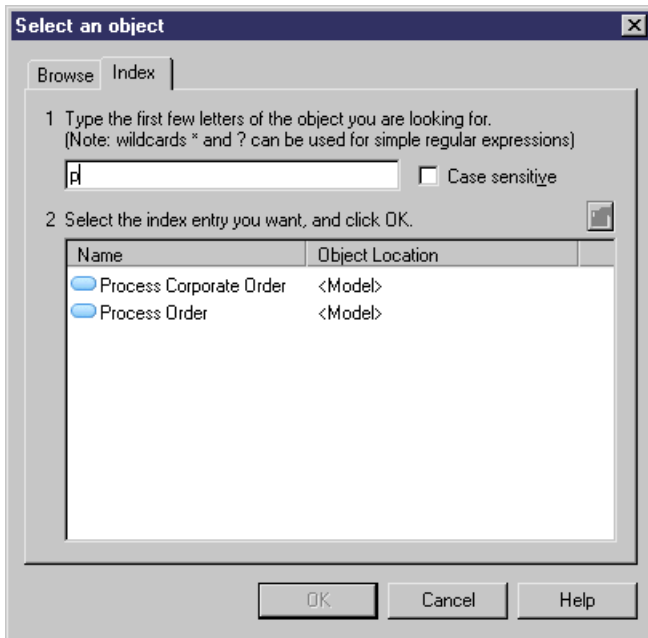
Certain selection dialogs allow you to choose objects from a tree view or by searching by name.

The **Browse** tab allows you to choose an object from a tree view:



The **Index** tab lets you search for an object by entering all or part of its name (or code depending on the **Display Name/Code** model option). Objects are sorted alphabetically in the

list and dynamically update as you type. Select an object and click the **Properties** button to view its property sheet:



You can select an object on either tab and then click the other tab to retain the choice and view it in that context. Double-click an object, or select it and click **OK**, to commit the selection and close the selection dialog.

## Moving, Copying, and Deleting Objects

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Objects in the PowerDesigner working environment are easy to manipulate and to reuse from one model or package to another.

### Dragging and Dropping Objects

You can drag and drop objects to copy, move, create a shortcut or a replica in the PowerDesigner modeling environment.

You can drag and drop objects from the Browser, the diagram or the Result list to the Browser or diagram window but not to the Result list.

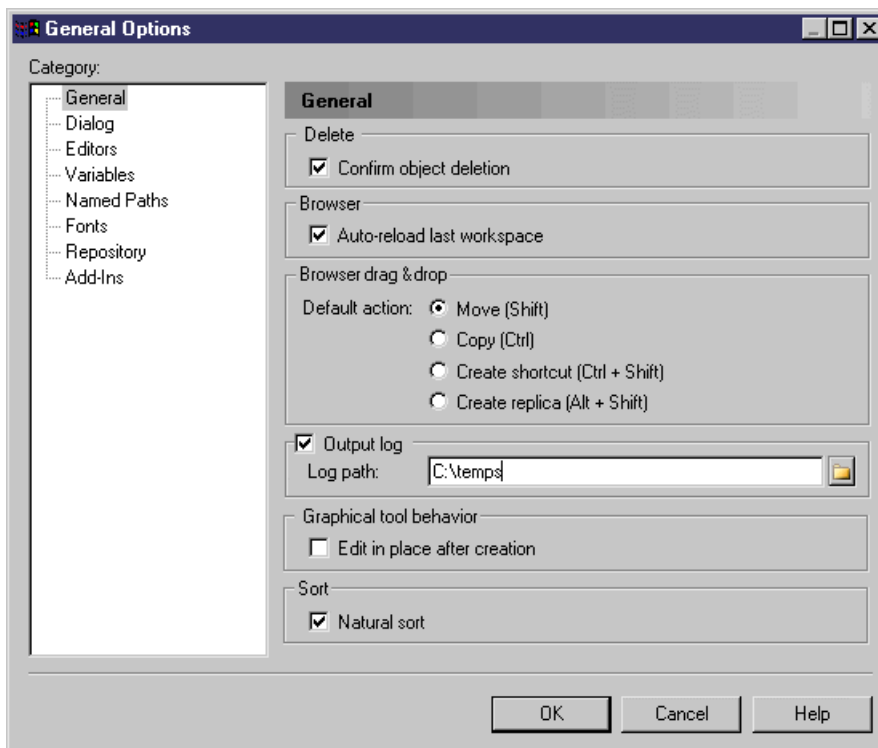
By default you move an object (from one package or model to another) in the Browser by drag and drop.

You can change this behavior temporarily by pressing one or more of the following keys:

Drag and drop with...	Result
[no key]	Move (in the Browser) or paste as shortcut (between diagrams)
Shift	Move
Ctrl	Copy
Shift + Ctrl	Shortcut creation
Shift + alt	Replication creation

**Note:** If you select an object in the Browser or diagram and then right-click and drag it, when you release the right mouse button, a contextual menu opens listing all the available drop actions.

To modify the default Browser drag and drop behavior, select **Tools > General Options** and select the appropriate radio button:



## Copying and Pasting Objects

You can copy objects from diagrams, the Browser, object lists, and the Results List and paste them into diagrams, the Browser, object lists, and external applications.

When you copy an object, you copy not only its properties but also the properties of its related objects to the clipboard. For example, if you copy a CDM entity, you also copy the attributes and business rules attached to that entity. When you paste an object, you transfer all of its properties from the Clipboard and create a new object, and not a graphical synonym or a new instance of the copied object.

### Copying Objects

To copy an object, select it in a diagram, the Browser, an object list, or the Results List, and then do one of the following:

- Select **Edit > Copy** from the PowerDesigner menu bar.
- Press CTRL + c.
- Right-click and select **Edit > Copy**.
- Open a list of objects, select one or several lines in the list and Press CTRL + c.

### Pasting Objects

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**Note:** By default, when you drag and drop objects, you move them, but if you hold down the ctrl key during a drag and drop, you can create a copy. For more information, see *Dragging and dropping objects* on page 126.

---

To paste an object in PowerDesigner, click in a diagram, the Browser, or an object list, and then do one of the following:

- Select **Edit > Paste** from the PowerDesigner menu bar.
- Press CTRL + V.
- Right-click and select **Edit > Paste**.
- Open a list of objects, select a line in the list and Press CTRL + V.

If you paste the selected object into an external application, the following will occur:

Copied item	Paste result
Diagram symbol	Image of the symbol (MS Word, PaintBrush)
List item from an object list	List in CSV format (MS Word, Excel)
Item from the Check Result list	List in CSV format (Excel)
Item from the Find Result list	List in CSV format (Excel)

### Pasting Objects as Shortcuts

When you copy an object you can paste it as a shortcut that references the original object (see *Chapter 11, Shortcuts and Object Replications* on page 355).

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**Note:** By default, when you drag and drop objects, you move them, but if you hold down the CTRL and SHIFT keys during a drag and drop, you can create a shortcut. For more information, see *Dragging and dropping objects* on page 126.

---

To paste an object as a shortcut in PowerDesigner, click in a diagram, the Browser, or an object list, and then do one of the following:

- Select **Edit > Paste As Shortcut** from the PowerDesigner menu bar.
- Right-click the Browser target or the diagram window and select **Edit > Paste As Shortcut**.

When pasting as a shortcut into a diagram, the following rules are used. If the object copied is in:

- The same model or package and the same diagram - a new graphical synonym of the object is created.
- The same model or package but a different diagram - a new shortcut symbol or graphical synonym is created.
- A different model or package:
  - If the shortcut does not exist, a shortcut is created (with a symbol)
  - If the shortcut already exists without a symbol, a symbol is created (if you are pasting into a diagram)
  - If a shortcut and a symbol already exist, a graphical synonym is created (if you are pasting into a diagram)

### Managing Paste Conflicts

When you paste an object in PowerDesigner, checks are applied in order to verify that no conflict occurs between the identifying properties of the objects. The identifying criteria depends on the type of object, for some objects it is just the code, for others, the name and the code.

For more information about the identifying properties of an object, see *Object namespaces* on page 116.

When a paste conflict occurs, PowerDesigner automatically renames the name and/or the code of the object in the following way:

Source object	First renaming	Second renaming
Name	Name2	Name3
CODE	CODE2	CODE3

A message is displayed in the Output pane to warn you that the object was renamed.

When a paste conflict occurs on a CDM entity, the entity is renamed according to the data item options set in the model.

Data item options	Result of copying an entity
Unique Code	New entity with new name and code
Allow Reuse	New identifier with new name and code Reuses other attributes
Unique Code only	New entity with new name and code New identifier with new name and code New attributes with new names and codes
Allow Reuse only	New entity with new name and code New identifier with same name and code Reuses other attributes
None	New entity with new name and code New identifier with same name and code New attributes with same names and codes

## Deleting Objects

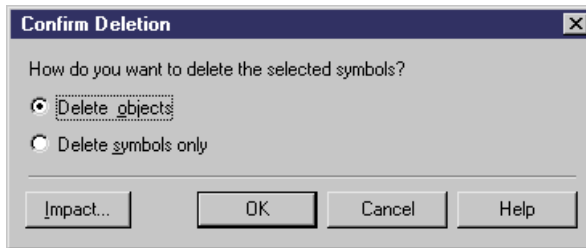
You can delete an object from a diagram, the Browser, or an object list.

Since PowerDesigner gives you the freedom to create multiple symbols in multiple diagrams to represent the same object, when deleting a symbol in a diagram, you can choose to delete just the symbol or the entire object.

When you delete an object, you also delete any sub-objects it contains (for example, when you delete a table from a PDM, you delete its columns, keys, triggers and indexes), along with all its diagram symbols. If you delete an object that is connected to another object via a link, the link is also deleted.

To delete an object, do one of the following:

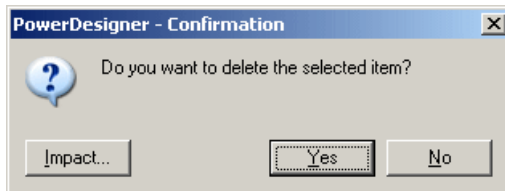
- Select its symbol in a diagram and press the Delete key or right click it and select **Edit > Delete**. A dialog will open asking you whether you want to delete the object itself (including any sub-objects it contains) or just the symbol:



You can review the impact that deleting the object would have on other objects in your environment by clicking the **Impact** button on the confirmation dialogs (see *Chapter 13, Impact and Lineage Analysis* on page 421). You can undo a deletion by clicking the **Undo** tool.

Make your choice and click **OK**. If you delete only the symbol, you can restore it to the diagram, by selecting **Symbol > Show Symbols** and reselecting the object in the Show Symbols dialog.

- Select its symbol in a diagram and press Shift+Delete. The object, any sub-objects it contains, and any associated diagram symbols will be deleted immediately without the need for confirmation.
- Select it in the Browser and press the Delete key or right click it and select **Edit > Delete**. A dialog will open asking you to confirm the deletion:



Click **OK** to delete the object, any sub-objects it contains, and any associated diagram symbols.

- Select it in an object list and click the Delete tool or press the Delete key. The object, any sub-objects it contains, and any associated diagram symbols will be deleted immediately without the need for confirmation.

---

**Note:** You can suppress the display of the Confirmation dialogs by deselecting the **Confirm Object Deletion** general option (see *General Options* on page 301).

---

### Deleting Domains and Data Items

If you have specified that domains and data items can be reused by multiple objects in a CDM or PDM and you delete a parent object to which they belong, these sub-objects will not be deleted with their parent. For more information, see the *Data Modeling* guide.

## Moving Objects from Package to Package

You can move an object from package to package using drag and drop feature.

Moving objects is different from cutting and pasting items, since you do not duplicate objects.

For entities containing data items, the following situations can occur when you move the entity:

Data items	Namespace	Move result
Only used by selected entity	Move within the same namespace	The data items are moved with the entity
Reused among different entities	Move within the same namespace	Shortcuts of data items are created for reused data items
Used only by one entity or reused among different entities	Change namespace	Data items are copied in the other namespace

For more information about shortcut and copy rules, see *Shortcuts* on page 355.

Moving objects is restricted as follows:

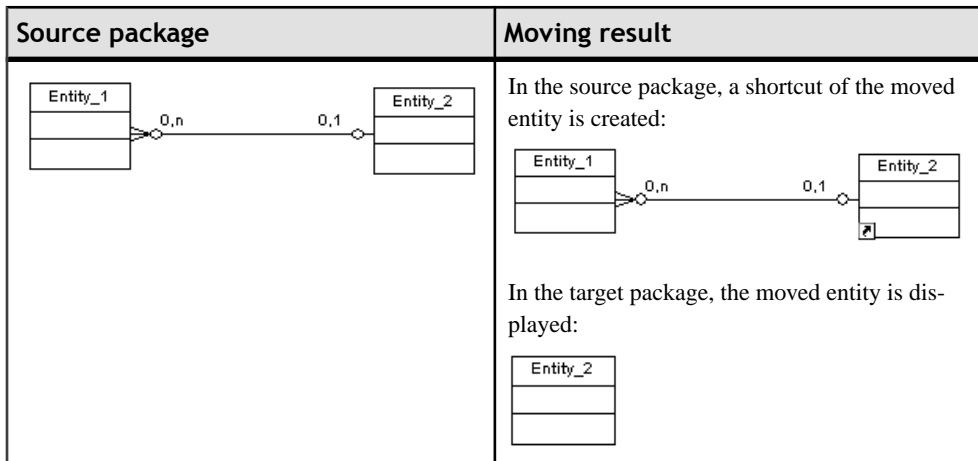
- Models must be compatible (same resource file)
- Global objects (business rule, domain, storage etc.) cannot be moved into a sub-package

When you move an object from a package to another, linking objects that you move keep their links in the target package and a shortcut is usually created in the source package. The general rule being that conceptual modeling must be preserved.

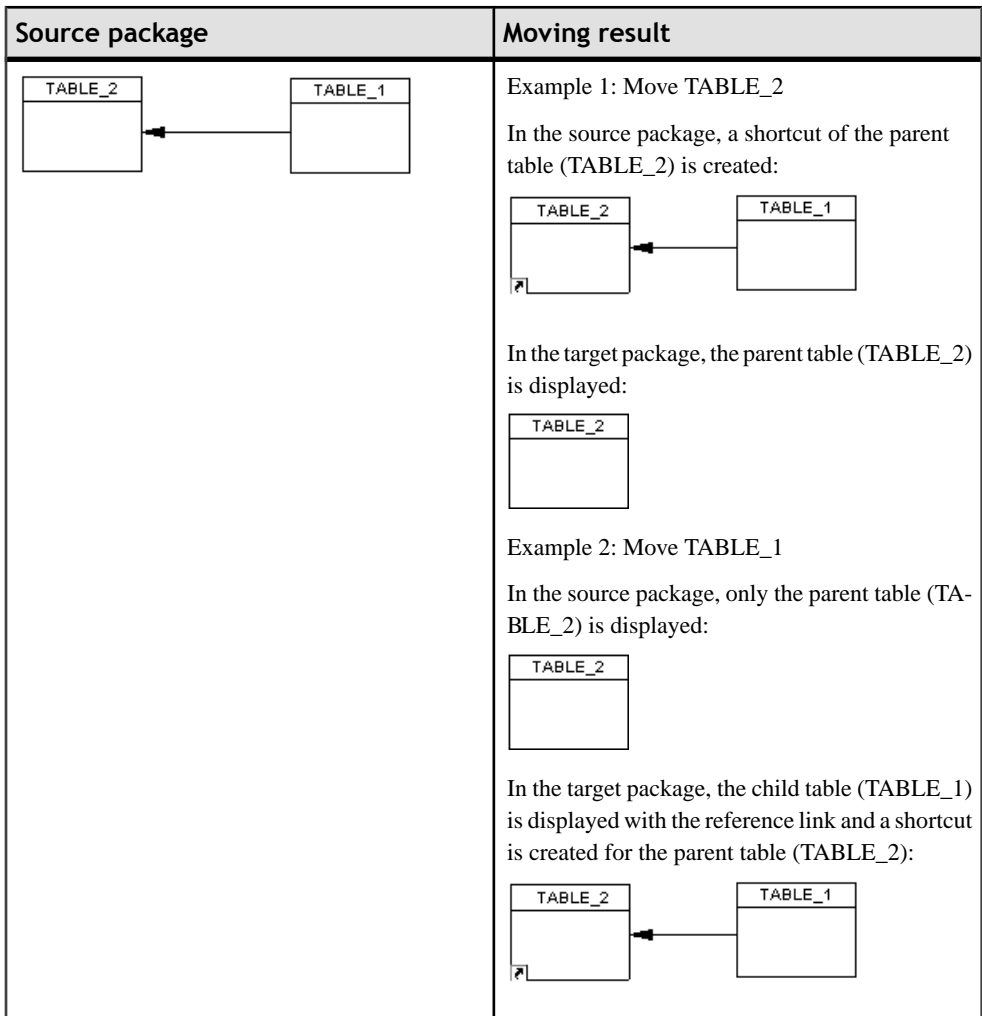
Shortcuts creation rules in PowerDesigner also apply to moving objects between packages.

For more information about shortcuts creation, see *Shortcuts* on page 355.

To move an object with a non-oriented link:



To move an object with an oriented link:



1. Select an object.
2. Press shift while dragging the object to the target package.

The object is moved to the new destination and a shortcut is created either in the source package or in the destination package depending on the link type.

## Creating Graphical Synonyms for Objects

A graphical synonym is an additional symbol for an object. Sometimes, creating multiple symbols for an object in a diagram can improve readability by reducing the length or

complexity or links. You create a graphical synonym by right-clicking a symbol and selecting **Edit > Create Graphical Synonym**.

You can create as many graphical synonyms as you want within the same diagram. You can even create graphical synonyms of graphical synonyms and of object shortcuts.

You can create graphical synonyms of graphical synonyms and of object shortcuts. Each graphical synonym displays the name of the object followed by a colon and the number of the synonym. In the following example, Employee : 1 and Employee : 2 both represent the Employee table:

Employee : 1		Employee : 2	
id	<Undefined>	id	<Undefined>
first name	<Undefined>	first name	<Undefined>
family name	<Undefined>	family name	<Undefined>

If you move an object for which you have created graphical synonyms from one package or model to another, shortcuts are created for the graphical synonyms in the original package.

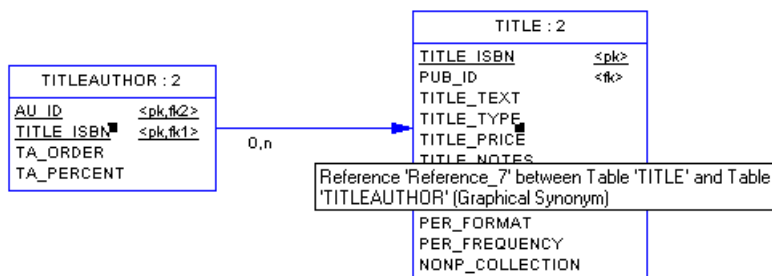
**Note:** To find any graphical synonyms of a symbol, right-click the symbol, select **Edit > Find Graphical Synonym**, and then select a graphical synonym from the list. The graphical synonym is centered and selected in the diagram window.

### Graphical Synonym Limitations

You can create graphical synonyms for link objects but only if both they and the symbols at both their extremities (which will also be duplicated) support them. The following object symbols do not support graphical synonyms:

- CDM - inheritances and inheritance links
- OOM - swimlanes, synchronizations, decisions, transitions, instance links, messages, association class links, and interaction frames, fragments, and references
- BPM - swimlanes, synchronizations, decisions, and flows
- All - free symbol line

Note that though you cannot visually distinguish a graphical synonym of a link from a normal link (unless you display the name attribute), when you select a link symbol, it is identified as a graphical synonym in its tooltip:



## Finding Objects

---

PowerDesigner lets you search for objects within all the models currently open in your workspace.

With the Find Objects dialog, you can:

- Locate objects in the different models in the workspace and modify their properties
- Find all the shortcuts related to a given object
- Reuse objects from one model to another

---

**Note:** Once you have started the Find Objects process, you can stop it at any time by clicking the Stop button in the Find Object dialog box.

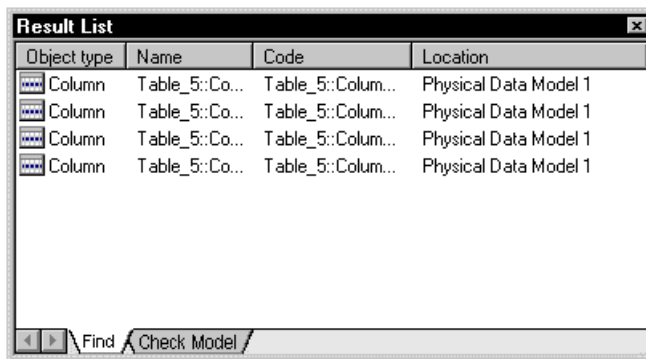
---

1. Select **Edit > Find Objects** to open the Find Objects dialog box.
2. Specify the appropriate parameters on the following tabs:
  - **Name and Location** - to search on the name and/or location of PowerDesigner objects.
  - **User and Date** - to search on the user and/or date of creation/modification of PowerDesigner objects.
  - **Advanced** - to search on other criteria.

For detailed information about these tabs, see *Find object parameters* on page 137.

3. Click the Find Now button.

The Find Object dialog box remains open, displaying messages in the Output pane, until the end of the process, when the Result List displays the result:



The screenshot shows a window titled "Result List" with a table of search results. The table has four columns: Object type, Name, Code, and Location. There are four rows of results, all showing "Column" objects in a "Physical Data Model 1".

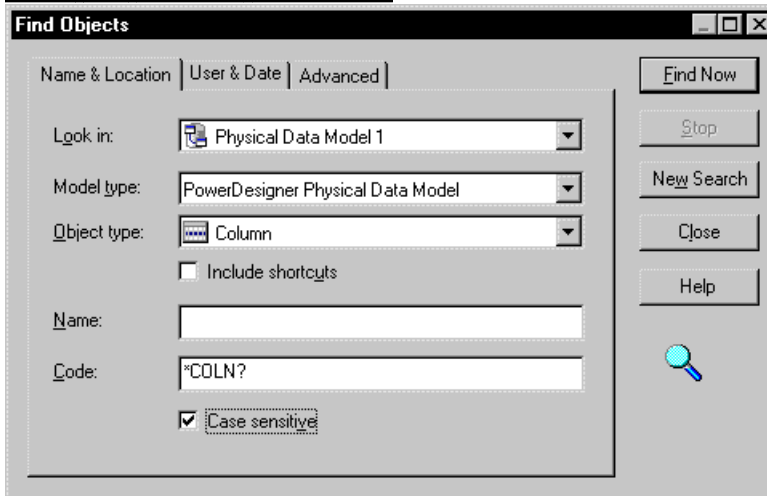
Object type	Name	Code	Location
Column	Table_5::Co...	Table_5::Colum...	Physical Data Model 1
Column	Table_5::Co...	Table_5::Colum...	Physical Data Model 1
Column	Table_5::Co...	Table_5::Colum...	Physical Data Model 1
Column	Table_5::Co...	Table_5::Colum...	Physical Data Model 1

At the bottom of the window, there are navigation arrows and a status bar showing "Find / Check Model".

## Find Object Parameters

The Find Objects dialog contains three tabs to let you specify precisely your search criteria.

### Name and Location Parameters

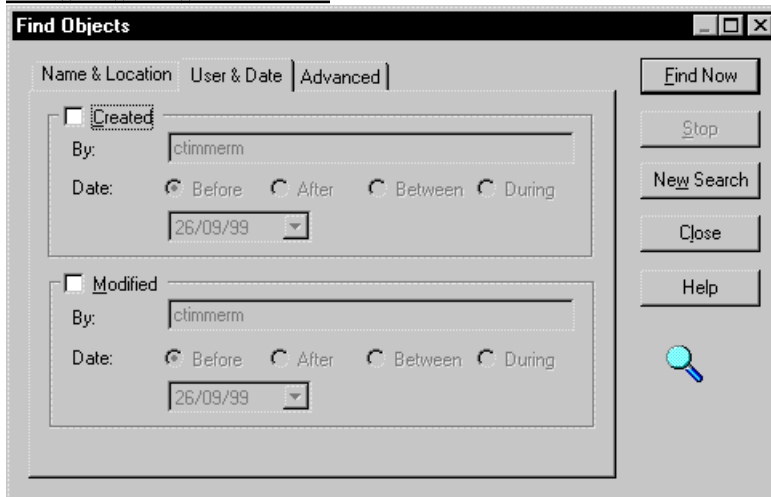


The following parameters are available on this tab:

Parameter	Description
Look in	Specifies the scope of the search. You can select the entire workspace, a project, folder, model, or package.
Model type	Specifies the type of PowerDesigner model to search. The options available in this list are affected by your choice in the Look in field.
Object type	Specifies the type of model objects to be searched. The options available in this list are affected by your choice in the Model type field.
Include shortcuts	Instructs PowerDesigner to include object shortcuts that match your criteria in the results.

Parameter	Description
Name	<p>Specifies the object name to search for. You can use the following special characters:</p> <ul style="list-style-type: none"> <li>* - none to any number of characters. For example: <ul style="list-style-type: none"> <li>W* finds "Work" and "Washington"</li> <li>*96 finds "01/11/96" and "26/08/96"</li> </ul> </li> <li>? - exactly one character. For example: <ul style="list-style-type: none"> <li>*_emp_??? finds "Div_emp_idn" but not "Div_emp_ident"</li> </ul> </li> <li>\ - escapes *, ?, or \. For example: <ul style="list-style-type: none"> <li>\?\\ - finds ?\</li> </ul> </li> <li>true/false - Boolean value (True is when the check box is selected)</li> </ul>
Code	Code of the object. You can type the exact code of the object or use a string expression.
Case sensitive	Specifies that the results must match the case of the criteria.

### User and Date Parameters

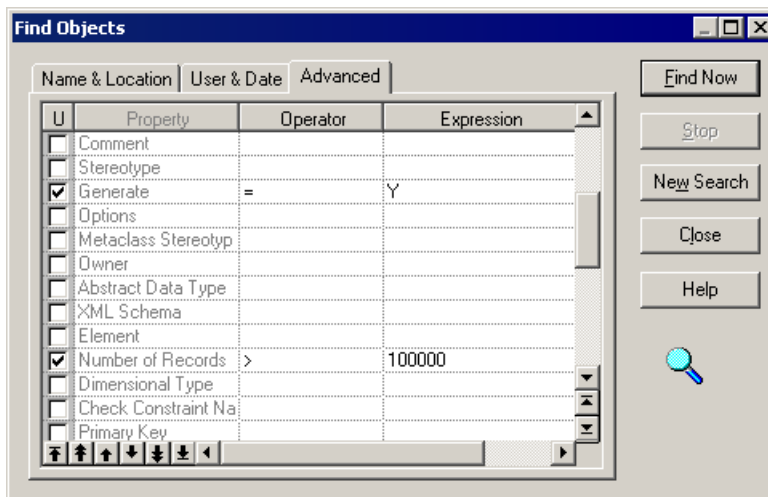


The following parameters are available on this tab:

Parameter	Description
Created	Enables searching on creation parameters. You can search against the name of the user who created the object and/or against the creation date using the following options: <ul style="list-style-type: none"> <li>• Before the specified date</li> <li>• After the specified date</li> <li>• Between the two specified dates</li> <li>• In the specified number of days since today</li> </ul>
Modified	Enables searching on modification parameters.

### Advanced Parameters

The Advanced tab allows you to specify advanced find parameters on each property of the selected object type. For more information about the operators and the expression syntax, see *Defining a Filter Expression* on page 120.



**Note:** If you do not select an object type on the **Name & Location** tab, then you can only search on the name and code properties on the **Advanced** tab.

The following parameters are available on this tab:

Parameter	Description
U (Used)	Specifies a property on which to apply the search.
Operator	Specifies an operator to use for the search. Click in the Operator column to display the list of available operators.

Parameter	Description
Expression	Specifies a string expression to search for.

---

**Note:** If you select the Used check box for a property without any expression, it is equivalent to a null value, the find process will consequently look for objects which selected property is null.

---

## Using the Result List

You can perform various operations on objects directly from the Result List.

The following operations are available by right-clicking an object in the Results List:

- **Properties** - to open the object's property sheet.
- **Find in Browser** - to highlight the object in the Browser.
- **Find in Diagram** - to open the diagram with the symbol centered. If the object has symbols in multiple diagrams, a list is displayed. If the object has no symbol, a warning message is displayed.
- **Copy** - to copy the object. Select a destination in the Browser or a diagram and select **Edit > Paste** or **Edit > Paste as Shortcut** from the contextual menu.

## Business Rules

A business rule is a rule that your business follows. It is a written statement specifying what an information system must do or how it must be structured. It could be a government-imposed law, a customer requirement, or an internal guideline.

Business rules often start as simple observations, for example "customers call toll-free numbers to place orders." During the design process they develop into more detailed expressions, for example what information a customer supplies when placing an order or how much a customer can spend based on a credit limit.

You can attach business rules to your model objects to guide and document the creation of your model. For example, the rule "an employee belongs to only one division" can help you graphically build the link between an employee and a division.

Business rules complement model graphics with information that is not easily represented graphically. For example, some rules specify physical concerns in the form of formulas and validation rules. These technical expressions do not have a graphical representation.

In the case of the PDM and OOM, you can generate business validation rules attached to domains as check parameters.

Before you create business rules, formulate your rules by asking yourself the following questions:

- What business problems do I want to address?
- Are there any procedures that my system must respect?
- Do any specifications dictate the scope of my project?
- Do any constraints limit my options?
- How can each of these procedures, specifications, and constraints be described?
- How can each of these descriptions be classified? Possible classifications are definitions, facts, formulas, requirements or validation rules

## Creating a Business Rule

You can create a business rule in any of the following ways:

- Select **Model > Business Rules** to access the List of Business Rules, and click the Add a Row tool
- Right-click the model or package in the Browser, and select **New > Business Rule**
- Open the property sheet of the object to which you want to apply the rule, click the Rules tab, and click the Create an Object tool

For general information about creating objects, see *Creating Objects* on page 101.

## Business Rule Properties

You can modify an object's properties from its property sheet. To open a business rule property sheet, double-click its Browser entry in the Business Rules folder. The following sections detail the property sheet tabs that contain the properties most commonly entered for business rules.

The General tab contains the following properties:

Property	Description
Name	The name of the item which should be clear and meaningful, and should convey the item's purpose to non-technical users
Code	The technical name of the item used for generating code or scripts, which may be abbreviated, and should not generally include spaces
Comment	Descriptive label for the rule
Stereotype	Sub-classification used to extend the semantics of an object.

Property	Description
Type	<p>Specifies the nature of the business rule. You can choose between:</p> <ul style="list-style-type: none"> <li>• Constraint – a check constraint on a value. In a PDM, constraint business rules can be generated in the database. For example, "The start date should be inferior to the end date of a project."</li> <li>• Definition – a property of the element in the system. For example; "A customer is a person identified by a name and an address".</li> <li>• Fact – a certainty in the system. For example, "A client may place one or more orders".</li> <li>• Formula – a calculation. For example, "The total order is the sum of all the order line costs".</li> <li>• OCL constraint [OOM only] – An Object Constraint Language expression.</li> <li>• Requirement – a functional specification. For example, "The model is designed so that total losses do not exceed 10% of total sales".</li> <li>• Validation – a constraint on a value. For example, "The sum of all orders for a client must not be greater than that client's allowance".</li> </ul>

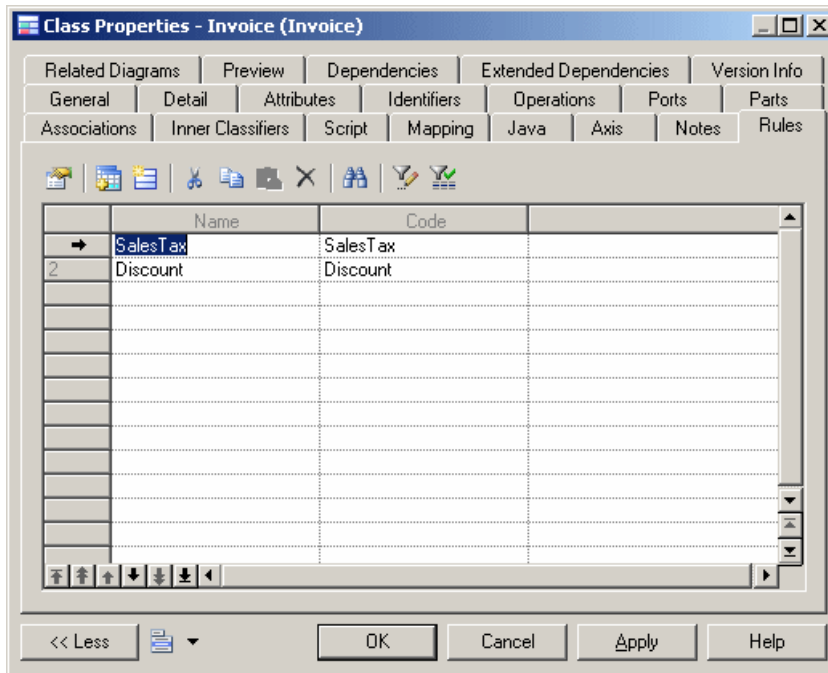
The following tabs are also available:

- Expression Tab - Though business rules typically start out as descriptions, as you develop your model and analyze your business problem, you can enrich them by adding technical expressions on this tab. Expressions are used primarily in CDMs and PDMs. Each rule can include two types of expression, which you define on the appropriate sub-tab:
  - Server
  - Client
- OCL Constraint Tab - This tab is only available for business rules with a type of OCL Constraint. The Object Constraint Language is the UML expression language. Enter your OCL expression in the text field.

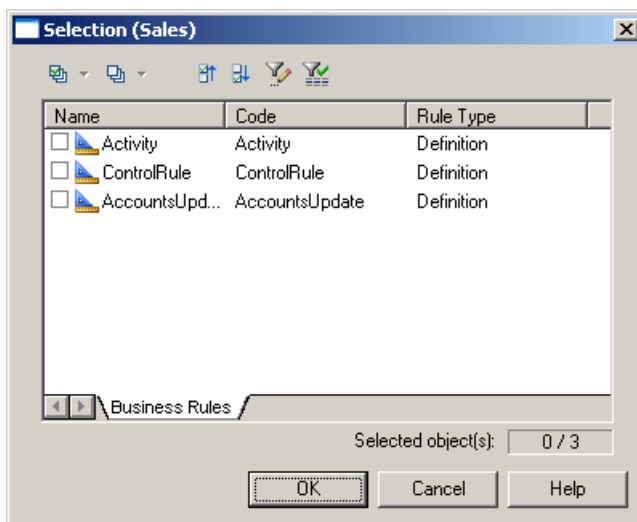
## **Applying a Business Rule to a Model Object**

You can apply business rules that you have created to your model objects.

1. Open the property sheet of an object, and then click the Rules tab:



2. Click the Add Rules tool to open a selection window listing all the business rules available in the model:



3. Select the business rules you want to add to the object, and then click OK to return to the object's property sheet.
4. Click OK to close the object property sheet and return to the model.

---

**Note:** When you apply a business rule to an object, its U (Used) column in the List of Business Rules is automatically checked. This column allows you to see what rules are unused, and delete them if necessary.

---

## File Objects

A file object is a representation in a PowerDesigner model of an external application file (for example, a Java file, script SQL, or MS Word file). The file itself can be kept external to the model or embedded within and saved with it.

For example you could:

- Attach a file object to any PowerDesigner object to enrich its description
- Attach a generated OOM class to a target Java file

You open the file in its associated editor by double-clicking its diagram symbol or browser entry. To change the associated editor, right-click the file object and select **Open With > Choose Program**

For more information about text editors, see *Specifying Text Editors* on page 305.

## Creating a File Object

You can create a file object in any of the following ways:

- Use the File tool in the diagram Palette.
- Select **Model > Files** to access the List of Files, and click the Add a Row tool.
- Right-click the model or package in the Browser, and select **New > File** from the contextual menu.
- Drag a file from Windows Explorer and drop it in the diagram or Browser.

For general information about creating objects, see *Creating Objects* on page 101.

## File Object Properties

You can modify an object's properties from its property sheet. To open a file object property sheet, double-click its diagram symbol or its Browser entry in the Files folder. The General tab contains the following properties:

Property	Description
Name	The name of the item which should be clear and meaningful, and should convey the item's purpose to non-technical users
Code	The technical name of the item used for generating code or scripts, which may be abbreviated, and should not generally include spaces
Comment	Descriptive label for the file object

Property	Description
Stereotype	Sub-classification used to extend the semantics of the file object. You can create stereotypes in the Profile category of the resource file attached to the current model.
Location type	Specifies the nature of the file object. You can choose from the following: <ul style="list-style-type: none"> <li>• Embedded – the file is stored within the model and is saved when you save the model. If you subsequently change the type to external, you will be warned that the existing contents will be lost.</li> <li>• External – the file is stored in the Windows file system, and you must enter its path in the Location field. If you subsequently change the type to embedded, you will be prompted to import the contents of the file into the model.</li> <li>• URL – the file is on the web and you must enter its URL in the Location field</li> </ul>
Location	[External and URL types only] Specifies the path or URL to the file.
Extension	Specifies the extension of the file object, which is used to associate it with an editor. By default, the extension is set to <code>txt</code> .
Generate	Specifies to generate the file object when you generate the model to another model.
Artifact	Specifies that the file object is not a piece of documentation, but rather forms an integral part of the application.  If an artifact has an extension that is defined in the Editors page in the General Options dialog box and is linked to the <i>&lt;internal&gt;</i> editor (see <i>Specifying Text Editors</i> on page 305), a Contents tab is displayed in the artifact property sheet, which allows you to edit the artifact file in the PowerDesigner text editor.  For more information about the use of artifact files, see "Files" in the Building Implementation Diagrams chapter of the <i>Objet-Oriented Modeling</i> guide.

## Attaching a File Object to a PowerDesigner Object

You can attach a file object to another object in any of the following ways:

- Right-click an object symbol in the diagram and select **File > Add file** from the contextual menu.
- Use the Link/Extended Dependency tool in the diagram palette to draw a link from the object symbol to the file object symbol.
- Open the property sheet of the object, click the Extended Dependencies tab, and select the file object using the Add Objects tool..

The connection between the object and the file object takes the form of an extended dependency, and is visible:

- Graphically in the diagram
- On the Dependencies tab of the file object property sheet and on the Extended Dependencies tab of the dependent object property sheet

- Under the File menu item in the contextual menu of the dependent object symbol.

For more information about extended dependencies, see *Using Extended Dependencies* on page 334.

## File Object Display Preferences

You can modify the following display preference for a file object using the **Tools > Display Preferences** command.

Preference	Description
Location	Displays the location of the file object

## Extending Objects

PowerDesigner includes powerful tools to extend and customize your modeling objects. You can add new attributes and attribute lists to objects, create entirely new objects, and customize object generation.

### Extended Attributes

The model objects defined in the PowerDesigner metamodel can be extended and given additional properties, called *extended attributes*. Some extended attributes are defined in the resource files that are provided with PowerDesigner to support a particular language or DBMS, and others will be defined by you or your colleagues to model features specific to your environment.

You may not know that you are working with extended attributes, as they are frequently assigned to standard or custom property sheet tabs. However, if one or more extended attributes is not so assigned, an Extended Attribute tab will be displayed in the property sheet of all objects of this kind, listing all the extended attributes in alphabetical order and with the following columns.

Property	Description
Name	Specifies the name of extended attribute.
Data type	Specifies the datatype of the extended attribute (such as boolean, color, date, file, float, font, etc or customized data types).
Value	Specifies the current value assigned to the extended attribute.
R	Redefined value. This checkbox is selected if you modify the default value in the Value column.

For information about adding extended attributes to model objects and displaying them in property sheet tabs, see the Extending your Models with Profiles chapter of the *Customizing and Extending PowerDesigner* manual.

## Adding New Properties to an Object

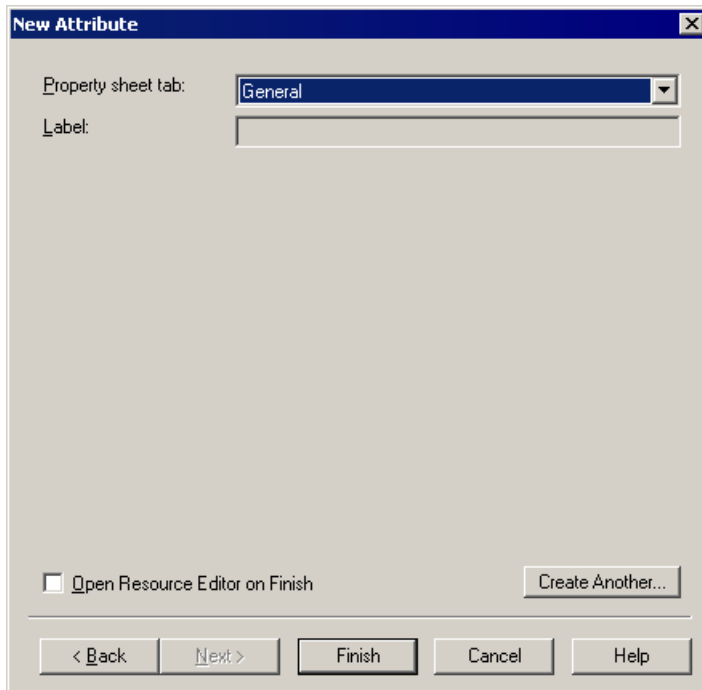
To quickly add new properties to an object, use the dialogs available from the property sheet menu. Properties added to an object are available for all other objects of that type.

### Adding a New Attribute to an Object

If the standard PowerDesigner attributes are insufficient for your modeling requirements, you can add new ones using the New Attribute dialog available from the property sheet menu.

1. Open the property sheet of the object you want to extend, click the menu button, and select **New Attribute** to open the New Attribute dialog:

2. Enter a **Name** and **Datatype** for the new attribute and complete any other appropriate fields.
3. [optional] Click **Next** to specify the property sheet tab on which you want the attribute to appear. If you choose to create a new property sheet tab, you must enter a tab label to display.



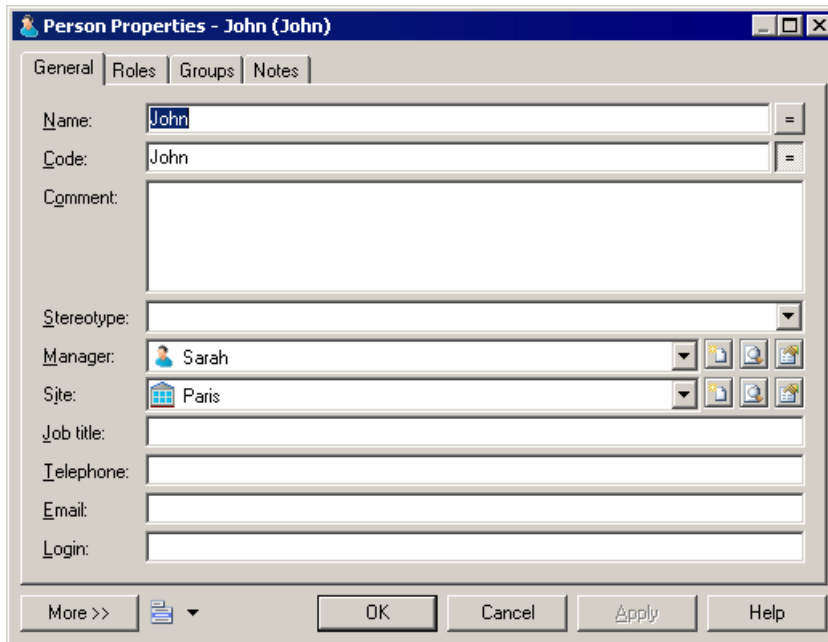
By default, the attribute is inserted on the tab from which you launched the New Attribute dialog, if the tab is editable.

4. [optional] If you want to view the new attribute in the PowerDesigner Resource Editor, select the **Open Resource Editor on Finish** checkbox.

All extensions are stored in PowerDesigner resource files. For detailed information about working with these files, see the Extending Your Models with Profiles chapter in the *Customizing and Extending PowerDesigner* manual.

5. Click **Finish** to close the dialog and create the new attribute.

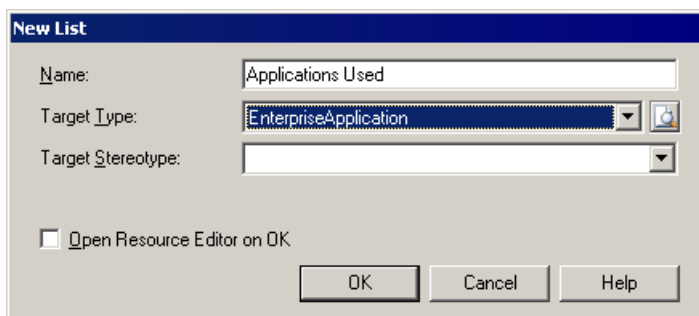
The attribute appears on the specified property sheet tab:



### **Adding a New List to an Object**

Many PowerDesigner objects are associated with multiple instances of another type of object. For example, a table can have multiple columns, a class can have many operations, and a person can be in many groups. You can model new kinds of associations by adding new lists to your object property sheets.

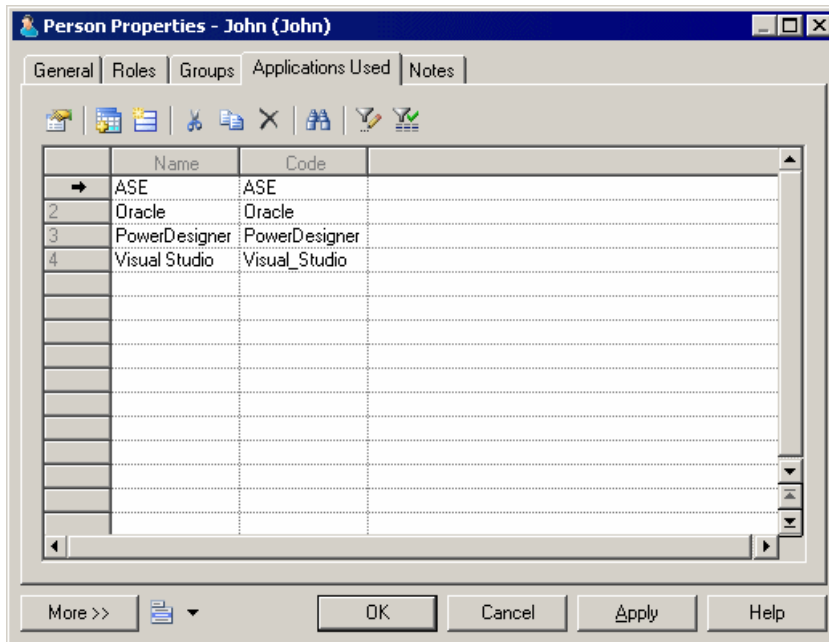
1. Open the property sheet of the object you want to extend, click the menu button, and select **New List of Associated Objects**.



2. Enter a **Name** for your list. This name is used as the name of the property sheet tab on which the list appears.

3. Select the type of associated object that you want your list to display. You can choose from any of the object types available in your model, but the association should make sense for your modeling needs.
4. [optional] To limit the objects of the selected type that your object can be associated with, specify a stereotype. If you specify a stereotype here, you will only be able to associate your object with other objects bearing this stereotype.
5. Click OK to exit the dialog and create the new list.

The list appears as a new tab in your property sheet, containing tools that let you associate existing and new objects of the specified type with your object:

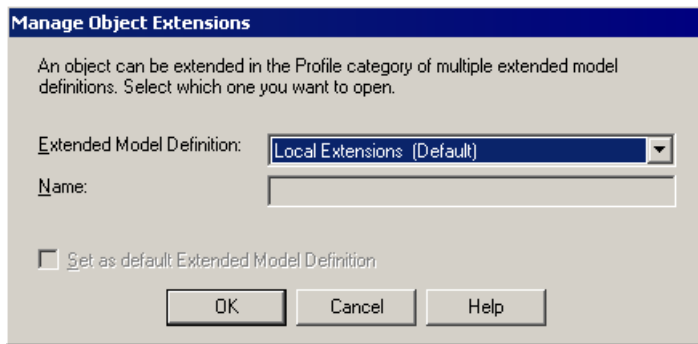


### Managing Extensions

To review your object extensions in the Resource Editor, select **Manage Object Extensions** from the property sheet menu.

You can create basic new properties and lists using the wizards available from the property sheet menu. To perform more advanced editing of extensions, you must open the appropriate extended model definition.

1. Open the property sheet of the object, click the menu button, and select **Manage Object Extensions**.



2. Specify the **Extended Model Definition** that you want to open, from the list of definition files attached to the model.

An object can be extended in the Profile category of multiple extended definitions. You can select an existing definition file or create a new one.

3. [optional] Select the checkbox to set the chosen extended model definition as the default.
4. Click OK to open the chosen extended model definition in the Resource Editor.

For detailed information about editing files in the Resource Editor, see the Extending Your Models with Profiles chapter in the *Customizing and Extending PowerDesigner* manual.

## Extended Objects, Sub-Objects, and Links

Extended objects, sub-objects, and links are additional objects that can be added in any kind of model to let you design specific business needs or concepts that are not supported by PowerDesigner standard objects.

For example, you can use extended objects in a PDM to design database objects that are not natively supported. You can specify "generated files" and templates in the definition of your extended objects in order to enable their generation and reverse-engineering.

Extended objects and extended links are available in all PowerDesigner models. However, only the free model (see *Using the Free Model* on page 97) displays these objects by default. If you want to use extended objects and/or links in another type of model, you have to add the corresponding metaclasses and their tools to the Profile category in the model's resource file or in an extended model definition.

For information about adding extended objects, sub-objects, and links to the Profile category, see the Extending Your Models with Profiles chapter in the *Customizing and Extending PowerDesigner* manual.

## Extended Object, Sub-object, and Link Properties

You can double-click any extended object symbol in the diagram to open its property sheet:

Property	Description
Name	Specifies the name of the item which should be clear and meaningful, and should convey the item's purpose to non-technical users.
Code	Specifies the technical name of the item used for generating code or scripts, which may be abbreviated, and should not generally include spaces.
Comment	Specifies additional information about the extended object.
Source	[extended links only] Specifies the name of the origin object of the extended link.
Destination	[extended links only] Specifies the name of the destination object of the extended link.
Stereotype	Sub-classification used to extend the semantics of the extended object. You can create stereotypes in the Profile category of the resource file attached to the current model.

## CanLinkKind Event Handler

You can use the *CanLinkKind* event handler to restrict the kind and stereotype of the objects you want to link together. The *CanLinkKind* event handler has two input parameters: the source and the destination extremity of the link, note that these cannot be shortcuts.

The *CanLink* event handler is called when you create a link using the corresponding tool in the Palette or when you try to modify the ends of a link from its property sheet.

For more information about the *CanLinkKind* event handler, see "Event Handlers (Profile)" in the Extending your Models with Profiles chapter of the *Customizing and Extending PowerDesigner* manual.

## Extended Object/link Display Preferences

You can modify the following display preference for extended objects using the **Tools > Display Preferences** command:

Preference	Description
Stereotype	Displays the stereotype of the extended object
Comment	Displays the comment of the extended object
Display sub-objects	[extended objects only] Displays the sub-objects (defined in an extended composition) of the extended object

## **Customizing the Generation of Files for an Object**

In PowerDesigner, you can define a generated file on a selected metaclass (or stereotype or criterion), in this case a file is generated for each instance of the metaclass existing in your model. The generated files mechanism is defined in "Templates and Generated Files (Profile)" in the Extending your Models with Profiles chapter of the *Customizing and Extending PowerDesigner* manual.

You can modify the default generation of files using artifacts. Artifacts are used to generate files only for selected instances of a metaclass in order to:

- Design a source file that includes the code of several objects in a single file.
- Generate only for selected instances of a metaclass.
- Customize the generated file name and path.

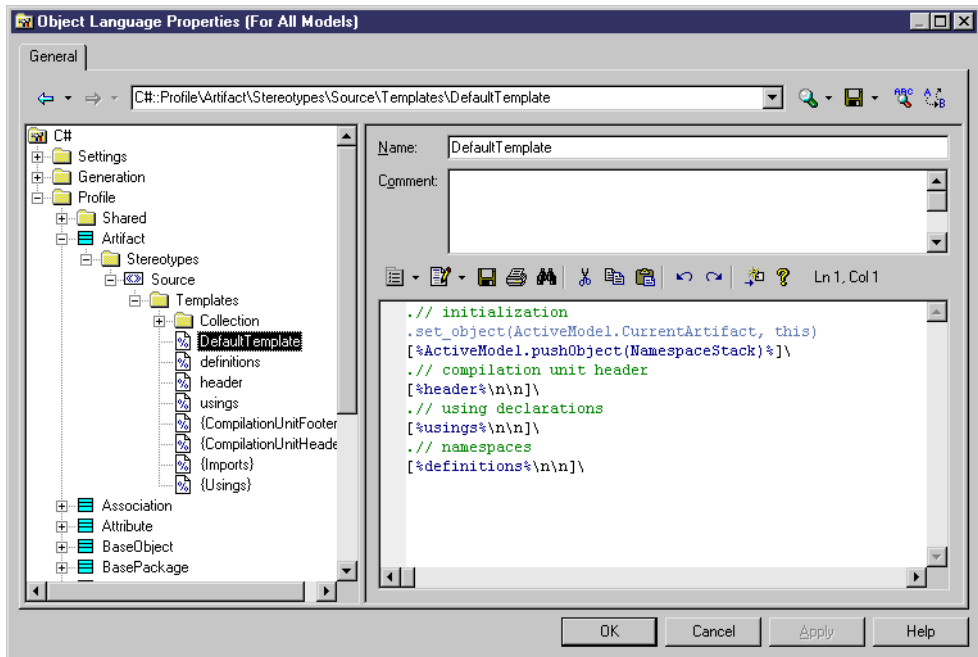
### **C# and VB .NET Reverse Engineering Use Case**

Artifacts are visible in the C# and VB .NET object languages. This is to support round-trip engineering for these languages: when you reverse engineer C# or VB .NET code, each source file in the source code becomes an artifact in PowerDesigner. The artifact allows you to re-generate the same collection of objects while preserving file structure.

### **Using Artifacts in a Model**

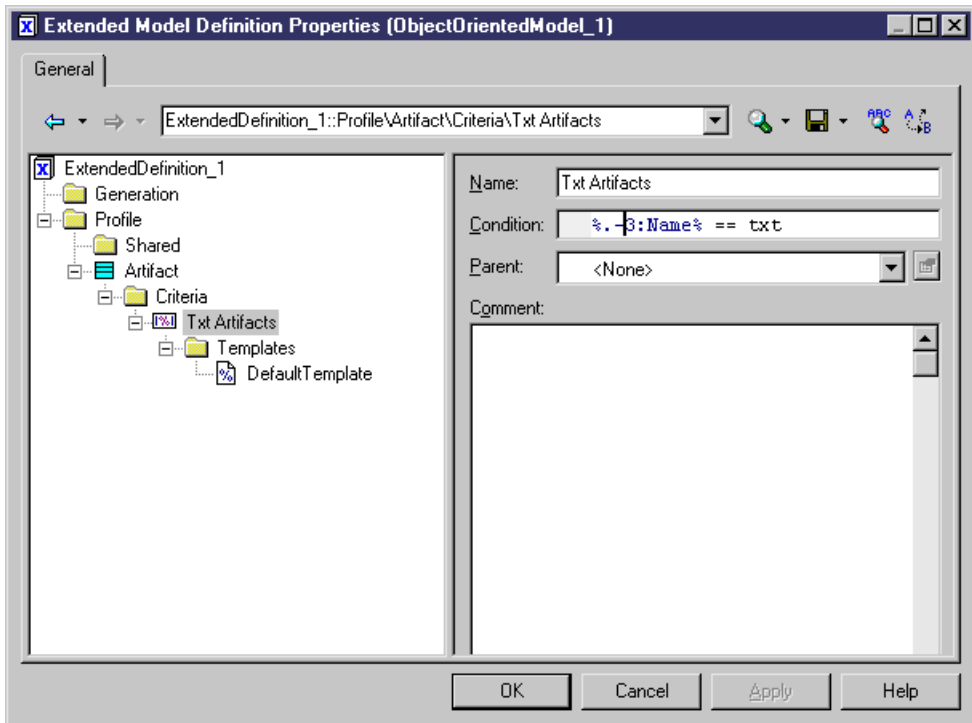
To be able to use an artifact in a model, you have to declare it in a resource file attached to your model. To declare an artifact you have to create a template called "DefaultTemplate" under an artifact stereotype or criterion bearing the name of the corresponding file type to generate.

In the C# resource file, if you expand the Artifact folder, you can see that the stereotype "Source" and the template "DefaultTemplate" are defined by default. This means that when you create a new artifact and assign the Source stereotype, this artifact inherits the default template defined below:



## Example

You define the following artifact criterion in an extended model definition:

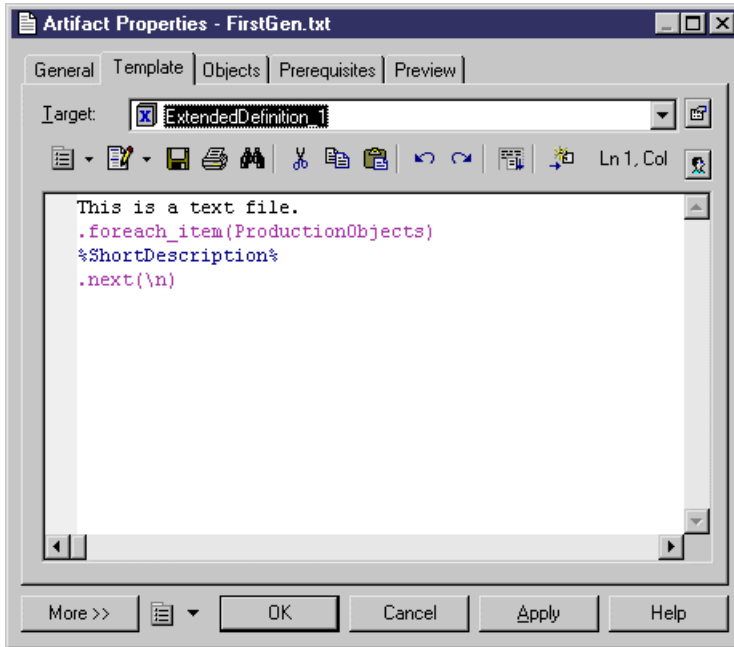


This criterion verifies that the last 4 characters of the artifact name are .TXT. You also need to create the default template in order to define the content of the generated file. In this example, DefaultTemplate is defined as follows:

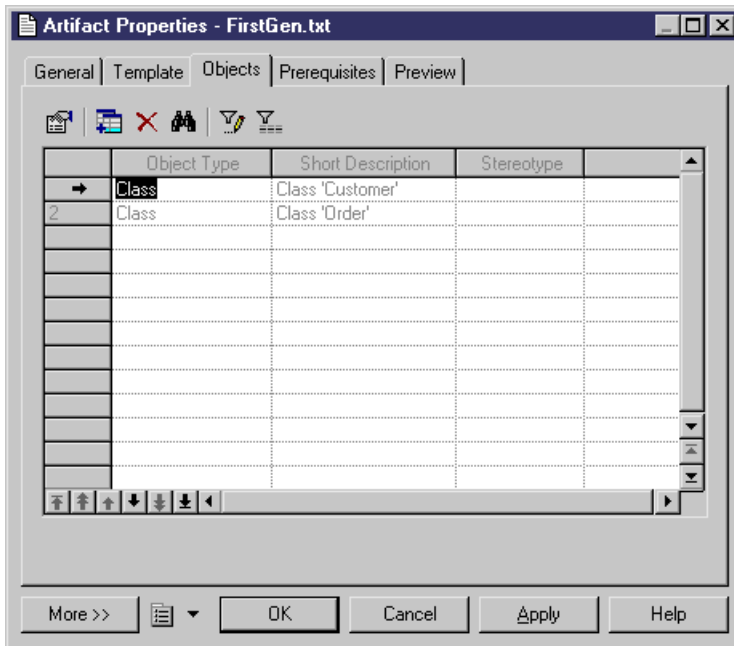
```
This is a text file.
```

```
.foreach_item(ProductionObjects)
%ShortDescription%
.next(\n)
```

You can now create artifacts in the model using the **New > Artifact** command in the model contextual menu. If you create an artifact with the .TXT extension and select the correct target in the Template tab of the artifact property sheet, the default template is automatically assigned to this artifact. This means that the short description of each instance of object associated with the current artifact will be written in the generated file:



You can now define instances of objects you want to include in the file generated from the current artifact:



**Defining an Artifact**

Artifacts can replace the standard generation of files; by default, an artifact generates the same code as the generated file but only for selected instances of a metaclass.

An artifact has the following properties:

Property	Description
Name	Name of the artifact.
Comment	Descriptive comment for the artifact.
Stereotype	Sub-classification used to extend the semantics of an object without changing its structure; it can be predefined or user-defined.
Encoding	Allows you to modify the default file encoding of the files to reverse engineer.

An artifact definition also includes the following properties:

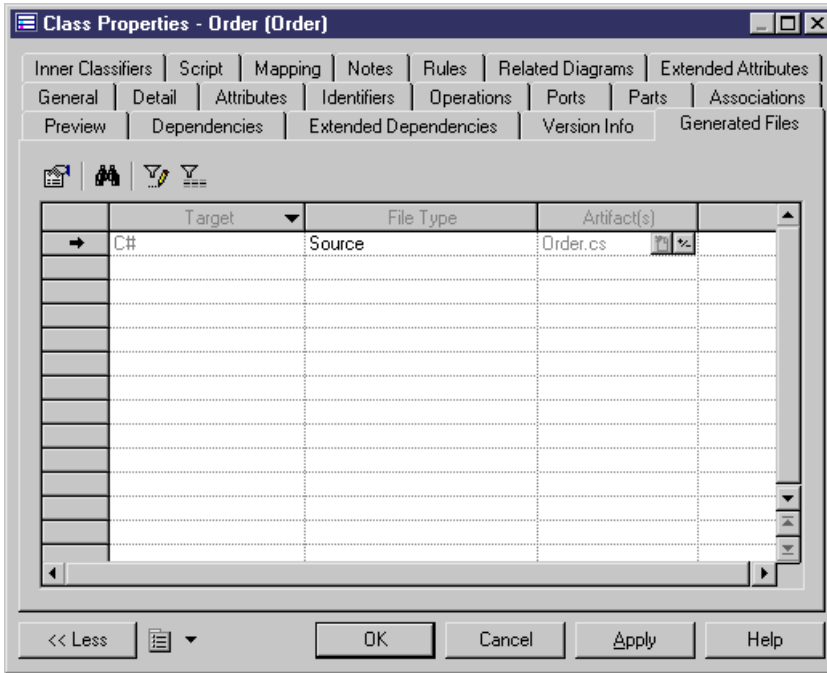
Property	Description
Template	Template used to generate the content of the generated file.
Objects	List of objects associated with the current artifact.
Prerequisites	List of artifacts that must be generated before the current artifact.
Preview	Allows to visualize the generated code of the artifact.

1. Double-click the symbol of an object with generated files, for example a class in C# language.
2. Click the Generated Files tab.

The Target column displays the resource file where the generated file is defined and the File Type column displays the type of the generated file.

Each row in the list corresponds to a generated file type available for the current instance of a metaclass, you can customize the generation of this file using an artifact.

3. Click the Create tool in the Artifact(s) column to add an artifact. This artifact will replace the standard file generation for the current object.



4. Click Apply and click the Properties tool to define artifact properties.
5. Click OK in both property sheets.

### **Managing Artifacts**

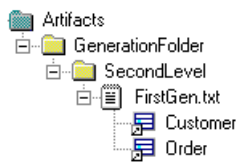
Artifacts appear in the Artifact category of the Browser. You can perform the following actions to customize an artifact:

- Change the artifact name using the Edit in place feature and avoid opening the artifact property sheet
- Drag and drop authorized objects from the diagram or the Browser to an artifact in order to add the code of this instance to the artifact

### **Artifact Folder**

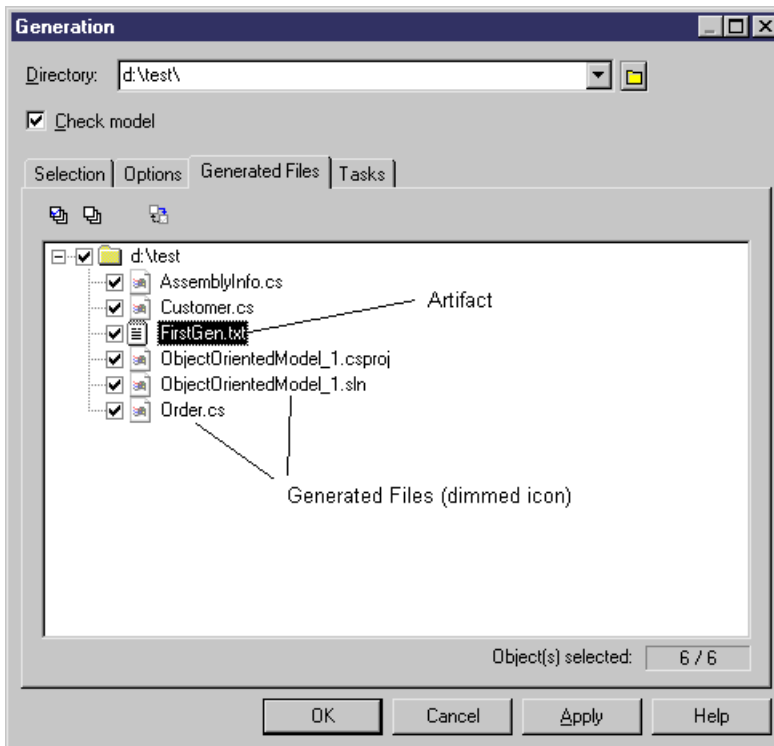
An Artifact folder is used to create an artifact hierarchy for generation.

You can create as many folders as you need using the **New > Artifact Folder** command in the Artifact category or model contextual menu. The artifact folder property sheet is displayed to let you define a name and comment for the folder. You can then create artifacts in the folder structure.



### **Generated Files Tab**

In the Generation dialog box, the Generated Files tab displays a checkbox tree with generated files (with a dimmed icon) and artifacts. You can select or deselect the files you want to generate.

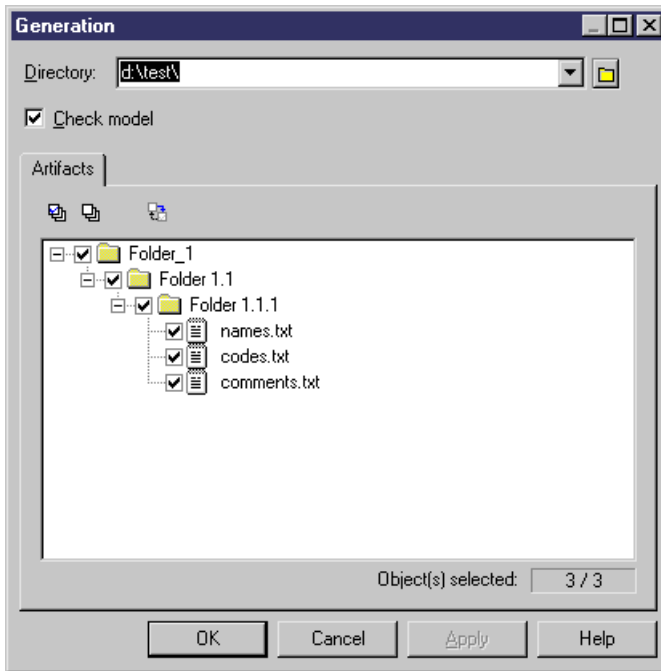


You can modify generation options from this dialog box, and you can also check artifact generation completeness: if an exclamation mark is displayed on the artifact icon it means that one or several prerequisite artifacts are missing.

If you click the Enforce Dependencies tool in the upper part of the dialog box, the artifacts that are prerequisites of other artifacts are automatically selected in the tree view in order to properly generate artifacts.

### **Generate from an Artifact Folder**

If you click the Generate command in the artifact folder contextual menu, a Generation dialog box is displayed to let you manage the generation of a given artifact folder. This dialog box also displays a checkbox tree with children artifacts of the selected artifact folder.



You can enforce dependencies in the Generation dialog box to make sure all prerequisites are selected for generation.

## Importing Objects from Excel Files

---

You can import objects listed in an Excel file to any kind of PowerDesigner model. The Excel Import extended model definition allows you to launch a wizard that guides you through mapping tables of objects to be modeled from Excel files to PowerDesigner objects and properties, and to import the contents of the files to your model. For example, you could create a list of database tables in an Excel file, specifying any appropriate properties, and then import them into a PDM.

You can import any number of different types of objects from a single Excel file, so long as they can all be imported to a single type of model. Each type of object should be listed in its own table on a separate worksheet of the Excel file. Each row in a table represents one object to import, and each column represents one property (an attribute or list of associated objects) of the object.

In the following example, the Excel file contains separate tables of objects containing tables, keys, references, and reference joins. The Table sheet, contains a list of three table to import. The columns Name, Owner, and Columns will be imported as the corresponding table properties:

	<u>Name</u>	<u>Owner</u>	<u>Columns</u>
	Customers	dba	ID,Name,Password,Email
	Orders	dba	ID,CustomerID,Date
	OrderLines	dba	OrderID,ProductID,Qty

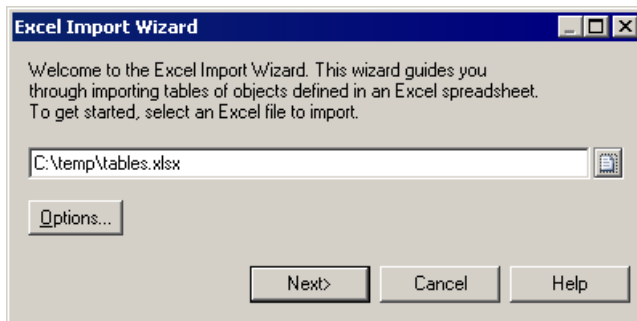
Table Table.Key Reference Reference.Reference Join

For detailed information about how to organise the file, see *Preparing Your Excel File for Import* on page 163.

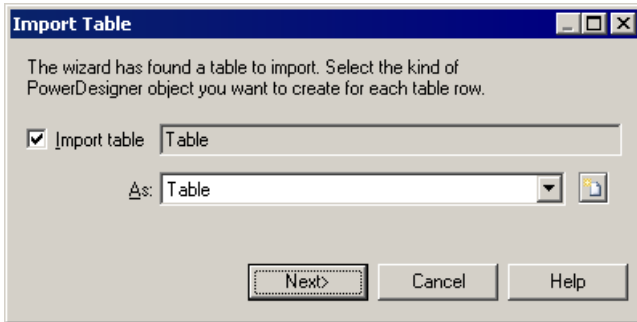
You can create a new model by importing objects from an Excel file or import your objects into an existing model.

1. Open the Excel Import Wizard:

- To create a new model, select **File > Import > Excel File**. Specify the kind of model you want to create in the New Model dialog (see *Creating a Model* on page 12), and then click **OK**.
- To import objects into an existing model, attach the Excel Import extended model definition (available for all model types on the **Import** subtab of the Select Extensions dialog) to your model (see *Attaching an Extended Model Definition to a Model* on page 328), then right-click the model in the Browser, and select **Import Excel File**.



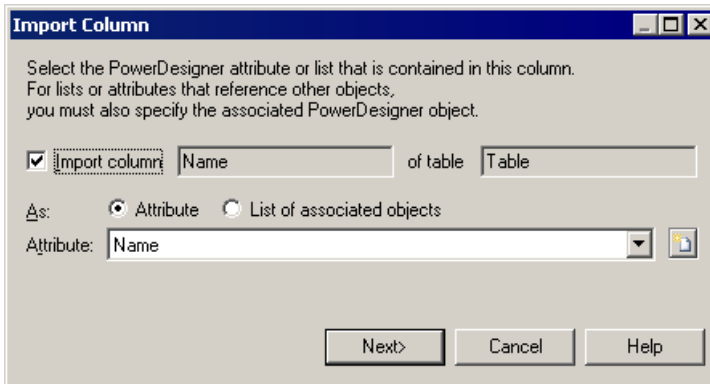
2. Click the **Select File** tool, browse to and select the Excel file to import, and click **Open** to return to the wizard.
3. [optional] Click the **Options** button to open the Import Options dialog (see *Excel Import Options* on page 165), specify any appropriate options and then click **Close** to return to the wizard.
4. Click **Next** to go to the Import Table page:



On this page, you must either:

- Select a PowerDesigner object type to import the table lines **As** from the list.
- Select to import the table lines as a new object type by clicking the **New** tool to the right of the list to open the New Object Type dialog.
- Deselect the check box to not import this table. When you click **Next**, PowerDesigner will search the Excel file for another table of objects to import.

5. Click **Next** to go to the Import Column page:



On this page, you must either:

- Select a PowerDesigner attribute to import the table column as from the **Attribute** list. To create a new attribute, click the **New** tool to the right of the list.
  - Select the **List of associated objects** radio button to import the column as a list, selecting the **List** to use and (if the list can contain multiple types of objects), the appropriate **Object**. To create a new list, click the **New** tool to the right of the list.
  - Deselect the check box to not import this table column.
6. Click **Next**. The wizard will search for the next column in the table and if there is none (or if you have selected to skip importing the table), will search for the next sheet containing a table of objects.

When all the sheets and all the columns have been processed, the import will begin. You can stop the import at any time by clicking the **Cancel** button in the bottom-right corner.

When it is complete, a dialog will appear showing how many objects have been created. Click **OK** to return to your model.

In addition to the objects that you have created, PowerDesigner creates an Excel Import object that contains your import parameters, along with a Table Mapping object for each of the imported tables, which lists the column mappings used. Right-click the Excel Import Object to access the following commands:

- **Import** - to re-import your file based on the options and mappings you have already defined. All the objects will be reimported, overwriting any existing objects based on their names. If you have added new objects to your worksheet tables they will be added to the model, but any objects that you have deleted from your worksheet will not be deleted from the model.
- **Change Mappings** - to re-import your file via the Excel Import Wizard in order to modify your table or column mappings.
- **Change Options** - to change the import options preparatory to re-importing with the command **Import**
- **Properties** - to open the Excel Import properties sheet.

---

**Note:** Advanced users may want to modify the Excel Import XEM to enable the import of data from other external file types. For detailed documentation about its implementation, open the XEM (which is located at `install_dir\Resource Files\Extended Model Definitions\ExcelImport.xem` in the Resource Editor and read the detailed commentary on the root element.

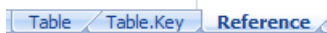
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## Preparing Your Excel File for Import

By following certain simple rules, you can greatly help PowerDesigner to recognize the information in your Excel files, and thus improve the accuracy and speed of the import.

Follow these rules to ensure that your import goes as smoothly and quickly as possible:

- **Insert only one table of objects per worksheet** – If you have more than one table on a worksheet, only the first will be recognized and imported.
- **Name your worksheet after the object to import** – If the name of your worksheet matches the name of a PowerDesigner object type, then the wizard will suggest mapping the table to that object type. The wizard does not recognize plural forms so, if your sheet contains tables, you should call it `Table`, and if it contains classes, call it `Class`.



A screenshot of a table with three columns. The first column is labeled 'Table', the second is 'Table.Key', and the third is 'Reference'. The 'Table' and 'Table.Key' columns are highlighted with a blue selection bar.

For sub-objects (objects linked to their parent by composition), you must prefix the name of the object with that of its parent object, (eg `Table.Key`) or it will not be recognized.

- **Name table columns after the property they contain** – If you name each of your columns after the attribute or collection that it contains, then the wizard will suggest mapping the column to that attribute or collection. As a general rule, attributes are singular

and collections plural so that, for example, you should name the column that contains your tables' names `Name` and the column containing its columns, `Columns`.

<u>Name</u>	<u>Owner</u>	<u>Columns</u>
Customers	dba	ID,Name,Password,Email

- **List items in a collection in a single cell** – You can quickly list items in a collection by entering them in a single Excel cell separated by commas:

<u>Table</u>	<u>Columns</u>
	ID,Name,Password,Email
	ID,CustomerID,Date
	OrderID,ProductID,Qty

You can change the separator by specifying another symbol in the **List value separator** import option.

- **Represent relationships of composition using a Parent column** – To specify relationships of type composition (such as columns in a table, classes in a package, or attributes in a class) between objects on different worksheets, specify the parent or location for the sub-object in a `Parent` column. You can specify a multi-level hierarchy of parents separated by a qualified name separator. Whereas specifying a collection of sub-objects in a single cell on the parent worksheet allows you to quickly populate the collection, specifying sub-objects on a separate worksheet allows you to detail all their properties.

<u>Name</u>	<u>Parent</u>
Area1	
Area2	Area1
Area3	Area1
Area4	Area1.Area2
Area5	Area1.Area3

## Excel Import Options

The Excel Import Wizard provides a number of options to allow some flexibility in the format of the data it can import.

Option	Description
Auto-map columns to properties	<p>Instructs the wizard to automatically map tables and columns that share names with objects or properties in the PowerDesigner metamodel without requesting confirmation. If your Excel sheets and table column headings conform to the PowerDesigner metamodel, this option can save considerable time by only showing you (and requesting your input for) items that the wizard is unable to match itself.</p> <p>For information about helping the wizard match your data to the PowerDesigner metamodel, see <i>Preparing Your Excel File for Import</i> on page 163).</p> <p>Default: Unselected</p>
Create symbols in active diagram	<p>Instructs the wizard to create symbols, where appropriate, for the imported objects in the currently selected diagram.</p> <p>Default: Unselected</p>
Create associated objects if not found	<p>Instructs the wizard to automatically create objects referenced by the imported objects where these are not otherwise defined in your Excel file. For example, If you have a worksheet listing PDM tables, which contains a column called <code>Owner</code>, PowerDesigner will create user objects for each of the names appearing in this column unless you supply a list of users on another worksheet. Similarly, if you do supply such a list of users but not all the names in the <code>Owner</code> column are included, user objects will be created for each of the missing names.</p> <p>Default: Selected</p>
Object identifier	<p>Specifies whether the object's name or code (the latter of which does not usually permit spaces or special characters ) is used in columns that reference the object. In the example above, you could use the user's name or code to reference it in the <code>Owner</code> column of the list of tables.</p> <p>Default: Name</p>
Qualified name separator	<p>Specifies the character used to separate namespaces in a qualified name. The Qualified name separator is used to specify the location or parent of an object. For example, to specify that architecture area <code>Area3</code> is inside <code>Area2</code>, which is in turn inside <code>Area1</code>, you would enter <code>Area1.Area2</code> in the <code>Parent</code> column for <code>Area3</code>.</p> <p>Default: Dot</p>

Option	Description
List value separator	Specifies the character used to separate items in a list in an Excel cell. For example, you could list all the columns of a table in a cell as follows: ID , Name , Email , Password.  Default: Comma
String literal for 'True'	Specifies the string used to signify 'True' for boolean attributes. False is signified by an empty cell.  Default: X ('Y', 'Yes', 'True', and '1' also always signify 'True').

# CHAPTER 5 Diagrams and Symbols

The majority of PowerDesigner models contain diagrams, in which your model objects are represented by symbols.

## Diagrams

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A diagram is a graphical view of a model or a package. All models and packages have at least one diagram.

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**Note:** In the Requirements Model, there are no diagrams, but rather views. For more information, see the *Requirements Modeling guide*.

---

You can add additional diagrams to a model or package to split the display and focus on certain portions of the system. You can also use multiple diagrams to focus on different subject areas. They allow you to see the symbols of the same objects, displayed with different kinds of information.

For example, in a Publishing model, different diagrams could define the different activities involved in this industry: the printing diagram, the sales diagram, the accounting diagram, the book selection committee diagram.

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**Note:** You can define your own custom matrices that act as diagrams and display the connections between objects in a grid format. For more information, see the Extending your Models with Profiles chapter of *Customizing and Extending PowerDesigner*.

---

Note that you cannot save a diagram individually, as it only represents a view of a model or package. When you save the model you also save all the diagram it contains in their present state of magnification.

## Creating a Diagram

By default, any model or package opens with a default diagram. You can create as many diagrams as you want in a model or in a package.

You can create a diagram in any of the following ways:

- Select **View > Diagram > New Diagram > Diagram type** .
- Right-click the background of your diagram and select **Diagram > New Diagram > Diagram type** from the contextual menu
- Right-click the model node in the Browser and select **New > Diagram type** from the contextual menu

In each case you will be invited to specify a name, code, and optional comment for the new diagram.

## Diagram Properties

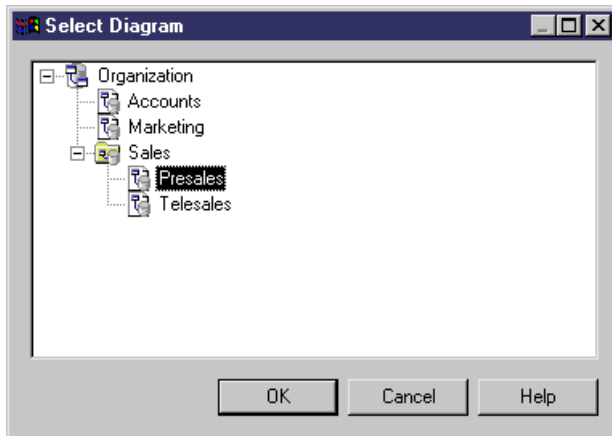
You can modify an object's properties from its property sheet. To open a diagram property sheet, right-click its Browser entry and select Properties from the contextual menu, or right click the diagram background and select **Diagram > Properties** from the contextual menu. The General tab contains the following properties:

Property	Description
Name	Specifies the name of the item which should be clear and meaningful, and should convey the item's purpose to non-technical users
Code	Specifies the technical name of the item used for generating code or scripts, which may be abbreviated, and should not generally include spaces
Comment	Additional information concerning the diagram
Parent	Specifies the name of the parent model or package
Stereotype	Specifies a stereotype for the diagram. For example, a statechart diagram can serve to model page flows in JSF and other web frameworks.  You can use a profile to provide special processing for diagrams and other objects carrying stereotypes. For more information, see the Extending your Models with Profiles chapter of the <i>Customizing and Extending PowerDesigner</i> manual.
Page scale	Sets a default display for page scale. The page scale percentage lets you define a page size according to your modeling needs. If you have a lot of objects on several pages, you can reduce the page scale percentage in order for all the objects to fit on a single printable page
Default Diagram	Diagram by default. This check box is automatically selected if the diagram is the first created diagram

## Opening and Viewing Diagrams




You can open a diagram from the Browser or from the View menu.

- Double-click the diagram entry in the Browser.
- Press **Ctrl +D**, or select **View > Diagram > Select Diagram** to open the Select Diagram dialog box, select a diagram node in the tree and click **OK**.



- In the case of package diagrams, you can additionally:
  - Select the Open Package Diagram tool from the Palette and click on a package symbol.
  - Press **Ctrl** and double-click a package symbol.
  - Right-click a package symbol and select **Diagram > Open Diagram**.

The following diagram viewing tools are available in the palette or from the **View** menu:

Tool	Description
	<p>Zoom In (F6) - Select the Zoom In tool and click anywhere in the diagram. The point clicked on is centered.</p> <p>Alternatively, you can select <b>View &gt; Zoom In</b>, or turn your mouse scroll wheel away from you while holding the <b>Ctrl</b> key.</p> <p>To zoom in to a particular area, select the Zoom In tool and click and drag a rectangle around the area to be displayed. When you release the mouse button, the diagram zooms to the selected area.</p>
	<p>Zoom Out (F7) - Select the Zoom Out tool and click anywhere in the diagram. The point clicked on is centered.</p> <p>Alternatively, you can select <b>View &gt; Zoom Out</b>, or turn your mouse scroll wheel towards from you while holding the <b>Ctrl</b> key.</p>
	<p>View the whole diagram (F8) - Double-click the Global View tool or select <b>View &gt; Global View</b>.</p>
[none]	<p>View actual size (F5) - Select <b>View &gt; Actual Size</b>.</p>
[none]	<p>View the current (printable) page (Ctrl+F10) - Select <b>View &gt; Page View &gt; Current Page</b>.</p>
[none]	<p>View all pages that contain symbols (F10) - Select <b>View &gt; Page View &gt; Used Pages</b>.</p>

Tool	Description
[none]	View all pages in the diagram - Select <b>View &gt; Page View &gt; All Pages</b> .
[none]	Center on selected symbols - Select <b>View &gt; View Selection</b> .
[none]	Return to previous view (F9) - Select <b>View &gt; Previous View</b> .  This and the Next View option allows you to toggle back and forth between various selections and zooms you have used to navigate in your diagram, for example between a limited view and a global view of the diagram.
[none]	Go to next view (Shift+F9) - Select <b>View &gt; Next View</b> .
[none]	Refresh View (Shift+F5) - Select <b>View &gt; Redisplay</b> .

## Finding an Object Symbol in the Diagram

You can locate any object with a symbol in a diagram or among several diagrams using Find in Diagram (or, for an RQM, Find in Document View). Objects without graphical symbol such as domains cannot be found in the diagram.

If the object has only one symbol, the appropriate diagram is opened with the object symbol centered. If the object has several symbols, a dialog box opens to allow you to select one.

This feature can be very useful if you are looking for the target object of shortcut symbols, as you can access the target object from the shortcut property sheet and then locate the target object in the diagram.

Find in Diagram (or Find in Document View) is available from:

- The Browser — Right-click an object in the Browser and select Find in Diagram (or Find in Document View) from the contextual menu.
- The Result List — Right-click an object in the Result List and select Find in Diagram (or Find in Document View) from the contextual menu.
- The object property sheet dropdown menu — Open an object property sheet and select Find in Diagram (or Find in Document View) from the dropdown menu at the bottom-left corner.
- An objects list — From an objects list, select an object in the list and click the Find Symbol in Diagram tool in the list toolbar.

## Specifying Diagrams as Related Diagrams

*Related Diagrams* are diagrams that provide additional information about an object. You can use related diagrams to further define the behavior and implementation of objects and to view them from different angles and in terms of semantic relationships.

You can associate any type of diagram open in the workspace with an object, including diagrams from other packages or models.

---

**Note:** You can only attach related diagrams to objects that have a **Related Diagrams** tab in their property sheet.

---

1. Open the property sheet of the object and click the **Related Diagrams** tab.
2. Click the **Add Objects** tool to open a selection window.
3. Select a model in the list, select the diagram(s) to attach and then click **OK** to return to the object property sheet.

The diagram is displayed in the list of related diagrams of the object. To open the diagram from the **Related Diagrams** tab, select it in the list and click the **Open Diagram** tool.

### Deleting a Diagram

When you delete a diagram, you delete a view of a model or a package. This action does not affect the objects in the model or package.

You can delete a diagram in any of the following ways:

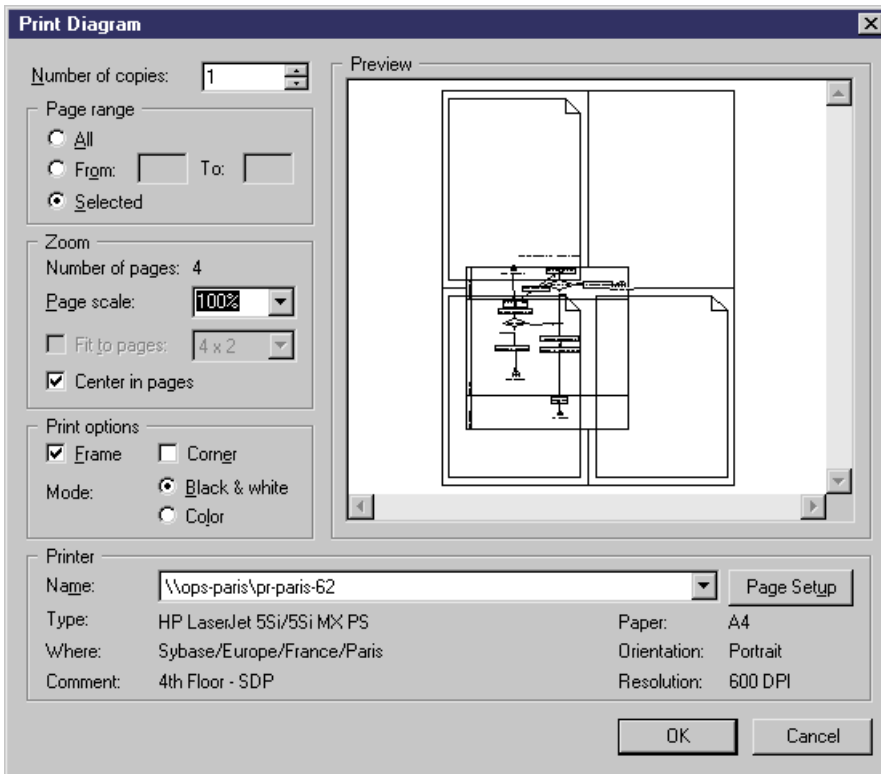
- Select the diagram node in the Browser and press the del key.
- Right-click the diagram window background and select **Diagram > Delete** from the contextual menu.
- Select **View > Diagram > Delete**.

### Printing Diagrams

You can print the currently selected diagram at any time. You can print the whole diagram, a selection of pages, or a selection of objects.

When you print a diagram, you do not print detailed information about the model objects. To do this, you need to create a model report.

1. [optional] Select certain symbols in the diagram in order to print them and exclude the others.
2. Select **File > Print**, or click the Print tool to open the Print Diagram dialog, which displays default print options and the number of printed pages needed for the diagram.



3. [optional] Specify the pages to print in the Page range groupbox or by clicking in the Preview pane (see *Print Diagram options* on page 172). Only pages with an overlaid page frame will be printed.
4. [optional] Specify a page scale or set of pages to fit to (see *Print Diagram options* on page 172). By default, diagrams are printed at 100% scale on as many pages as necessary.
5. [optional] Click the Page Setup button to open the Page Setup dialog and specify your page layout (see *Page Setup options* on page 173).
6. Click OK to start printing.

### **Print Diagram Options**

When you print a diagram, you can select the following print options from the Print diagram dialog box. It also displays a preview of the selection you want to print:

Option	Description
Number of copies	Number of copies you want to print. You can type it or use the arrows.

Option	Description
Page range	Specifies which pages to print. You can choose between: <ul style="list-style-type: none"> <li>• All - Prints all the pages of the diagram.</li> <li>• From / To - Prints a range of pages covered by the diagram. The corresponding pages are framed in the Preview window.</li> <li>• Selected - Prints the pages you select in the Preview window.</li> </ul>
Number of pages	Displays the number of pages required based on your zoom options.
Page scale	Specifies the scale at which the diagram will be printed.
Fit to pages	Reduces the scale of the diagram to print it on the number of pages specified, for example 1x3. The Number of pages option is automatically updated and the Center in pages option is unavailable. These parameters are not saved and your diagram stays unchanged in the diagram window. If you want to apply these changes to your diagram, you should use the <b>Symbol &gt; Fit to Page File</b> command from the menu bar and the <b>File &gt; Page Setup</b> for paper orientation.
Center in pages	Centers the diagram in the pages that it covers. The Fit to pages option is automatically unavailable.
Frame	Solid line border around graphic on all pages.
Corner	Specifies the printing of "crop marks" in each corner to help align multiple pages.
Mode:	Specifies whether the diagram will be printed in Black & White or Color.
Printer: Name	Name of the printer. Select a printer from the Name list. Click the Page Setup button to modify the current printer parameters.

### Page Setup Options

The Page Setup dialog allows you to modify standard printer parameters, such as Paper, Orientation and Margins, and to add various kinds of information to the Header, Footer and Page of your printed diagram.

You can arrive at the Page Setup dialog by selecting **File > Page Setup**, or by clicking the **Page Setup** button in the Print Diagram dialog (see *Printing diagrams* on page 171).

The following fields let you specify the content of the header and footer:

Option	Description
Header	<p>Specifies the content of the page header. You can insert fixed text and use the arrow button to the right of the field to insert one or more of the following variables:</p> <ul style="list-style-type: none"> <li>• Current Date - inserts the date</li> <li>• Current Time - inserts the time</li> <li>• Current Page - inserts the content of the <b>Page</b> field</li> <li>• Last Page - inserts the number of the last page</li> <li>• Diagram - inserts the diagram name</li> <li>• Location - inserts the file path</li> <li>• Model - inserts the model name</li> <li>• Package - inserts the package name</li> <li>• Module - inserts the model type</li> <li>• Application Name - inserts "PowerDesigner"</li> </ul>
Footer	<p>Specifies the content of the page footer. You can insert fixed text and use the arrow button to the right of the field to insert the same variables as for the page header.</p>
Page	<p>Specifies the page number format to use in the header and footer. You can insert fixed text and use the arrow button to the right of the field to insert one or more of the following variables:</p> <ul style="list-style-type: none"> <li>• Page Row - inserts the diagram pagination grid row number. This can be useful to help assemble large diagrams printed on multiple pages. You may need to zoom out to see the diagram pagination grid:</li> </ul> <div> </div> <ul style="list-style-type: none"> <li>• Page Column - inserts the diagram pagination grid column number</li> <li>• Page Number - inserts the standard page number</li> </ul>

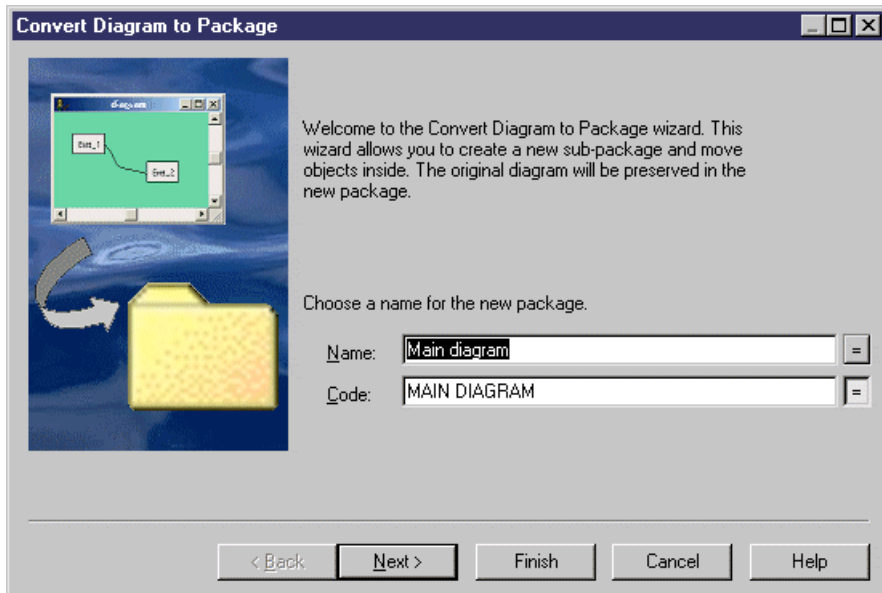
## Converting a Diagram to a Package

PowerDesigner lets you convert a diagram to a package. You can move all the objects in the diagram to the new package or specify only certain objects. Other objects will stay in their original package and be represented via shortcuts in the new package.

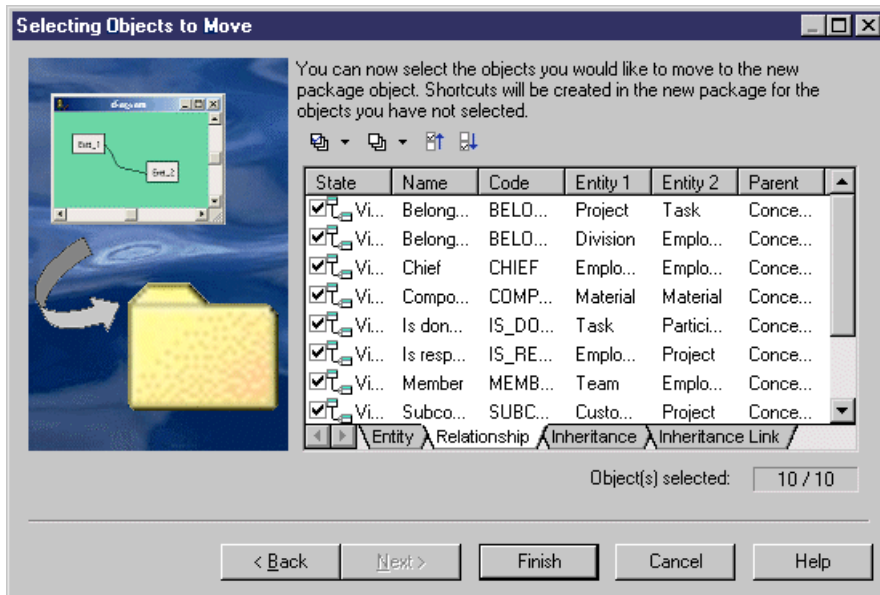
The linking objects that you move keep their links in the target package and a shortcut is usually created in the source package. The general rule being that conceptual modeling must be preserved.

Shortcuts creation rules in PowerDesigner also apply to moving objects between packages (see *Chapter 11, Shortcuts and Object Replications* on page 355).

1. Select **View > Diagram > Convert to Package** (or right-click the diagram background window and select **Diagram > Convert to Package** or right-click the diagram node in the Browser and select **Convert to Package**) to open the Convert Diagram to Package wizard. By default the package takes the name of the diagram.



2. Click **Next** to open the Selecting Objects to Move page, which lists all the objects in the diagram available to move to the new package. Objects are organized by object type, with a sub-tab for each object type. By default, all the objects are selected.



- [optional] Deselect any objects you do not want to move to the new package. Objects deselected here will remain in the original package and be represented in the new package via shortcuts.
- Click **Finish** to create the new package and move the selected objects to it.

The new package and diagram are added in the Browser.

## Moving a Diagram to a Package

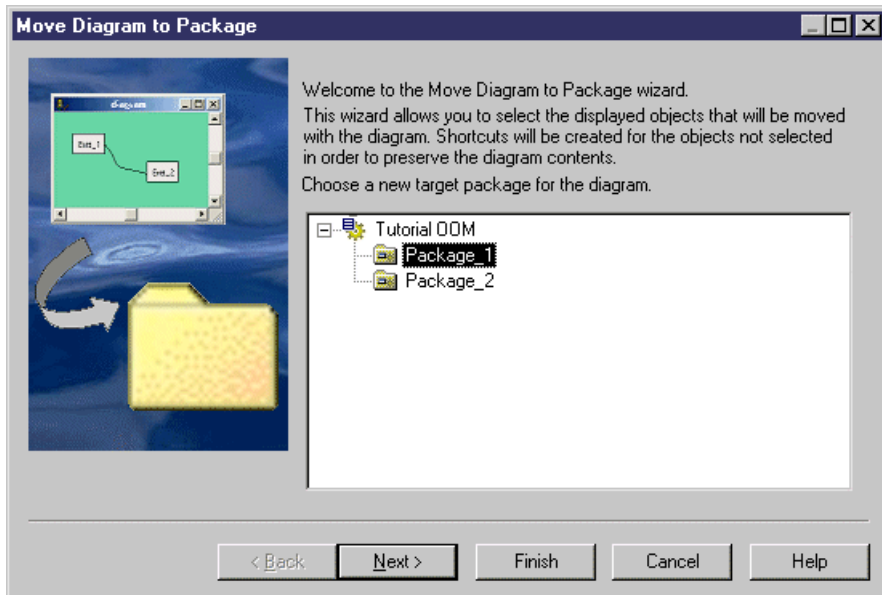
In some cases, you may want to move a diagram and some or all of the objects it contains into another package or composite object, such as a process or activity.

The linking objects that you move with the diagram keep their links in the target package and a shortcut is usually created in the source package. The general rule being that the design of the original diagram must be preserved.

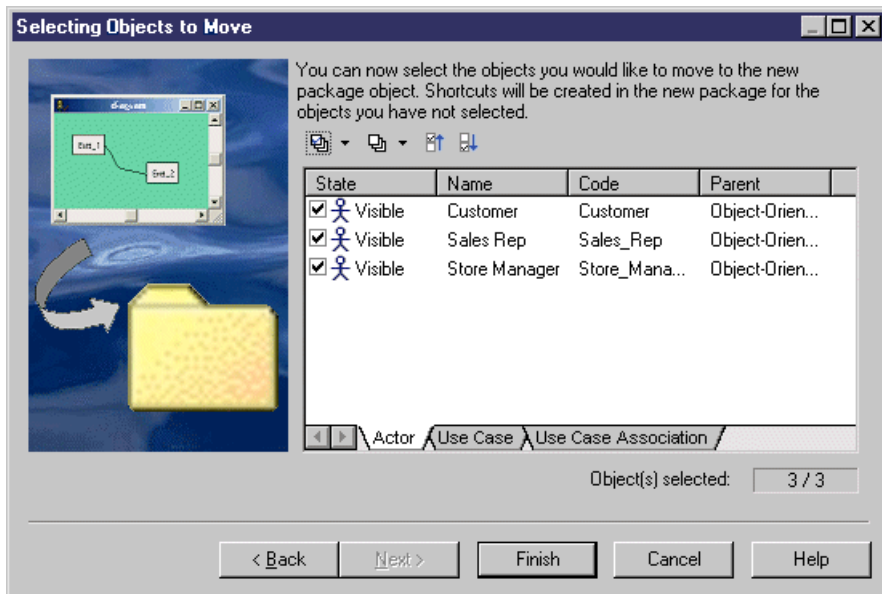
Shortcuts creation rules in PowerDesigner also apply to moving objects between packages (see *Chapter 11, Shortcuts and Object Replications* on page 355).

You can simply drag and drop the diagram from one package to another in the Browser to move all the objects in the diagram to the target package. To control which objects are moved, use the wizard.

- Select **View > Diagram > Move to Package** (or right-click the diagram background window and select **Diagram > Move to Package** or right-click the diagram node in the Browser and select **Move to Package**) to open the Move Diagram to Package wizard.



2. Select the target package to which you want to move the current diagram and click **Next** to open the Selecting Objects to Move page, which lists all the objects in the diagram available to move to the new package. Objects are organized by object type, with a sub-tab for each object type. By default, all the objects are selected.



3. [optional] Deselect any objects you do not want to move to the new package. Objects deselected here will remain in the original package and be represented in the new package via shortcuts.
4. Click **Finish** to move the diagram to the new package.

If the last diagram is moved or deleted from a package, a new diagram is automatically created as all packages must contain at least one diagram.

## Moving Entities Between Packages in a CDM

In a CDM, when moving entities containing data items from one package to another, the following rules apply:

Data items	Namespace	Move result
Only used by selected entity	Move within the same namespace	The data items are moved with the entity
Reused among different entities	Move within the same namespace	Shortcuts of data items are created for reused data items
Used only by one entity or reused among different entities	Change namespace	Data items are copied in the other namespace

## Dependency Matrices

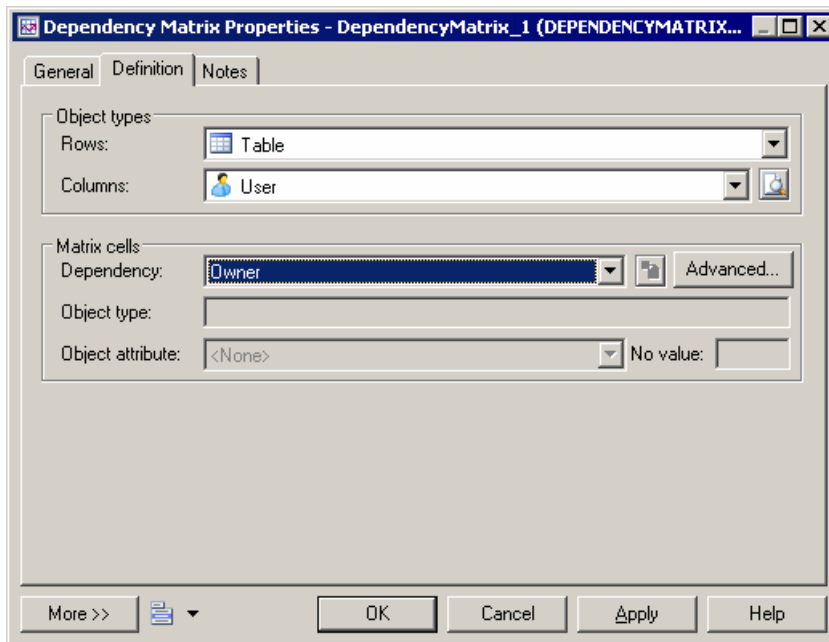
You can create dependency matrices to review and create links between any kind of objects. You can create an individual matrix from the Browser or define a matrix in a resource file for reuse.

In the following enterprise architecture model (EAM) example, systems are listed along the top of the matrix, and linked to the sites where they are in use, via extended dependencies:

		Backup	Backup		Finance	Finance			Production
			Live	Offline		Payroll	Purchasing	Sales	
Europe									
Europe	France								
	Lyons			✓					✓
	France		✓				✓	✓	
	Marseilles								
	Paris					✓			
	Spain								
Spain	Barcelona							✓	
	Bilbao		✓				✓		
	Madrid			✓		✓			
US									
US	Chicago					✓			
	New York		✓				✓		
	San Francisco			✓				✓	✓

1. Right-click a model or package node in the Browser and select **New > Dependency Matrix** to open the matrix property sheet to the **Definition** tab.
2. Select an object type from the current model to populate your matrix rows and an object type from the current or another model type to populate the columns.
3. Specify how the rows and columns of your matrix will be associated by selecting a dependency from the list.

In the following example, PDM tables are associated to users by the Owner dependency:



Only direct dependencies are available from the list. To specify a more complex dependency, click the **Advanced** button to open the Dependency Path Definition dialog (see *Specifying Advanced Dependencies* on page 180).

4. For certain dependencies, the **Object type** on which the dependency is based will be displayed, and you can select an **Object attribute** to display in the matrix cells along with the **No value** symbol, which is displayed if that attribute is not set in any particular instance.
5. Click the **General** tab and enter a name for the matrix (for example Table Owners Matrix).
6. Click **OK** to complete the definition and open your matrix.

---

**Note:** For information about defining a dependency matrix in a resource file (such as a DBMS definition file, object language file or extended model definition) and for detailed information about its properties, see the Extending Your Models with Profiles chapter in the *Customizing and Extending PowerDesigner* book.

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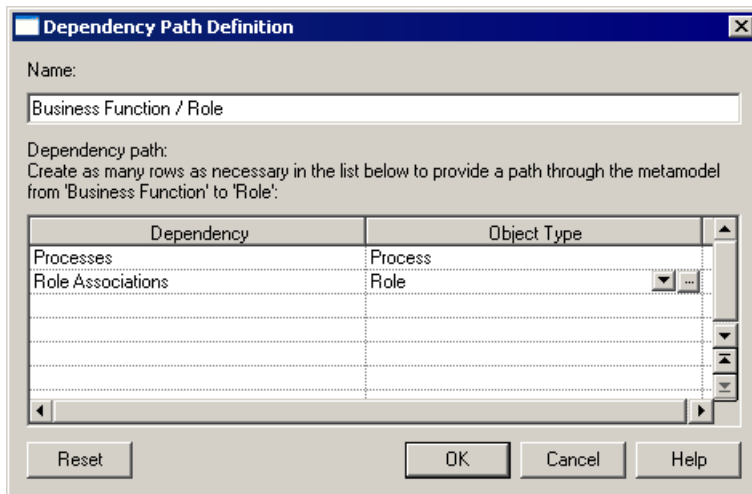
## Specifying Advanced Dependencies

You can examine dependencies between two types of objects that are not directly associated with each other, using the Dependency Path Definition dialog, which is accessible by clicking the Advanced button on the Definition tab, and which allows you to specify a path passing through as many intermediate linking objects as necessary.

Each line in this dialog represents one step in a dependency path:

Property	Description
Name	Specifies a name for the dependency path. By default, this field is populated with the origin and destination object types.
Dependency	Specifies the dependency for this step in the path. The list is populated with all the possible dependencies for the previous object type.
Object Type	Specifies the specific object type that is linked to the previous object type by the selected dependency. This field is autopopulated if only one object type is available through the selected dependency.

In the following example, a path is identified between business functions and roles, by passing from the business function through the processes it contains, to the role linked to it by a role association:



## Working with Dependency Matrices

The dependency matrix displays the connections between the objects of the types specified in your definition.





In the following example, the same hierarchy of business processes is shown in the row and column headers in order to analyze the dependencies between them:









		Communication	Direct Sales	Register Order	Send to Manufacturing	Validate Order	Indirect Sales	Contact Partner	Organize Event	Manufacturing	Material Control	Quality Assurance	Shipping	Planning
Communication					✓			✓	✓				✓	✓
Direct Sales														
Direct Sales	Register Order											✓		
	Send to Manufacturing				✓									
	Validate Order	✓						✓			✓			
Indirect Sales														
Indirect Sales	Contact Partner													
	Organize Event					✓								
Manufacturing													✓	
Manufacturing	Manufacture													
	Material Control							✓						
	Quality Assurance										✓			
	Shipping								✓					
Planning					✓									

To add a link, click in the appropriate cell, and then click the **Create link** button at the bottom of the matrix (or press the Spacebar or V).

To delete a link, click in a cell containing a link, and then click the **Delete link** button at the bottom of the matrix (or press the Spacebar or Delete key).

The following tools are available above the dependency matrix:

Tool	Description
	Properties – opens the property sheet of the object associated with the selected row, column, or cell.
	Copy – Copies the entire matrix for pasting into a CSV environment such as Excel or a plain text file.
	Select Rows/Columns (Ctrl + N) – Opens a selection box which allows you to select rows and columns to display in the matrix either by hand or by defining a filter (see <i>Adding an Item from a Selection List</i> on page 122).
	Display only Full Rows/Columns (Ctrl+R) – Filters the display to show only rows/columns that are populated.

Tool	Description
	Display only Empty Rows (Ctrl+E) – Filters the display to show only empty rows.
	Vertical/Horizontal Column Header - Toggles between vertical and horizontal orientation of column headers.
	Shrink to Fit - Shrinks row and column headers to fit their contents.
	Show Parents in Row Header - Displays the hierarchy of objects that are ancestors to the row objects.
	Show Parents in Column Header - Displays the hierarchy of objects that are ancestors to the row objects.
	Show Packages in Headers - Displays the hierarchy of packages that contain the row and column objects.
	Refresh - Refreshes the display of dependencies in the matrix.
	Export to Excel - Exports the matrix as an MS Excel file. If the specified file already exists, you will be given the option to overwrite it or append a new worksheet in the file.

**Note:** You can modify the definition of the dependency matrix at any time by right-clicking its Browser node, selecting **Properties**, and clicking the **Definition** tab.

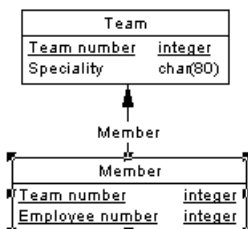
## Manipulating Symbols

You can modify the display of individual symbols in a model including object symbols, links, graphic shapes, and lines.






## Selecting Symbols

You can select symbols in a PowerDesigner diagram using standard gestures. Selected symbols display handles.

For example, the illustration below shows the selection of the Member table.



The following table lists the various ways of selecting symbols in a diagram:

To Select	Tool	How to use
One symbol		Click the Pointer tool, and then click the symbol.
Several Symbols		Click the Pointer tool. Click the first symbol to select, and then press the shift key while you click additional symbols.
All symbols within a certain area		Click the pointer tool. Click and hold while drawing a rectangle around the area containing the symbols to select.
All symbols connected to a selected symbol		Click the pointer tool. Click the first symbol to select, and then select <b>Edit &gt; Select Connected Symbols</b> .
All symbols		Click the Grabber tool. Alternatively, select <b>Edit &gt; Select All</b> , or type Ctrl+A

## Resizing Symbols

You can resize diagram symbols:

- Individually – Select the symbol and then click and drag on one of its handles
- All at once - Click the Grabber and then click and drag on one of the handles

## Bending and Straightening Link Symbols

You can add and remove corners to and from link symbols.

1. Draw a link between two objects:



2. Press Ctrl while you click a point on the line to create a handle where you want to insert a corner :



3. You can add a second handle, or as many as you need:



4. To create a corner, click and hold the handle and then drag it to where you want the corner to be:



5. You can drag the other handles too:



6. To remove a handle (and corner), press Ctrl and click on the handle to remove:



## Dragging a Link Symbol from One Object to Another

You can drag a link symbol from one object to another.

1. Click a link symbol in the diagram.
2. Drag one of its end handles to a different object.

## Creating a Graphical Link Between Any Two Symbols

You can create a graphical link between any two symbols in the diagram. This link is purely graphical and does not convey any semantics.

1. Select the Polyline tool in the Palette.
2. Click inside the first symbol and while continuing to hold down the mouse button, drag the cursor to a second symbol. Release the mouse button inside the second symbol and right-click.

A link is created. You can double-click the link symbol to open the Link Symbol Text dialog box and edit the link.

## Arranging Symbols Using the Symbol Menu

The Symbol menu allows you to do many different things with your diagram symbols.

Menu Item	Function
Format [Ctrl+T]	Opens the Symbol Format window, which allows you to control many aspects of the appearances of the selected symbols. For detailed information, see <i>Symbol Format Properties</i> on page 191.
Get Format	Copies the format of the selected symbol, making it available for applying to other symbols. Only available if a single symbol is selected.
Apply Format	Applies the format copied with Get Format to the selected symbols.

Menu Item	Function
Shadow [Ctrl+W]	Applies the standard shadow effect to the selected symbols. See also <i>Symbol Format Properties</i> on page 191.
Adjust to Text [Ctrl+J]	Expands (or shrinks) the width of the selected objects to fit the length of their names.
Normal Size	Applies the default size (specified in the Format Display Preferences) to the selected objects.
Fit to Page	Opens the Fit to Page dialog, which lists the number of pages currently used and the display scale, and allows you to specify the number of pages to use and to center the symbols on the pages.
Auto-Layout	Automatically rearranges the symbols in the diagram See <i>Auto-layout</i> on page 186.
Align	Each of the submenu options aligns the selected symbols in a different manner. For a list of options, see <i>Aligning selected symbols</i> on page 188.
Disposition	<p>Automatically arranges all (or selected) symbols in the diagram. There are various forms of disposition:</p> <ul style="list-style-type: none"> <li>• Horizontal [Ctrl+H] – straightens selected link objects and makes them horizontal where possible.</li> <li>• Vertical [Ctrl+L] - straightens selected link objects and makes them vertical where possible.</li> <li>• Flip Horizontal – reverses the horizontal disposition of the selected symbol</li> <li>• Flip Vertical - reverses the vertical disposition of the selected symbol</li> <li>• Arrange Symbols – distributes the selected symbols evenly.</li> <li>• Arrange Connectors – straightens the selected link symbols and centers their endpoints in the objects that they connect.</li> <li>• Arrange Attach Points - centers the endpoints of the selected link symbols in the objects that they connect.</li> <li>• Arrange Attached Text – returns text objects associated with the selected link symbols to its default position.</li> </ul>

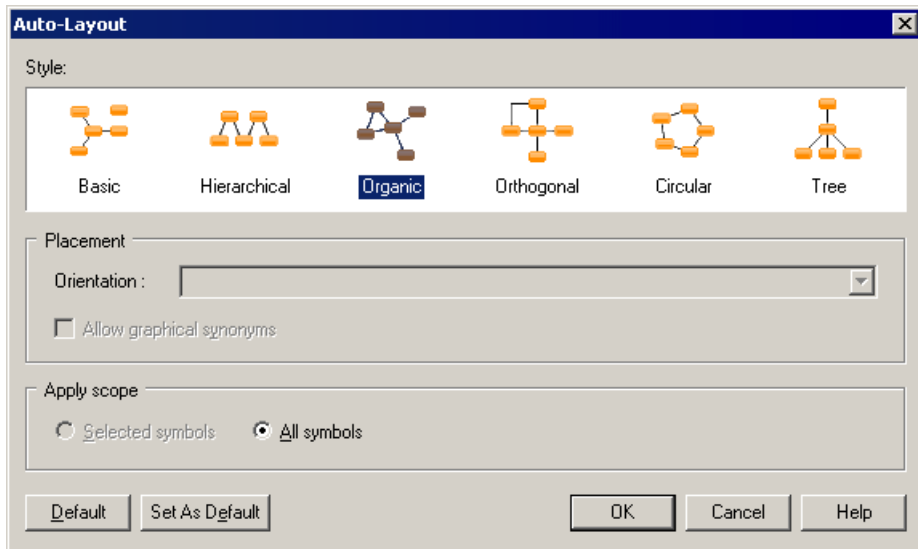
Menu Item	Function
Order	<p>Promotes or demotes the selected symbols in terms of layers within the diagram. This can be useful when you have overlapping symbols and want to have one appear above the other. The following options are available:</p> <ul style="list-style-type: none"> <li>• Bring to Front</li> <li>• Send to Back</li> <li>• Bring Forward</li> <li>• Send Backward</li> </ul> <p>By default, when you insert a free symbol (for example, a note) on a design object symbol (for example, a table), the free symbol is always inserted at the back, as free symbols are usually used as backgrounds.</p> <p>Priority is given to the front-most symbols. When symbols overlap, it may not be possible to select the symbol in the background, even if its handles are visible.</p>
Group Symbols	Groups selected symbols, allowing them to be selected, moved and resized as a single block.
Ungroup Symbols	Separates selected objects that were previously grouped together.
Hide Symbols	Hides (makes invisible) the selected symbols. You may want to do this to make a large model more readable, or to focus on only a particular part of a model.
Show Symbols	Opens the Show Symbols dialog box, in which you can select or deselect all the symbols in the diagram to show or hide them.
Protect Symbols	Protects the selected symbols, making them impossible to select and edit.
Unprotect Symbols	Unprotects the selected symbols, making them available to select and edit.

### **Auto-layout**

The auto-layout command automatically rearranges symbols in diagrams in order to avoid node overlaps, link intersections with nodes and others links, or long distances between related nodes.

Note that auto-layout is not available for the OOM sequence diagram or any diagrams containing swimlanes.

1. Select **Symbol > Auto-Layout** to open the Auto-Layout window.



2. Choose one of the available styles. Note that depending on the diagram from which you launch auto-layout, some styles may not be available.
  - Basic – Suitable for simple diagrams.
  - Hierarchical – Highlights the main direction or flow within a directed graph. You can additionally specify an orientation for the flow within the graph.
  - Organic – For undirected graphs.
  - Orthogonal - For undirected graphs. You can additionally specify an orientation for the flow within the graph.
  - Circular – Produces interconnected ring and star topologies to emphasize group and tree structures within a network. You can additionally specify a cycle or radiation shape.
  - Tree – For directed or undirected trees. You can additionally specify an orientation for the flow within the graph.
3. Specify if you want to apply the auto-layout to only selected or all symbols.
4. Click OK to apply the auto-layout and return to the diagram.











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**Note:** You can, at any time, click the default button to revert to the default auto-layout settings. Click the Set As Default button to set the currently selected style as the default.

---

## Aligning Selected Symbols

The following tools are available from the **Symbol > Align** submenu. Each tool acts on the symbols presently selected in the diagram:

Align submenu item	Tool	Action
Left		Aligns left borders of selected symbols with leftmost selected symbol
Center on vertical axis		Centers selected symbols on the most central selected symbol
Right		Aligns right borders of selected symbols with rightmost selected symbol
Same width		Stretches selected symbols to the width of the selection area (from the leftmost symbol to the rightmost symbol)
Evenly space horizontally		Assigns equal space between at least three symbols on a horizontal axis
Top		Aligns tops of selected symbols with topmost selected symbol
Center on horizontal axis		Centers selected symbols on the most central selected symbol
Bottom		Aligns bottom selected symbols with lowest selected symbol
Same height		Stretches selected symbols to the height of the selection area (from the topmost symbol to the lowest symbol)
Evenly space vertically		Assigns equal space between at least three symbols on a vertical axis

## Showing and Hiding Symbols

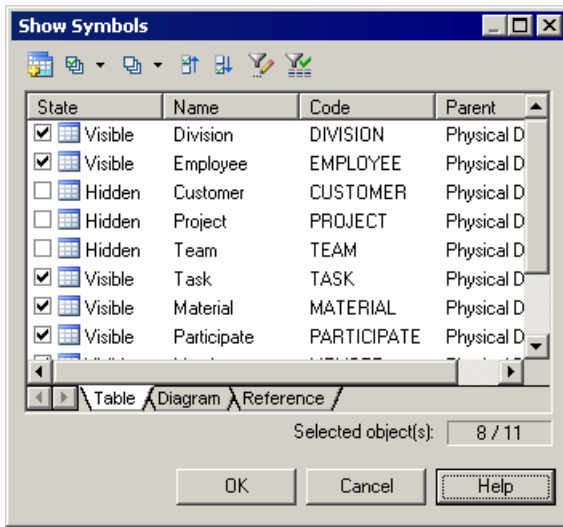
For PowerDesigner objects that have symbols, the symbol is automatically displayed in the diagram when you create the object. Hiding some symbols can improve the readability of your diagram. When you hide a symbol you do not delete it or the object.

---

**Note:** When you hide an object with link objects connected to it, the links are also hidden. For example, if you hide a table symbol, any references attached to it will also be hidden.

---

To open the Show Symbols dialog, select **Symbol > Show Symbols** or right-click the diagram background and select **Diagram > Show Symbols**:



Object symbols are organized by type in sub-tabs. If shortcuts, extended dependencies and/or free symbols are present in the package, they appear on their own sub-tabs. You show and hide symbols by selecting or deselecting them.

The following tools are available for selecting symbols:

Tool	Description
	Allows you to select objects from other packages to display them in the current diagram.
	Selects all objects in the current tab. You can select all objects on all tabs by pressing the Ctrl key as you click or by clicking the arrow and selecting All Pages.
	Deselects all objects in the current tab. You can deselect all objects on all tabs by pressing the Ctrl key as you click or by clicking the arrow and selecting All Pages.
	Moves all selected object to the top of the list
	Moves all selected object to the bottom of the list

**Note:** To hide one or more symbols without using this dialog, select them and then choose **Hide Symbols** from the **Symbol** or contextual menu. To show a symbol without using the dialog, simply drag the object into the diagram from the Browser or another diagram. If you drag the symbol from another package or model, a shortcut to the object will be created in the destination model.

## Understanding Automatic Link Completion

The following rules apply to the display of link objects in the diagram window.

### General Rules

Object	Check box	Result in the diagram...
Link	Selected	Objects at both ends are automatically displayed
Any	Deselected	Link objects attached to the hidden object are automatically hidden
Non link	Selected	Link objects attached to the displayed non link object are automatically displayed if their other ending object is already displayed

### CDM Special Behavior

Object	Check box	Result in the diagram...
Association	Selected	Entities and association links attached to the displayed association are automatically displayed
Association link	Selected	Entities and associations attached to the displayed association link are automatically displayed
Inheritance	Selected	Entities (parent and children) and inheritance links attached to the displayed inheritance are automatically displayed
Inheritance link	Selected	Entities (parent and children) and inheritance attached to the displayed inheritance link are automatically displayed
Parent entity	Deselected	Inheritances for which the hidden entity is the parent are automatically hidden

## Finding a Symbol in the Diagram from an Object List

You can locate any object in a diagram from an object list using the PowerDesigner Find feature.

1. **Model > Object type** .
2. Select an object in the list.

An arrow is displayed at the beginning of the line.

3. Click the Find Symbol in Diagram tool.

The symbol is selected and centered in the diagram window. To see the symbol, you have to move the list dialog box.

When an object has several symbols within a model, a symbol selection dialog box is displayed that lets you select an object symbol among all instances of the object within the model diagrams. When you click OK the symbol is selected and centered in the current diagram window. To see the symbol, you have to move the list dialog box.

---

**Note:** You can also find the symbol of an object in a diagram by right-clicking the object in the Browser and select Find in Diagram (or, for an RQM, Find in Document View) from the contextual menu. The symbol of the object is centered and selected in the diagram window.

---

## Using Composite View to Display Sub-Objects within a Symbol

Many objects (packages, processes, classes, activities, states, EAM objects, etc.) have the capability to display sub-objects within their symbols through one or more *composite view* modes. Depending on the type of object, the sub-objects can be displayed either as a static sub-diagram within the symbol or as dynamically editable symbols that you can create and arrange directly from the parent diagram.

To toggle between the different composite view modes, right-click a symbol and select **Composite View** and then one of the following commands:

- None - display the parent symbol only without any sub-objects
- Read-only (Sub-Diagram) - display sub-objects in a non-editable sub-diagram that can be resized as necessary. To access the sub-diagram, press CTRL and double-click the symbol
- Editable - allow the creation and arrangement of sub-objects directly within the symbol in the parent diagram.
- Adjust to read-only view - resizes the symbol to display all the objects in the read-only view.

---

**Note:** Not all modes are available for all objects that support composite view. Certain objects (for example, processes in the BPM) must be decomposed before you can access composite view.

---

For information about the specific objects supporting composite view, see the appropriate modeling guide.

## Symbol Format Properties

You can change the format of symbols in the Symbol Format dialog.

You may arrive at the Symbol Format dialog when changing the format of:

- One or more individual symbols – select the symbols and then press **Ctrl+T**, select **Symbol > Format**, or **Format** from the contextual menu.
- All symbols - via display preferences (see *Display Preferences* on page 289).
- Custom symbols defined for extensions – see the "Extending Your Models with Profiles" chapter of *Customizing and Extending PowerDesigner*.

---

**Note:** When defining the format of custom symbols in the Resource Editor, each tab in the Symbol Format dialog contains two additional options, **Apply format to symbols**, and **Allow**

**users to modify symbol format**, which allow you to control the default format of symbols and whether users can modify them to a very fine degree. For more information on these options, see *Controlling the Format of Custom Symbols* on page 195.

---

The following sections list the tabs and properties available in this window.

### **Size Tab**

The Size tab controls the size of the symbol and how the size can be manipulated:

<b>Property</b>	<b>Description</b>
Current size	Specifies the width and height (in pixels) for the symbol.
Normal size	[read-only] Specifies the default width and height (in pixels) for symbols of this kind.
Auto-adjust to text [CTRL+J]	[Default] Auto-resizes the width of the symbol to display all the text it contains up to 254 characters (mutually exclusive with Keep size). For example, a table symbol adjusts its size to display full column names, or column codes, up to the truncation or word wrap length. You can define default adjustment to all symbols.  If you manually resize a symbol, this option is disabled for the symbol.
Keep aspect ratio	Maintains the ratio of height to width when resizing the symbol.
Keep center	Maintains the center position of the symbol when resizing it.
Keep size	Prevents the resizing of symbols both manually and through Auto-adjust to text (mutually exclusive with Auto-adjust to text).

### **Line Style Tab**

The Line Style tab controls the color, size and format of lines (for link and other one-dimensional symbols) and borders (for two-dimensional symbols, such as classes or tables). You can modify the line style of any symbol in the model.

<b>Property</b>	<b>Description</b>
Color	Specifies the color of the line or border.
Width	Specifies the thickness of the line or border.
Style	Specifies the format of the line or border, such as invisible, solid, dashed or dotted.
Corners	[Link and line symbols only] Specifies the format of corners, such as sharp or rounded right-angles and free angles.

Property	Description
Arrow	[Link and line symbols only] Specifies the format of the link or line symbol at its Beginning, Center, and End.
Use perpendicular arrow	[Link and line symbols only] Specifies that the link or line object always touches objects at its ends at a right angle. This option allows you to use free angles for the body of a link or line object, while retaining a connection at right angles for its beginning and end.

---

**Note:** These options may be overridden by the design semantics of a link symbol (such as a PDM reference).

---

### **Fill Tab**

The Fill tab controls the color, content, and effects for symbol filling.

Fill effects	Description
Fill color	Specifies the color to use for the fill.  The Fill color check box is available for free symbols, packages, interaction fragments, and swimlanes, and when cleared will create a transparent symbol. This can be useful when you wish to use an "in-box" UML representation, for packages for example.  Note that transparent objects can only be selected by clicking near their borders.
Image	Specifies a graphic file to display within the symbol. Click the <b>Modify</b> button to select a file.
Display Mode	Specifies the alignment of the image within the symbol.
Gradient	Specifies the gradient fill options. Click the <b>Modify</b> button to open a dialog allowing you to control Start and End colors, End Color Luminosity, Shading Style and Gradient Mode.

### **Shadow Tab**

The Shadow tab allows you to add a standard, 3D effect or gradient shadow to objects in a diagram.

### **Font Tab**

The Font tab allows you to define the display preferences for the font, size, style, and color of text associated with symbols in the model. When you modify font preferences, they apply to all existing and new symbols.

## Text Alignment Tab

The Text Alignment tab allows you to define the alignment of text in text boxes and rectangles, ellipses, rounded rectangles, and polygons.

**Note:** You can only control the text alignment for these shapes, and not for model object symbols. When working with RTF, all the options but Vertical are disabled.

Parameter	Description
Center	Centers the text horizontally and vertically.
Word wrapping	Auto-wraps text in the symbol.
Horizontal	Aligns text to the left, center, or right on the horizontal axis.
Vertical	Aligns text to the top, center, or bottom on the vertical axis

## Custom Shape Tab

The Custom Shape tab allows you to define a new symbol shape for most non-link symbols.

Property	Description
Enable custom shape	Enables or disables the customization of a symbol shape
Shape Type	<p>Specifies the type of shape to be used. Choose one of the following values, and then click the <b>Browse</b> button to select an image (see <i>Browsing for Images</i> on page 196):</p> <ul style="list-style-type: none"><li>• Predefined symbol - Default shape assigned to symbols in PowerDesigner.</li><li>• Metafile (EMF, WMF) - Representation using geometrical formulas allowing for resizing and stretching.</li><li>• Bitmap (DIB, RLE, JPG, JPEG, TIF, TIFF, PNG) - Representation of a graphics image consisting of rows and columns of dots.</li><li>• Icon (ICO) - Small picture representing an object, usually smaller than standard PowerDesigner symbols.</li></ul>
Shape Name	List of the available shapes of the selected type. Click the <b>Browse</b> button to select shapes.
Display name	Specifies where the symbol name should appear (Center option is not available for icon shapes)

## Content Tab

The Content tab allows you to specify the information that you want to display on the symbol. The properties that are listed on this tab as being available for selection are controlled by the content display preferences (see *Content Display Preferences* on page 294).

## Sub-Objects Tab

The Sub-Objects tab is only available when you open the Format tab after having selected a single object. It allows you very fine control over the sub-objects (such as PDM table columns or OOM class attributes and operations) that you want to display inside your object symbol. For each individual sub-object, you can decide whether to display it or not, and what font to use for its display.

---

**Note:** For a collection of sub-objects to be available for selection and customization here, the collection must be selected for display in the object's content display preferences (see *Content Display Preferences* on page 294). Where the number of lines to display for a collection is limited in the display preferences, that limit will take precedence over any choices you make here.

---

Each collection of sub-objects that is enabled in the display preferences has its own sub-tab. For each sub-object, you can:

- Select to display or hide it in the parent object symbol by selecting or deselecting its checkbox in the **[D]isplay** column.
- Apply a specific font to its display by clicking the **Select font tool** or the ellipsis button in the **Specific Font** column.

---

**Note:** When not all sub-objects in a collection are selected for display, the parent object symbol will display ellipses to indicate that more items are available.

---

## Controlling the Format of Custom Symbols

When defining custom symbols for your object extensions, you may want to enforce certain aspects of the symbol format, while allowing users some liberty to change other aspects. If you access the Symbol Format dialog from a custom symbol in the Resource Editor, you can control the default format options for the symbol, and whether users can edit them, on a per-tab basis.

For example, you could extend the PDM table metaclass with a criteria to specify a custom symbol with a red border for tables that are anticipated to contain more than 1m records. You may want to enforce this border style for all such tables while allowing users to change the font, size, content, and other aspects of the symbol format.

For information about extending objects and creating custom symbols for them, see the "Extending Your Models with Profiles" chapter of *Customizing and Extending PowerDesigner*.

When you access the Symbol Format dialog from a custom symbol in the Resource Editor, the following additional options are available at the top of each tab:

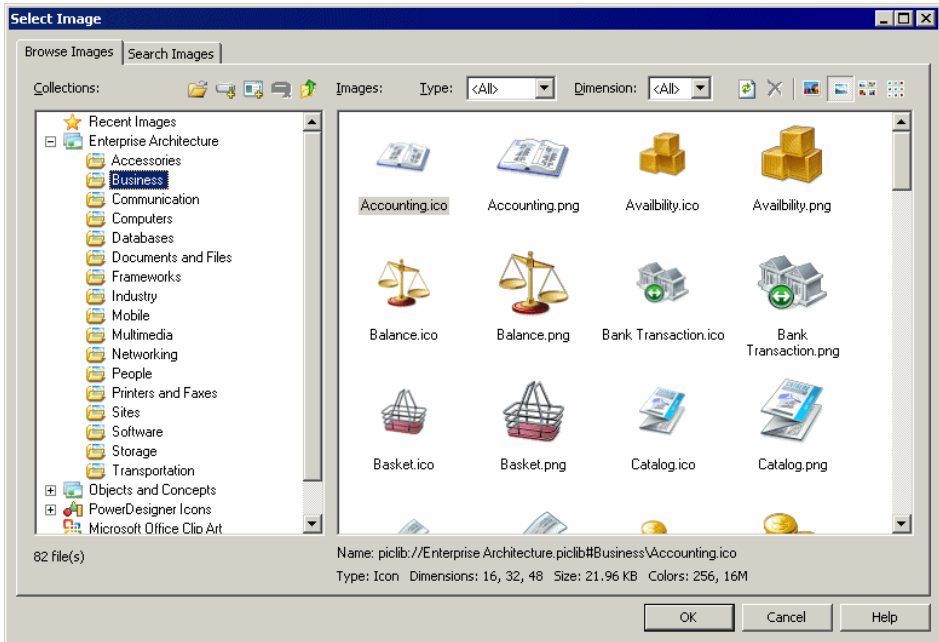
Option	Description
Apply <i>format</i> to symbols	<p>Specifies that the format options on the tab will be applied to custom symbols at creation time or whenever the appropriate criteria are met or the specified stereotype applied.</p> <p>If this option is not selected, the standard display preferences for the format options on the tab will be applied and users are free to modify them.</p>
Allow users to modify symbol <i>format</i>	<p>Specifies that users can modify the format options for the symbol and that any changes that are made will be respected in the event that the definition of the custom symbol is updated.</p> <p>If <b>Apply format to symbols</b> is selected and this option is unselected, then the format options specified on this tab cannot be changed by the user.</p>

## Browsing for Images

The Select Image dialog lets you manage the images that you use in your model diagrams, and to insert them into your models as object symbols, diagram backgrounds, etc.

1. Open the Select Image dialog in any of the following ways:

- From the Symbol Format dialog **Custom Shape** tab, click the **Enable Custom Shape** check box, and then click the **Browse** button next to the **Shape type** property (see *Symbol Format Properties* on page 191).
- From the Symbol Format dialog **Fill** tab, click the **Modify** button in the **Fill Effects** group box (see *Symbol Format Properties* on page 191).
- Right-click a diagram symbol and select **Change Image**.
- Select **Edit > Import Image** (see *Importing and Exporting Model Graphics* on page 203).





2. Click a collection in the **Collections** pane to display its available images in the **Images** pane. You can add folders to the **Collections** pane by clicking the **Add Directory** tool.
3. [optional] In the **Images** tab, select an image type and/or dimension to filter by from the **Type** and **Dimension** lists.
4. Select an image and click **OK** to return to the Symbol Format dialog or to display the image in the diagram.




**Browse Images tab tools**

The Browse Images tab contains tools to help you manage images:

**Collections Pane**







The Collections pane displays a list of your image collections, and contains the following tools:

Tool	Description
	Open Image File - Lets you browse to an image file to select it directly without passing by an image collection.
	Add Directory – Adds a directory to the list of collections. When you add a directory, any sub-directories containing images are also added along with any intermediate directories required to represent the directory tree.

Tool	Description
	Add Executable or DLL - Adds an executable or DLL and all the images associated with it to the list of collections.
	Remove Directory, Executable, or DLL – Removes a directory from the list of collections. Predefined directories, such as Recent Images or Microsoft Office Clip Art cannot be removed.
	Up – Moves up a level in the collections tree.

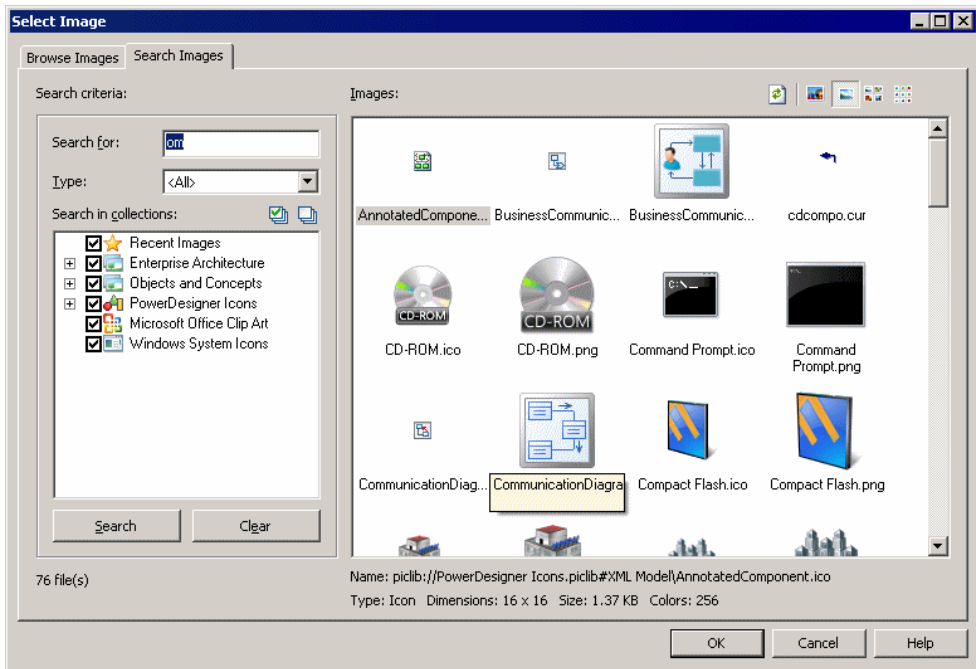
### Images Pane

The Images pane displays the images available in the selected collection, and contains the following tools:

Tool	Description
Type	Filters images by type, such as PNG, Bitmap, Cursor, etc.
Dimension	Filters images by dimension, such as 16, 48, 128, etc.
	Refresh Preview – Refreshes the list of available images.
	Delete Recent Image – Deletes a selected recent image.
	Extra Large Icons – Displays images as extra large icons.
	Large Icons – Displays images as large icons.
	Medium Icons – Displays images as medium icons.
	Small Icons – Displays images as small icons.

## Searching for an Image

You can search for images among your collections on the **Search Images** tab of the Select Image dialog.



1. Specify the appropriate search criteria in the **Search Criteria** pane. You can specify:
  - **Search for** – Enter all or part of a filename to search against. Wildcards are automatically applied so that for example, entering "ec" will return an image named "vector.png".
  - **Type** – Select the type of image to search for, such as PNG, Bitmap, Cursor, etc.
  - **Search in collections** – Specifies the scope of the search by selecting or deselecting collections to search in.
2. Click the **Search** button to display the result of the search in the Images pane.
3. Select an image in the **Images** pane, and click **OK** to return to the Symbol Format dialog or to display the image in the diagram.

The **Clear** button resets the search criteria to the default values.

## Working with Decorative Symbols









Decorative symbols have no technical meaning in your diagram, but help make it more readable. You can use them to surround parts of a model, for example, to distinguish domains of activity.

### Drawing a Rectangle

You can draw a rectangle using the Rectangle tool in the Palette.

1. Select the Rectangle tool in the Palette.
2. Click at the point in the diagram where you want to insert one corner of the rectangle, hold the mouse button, and drag to where you want to place the alternate corner.
3. Release the mouse button to create the rectangle.
4. [optional] Click on and drag a handle to resize the rectangle.

The following tools are available:

Tool	Description
	Line
	Arc
	Rectangle. Press ctrl while drawing to create a square.
	Ellipse. Press ctrl while drawing to create a circle.
	Rounded Rectangle. Press ctrl while drawing to create a rounded square.
	Polyline - Release the mouse button at each point where you want to create a corner. Right click to finish.
	Polygon - Release the mouse button at each point where you want to create a corner. Right click to finish and close the polygon.
	Title Box - A diagram title box retrieves from the model properties and displays such information as: the model and the package to which the diagram belongs, the name of the diagram itself, the author and version of the model and the date of modification.  If no Author is specified in the model property sheet, the user name specified in the Version Info page is used.  You can choose to display the repository version number of the model or a user-defined version number on the Title display preferences page.

---

**Note:** After creating certain shapes, you can modify the type of corner by right-clicking and selecting **Format > Line Style** and selecting a type in the Corners list. You can also define a default style for corners in the display preferences of graphic shapes.

---

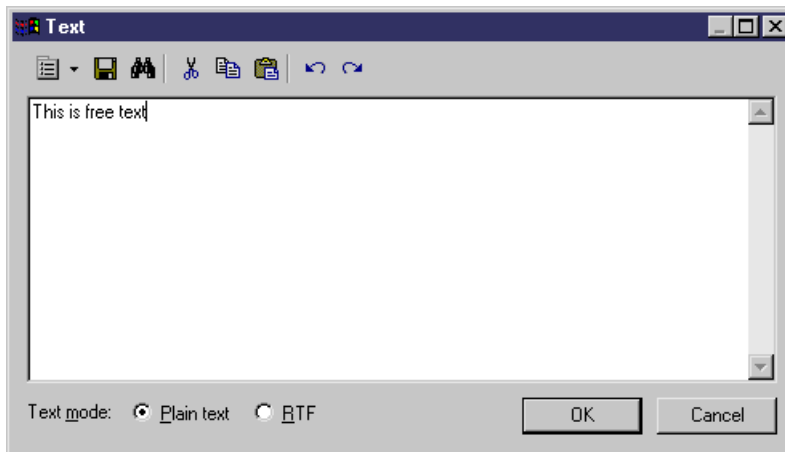
## Working with Textual Symbols

*Free text* is text that is not associated with an object in the model. For example, a note that you type in a rectangle is free text, (while a column name is not). You can insert free text in your model independently of any shape, and can select and move it like any symbol.

1. Click the Text tool in the palette, and then click in the diagram where you want to insert the text. A symbol saying <Default text> is created.

<Default  
text>

2. Double-click the text to open a text input window.



3. Type text in the window, and then click OK.

### Inserting Text into Shapes

You can insert text inside any graphic shape. This text is attached to the shape and will move with it. If you change the fill color of the shape, the text also changes.

1. Double-click a shape in the diagram to open a text input window.
2. Type text in the window, and then click OK.

### Assigning Text to Free Links

You can assign text to lines and polylines in the diagram to document links between object symbols. The text is attached to the line. If you move the line, the text moves with it.










You can format the text attached to free links using the Symbol Format dialog box available from the contextual menu of the link. The same format is applied to each text zone.










1. Double-click a line or a polyline in the diagram to open the Link Symbol Text dialog box to the Center Text tab. There are also tabs that allow you to add text to the Source and Destination ends of the line.
2. Type the appropriate text in the appropriate tabs and then click OK

### **Formatting Free Text**

Free text and text in graphic shapes support two modes. These are selectable at the bottom of the text input window:

- Plain text - text formatting is controlled by the display preferences for Free Symbols
  - RTF (Rich Text Format) – text formatting can be controlled directly in the text input window
1. Create a free text object and double-click it to open a text input window
  2. Select the RTF radio button at the bottom of the text input window to enter RTF editing mode.
  3. Use the RTF tools listed below, or click the Format tool to open the Text Format window. This window has three tabs:
    - Font – including style, size, effects, color and background
    - Paragraph- including indentation, spacing, and alignment
    - Tabs – including positioning and alignment
  4. When complete, click OK to return to the diagram

Tool	Function
	Editor Menu
	Launch External Editor
	Save
	Print
	Find
	Cut
	Copy
	Paste
	Undo

Tool	Function
	Redo
	Open Format Menu
	Bold
	Italic
	Underline
	Align Left
	Align Center
	Align Right
	Bullets

## Importing and Exporting Model Graphics

You can import graphics to and export graphics from your PowerDesigner models.

To import an image into PowerDesigner, select **Edit > Import Image** to open the Select Image window (see *Browsing for Images* on page 196), select an image and click **OK** to display it in the diagram. Imported images are saved in the model.

To export one or more symbols from PowerDesigner, select them in the diagram and then click **Edit > Export Image** to open a Save As dialog, select a format in the **Save As Type** list, enter the filename and click **OK**.

You can export symbols in any of the following file type formats:

File type	Extension
Enhanced Metafile	EMF
Bitmap	BMP, DIB, RLE
JPEG Compliant	JPG, JPEG
Portable Network Graphic	PNG
Graphics Interchanged Format	GIF
Tagged Image File Format	TIF, TIFF

File type	Extension
Scalable Vector Graphics	SVG

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**Note:** If you export symbols or cut or copy them to the Clipboard, you must select **Edit > Export in Color** to retain them in color.

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## CHAPTER 6 Reports

Reports allow you to publish information about your model, and can be used to provide documentation for your system.

You can create the following types of report:

- A *model report*—documents the contents of a model, listing all or a selection of its objects, and showing how they are associated with one another. Listed in the browser within the Reports folder beneath its parent model, and saved with the model. See *Creating a Model Report* on page 205.
- A *list report*—documents a single object type, and can help you to see, for example, the type of each table in a physical data model (PDM). Listed in the browser within the List Reports folder beneath its parent model, and saved with the model. See *Creating a List Report* on page 216.
- A *multi-model report*—documents one or more models, and can help you to see, for example, to which table in a physical data model (PDM) an entity in a conceptual data model (CDM) corresponds. Listed in the browser as a top-level object, and saved as a *.mmr* file. See *Creating a Multi-Model Report* on page 223.

### Creating a Model Report

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There are two steps to creating a PowerDesigner model report:

- *Define the contents and format of the report*—PowerDesigner provides a variety of ways to define model reports:
  - *Standard Report Templates*—to generate a model report directly, without any configuration. See *Creating a Report with a Report Template* on page 206.
  - *The Report Wizard*—to easily control the generation of a model report with minimal intervention. See *Creating a report with the Report Wizard* on page 206.
  - *The Report Editor*—to have full control over the content and format of your reports. See *Creating a report with the Report Editor* on page 214.
- *Generate the report*—PowerDesigner supports generating reports in HTML or RTF, or will print them directly. See *Generating a model report* on page 215

You can combine these methods as necessary. For example, you could create an initial report with a standard template, refine your selection of objects with the wizard, and then fine-tune formatting in the editor.

## Creating a Report with a Report Template

The easiest way to create a model report without any configuration is to use one of the standard model report templates. These allow you to generate a report directly in HTML or RTF format, without specifying objects or formats.

The following standard templates are available:

- *Full <Model Type> Report*– provides lists of all the types of objects in the model, together with detailed information on each object.
- *List <Model Type> Report*– provides lists of all the types of objects in the model.
- *Standard <Model Type> Report*– provides lists of all the types of objects in the model, together with detailed information on each of the main objects.

You can also create your own report templates (see *Report Templates* on page 255).

Report templates are available in the Generate Report window. To generate a report using a template, see *Generating a model report* on page 215.

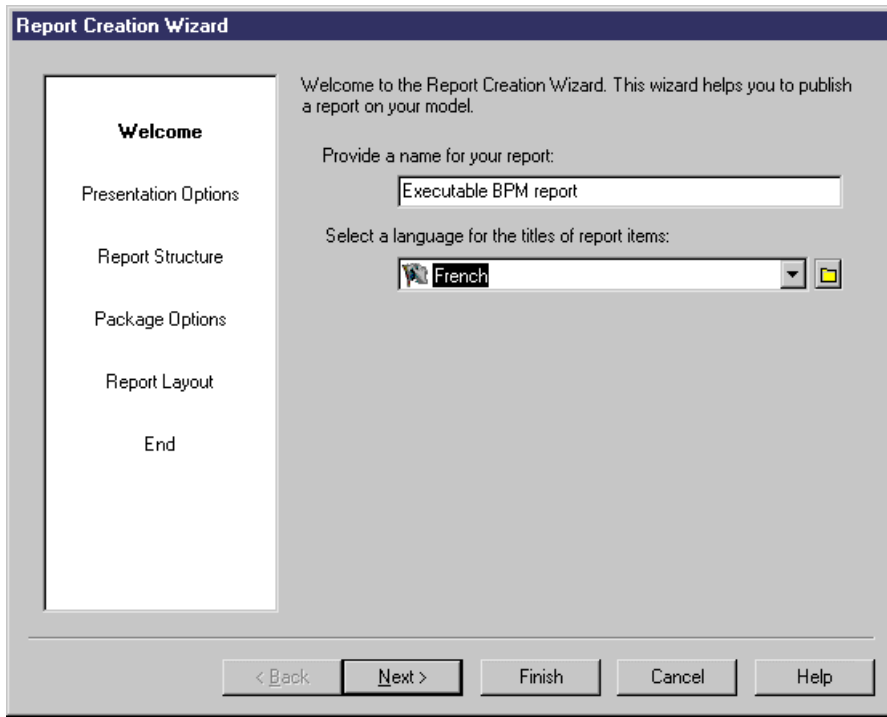
## Creating a Report with the Report Wizard

The Report Wizard is an easy way to select which objects will appear in your report, and to control their formatting.

You can complete as much of the Wizard as you want. At each step, you click Next to advance to the next stage, or Finish to exit the wizard and create a report based on your selections so far.

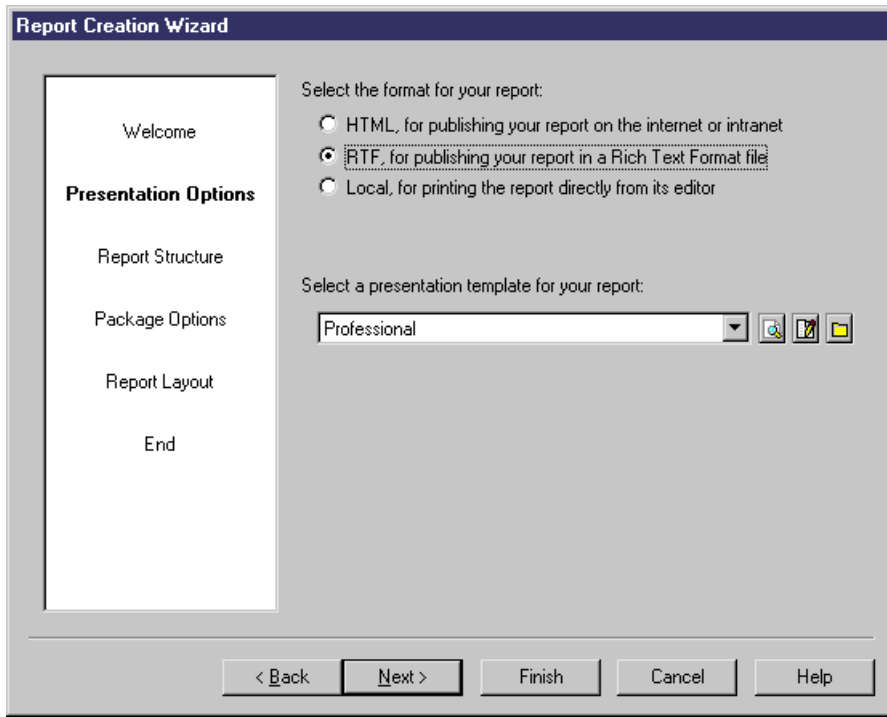
The Report wizard can be launched from your model, to create a new report, or from the Report Editor window of an existing report.

1. Select **Report > Report Wizard** (or select **Report > Reports**, and then click the Report Wizard tool) to launch the wizard:



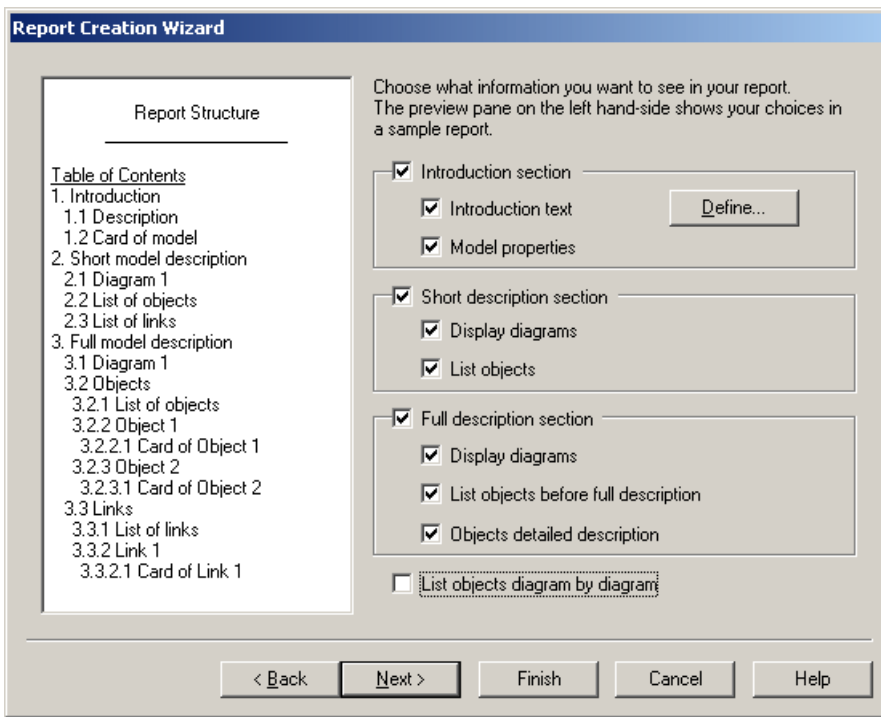
2. The Welcome page allows you to specify a name for the report and the language in which you want its titles to appear. Note that this page is not displayed if you launch the wizard from the Report Editor.

When you are satisfied, click Next:



3. The Presentation Options page allows you to specify a format for your report. You can choose between:
- *HTML*, for publishing your report on the internet or intranet – you can additionally select, and preview, a presentation template using the tools to the right of the template field.
  - *RTF*, for publishing your report in a Rich Text Format file – you can additionally select, preview, and edit, a presentation template using the tools to the right of the template field.
  - *Local*, for printing the report directly from its editor.

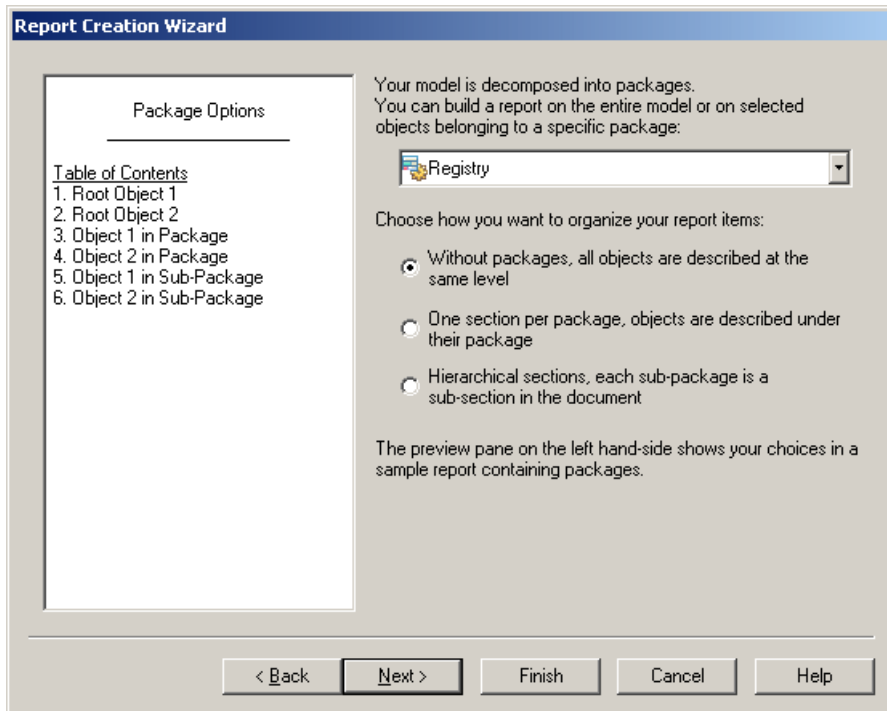
When you are satisfied, click Next:



4. The Report Structure page allows you to specify the kinds of information that will appear in your report. The preview pane on the left hand-side displays a sample report that changes dynamically according to your selections. You can select any or all of the following options:
- *Introduction section* – specifies an introduction sub-heading, preceded by a page break. Makes available the following sub-options:
    - *Introduction text* - Text paragraph. Click the Define button to open an editor.
    - *Model properties* - Model card
  - *Short description section* – specifies a short description section sub-heading, preceded by a page break. Makes available the following sub-options:
    - *Display diagrams* - [not for RQM] Diagram book, Graphics, Diagram description, Diagram annotation
    - *List objects* - List item for each object type in the model
  - *Full description section* – specifies a full description section sub-heading, preceded by a page break. Makes available the following sub-options:
    - *Display diagrams* - [not for RQM] Diagram book, Graphics, Diagram description, Diagram annotation
    - *List objects before full description* - Title item and list item for each object type
    - *Objects detailed description* - Book item for each object type
  - *List objects diagram by diagram* - [not for RQM] Diagram book - Instead of a flat display of object types, it allows you to display objects sorted by diagram in which they

are displayed. Global objects, such as business rules for example do not belong to a diagram but to the whole model, and therefore are listed under a specific Title book.

When you are satisfied, click Next:



5. The Package Options page is displayed only if your model contains packages, and allows you to control the treatment of packages within the report. The preview pane (on the left hand-side) changes dynamically in order to preview your selection. You can select whether to base the report on the entire model or on a sub-package, and then choose between the following options:

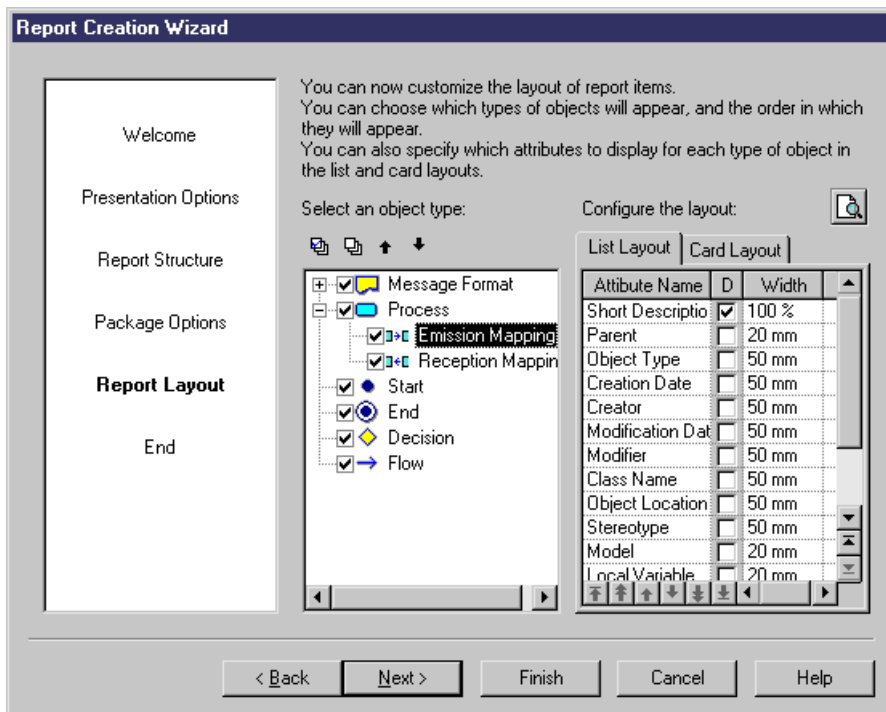
- *Without packages, all objects are described at the same level* [not available for HTML or an RQM] – Lists all the objects together on the top level, whether or not they belong to a package.
- *One section per package, objects are described under their package* [not available for HTML or an RQM] – Groups objects by the package to which they belong.
- *Hierarchical sections, each sub-package is a sub-section in the document* - Groups objects by the package to which they belong, and groups packages beneath their parents to recreate the package hierarchy.

Note that:

- Global objects (such as business rules) are always included, even when you select a package.

- Composite objects (such as activities, or processes in an OOM) are always displayed in an Hierarchy, even if you have selected a different package option.

When you are satisfied, click Next:



6. The Report layout page allows you to select the types of object to include in the report and to configure the layout of the object lists and cards.

To specify the inclusion of an object type, select its checkbox in the list. The list includes only those objects that are present in the selected model or package. Click on the plus sign to the left of an object to reveal and select or deselect its sub-objects.

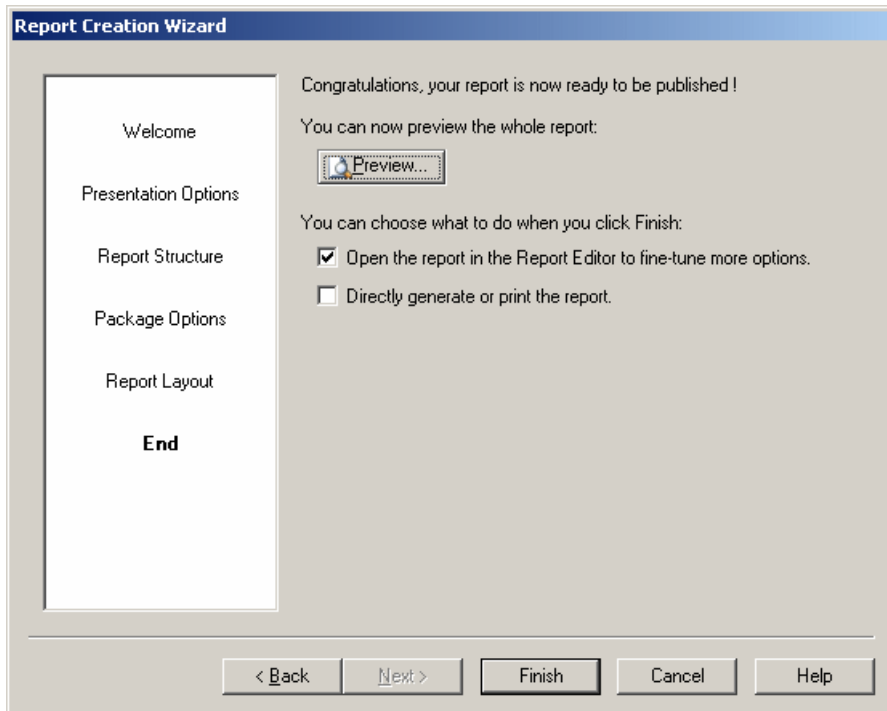
Stereotypes used as metaclass display in the list of object types, below those of their parent object (see *Reporting on stereotypes as metaclasses* on page 213).

The Select All and Deselect All tools are available above the list. You must select at least one object type to proceed with the wizard. The Move Up and Move Down tools allow you to promote or demote the position of an object (though child object types cannot be moved beyond the scope of their parents).

7. Select an object type in the object type list, and the click the List Layout or Card Layout tab in the right-hand pane to configure its display. These tabs list the object attributes that can be displayed in the report. The following parameters are available:

- *Attribute Name*– You can use the arrows at the bottom of the list to promote or demote the attribute in the list
- *D[isplayed]*– Select the checkbox to enable the display of the attribute
- *Width* [List Layout only] – Each attribute selected for display will be a column in the list. Use this parameter to specify the width of the column either as a percentage or in millimeters.

8. When you are satisfied, click Next:



9. The End page allows you to decide what you will do with your newly created report. Click the Preview button to preview your report in:

- your Browser – for HTML reports
- your RTF Editor – for RTF reports
- the PowerDesigner preview window – for reports to be printed directly.

Before clicking Finish to complete the report creation, you can select one or both of the following options:

- *Open the report in the Report Editor to be able to fine-tune more options*
- *Directly generate or print the report*

When you are satisfied, click Finish to exit the wizard and create the report.

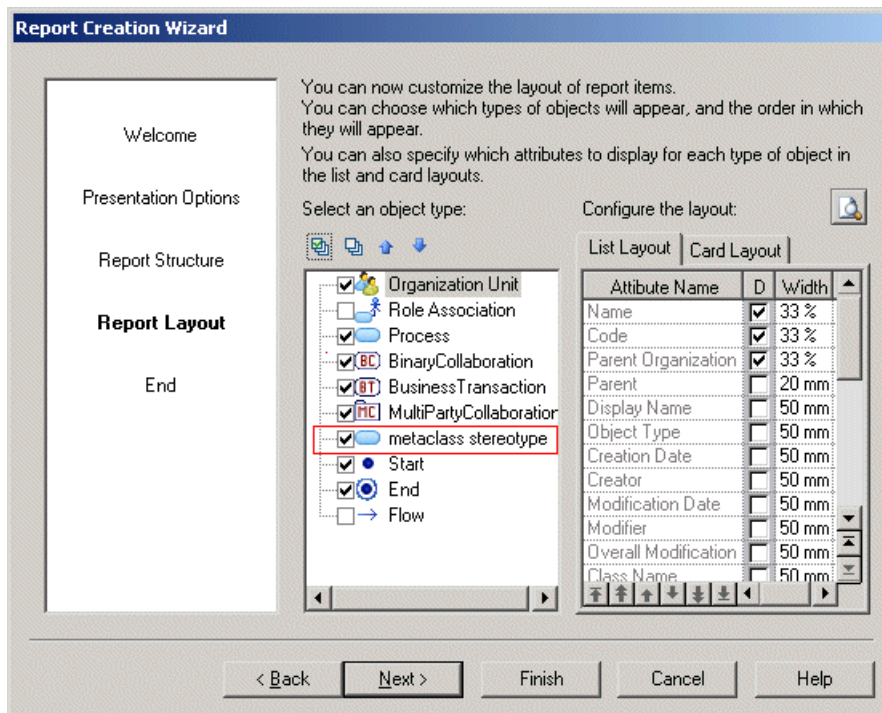
### Reporting on Stereotypes as Metaclasses

When a stereotype is defined as "Use as metaclass" in a language, DBMS or extended model definition, it inherits the attributes of a standard metaclass.

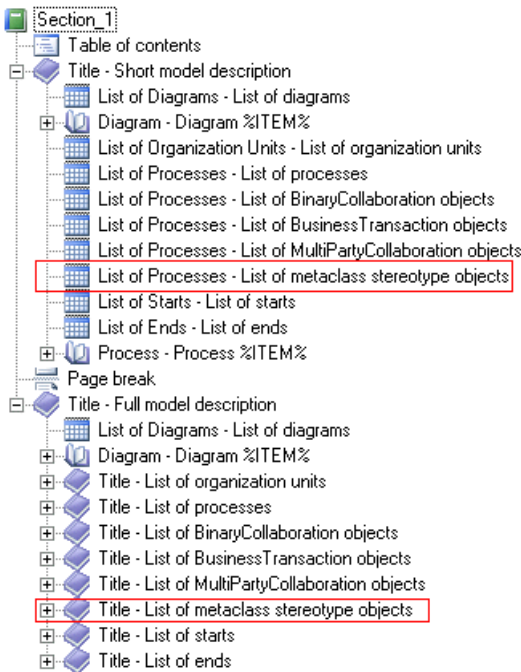
The report wizard support metaclass stereotypes as follows :

- Lists metaclass stereotypes in the list of object types, below the parent object in the Report Layout page.
- Generates a book and a list separately for each metaclass stereotype, below those of the parent object in the Report Editor.

For example, you create a stereotype "used as metaclass" (called metaclass stereotype) in the process language associated with a BPM, then you associate the metaclass stereotype to a process in the diagram and launch the Report Wizard. The metaclass stereotype is listed in the object type list below the parent object in the Report Layout page. Its associated extended attributes if any, are listed in the List Layout and Card Layout tabs.



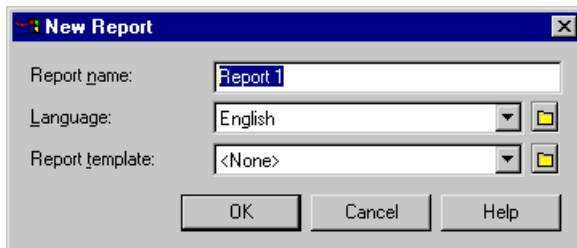
And the generated report shows the list and the book for the metaclass stereotype below those of the parent object in the Report Editor:



## Creating a Report with the Report Editor

The Report Editor gives you complete control over the content and format of your report. You can create a blank report from the List of Reports, open it in the Report Editor, and build it using Report Items.

1. Select **Report > Reports** to open the List of Reports, which shows an alphabetical list of all reports saved in the model.
2. Click the New Report tool to open the New Report dialog box:

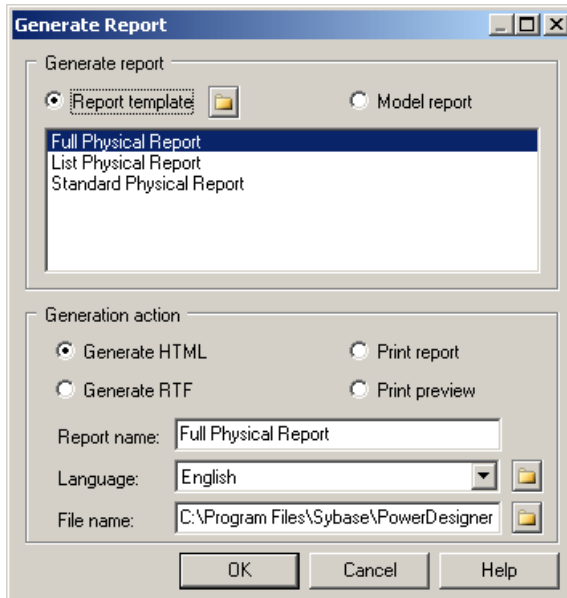


3. Enter a report name, and select a language for the report's titles from the list.
4. [optional ] Select a report template from the list.
5. Click OK to create the report and open it in the Report Editor (see *Using the Report Editor* on page 224).

## Generating a Model Report

The Generate Report window also allows you to access the standard report templates, or templates or reports that you have previously created, and to generate them in HTML or RTF format, or to print them directly.

1. Select **Report > Generate Report** to open the Generate Report window.



2. Select a Generate report option. You can choose from the following options:
  - Report template – PowerDesigner provides standard report templates to select the objects to include in your report and to provide formatting. You can also create your own templates. You can select an alternative folder to look for additional templates by clicking the Browse button to the right of the radio button.
  - Model report – lists any reports that you have previously created in the model.
3. Select the appropriate template or report from the list.
4. Select a Generation action. You can choose from the following options:
  - Generate HTML – Generates a frameset named after the File name field, together with a folder containing the necessary HTML and GIF files. For example MyReport.html would have an associated folder called MyReport\_files.
  - Generate RTF - Generates a Rich Text Format file named after the File name field.
  - Print report – Opens the Windows Print window to allow you to directly print the report.

- Print preview – opens the print preview window, from which you can choose to print the report, or to generate it as HTML or RTF.
5. [for HTML or RTF only] Specify a report name and file name for the generated file.
  6. Specify the language in which to generate the report.
  7. Click OK to begin the generation. The Generation action specified above will be performed.

---

**Note:** If you want to quickly generate a report that you have already defined, and which is visible in the Browser, right-click its Browser entry, and select Print, **Generate > RTF**, or **Generate > HTML** from the contextual menu.

---

## Creating a List Report

---

A *list report* documents a single object type within a model, and is displayed as a customizable list with columns and rows that you can filter as necessary.

You can create snapshots (called *result sets*) of a list report to keep a history of the execution of a list report in your model. Result sets are listed in the browser beneath their parent list report, and are saved with the model. For more information, see *Creating Result Sets* on page 221.

A list report is saved in the model and can be exchanged between models of the same type.

You can also right-click a list report in the Browser and select **Generate > Format**.

You can right-click a list report in the Browser and select Preview to preview the list report before printing. You can also right-click a list report in the Browser and select Print without previewing the list report.

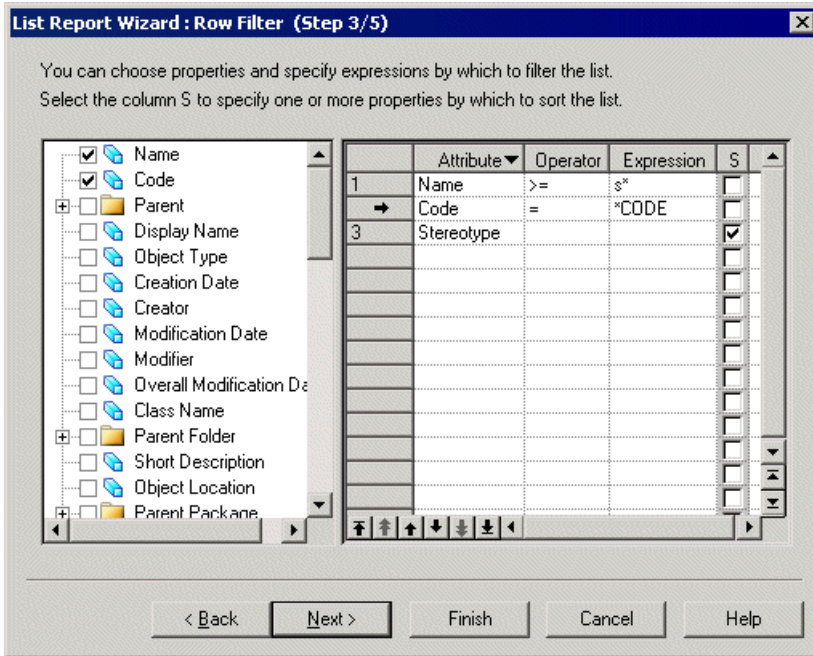
You can create a list report in any of the following ways:

- Select **Report > List Report Wizard** to launch the List Report Wizard. You can complete all the steps or click the Finish button at any time after having selected an object type for the report.
  - Select **Report > List Reports** to access the List of List Reports, and click the Add a Row tool.
  - Right-click the model, package or object category in the Browser, and select **New > List Report**.
1. Select **Report > List Report Wizard** (or select **Report > List Reports** and click the List Report Wizard tool in the toolbar) to launch the Wizard:



- The Column Filter page allows you to specify which of the object's properties will be included in the list report. Select a property in the left-hand pane to add it to the list in the right-hand pane. You can promote or demote properties in the list using the arrows at the bottom of the pane.

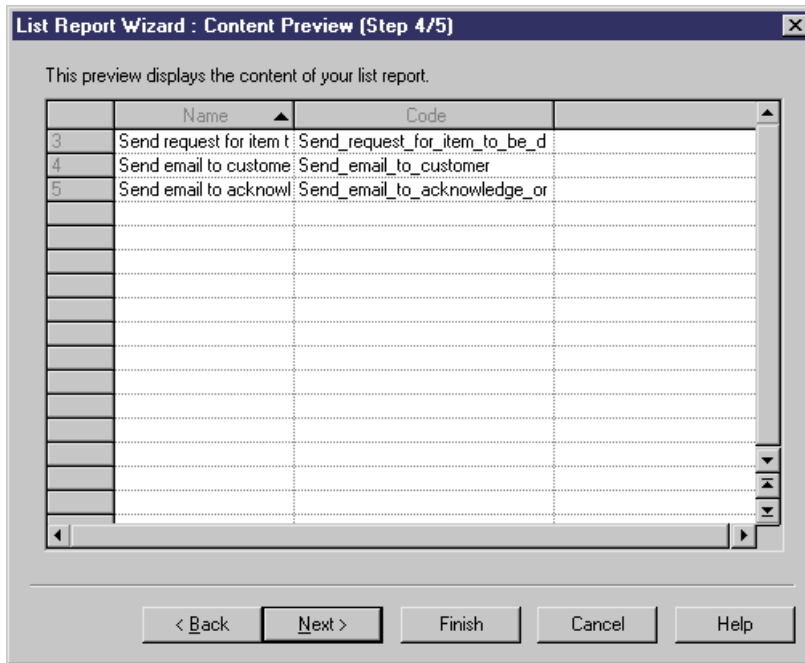
When you are satisfied, click Next:



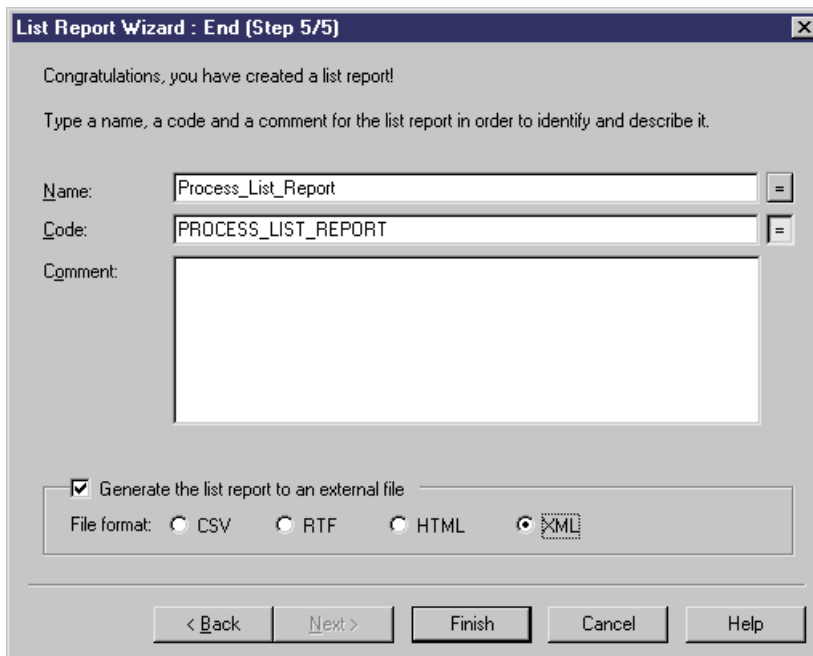
- The Row Filter page allows you to specify filters to restrict the objects that will be included in the list report. Select a property in the left-hand pane to add it to the list in the right-hand pane, select an operator, and then enter an expression to filter by. You can specify to sort the list on the values of a property by selecting the S[ort] checkbox.

For more information about the operators and the expression syntax, see *Defining a Filter Expression* on page 120.

When you are satisfied, click Next:



- The Content Preview page allows you to visualize the results of your choices so far. To alter the definition click the Back button. Otherwise, click Next:



6. The End page allows you to specify a name and code for the list report, and to add a comment. You can also specify whether to generate the report to an external file.

Click Finish to exit the wizard. If you have selected to generate the report to an external file, you will be asked to specify a file name.

The list report is added to the model and listed in the Browser under the List reports folder

## **List Report Properties**

You can modify an object's properties from its property sheet. To open a list report property sheet, double-click its Browser entry in the List Reports folder or in the List of List Reports. By default, the property sheet of a list report always opens on the Content tab.

The General tab contains the following properties:

<b>Property</b>	<b>Description</b>
Name	Specifies the name of the list report.
Code	Specifies the code of the list report.
Comment	Descriptive comment for the object.
Object type	Specifies the type of the object the list report will be based on. You must select an object type to have any content in your list report.
Model or Package	Specifies the model or package from which the objects will be drawn. Package selection is unavailable for global objects such as users.
Include shortcuts	Specifies whether the list report includes shortcuts.
Include sub-packages	Specifies whether the list report includes sub-packages. This option is unavailable for global objects such as users.

## **Column Filter Tab**

In the Column Filter tab, you can choose the object properties to be used as column titles in the list report and the order in which they will be displayed.

## **Row Filter Tab**

The Row Filter tab lists the filters that restrict the rows included in the list report. Select a property in the left-hand pane to add it to the list in the right-hand pane, select an operator, and then enter an expression to filter by.

You can specify to sort the list on the values of a property by selecting the S[ort] checkbox. For more information about operators and expression syntax, see *Defining a Filter Expression* on page 120.

## Content Tab

The Content tab displays the current values for the list report. Properties selected in the Column Filter tab are displayed as column headings and property values in rows must satisfy filter expressions defined in the Row Filter tab.

You can open the property sheet of any object included in the list report by clicking the Properties tool.

Note that data displayed in the Content tab does not dynamically change when you perform a change to your model that may affect your list report. To update the Content tab, you must click the Refresh List Report tool.

Use the generation tools to generate a list report result set as a CSV, RTF, HTML, or XML file.

## Result Sets Tab

The Result Sets tab lists the result sets stored for the list report. Use the generation tools to generate a list report result set as a CSV, RTF, HTML, or XML file.

## Creating Result Sets

A result list is a snapshot of the content of a list report at a given system date and time. You can create as many result sets as you want for the same list report, in order to keep a history of a given list report for future reference.

You can create a result set in any of the following ways:

- Open the property sheet of a list report, click the **Result Sets** tab, and then click the **Create Result Set** tool.
- Right-click a list report in the Browser and select **New > List Report Result Set** from the contextual menu.

Result sets are stored within the model and display under the list report to which they are related in the Browser:



## Result Set Properties

You can modify an object's properties from its property sheet. To open a result set property sheet, double-click its Browser entry in the List Reports folder just beneath the list report to which it applies. The following sections detail the property sheet tabs that contain the properties most commonly entered for result sets.

The General tab contains the following properties:

Property	Description
List Report	Name of the list report to which the result set applies.
Report Date	Date and time when the result set was created.
Comment	Descriptive comment for the result set that allows you to identify it.

The Content tab shows the contents of the result set. Use the generation tools to generate the result set as a CSV, RTF, HTML, or XML file.

## Generating a List Report

You can generate a list report to a CSV, RTF, HTML, or XML file

- Right-click the list report in the Browser and select *Generate Format* .
- Open the property sheet of the list report, select the Content tab, and click the *Generation Format* tool.
- Select **Report > Generate List Report** to open the Generate List Report dialog box.




You can right-click a result set in the Browser and select Preview to preview the result set before printing. You can also right-click a result set in the Browser and select Print without previewing the result set.

## Importing and Exporting List Report Files

It can be useful to exchange list report files between models of the same type. For example, you may want to compare the properties of a certain subset of classes in two OOMs. You can import and export list reports to and from your model using the List of List Reports.

To open the List of List Reports, select **Report > List Reports**.

The following tools are available on the List of List Reports:

Tool	Description
	List Report Wizard - Launches the List Report Wizard (see <i>List Reports</i> on page 216).
	Import List Report from File - Opens a standard Open dialog, which allows you to browse to the list report file to import. A list report file has a .LRT extension.
	Export List Report to File - Opens a standard Save As dialog, which allows you to browse to the location to save the list report.

## Creating a Multi-Model Report

A *multimodel report (MMR)* is a PowerDesigner report that can document any number of models together and show the links between them. To create such a report, you must have at least one model open in the workspace, and you can add additional models at any time.

1. Select **File > New Model** to open the New Model dialog box.
2. Select Multi-Model Report.

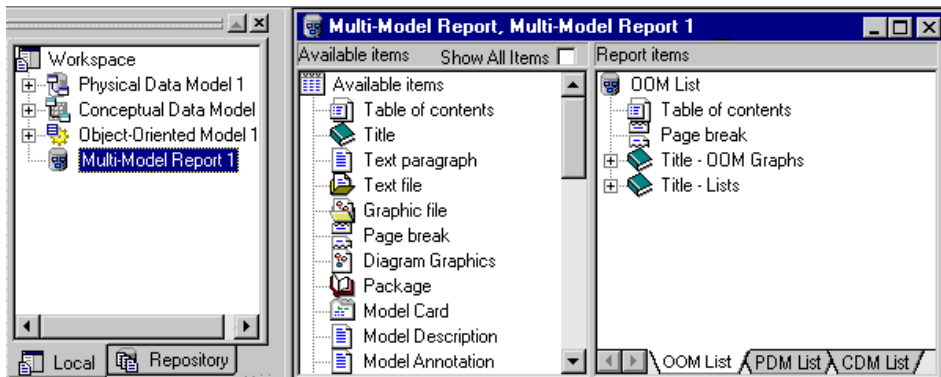
This option may be in the left or right hand pane, depending on the configuration of your New Model dialog (see *Creating a Model* on page 12).

3. Enter a name for the report, specify a language, and select a model from the Model Name list as the basis for the first section of the report.
4. [optional] Select a template (see *Creating a Report with a Report Template* on page 206) from the Report Template list.

**Note:** When you use a template in a language different from the one specified for the report, only user-defined items such as Title or Text paragraph will retain the language of the template. Other items will be displayed in the report language.

5. Click OK to create the multi-model report.

The report opens in the Report Editor, and is added to the Browser:



6. Select **File > Save** to save your report.

**Note:** If you want to quickly generate a multi-model report from an existing one without modifying it, right-click a multi-model report node in the Browser and select **Print** or **Generate > RTF** or **Generate > HTML**.

## Adding a Second Model to a Multi-Model Report

It is perfectly acceptable to create a multi-model report that contains only one model, but in the majority of cases, you will want to add additional models.

Each model in the report belongs to a separate "section", which can be accessed via the tabs at the bottom of the Report Editor window (see *Report Properties* on page 247).

You can only add models that are currently open in the workspace to the report. However, once a model has been added, you can edit the report even if the source model has been closed.

1. Open the multi-model report, and select **Report > Report properties** to open its property sheet.
2. Click the Sections tab, and click the Add a Row tool.
3. In the Model column, select the model you want to add from the list.
4. In the Sections column, enter the name that you want the model to have in the Report Editor.
5. Click OK to return to the Report Editor (see *Using the Report Editor* on page 224).

## Configuring a Multi-model Report with the Report Wizard

You can use the Report Wizard to configure a multi-model report. The wizard works on a single section at a time, and will delete any content currently in the section.

1. Open the multi-model report, and select the section you want to work on by clicking the appropriate tab at the bottom of the Report Editor window.
2. Click the Report Wizard tool in the Reports toolbar to launch the Report Wizard, and follow the procedure in *Creating a report with the Report Editor* on page 214.

## Generating a Multi-model Report

You can generate a multi-model report from within the Report Editor by clicking one of the Generate <format> tools on the Reports toolbar.

Alternatively, you can right-click the multi-model report entry in the Browser, and select **Generate > <format>** from the contextual menu.

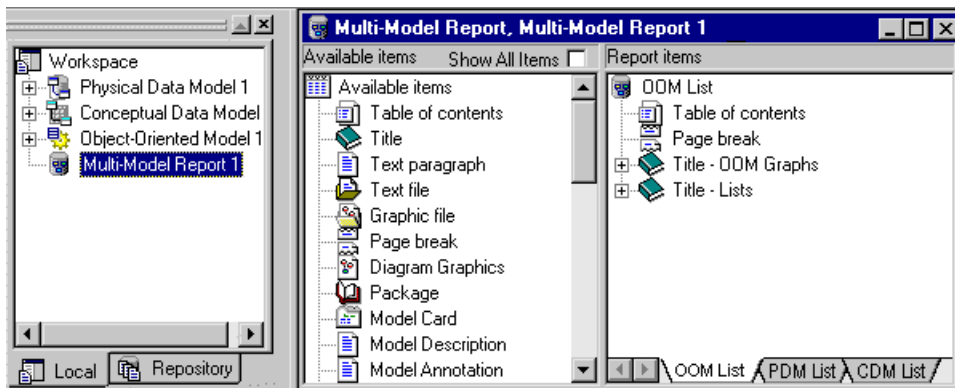
## Using the Report Editor

You can edit model reports, multi-model reports, and report templates in the Report Editor. It displays the structure of the report or template as a tree view.

The Report Editor window contains two panes:

- The Available Items pane (left pane), from which you can select items to include in the report.

- The Report Items pane (right pane), in which you add the items that compose your report. It can also be filled with the items of a template that you select at the creation of your report.













By default, the Available Items pane displays only the report items that correspond to objects that exist in the current model. For example, if you have not created any interfaces in your OOM, then the List of Interfaces and Interface book will not be listed. Select the Show All Items check box at the top of the Available Items pane to display all the report items available for this kind of model.

By default, in the Multi-Model Report Editor, all available report items are displayed if the associated model is not open in the workspace.

## Report Toolbar

The following tools are available from the Report toolbar:

Tool	Description
	Report Wizard - Opens the Report Wizard (see <i>Creating a report with the Report Wizard</i> on page 206).
	Print Preview - Displays a report print preview (see <i>Previewing your Report</i> on page 227)
	Print - Prints the report.
	Generate RTF - Generates the report as an RTF file.
	Generate HTML - Generates the report as an HTML file.
	Add Item - Adds an item to the Report Items pane.

Tool	Description
	Up One Level - Moves item up one level.
	Down One Level - Moves item down one level.
	Raise Level - Moves item at the same level as the book item (item that contains other items) that precedes.
	Lower Level - Moves item within the book item that follows.

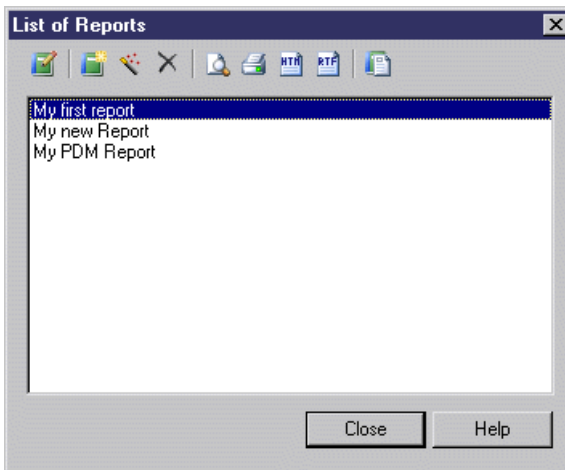
For information about managing toolbars, see "Toolbars" in the Models.

## Opening a Report in the Report Editor

You can open and edit any existing report in the Report Editor.

For information about creating a report, see *Creating a Model Report* on page 205.

1. Select **Report > Reports** to open the List of Reports.



2. Select the report you want to modify and click the Edit Report tool to open it in the Report Editor.

---

**Note:** If you want to quickly generate a report from an existing one without modifying it, select a report in the List of Reports then click the Print Report, Generate HTML, or Generate RTF tool.

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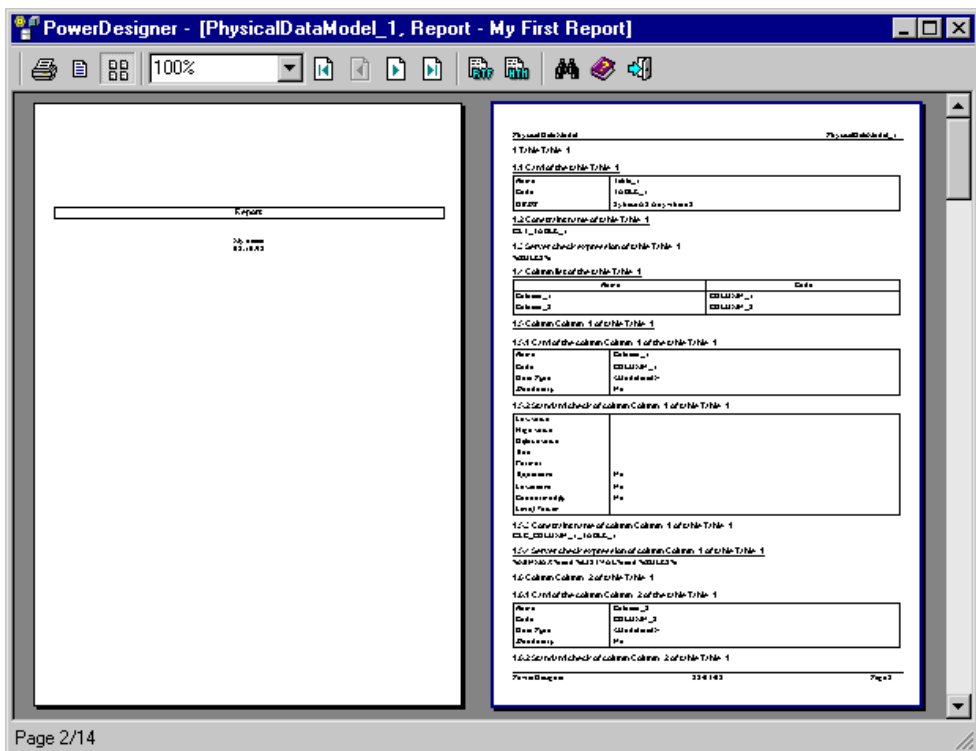
## Previewing Your Report

You open the Print Preview window from the Report Editor or from the End page of the Report Creation Wizard.



**Note:** You can preview a report item by right-clicking it in the Report Items pane and selecting Quick View.











### Opening the Preview

You can display a preview from the Report Editor or from the Report Creation Wizard. Select **Report > Print Preview** or click the Preview tool in the End page of the Report Creation Wizard to open the Print Preview window:



The following tools are available in this window:

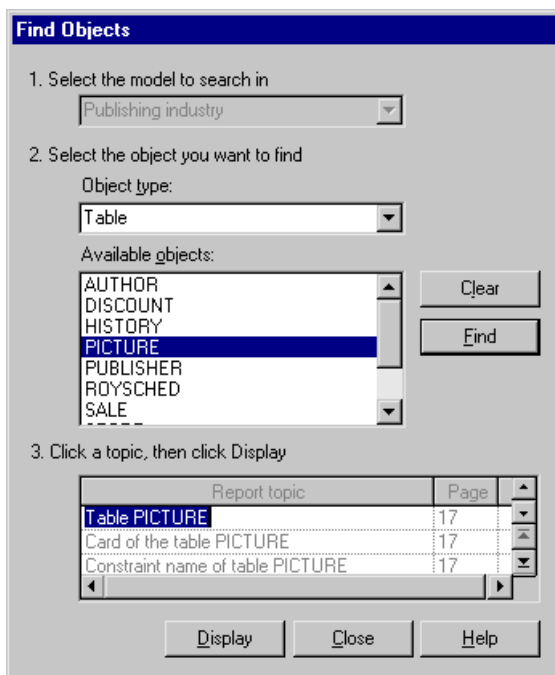
Tool	Goes to preview
	Print the report.
	Preview the report one page at a time.

Tool	Goes to preview
	Display the report two pages at a time.
	Go to the first page.
	Go to the previous page.
	Go to the Next page.
	Go to the Last page.
	Generate the report in HTML format.
	Generate the report in RTF format.
	Open the Find Objects dialog.
	Help
	Close the preview.

### **Finding Objects in the Preview**

You can search for mentions of specific objects in your report.

1. Click the Find tool to open the Find Objects dialog.
2. [multi-model reports only] Select the model you want to search in.
3. Select an object type and an available object, and then click the Find button to display a list of topics that mention the object.



4. Select a topic in the list and click the Display button to navigate to that topic in the preview.

## Saving a Model Report

Reports are saved with the model to which they belong.

---

**Note:** To reduce the size of your model, you can create its report as a multi-model report, which is saved to a separate file. For more information, see *Creating a Multi-Model Report* on page 223.

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## Adding Items to a Report

The Available Items pane of the Report Editor lists the items that you can add to your report.

You can add an item to the Report Items pane in any of the following ways:

- Double-click the item in the Available Items pane to place it below the currently selected item in the Report Items pane.
- Drag the item from the Available Items pane and drop it at the desired position in the Report Items pane. Use the ctrl or shift key to select multiple items. If the pointer becomes a barred circle, that means the drop target is unauthorized. Note that you can drag and drop an item only when the Report Items pane already contains at least one item.
- Right-click the item in the Available Items pane and select Add from the contextual menu

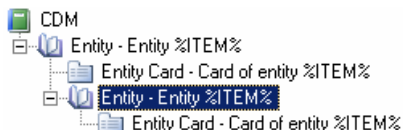
The following kinds of report items are available:

Icon	Description
	Table of contents – Inserts a table of contents. PowerDesigner automatically inserts a following page break.
	Title - Free text to introduce what is next.
	Paragraph – the following types are available, depending on the context: <ul style="list-style-type: none"> <li>• Text paragraph – free text that can be inserted anywhere</li> <li>• Description – contents of the Description sub-tab of the Notes tab of the model or object property sheet</li> <li>• Annotation – contents of the Annotation sub-tab of the Notes tab of the model or object property sheet</li> <li>• Other – text paragraphs are available as necessary to display code preview, scripts, validation rules, etc</li> </ul>
	Text file – Inserts the contents of a text file, selected via a file chooser.
	Graphical file - Inserts the contents of a graphics file, selected via a file chooser.
	Page break – Inserts a page break. Right-click the inserted item and deselect Generate in HTML to disable it when generating HTML reports.
	Card – Inserts a table listing the properties of the model or package. Right-click the item after insertion and select Layout to control the properties listed (see <i>Controlling the layout of card report items</i> on page 245)
	List - Inserts a table listing the objects of a given type belonging to the model or another object. Right-click the item after insertion and select Layout to control the properties listed (see <i>Controlling the layout of list report items</i> on page 244)
	Graphics – Inserts an image of a diagram.
	Book – Inserts a set of sub-items to report on a particular type of object. May contain cards, lists, text items, graphics, and other books as necessary.  When you add a book item to a report, you automatically add its dependent items. You can delete any dependent item that you do not need.

When you add an item to the Report Items pane, the item remains in the Available Items pane. You can insert the same item several times in the same report contents.

Notes:

- Composite objects - BPM processes can contain other processes, OOM activities can contain other activities, and CDM entities can contain other entities. Such composite object hierarchies are not included by default in the report, but you can display them by adding a second instance of the appropriate report item inside the first. In the following example, the second Entity book is added inside the first Entity book to display child entities inside their parent entities:



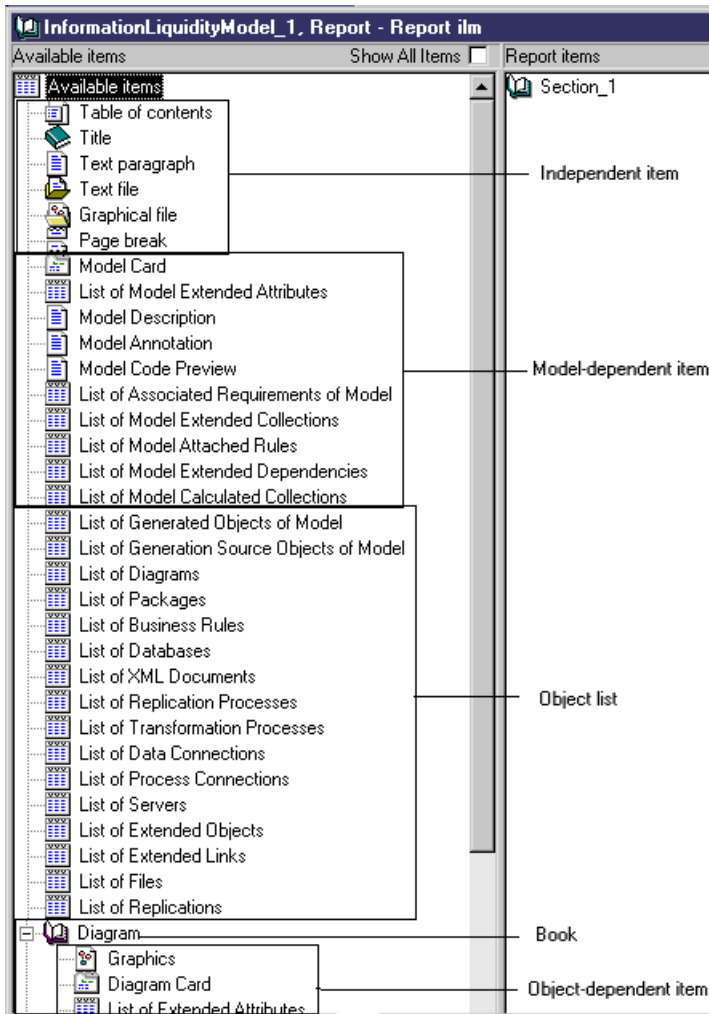
- Package and composite object hierarchy - When you add a package or composite object to a report, you can select the Hierarchical Display command in the item contextual menu to display the package or composite object hierarchy in the generated report. You do not need to use this command when you generate for an HTML report, as HTML reports always provide a hierarchical display.
- Drag and drop between reports - You can drag and drop items between reports of the same type. If you simply drag and drop an item from one report to another without pressing any key, you move the item from one report to another. You can copy an item by pressing the ctrl key while dragging and dropping it. The report in which you want to drop the item must already contain at least one item.

---

**Note:** When you generate an HTML report that contains a diagram graphic and the object cards of the symbols, hyperlinks are created between the diagram symbols and the corresponding object cards. You can click a symbol in the diagram to access the object card that corresponds to it in the HTML page.

---

In the following example, the Available Items pane lists report items available for an Information Liquidity Model (ILM), divided into independent items, and those that provide model- and object-specific information:



## **Modifying Items in the Report Items Pane**

You can move items in the Report Items pane by dragging and dropping them.

To copy an item, hold down the ctrl key while dragging it. You can copy any item within the Report Items pane except for the root folder. Any formatting applied to the copied item is preserved. When you copy a book item, you also copy its dependent items.

## **Contextual Menu**

The following actions are available by right-clicking items that you have added to the report in the Report Items pane:

Command	Description
Show Title	Controls the display of the item title in generated reports.
Show Book Title in HTML TOC	[book items] Controls the display of the book item title in the table of contents of HTML reports.
Show Contents in HTML TOC	[book items] Controls the display of the sub-item titles in the table of contents of HTML reports.
Up	Moves the item up one line in the tree.
Down	Moves the item down one line in the tree.
Raise Level	Moves the item up one level in the tree.
Lower Level	Moves the item up one level in the tree.
Format	Opens the dialog allowing you to modify the formatting of the item (see <i>Formatting textual report items</i> on page 239 and <i>Formatting graphical report items</i> on page 243).
Layout	[list and card items] Opens a dialog allowing you to modify the layout of the item (see <i>Controlling the layout of list report items</i> on page 244 and <i>Controlling the layout of card report items</i> on page 245).
Collection	[list and book items] Opens a dialog allowing you to define the collection to which the report item will be applied (see <i>Modifying the collection of a report item</i> on page 234).
Selection	[list and book items] Opens a dialog allowing you to refine the selection of objects to which the report item will be applied (see <i>Refining the selection of objects for a report item</i> on page 236).
Edit Title	Opens the item in a dialog allowing you to edit its title (see <i>Modifying the title of an item</i> on page 233).
Delete	Removes the item from the Report Items pane. You can delete any item except the root.
Quick View	Generates a preview of the item (see <i>Previewing your Report</i> on page 227).

### **Modifying the Title of an Item**

Package, object, and object-dependent items all have default titles, and you can insert Title items anywhere in the Report Items pane and as often as you want. You can edit the default text of these report items.

1. Right-click an item in the Report Items pane and select Edit Title to open it in the Editor dialog box.

2. Enter any appropriate changes to the title text. The user-defined check box will be automatically selected. To revert to the default value, clear this check box.
3. [optional] Clear the Show Title check box if you do not want to show the title of the item in the previewed or generated report.
4. [optional] Insert GTL variables that represent the name of the object, its parent, or model, etc at the cursor, by selecting them with the Insert button.
5. [optional] Click the Format button to open the Format dialog box, and select the appropriate formatting.
6. Click OK to return to the Report Editor. The first line of the title is displayed next to the item in the Report Items pane.

---

**Note:** You can edit the default titles of all report items in the report language resource file that is attached to your report. For more information, see the Translating Reports with Report Language Resource Files chapter in the *Customizing and Extending PowerDesigner* book.

---

### **Modifying the Collection of a Report Item**

The Report Editor and the report items contained within it are drawn from the PowerDesigner metamodel. You can extend the metamodel to, for example, add new properties to an existing object (extended attributes), to create new objects (extended objects), and to create new connections between object types (extended and calculated collections and extended compositions).

For more information about these extension mechanisms, see the Extending your Models with Profiles chapter of the *Customizing and Extending PowerDesigner* manual.

While you can report on these new properties, objects, and collections, the collections are not included, by default, in the object book report items in the Available Items pane of the Report Editor and you must reconstruct them yourself. You can add any object list or book inside any other object book to allow you to represent any extended or calculated collection. Since there is no control over the location where you drop report items, and you are responsible for the global consistency of items and collections in your report

---

**Note:** If you create extended or calculated collections in your model and use the Report Wizard (see *Creating a report with the Report Wizard* on page 206) to create your report, the generated report automatically creates a list for each type of extended and calculated collection inside the book item for each affected metaclass.

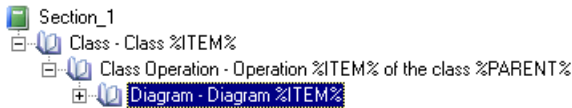
---

Once you have dropped the appropriate item, you can modify its collection and select a calculated or extended collection.

### **Book Item**

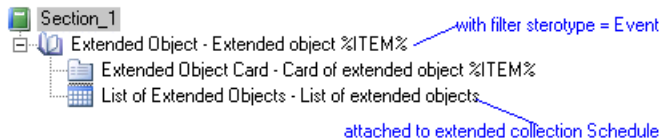
In the following example, a calculated collection has been created on the operations metaclass that retrieves the diagrams where messages using a given operation are displayed. To display

these diagrams in the report, a diagram item must be inserted inside the operation book item and the appropriate calculated collection selected for its collection:



### List Item

In the following example, in order to manage the "schedule" and "event" concepts, the extended object <<event>> has been created, along with an extended collection of extended objects <<schedule>>. The Extended Object report item is added to the report and filtered on the stereotype Event (see *Refining the selection of objects for a report item* on page 236) and the List of Extended Objects is added to the Extended Object book, with its collection set to Schedule:



### Modifying the Collection of an Item

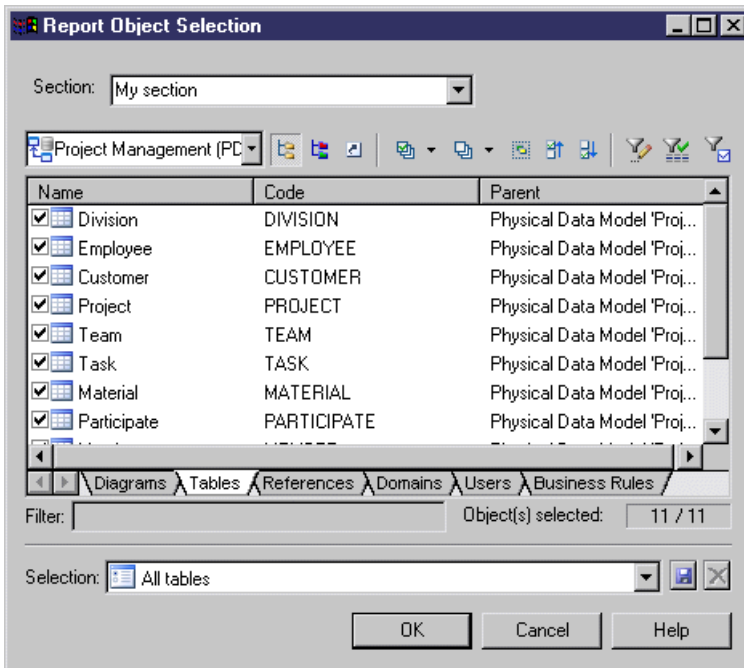
You can change the collection of an item.

1. Drag and drop the appropriate book or list item under the selected book item in the Report Items pane.
2. Right-click the book or the list item and select Collection to display its Collection dialog box.
3. Select a collection in the Collection list and click OK to return to the Report Editor.

### Selecting Objects to Include in the Report

By default, the report includes all the objects in your model. You can restrict the objects included by making a selection, which is saved with the report.

1. Select **Report > Select Objects from** the Report Editor to open the Report Object Selection dialog box. All the objects (except any external shortcuts) are selected by default.



2. Select a report section from the Section list (see *Report Properties* on page 247).
3. [optional] Select a package from the package list.
4. Select the objects that you want to include in the report from each of the object-specific sub-tabs.
5. [optional] Specify a name for your selection in the Selection list and click the Save tool beside the list. The selection is saved as part of the model file (or in the .mmr file for a multi-model report).
6. Click OK to confirm your selection and return to the Report Editor.

For information about the tools in this dialog, see *Adding an Item from a Selection List* on page 122.

### **Refining the Selection of Objects for a Report Item**

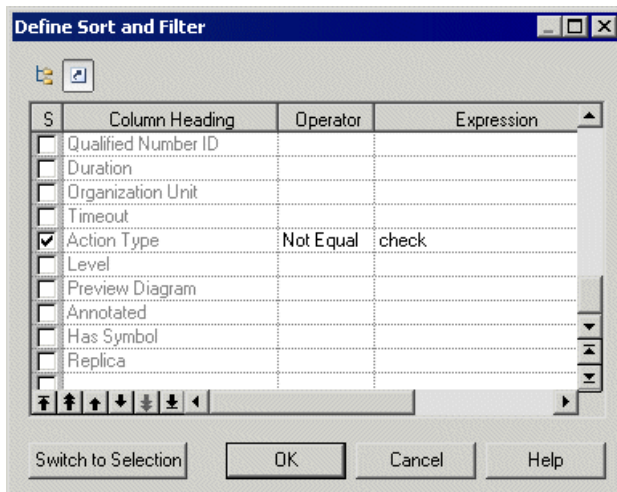
You can refine the selection of objects for individual report items. For example you can have a list of all the tables in your PDM, but you need detailed information about only some of them. You can refine the object selection either by selecting individual objects or by applying a filter. You can also control the ordering of individual objects.

---

**Note:** If you have made a selection of objects at the report level (see *Selecting objects to include in the report* on page 235), objects excluded there will not be available for selection at the report item level.

---

1. Right-click a book or model-dependent list item in the Report Items pane and select Selection (or, for matrix items, right-click the matrix item and select Row Selection or Column Selection) to open the Define Sort and Filter dialog box:

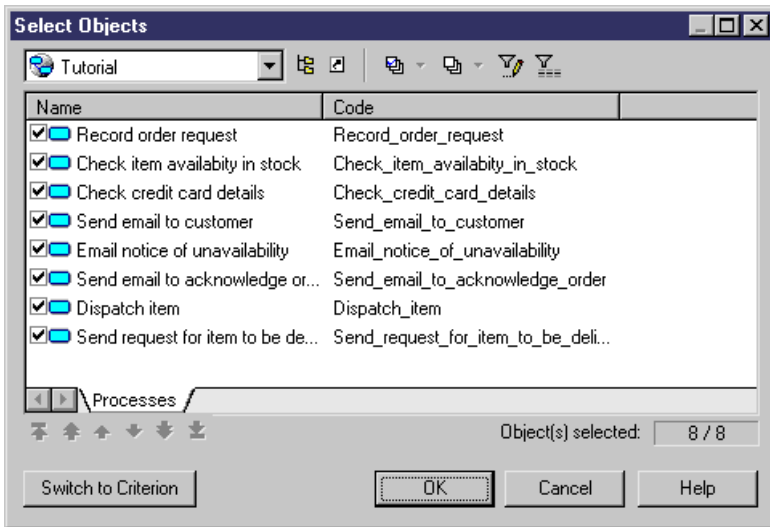


2. [optional] Sort and filter the objects you want to include as follows:
  - Select the S column next to a property to sort by its value
  - Select an operator to apply on the expression value in the Operator column.
  - Enter an expression to filter by in the Expression column, and select the U column to apply the filter to your selection.  
For more information about the operators and expression syntax, see *Defining a Filter Expression* on page 120.
  - Use the arrow buttons at the bottom of the dialog to reorder properties in the list
3. [optional] If you want to refine your selection by choosing from a list of available objects, click the Switch to Selection button in the lower left corner of the dialog box to display the Select Objects dialog box:

---

**Note:** If you click the Switch to Selection button, any information entered in the Define Sort and Filter dialog will be lost.

---



4. Select the objects that you want to include at this place in the report. By default, all the objects are selected. You can reorder the objects in the list by using the arrow buttons at the bottom of the dialog.

---

**Note:** If you define a selection of ordered objects on a package for which have selected the Hierarchical Display command (see *Adding items to a report* on page 229), any reordering you do here is ignored.

---

5. When you are satisfied with your filtering or selection, click OK to return to the Report Editor. Note that only the last of the filter or selection from which you clicked OK will be applied.

## Formatting Report Items

The formatting of your report is highly customizable. You can set default formats and/or create specific formats for individual report items:

---

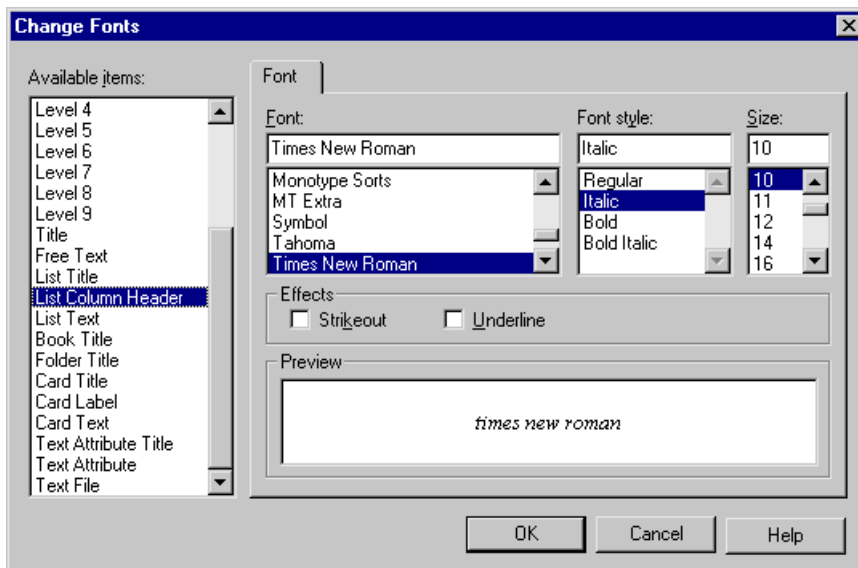
**Note:** Right-click any item and select Format to access its formatting options.

---

### Specifying Default Fonts for Report Items

You can specify default fonts for report items, report templates and reports. The default fonts are saved in the registry.

1. Select **Report > Change Fonts** from the Report Editor window to open the Change Fonts Properties dialog box:

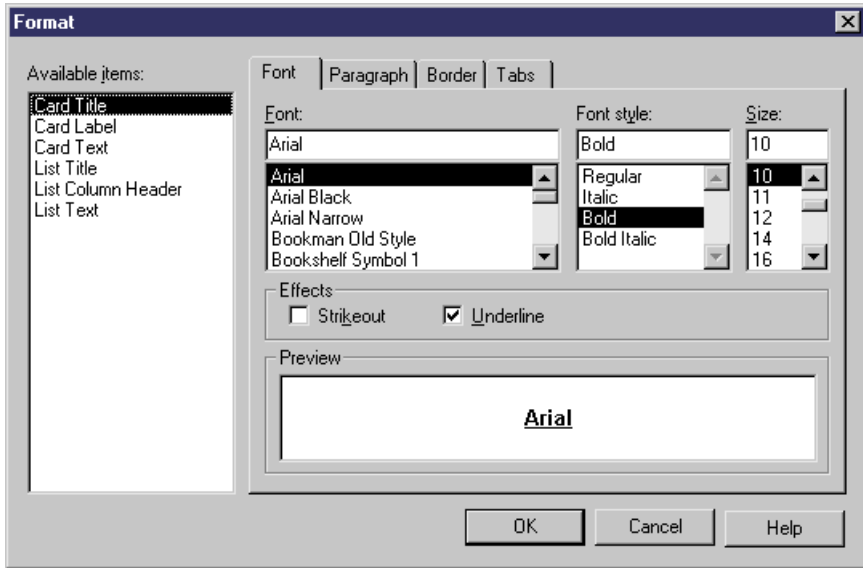


2. Select one or more available items in the left-hand list, and specify a font, style, size, and effects as appropriate.
3. Click OK to return to the Report Editor.

### Formatting Textual Report Items

You can access the report items Format dialog in any of the following ways:

- Select one or more text or list report items in the left-hand Available Items pane, and select **Report > Format** in order to set default formatting for them.  
Each instance of the item that you subsequently add to the right-hand Report Items pane will have this same formatting, but your changes will not affect any report items already in the Report Items pane.
- Select one or more text or list report items in the right-hand Report Items pane, and select **Report > Format** to change their formatting.



### Available Items

Some report items contain more than one text element. You can format each separately or use the ctrl or shift keys to select several at once:

Report Item	Text Selections
Card items	<p>The following selections are available for card items (lists of properties), which are output in table format:</p> <ul style="list-style-type: none"> <li>• Title - Title of the item, eg "Card of the Table"</li> <li>• Label - Property name on a list of properties, eg "Table Code"</li> <li>• Text – Value of a property, eg "EMPLOYEE"</li> </ul>
CRUD Matrix items	<p>The following selections are available for CRUD Matrix items, which are output in table format:</p> <ul style="list-style-type: none"> <li>• Matrix title – Title of the item, eg "CRUD Matrix "</li> <li>• Matrix row and column – Resource and process name, eg " Check item (process name in rows)" and " Stock (resource name in columns)"</li> <li>• Matrix text – CRUD value, eg " RU "</li> </ul>

Report Item	Text Selections
Model- and object-dependent items	<p>The following selections are available for model- and object-dependent items, which are output in text format:</p> <ul style="list-style-type: none"> <li>• Title – Title of the item, eg " Table Description "</li> <li>• Text – Text of the description, annotation, or script, eg "This table describes different employee characteristics "</li> </ul>
List items	<p>The following selections are available for list items, which are output in table format:</p> <ul style="list-style-type: none"> <li>• Title – Title of the item, eg " List of Indexes "</li> <li>• Column Header – Heading of column, eg " Code "</li> <li>• Text – Value in the column, eg " PK_EMPLOYEE "</li> </ul>
Title page	<p>The following selections are available for the title page, which is output in text format:</p> <ul style="list-style-type: none"> <li>• Title – Title of the report, eg "OOM Report"</li> <li>• Optional Fields – Text of the author, date, version or summary, eg " VB, 09.15.99, draft, report with lists only "</li> </ul> <p>For more information about the title page, see <i>Report Properties</i> on page 247.</p>
Table of contents	<p>The following selections are available for the table of contents, which is output in text format:</p> <ul style="list-style-type: none"> <li>• TOC title – Title of the table of contents, eg " Table of contents "</li> <li>• Level <i>x</i> – Text of the different hierarchy levels in the table of contents, eg "2.1 Model information "</li> </ul>

---

**Note:** Select the levels to display from the Show levels list beneath the Available items pane of the Format dialog box. To define the levels to be shown in the TOC of an HTML report, see *Report Properties* on page 247.

---

### **Font Tab**

The Format dialog Font tab allows you to specify a font, style, size, and effects for the text elements that you select in the left-hand Available items list.

### **Paragraph Tab**

The Format dialog Paragraph tab allows you to specify indentation, spacing, and alignment for the text elements that you select in the left-hand Available items list.

## **Border Tab**

The Format dialog Border tab allows you to specify elements of a frame around the text elements that you select in the left-hand Available items list. The following border formatting is available:

<b>Option</b>	<b>Description</b>
Left	Inserts a vertical line to the left of all the occurrences of the selected text elements.
Right	Inserts a vertical line to the right of all the occurrences of the selected text elements.
Top	Inserts an horizontal line on top of all the occurrences of the selected text elements.
Bottom	Inserts an horizontal line at the bottom of all the occurrences of the selected text elements.
Box	[card and list items only] Inserts a rectangle around all the occurrences of the selected text elements.  For card items, inserts a rectangle that groups all the occurrences of Text Label (property names) including Text (corresponding property values).  For list items, inserts a rectangle that groups all the occurrences of Column Header (heading of column, example Code), and also a rectangle that groups all the occurrences of Text (value in the column), if you have previously highlighted each of these text selections in the Available Items pane.
Width	Specifies the line width for the Left, Right, Top and Bottom frame options
Box width	Specifies the line width of the box frame
From text	Specifies the amount of space from text to top, bottom, left, and right border

## **Tab Tab**

The Format dialog Tab tab allows you to specify tab positions and alignment for the text elements that you select in the left-hand Available items list. This formatting is particularly useful for the layout of headers and footers (see *Modifying report section headers and footers* on page 246).

The following tab formatting is available:

<b>Option</b>	<b>Description</b>
Tab stop position	Specifies the measurement for a tab stop
Default tab stops	Specifies the default spacing between tab stops

Option	Description
Alignment	Specifies how text is to be aligned at the tab stop. To change the alignment for an existing tab stop, click it in the Tab Stop Position box, and then click the new alignment option

### **Editing Textual Report Items**

You can edit the text of a text paragraph or a text file in a text editor by double-clicking it or right-clicking it and selecting **Edit**.

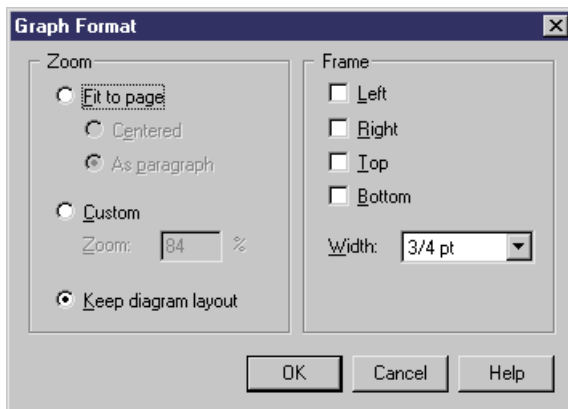
For text paragraphs, you can select the following kinds of content:

- User-defined - Enter text directly into the box. Click the Format button to apply formatting to selected text.
- Object attribute - Select an attribute from the list.

### **Formatting Graphical Report Items**

You can access the report items Graph Format dialog in any of the following ways:

- Select one or more graphical report items in the left-hand Available Items pane, and select **Report > Format** in order to set default formatting for them.  
Each instance of the item that you subsequently add to the right-hand Report Items pane will have this same formatting, but your changes will not affect any report items already in the Report Items pane.
- Select one or more graphical report items in the right-hand Report Items pane, and select **Report > Format** to change their formatting.



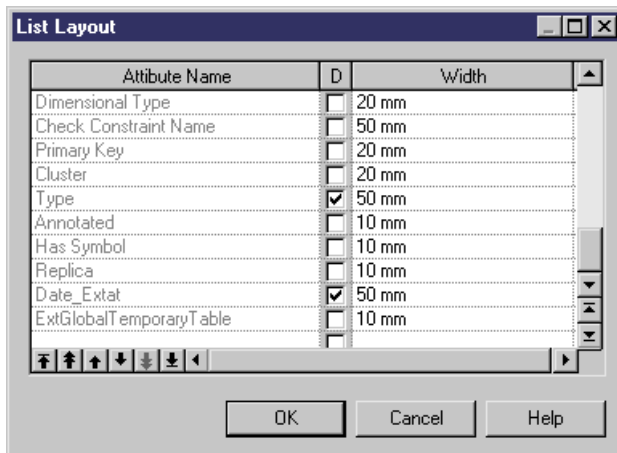
The following options are available in the Graph Format dialog:

Option	Description
Zoom	Specifies the resizing of the graphic in the report. You can choose between: <ul style="list-style-type: none"> <li>• Fit to page</li> <li>• Custom zoom</li> <li>• Keep diagram layout - one page of the diagram per report page</li> </ul>
Frame	Specifies the borders to insert around the graphic.

### **Controlling the Layout of List Report Items**

List report items are published as tables, ordered by the name or code of the objects. You can specify which attributes will be displayed, in which order, and the width of their columns.

1. Select one or more list report items in the Report Items pane and select **Report > Layout** to open the List Layout dialog, which lists all the attributes available for the object:



2. Enter any appropriate layout changes as follows:
  - Use the arrow buttons at the bottom of the dialog to reorder columns in the table.
  - Select the D column next to a property to display it in the table.
  - Enter a width in the width column. You can specify the width in millimeters (mm), inches (in) or as a percentage of the table width.
3. Click OK to return to the Report Editor.

---

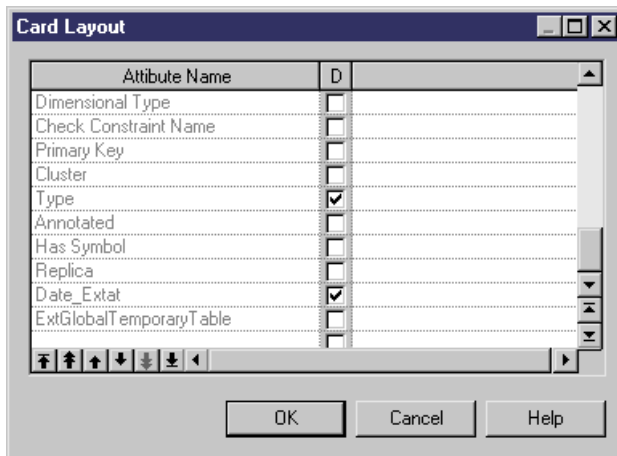
**Note:** If extended attributes are specified for the object, they will be available for selection in the List Layout dialog. You can choose to select all extended attributes or only those whose value has been modified using the **Display > All** and **Display > Only modified ones** commands from the list item contextual menu.

---

### Controlling the Layout of Card Report Items

Card report items represent the property sheets of individual objects and are published as two-column tables. You can specify which attributes will be displayed, and in which order.

1. Select one or more card report items in the Report Items pane and select **Report > Layout** to open the Card Layout dialog, which lists all the attributes available for the object:



2. Enter any appropriate layout changes as follows:
  - Use the arrow buttons at the bottom of the dialog to reorder properties in the table.
  - Select the D column next to a property to display it in the table.
3. Click OK to return to the Report Editor.

---

**Note:** Select the Displayed check box for the Class Name attribute to distinguish shortcuts cards from the other object types cards in the generated report.

---

### Suppressing the Titles of Report Items

You can suppress the title of any item in your report. The following illustration shows a portion of a report, with the title of the process card displayed:

#### 1 Process Process\_1

##### 1.1 Card of process Process\_1

<i>Name</i>	Process_1
<i>Code</i>	Process_1
<i>Comment</i>	

This illustration shows the same report with the title of the process card suppressed:

#### 1 Process Process\_1

<i>Name</i>	Process_1
<i>Code</i>	Process_1
<i>Comment</i>	

Right-click an item in the Report Items pane and deselect the Show Title command.

or

Double-click an item to open the Editor dialog box, clear the Show Title check box, then click OK.

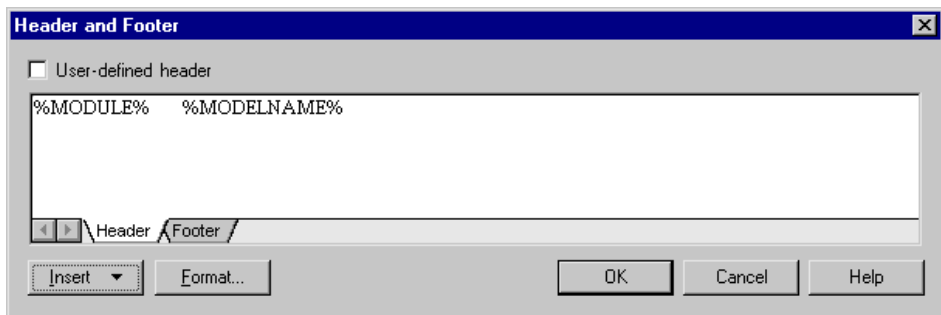
### **Modifying Report Section Headers and Footers**

The Report includes a default header and footer that you can modify.

For more information about the default header and footer, see *Report Properties* on page 247.

For RTF reports, you can specify separate headers and footers for each section of your report (see *Report Properties* on page 247).

1. Right-click the root section item in the Report Items pane and select Header/Footer (or click the Header & Footer button in the Presentation Options page of the Report Creation Wizard) to open the Header and Footer dialog:



2. Enter any appropriate changes to the header text. Edit the Footer text by clicking on the Footer sub-tab. You can use any of the variables available to the RTF template (see *RTF and HTML Report Presentation Templates* on page 252).

If you change the default header or footer text, then the User-Defined check box is selected, to indicate that you have overridden the default values in the associated report language resource file. To revert to the default value, clear the check box. For more information about report language resource files, see the Translating Reports with Report Language Resource Files chapter in the *Customizing and Extending PowerDesigner* book.

**Note:** Use the key combination ctrl+tab to insert tabulations in a header or open the Tabs tab in the Format dialog box (see *Formatting textual report items* on page 239) to set tab stop values.

3. Click OK in each of the dialog boxes.

## Report Properties

To open the report property sheet, select **Report > Report Properties** from the Report Editor window.

The report property sheet General tab contains the following properties:

Property	Description
Name	Specifies the name of the report.
Code	Specifies the code of the report.
Comment	Provides additional descriptive information about the report.
Language	Specifies the language of the report. Click the tools to the right of this field to edit the selected report language resource file or to change the path that populates the list. For more information see the "Translating Reports with Report Language Resource Files" chapter in the <i>Customizing and Extending PowerDesigner</i> manual.
No paragraph numbering	Suppresses section numbers in RTF and printed reports. Paragraph numbering is not used in HTML reports.
Generate empty paragraphs	Generates titles for all book items, even if they have no content.

## Title Page Tab

The report property sheet Title Page tab allows you to specify the contents of a title page for your report:

Property	Description
No title page/ Include title page	Select whether to include a title page. Selecting <b>Include title page</b> enables the other fields on this tab.
Title	Specifies the title of the report. Defaults to the name of the report.
Author	Specifies the report author. Defaults to user shown on the Version Info tab.
Date	Specifies the date of the report. Defaults to the current date.
Version	Specifies the version number of the report. Defaults to the version in the model property sheet.
Summary	Specifies any additional text to be printed on the title page.

Click the Format button to customize the formatting of these fields.

---

**Note:** For HTML reports, a home page is generated instead of a title page (see below). Title pages are never generated for RTF reports generated with a report template.

---

### **RTF Format Tab**

PowerDesigner provides a set of predefined RTF presentation templates, style sheets, and header and footer files for generating RTF reports, which are located in the Resource Files\RTF Report Templates directory. You can use these files as a basis to create your own templates.

The report property sheet RTF Format tab allows you to specify an RTF presentation template for your report, and contains the following properties:

<b>Property</b>	<b>Description</b>
Template	Specifies the RTF presentation template to be used to style the report. Click the tools to the right of this field to edit the selected template (see <i>RTF and HTML Report Presentation Templates</i> on page 252) or browse to an alternate template directory.
Use sections header and footer	Specifies to use the header and footer defined in each report section instead of those defined in the RTF presentation template. If you want to preserve the header and footer of the title page and the one of the table of contents page, you should add a section break after the table of contents.  This option is recommended when formatting a multi-model report, as otherwise all the pages of the report will have the same header and footer.

---

**Note:** Click the **Set As Default** button to specify your current settings as the default for RTF reports. To revert to the previously saved values, click the **Default** button.

---

### **HTML Format Tab**

PowerDesigner provides a set of predefined HTML presentation templates, style sheets and header and footer files for generating HTML reports, which are located in the Resource Files\HTML Report Style Sheets directory. You can use these files as a basis to create your own templates.

The report property sheet HTML Format tab allows you to specify HTML presentation options for your report, and contains the following properties:

<b>Property</b>	<b>Description</b>
Template	Specifies the HTML presentation template to be used to style the report. Click the tools to the right of this field to preview, save, or delete the selected template, or to browse to an alternate template directory.

Property	Description
Style sheet	Specifies the style sheet to be used to style the report as an absolute or relative path or a URL. Click the tools to the right of this field to edit the selected stylesheet (see <i>RTF and HTML Report Presentation Templates</i> on page 252) or browse to an alternate style sheet.
Header / Footer	Specifies the HTML file to be used as the report header or footer as an absolute or relative path or a URL. Click the tools to the right of the field to edit the selected file (see <i>RTF and HTML Report Presentation Templates</i> on page 252) or browse to an alternate file.  You can also specify the height, in pixels, of the header and footer.
Home page	Specifies the HTML file to be used as the report homepage as an absolute or relative path or a URL. Click the tools to the right of this field to edit the selected file (see <i>RTF and HTML Report Presentation Templates</i> on page 252) or browse to an alternate file.
Table of contents	<p>These options control the format of the table of contents. You can specify:</p> <ul style="list-style-type: none"> <li>• <b>Level</b> - the maximum number of levels to display in the HTML table of contents. The default is 4.</li> <li>• <b>Width</b> - the width of the frame as a percentage of the total width of the report window. The default is 25%.</li> <li>• <b>TOC at right</b> - whether the TOC will be generated on the left (default) or right side of the screen.</li> </ul> <p>You can reduce the size of the HTML TOC using the following commands from the contextual menu of book items in the Report Items pane:</p> <ul style="list-style-type: none"> <li>• <b>Show contents in HTML TOC</b> - deselect this option to display only the title of the item without its contents in the TOC.</li> <li>• <b>Show book title in HTML TOC</b> - deselect this option to remove the title of the book item from the table of contents. Automatically deselects the Show contents in HTML TOC option.</li> </ul>
Image Format	<p>Specifies the file format for graphic files to be generated and embedded in the report. You can choose from the following:</p> <ul style="list-style-type: none"> <li>• SVG - XML-based language for Web graphics, which allows you to interact with the graphics. Note that SVG is not supported for graphics embedded in RTF in PowerDesigner property fields, and such graphics will be generated as PNG.</li> <li>• PNG – higher quality than JPEG.</li> <li>• JPEG – smaller file size than PNG.</li> </ul>

Property	Description
List format	Specifies the format for lists. You can specify the number of rows you want to display per page in the list results and the number of links to additional results displayed below the list. Additional results are numbers with hyperlinks to other pages containing the next rows of the list.
Add page break for top level list and cards	Inserts a page break before each top level list and card to avoid long HTML pages.

**Note:** Click the *Set As Default* button to specify your current settings as the default for HTML reports. To revert to the previously saved values, click the **Default** button.

Depending on the type of location (local or UNC paths, or URL), style sheet files, header and footer files and home page files are used as follows:

Location	Use
Local path or UNC path	The file is copied into the report generation folder.
URL	The file is referenced in its location.

We recommend that you gather your style sheets and header and footer files in a subfolder with the same name as the presentation template file with which they are associated to ensure that the structure of links between them is simplified.

For example, the *Header\_Blue.html* header uses files that are gathered in the *Header\_Blue\_files* folder:



## Sections Tab

You can use sections to structure your report. You can create, delete, modify and rename sections in the report property sheet. Each section can only report on one type of model. In a multi-model report, each different type of model (PDM, OOM, BPM, etc) must have its own section.

Reports must contain at least one *section*. Sections are displayed as tabs at the bottom of the Report Items pane of the Report Editor.

The report property sheet Sections tab allows you to create, configure, and delete report sections, and contains the following properties:

Property	Description
Name	Specifies the name of the section, which will be displayed on the sub-tab at the bottom of the Report Editor window.  You can change the name of a section here or by right-clicking the section node in the Report Editor and selecting Rename
Model	[multi-model reports only] Specifies the model on which the section will report.
Template	Specifies the template upon which the section is based. You can choose between: <ul style="list-style-type: none"> <li>• <i>None [default]</i> – creates an empty section.</li> <li>• <i>Full Model Type Report</i> – provides lists of all the types of objects in the model, together with detailed information on each object.</li> <li>• <i>List Model Type Report</i> – provides lists of all the types of objects in the model.</li> <li>• <i>Standard Model Type Report</i> – provides lists of all the types of objects in the model, together with detailed information on each of the main objects.</li> </ul>
Apply Template	Re-applies the specified template to the section, deleting any modifications you may have made.  Note that you cannot undo this action.

---

**Note:** You can launch the Report Wizard from the Report Editor to configure the present section. The wizard configures only one section at a time, and will delete the current contents of the section. To configure a second section, select it using the section tabs at the bottom of the window, and relaunch the wizard. For information, see *Creating a report with the Report Wizard* on page 206.

---

### Valid Codepage

By default, PowerDesigner generates in the HTML page a character set (charset) built from the current language of the report. If this is not correct for your needs, you can change the charset.

1. Right-click the report in the Browser, and select Properties from the contextual menu to open its property sheet.
2. On the General tab, click the Properties button to the right of the Language field to open the Report Language resource file in the Resource Editor.
3. Expand the Report **Titles > Common Objects** category, and set the appropriate values for the CharSet and CodePage items.

For information about working with charsets and coding pages, see: <http://www.w3.org/International/tutorials/tutorial-char-enc/>.

---

**Note:** You can translate the navigation buttons (Previous, Next, Home) generated by default in your HTML report using HtmlNext, HtmlPrevious and HtmlHome items in the Report Titles \Common Objects category of the Report Language Editor. For more information, see the "Translating Reports with Report Language Resource Files" chapter in the *Customizing and Extending PowerDesigner* manual.

---

## RTF and HTML Report Presentation Templates

PowerDesigner provides a set of predefined RTF and HTML presentation templates to style reports in these formats. You can use these templates and their associated files as a basis to create your own presentation templates. These RTF presentation templates are stored in the Resource Files\RTF Report Templates folder.

The following GTL variables are available to these templates:

Variable	Description
%DATE%	Report date defined in report property sheet.
%TIME%	Report generation time.
%MODELNAME%	Model name of a report section.
%MODELCODE%	Model code of a report section.
%MODULE%	Module name of a report section.
%APPNAME%	Application name (PowerDesigner).
%TITLE%	Report title defined in report property sheet.
%AUTHOR%	Report author defined in report property sheet.
%VERSION%	Report version defined in report property sheet.
%SUMMARY%	Report summary defined in report property sheet.
%COMPANY%	Company name (Sybase, Quest).
%REPORTCONTENT%	[RTF only] Report insertion point in the RTF presentation template. If this variable is not defined, the report is appended at the end of the RTF presentation template.
%NEXT%	[HTML only] URL of the Next page of the home page.
%NEXTLABEL%	[HTML only] Name of the Next page of the home page.

### **RTF Presentation Templates**

An RTF presentation template file has an .RTF extension and allows you to define the header, footer, title page, table of contents, and general style of your RTF report. You can insert pictures, page borders and variables in an RTF presentation template.

The presentation template takes into account all the presentation options that you have defined in the Report Wizard or Report Editor, except the table of contents report item as this is defined in the RTF presentation template.

---

**Note:** If you open a report saved in a previous version, the RTF Template list is set to <None>.

---

### **HTML Presentation Templates**

An HTML presentation template file has an .HTMLTPL extension and allows you to define the header, footer, home page, and style sheet (for font, color, background, size, margin, and alignment) for your HTML report. The formatting defined in your style sheet will override any defined in the Report Wizard or Report Editor.

---

**Note:** If you open a report saved in a previous version, the HTML presentation template has the values of the default HTML presentation template or the Presentation template box will be set to (<None>).

---

### **Style Sheet Structure**

The following table describes the use of class names in the report style sheets:

<b>Class names</b>	<b>Description</b>
BODY	Defines the background styles for all report pages, except the home page frame and the browser frame page.
.BROWSERBODY	Defines the background styles for the browser page.
.HOMEBODY	Defines the background styles for the home page.
.TEXT	Defines the default font styles for text blocks, like description, annotation, etc.
.TITLE	Defines the default font styles for the title of the home page.
TABLE	Defines the default styles for tables.
TD	Defines the default styles for table cells.
Table.GRID	Defines the styles for object list tables.
TABLE.GRID TD.HEADER	Defines the styles for the header cells of object list tables.
TABLE.GRID TD	Defines the styles for the cells of object list tables of even rows.

Class names	Description
TABLE.GRID TD TD2	Defines the styles for the cells of object list tables of odd rows.
Table.FORM	Defines the styles for object card tables.
TABLE.FORM TD.HEADER	Defines the styles for the cell name of object card tables.
TABLE.FORM TD	Defines the styles for the cell value of object card tables.
Table.TEXT	Defines the styles for the tables around the text blocks.
TABLE.TEXT TD	Defines the styles for the cells of tables around the text blocks.
Table.TITLE	Defines the styles for the tables around the home page title.
TABLE.TITLE TD	Defines the styles for the cells of tables around the home page title.
Table.GRAPHICS	Defines the styles for the tables around graphics.
TABLE.GRAPHICS TD	Defines the styles for the cells of tables around graphics.
H1	Defines the styles for level 1 headings.
H2	Defines the styles for level 2 headings.
H3	Defines the styles for level 3 headings.
HR	Defines the styles for separator lines.
A:LINK	Defines the default colors for non-visited hyperlinks.
A: VISITED	Defines the default colors for visited hyperlinks.
A: HOVER	Defines the default colors for highlighted hyperlinks.
.BROWSER	Defines the default font styles for the browser.
A.BROWSER:LINK	Defines the default colors for non-visited hyperlinks of the browser.
A.BROWSER:VISITED	Defines the default colors for visited hyperlinks of the browser.
A.BROWSER:HOVER	Defines the default colors for highlighted hyperlinks of the browser.
TABLE.NAVGROUP	Defines the styles for the tables around the navigation buttons.
TABLE. NAVGROUP TD	Defines the styles for the cells of tables around the navigation buttons.

Class names	Description
.NAVBUTTON	Defines the default font styles for the navigation buttons.
A.NAVBUTTON:LINK	Defines the default styles for non-visited hyperlinks of the navigation buttons.
A.NAVBUTTON:VISITED	Defines the default styles for visited hyperlinks of the navigation buttons.
A.NAVBUTTON:HOVER	Defines the default styles for highlighted hyperlinks of the navigation buttons.

## Report Templates

---

A report template specifies content and formatting for a report section.

If your report has more than one section, you can apply report templates to each of the sections (see *Report Properties* on page 247).

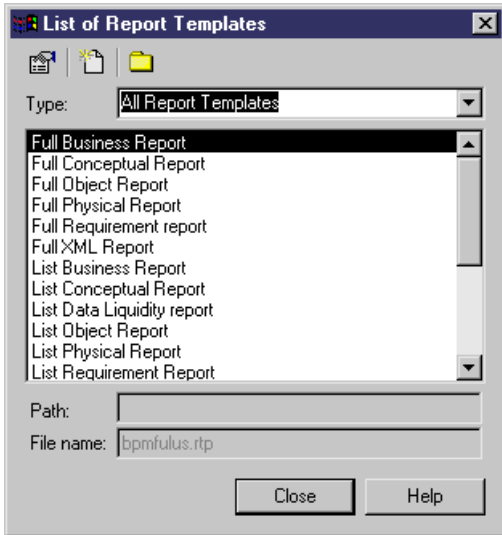
PowerDesigner provides a set of standard report templates that allow you to generate reports without any configuration (see *Creating a report with a report template* on page 206). You can also create your own report templates

Report templates are edited in the Report Template Editor, which is like the Report Editor except that it can only contain a single report section, and the right-hand pane is called Template Items.

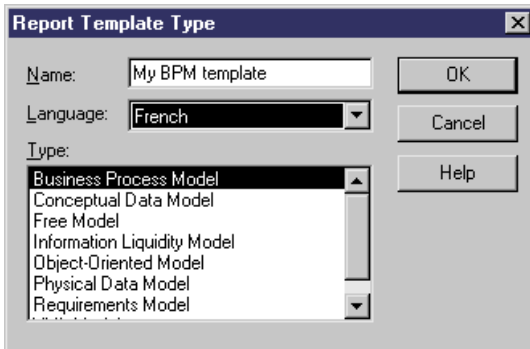
### Creating a Report Template from the List of Report Templates

You can create a report template from scratch, or based on an existing template, from the List of Report Templates.

1. Select **Tools > Resources > Report Templates** to open the List of Report Templates:



2. Click the New tool and enter a name for your template:



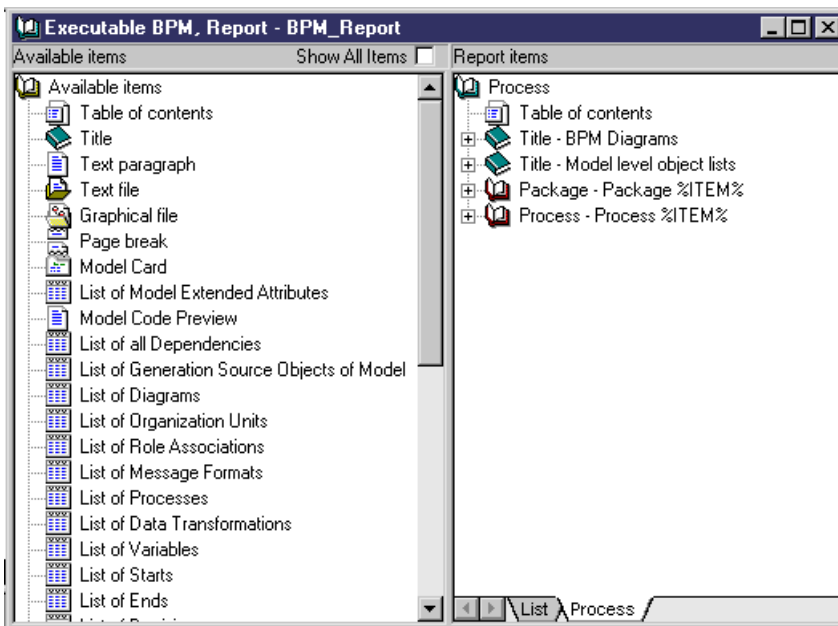
3. Select a language and model type for the template, and then click OK to open the empty template in the Report Template Editor.
4. Add report items as appropriate to the Template Items pane (see *Adding items to a report* on page 229) and set any desired formatting (see *Formatting Report Items* on page 238).
5. Select **File** > **Save** to save the template.

The template will be available the next time you create a report.

## Creating a Template from a Report Section

Once you have created a report section, you can save it as a template for use with other reports.

1. In the Report Editor, click the tab corresponding to the section you want to save as a template.



2. Select **Report > Create Template From Section** to open the section in the Report Template Editor.
3. Select **File > Save**, enter a name for the template, and click OK to save it for future use.

---

**Note:** You can rename a template in the Template Items pane by right-clicking the Template node at the root of the tree and select Rename.

---

## Modifying and Saving a Template

You can modify existing templates from the List of Report Templates.

1. Select **Report > Report Templates** to open the List of Report Templates.

---

**Note:** You can open the List of Report Templates from the List of Reports by clicking the Manage Report Templates tool.

---

2. Select a template type to display the list of available templates of that type.
3. [optional] Click the Path tool to select a different directory in which to search for templates.
4. Select a template and click the Properties tool to open it in the Report Template Editor.
5. Make any appropriate changes to the template and then select **File > Save**.



# CHAPTER 7 Comparing and Merging Models

PowerDesigner provides powerful tools for comparing models and merging them.

## Comparing Models

---

You can compare the content of two PowerDesigner models or two resource files of the same type at any time.

You may want to compare models or resource files to:

- Follow up evolutions in models or resources manipulated by different development teams
- Evaluate the differences that exist between the models or resources before merging them

---

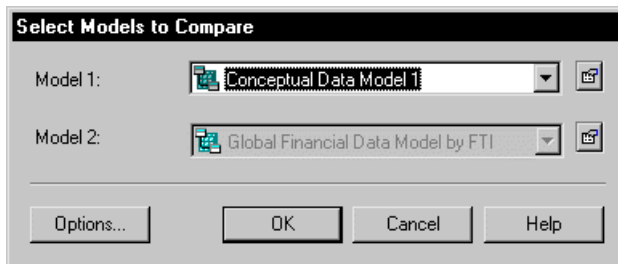
**Note:** For more information about the comparison of resource files, see "Comparing Resource Files" in the Resource Files and the Public Metamodel chapter of the *Customizing and Extending PowerDesigner* manual.

---

1. Select **Tools > Compare Models** to open the Select Models to Compare dialog box.

The current model is displayed in the Model 2 field.

2. Select a model to compare in the Model 1 list. Only models of the same type in the workspace are available for comparison.



3. [optional] Click the Options button to open the Comparison Options window and specify which objects and properties you want to include in the comparison. For more information, see *Comparison options* on page 260.
4. Click OK to open the Compare Models window, which displays the objects contained within the models or resource files in a tree format, and highlights the differences between them. See *Analyzing differences in the Compare Models window* on page 261. You can apply a filter to simplify the list of differences (see *Filtering Changes in the Compare and Merge Windows* on page 264).

## Comparison Options

The Comparison Options dialog box allows you to specify which types of objects you will compare. By default, all objects are selected for comparison.

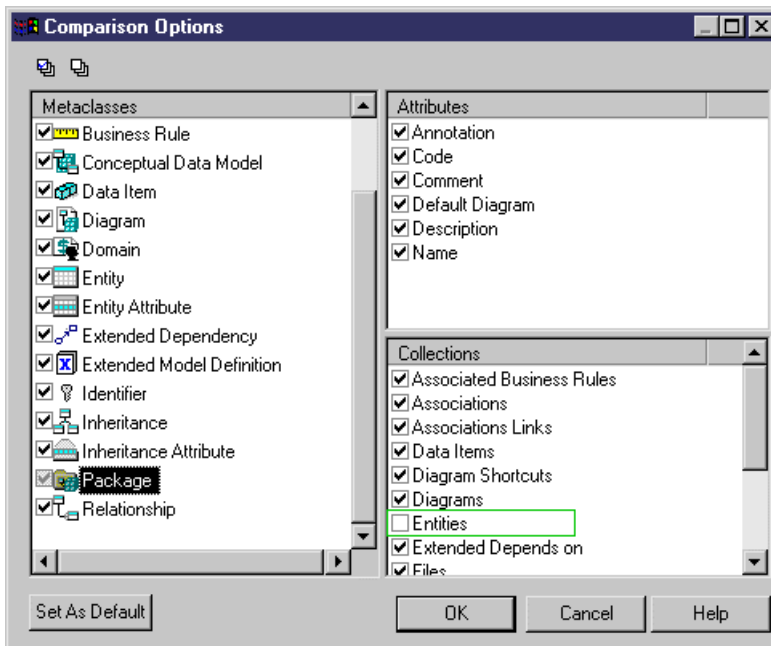
The dialog box is divided into three panes:

- Metaclasses – top-level objects such as tables, classes, entities, etc.
- Attributes – simple properties associated with the selected metaclass.
- Collections – properties that can contain multiple properties, and which are often sub-objects in their own right.

When you select a metaclass, the lists of attributes and collections change accordingly.

When you merge two models, differences are ignored for metaclasses, attributes and collections not selected for comparison. No changes will be applied to the model to be merged for a metaclass, attribute or collection where the selection checkmark has been cleared in the comparison options lists.

In the following illustration, the Entities collection check box is deselected for comparison:



---

**Note:** You can set your current selection of comparison options as default by clicking the Set as default button in the Comparison Options dialog box.

---

You can perform the following option selections:

You can...	To...
Select or deselect a meta-class check box	Select or deselect all its attributes and collections at once
Right-click a metaclass attribute or collection	Select or deselect the attribute or collection for all metaclasses at once from the contextual menu
Click the Select All or Deselect All tools	Select or deselect all metaclasses, attributes and collections at once

You can also select several metaclasses at the same time. Only attributes and collections that are common to all metaclasses are listed on the right hand side. When an attribute or collection property value is different from a selected metaclass to another, the attribute or collection check box is grayed-out to indicate the difference.

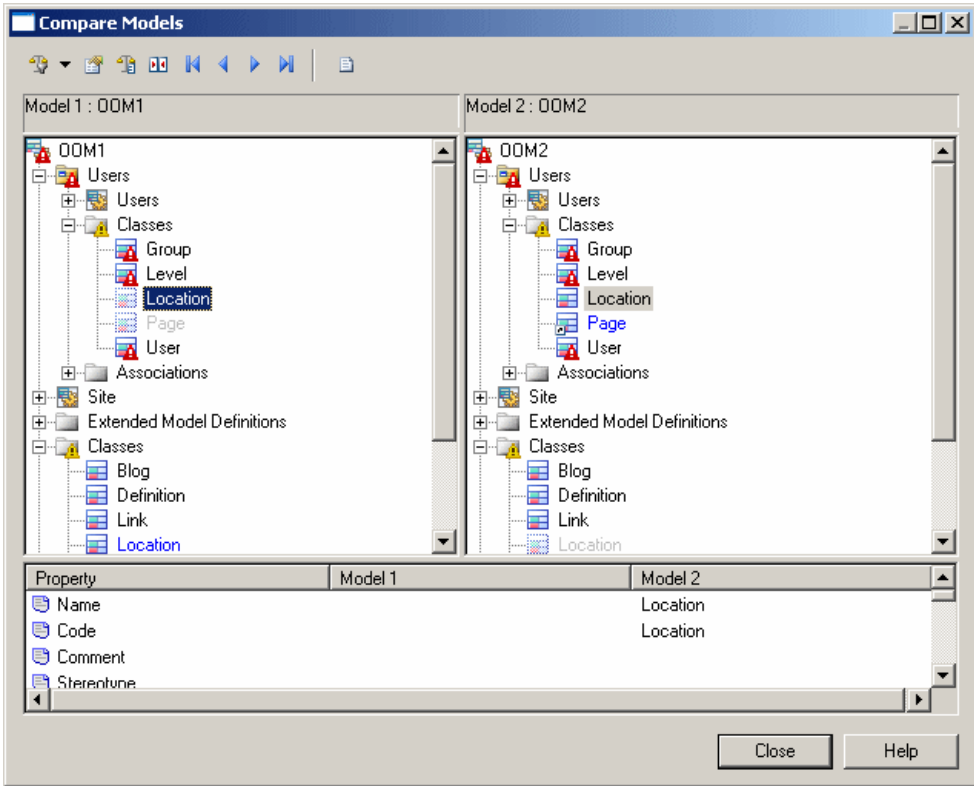
When you select a metaclass check box, you do not select the metaclass itself for comparison, but only its attributes and collections. If you want to select or deselect a metaclass for comparison, you have to click a Model and/or Package metaclass to display its corresponding attributes and collections and select or deselect the collection check box that corresponds to the unwanted metaclass in the list of Collections on the bottom right hand side.

## Analyzing Differences in the Compare Models Window

The Compare Models window allows you to compare the contents of two models.

Four types of differences between the models can be detected during a comparison:

- *Creation*: When an object is created in one of the models, it is displayed in blue.
- *Deletion*: When an object is deleted from a model, it is displayed as a ghost object in the model tree.
- *Modification*: When the properties of an object are different between models, a red exclamation mark is displayed in the bottom right corner of the object node.
- *Move*: When the object has been moved to a different position, for example, a column moved in the list of columns. In this case a green triangle is displayed in the bottom right corner of the object indicates that there has been a move. The green triangle is displayed both on the ghost object indicating the original position of the item and on the object in its new location.










The window is divided in two parts:

- The *object comparison panes* in the upper part of the comparison window display two models of the same type in a tree format and highlight the differences between them.
- The *property comparison pane* in the lower part of the comparison window displays the properties of the nodes selected in the model trees. The property comparison part is divided in three columns, listing the property name, and the values in the two models. The following kinds of differences are possible:

Difference type	Property name column	Model 1 properties column	Model 2 properties column
Object creation	No sign	Object properties displayed	No properties displayed
Object deletion	No sign	No properties displayed	Object properties displayed
Object modification	Diverging property type highlighted by an exclamation point	Divergent object properties displayed	Divergent object properties displayed

Difference type	Property name column	Model 1 properties column	Model 2 properties column
Object move	No sign	Identical object properties displayed	Identical object properties displayed
Object moved and modified	Diverging property type highlighted by an exclamation point	Object properties displayed	Object properties displayed



### Comparison Symbols



Symbol	Description
 Customer	Ghost object which does not exist in one of the models
 Customer	Shortcut exists in model
 (yellow)	Sub-objects are different
 (red)	Object exists in both models with different properties
 (green)	Object was moved and modified. This symbol indicates the initial location of the object in the model. This symbol always is displayed besides a ghost object.
 (red)	Object was moved and modified. This symbol indicates the new location of the object in the model.
 (green)	Object was moved

**Note:** You can open the property sheet of an object (in read-only mode) by double-clicking its node in the tree view. You can also right-click the object node and select Properties from the contextual menu. You can open several property sheets in order to compare the properties of different objects. However, all property sheets will be closed when you close the Comparison window.

### Navigating Among Differences

You can navigate among the differences that appear in the object comparison part using the following tools from the comparison toolbar:

Tool	Description
	Goes to the first difference in the tree view
	Goes to the previous difference in the tree view

Tool	Description
	Goes to the next difference in the tree view
	Goes to the last difference in the tree view

---

**Note:** To expand all nodes at once, you can press the numpad star (\*). To collapse all nodes at once, you can press the numpad minus sign (-).

---

## Filtering Changes in the Compare and Merge Windows

You can filter the objects that are shown in the Compare and Merge windows.

1. In the Compare or Merge Models window, click the arrow next to the **Change Filter** tool to display the list of filters:

- • All objects
- All changes
- Only created objects
- Only deleted objects
- Only modified objects
- Only moved objects
- Only identical objects
- Only selected objects [Merge Only]
- Show only conflicts [Merge Only] - A merge conflict occurs when the same object has been modified differently in the origin and generated model or the local and Repository model.
- Hide all preservations [Merge Only] - Hides all differences associated with changes made in the model to be merged as well as all identical objects in order to show only changes made in the model on the left since last generation.
- Advanced Filters – Opens the Comparison Filters dialog box, which allows you to combine several filters.

[Merge Only] The following additional Filters on State are available for combining:

- Show only selected objects - Displays only selected merge actions
- Show only conflictual objects - Displays objects that have been changed simultaneously by two different users. This filter is only available for merge during consolidation
- Show only non-preserved objects - Displays objects modified in a generated model but not in the source model. This filter is only available for merge during model generation

You can display all created and deleted objects in the same tree view, check which objects have changed parent after a move (from one package to another package,

for example), or which objects have been moved within the same collection (when you move attributes within the same entity, for example).

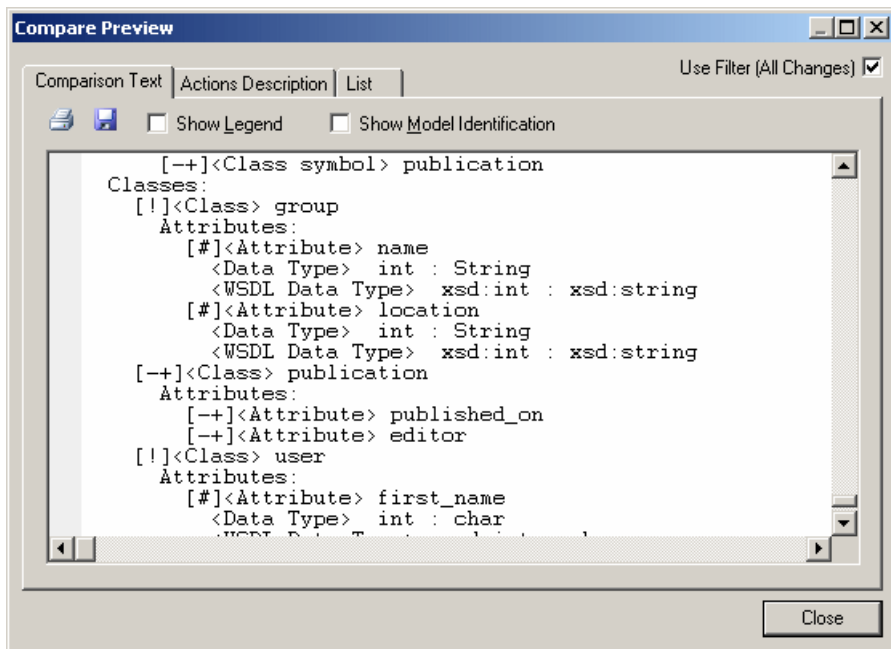
2. Select the appropriate filter to apply it to the Compare or Merge Window. Only objects complying with the filter criteria are displayed.

## Previewing, Printing, and Saving Comparison Results

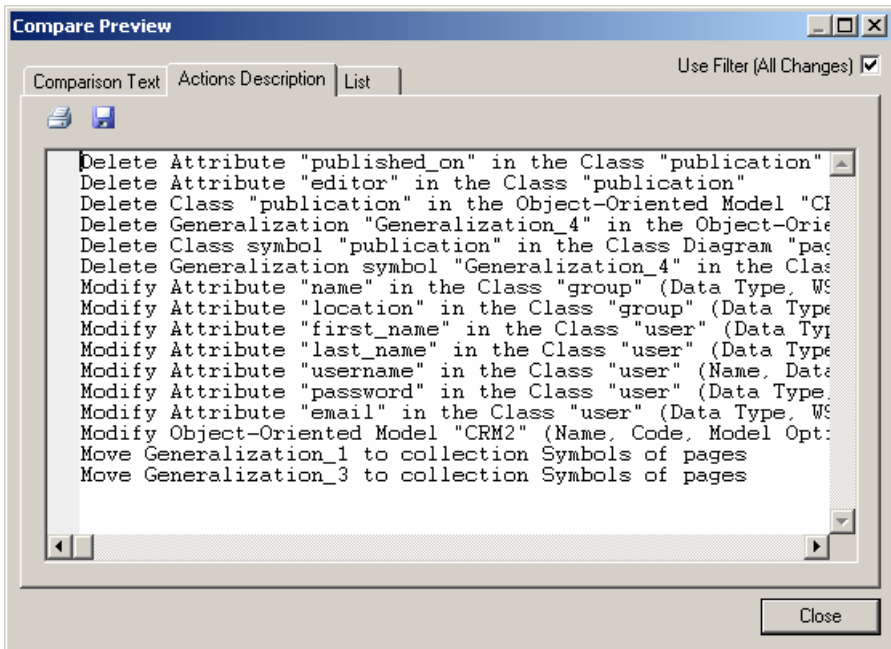
You can preview, save, and export the results of the comparison by clicking the Compare Preview tool to launch the Compare Preview window.

This window provides three formats viewing the comparison results on the following tabs:

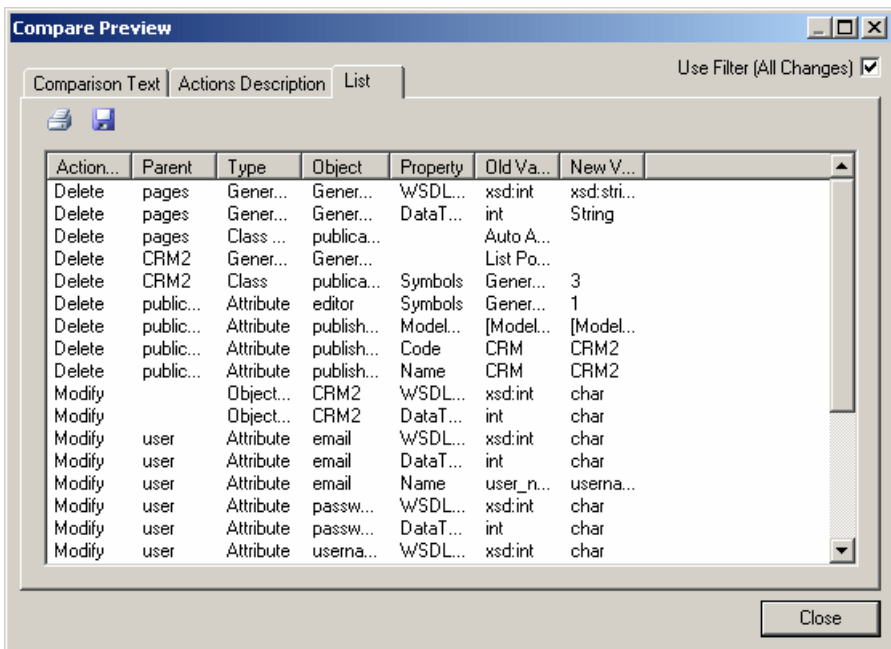
- *Comparison Text*—a textual representation of the differences between the models. This is the most exhaustive format, and provides complete information about the whole object tree. Select the Show Legend and/or Show Model Identification options to display additional information at the beginning of the text.





- *Actions Description*—a list of the actions that would need to be taken to render the models the same. This will often be the most readable format as it represents each change in the form of a sentence:



- *List* – a columnar representation of the required actions. This format is the most easily manipulated. You can sort by any of the columns, and export the list in a variety of formats to allow for various kinds of transformation:



The following tools are available on each of the tabs:

Tool	Description
Use Filter	Filters the changes using the filter specified in the main window (see <i>Filtering Changes in the Compare and Merge Windows</i> on page 264). If no filter has been specified before the preview is launched, then this option is not visible.
	Print
	Save - Saves the comparison in text format for Comparison Text and Actions Description , and in XML, CSV, RTF, or HTML format for List.

The following columns appear on the List tab:

Column	Description
Action Type	Specifies the type of action to perform. Can be any of the following: <ul style="list-style-type: none"> <li>• Create – creates an object</li> <li>• Delete – deletes an object</li> <li>• Modify – modifies an object</li> <li>• Move Object – moves an object to a new parent</li> <li>• Col Insert – inserts an object into a collection</li> <li>• Col Remove – removes an object from a collection</li> <li>• Col Move – moves an object from one position to another within a collection</li> </ul>
Parent	Specifies the parent of the object to be changed (the original parent, in the case of an object that will be moved). For example, a class for an operation, or a diagram for a symbol.
Type	Specifies the type of the object to be changed.
Object	Specifies the name of the object to be changed
Property	Specifies the object property or collection to be changed. Empty for a Create, Delete, or Move Object action.
Old Value	Specifies the original value of the property to be changed. Empty in the case of a Create or Col Insert
New Value	Specifies the updated value of the property. Empty in the case of a Delete or Col Remove.

For example, changing the datatype of attribute MyVariable from int to long would yield the following column entries:

Action Type	Parent	Type	Object	Property	Old Value	New Value
Modify	MyClass	Attribute	MyVariable	DataType	int	long

## Merging Models

---

You can merge the content of two PowerDesigner models or two resource files of the same type at any time.

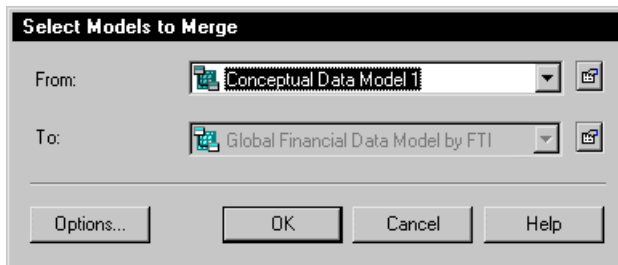
**Note:** For information about selecting resource files to merge, see "Merging resource files" in the Resource Files and the Public Metamodel chapter of the *Customizing and Extending PowerDesigner* manual.

---

1. Select **Tools > Merge Models** to open the Select Models to Merge dialog box.

The current model is displayed in the To field.

2. Select a model to merge in the From list. Only models of the same type in the workspace are available for merging.



**Note:** If you want to merge two PDMs, BPMs, OOMs or XSMs, you have to select two models with the same target DBMS or language

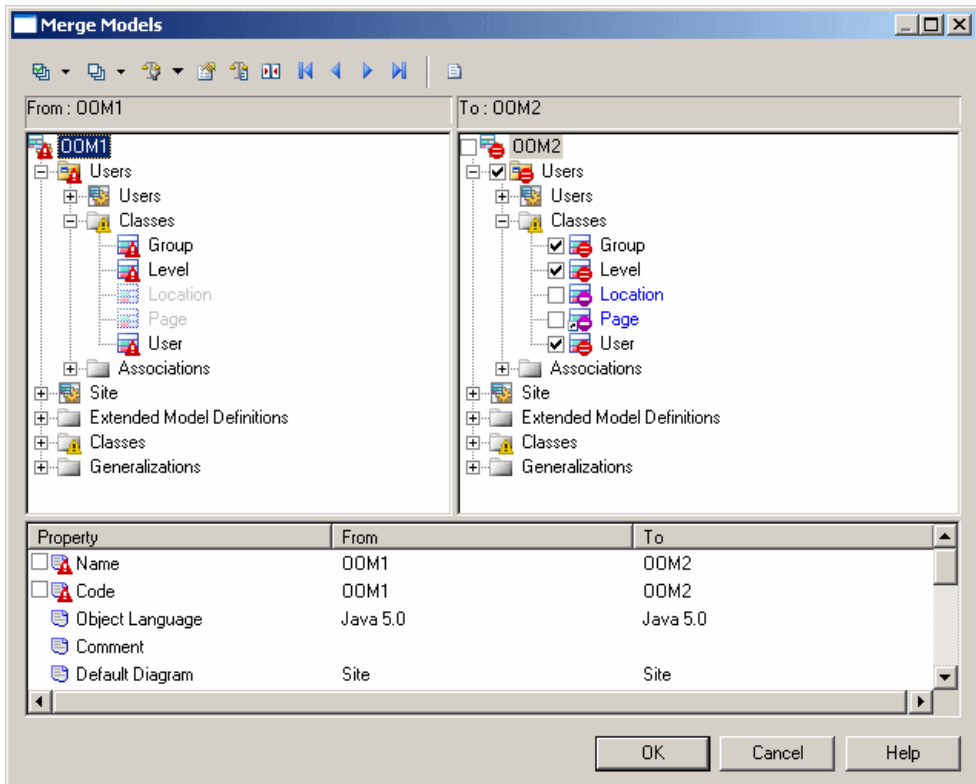
---

3. [optional] Click the Options button to open the Comparison Options window and specify which objects and properties you want to include in the comparison and possible merging (see *Comparison options* on page 260).
4. Click OK to open the Merge Models window, which displays the objects contained within the models or resource files in a tree format, and highlights the differences between them (see *Analyzing Differences in the Merge Models Window* on page 269). You can apply a filter to simplify the list of differences (see *Filtering the Changes to Merge* on page 264).
5. After selecting the merge actions that you want to perform, click **OK**.

The Merge Models dialog box closes and the merge begins. Merge messages are displayed in the Output pane. A final message informs you that the models were successfully merged.

## Analyzing Differences in the Merge Models Window

The Merge Models window allows you to compare the contents of two models:







The window is divided in two parts:

- The *object comparison panes* in the upper part of the comparison window display two models of the same type in a tree format and highlight the differences between them. Any eventual merge will be effected on the "To" model in the right-hand pane.
- The *property comparison pane* in the lower part of the comparison window displays the properties of the nodes selected in the model trees. The property comparison part is divided in three columns, listing the name of the property and its values in the From and To models.

Merge is performed from left to right, the model to be merged is compared to the model on the left pane, differences are highlighted in this model, and merge actions are applied in the model on the right pane.

## Navigating Among Differences

You can navigate among the proposed merge actions displayed in the model to be merged using the following tools:

Tool	Description
	Goes to the first difference in the tree view
	Goes to the previous difference in the tree view.
	Goes to the next difference in the tree view
	Goes to the last difference in the tree view

---

**Note:** You can right-click a moved object and select Next or Previous occurrence to go to its next or previous occurrence.

---

**Note:** To expand all nodes at once, you can press the numpad star (\*). To collapse all nodes at once, you can press the numpad minus sign (-).

---

## Understanding Merge Action Icons



For each difference detected during the comparison process, a merge action is proposed for you to synchronize the model to be merged with the model on the left pane.









Merge icons are composed of a symbol and a color. A triangle provides an indication that there is a difference between the two models. A circle with a check box, which only appears on the right-hand pane specifies a merge action that will be performed if the check box is selected.

The following table explains the color code:

Color	Description
Red	Modification
Yellow	Indication
Green	Move
Purple	Deletion and shortcut replacement
Blue	Addition

The following table lists the indications and merge action symbols:

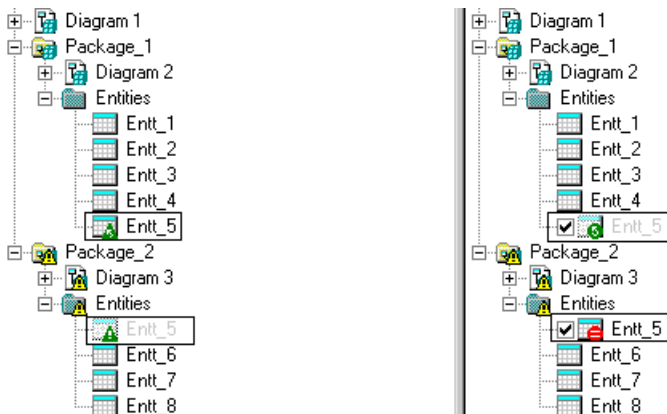
Icon	Description
 Entities	[yellow] Notification that children were modified
 Table_1	[red] Notification that object properties were modified


Icon	Description
 Entt_5	[green] Notification that object was moved
<input checked="" type="checkbox"/>  Dept	Object creation [blue] - Adds object to model to be merged because it exists in model on left pane
<input type="checkbox"/>  Marketing	Object deletion [purple] - Deletes object from model to be merged
<input checked="" type="checkbox"/>  Name	Object modification [red] - Updates object definition in model to be merged using object definition in model on left pane
<input checked="" type="checkbox"/>  Id_number	Object move [green] - Moves object in model to be merged to the same location as in model on left pane or replaces it with shortcut
<input checked="" type="checkbox"/>  Entt_2	Shortcut merge [purple] - Replaces the shortcut with target object
<input type="checkbox"/>  Applet	Shortcut deletion [purple] - Deletes shortcut from target model
<input type="checkbox"/>  Exception	Shortcut creation [blue] - Creates shortcut in target model


### Moving an Object from a Package to Another

When you merge models in one of which you have moved an object from a package to another and modified its properties, the object is displayed in both packages of the model to be merged, in the object comparison part.

In the following example, Entt\_5 in Package 2 was modified and moved into Package 1:



Icon	Description
<input checked="" type="checkbox"/> 	One occurrence remains in the package on the left pane and the opposite icon is displayed at the bottom right corner of the object to indicate that the object properties were modified

Icon	Description
	The second occurrence is displayed grayed out in the package to be merged and the opposite icon is displayed at the bottom right corner of the object to indicate that the object was moved but does not yet exist in that location

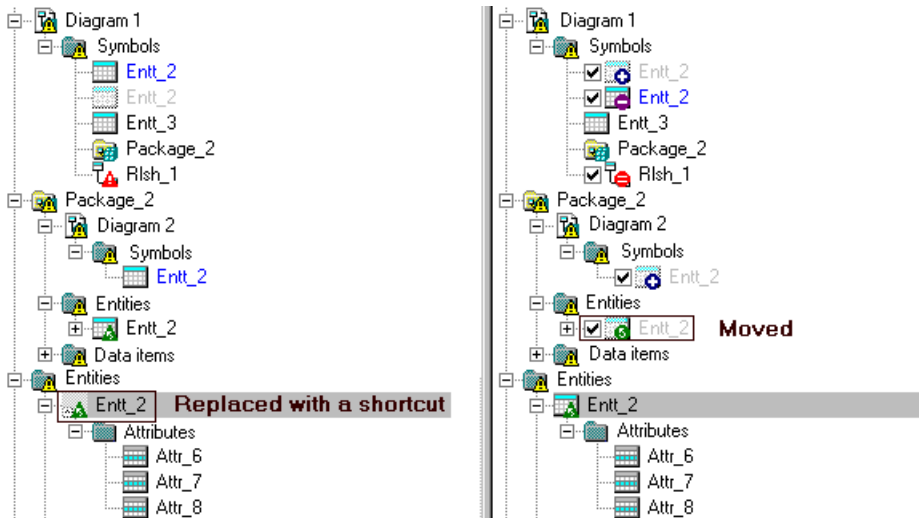
You are invited to synchronize the models on the right and left panes by selecting both check boxes.





**Note:** When you select or clear a merge action check box for a moved object, the check box of the other occurrences are automatically selected or cleared.

When you move an object that is replaced with a shortcut, the merge action suggested is the move with no indication of shortcut replacement. The unique indication of the object replacement with a shortcut is displayed with the following icon in the model on the left pane of the Merge Models dialog box:



In the following example, Entt\_2 in the main diagram was moved into Package 2:



Left model	Right model	Description
	<input checked="" type="checkbox"/> 	Move target object
		Replace target object with a shortcut

**Note:** When you merge models, move is not a suggested merge action for objects which are in different namespaces but have identical name. In that case creation or deletion of the object are proposed.

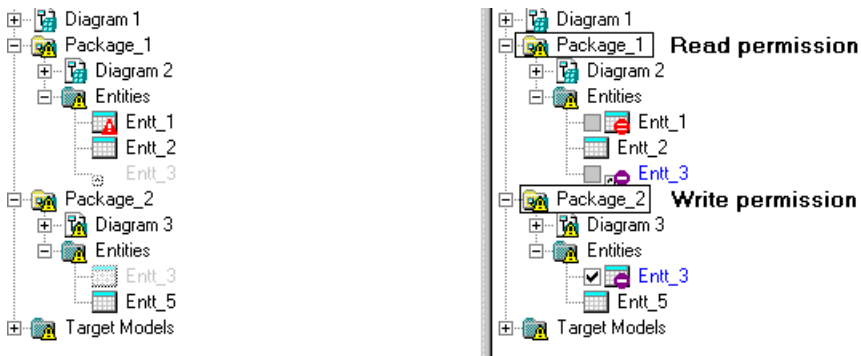
For more information on namespace in models, see *Object Namespaces* on page 116.

### User Permissions in the Repository

When a user does not have the appropriate rights and permissions in the repository, merge actions appear with a grayed out check box and cannot be selected.

However, some actions can be applied to objects in packages on which the user does not have the required permission, in order to be consistent with a permitted action.

In the following example, the model on the left pane corresponds to the local model and the model on the right pane corresponds to the repository model. The user has a Read permission on Package 1 and a Write permission on Package 2.



Model	Package	What happens...
Local model (left pane)	Package 2 (Write permission)	Entt_3 was deleted
	Package 1 (Read permission)	Entt_1 properties were modified Entt_3 shortcut was deleted because of the deletion of Entt_3 in Package 2
Repository model (right pane)	Package 2 (Write permission)	The proposed merge action for Entt_3 is delete. The user has a Write permission and can select this action
	Package 1 (Read permission)	Entt_1 check box cannot be selected (grayed) because the user does not have Write permission The check box for Entt_3 shortcut cannot be selected (grayed) but the shortcut will be deleted anyway to be consistent with the merge action for Entt_3 selected in Package 2

For more information on user permission, see the *Working with the Repository* manual.

## Selecting Merge Actions in the Model to Be Merged

You can select or deselect merge actions in the pane of the model to be merged, using:

- A category contextual menu
- An object contextual menu

To do so, you right-click an object or a category in the pane of the model to be merged and select the Select or Deselect command to open the sub-menu of the merge actions.



By default, all creation, modification and move actions are selected in the model to be merged, deletion actions are not selected.

---

**Note:** For consolidated models, the merge actions selected by default depend on the latest modifications saved in the model. For generated models, if the Preserve modification generation option was selected, they depend on the modifications saved in the model to be merged.

---

The following selection tools from the merge toolbar:

Tool	Description
	Select all merge actions. Click the arrow to select all of one kind of merge action.
	Clear all merge actions. Click the arrow to deselect all of one kind of merge action.

### Merging Object Properties

PowerDesigner lets you select individual object properties to merge.

---

**Note:** You can double-click a property in the property comparison part to display differences between models. When a line is added the following symbol is displayed >>, when a line is deleted, the following symbol is displayed <<.

---

1. Select objects with different definitions in the object comparison part of the Merge window.
2. Select or clear the check boxes corresponding to the properties you want to merge in the properties comparison part of the Merge window.

By default, the diverging properties are selected in the list:

Property	From	To
<input type="checkbox"/> Name	11	11
<input type="checkbox"/> Code	11	11
<input type="checkbox"/> Displayed	TRUE	TRUE
<input type="checkbox"/> Comment		
<input checked="" type="checkbox"/> Data Type	<undefined>	char(0)
<input type="checkbox"/> Identity	FALSE	FALSE
<input type="checkbox"/> With Default Option	FALSE	FALSE
<input type="checkbox"/> Mandatory	FALSE	FALSE
<input type="checkbox"/> Check on Table Constraint Name	CKC_11_TABLE_3	CKC_11_TABLE_3
<input type="checkbox"/> Distinct Values	40	40

## Synchronizing Objects Manually

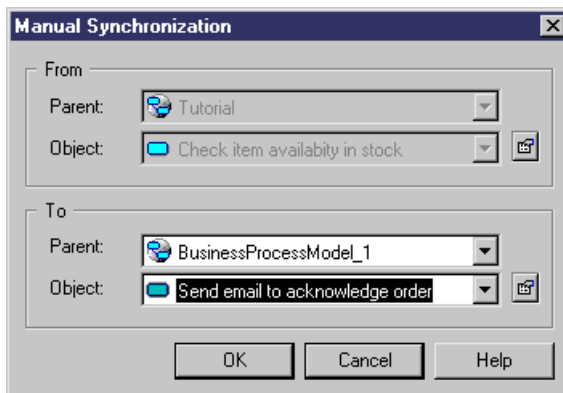
When an object has been renamed or modified out of the PowerDesigner interface, the link with the corresponding object in the compared model is lost, and the comparison interface will display two disconnected objects in the model trees with object creation and deletion actions in each model.

Manual synchronization lets you perform the following operations:

- Synchronize moved or disconnected objects. Use the Parent box to select the parent package corresponding to the package on the left pane.
- De-synchronize objects that share common properties and are naturally related in the comparison process. You can select <NONE> or another object from the Object list in order to break the relation between objects.

The tree view of the model to be merged is automatically updated after you validate a manual synchronization.

1. Select the item you want to synchronize from one of the model trees, and then click the Manually Synchronize Two Objects tool to open the Manual Synchronization dialog box is displayed:



Depending on the merge action proposed, the From or the To box is editable.

2. Select a model or package in the Parent list, and then select the object that you want to synchronize with in the Object list. You can use the Properties tool to better identify object
3. Click OK.

The selected items are synchronized and the tree view of the model to be merged is updated in order to show the impact of the manual synchronization.

When you synchronize objects and linking objects, you obtain the following result:

Object	Within the same package	Between different packages
Object	Objects on the left pane and parent objects are synchronized	Object moved to package to be merged and removed from package on the left pane
Linking object		

### **Previewing, Printing, and Saving Merge Actions**

You can preview and print the selected merge actions by clicking the Merge Preview tool to open the Merge Preview window.

This dialog is the same as the Compare preview dialog. See *Previewing, printing, and saving comparison results* on page 265.

# CHAPTER 8 Customizing Your Modeling Environment

PowerDesigner is highly customizable. You can modify its interface to suit your work habits, , set default naming conventions, change the appearance of object symbols, add new properties to objects, and even create your own types of objects.

## User Profiles

---

User profiles help you to standardize the look and feel of your models and to support standards. Profiles allow you to group options and preferences together for sharing and reuse across your organization. Various profiles are provided with PowerDesigner, and you can create your own.

The various kinds of PowerDesigner options and preferences are stored in your model files and/or in your Windows registry. User profiles can contain default values for:

- Display Preferences – [model or registry] to control the color, shape, size, etc. of your diagram symbols and the information that is displayed upon them
- Model Options – [model only] to control naming conventions, case sensitivity, notation, default values, etc.
- General Options – [registry only] to control dialog preferences, environment variables, fonts, etc.
- Check Model options – [model only] to control which checks are applied, and which are errors, warnings, etc.
- Other options – [registry only] such as the layout of toolbars and windows, favorite pages, default columns for grids, etc.

User profiles can contain any number of default preferences and options, the application of which is cumulative. Thus, if you:

1. Apply a user profile that directs that table symbols in the physical data model are drawn by default in red, and that view symbols are drawn in blue (via display preferences)
2. Apply a second user profile that directs that table symbols are drawn in green.

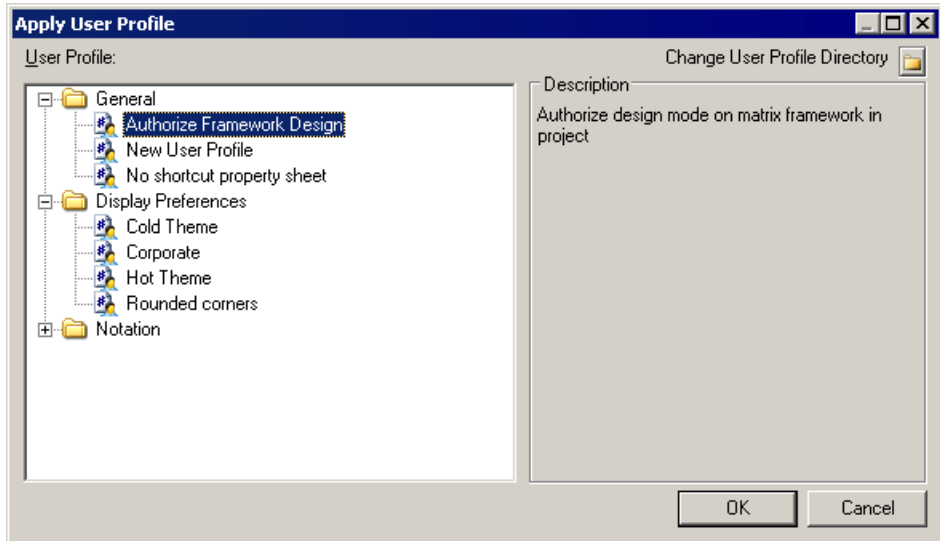
The result will be that table symbols are drawn in green, and view symbols are drawn in blue. You can, of course, override these default preferences and options locally in the model.

User profiles are PowerDesigner resource files, and so can be opened and edited in the resource editor, but in general you will create and edit them by extracting preferences defined in a model, or from your registry.

## Applying a User Profile

You can apply a user profile at any time. The defaults; preferences, and options contained within the profile will overwrite the existing values for those defaults, preferences and options, while leaving all others unchanged. Note that while general PowerDesigner options take effect immediately, model options and display preferences only take effect when you create a new model.

1. Select **Tools > Apply User Profile** to open the Apply User Profile dialog:



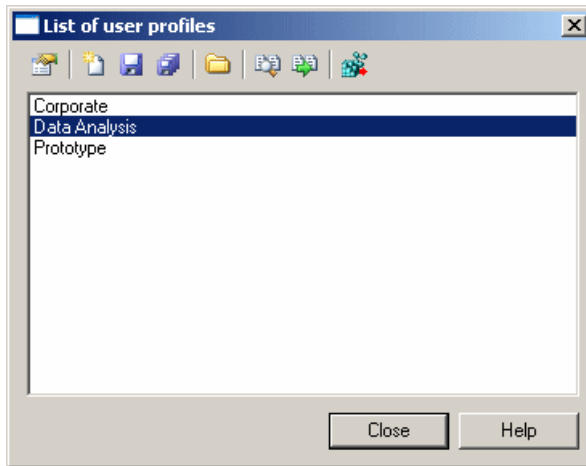
2. [optional] Click the Change User Profile Directory button, and browse to a folder where you have saved user profiles. By default they are saved in the *install\_dir*/Resource Files/ User Profiles directory.
3. Select a profile from the list and click OK.

The user profile is applied, and overwrites the defaults, preferences, and options contained within it with the values it defines.

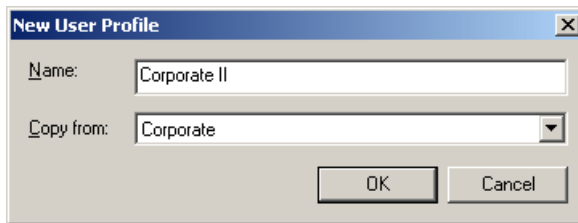
## Creating a User Profile

You can create a user profile by copying an existing profile, or by copying values from an open model or from your registry.

1. Select **Tools > Resources > User Profiles** to open the List of User Profiles:



2. Click the New Button to open the New User Profile dialog:



3. Enter a name for your profile and select a source from which to copy from. You can choose between:
  - Another user profile – makes a copy of the existing profile.
  - <Registry> - copies all your PowerDesigner defaults from your Windows registry.
  - <Model> - opens the Model for User Profile dialog which allows you to specify the preferences to copy from an open model (see *Copying preferences from a model* on page 280).
4. Specify a name and a location to create the profile and click Save.

The user profile is created and opened for review in the resource editor.

## Updating a User Profile

You can update a user profile by copying values from an existing profile, from an open model, or from the registry.

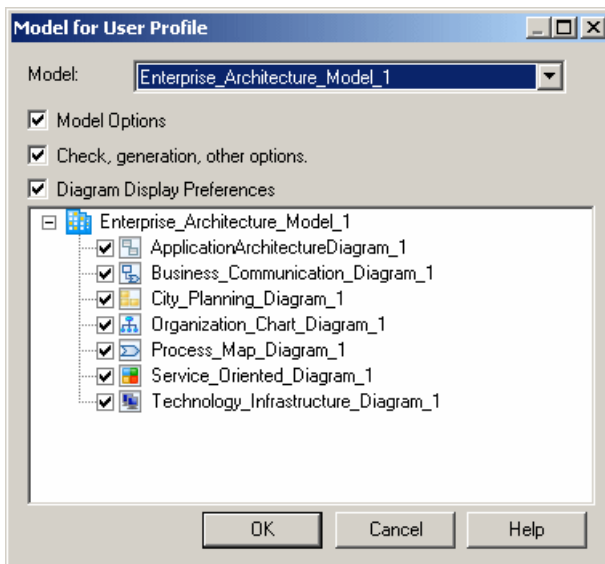
1. Select **Tools > Resources > User Profiles** to open the List of User Profiles, select the profile to update and click the Merge tool to open the Select User profiles to Merge dialog.
2. In the From field, select a source from which to copy from. You can choose between:
  - Another user profile

- <Registry> - copies all your PowerDesigner defaults from your Windows registry. Note that model check options and generation options are not stored in the registry and can only be extracted from a model or another user profile.
  - <Model> - opens the Model for User Profile dialog which allows you to specify the preferences to copy from an open model (see *Copying preferences from a model* on page 280). Note that general options, and options relating to the PowerDesigner interface (such as toolbar and window layout, favorite property sheet pages and grid layouts) are not stored in models and can only be extracted from the registry or another user profile.
3. Click OK to open the Merge window, which lets you review and approve each proposed change before committing it. For detailed information about using this window, see *Chapter 7, Comparing and Merging Models* on page 259.
  4. When you are satisfied, click OK to update the profile and return to the list.

## Copying Preferences from a Model

When you choose to create or update a user profile by copying preferences from a model, you open the Model for User Profile dialog:

For more information, see *Creating a user profile* on page 278 or *Updating a user profile* on page 279.











You can to specify the following options and preferences to capture:

Option	Description
Model	Specifies the open model from which you will capture preferences.

Option	Description
Model Options	Captures the model options from the specified model.
Check, generation, and other options	Captures the check model, generation, and other options from the specified model.
Diagram Display Preferences	Captures the display preferences from the diagrams that you select in the tree below. Note that, to avoid conflicts, you can only select one instance of each diagram type. Thus, if your chosen model is an OOM, which contains two class diagrams, selecting one class diagram will deselect the other.

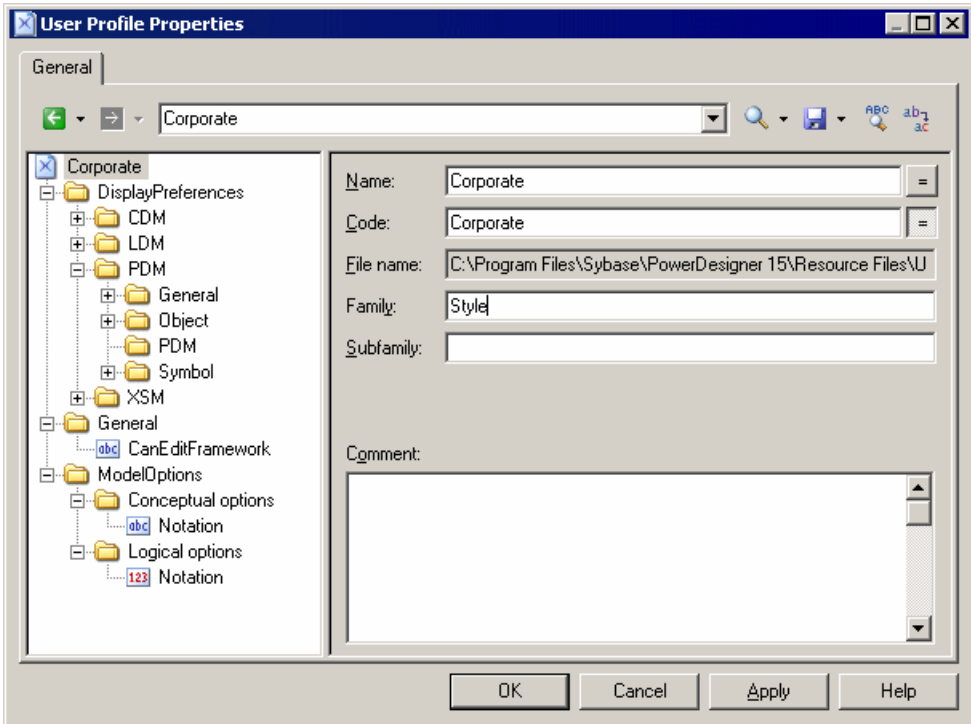
## Using the List of User Profiles

The List of User Profiles lists all the user profiles available to you. The following tools are available above the list:

Tool	Description
	Properties – opens the selected profile in the resource editor.
	New – creates a new profile. See <i>Creating a user profile</i> on page 278
	Save – saves the selected profile.
	Save All – saves all the profiles.
	Path – allows you to specify a directory from which to populate the list.
	Compare – opens the Compare window, which allows you to compare the structure of two profiles.
	Merge – allows you to update the selected profile with preferences from another profile, a model, or the registry. See <i>Updating a user profile</i> on page 279
	Apply to Registry – applies the selected profile to your registry, overwriting your previous defaults and preferences. This has the same effect as selecting <b>Tools &gt; Apply User Profile</b> (see <i>Applying a user profile</i> on page 278).

## Reviewing and Editing User Profiles in the Resource Editor

You can open any user profile in the Resource Editor to review and edit it. In the following example, the Corporate user profile contains display preferences for CDMs, LDMs, and PDMs, along with a general option and some model options:



The profile root node has the following properties:

Property	Description
Name/Code	Specifies the name and code (used for scripting) for the profile.
File name	[read-only] Specifies the path to the profile file.
Family	Specifies the family in which the profile will appear in the Apply User Profile window (see <i>Applying a user profile</i> on page 278) and if it is added to the PowerDesigner installer image. If no value is entered, the profile is added to the General family.
Subfamily	Specifies a subfamily within the profile family.

Since the registry key names and values are not necessarily easy to read, we recommend that you restrict your edits in this environment to deleting unwanted defaults.

To delete an item, simply right-click it and select Remove. You can always make additions or adjustments to the values of user profiles by extracting them from models or other profiles.

### **Making Custom User Profiles Available in the PowerDesigner Installer**

Once you have developed your own user profiles, you may want to add them to your PowerDesigner install image in order to allow your users to install them when they install PowerDesigner.

The user profiles that are installed with PowerDesigner are stored in the following directory on the first install CD:

```
Setup/User Profiles
```

To include your profiles in the install, simply copy them to this directory in your install image.

For information about installing PowerDesigner, see the *Installation Guide*.

### **Guiding Model Creation through Categories and Templates**

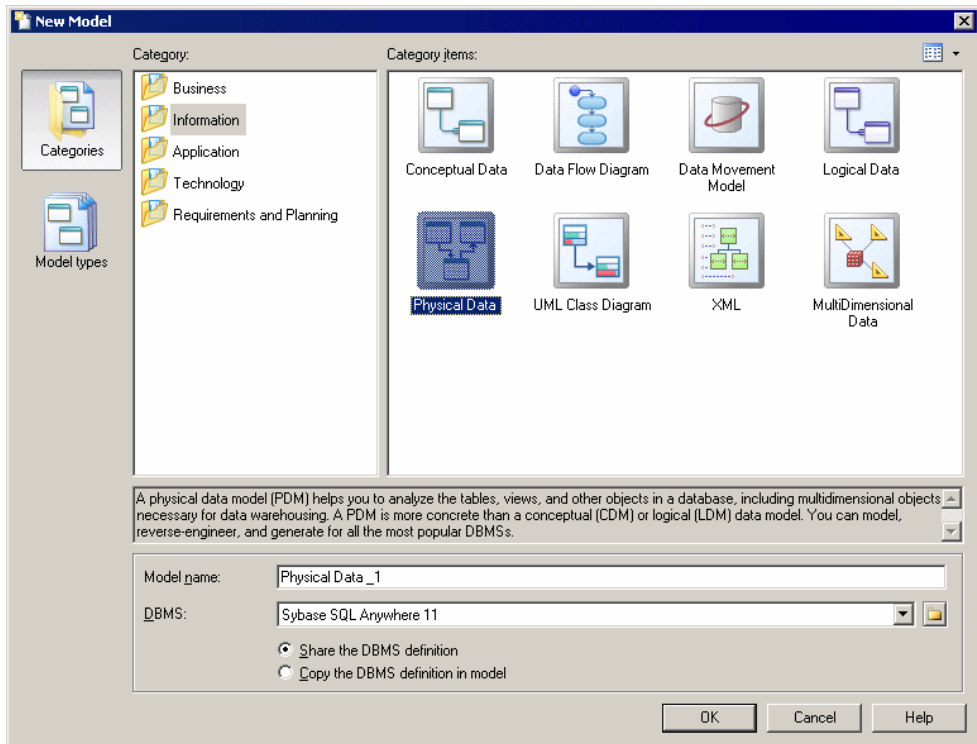
You can create model templates with predefined targets, extensions, and first diagrams to help guide users through model creation. You can organize these templates in categories and share them with your team, supplementing or even replacing the default New Model dialog with these categories.

A model category set is a PowerDesigner resource file that contains one or more categories, which in turn contain templates to guide users through model creation in the New Model dialog.

Using categories and templates for model creation simplifies the model creation process by preselecting appropriate targets, extension, and diagrams, and by hiding irrelevant choices from users. You can create different category sets for different users so that, for example, data architects will have different choices from business analysts when they open the New Model dialog.

You can use model category sets in conjunction with resource sharing (see "Sharing Resources in the Repository" in the Working with Repository Documents chapter of the Working with the Repository manual) to ensure that everyone on your team is creating models using the same centralized targets and extensions checked out automatically from the repository.

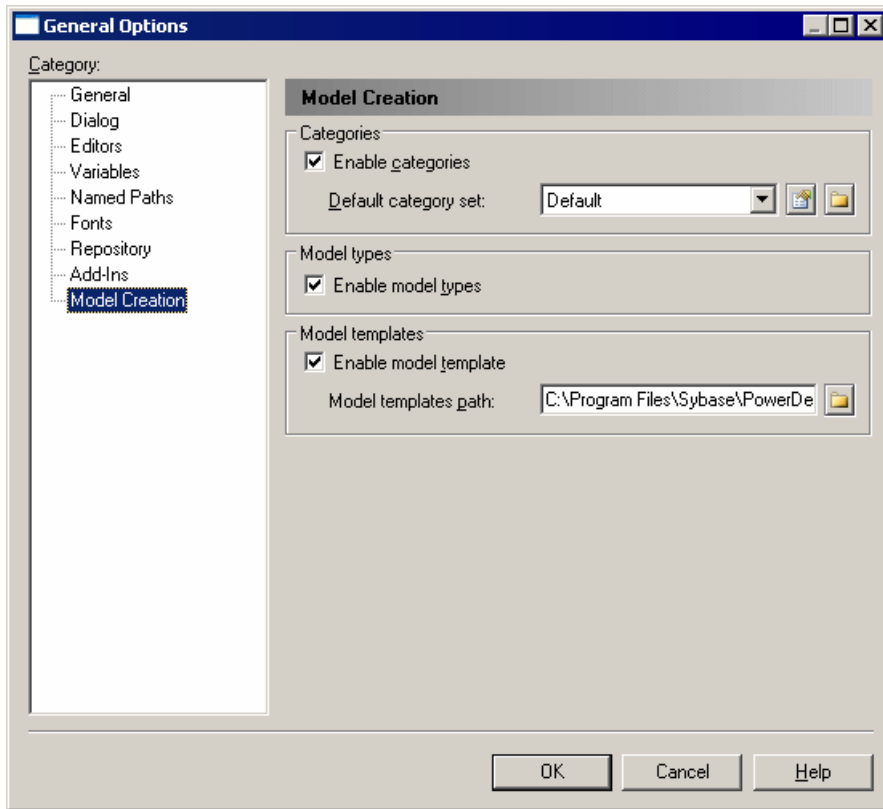
In the following example, the Information category is selected and provides eight templates to choose from:



## Selecting a Model Category Set to Display in the New Model Dialog

The model category set you select in the Model Creation general options will be displayed in the New Model window.

1. Select **Tools > General Options**, and click the **Model Creation** category in the left hand pane.



2. Verify that the **Enable categories** check box is selected, and select the category set you want to display from the Default category set list.
3. [optional] Click the **Path** tool to the right of this field to browse to another folder containing model category sets or the **Properties** tool to open the currently-selected set in the Resource Editor.
4. Click **OK** to close the General Options dialog.  
The selected category set and the templates it contains will be displayed in the New Model dialog next time you open it.

## Creating a Model Category Set

You can create as many different model category sets as you need, creating different sets for different types of users, for example.

1. Select **Tools > Resources > Model Category Sets** to open the List of Model Category Sets.
2. Click the **New** tool to open the New Model Category Set dialog.
3. Enter a name for your model category set, and select a source to copy it from. You can choose between:

- <Default template> – creates an empty set that you complete by adding categories and templates.
- Another model category set – makes a copy of an existing set that you can edit as necessary.

4. Specify a name and a location to create the set and click **Save**.

The model category set is created and opened for review in the Resource Editor.

5. For each category that you need, right-click the root node, and select **New**. In the right-hand pane, enter a name for the category and, optionally, click the **Browse for icon** tool to change the default icon.

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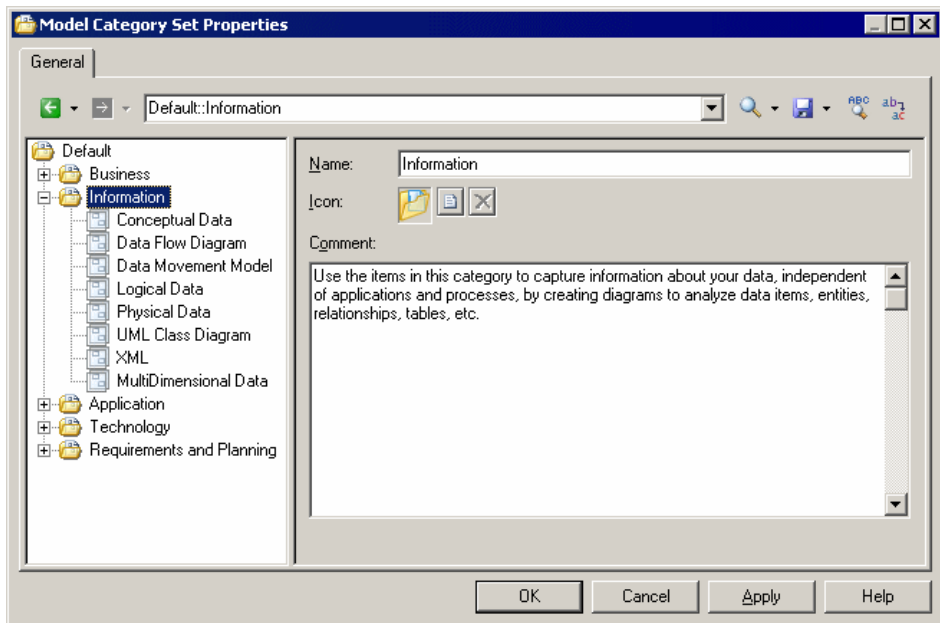
**Note:** You can reorder the categories if necessary by drag and drop.

---

6. When you have created your categories, you add templates to them by right-clicking the category and selecting **New** and then one of the following:

- Model - creates a simple model template that can specify a default target, extensions, and an empty first diagram (see *Adding a Model Template to a Model Category Set* on page 287).
- Model from Template - which points to an actual model file that, in addition to specifying a target and extensions, can contain multiple diagrams, display preferences, general and model options, etc (see *Adding a Model from Template to a Model Category Set* on page 288)

7. When you have finished creating categories and templates, click OK to close the resource editor and click the Save tool in the List of Model Category Sets to save your edits.



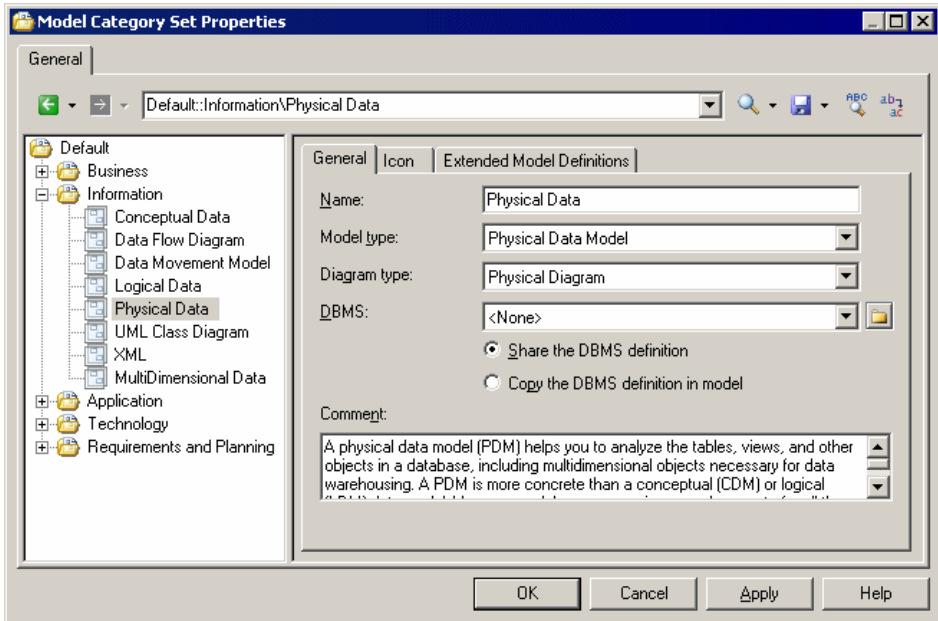
You can test your category set by selecting it in the General Options dialog (see *Selecting a Model Category Set to Display in the New Model Dialog* on page 284) and selecting **File > New Model**.

### **Adding a Model Template to a Model Category Set**

Model templates are simple templates that can specify a default target, extensions, and an empty first diagram.

1. Right-click the category to which you want to add the template, and select **New > Model**.
2. On the General tab, enter a template name and select a model and diagram type.
3. [optional, for model types with targets] Specify a target (DBMS, object or process language, etc). If you select None, then the user can select any available target language in the New Model dialog.
4. [optional] On the Icon tab, click the **Browse for icon** tool to change the default template icon.
5. [optional] On the Extended Model Definitions tab, click the **Select Extended Model Definitions** tool to attach one or more extended model definitions to the model. Select one or more XEMs to attach to your model, and select one of the following radio buttons:
  - **Share** – creates a link to the XEM file. Any changes made to the extended model definition will be shared.
  - **Copy** – creates a copy of the XEM private to the model. Any changes made to the XEM affect only the current model, with which it is saved.
6. [optional] Select the **Allow additional extensions at model creation** check box if you want to allow users to attach additional XEMs to those you have specified. The **Extensions** button in the New Model dialog is not available if you do not select this check box.

In the following example, the Physical Data template is specified to create a Physical Data Model with a physical diagram, and since no DBMS is specified, the user will be able to choose one at model creation time:



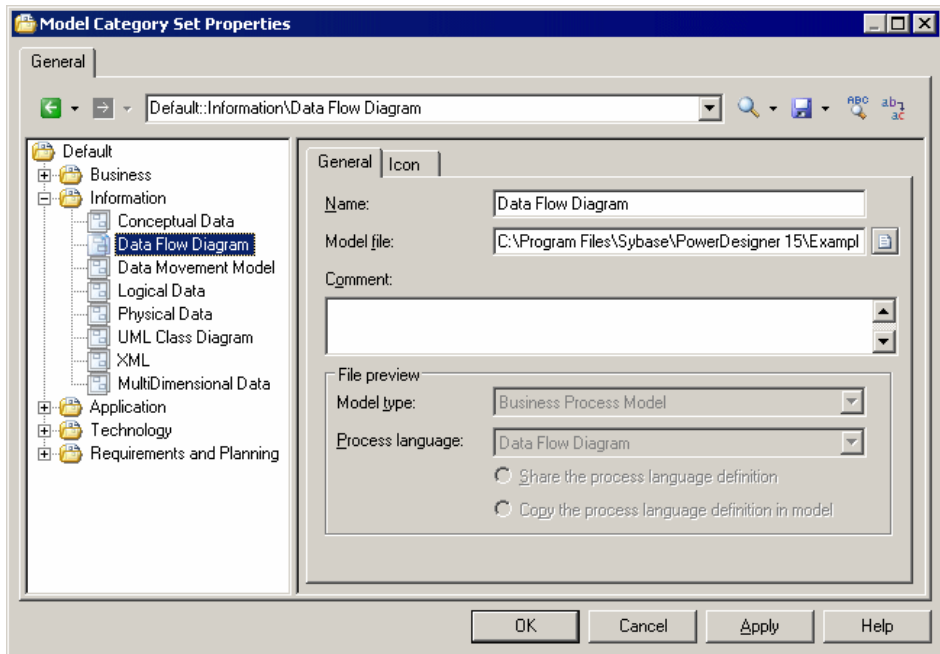
### Adding a Model from Template to a Model Category Set

Models from templates are templates that point to existing model files that, in addition to specifying a target and extensions, can contain multiple diagrams, display preferences, general and model options, etc.

In order to add a model from template to a category, you must have a model file that contains all the appropriate parameters ready to point to.

1. Right-click the category to which you want to add the template, and select **New > Model from Template**.
2. On the General tab, enter a template name and click the **Select File** tool to the right of the Model file field to browse to and select the model file to use as the template.
3. [optional] On the Icon tab, click the **Browse for icon** tool to change the default template icon.

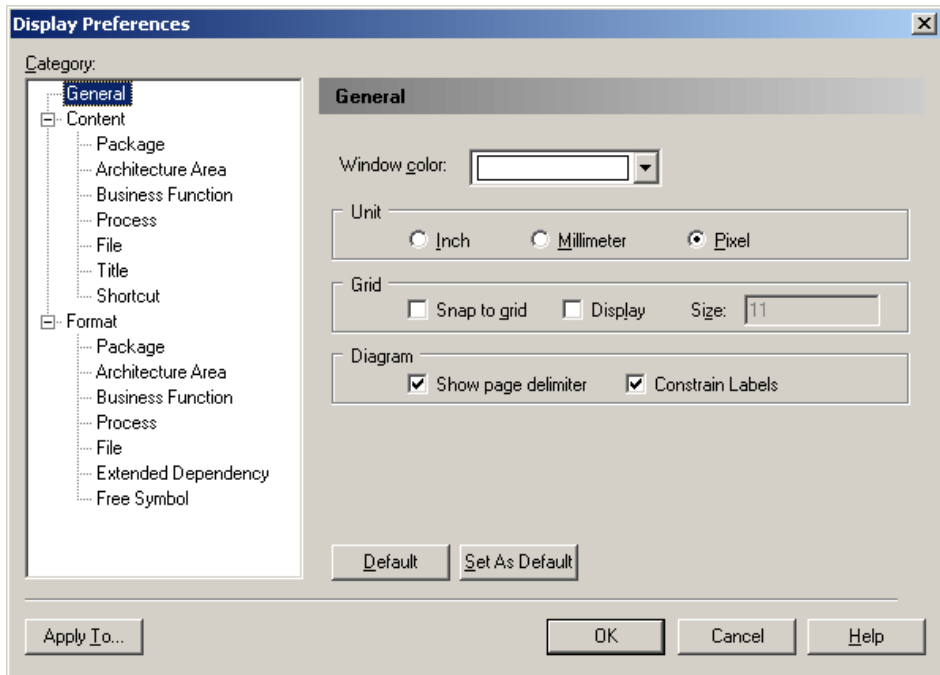
In the following example, the Data Flow Diagram template is specified to create a Business Process Model from an existing dfd.bpm model, and will inherit its pre-configured options, preferences, extensions, and objects:



## Display Preferences

You can set default display preferences for the symbols in your model. Using the Display Preferences dialog box you can:

- Define preferences for the current diagram
  - Apply display preferences to a selection of diagrams
  - Restore default display preferences
  - Set new default display preferences
1. Open the diagram that contains the objects for which you want to change the display preferences. Select **Tools > Display Preferences** to open the Display Preferences dialog box:



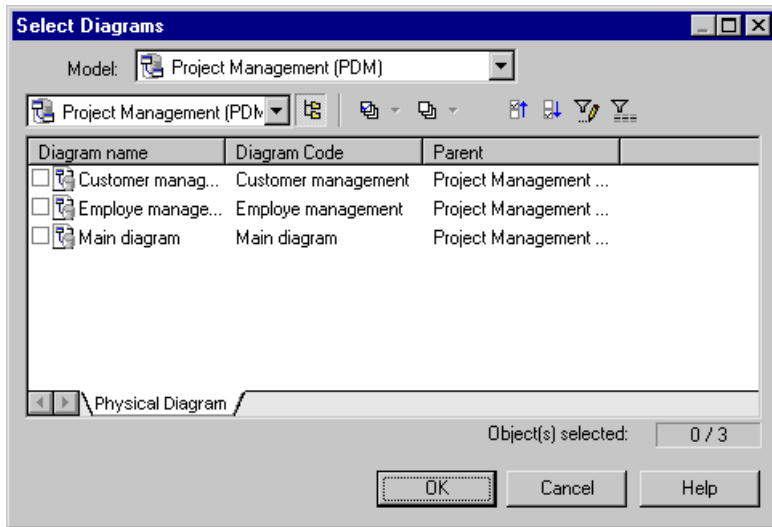
2. Select categories in the left hand panel and set preferences in the right-hand panel. There are three broad categories of display preferences:

- General display preferences – which control the format of the diagram itself (see *General display preferences* on page 292)
- Content display preferences – which control what information is displayed on an object's symbol (see *Content display preferences* on page 294)
- Format display preferences – which control the look (color, line style, font, and others) of the symbol (see *Format display preferences* on page 301)

On each of the pages, you can, at any time click:

- the Default button, which reverts any changes to their default values
- the Set As Default button, which assigns the current values to defaults.

3. [optional] Click the Apply To button to open the Select Diagrams dialog box:

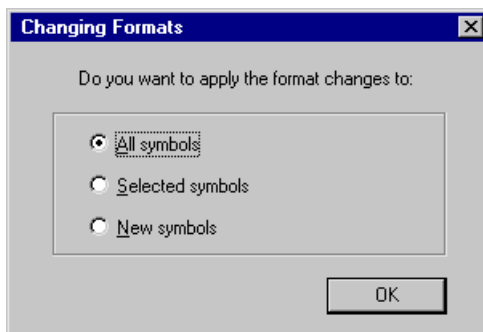


Select the checkboxes of the diagrams to which you want to apply your changes and click OK. You will be asked whether you want to apply your changes to all the symbols in the selected diagrams. If you click:

- Yes – All existing and new symbols will reflect your changes to the Format, General and Content display preferences.
- No – New symbols only will reflect your changes. Only the General and Content display preferences are applied to existing symbols. The Format changes are canceled.
- Cancel – Your changes will not affect any symbols in any diagrams except the current one.

In each case, you return to the Display Preferences dialog box.

4. On the Display Preferences dialog box, click OK. The Changing Formats dialog box will open:

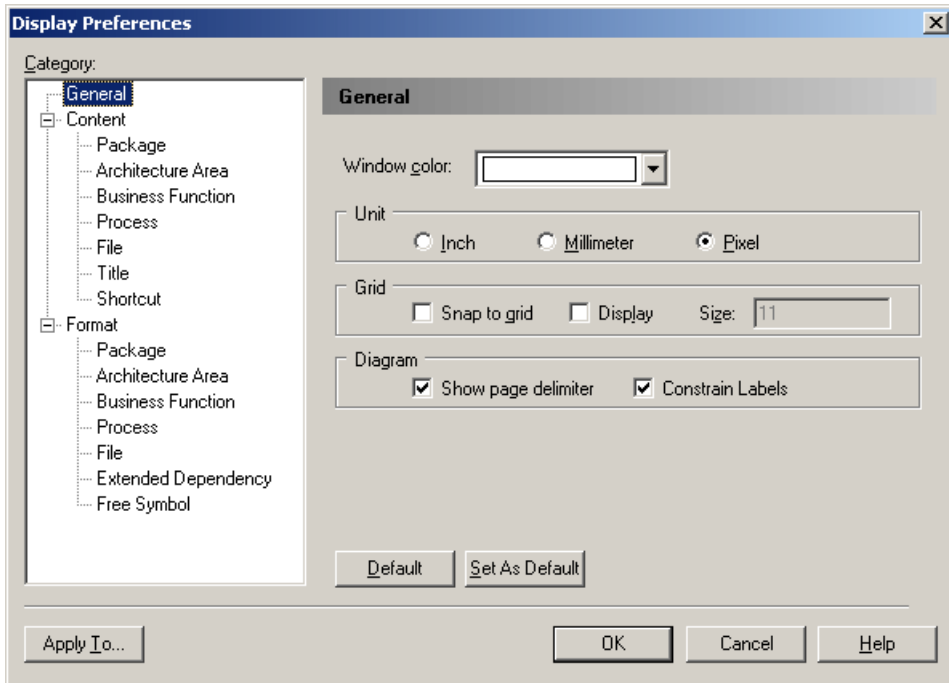


The choices in this dialog apply only to the present diagram and will not override your choices made in the Select Diagrams dialog box.

5. Click OK to apply your changes

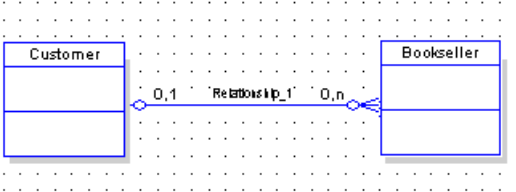
## General Display Preferences

The General category allows you to control the general look of the diagram.



You can set the following preferences:

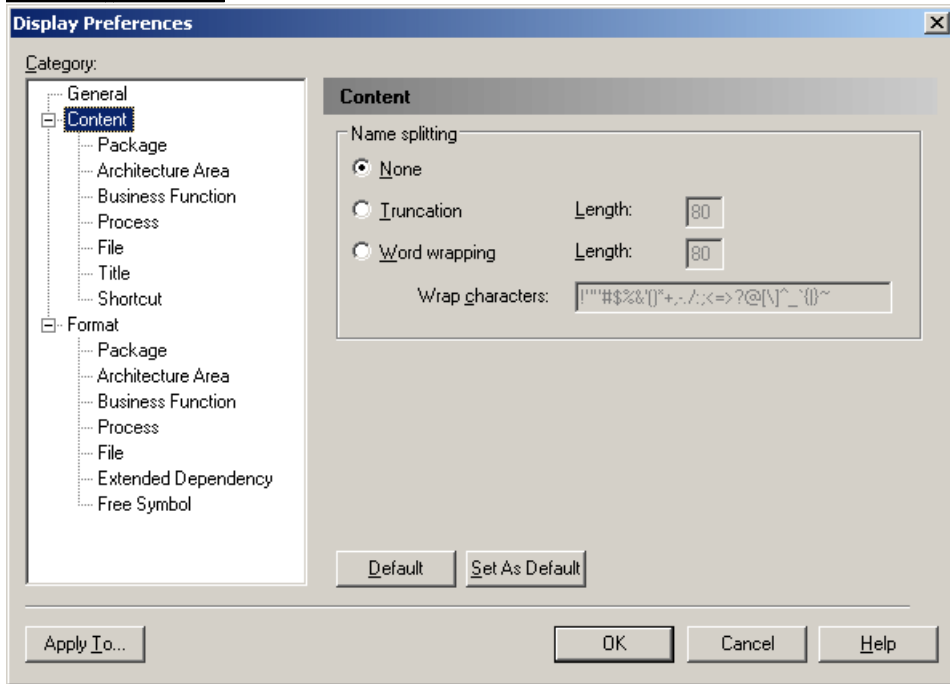
Property	Description
Window color	Sets the background color for the diagram.
Unit	Specifies the measurement unit for symbol size. You can choose between inches, millimeters, and pixels.

Property	Description
Snap to grid	<p>Automatically aligns all new objects that you create in the diagram window to the anchor points of a grid.</p>  <p>You can specify the size and visibility of the grid with the Display and Size options.</p> <p>All existing objects are aligned automatically when you move them within the diagram.</p>
Display	Activates a grid in the background of the diagram.
Size	Determines the number of anchor points per square inch in the grid.
Show page delimiter	Shows limit of pages on the diagram background
Constrain labels	Limits the distance to which you can displace labels from link objects. Uncheck this option to be able to move link labels anywhere in your diagram.
Organization unit swimlane	<p>[diagrams with swimlanes only] Specifies that organization units will be displayed as swimlanes.</p> <p>When this options is selected, you may also specify the direction of the swimlanes, in choosing between Horizontal and Vertical.</p>
Darken Child Symbol	[diagrams with composite symbols only] Specifies that the symbols of child objects are darker than those of their parents in order to make them stand out more.
Orientation	[diagrams with tree structures only] Specifies the direction in which branches will expand. You can choose between Horizontal and Vertical.

## Content Display Preferences

The Content category allows you to control what information is displayed in object symbols.

### Content Category



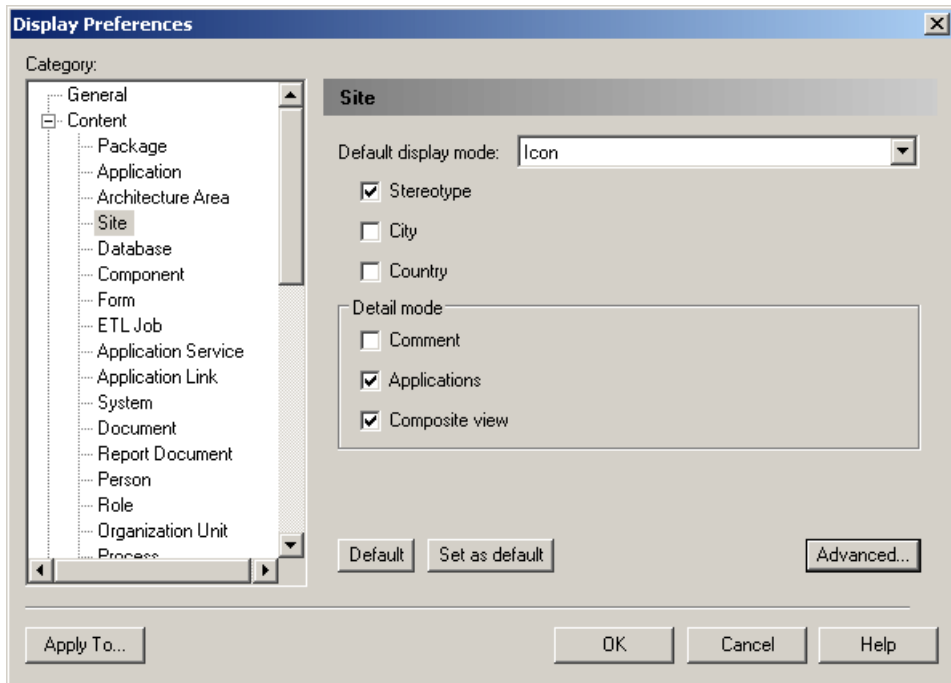
By clicking on the category itself, you can set the following preferences:

Preference	Description
Name Splitting	Controls the display of names on symbols. You can choose between: <ul style="list-style-type: none"> <li>• None</li> <li>• Truncation - Truncates name (or code), to the specified length</li> <li>• Word wrapping - Wraps name and code text onto additional lines (up to the specified length) after the specified wrap character (up to the indicated length)</li> </ul>
Wrap characters	Specifies a set of characters after which word wrapping is possible.

Preference	Description
Display overlay for non-local objects	Enables the display of an overlay on objects being reused in the same container but with distinct location. For instance an activity can be reused under another activity of the same package or an inner class can be referenced by another class of the same package. The overlay is a mirror image of the shortcut overlay (see <i>Shortcuts</i> on page 355).

## Objects

You can modify the information displayed on each type of object by selecting it in the list.



Choose the information that you want to display by selecting the appropriate checkboxes.

## Customizable Display Preferences

The display preferences of many objects can be customized so that practically any of their properties can be displayed on their diagram symbol, with the following exceptions:

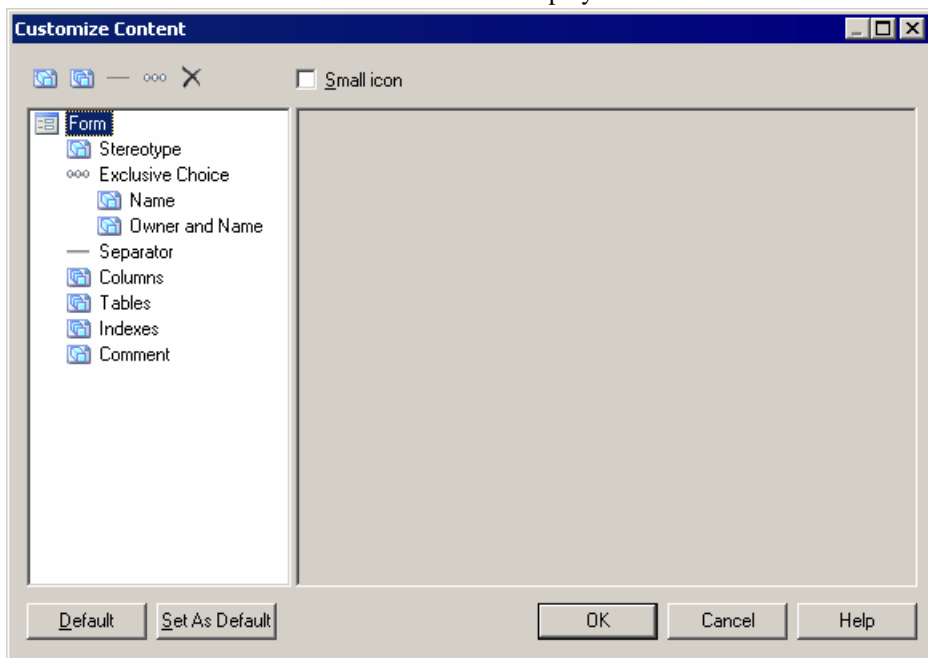
- multi-line fields and collections (such as table columns or class operations) cannot be displayed in icon mode or on link symbols

The following special preferences may be available for these objects:

Preference	Description
Default display mode	<p>Specifies the way the object will be displayed by default:</p> <ul style="list-style-type: none"> <li>• Icon</li> <li>• Detail – a rectangle permitting the display of additional information</li> </ul> <p>This preference is only available if the object supports both modes.</p>
Detail mode	<p>Specifies the additional information that will be displayed in Detail mode:</p> <ul style="list-style-type: none"> <li>• Comment – from the General tab of the object's property sheet</li> <li>• <i>[collections]</i> – for example, sub-sites, applications, etc.</li> <li>• Composite view - displays child objects as symbols within the object symbol. If this option is present, it cannot (unlike the other preferences) be removed from this screen</li> </ul>

### **Customizing Content Display Preferences**






If an object supports customizing the information that you can display on its symbol, an Advanced button is available in the bottom-right corner of its Content Display Preferences page. Click this button to go to the Customize Content window, which allows you to choose and reorder the information that is available for display in the Content window.



The list in the left hand pane shows the properties that are currently available to display on the symbol in the Display Preferences dialog. In the case of link symbols the list contains three

sublists, Source, Center, and Destination, which allow you to specify different content to display on each of these parts of the link symbol.

You can drag and drop items to reorder the list, and use the following tools to modify it:

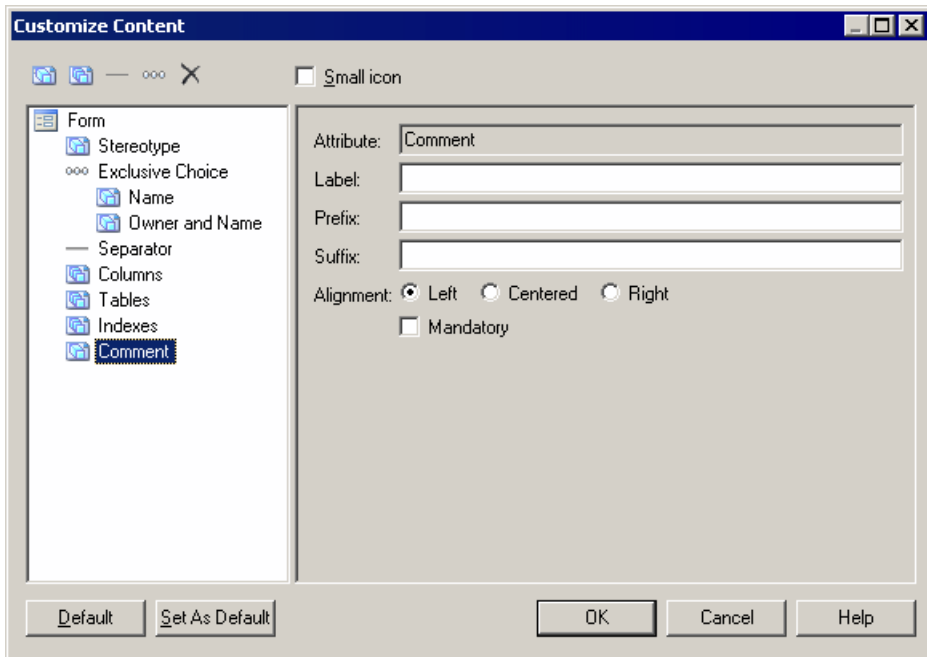
Tool	Description
	Add Attributes – allows you to select additional attributes to add to the list.
	Add Collections – allows you to select additional collections (such as table columns, class operations, etc) to add to the list.
	Add Separator Line – inserts a separator line after the item selected in the list.
	Add Exclusive Choice - inserts an item under which you can group properties from which your users will choose one to display.
	Delete – removes the selected item from the list.

Select the **Small icon** check box to display a small object icon in the top-left corner of the symbol in detail mode.

### Configuring Attributes

Click on an attribute in the list to set the following options:

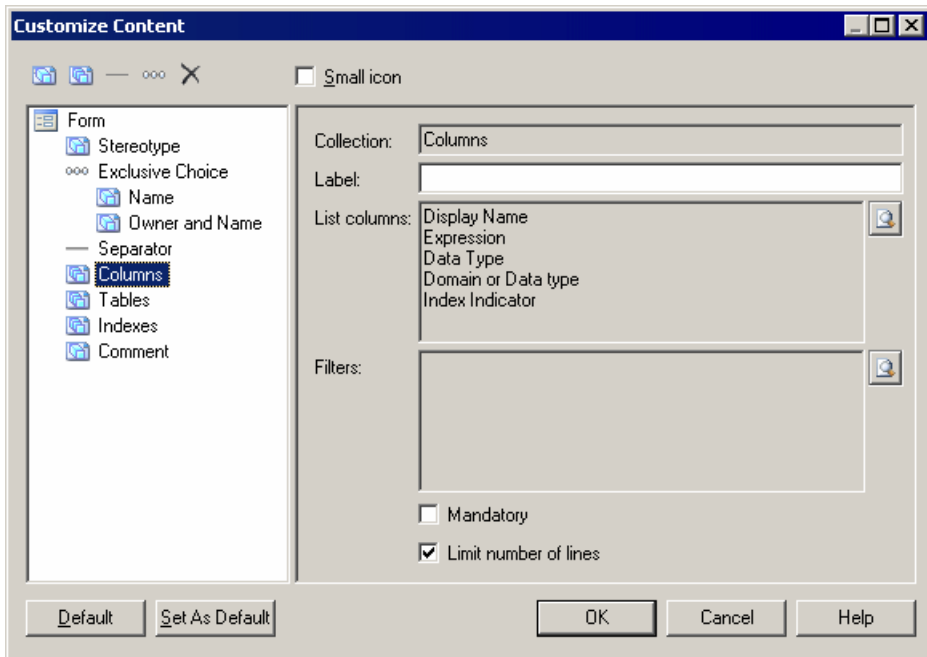
- **Label** - Specify a label to use in the Display Preferences dialog in place of the attribute's name.
- **Prefix** and **Suffix** - Add a prefix and/or suffix to the value of the attribute (text items only).
- **Alignment** - Specify the alignment of the text (unlimited text items only).
- **True** and **False** - Specify a value to display for true and false (booleans only) For example, for a boolean attribute, "Annotated", you could specify "Annotated" and "Not Annotated" for true and false. By default, boolean properties are displayed if they are true and do not appear if they are false.
- **Mandatory** - Specify that it is mandatory. Mandatory properties are always displayed on the symbol, and are not available for deselection in the Display Preferences dialog.



## Configuring Collections

Click on a collection in the list to:

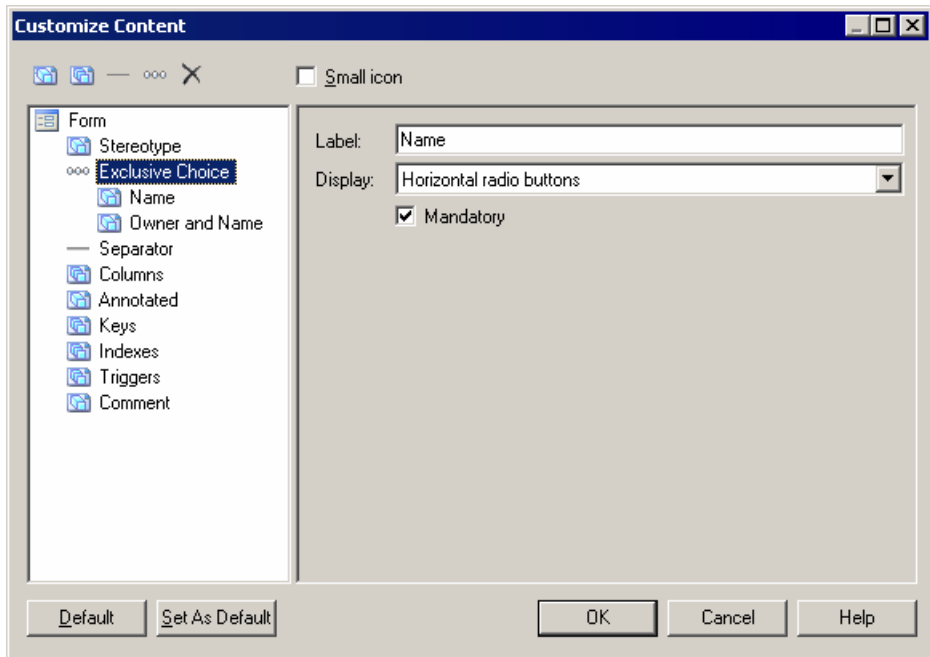
- **Label** - Specify a label to use in the Display Preferences dialog in place of the collection's name.
- **List columns** - Specify the properties displayed for each object in the collection. Click the Select tool beside the List columns field to select attributes for display.
- **Filters** - Specify one or more filters to offer as options when choosing to display the collection. Click the Select tool beside the Filters columns field to open the Define Available Collection Filters dialog, enter a name for the filter and then click the ellipsis button in the Filter Expression column to define the parameters of the filter. You can specify as many filters as you need. They will be available for selection in the Display Preferences dialog in the form of radio buttons under the checkbox to select the collection
- **Mandatory** - Specify that it is mandatory. Mandatory properties are always displayed on the symbol, and are not available for deselection in the Display Preferences dialog.
- **Limit number of lines** - Provide a field allowing the user to limit the display of collection members to a number that they enter.



### Configuring "Exclusive Choices"

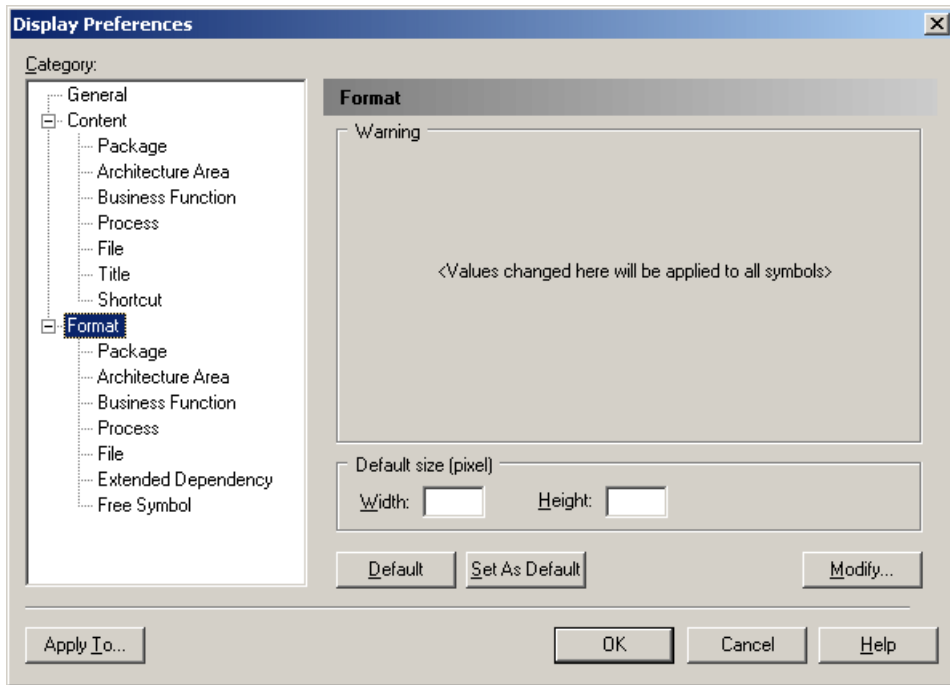
Click on an exclusive choice in the list to:

- **Label** - Specify a label to use in the Display Preferences dialog in place of the collection's name.
- **Display** - Specify whether the choice displays as horizontal or vertical radio buttons or as a combo list.
- **Mandatory** - Specify that it is mandatory. Mandatory properties are always displayed on the symbol, and are not available for deselection in the Display Preferences dialog.



## Format Display Preferences

The Format category allows you to control the look of object symbols.



By clicking on the category itself, you can set the following preferences:

Preference	Description
Default Size	Horizontal and vertical size of a symbol containing text (measured in units of 1/7200 of an inch)

**Note:** The Preview box displays the format of the new objects you are going to create not the format of existing objects. In the case of existing objects, only the attributes modified in the display preferences are modified in the diagram

## General Options

You can control the look and behavior of the PowerDesigner interface through the general options, the values for which are saved in the registry of your local machine.

To set general options, select **Tools > General Options**. The following options are available under the **General** category:

Option	Description
Autosave	<p><b>Save recovery backup file every x minutes</b> - Instructs PowerDesigner to save changes to all open models to a recovery backup file at the specified interval. Enabling this option provides you with a recovery option if PowerDesigner or your computer crash before you have had a chance to save your changes.</p> <p>The save will take place after the interval has passed, but only when PowerDesigner is idle for more than ten seconds. Note that saving large or multiple models may take several seconds, and that PowerDesigner will not be responsive while it is performing the save.</p> <p>In the event that your modeling session exits abnormally, when next you open PowerDesigner you will be invited to restore your unsaved models. You can choose:</p> <ul style="list-style-type: none"> <li>• <b>Yes</b> - to open the recovered models in the Browser allowing you to review and save or delete them as necessary.</li> <li>• <b>No</b> - to postpone reviewing the recovered models until the next time you open PowerDesigner.</li> </ul> <hr/> <p><b>Note:</b> This option is not supported for the PowerDesigner plugins for Eclipse and Visual Studio.</p>
Delete	<p><b>Confirm object deletion</b> - Controls the display of a confirmation dialog box when you delete an object. If you disable this option, the confirmation dialog will no longer be shown and the default behavior is as follows:</p> <ul style="list-style-type: none"> <li>• Deleting an object symbol - the symbol only is deleted</li> <li>• Deleting an object in the browser - the object, any sub-objects it contains, and any associated diagram symbols are deleted.</li> </ul> <p>You can delete any object without confirmation at any time by selecting its symbol in a diagram and pressing Shift+Delete</p> <p>For more information, see <i>Deleting Objects</i> on page 130.</p>
Startup	<p><b>Auto-reload last workspace</b> - Opens the last-edited workspace when you launch PowerDesigner. If this option is unchecked, PowerDesigner will open with an empty workspace.</p> <p><b>Show welcome page</b> - Displays the Welcome Page when starting PowerDesigner. If you select the Do not show this page again check box in the Welcome page, the Show Welcome page option is deselected.</p>

Option	Description
Browser	<p><b>Browser drag and drop: Default action</b> - Specify the default result of dragging and dropping an object (without any modifier key) in the Browser. You can choose from the following:</p> <ul style="list-style-type: none"> <li>• <b>Move (Shift)</b> – The object is displaced to the new location (parent object, package, model, etc).</li> <li>• <b>Copy (Ctrl)</b> – A copy of the object is created in the new location.</li> <li>• <b>Create Shortcut (Ctrl + shift)</b> – A shortcut to the object is created in the new location.</li> <li>• <b>Create replica (Alt + shift)</b> – A replica of the object is created in the new location.</li> </ul> <p>The modifier keys given after the option are valid no matter what the default behavior.</p>
Output log	<b>Log path</b> - Specifies the path to the log file where PowerDesigner records all of its outputs.
Graphical tool behavior	<b>Edit in place after creation</b> - Allows you to directly modify the name of an object from the object symbol in the diagram without opening its property sheet whenever you create an object with the palette
Sort	<b>Natural Sort</b> - Treats numbers numerically when sorting objects in the Browser. For example, a naturally sorted list of tables would have the order: Table_1, Table_3, Table_12, Table_20.

## Dialog Box General Options

To set general options for dialog boxes, select **Tools > General Options**, and select the Dialog category in the left hand pane.

The following options are available:

### Operating Modes

Option	Description
Auto Commit	<p>Specifies that any change made in a property sheet is automatically committed in the object definition. You cancel a change by using the Undo feature.</p> <p>If this option is disabled, you must click Apply or OK to commit your changes.</p>

Option	Description
Name to Code mirroring	<p>Automatically keeps the code of an object synchronized with its name via the application of any naming conventions (see <i>Naming Conventions</i> on page 315). To disable Name to Code mirroring on an individual object, click to deselect the equal sign button to the right of the code field.</p> <p>This option is independent of (but required by) the <b>Enable name/code conversions</b> model option, which permits more complex transformations on codes via controls the application of conversion scripts (see <i>Name and Code Conversion Scripts</i> on page 317).</p>

### Property Sheets

In PowerDesigner, property sheets appear by default with a certain size and a series of tabs in the upper part of the dialog box. The following options are available for property sheets:

Option	Description
Keep size	Preserves the customized size you have defined
Keep last tab	Opens the property sheet to the last selected tab
Open mode	<p>Controls how property sheets are opened. You can choose between:</p> <ul style="list-style-type: none"> <li>• Open each object in the same property sheet</li> <li>• Open each object in its own property sheet</li> </ul>
Tabs mode	<p>Controls the display of tabs. You can choose between:</p> <ul style="list-style-type: none"> <li>• Tabs on one row - Aligns all tabs on a single line with arrow buttons &lt; and &gt; for browsing</li> <li>• Tabs on several rows - Displays tabs on two lines, their size corresponding to the length of their title.</li> </ul>

### Shortcut Property Sheets

The following options are available:

Option	Description
Internal Shortcut	<p>Controls whether double-clicking an internal shortcut opens the property sheet for the shortcut or for the target object.</p> <p>You can switch from one mode to the other by pressing the shift key while opening the property sheet. If the target object cannot be found (target model is closed for example), the shortcut property sheet automatically opens.</p>

Option	Description
External Shortcut	Controls whether double-clicking an external shortcut opens the property sheet for the shortcut or for the target object.

For more information, see *Shortcuts* on page 355.

### Object Lists

The following options are available:

Option	Description
Auto-insert rows	Specifies that a new item is created automatically in a list when you click an empty row
Use default name	Specifies that new items are given default names upon creation, allowing you to create multiple new objects without having to supply names or other properties.

### Specifying Text Editors

When you are using PowerDesigner, you will need to edit such things as descriptions and annotations for objects, or generated scripts like SQL in the PDM or Java in the OOM

By default, all files are edited using PowerDesigner's internal editor. You can define an external text editor to launch automatically for editing various kinds of objects. You can define as many text editors as you need, and the same file extension can have several text editors allocated, with the first listed acting as the default.

1. Select **Tools > General Options** and click the Editors category in the left-hand pane.
2. Click the Insert a Row tool, and enter a file extension (such as .DOC, .RTF, .TXT, .XLS) in the Extension column.

The Editor Name and Editor Command columns are both set to <internal> to indicate that the internal PowerDesigner editor will be used to edit files with this extension.

3. [optional] Enter an editor name (such as MS Word, Notepad, MS Excel) in the Editor Name column, and enter an editor command (such as winword.exe) in the Editor Command column. You can click the ellipsis button in this field to browse to the relevant directory.
4. Click OK to close the dialog box.

## Defining Environment Variables

The following variables are created when you install PowerDesigner:

Variable	Description	Default
CMD	Windows command interpreter	command.com or cmd.exe
HOME	Variable defining the default home directory	—
J2EEVERIF	Batch program for verifying if the deployment jar for an EJB is correct	verifier.bat
JAR	Command for archiving java files	jar.exe
JAVA	Command for running JAVA programs	java.exe
JAVAC	Command for compiling JAVA source files	javac.exe
JAVADOC	Command for defining JAVA doc comments	javadoc.exe

You can edit these variables and add your own.

1. Select **Tools > General Options**, and click the Variables category in the left-hand pane.
2. Click in the row of an existing variable in order to edit its values, or click the Add a Row tool to create a new variable.
3. Click OK to close the dialog box.

Variables defined here are used in commands in the Generation\Commands sub-category of the JAVA object language, and can be used in the Generation Template Language.

The syntax for using these variables in GTL requires that you add \$ before the variable name within the % signs, for example %\$CMD%.

For more information about the GTL, see the Customizing Generation with GTL chapter of the *Customizing and Extending PowerDesigner* manual.

## Defining Named Paths

When you add a document or a model to the workspace, create an external shortcut, or perform various other file operations, PowerDesigner saves the paths to these external files in the workspace or model files.

However, in a team environment, when people exchange model files, the links may be broken when one user opens the file of another .

To solve this potential problem, you can define *named paths* in PowerDesigner. A team leader can define a list of names corresponding to shared resource files and specify a folder structure. Then each team member recreates the named paths on his/her workstation.

PowerDesigner provides a number of predefined named paths, each of which is preceded by an underscore:

Name	Path
_DBMS	Folder where DBMS definition files are stored
_EXAMPLES	Folder where the demo examples are stored
_HOME	PowerDesigner installation folder
_LIBRARY	Folder where object libraries are stored
_OBJLANG	Folder where object language definition files are stored
_PRCSLANG	Folder where process language definition files are stored
_RTPLANG	Folder where report language definition files are stored
_XEM	Folder where extended model definition files are stored
_XMLLANG	Folder where XML language definition files are stored

### **\_HOME Predefined Named Path**

\_HOME is a very useful named path that facilitates the installation of your add-ins without having to modify your XEM or your XML or ActiveX add-ins commands.

For example: %\_HOME%\add-ins\SpellChecker\SpellCheckAddIn.dll

By default, the path of a predefined named path corresponds to the installation path you have selected. If you use files proceeding from another directory, the path of the predefined named paths is not automatically modified. You have to carry out this change manually.

You should not modify the name of a predefined named path. If you do so, the predefined named path is preserved in the list and a new named path is created with the name and path of the modified predefined named path.

If you modify the path of a predefined named path and want to cancel the change, you have to select the predefined named path in the list, delete it and click OK in the General Options dialog box. The next time you open the Named Path page in the General Options dialog box, the deleted predefined named path is displayed in the list with the default installation path.

### **Saving a File**

When you save a PowerDesigner model or workspace, the name of a named path is substituted for the actual path. For example, if the HOME named path is defined as:

```
HOME = c:\Program Files\Sybase
```

And you have the following path in your model:

```
c:\Program Files\Sybase\PowerDesigner\tempo_samples
```

When you save this file, the path will be saved as:

```
%HOME%\PowerDesigner\tempo_samples
```

### **Opening a File**

When you open a file, named paths are replaced by the value of that path in the local environment. For example:

```
%HOME%\PowerDesigner\tempo_samples
```

becomes:

```
c:\Program Files\Sybase\PowerDesigner\tempo_samples
```

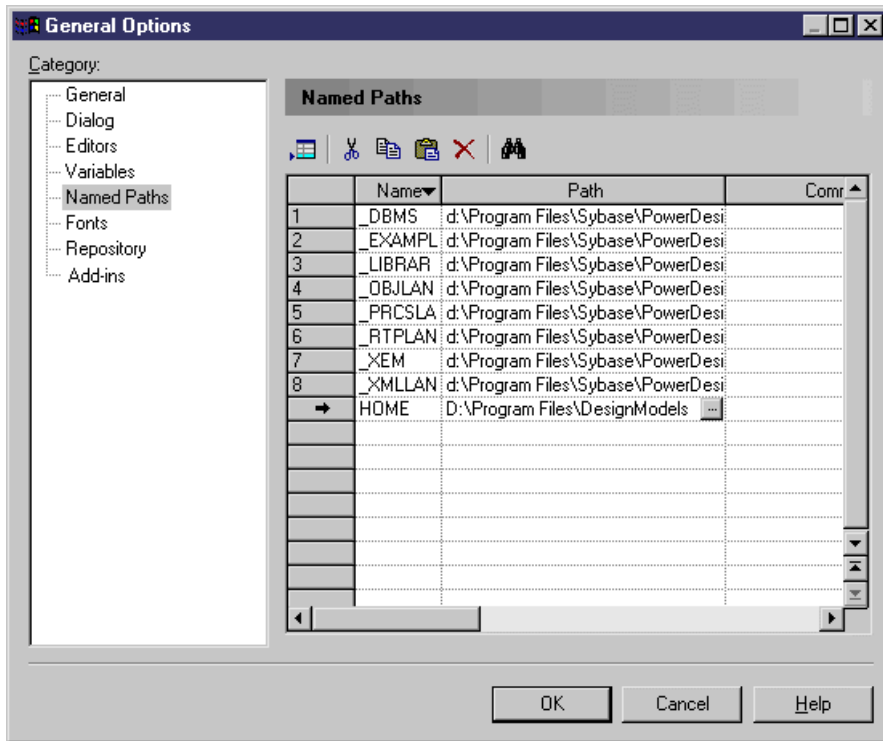
If you open a file containing a named path not defined on the current machine, the Unresolved Named Path dialog box open, offering you the following options:

- Ignore the named path and keep the file name unresolved - The link between files is broken and you may have update problems.
- Define a new named path ... - Allows you to define the path on your machine.
- Browse another existing variable to replace with – Allows you to resolve the path using one of your existing names paths.
- Directly browse the target file – Allows you to browse for another target file. The selected file will replace the file you were trying to open

### **Creating a Named Path**

You can create additional named paths. Your team should agree on the names of any named paths to be created.

1. Select **Tools > General Options**, and then click the Named Paths category.
2. Click the Add a Row tool and enter a name and a path for the named path.



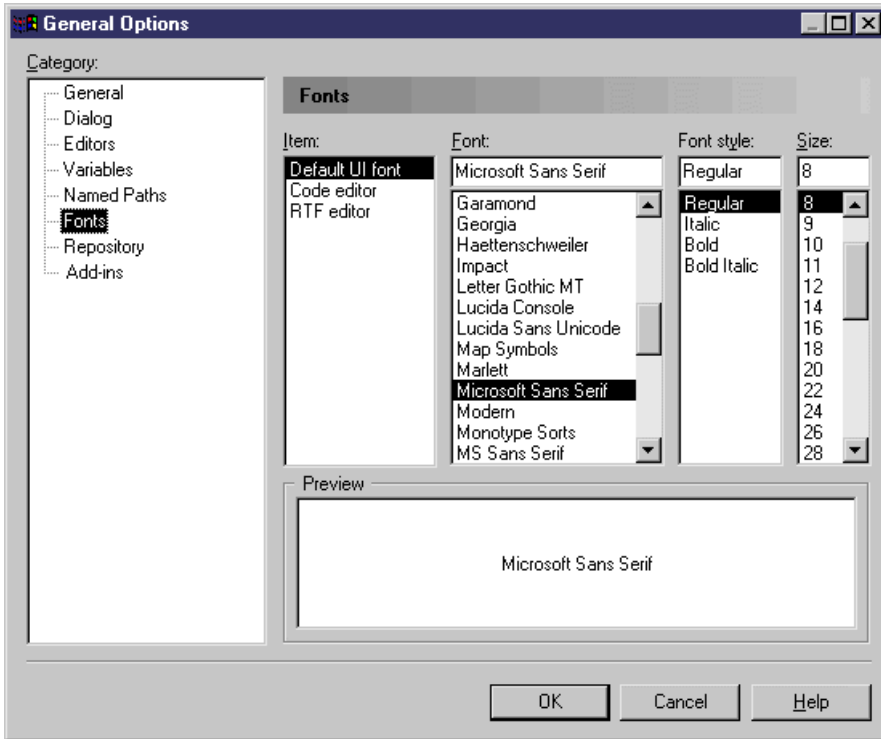
3. Click OK.

## Defining Default Interface Fonts

You can modify the default font proposed for:

- User interface (lists)
- Code editor (SQL preview)
- RTF editor (description, annotation)

1. Select **Tools > General Options**, and then click the Fonts category.
2. Specify the appropriate font format options.



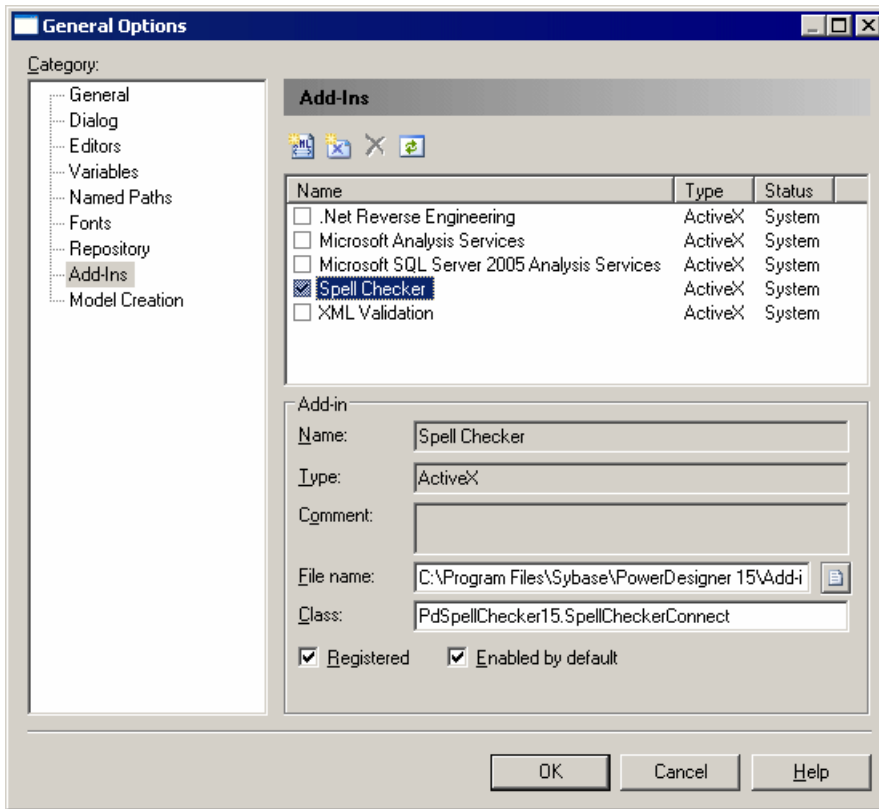
3. Click OK.

## Managing Add-Ins

An add-in is a module that adds a specific feature or service to PowerDesigner. PowerDesigner provides several add-ins by default.

Add-in	Description
Microsoft Analysis Services	Imports multidimensional data from MS SQL Server into a PDM. Microsoft Analysis Services must be installed on the current machine.
Microsoft Word Import Export	Imports and exports MS Word documents to and from requirements models.
.Net Reverse Engineering	Reverse engineers VB .Net and C# source files.
Spell Checker	Uses the MS Word spell checker for PowerDesigner object names, codes, comments, descriptions, and annotations
XML Validation	Checks that an XML document conforms to the current schema in the XML model. This add-in requires MSXML 4.0

You enable an add-in by selecting its checkbox.



Add-ins installed with PowerDesigner are called *system* add-ins, and are declared in a Local Machine Registry key. If you modify system add-in properties, you can click the Reset Values For System Add-In tool to recover add-in parameters as they are registered in the Local Machine key.

You can create your own add-ins. User-defined add-ins are called *user* add-ins, they are declared in a Current User Registry key.

### .Net Reverse Engineering

In order to use the .Net binary reverse, you need to register the application reverseapp.exe.

.Net Framework 1.1 must be installed. You must use the regasm.exe program located in the Windows directory under the Microsoft.NET\Framework folder. The command line is the following:

```
regasm /codebase reverseapp.exe
```

The .net Assemblies command is displayed in the **File > Reverse engineer** menu. The executable can also be used separately from PowerDesigner.

```
ReverseApp -c|-v [-l ] [-r ] [-g]
```

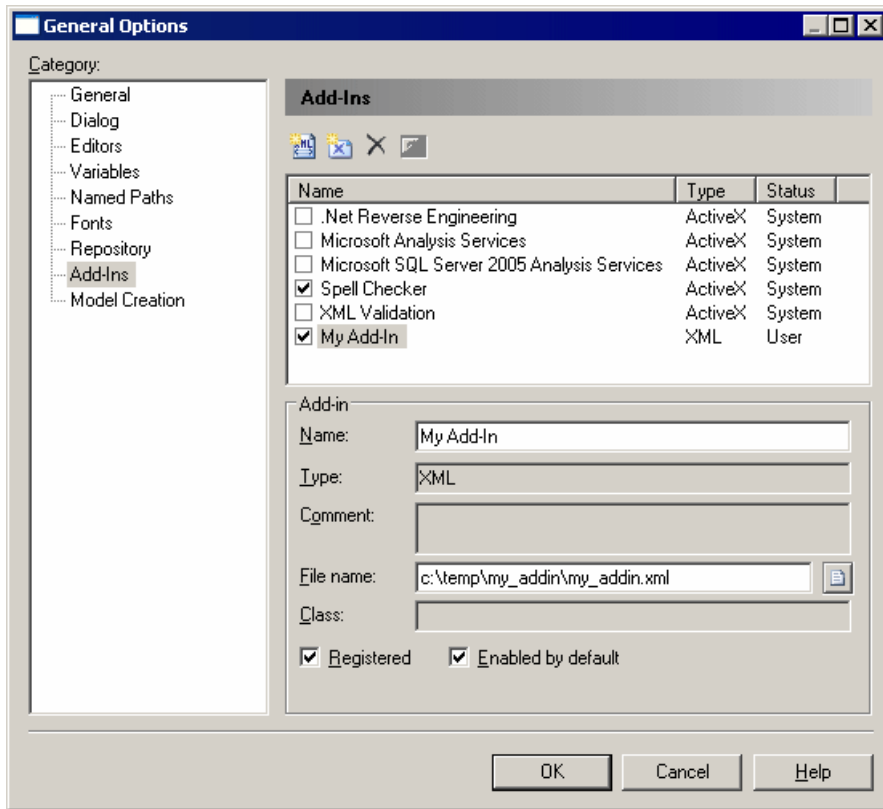
- l: followed by library file name, this option can be repeated several times.
- r: recursively forces to reverse engineer parameter type and return type.
- g: does not display reverse engineering dialog box and directly proceeds with reverse engineering.
- c: reverse engineers C# model.
- v: reverse engineers VB.Net model.

ReverseApp will retrieve the namespaces, classes, and other objects defined in these assemblies and create a corresponding Object-Oriented Model.

### **Declaring Your Own Add-In**

You can create your own XML or ActiveX add-ins by declaring and enabling them in the **Add-Ins** page of the General Options dialog.

1. Select **Tools > General Options**, and then click the **Add-Ins** category.
2. Click the **Add New XML Add-In** or **Add New ActiveX Add-In** tool.  
An ActiveX add-in implements an interface that defines methods, which are invoked by PowerDesigner in order to dialog with menus and execute commands that are defined by the ActiveX. An XML add-in uses a declarative program with a language linked to an .EXE file or a VB script.
3. Enter the name of your add-in in the **Name** box and click the **Select File** tool to the right of the File name field to browse to the .xml, .dll, or .exe file.
4. [ActiveX only] Enter the name of the ActiveX implementation class in the **Class** field.



5. Click **OK**.

For more information about the add-in creation procedure, see "Customizing PowerDesigner Menus Using Add-Ins" in the Scripting PowerDesigner chapter of *Customizing and Extending PowerDesigner*.

### **Spell Checking**

Spell checking in PowerDesigner is only available if you have MS Word 2000 or higher installed on your machine, and if your system code page is consistent with the model language. For example, for the spell checker to work properly on a Chinese model, your system code page should be Chinese.

### **Enabling the Spell Checker**

The spell checker is a PowerDesigner add-in that needs to be enabled to work properly.

1. Select **Tools > General Options** to open the General Options dialog box.
2. Click the Add-Ins node in the Category tree view and select the Spell Checker checkbox.
3. Click OK to return to the model diagram.
4. Select **Tools > Spell Checking Options** to open the Spell Checking Options dialog box.

5. Select the properties of model objects for which you want to check the spelling. If you select Check sub-objects, then all the child objects of any object you check will also be checked.
6. Select the language of your model in the Dictionary Language list, and then click OK to return to the model diagram.

### **Using the Spell Checker**

You can use the spell checker at any time.

1. Right-click an object or a model node and select Spell Check in the contextual menu.  
Spell checking starts. If an error is found the Spell Checking dialog box opens.
2. For each error, you can:
  - Click Change to accept the suggested replacement word
  - Type your own replacement and click Change
  - Click Change All to apply the change to the entire object or model
  - Click Add to add the word to your custom dictionary

A message is displayed to inform you that spell checking is successful.

## **Customizing the New Model Dialog**

You can control the format of the New Model dialog by hiding some of the methods of model creation.

To set general options for model creation, select **Tools > General Options**, and click the **Model Creation** category in the left hand pane. The following options are available:

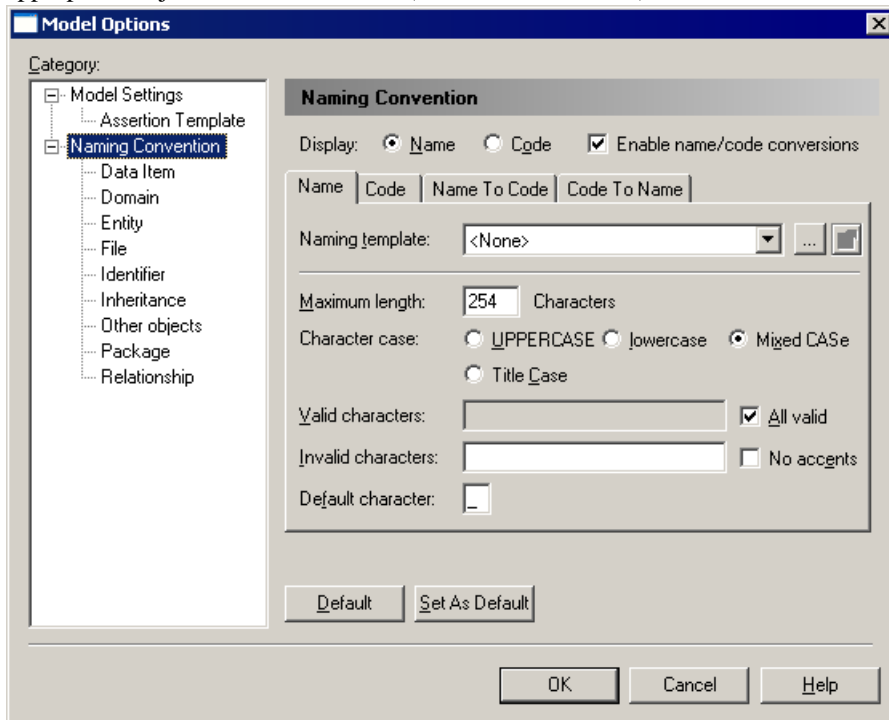
Option	Description
Enable Categories	<p>Enables the display of the Categories button in the New Model dialog, which lets you create models from predefined templates. Select the model category set to use in the Default category set list. If no valid model category set is selected then the Categories button will not be available.</p> <p>Click the Select Path tool to the right of this field to browse to another folder containing model category sets or click the Properties tool to open the currently-selected set in the Resource Editor. For more information about category sets, see <i>Guiding Model Creation through Categories and Templates</i> on page 283.</p>
Enable Model Types	<p>Enables the display of the Model types button in the New Model dialog, which lets you create models from the classic list of model types.</p>

Option	Description
Enable model template files	<p>Enables the display of the Template files button in the New Model dialog, which lets you create models from model templates. If no valid template directory is selected then the Templates button will not be available.</p> <p>Click the Select Path tool to the right of this field to browse to another folder containing model templates. For more information about model templates, see <i>Model Templates</i> on page 97.</p>

For information about using the New Model dialog, see *Creating a Model* on page 12.

## Naming Conventions

You can use naming conventions to specify a case, maximum length, and valid characters for object names and codes, and to invoke conversion scripts and conversion lists to generate appropriate object codes from names (or names from codes).



To set naming conventions to control the names and codes of all objects, select **Tools > Model Options** and click on the **Naming Convention** node. To set naming conventions for a particular kind of object, select its node under the **Naming Convention** node.

The following options are available on the **Naming Convention** node only and apply to all objects:

Option	Description
Display	Specifies whether object names or codes are displayed in the Browser and on diagram symbols. You can override this setting for diagram symbols by setting the appropriate display preferences (see <i>Display Preferences</i> on page 289).
Enable name/code conversions	<p>By default, when you enter an object name, the object code is autogenerated by applying the naming conventions specified on the <b>Code</b> tab below. Select this option to additionally apply the conversion scripts and conversion tables specified on the <b>Name to Code</b> tab (see <i>Name and Code Conversion Scripts</i> on page 317).</p> <p>You can decouple an object's code from its name by clicking to release the = button to the right of the <b>Code</b> field in the object property sheet and entering your own code (which will still be subject to the naming conventions). You can autogenerate a name from a code by clicking the = button to the right of the <b>Name</b> field.</p>

The following options are available on each of the **Name** and **Code** tabs of the **Naming Convention** node (where they apply to all objects) and on each of the sub-nodes (where they apply to the selected object):

Option	Description
Naming Template	Specifies a naming template to supply the naming conventions for the name or code. A naming template contains the same fields as those on this tab, but in a format that can be reused for other objects (see <i>Creating a Naming Template</i> on page 317). Click the ellipsis button to the right of this field to open the List of Naming Templates or click the Properties tool to view and edit the selected template.
Maximum Length	Specifies the maximum number of characters permitted in a name or code. In a PDM, this maximum may be set here and/or in the DBMS definition file. If both are specified, then PowerDesigner applies the stricter constraint. For example, in the case where you set 128 here and the DBMS file specifies 30, PowerDesigner will apply the 30 character limit.
Character Case	<p>Specifies the case to apply to the name or code. You can choose between:</p> <ul style="list-style-type: none"> <li>• UPPERCASE</li> <li>• lowercase</li> <li>• Mixed CASE</li> <li>• Title Case (Name only)</li> <li>• UpperCamelCase (Code only)</li> <li>• lowerCamelCase (Code only)</li> </ul>

Option	Description
Valid Characters	<p>Specifies the list of characters permitted in the name or code. Character ranges are entered between single quotes and separated by a dash. Individual or multiple characters are entered between double quotes. Each valid item is separated by a comma. By default, PowerDesigner allows the following valid characters for codes:</p> <pre>'a'-'z', 'A'-'Z', '0'-'9', "_"</pre> <p>Select the <b>All valid</b> check box to the right of this field to permit any character.</p>
Invalid Characters	<p>Specifies the list of characters not permitted in the name or code. By default, PowerDesigner excludes the following characters for names:</p> <pre>"+-*/\.,!:;"</pre> <p>Select the <b>No accents</b> check box to the right of this field to remove accents from accented characters.</p>
Default Character	<p>Specifies the character that is used to replace any invalid characters that are entered.</p>

## Creating a Naming Template

You can create a naming template to specify naming conventions for names or codes and reuse it for multiple types of objects.

1. Select **Tools > Model Options** and click the **Naming Convention** node in the Category tree.
2. Click the Ellipsis button to the right of the **Naming Template** field to open the List of Naming Templates.
3. Click the **Add a Row** button and enter a name for the new naming template.
4. Click the **Properties** tool to open the template property sheet, complete all the appropriate properties (see *Naming Conventions* on page 315), and then click **OK** to return to the list.
5. Click **OK** to return to the Model Options page.

Your template is now available for selection in the **Naming Template** field. Click the **Properties** tool to the right of this field to modify the selected template.

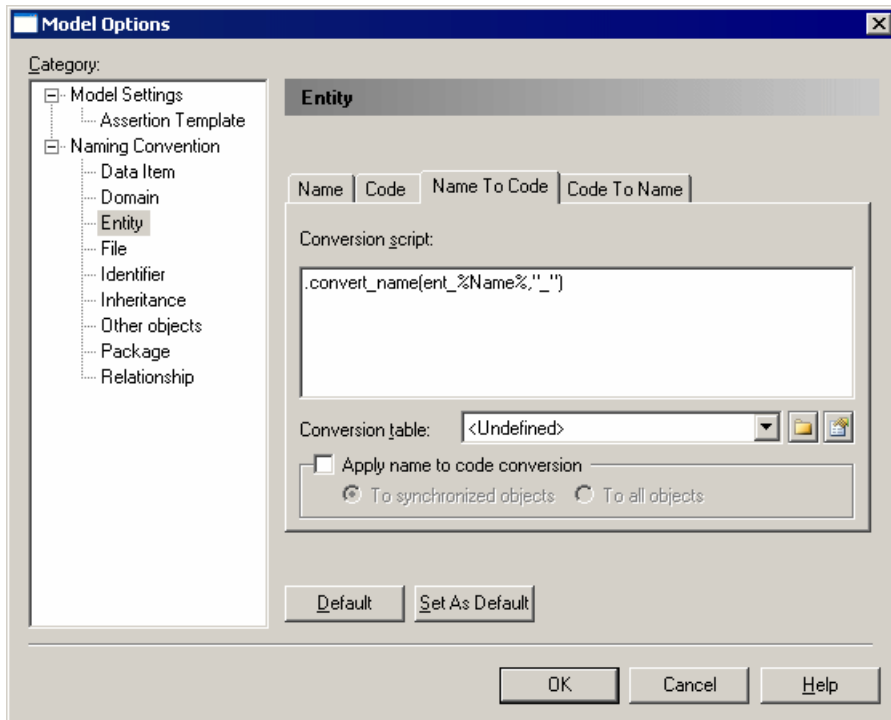
## Name and Code Conversion Scripts

Conversion scripts permit more complex transformations, including adding prefixes or suffixes and the use of conversion tables. You specify the script on the **Name to Code** or **Code to Name** tab depending on which direction you want to perform the conversion.

---

**Note:** To enable the use of your conversion script, you must select the **Enable name/code conversions** check box in the upper part of the **Naming Convention** page of the Model Options dialog.

---



The following options are available on each of these tabs:

Option	Description
Conversion script	<p>The default Name to Code conversion script is:</p> <pre>.convert_name( %Name% , "_ " )</pre> <p>This script takes the value of the <b>Name</b> field (represented by the GTL variable %Name%) and generates a <b>Code</b> by replacing any non alpha-numeric characters with an underscore.</p> <p>It also calls a conversion table (if one is selected in the <b>Conversion table</b> field) to perform conversions on specific strings encountered in the name or code.</p> <p>You can modify the conversion script as necessary. For example, to insert the prefix tbl_ before the code of each table, use the following script:</p> <pre>.convert_name( tbl_%Name% , "_ " )</pre> <p>If the stdnames conversion table is selected then, for a table with the name Customer, PowerDesigner will automatically provide a code tbl_CUST.</p> <p>You can enter any valid GTL code (including macros such as .foreach_part, .lowercase, .uppercase, .replace, and .delete), but only the .convert_name and .convert_code macros will call a conversion table if one is selected.</p> <p>For detailed information about GTL, see <i>Chapter 4, Customizing Generation with GTL</i> in <i>Customizing and Extending PowerDesigner</i>.</p>
Conversion table	<p>Specifies the conversion table to use to perform conversions on specific strings encountered in the name or code (see <i>Creating a Conversion Table</i> on page 320).</p> <p>PowerDesigner provides an example conversion table called stdnames.csv. For example, an object name Customer_1 would be transformed into the object code CUST_1 if stdnames was selected.</p>
Apply name to code conversion/ Apply code to name conversion to all objects	<p>Applies the conversion script (and conversion table) when you click <b>OK</b>:</p> <ul style="list-style-type: none"> <li>• <b>To synchronized objects</b> - those objects in which the object code is presently synchronized with the name.</li> <li>• <b>To all objects</b> - all objects in the model regardless of whether the object name is currently synchronized with the name.</li> </ul> <p>The option on the <b>Code to Name</b> tab will always apply your changes to all objects in the model.</p>

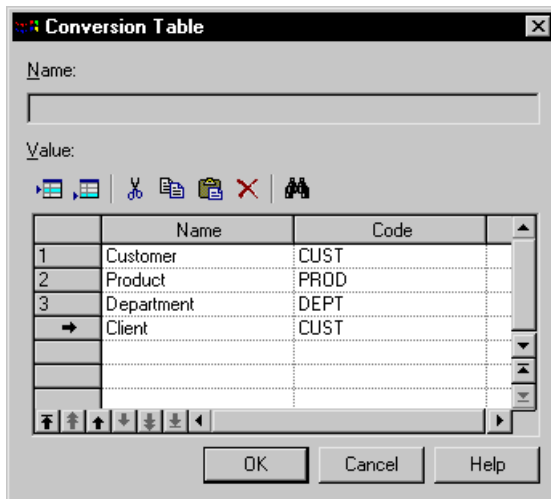
**Note:** When generating one model from another, name to code conversion can be used to provide appropriate codes for the target model objects. For more information, see the **Convert Names into Codes** options on the *Model Generation Options Window Detail Tab* on page 339).

## Creating a Conversion Table

Conversion tables are .csv files containing a list of strings that may appear in object names matched with equivalent (generally shorter) strings with which to replace them when generating object codes.

For example, each instance of the word `customer` could be converted to `cust`. To review the example conversion table provided with PowerDesigner navigate to and open `install_dir/Resource Files/Conversion Tables/stdnames.csv`.

1. Select **Tools > Resources > Conversion Tables** to open the List of Conversion Tables.  
To review an existing conversion table, select it in the list and click the **Properties** tool.
2. Click the **New** tool, enter a name and click **Save** to create the file and open the Conversion Table dialog.
3. Click the **Add a Row** tool and then enter a name and the code into which you want to convert it:



You can create as many conversion Name-Code pairs as required. The values in these columns are not case-sensitive.

---

**Note:** It may be that several different names are converted the same code. For example, `client` and `customer` may both be converted to `CUST`. If a table containing these lines were used to convert codes to names, then the first value encountered in the Name column is always used and there is a risk that multiple objects will be given the same name.

---

4. Click **OK** to return to the list of conversion tables, and then click **Close** to return to your model.

Your conversion table is now available to be selected in the Model Options dialog.

**.convert\_name and .convert\_code Macros**

These macros convert the object name to its code (or vice versa) and can search for and apply values found in an associated conversion table.

Use the following syntax to convert a name to a code:

```
.convert_name (expression[, "separator" [, "separator_pattern" ], case])
```

Use the following syntax to convert a code to a name:

```
.convert_code (expression[, "separator" [, "separator_pattern" ]])
```

The following parameters are available:

Parameter	Description
expression	Specifies the text to be converted. For <code>.convert_name</code> , this is generally the <code>%Name</code> <code>%</code> variable and may include a suffix or prefix. Type: Simple template
separator	[optional] Character generated each time a separator declared in <code>pattern-separator</code> is found in the code. For example, <code>"_"</code> (underscore). Type: Text
pattern-separator	[optional] Declaration of the different separators likely to exist in a code, and which will be replaced by <code>separator</code> . You can declare several separators, for example <code>"_ "</code> and <code>"-"</code> . Type: Text
case	[optional for <code>.convert_name</code> only] Specifies the case into which to convert the code. You can choose between: <ul style="list-style-type: none"> <li><code>firstLowerWord</code> - First word in lowercase, first letters of subsequent words in uppercase</li> <li><code>FirstUpperChar</code> - First character of all words in uppercase</li> <li><code>lower_case</code> - All words in lowercase and separated by an underscore</li> <li><code>UPPER_CASE</code> - All words in uppercase and separated by an underscore</li> </ul>

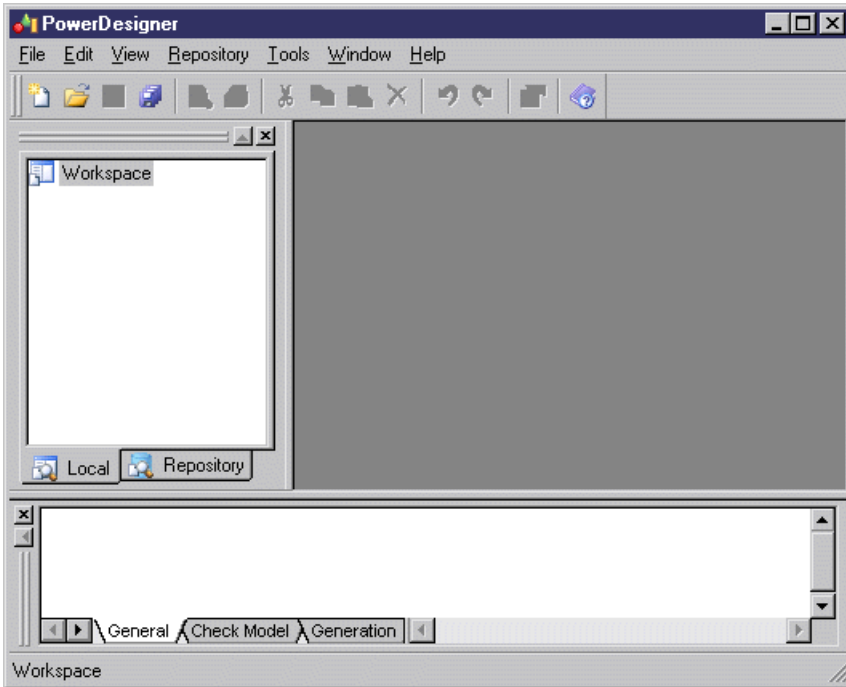
In the following example, the `.convert_name` macro will convert a class name `Corporate Customer` into `clsCorporateCust` if the `stdnames` conversion table is selected:

```
.convert_name (cls_%Name%[, ,, firstLowerWord])
```

# Windows

---

The PowerDesigner main window is divided into different windows with independent behavior.



In the upper part of the window, you can see the PowerDesigner general title bar and the menu bar. Below the general menus, the standard toolbar displays tools for carrying out standard operations such as Open, Save or Undo.

Two dockable windows are displayed by default when you open PowerDesigner: the Browser on the left and the Output pane at the bottom.

On the right hand side, the canvas is empty upon opening. This area is used to display the different MDI child windows.

You can customize the PowerDesigner environment by docking windows in the interface. Dockable windows are windows that align themselves with the edge of another interface element, typically a window or a pane.

There are three dockable windows in the PowerDesigner interface:

Window	Purpose
<i>Browser</i>	Provides a hierarchical view of the contents of the workspace
<i>Output pane</i>	Displays PowerDesigner messages during check model, generation, reverse operations, or script execution
<i>Result List</i>	Displays result lists for a Find or a Check Model operation

## Docking a Window

You can dock a specific window in a chosen location of the main window.

1. Click the window title bar and keep the mouse button pressed.



2. Drag the selected window to another location in the main window.

If you drag the window close to another interface element, the dockable window automatically aligns itself with the edge of the closest interface element.

If you drag the window anywhere in the work environment, the window is resized and displays a title.

## Disabling the Docking Feature

You can disable the docking feature.

Right-click the dockable window background and deselect the Docking View command.

The window becomes an MDI window.

---

**Note:** If you want to move a window in the PowerDesigner environment without using the docking feature you have to press ctrl while you drag the window.

---

## Hiding a Docking Window

You can hide a docking window.

Click the X button in the window title bar.

## Restoring a Window

You can restore a window that is no longer displayed.

Select **View > Browser**.

*or*

Select **View > Output**.

*or*

Select **View > Result List**.

## Toolbars

---

Toolbars are designed to provide quick access to specific menu commands and to ease creation of objects related to a target language.

By default, the Standard toolbar is displayed when you start PowerDesigner for the first time. You can display more toolbars in the interface, this is saved in the registry.

### Creating a Toolbar

You can create new toolbars in the PowerDesigner environment.

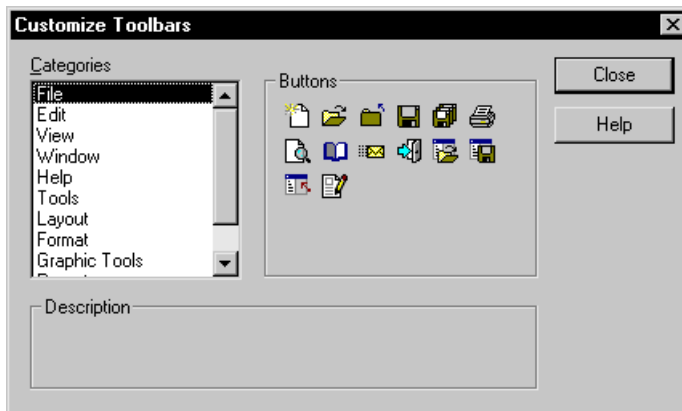
1. Select **Tools > Customize Toolbars** to display the Toolbars dialog box.
2. Click the New button to display the New Toolbar dialog box.
3. Type a name in the Toolbar Name box.



4. Click OK.

The new toolbar is displayed in the list of toolbars, it is empty.

5. Select the new toolbar in the Toolbars list and click Customize to display the Customize Toolbars dialog box.



6. Select a menu category in the Categories pane.

The tools corresponding to the commands of the menu appear in the right pane of the window with a description in the lower part of the window.

7. Select the tools you want to add, drag them to the new toolbar, and release the mouse button.

The tools are inserted into the new toolbar.




---

**Note:** To delete a tool in a toolbar, you must be in Customize mode, then right-click the tool to be deleted and select Delete from the contextual menu.

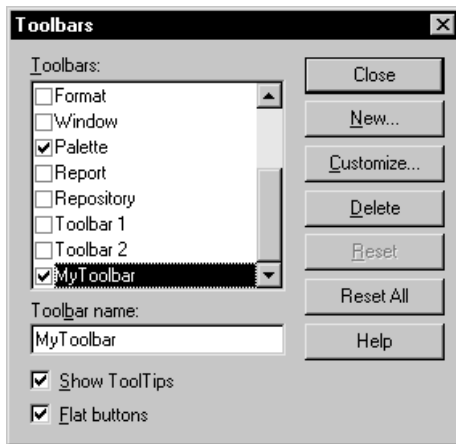
---

8. Click Close in each of the dialog boxes.

## Customizing a Toolbar

You can customize the PowerDesigner toolbars according to your needs.

1. Select **Tools > Customize Toolbars** to display the Toolbars dialog box, and select a toolbar in the list.



2. Select whether you want to **Show Tooltips** and have **Flat buttons** (instead of the standard 3D buttons).
3. Click the **Customize** button to open the Customize Toolbars window.
4. Select a menu category in the Categories pane to display the corresponding tools in the right pane.

Select the Custom Graphical Tools category to view and add tools defined in an extended model definition (see *Chapter 3, Extending Your Models with Profiles in Customizing and Extending PowerDesigner*).

5. Select the tool you want to add and drag and drop it onto the desired toolbar.
6. Click **Close** to return to the Toolbars dialog.

Click **Reset** or **Reset All** to undo your customizations.

7. Click **OK** to return to your model.

## **Hiding and Showing a Toolbar**

By default, the Standard toolbar is displayed in the PowerDesigner main window and the Palette in the diagram window. You can choose to hide or show a toolbar from the PowerDesigner interface.

1. Select **Tools > Customize Toolbars** to display the Toolbars dialog box.
2. Clear the check box corresponding to the toolbar you want to remove from the interface.

*or*

Select the check box corresponding to the toolbar you want to add to the interface

The toolbar instantly is displayed or disappears from the interface.

3. Click Close.

## **Deleting a Toolbar**

You can delete any user-defined toolbar but you cannot remove a default PowerDesigner toolbar.

1. Select **Tools > Customize Toolbars** to display the Toolbars dialog box.
2. Select a user-defined toolbar in the list of toolbars and click the Delete button.
3. Click Close.

## **Resource Files and Extended Model Definitions**

The PowerDesigner modeling environment is powered by resource files, which define the objects available in each model along with the methods for generating and reverse-engineering them. You can view, copy, and edit these XML-format resource files in order to customize and extend the behavior of the environment.

For detailed information about viewing and editing PowerDesigner resource files see the *Customizing and Extending PowerDesigner* manual.

Extended model definitions (.XEM files) provide means for customizing and extending PowerDesigner metaclasses, parameters and generation. Extended model definitions are typed like models in PowerDesigner. You create an extended model definition for a specific type of model and you cannot share these files between heterogeneous models. When you create a new model, or when you reverse engineer into a new model, you can select one or several extended model definitions and attach them to the model from the New dialog box.

For example, you can attach XEMs to a Java model to help you in working with a particular IDE, or O/R mapping framework. The XEM may provide objects with additional properties or property tabs, and define additional generation targets and options.

PowerDesigner provides a number of predefined XEMs and you can also create your own.

An extended model contains:

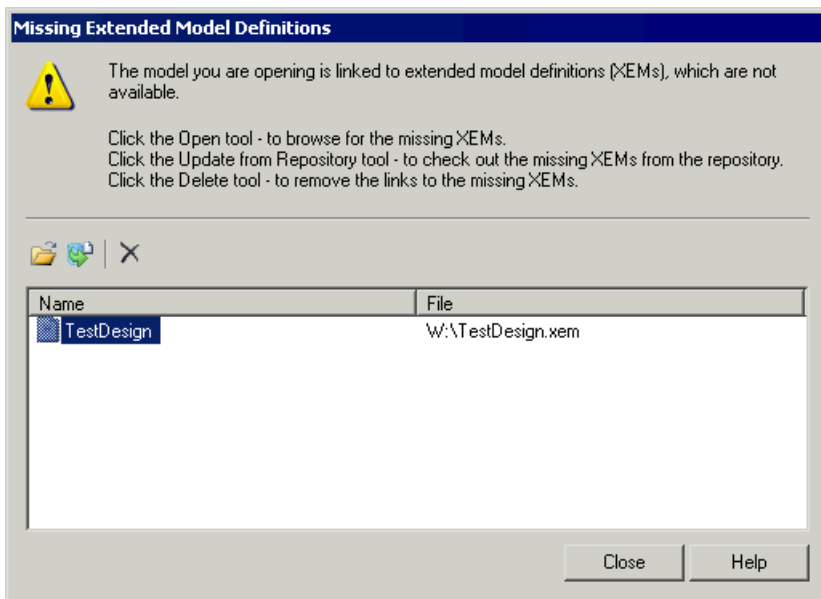
- a *profile* definition - a set of metamodel extensions defined on metaclasses
- *generation* parameters - used to develop or complement the default PowerDesigner object generation or for separate generation.

For more information about XEMs, including how to create your own, see "Extended Model Definitions" in the Resource Files and the Public Metamodel chapter of the *Customizing and Extending PowerDesigner* manual.



### Missing XEMs


If you rename, move or delete extended model definition files that are attached to a model, you will lose the links between them.

When you subsequently open the model, the following dialog box is displayed to list the XEMs that are not available:



The following tools are available in this dialog box:

Tool	Description
	Open – Lets you browse to, and re-attach, the missing XEMs.
	Update from Repository – Lets you check out the missing XEMs from the repository.

Tool	Description
	Delete – Lets you remove the links between the model and the missing XEMs.

## Attaching Extensions to a Model

You can attach an extended model definition (.xem) to your model when you create it by clicking the **Select Extensions** button on the New Model dialog. You can attach an extended model definition to an existing model from the List of Extended Model Definitions.

---

**Note:** You should never modify the original extended model definitions shipped with PowerDesigner. To create a copy of the file to modify, open the List of Extended Model Definitions, click the **New** tool, specify a name for the new file, and then select the .xem that you want to modify in the **Copy from** field.

---

1. Select **Model > Extended Model definitions** to open the List of Extended Model Definitions.
2. Click the **Import** tool to open the Select Extensions dialog.
3. Review the different sorts of extensions available by clicking the sub-tabs and select one or more to attach to your model.
4. Select one of the following radio buttons:
  - **Share** – creates a link to the XEM file. Changes made to the target affect all models that share it.
  - **Copy** – creates a copy of the XEM and saves it with the model. Changes made to the target affect only the current model.
5. Click **OK** to return to your model.

---

**Note:** When you import an extended model definition and copy it into a model, the name and code of the extended model definition may be modified in order to respect the naming conventions of the Other Objects category in the Model Options dialog box.

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## PART II

# Linking and Synchronizing Models

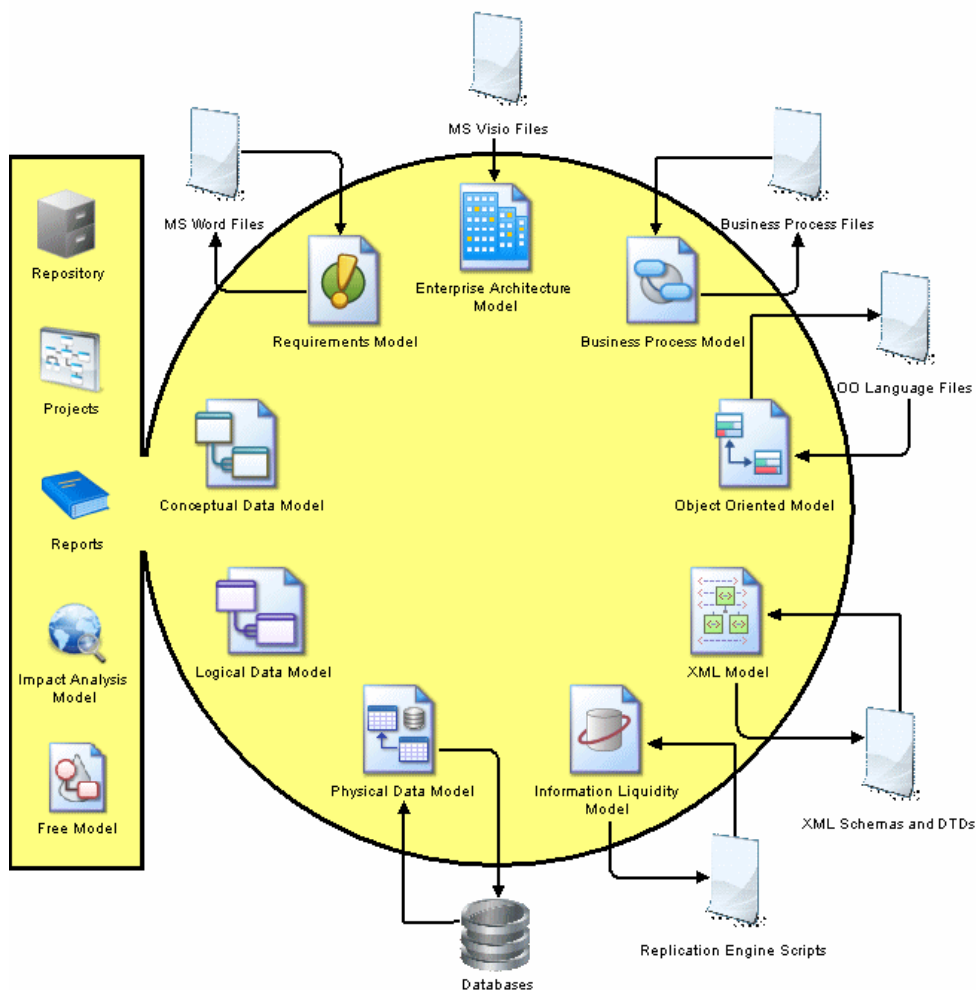
The chapters in this part describe the PowerDesigner features that help you create links between models and trace the impact of changes between models.



# CHAPTER 9 Getting Started with Linking and Synching

The PowerDesigner Enterprise Modeling environment allow you to create and exploit complex interdependencies between your models.

The richness of the PowerDesigner modeling environment enables you to model interconnected systems and view them in many different ways.



A single data item such as a product name can be implicated in multiple systems, which are modeled in a number of interdependent models. It may also be represented at various levels of abstraction in conceptual, logical, and physical data models, or in different contexts such as object-oriented, XML, business process, and enterprise architecture models.

Instead of defining this same object and all its accompanying metadata multiple times, PowerDesigner allows you to generate these instances or in other ways link them together, and provides powerful tools for tracking and analyzing the dependencies between them.

---

**Note:** In order to obtain a complete view of the dependencies between your models, they must either all be open in your workspace or stored in the repository and checked out with the **Check out dependencies** option selected. When working with multiple connected models, we recommend that you group your models together into a project (see *Chapter 2, Projects and Frameworks* on page 37).

---

## Creating Links Between Models

---

PowerDesigner provides many ways to link the objects of your models together.

You can create the following kinds of links between models:

- *Generation links* - are created during model or object generation. Each generated object is linked with its origin object.
  - Model Generation - generates one model from another and allows subsequent synchronization on demand (see *Generating Models* on page 337).
  - Object Generation - allows you to define the generation of objects from one model to another with subsequent synchronization on demand (see *Generating Model Objects* on page 349).
- *Shortcuts* - create a reference to an object in another model. You either create shortcuts explicitly in order to share or reuse an object in another model (see *Shortcuts* on page 355) or implicitly when creating other kinds of links. To create any of the kinds of links in this list, the target model in which the referenced object resides must be open in your workspace:
  - RQM Traceability Links - link requirements with design objects that are intended to satisfy them (see *Chapter 4, Linking Requirements with Design Objects in Requirements Modeling*).
  - EAM Object Export/Import - link enterprise architecture objects with the design objects that will implement them (see "Exporting and Importing Objects to and from Other Models" in *Chapter 7, Importing to and Generating and Exporting from an EAM of Enterprise Architecture Modeling*).
  - BPM Data Export/Import - link data objects in the BPM with objects in other models (see "Data (BPM)" in *Chapter 3, Building Business Process Diagrams of Business Process Modeling*).

- Extended Attributes and Collections - allow you to extend the PowerDesigner metamodel to define new kinds of links between objects (see *Extending Objects* on page 146).
- Object Mappings - specify connections between certain predefined types of objects (see *Chapter 12, Object Mappings* on page 389).
- Related Diagrams - specify connections between objects and other diagrams in which they are not present (see *Specifying Diagrams as Related Diagrams* on page 170).
- Extended Dependencies - specify connections between any objects without restrictions (see *Creating Extended Dependencies* on page 334).
- *Object Replications* - duplicate an object from one model to another and allow you to vary the properties you choose while keeping the rest synchronized with the original object (see *Object Replications* on page 371).

## Viewing Links Between Models

---

PowerDesigner provides an array of tools to allow you to view and analyze the links created between your models.

Some or all of the following tools are available to you to view, analyze and edit the links between your models:

- Project Diagram - provides a high-level read-only view of the links between the models in your project (see *Project Diagrams* on page 39).
- Dependency Matrix - provides an editable view of all the links between the two object types that you specify in the matrix definition (see *Dependency Matrices* on page 178).
- Generation Links Viewer - provides a read-only view of all the model or object generation links between the present model and any models it is associated through generation (see *The Generation Links Viewer* on page 350).
- Mapping Editor - provides an editable view of all the mappings between the present model and any models it is associated with through mappings (see *Creating Mappings from the Mapping Editor* on page 396).
- Multi-Model Report - provides a configurable report in HTML or RTF format documenting your models and the links between them (see *Creating a Multi-Model Report* on page 223).
- Impact and Lineage Analysis - provides a configurable analysis of the objects that impact and/or are impacted by the selected objects (see *Chapter 13, Impact and Lineage Analysis* on page 421).
- Object Lists - can include shortcuts to objects of the selected type if the **Include Shortcuts** tool is selected (see *Object Lists* on page 117).
- Object property sheets (see *Object Properties* on page 104) - provide information on various forms of links on the following tabs:
  - Related Diagrams

- Extended Dependencies
- Mappings - where available
- Requirements - if enabled (see *Requirements Tab* on page 114)
- Dependencies - lists the objects that depend on the object (see *Dependencies Tab* on page 115)

## Creating Extended Dependencies

---

You can specify additional kinds of connections between PowerDesigner objects through extended dependencies. These links can be created between objects of any type of model. They are used for documentation purposes only, and but are not interpreted or checked by PowerDesigner.

You create an extended dependency between objects in the same diagram by selecting the **Link/Extended Dependency** tool in the Palette. Click inside the influent object symbol and, while continuing to hold down the mouse button, drag the cursor and release it on the dependent object symbol.

In the following example, the CDM entities `School` and `Work` do not have any direct calculable connection, but `Work` is shown as being dependent on `School` through an extended dependency:



You can refine the meaning of extended dependencies by applying stereotypes to them to identify the kind of dependency represented. You can enter a stereotype name by hand in the **Stereotype** column of the **Extended Dependencies** tab of the dependent object, or select a value from the list if you have previously defined stereotypes in an extended model definition (see "Extended Model Definitions" in the Resource Files and the Public Metamodel chapter of the *Customizing and Extending PowerDesigner* manual).

## Creating Extended Dependencies Between Objects from Different Models

---

You can create extended dependencies between objects in different models in the dependent object property sheet. The model that contains the influent object must be open in the workspace.

1. Open the property sheet of the object, and click the **Extended Dependencies** tab.
2. Click the **Add Objects** tool to open the Add Objects dialog box.
3. Select a model from among the models open in the workspace from the Model box, (optionally) a package from the list, and an object from one of the sub- tabs and then click **OK** to add an extended dependency to it.

The extended dependency you have created is displayed simultaneously in the list of extended dependencies but also in the diagram if objects at both extremities are displayed.

4. [optional] Enter a stereotype to further identify the extended dependency you have just created in the **Stereotype** column, or select a stereotype from the list if available.
5. Click OK to close the property sheet and return to the diagram.



# CHAPTER 10 Generating Models and Model Objects

## Generating Models

---

PowerDesigner provides powerful capabilities for generating one model from another, and keeping the two models synchronized. Thus, you could model your data at an abstract level in a CDM, generate an LDM to model implementation-neutral features, and then generate multiple PDMs for various DBMSs.

The following table shows which model types you can generate from each model type. The left column lists the source model and the column headings the model types that can be generated from it:

	BPM	CDM	LDM	PDM	ILM	OOM	XSM
BPM	X						
CDM		X	X	X		X	
LDM		X	X	X			
PDM		X	X	X		X	X
ILM					X		
OOM		X		X		X	X
XSM				X			X

1. Select Tools, and then one of the following to open the appropriate Model Generation Options Window:
  - Generate Business Process Model... Ctrl+Shift+B
  - Generate Conceptual Data Model... Ctrl+Shift+C
  - Generate Logical Data Model... Ctrl+Shift+L
  - Generate Physical Data Model... Ctrl+Shift+P
  - Generate Information Liquidity Model...
  - Generate Object-Oriented Model... Ctrl+Shift+O
  - Generate XML Model... Ctrl+Shift+M

2. On the General tab, select a radio button to generate a new or update an existing model, and complete the appropriate options. For more details, see *Model Generation Options window* on page 338.
3. [optional – PDM-PDM generation only] Click the DBMS Preserve Options tab and set any appropriate options. For more details, see *Model Generation Options window DBMS Preserve Options tab* on page 339.
4. [optional] Click the Detail tab and set any appropriate options. For more information, see *Model Generation Options window Detail tab* on page 339.
5. [optional] Click the Target Models tab and specify the target models for any generated shortcuts. For more information, see *Model Generation Options window Target Models tab* on page 346.
6. [optional] Click the Selection tab and select or deselect objects to generate. For information about using the tools on this tab, see *Adding an Item from a Selection List* on page 122.
7. Click OK to begin generation.

## Model Generation Options Window

The following options are available on the General tab:

### Generate new ...

Option	Description
DBMS, Object, XML, or Process language	Specifies the target for the model to be generated. Select one of the radio buttons to: <ul style="list-style-type: none"> <li>• Share and link to the target definition</li> <li>• Copy the target definition to the model to allow it to be modified without affecting other models</li> </ul>
Name	Specifies the name for the model to be generated.
Code	Specifies the code for the model to be generated.

Click the **Configure Model Options** button to open the Model Options dialog for the model to be generated, in which you can specify naming conventions (see *Naming Conventions* on page 315) and other model options. For more information about the model options available for a particular type of model, see the appropriate modeling guide.

**Update existing...**

Option	Description
Select model	Specifies the target model to be updated. Select a model that has already been generated from the current model from the list, or click the ellipsis button to the right to open a list of other models of the same type open in the workspace.
DBMS, Object, XML, or Process language	Displays the target of the model to be updated.
Preserve modifications	Allows you to manually compare and merge the source model with the model to be generated in the Merge Models window (see <i>Chapter 7, Comparing and Merging Models</i> on page 259).  If this option is not selected, all the existing objects in the target model will be automatically replaced by those in the generated model.

**Model Generation Options Window DBMS Preserve Options Tab**

This tab is only available when you generate a PDM from another PDM, and allows you to choose to preserve or lose, the values associated with the following database objects:

- Physical options - for relevant objects
- Triggers and stored procedures – Note that, if the target belongs to a different DBMS family, triggers are automatically rebuilt.
- Database objects – non-standard objects. If the source DBMS does not support an object its option is not available. Only objects supported by the target DBMS will be generated.
- Extended attributes

**Model Generation Options Window Detail Tab**

The following options are available on this tab:

Option	Description
Check Model	Invokes a model check before generation, and stops generation if errors are found. You can configure specific model checks before generation by selecting <b>Tools &gt; Check Model</b> . For more information, see <i>Checking a Model</i> on page 92.
Save Generation Dependencies	Instructs PowerDesigner to retain links between each source object and the corresponding target object, which allow objects to be subsequently identified, even if they have been modified.
Generate Mappings	Defines the source model as the data source of the generated model and creates mappings between all source and target objects. This option is dependent on the Save Generation Dependencies option.

Option	Description
Rebuild Triggers	[CDM-PDM and OOM-PDM only] Instructs PowerDesigner to build triggers with preservation option, after the PDM generation. Rebuild takes place after merge if you are updating an existing PDM
Convert Names into Codes	<p>Instructs PowerDesigner to generate target model object codes from source model object names using the appropriate conversion script (see <i>Name and Code Conversion Scripts</i> on page 317). This option can be useful when generating models with very different naming conventions. If it is not selected, target object codes are generated from source object codes.</p> <p>For example an OOM Java class attribute code may be <code>customerName</code> whereas the PDM table column that you want to generate must be called <code>CUSTOMER_NAME</code>. By selecting this option and specifying the appropriate conversion scripts in the model options available from the <b>General</b> tab, you can generate your columns with appropriate codes.</p>
Enable transformations	<p>Enables pre- and post-generation transformations.</p> <p>When you click this button, the <b>Pre-generation</b> tab is displayed if the source model contains transformations. You can select the transformations to execute before generation.</p> <p>The <b>Extended Model Definitions</b> tab also is displayed for you to select extended model definition files to attach to the generated model. These files may contain post-generation transformations, in this case, the <b>Post-Generation</b> tab is displayed to let you select the transformations you want to be executed in the generated model. If the generation is an update, and the generated model contains extended model definitions with post-generation transformations, the <b>Post-generation</b> tab is automatically displayed as soon as you click the Enable Transformations button.</p>
Skip single root element	[XSM-PDM only] Specifies to ignore a single root element and to treat its immediate child elements as multiple roots, which will be generated as tables.
Generate columns/attributes as elements	[PDM-XSM only], Specifies that PDM table columns are generated as child elements (instead of attributes) in the XML model. You can then set attributes to these child elements.
Class Prefix	Prefix for a class. It can help identify a class in a model

### Table Options

The following options are available when generating a PDM:

Option	Description
Table Prefix	Specifies a prefix for the names of generated tables.

Option	Description
ID column type	[XSM-PDM only] Specifies the type to use for ID columns, and which will be used to generate <code>xs:ID</code> types.  Default: <code>numeric</code>

### Reference Options

The following options are available when generating a PDM:

Option	Description
Update Rule	Specifies the default update constraint for referential integrity.
Delete Rule	Specifies the default delete constraint for referential integrity.
FK column name template	<p>Specifies the naming convention for migrated foreign keys. You can select one of the default templates from the list or enter your own using the following variables:</p> <ul style="list-style-type: none"> <li>• <code>%REFR%</code> - Name / Code of the reference</li> <li>• <code>%PARENT%</code> - Name / Code of the parent table</li> <li>• <code>%COLUMN%</code> - Name / Code of the parent column</li> <li>• <code>%KEY%</code> or <code>%CONSTNAME%</code> - Name / Code of the key constraint attached to the reference</li> <li>• <code>%PROLE%</code> - Role of the entity that generated the parent table, this variable proceeds from the conceptual environment. If no role is defined on the relationship or association, <code>%PROLE%</code> takes the content of <code>%PARENT%</code> to avoid generating a column with no name</li> </ul> <p>The following example checks the <code>%PROLE%</code> value; if it is equal to the parent name (which is the replacement value) then the template <code>%.3:PARENT%_%COLUMN%</code> will be used, otherwise template <code>"%PROLE%"</code> will be used because the user has entered a parent role for the relationship:</p> <pre>[ %PROLE%=%PARENT%?.3:PARENT%_%COLUMN%:%PROLE% ]</pre> <p>Customized naming templates reappear in the generation dialog box the next time you open it, but are not saved to the list of predefined templates.</p> <p>For more information about PowerDesigner variables, see "PDM Variables" in the DBMS Resource File Reference chapter of the <i>Customizing and Extending PowerDesigner</i> manual</p>

Option	Description
Use template	<p>Controls when the FK column name template will be used. You can choose between the following radio buttons:</p> <ul style="list-style-type: none"> <li>• Always use template</li> <li>• Only use template in case of conflict</li> </ul>

### Index Options

The following options are available when generating a PDM:

Option	Description
PK index names	<p>Specifies the naming convention for primary keys. You can use the following variables in this and the Key index fields:</p> <ul style="list-style-type: none"> <li>• %TABLE% - Generated code of the table. This is the table code that is generated in the database. It may or may not be truncated if the code contains characters not supported by the DBMS</li> <li>• %TNAME% - Table name</li> <li>• %TCODE% - Table code</li> <li>• %TLABL% - Table comment</li> </ul> <p>Default: %TABLE%_PK</p>
AK index names	<p>Specifies the naming convention for alternate keys. You can use the following variables in this field:</p> <ul style="list-style-type: none"> <li>• %REFR% - Generated code of the reference</li> <li>• %REFNAME% - Reference name</li> <li>• %REFRCODE% - Reference code</li> <li>• %PARENT% - Generated code of the parent table</li> <li>• %PNAME% - Parent table name</li> <li>• %PCODE% - Parent table code</li> <li>• %CHILD% - Generated code of the child</li> <li>• %CNAME% - Child table name</li> <li>• %CCODE% - Child table code</li> <li>• %PQUALIFIER% - Parent table qualifier</li> <li>• %CQUALIFIER% - Child table qualifier</li> </ul> <p>The generated code of a variable is the code defined in the object property sheet, which may be truncated when generated if the code contains characters not supported by the DBMS</p> <p>Default: %TABLE%_AK</p>

Option	Description
FK index names	Specifies the naming convention for foreign keys, by default %REFR%_FK
FK threshold	Specifies the minimum number of estimated occurrences of an entity necessary to create an index on a foreign key. The estimated number of occurrences can be specified in the entity property sheet. If this property is not set, foreign key indexes are generated by default.

---

**Note:** If you modify a primary key in a PDM, then regenerate the PDM from a CDM, the modified primary key is not preserved. If you want to preserve a modified primary key, you need to modify the identifier in the CDM before regeneration.

---

### **Add Package Hierarchy**

When you reverse engineer a database into a PDM and then generate an OOM with the corresponding O/R mapping, you can use the Add Package Hierarchy feature to create the appropriate packages in the OOM. You select the Add Package Hierarchy command from the object model contextual menu. For more information, see the *Generating and Reverse Engineering OO Source Files* chapter in *Object-Oriented Modeling*.

### **Applying Model Transformations**

Transformations are used to perform standard modifications to your model objects. You can apply transformations either on demand or during generation.

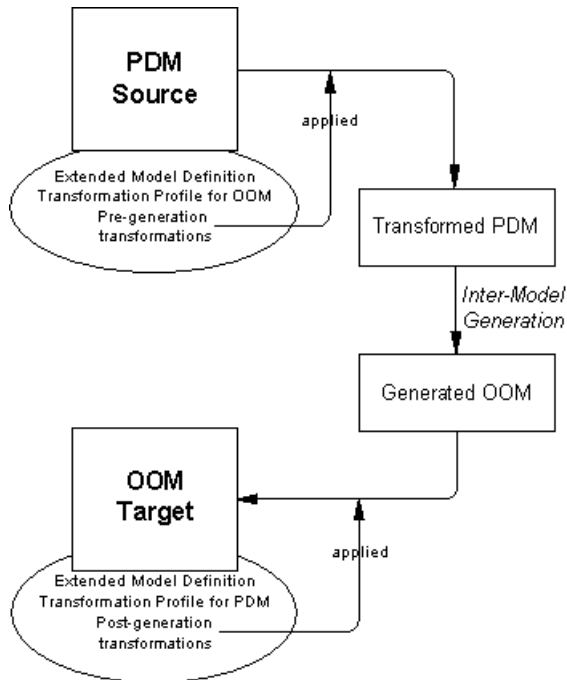
For information about creating transformations, see "Transformations and Transformations Profiles (Profile)" in the Extending your Models with Profiles chapter of the *Customizing and Extending PowerDesigner* manual.

### **Applying Transformations During Generation**

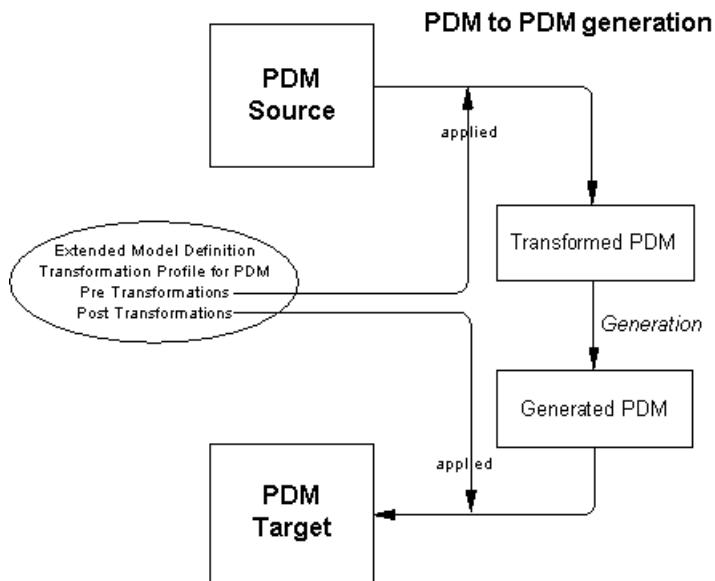
Transformation profiles can be used during model generation:

- pre-generation transformations are applied to the source model
- post-generation transformations are applied to the target model

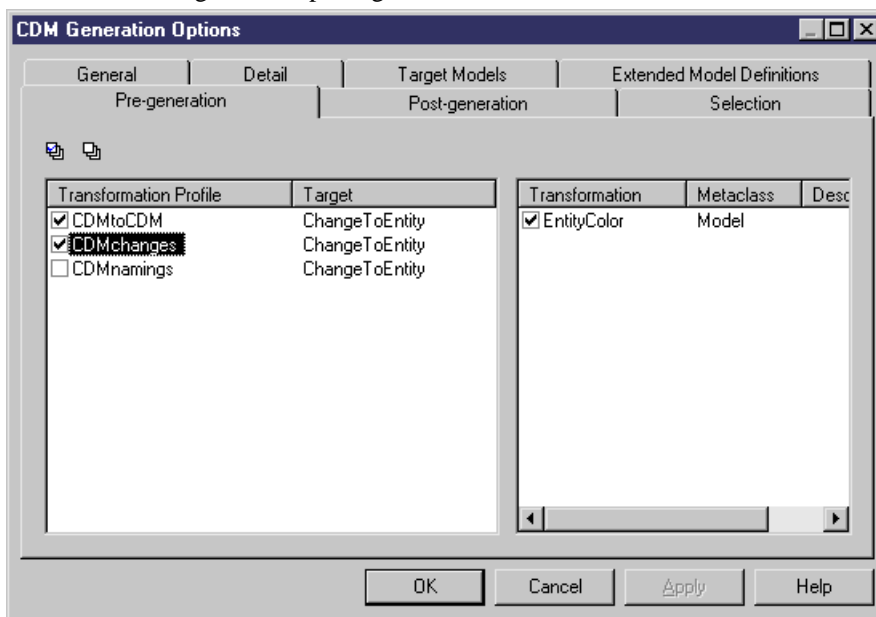
During inter-model generation, it is impossible to execute both lists of transformations of the same transformation profile, because the current model is the source of generation but not the target as defined in the following example.



When you generate a model to the same type of model, you can execute both lists of transformations of the transformation profile provided you select the same extended model definition in the source and in the target model.



1. Select **Tools > Generate Model** to open the Model Generation Options dialog box.
2. Click the Details tab, and click the Enable Transformations to display the Extended Model Definitions, Pre-generation, and Post-generation tabs.
3. Click the Extended Model Definitions tab to select the extended model definitions in which you have defined your transformations.
4. Click the Pre-generation tab and select profiles and transformations to be applied before generation. If you deselect a profile checkbox, none of its transformations will be executed. You can drag and drop profiles to modify transformation execution order. During generation, transformations are executed in the following order:
  - The order of profiles in the pre and post generation pages
  - The order of transformations in the profile itself
  - The order in which objects are treated in the model, that is to say beginning at the model level and recursing into sub-packages



5. Click the Post-generation tab and select profiles and transformations to be applied after generation.
6. Click OK in the Model Generation Options dialog box.

## Applying Transformations on Demand

Transformations can also be applied on demand in your model as a sort of design pattern. You can design a pattern using the transformation feature and "play" it in your model in order to modify objects.

For example, if you are working in an OOM, you can create a transformation that converts all analysis classes with the <<control>> stereotype into components in order to add an implementation layer to your model.

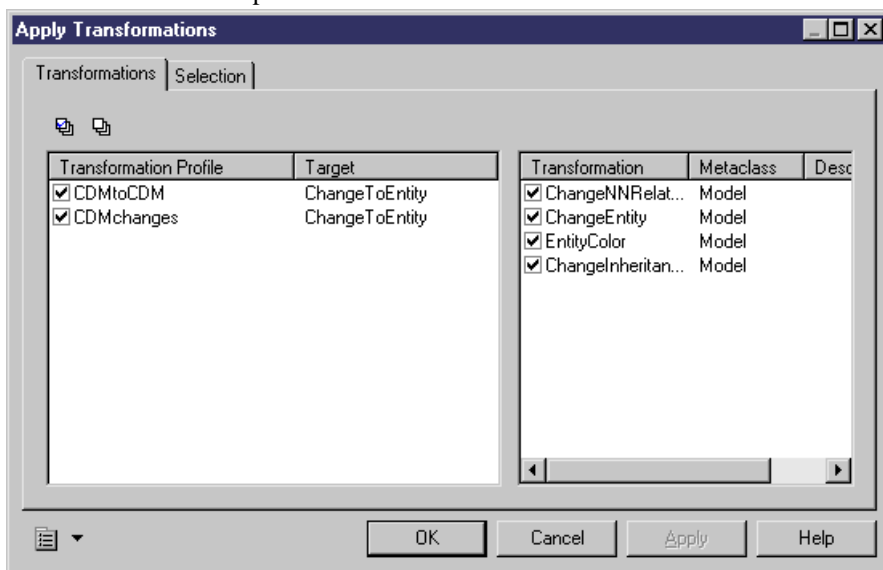
---

**Note:** You can only invoke post-generation transformations on demand.

---

There are two methods for applying transformations on demand in a model:

- Add a transformation as a command in a main or contextual menu (see "Menus (Profile)" in the Extending your Models with Profiles chapter of the *Customizing and Extending PowerDesigner* manual).
  - Use the Apply Transformations window available from the Tools menu.
1. Add one or more extended model definitions containing post-generation transformations to your model
  2. Select **Tools > Apply Transformations** to open the Apply Transformations window.
  3. Select transformations profiles and transformations on the Transformations tab.



4. [optional] Click the Selection tab and deselect any objects that you want to exclude from the transformation.
5. Click OK to apply the transformations.

## Model Generation Options Window Target Models Tab

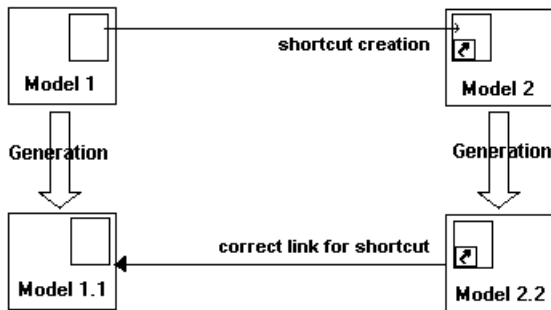
Shortcuts reference a target object in a target model, to allow you to share objects between different models. You can preserve the link between a generated shortcut and its target object

during generation. By default, the Generate check box is selected and the Generated as property is set to Shortcut in the shortcut property sheet, which allows you to preserve the link between a shortcut and its target object through generation.

To generate shortcuts you have to select the generated models containing the target objects of the generated shortcuts in the Target Models tab of the generation dialog box. The Target Models tab displays the following columns:

Column	Description
Target Models	[read only ]Original target model of the shortcut.
Generated Models	Specifies the target model for the generated shortcut.

The model generation process allows you to define the target object of a shortcut in a generated model.



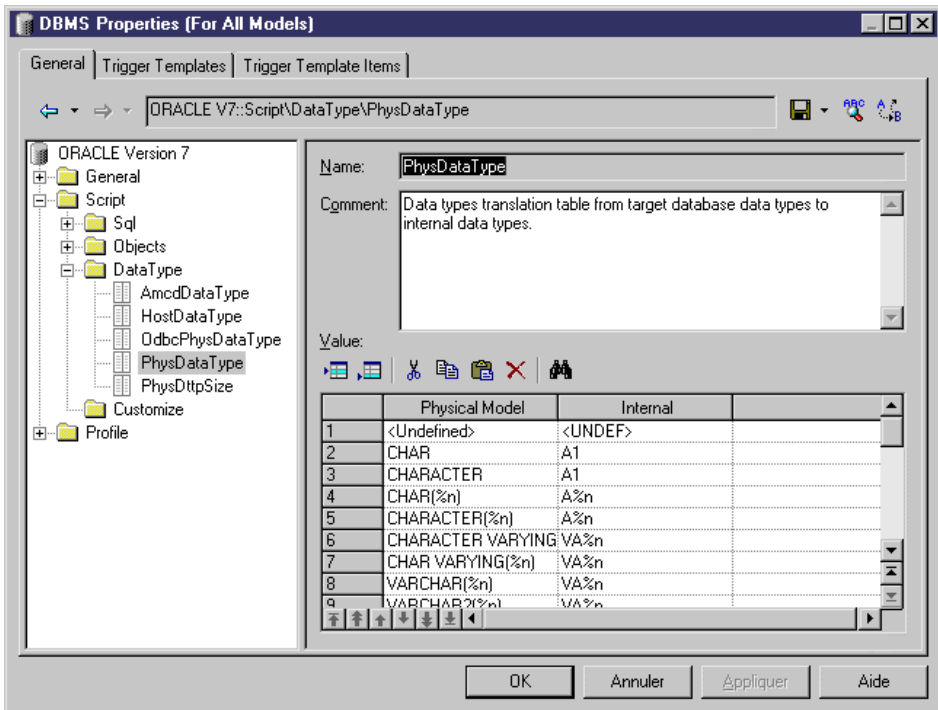
For example, here is the proper sequence of events for shortcuts generation:

1. Model 2 contains a shortcut of an object from Model 1.
2. Model 1 is generated into Model 1.1
3. Model 2 is prepared for generation to Model 2.2 and the Target Models tab is selected. Model 1 is listed in the Target Models column and, if Model 1 is open in the workspace, the Generated Models column displays the name of the last model generated from it. You can select another generated model in the Generated Models column. If Model 1 is not open, clicking its entry will open it.
4. The shortcut in Model 2.2 is correctly generated with a link to its target object in Model 1.1.

## Data Type Conversion

PowerDesigner converts from the data types of the source model to those of the target model using its standard conceptual types (which are also used in the CDM). You can review the conversions that will be made by accessing the relevant resource file.

1. Select **Tools > Resources > Type** to open the appropriate list of resource files.
2. Select a resource file in the list, and click the Properties tool to open it in the Resource Editor.
3. Expand the following categories:
  - For DBMS resource files: **Script > DataType**
  - For other resource files: **Settings > DataType**
4. Review the entries in the DataType category, each of which is described in its Comment field.



For more information on data types, see the Resource Files and the Public MetaModel and DBMS Resource File Reference chapters in *Customizing and Extending PowerDesigner* manual

## Generating Model Objects

---

You can extend the inter-model generation capabilities provided by PowerDesigner by defining your own object generation commands. You can define as many commands as you need, and generate any of your model's objects as any kinds of objects in any other model. The generated objects are linked to the original objects and can be resynchronized at any time.

Before you can generate model objects, you must define the details of the generation (see *Defining an Object Generation* on page 349)

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**Note:** This procedure deals with generating a single type of objects to another model. For information about generating your entire model to another model, see *Generating a Model* on page 337).

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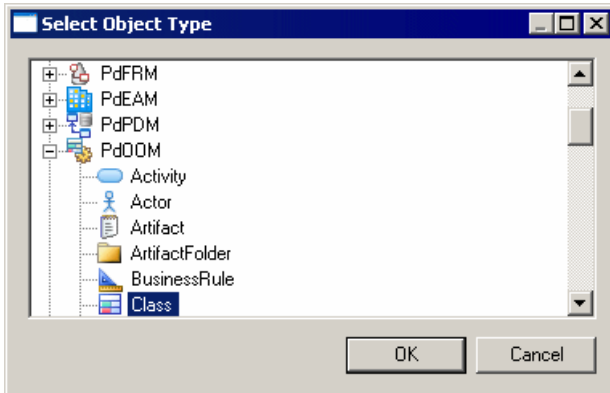
1. Select **Tools > Generate Objects > *Menu command name*** to open the Object Generation Options window for the generation that you have previously defined (see *Defining an Object Generation* on page 349).
2. On the General tab, select a radio button to generate a new or update an existing model, and complete the appropriate options. For more details, see *Model Generation Options window* on page 338.
3. [optional] Click the Detail tab and set any appropriate options. For more information, see *Model Generation Options window Detail tab* on page 339.
4. [optional] Click the Target Models tab and specify the target models for any generated shortcuts. For more information, see *Model Generation Options window Target Models tab* on page 346.
5. [optional] Click the Selection tab and select or deselect objects to generate. For information about using the tools on this tab, see *Adding an Item from a Selection List* on page 122.
6. Click **OK** to begin generation.

## Defining an Object Generation

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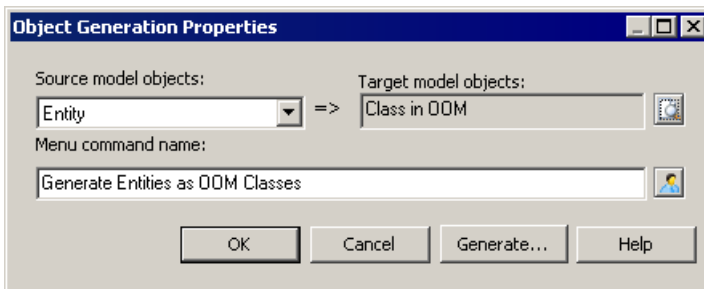
You can define as many object generations as you need. The generations are stored as objects in your model and are available as commands under the **Tools** menu.

1. Select **Tools > Generate Objects > Define New Object Generation** to open the Object Generation Properties dialog.
2. Select the type of model object you want to generate other model objects from in the **Source model objects** list.
3. Click the **Choose Metaclass** tool to the right of the **Target model objects** field to open the Select Object Type dialog, which allows you to select the type of objects you want to generate.



You can choose any object (including extensions) from any PowerDesigner model type, but some choices will be more appropriate than others.

4. [optional] Edit the **Menu command name** that PowerDesigner suggests, and which will appear under the **Tools > Generate Objects** menu to allow you to launch the generation.



5. Click **Generate** to launch the generation immediately or **OK** to save the generation definition for use later.

Once you have defined an object generation, you can launch it at any time by selecting **Tools > Generate Objects > Menu command name**. You can review the object generations that you have defined by selecting **Tools > Generate Objects > Manage Object Generations**.

## The Generation Links Viewer

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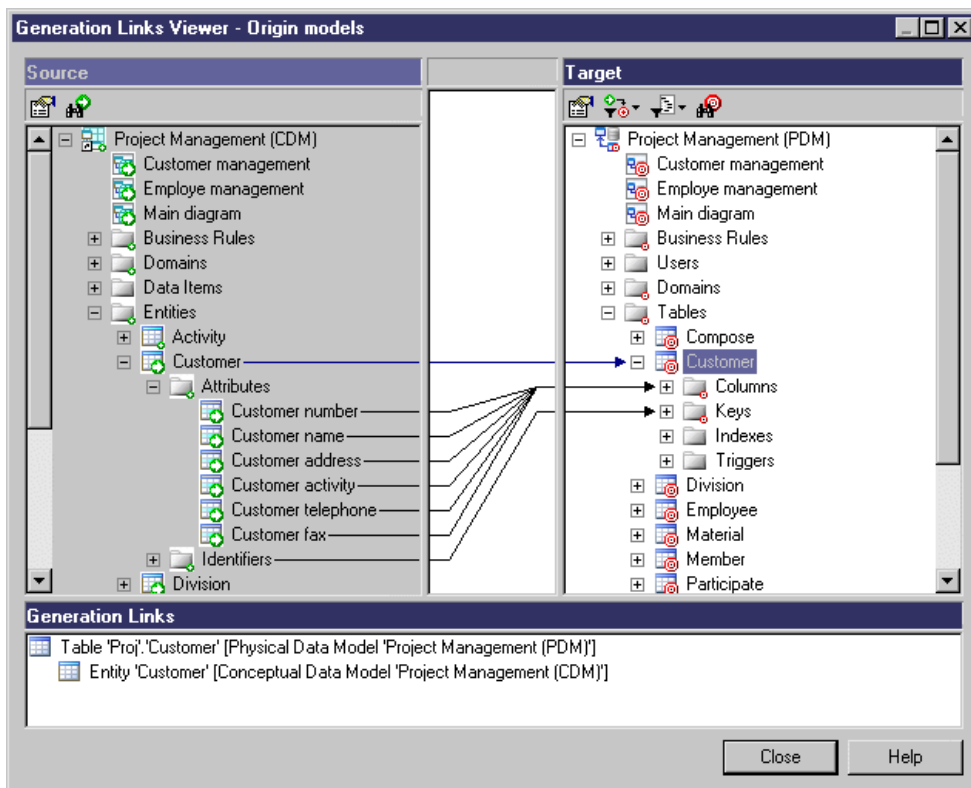
The Generation Links Viewer allows you to view (but not edit) the generation links of a given model, which allow you to identify the origin of each generated or derived object of the model.

**Note:** Links are created between models during model generation only if the *Save Generation Dependencies* option on the Detail tab of the generation dialog box is selected.

---

You can choose to view the:

- Links to the model(s) derived from the present model, by selecting **Tools > Generation Links > Derived Models** - the current model is shown in the Source pane and the derived models in the Target pane.
- Links to the model(s) from which the present model was derived, by selecting **Tools > Generation Links > Origin Model** - the current model is shown in the Target pane and the origin models in the Source pane.








The Generation Links Viewer dialog box is divided in three parts:

- The Source pane - which is on the left-hand side, and displays the structure of the source model
- The Target pane - which is on the right-hand side, and displays the structure of the target model(s)
- The Generation Links pane – shows you the sources or the targets of the selected object in the current model as a tree view. The root object is the source or target object from the current model, and the generation link name is composed of the object type and name (followed by, for link objects, the names of its extremities) followed by its parent model. You can double click a generation link in this pane to view the properties of the source or target object.

Source object icons have a small green arrow symbol and target object icons have a small red target symbol on their bottom right-hand corners.

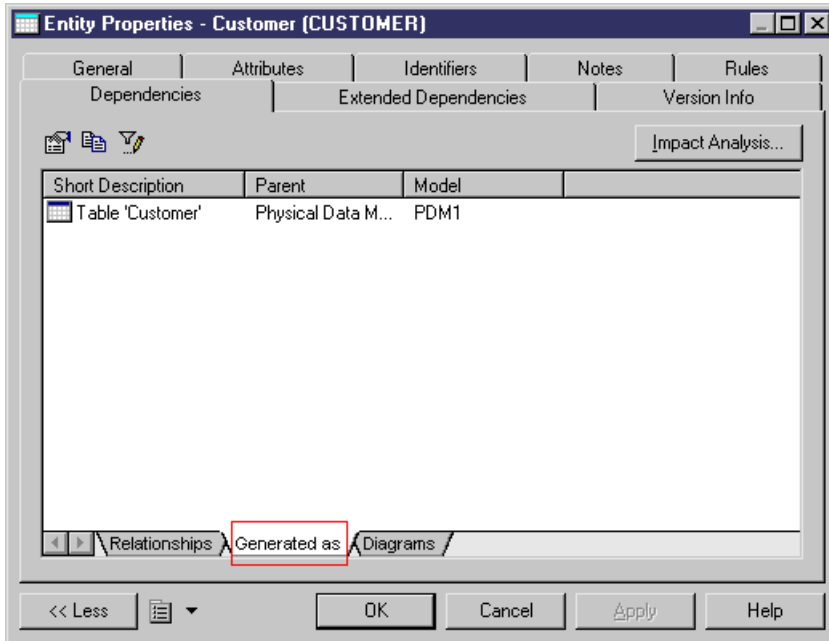
Non-editable links are drawn from the origin object in the Source pane to the derived object in the Target pane. Double-click the link in either pane to open the appropriate object's property sheet, or in the area between the two panes to display its details in the Generation Links pane.

The following tools are available in the Generation Links Viewer:

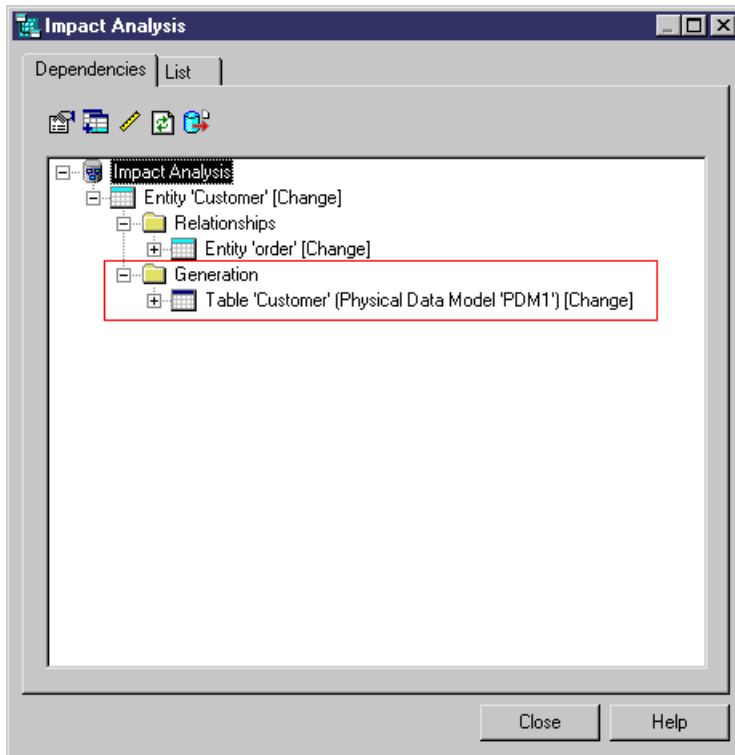
Tool	Description
	Properties - Opens the property sheet of the selected source or target object.
	Find Source Object - Finds an object in the Source pane and highlights it.
	Find Target Object - Finds an object in the Target pane and highlights it.
	Filter Generation Links – You can choose to filter by: <ul style="list-style-type: none"> <li>• All generation links</li> <li>• Only generation links of the selected object</li> <li>• Only generation links of the selected object and its child objects</li> </ul>
	Filter Objects - You can choose to filter by: <ul style="list-style-type: none"> <li>• All objects</li> <li>• Only objects with generation links</li> <li>• Only objects without generation links</li> </ul>

## Using Impact Analysis with Generated Models

To use impact analysis on generated models, consolidate them in the Repository and extract them with the **Extract Dependencies** option selected to display the **Generated As** subtab in the **Dependencies** tab of source objects.



In the Impact Analysis dialog box, this link does not appear by default, you have to click the *Extract Dependencies* tool to display the generation links:



# CHAPTER 11 Shortcuts and Object Replications

Shortcuts and object replications allow you to reuse objects defined in one model or package elsewhere.

## Shortcuts

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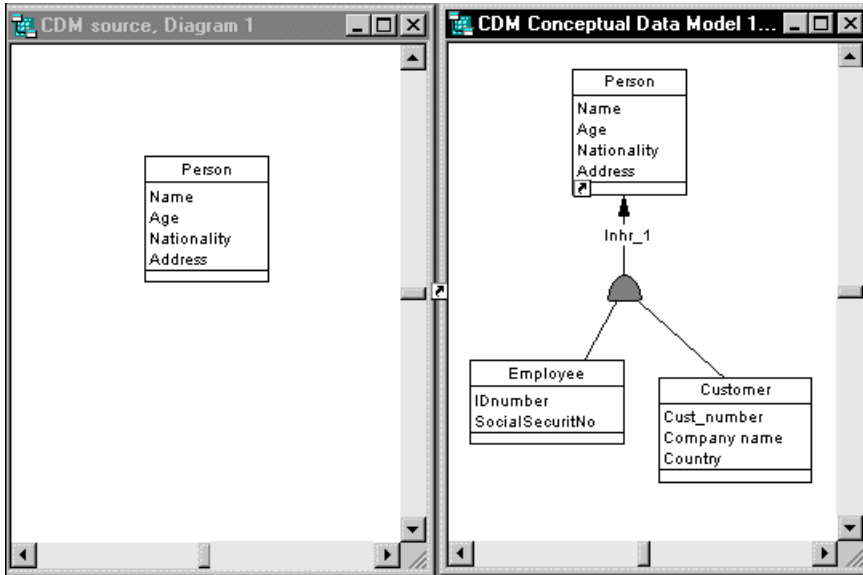
A *shortcut* is an object that represents and references a *target object*. There are two types of shortcuts:

- An *Internal* shortcut – is a shortcut to an object in a different package in the same model.
- An *External* shortcut – is a shortcut to an object in a different model. The external model may take the form of a library of reusable objects.

With shortcuts you can benefit from:

- *Reusability*: You can create libraries of reusable objects whose properties are inherited by multiple objects in different models. For example, the entity person and its four attributes: Name, Age, Nationality and Address can be used via inheritance links in any model where you have need of a Customer, Employee, etc.
- *Automatic updates*: When the target object changes, the updates cascades automatically to all the shortcuts. Note that both the referencing and target models must be open in the workspace for the changes to be propagated.

In the example below, the Person entity is created in one CDM, and a shortcut to it is created in a second CDM. The Person symbol in the second CDM carries a small arrow in its bottom left corner to indicate that it is a shortcut:



### Objects that Do not Support Shortcuts

You can create internal and external shortcuts on most of the object types that appear under a model diagram or package in the Browser. You can also create shortcuts of shortcuts.

The following objects do not support shortcuts at all or support only internal shortcuts:

Model	Internal and External Shortcuts not supported	External shortcuts not supported
CDM	—	—
OOM	Start, end, decision, synchronization, junction point, transition, state, interaction fragment, interaction reference	Message
BPM	Start, end, decision, synchronization, resource flow, service provider, service interface, operation	Flow, correlation, variable
XSM	[No internal shortcuts as there are no packages in an XSM]	Import, include, redefine, annotation
ILM	—	—
RQM	Traceability link, user allocation	—

However, it is still possible to create shortcuts in a model of a different type for traceability purposes.

You cannot create internal shortcuts to *global objects*, such as organization units, or business rules, because they always belong to the model and cannot be displaced into a sub-package. However, you can create external shortcuts to these objects.

---

**Note:** You can reuse data item shortcuts only if they are internal (same namespace). A duplicated data item shortcut has the same characteristics as the original data item shortcut.

---

## Creating a Shortcut

You can create shortcuts to target objects from another package in the current model, or from another model open in the workspace through copy and paste, drag and drop, or from the List of Shortcuts.

### Creating a Shortcut by Copying and Pasting an Object

You can create a shortcut using copy and paste.

1. In the Browser or diagram window, select a target object in the target model or package and press CTRL+C or select **Edit > Copy**.
2. Select the model or package where you want to create the shortcut in the Browser, or double-click a target diagram.
3. Select **Edit > Paste as Shortcut**.

The shortcut symbol is displayed in the model or package diagram.

Title			
Title ISBN	<pi>	A10	<M>
Title Text		LONG_TEXT	<M>
Title Type		SHORT_TEXT	<M>
Title Price		AMOUNT	
Title Notes		LONG_NOTES	
Title Publication Date		DATE	<M>
Identifier_6	<pi>		

### Creating a Shortcut by Drag and Drop

You can create a shortcut by drag and drop.

1. Select a target object in the Browser or diagram window.
2. Press ctrl + shift while you drag the object to the desired model or package and release the mouse button.

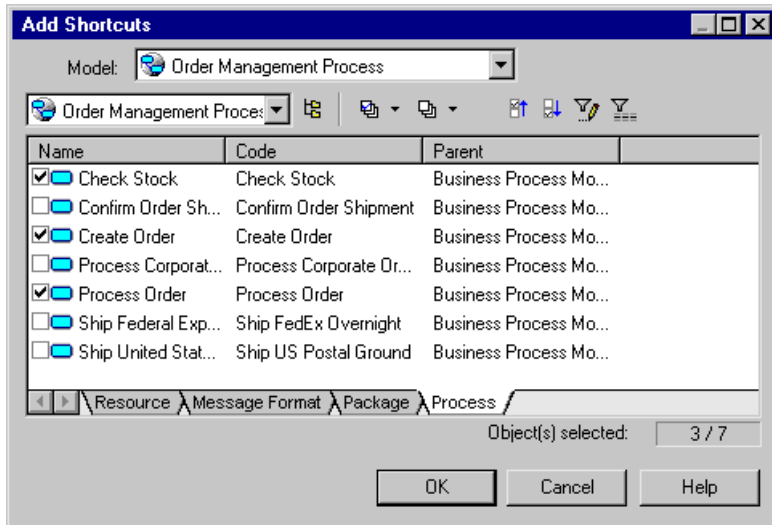
The shortcut is displayed in the active model or package and in the Browser under the appropriate node.

For more information on dragging and dropping objects, including how to change the default behavior, see *Dragging and Dropping Objects* on page 126.

## Creating a Shortcut in the List of Shortcuts

You can create a shortcut from the List of shortcuts.

1. Select **Model > Shortcuts** to open the List of Shortcuts.
2. Click the Add Shortcuts tool to open the Add Shortcuts selection box.



3. Select the appropriate model and package in the upper part of the dialog box, and select objects to add as shortcuts using the sub-tabs in the lower part of the dialog.
4. Click OK to return to the List of Shortcuts.

The newly-selected objects are displayed in the List of Shortcuts.

For more information, see *Adding an Item from a Selection List* on page 122.

The following rules restrict the use of shortcuts:

- You cannot create more than one shortcut to the same target object in the same model or package
- You cannot create a shortcut for a data item outside the current namespace
- You cannot create links between two shortcuts, if the link implies a parent/child hierarchy (for example: reference link between two table shortcuts in the PDM)
- You cannot create a link between an entity and the shortcut of an inheritance. For more information, see *Linking shortcuts* on page 361.

When you create a shortcut, the following display rules apply to the shortcut symbol:

If referencing model or package...	PowerDesigner creates...
Does not contain the shortcut	Shortcut and shortcut symbol

If referencing model or package...	PowerDesigner creates...
Already contains shortcut without symbol	Shortcut symbol
Already contains shortcut with symbol	Shortcut synonym

## Shortcut Properties

To open the property sheet of a shortcut, double-click its Browser entry or diagram symbol. The General tab contains the following properties:

Property	Description
Target type	Type of model and object type
Name	Name of the target object. The Properties button lets you open the target object property sheet
Code	Code of the target object.
Target model	Name of the model to which the target object belongs. The Properties button lets you open the target model property sheet
Target package	Name and path of the package to which the target object belongs. The Properties button lets you open the target package or model property sheet.
Shortcut type	Type of the shortcut, external or internal
Status	Displays the status of the target model or object. The following states are possible: <ul style="list-style-type: none"> <li>• Closed – the target model is closed and the status of the target object cannot be determined</li> <li>• Opened – the target model is open and the target object is present.</li> <li>• Not Found – the target model or target object cannot be found. For more information, see <i>Changing the target object</i> on page 361.</li> </ul>
Object1	[link shortcut only] Name of the source object from which the link is dragged
Object2	[link shortcut only] Name of the target object towards which the link is dragged
Generate	[external shortcut only] Shortcut is automatically included among the objects generated from the model when you launch the generation process
Generated as	[external shortcut only] Specifies how the shortcut will be treated during a model-to-model generation. You can choose between: <ul style="list-style-type: none"> <li>• Shortcut - the shortcut is generated as a shortcut and retains its link to the target model</li> <li>• Object – the shortcut is generated as an independent object and loses its link to the target model</li> </ul>
Change target object	Click this button to change the target object of the shortcut

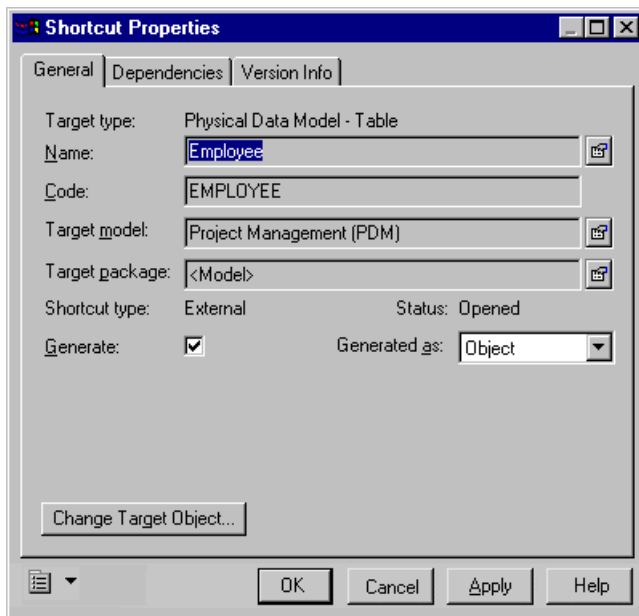
A shortcut property sheet also includes the following tabs:

Property	Description
Dependencies	Objects with which the shortcut collaborates. See <i>Displaying the objects that are dependent on a shortcut</i> on page 363.
Version Info	Shortcut owner, modification and creation details

### **Modifying the Target Object Properties**

You can access and change the properties of the target object from the shortcut property sheet.

1. Open the property sheet of the shortcut.



2. Click the Properties button to the right of the Name box to open the target object property sheet.

If the target model is closed, you will be prompted to open it.

3. Modify the target object properties.
4. Click OK to return to the shortcut property sheet and OK again to return to the model diagram.

---

**Note:** You can also access and modify the properties of the target model and package by clicking the properties tools to the right of these fields.

---

### **Changing the Target Object**

You can change the target object that is referenced by the shortcut.

You may need to do this if the original target object or model has been deleted, and the shortcut status is, consequently, Not Found.

In this case, you can either delete the shortcut or select a new target object. The new target must be of the same object type, and cannot already be referenced by another shortcut in the same package.

1. Open the shortcut property sheet.
2. Click the Change Target Object button in the bottom left corner of the shortcut property sheet to open an object selection dialog box.
3. Browse to the appropriate package and select a new target object.
4. Click OK to return to the shortcut property sheet.

The new target object is displayed in the Name box and the shortcut status is changed to Opened.

5. Click OK to return to the model diagram.

---

**Note:** You can also change the target object of a shortcut by opening the List of Shortcuts, selecting a shortcut and clicking the Change Target Object tool.

---

### **Synchronizing Shortcuts**

When you create an external shortcut to a target model that has never been saved, you should save the target model before the referencing model in order to allow synchronization between the models. If you attempt to save the referencing model first, you will be prompted to save the target model.

When you make changes to a target object, the shortcut is synchronized automatically:

- If the referencing model is opened - synchronization occurs instantly.
- If the referencing model is closed - synchronization occurs when it is next opened.

Both the referencing and target models must be open for synchronization to occur.

### **Linking Shortcuts**

You can create a link between two shortcuts in the referencing model if the link does not imply a parent/child hierarchy. For example, you cannot create a reference link between two table shortcuts in the PDM, as the reference is an oriented link.

You can also keep the link existing between two target objects in the referencing model.

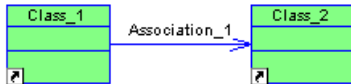
Unlike shortcut symbols, the shortcut of a link does not show a particular icon that identifies it.

## Creating the Shortcut of a Link

In the target model, when two target objects are linked, you can keep this link and create a shortcut for the link.

1. Select both target objects and their link using the shift key for multi-selection.
2. Press ctrl + shift while you drag the symbols and their link to the desired model or package and release the mouse button.

The object shortcuts appear with their link.



## Updating the Display of a Link Between Shortcuts

When you create a link between two target objects in the target model, you can update the referencing diagram in order for it to display the new link.

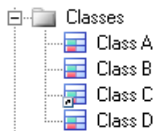
1. Display the referencing model diagram window.
2. Select **Tools > Complete Links**.

The link is displayed between the shortcuts in the referencing model.

## Displaying Shortcuts

Shortcuts are visible in both the Browser and the diagram window.

In the Browser, a shortcut is treated as a regular object, except that its symbol carries a small arrow in its bottom left corner. In the example below, the shortcut to Class C appears under the Class folder, sorted alphabetically among the other classes that are native to the model:



In a diagram, the symbol of a shortcut is identical to the symbol of a regular object except that it carries a small arrow in its bottom left corner.

Title			
Title ISBN	<pi>	A10	<M>
Title Text		LONG_TEXT	<M>
Title Type		SHORT_TEXT	<M>
Title Price		AMOUNT	
Title Notes		LONG_NOTES	
Title Publication Date		DATE	<M>
Identifier_B	<pi>		

If the target model is closed, only the name of the target model will be displayed. No other properties or sub-objects will be available:

Target model	Description	Default display Symbol
Opened	Shortcut symbols displays target object name, and target object attributes	
Closed	Simplified shortcut symbol with name, identical size but no attributes	

### **Modifying Shortcut Display Preferences**

You can modify the following display preferences for a shortcut using the **Tools > Display Preferences** command:

Preference	Description
Icon	Displays the shortcut icon on shortcut symbols
Model	[external shortcuts only] Displays the name of the target model on shortcut symbols
Package	<p>Displays the package name on shortcut symbols. If you select this option, you must choose one of the following options:</p> <ul style="list-style-type: none"> <li>• Full path – displays the full path to the package</li> <li>• Last package only –displays the last package name only</li> </ul>

### **Displaying the Objects that Are Dependent on a Shortcut**

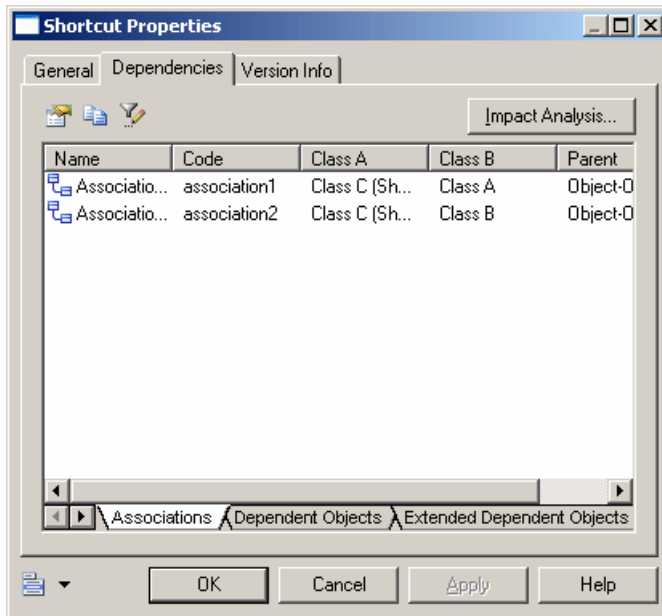
Shortcuts can collaborate with other objects in a variety of ways. The Dependencies tab in the shortcut property sheet lists the objects that are dependent on the shortcut.

This can be very useful to avoid deleting a shortcut whose deletion could seriously modify the design of your model.

Open the shortcut property sheet, and click the Dependencies tab.

The Dependencies tab lists all the objects dependent on the shortcut in all the models open in the workspace.

You can double-click an entry in the list to display the object's property sheet, or click the Impact Analysis button to determine the impact of deleting the shortcut.

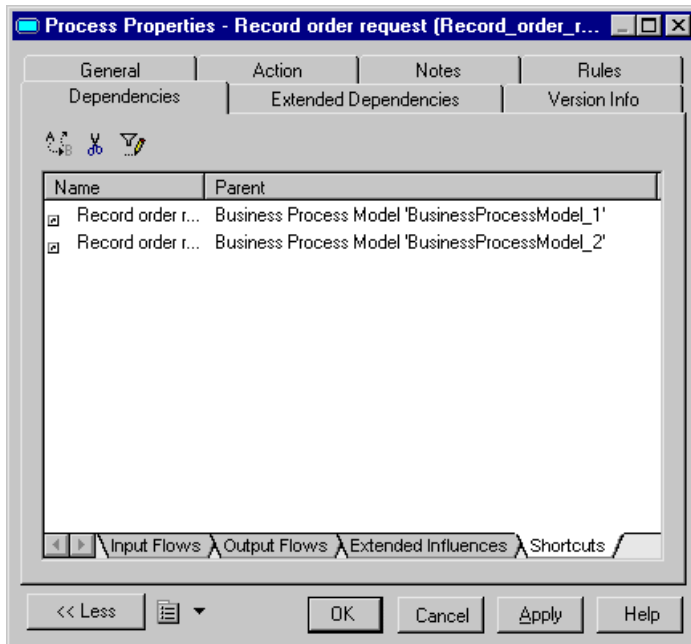


### **Displaying the Shortcuts that Reference a Target Object**

The Dependencies tab in an object's property sheet lists all the shortcuts that reference the object

1. Open the target object property sheet and click the Dependencies tab.
2. Click the Shortcuts sub-tab.

The Shortcuts sub-tab lists all the shortcuts that reference the target object in all the models open in the workspace.

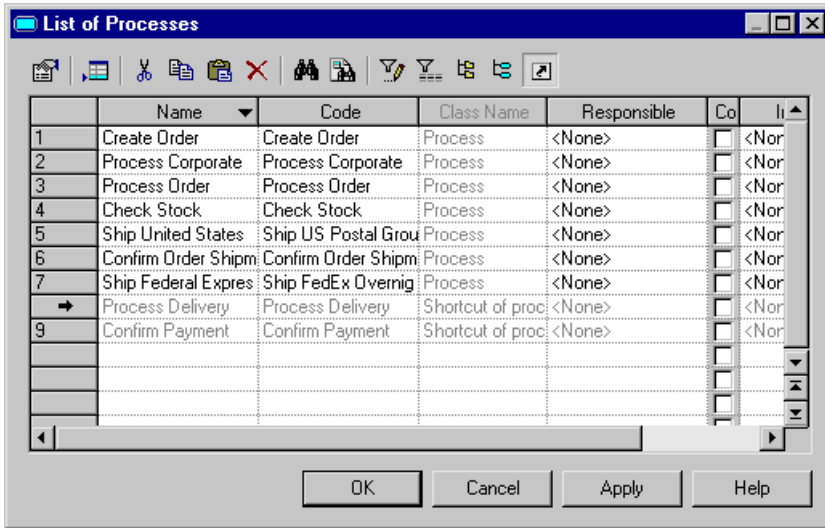


For more information on how to visualize external shortcuts of a target object in closed model, see "Auditing repository activities" in the "Managing Repository Documents" chapter of the *Working with the Repository* manual.

### **Displaying All the Shortcuts for a Particular Type of Object**

You can display all the shortcuts for a particular type of object in the object lists.

1. Select **Model > Objects** to open the relevant list of objects.
2. Click the Include Shortcuts tool to display the shortcuts of this object type within the list.



The shortcuts of this object type are displayed grayed out in the list. You cannot modify a shortcut directly in this list, but you can select one and click the Properties tool to display its property sheet.

---

**Note:** If both the Include Shortcuts and Include Sub-packages tools are enabled in the selected list, all the objects shortcuts of the current package and those of the sub-packages appear.

---

### **Displaying All the Shortcuts in the Model**

You can display all the shortcuts in the model in the List of Shortcuts. The U[sed] column is checked when the shortcut has a symbol in a diagram or if it is referenced by at least one other object. If this column is not checked, the shortcut is not used in the model and you can safely delete it.

Select **Model > Shortcuts** to open the List of Shortcuts.

All the shortcuts in the model are displayed grayed out in the list. You cannot modify a shortcut directly in this list, but you can select one and click the Properties tool to display its property sheet.





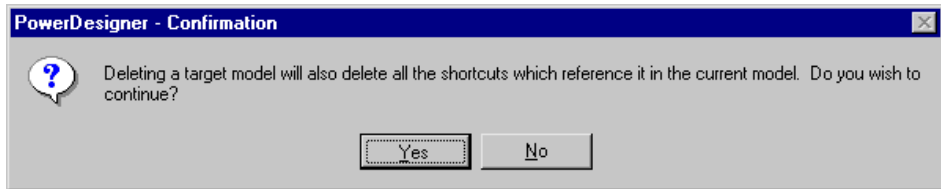
- Click OK to close the list of target models.

### Deleting a Target Model

If you delete a target model, you delete all its shortcuts.

- Select **Model > Target Models** to open the List of Target Models.
- Select a target model in the list and click the Delete tool.

A message warns you that all the shortcuts related to the target model will be deleted during this operation.



- Click Yes to confirm the deletion of the target and of all its shortcuts.

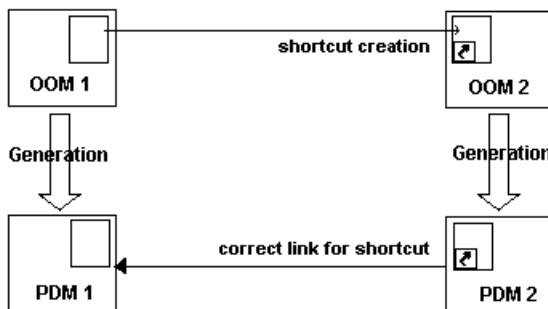
## Generating Shortcuts

You can generate shortcuts through the Target Models page located in the model type Generation Options dialog box.

This page also allows you to generate replications (see *Generating Replications* on page 385).

When you generate a model from another models, shortcuts are, by default, generated in the new model as independent objects. You can choose to instead generate them as shortcuts and, thus, preserve their links to the target model.

The following example shows the generation of a PDM from an OOM:



Here is the proper sequence of events for external shortcuts generation:

- OOM 1 is the target model of a shortcut in OOM 2

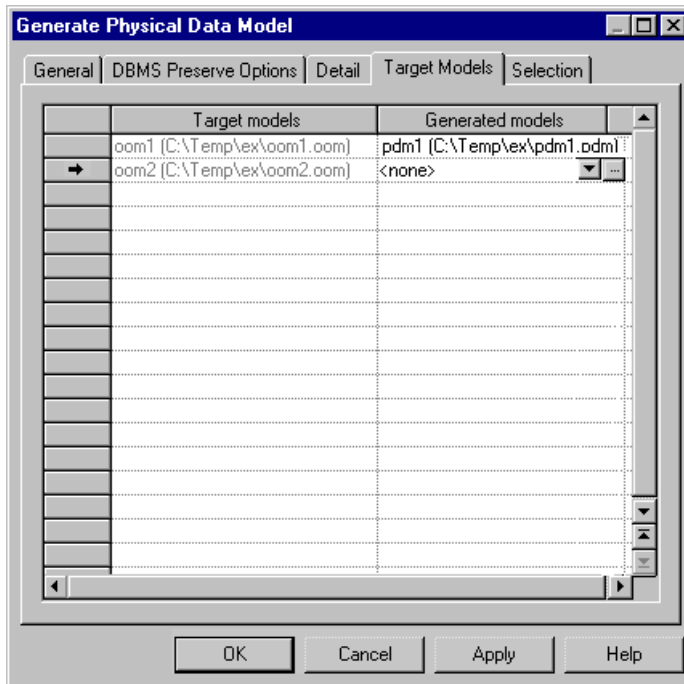
- OOM 1 is generated to PDM 1
  - OOM 2 is prepared for generation to PDM 2 by associating appropriate properties and parameters in both the shortcut property sheet and the Target Models page:
    - If OOM 1 Is Still Opened in the Workspace, the Target Model column displays the original target model (OOM 1), and its path. The Generated Models column displays the last generated PDM the first time you generate the OOM into a PDM; the next time you generate the OOM into a PDM, the Generated Models column displays the last PDM selected. You can click the arrow in the Generated Models column to modify the PDM selection in order to allow the creation of a correctly linked shortcut.
    - If OOM 1 Is Closed in the Workspace, the Target Model column displays the original target model (OOM 1), and its path. The Generated Models column displays <none>. When you click into the Generated Models column, the original target model OOM 1 is automatically opened in the workspace in order to find the models generated from OOM 1. You can use the arrow to select PDM 1, the new target that will allow the creation of a correctly linked shortcut in PDM 2.
  - The external shortcut in PDM 2 is correctly generated with a link to its target object in PDM 1
1. Before beginning the generation, verify that all the appropriate shortcuts have the following properties set:
    - Generate is selected to include the shortcut in the generation process
    - Generated As is set to Shortcut

---

**Note:** You can select and modify the properties of multiple shortcuts in the List of Shortcuts.

---

2. Select **Tools > Generate *model type*** and click the Target Models tab, which contains a list of :
  - Target Models - of the current model that contain at least one shortcut generated as shortcut
  - Generated Models – from which you can select the model that will be used as a target for the generated shortcut
3. Verify the list of generated models for each shortcut you want to generate as a shortcut or make the appropriate changes.



4. Click OK to start generation.

## Object Replications

While shortcuts allow you to reference objects in other models, they have some limitations:

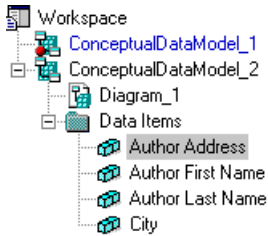
- the complete definition of the target object can only be accessed if the target model is open.
- you cannot redefine locally any of the properties of the target object.

For example, in one model you may need a Client table with Name and detailed Address columns, while in another model you may need only the Name column.

In this case, instead of using a shortcut, you should *replicate* the object.

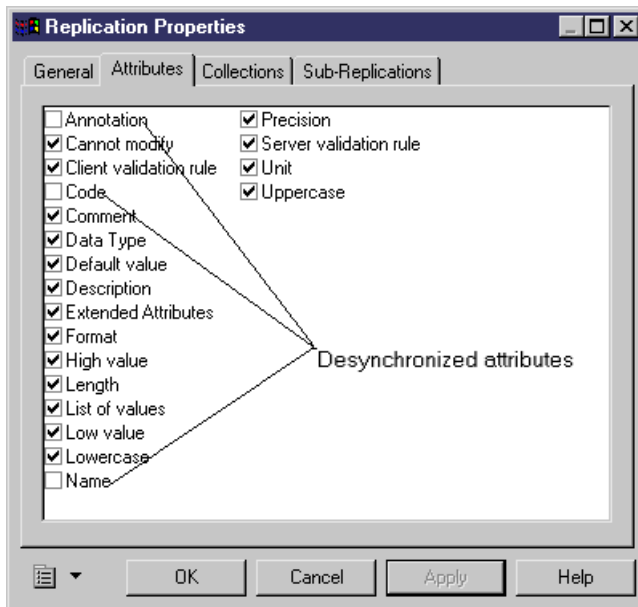
When you replicate an object, PowerDesigner creates a complete copy (or *replica*) of the object. The replica retains the name, code, type and Id of the *original object* and is automatically updated when the original is modified.

A replica looks exactly like other objects in the Browser and diagram, but its property sheet is, by default, uneditable, because all its properties are synchronized with the original:



You can desynchronize any property that you want to change, while retaining synchronization of the others.

The link to and synchronization with the original object is maintained by a *replication*, which is not visible in the Browser or diagram, but whose properties are accessible via the List of Replications.



**You Use Shortcuts when**

You want to reference an object in the same model or in different models or packages in order to share this object representation between models or packages. The shortcut is not a local copy of the target object and cannot be modified independently of its target object.

**You Use Object Replications when**

You want to have a local copy of an object that can also diverge from its original object.

**Objects that Support Object Replications?**

You can create as many replicas as you want for most of the object types that appear under a model diagram or package in the Browser.

You can also create replicas of replicas.

You cannot replicate links, but you can create a link between two replicas in the referencing model.

The following table lists objects per module that support replications:

<b>Module</b>	<b>Object</b>
CDM Conceptual Diagram	Entity, Data Item
PDM Physical Diagram	Table, View, User, Role, Group, Abstract Data Type, Test Data Profile, Storage, Tablespace, Procedure, Trigger Template, Trigger Template Item, Join Index, Sequence, Database Package, Synonym
PDM Multidimensional Diagram	Cube, Dimension, Fact, Data Source
OOM Class Diagram	Class, Interface
OOM Use Case Diagram	Use Case, Actor
OOM Sequence Diagram	Object, Actor
OOM Activity Diagram	Object State, Organization Unit, Object, Activity
OOM Component Diagram	Component
OOM Object Diagram	Object
OOM Deployment Diagram	Component Instance, Node
OOM Collaboration Diagram	Object, Actor
OOM Statechart Diagram	Event, State
BPM Business Process Diagram	Organization Unit, Resource, Message Format, Data, Service Provider, Event, Data Transformation, Variable, Correlation, Process, Correlation Key
XSM XSD Diagram	Attribute Group, Attribute, Element, Simple Type, Complex Type, Group, Notation, Import, Include, Redefine
XSM DTD Diagram	Entity, Attribute Group, Attribute, Element, Group, Notation
RQM	Term, User, Group, Replication

Module	Object
ILM Information Liquidity Diagram	—
All modules	File, Business Rule, Domain, Data Source

## Creating a Replica

You can creating replicas using:

- the Replicate Objects dialog box
- drag and drop while holding alt + shift

### Creating a Replica from the Replicate Objects Dialog Box

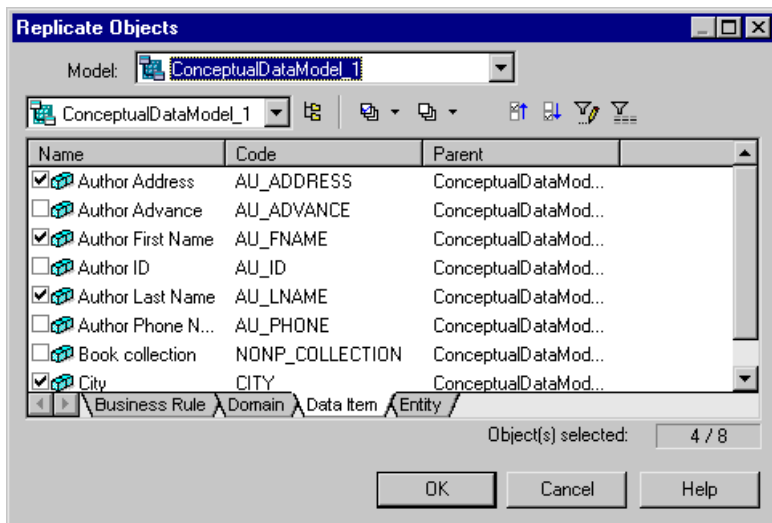
The Replicate Objects dialog box allows you to select one or more objects to replicate from any model or package open in the workspace.

1. Select **Edit > Replicate Objects** (or right-click the diagram background and select **Edit > Replicate Objects** from the contextual menu) to open the Replicate Objects dialog box.
2. Select a model and, optionally, a package from which to select objects to replicate. All the available objects of the selected model and package are displayed.

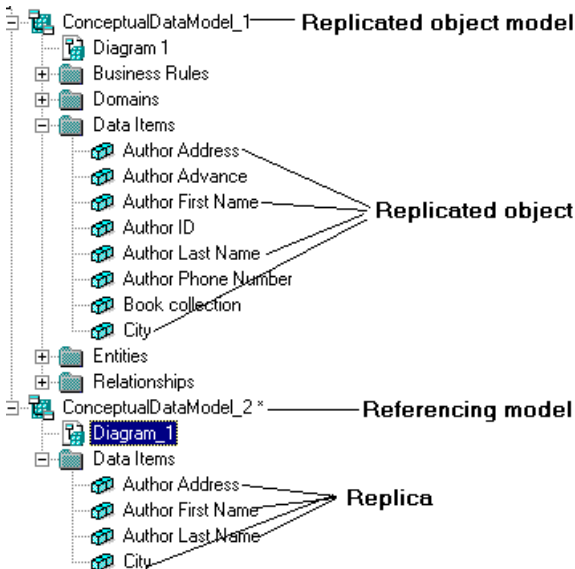
**Note:** If you want to display all objects in the model and all objects in packages and sub-packages, click the Include Sub-Packages tool in the list toolbar.

3. Select the objects you want to replicate from the various sub-tabs and click OK.

**Note:** If you select an object that owns sub-objects (a table that contains columns, for example, or a class that contains attributes or operations), its sub-objects are also replicated. If you want to directly replicate a sub-object, you must use drag and drop.



The replicas appear in the active model and in the Browser under the appropriate node.

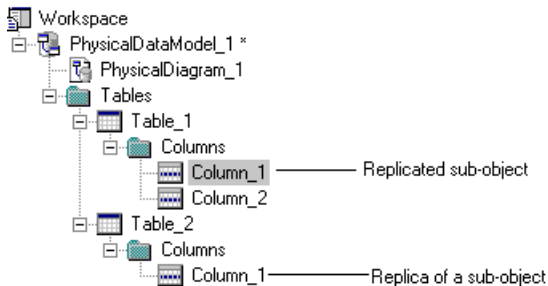


### Creating a Replica Using Drag and Drop

You can use drag and drop while holding alt+shift to create replicas in the Browser or diagram, or from one to the other. A rounded arrow within a circle is displayed under the cursor when you are about to create the replica.

You can replicate sub-objects by drag and drop in the Browser while pressing the alt + shift keys combination. It can be useful to replicate a sub-object independently of its parent object (for example a column without the table that owns it) to create a reference library, in which you can store columns, attributes or operations that you regularly use.

The following example illustrates a column (Column\_1) in Table\_1 that is replicated in Table\_2:

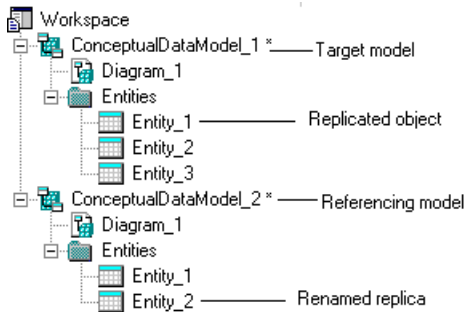


You can define the default behavior of drag and drop to directly create replicas (see *General Options* on page 301).

Name uniqueness is automatically checked when you replicate an object, so that replicas are renamed in the referencing model when objects with the same name already exist in the model.

For more information on the definition of the namespace, see *Object Namespaces* on page 116.

The following example illustrates the replication of Entity\_1 in a model that already contains an entity named Entity\_1. The Entity\_1 replica is automatically renamed to Entity\_2 in the referencing model:



1. Select a target object in the Browser.
2. Press alt+shift while you drag the object to the desired model or package and release the mouse button.

The replica is displayed in the active model or package and in the Browser under the appropriate node.

---

**Note:** You can also create a replica by right-clicking and dragging the target object and select the Replicate Here menu item from the contextual menu.

---

## Replica and Replication Properties

Replicas have the property sheets appropriate to their object type. For example, a replica of a class has a standard class property sheet. However, by default, the property sheet of a replica is read-only because all its properties are synchronized with the original object.

### Opening the Property Sheet of a Replication

In order to make editable any of the properties of a replica, you must open the properties of the replication responsible for its link with the original object.

1. Open the property sheet of a replica and click the Version Info tab.
2. Click the Replication Properties button in the Replicated From groupbox.

The definition of a replication object includes the following general properties:

Property	Description
Original Object Model	Model of the original object. The Properties button lets you open the property sheet of the model containing the original object.  The List of Target Models shows models containing shortcuts or replicas in the current session. It also allows you to get a model full name to distinguish from another. For more information on how to use the List of the Target Model, see <i>Working with the target models referenced by the model</i> on page 367.
Original Object Full Name	Full path describing the location of the original object. The Properties button lets you open the property sheet of the original object
Original Object Type	Type of the original object
Original Object Status	Displays the status of the original object. The following states are possible: <ul style="list-style-type: none"> <li>• Closed – the target model is closed and the status of the original object cannot be determined</li> <li>• Opened – the target model is open and the original object is present.</li> <li>• Not Found – the target model or original object cannot be found. For more information, see <i>Deleting replicas, replications, and original objects</i> on page 380.</li> </ul>
Replica Object Full Name	Full path describing the location of the replica object. The Properties button lets you open the property sheet of the replica object
Generate	Replication is automatically included among the objects generated from the model when you launch the inter-model generation process. For more information, see the <i>Generating Replications</i> on page 385 section.

A replication definition also includes the following properties:

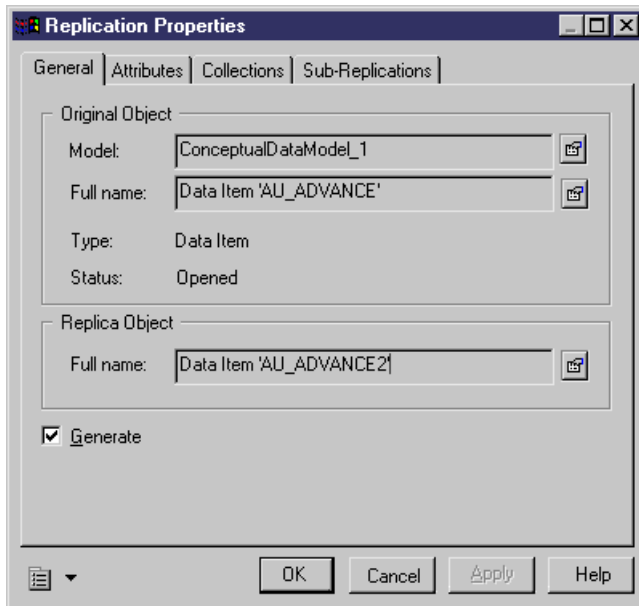
Property	Description
Attributes	List of replicated attributes
Collections	List of replicated collections
Sub-Replications	List of replicated sub-objects (for example a column of a replicated table)

**Note:** Select **Model > Replications** to open the List of Replications, select a replication in the list, and then click the Properties tool

## **Modifying the Original Object Properties**

You can access and change the properties of the original object from the replication property sheet.

1. Open the property sheet of the replica, and then click the Version Info tab.
2. Click the Replication Properties button in the Replicated From groupbox to open the replication property sheet:



3. Click the Properties button to the right of the Full name field to open the original object property sheet.
4. Modify the original object properties.
5. Click OK to return to the replication property sheet and OK again to return to the model diagram.

## **Synchronizing Replicas**

When you create a replica to a target model that has never been saved, you should save the target model before the referencing model in order to allow synchronization between the models. If you attempt to save the referencing model first, you will be prompted to save the target model.

When you make changes to an original object, the replica is synchronized automatically:

- If the referencing model is opened - synchronization occurs instantly.
- If the referencing model is closed - synchronization occurs when it is next opened.

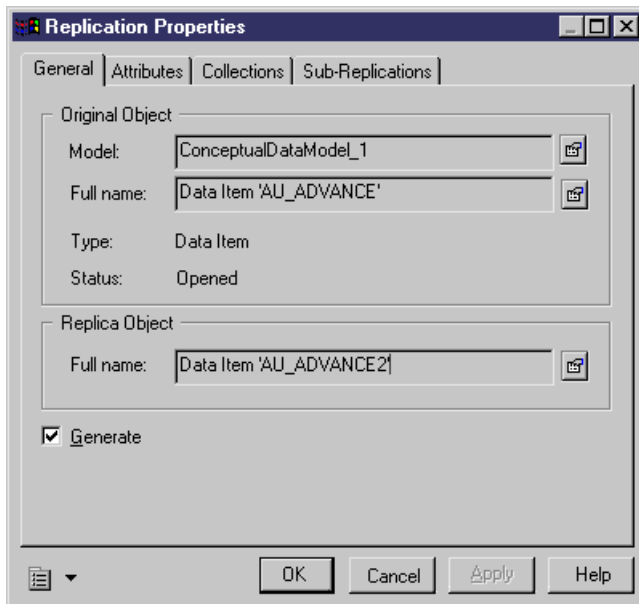
Both the referencing and target models must be open for synchronization to occur.

### **Desynchronizing Replica Properties**

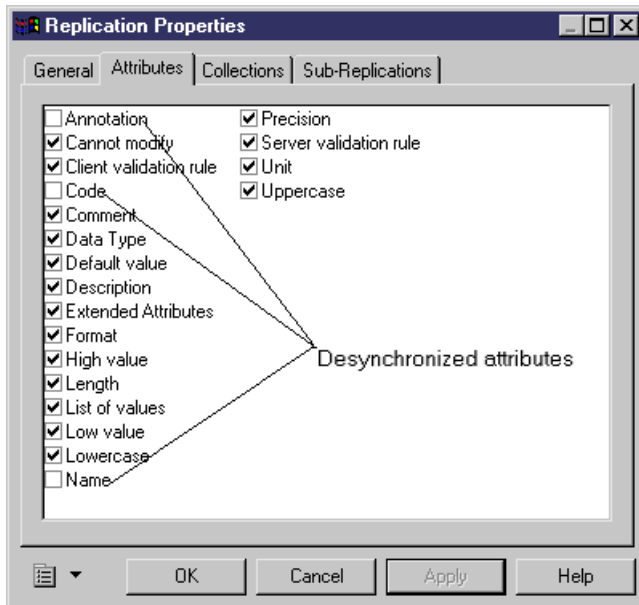
By default, when you replicate an object, all of its properties are also replicated, and synchronized to the original, and are uneditable in the replica property sheet.

You can desynchronize any of these properties in the replication property sheet, and then change their values in the replica.

1. Open the property sheet of a replica, and then click the Version Info tab.
2. Click the Replication Properties button in the Replicated From groupbox to open the replication property sheet:



3. Click one of the following tabs to display the type of property you want to desynchronize:
  - Attributes – properties that contain a single value
  - Collections – properties that can contain multiple values
  - Sub-replications – sub-objects, that have their own property sheets
4. Clear the check boxes next to the items that you want to desynchronize:



5. [for sub-replications] Select the sub-object in the list on the Sub-replications tab and click the properties tool to open its sub-replication property sheet. Then clear the relevant check boxes to desynchronize its properties.
6. Click OK to return to the replica property sheet.

The desynchronized properties are now editable in the property sheet, and will no longer be synchronized with the original.

## **Moving Replicas, Replications, and Original Objects**

If you move a replica to a different package or model, the replication that links it to the original object is also moved.

If you move an original object, any replications that link replicas to it will be automatically updated.

You cannot move a replication separately from the replica that it serves.

For more information on moving objects, see *Moving Objects from Package to Package* on page 132.

## **Deleting Replicas, Replications, and Original Objects**

If you delete a replica, the replication that linked it to the original object is also deleted.

If you delete an original object, any replicas linked to it will be deleted too, unless they have one or more property desynchronized, in which case they will be retained and become normal objects.

If you delete a replication, the link between the replica and its original is broken and the replica becomes a normal, object. No further synchronization is possible.

1. Open the property sheet of a replica, click the Version Info tab, and then click the Delete Replication button in the Replicated From groupbox.
2. Select Model Replications to open the List of Replications, select a replication in the list and click the Delete tool

### **Displaying Replicas and Replications**

Replicas look identical to normal objects, but all or part of their property sheets will be grayed out and uneditable.

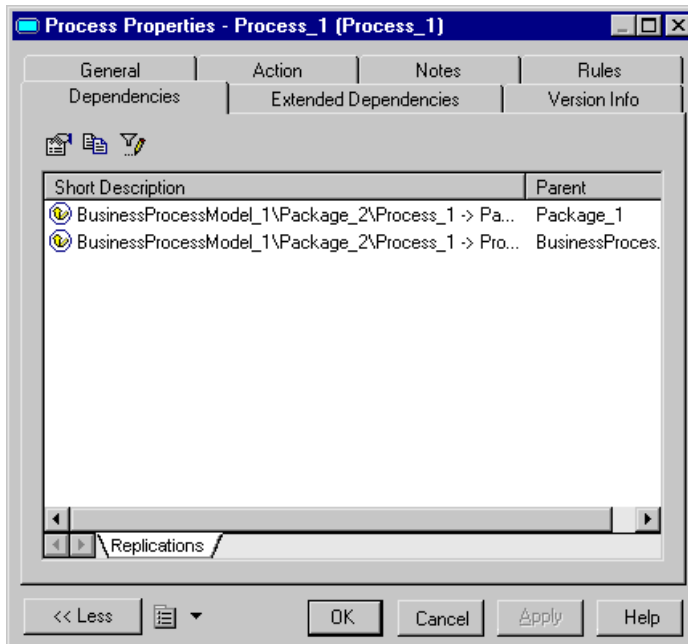
Replications, which maintain the link between the replica and the original object have no browser entry or diagram symbol, but their property sheets can be accessed from the property sheet of the replica or from the List of Replications.

### **Displaying the Replications Linked to an Original Object**

The Dependencies tab in an object's property sheet lists all the replications that reference the object

1. Open the original object property sheet and click the Dependencies tab.
2. Click the Replications sub-tab.

The Replications sub-tab lists all the replications that reference the original object in all the models open in the workspace.

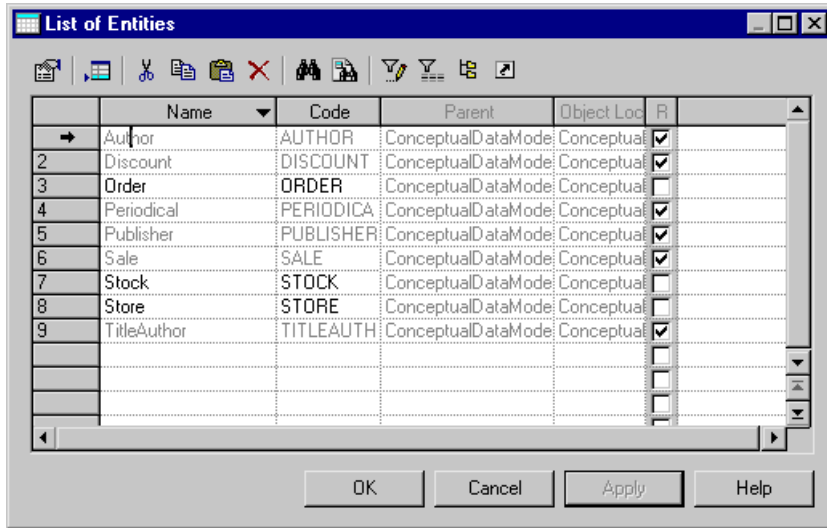


### **Displaying All the Replicas for a Particular Type of Object**

You can display all the replicas for a particular type of object in the object lists.

1. Select **Model > Objects** to open the List of *Objects*.
2. Click the Customize Columns and Filter tool, select Replica in the list of filter options, and then click OK.

When the R[eplica] column is selected, this indicates that the object is a replica. Any property that is synchronized (and thus not editable) is grayed in the list.



You can select a replica, and then click the Properties tool in order to open its property sheet, and desynchronize any of its properties to make them editable. When a property has been desynchronized, it is no longer greed in the object list, and can be edited.

---

**Note:** If the Include Sub-packages tools is enabled in the selected list, all the replicas of the current package and those of the sub-packages appear.

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### **Displaying All the Replications in the Model**

You can display all the replications in the model in the List of Replications.

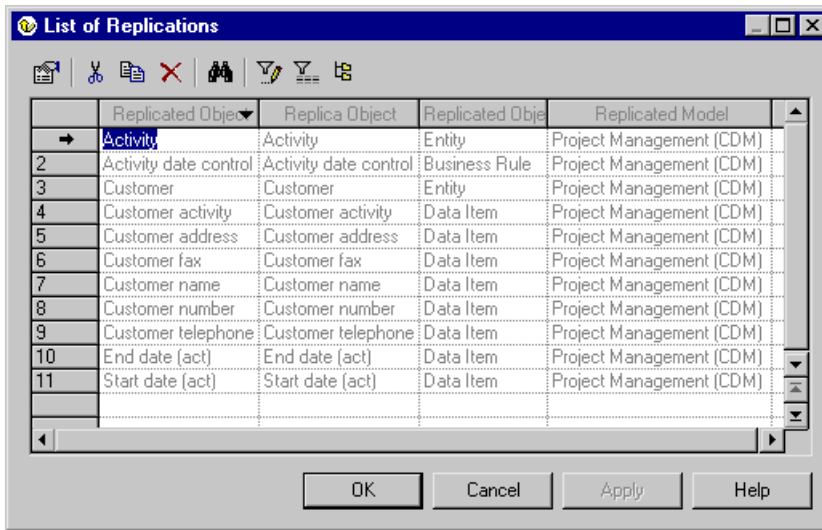
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**Note:** You cannot create new replications from the List of Replications. You must use drag and drop or select **Edit > Replicate Objects**

---

Select **Model > Replications** to open the List of Replications.

All the replications in the model are displayed grayed out in the list. You cannot modify a replication directly in this list, but you can select one and click the Properties tool to display its property sheet.




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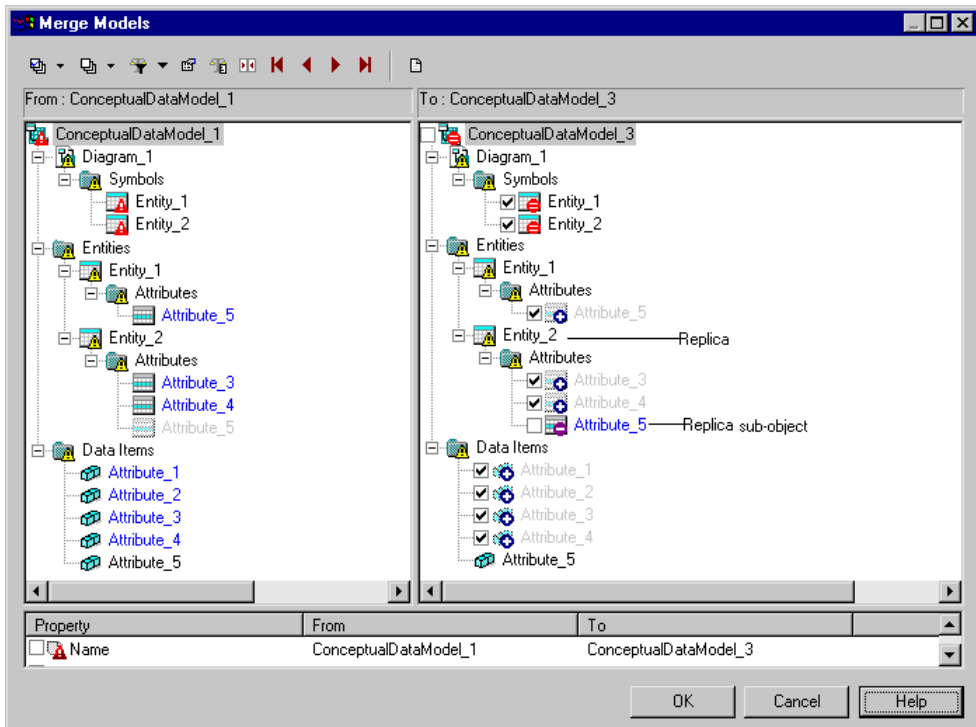
**Note:** You can display the replications of all packages by clicking the Include Sub-Packages tool.

---

### **Comparing and Merging Replicas**

You can compare and merge the properties of a replica with those of the original object.

When merging models containing replications, you must merge both replicas and their associated replications in order to merge a complete replication. Otherwise they will be merged as ordinary objects and not as replicas.



For more information on comparison and merging see *Chapter 7, Comparing and Merging Models* on page 259.

## Generating Replications

You can generate a replica in another type of model and preserve the link with its original object through generation. You will then be able to continue the synchronization in the generated model.

This requires first generating all original object models to the destination model type so that these new objects can be referenced as the original objects for the generated replicas.

You specify original object models to be used during generation through the Target Models page located in the Generation Options dialog box.

Before you generate a replication, you must:

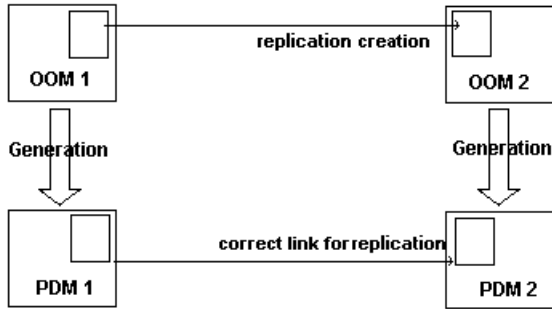
- Select the Generate check box in the replication property sheet otherwise the replica will be generated as an ordinary object and not as a replica
- Select generated models in the Target Model page located in the Generation Options dialog box in order to retrieve the corresponding original object of each replica in the generated model

The Target Model page also allows you to select generated model for shortcuts.

For more information on the Target Model page, see *Working with the target models referenced by the model* on page 367.

### **Example of an Inter-model Generation with Replications**

The following example shows the generation of a PDM from an OOM:



Here is the proper sequence of events for replication generation:

- OOM 1 is the target model of a replica in OOM 2
- OOM 1 is generated to PDM 1
- OOM 2 is the referencing model that contains the replica
- OOM 2 is generated to PDM 2 while preserving the link between the replica in PDM2 and the original object in PDM 1

### **Selecting a Type of Generation for a Replication**

You can choose to generate a replication in another type of model and preserve the link with its original object through generation. The list of replications allows you to perform a multiple selection.

For more information on the generation of replications, see *Generating Replications* on page 385.

1. Select **Model > Replications** to open the list of replications.
2. Select a replication in the list.
3. Click the Customize Columns and Filter tool in the list toolbar, select the Generate check box from the list of filter options that is displayed, and click OK.

You return to the list of replications.

4. Click the Generate column for the replication you want to generate during inter-model generation.
5. Click OK.

The replication will be automatically included among the objects generated from the model when you will launch the generation process.



# CHAPTER 12 Object Mappings

Object mapping allows you to establish connections between objects belonging to heterogeneous models and diagrams. You create mappings between objects to model *O/R (Object-Relational)* mappings, which associate classes with tables to store OOM objects into a relational database, or simply to express a correspondence between objects in different models.

The following table lists the supported types of model-to-model mapping in PowerDesigner:

Source Model	CDM Target	LDM Target	PDM Target	OOM Target	XSM Target
CDM	X	X	X	X	
LDM	X	X	X	X	
PDM	X	X	X	X	X
OOM	X	X		X	X
XSM					X

---

**Note:** Mappings are also used to define data replications in the ILM. For more information, see "Visualizing and Refining Data Replications with the Mapping Editor" in the Building Information Liquidity Diagrams chapter of the *Information Liquidity Modeling* guide.

---

You can create mappings :

- in the Mapping Editor - which gives you a global view of all the mappings to objects in the current (target) model (see *Creating Mappings from the Mapping Editor* on page 396)
- on the Mapping tab of the property sheet of the target object (see *Creating Mappings from an Object's Property Sheet* on page 417)
- During model generation, by selecting the **Generate Mappings** option in the Model Generation Options window (see *Generating Models* on page 337).

Each mapping is recorded in a query, a textual expression or an XPATH expression defined in the target object, which permits the selection of data from the data source and its transfer to the target model. You can view and refine these mappings in the Mapping Editor.

The following tables list the objects that can be mapped for each kind of model.

## CDM Mappings

CDM objects can be mapped to other model objects as follows:

CDM Source Objects	CDM Target Objects	LDM Target Objects	PDM Target Objects	OOM Target Objects
Entity	Entity, Association, Relationship	Entity, Relationship	Table	Class, Association
Entity attribute	Entity attribute, Association attribute	Entity attribute	Column	Class attribute
Relationship	Entity, Association, Relationship	Entity, Relationship	Table, Reference	Class, Association
Inheritance	Inheritance	Inheritance	-	-
Inheritance attribute	Inheritance attribute	Inheritance attribute	-	-
Association	Entity, Association	Entity, Relationship	Table, Reference	Class, Association
Association Attribute	Association attribute, Entity attribute	Entity attribute	Column	Attribute
Data item	Data item	-	-	-
Domain	Domain	Domain	Domain	Domain

**Note:** You can map inheritances with CDM objects only when its child entities are not generated, i.e. when the "Generate children" option is deselected in the Generation tab of the inheritance property sheet.

### LDM Mappings

LDM objects can be mapped to other model objects as follows:

LDM Source Objects	CDM Target Objects	LDM Target Objects	PDM Target Objects	OOM Target Objects
Entity	Entity, Relationship, Association	Entity, Relationship	Table	Class, Association
Entity attribute	Entity attribute	Entity attribute	Column	Attribute
Relationship	Entity, Relationship	Entity, Relationship	Table, Reference	Class, Association
Inheritance	Inheritance	Inheritance	Reference	Generalization

LDM Source Objects	CDM Target Objects	LDM Target Objects	PDM Target Objects	OOM Target Objects
Inheritance attribute	Inheritance attribute	Inheritance attribute	-	-
Domain	Domain	Domain	Domain	Domain

### PDM Mappings

PDM objects can be mapped to other model objects as follows:

PDM Source Objects	CDM Target Objects	LDM Target Objects	PDM Target Objects	OOM Target Objects	XSM Target Objects
Table	Entity, Relationship	Entity, Relationship	Table, Fact, Dimension	Class, Association	Element, Complex type
Table column	Entity attribute	Entity attribute	Table column, Measure, Dimension attribute	Attribute	Element, Complex type
View	-	-	Fact, Dimension	Class	-
View column	-	-	View column, Table column, Measure, Dimension attribute	Attribute	-
Reference	Relationship	Relationship	Reference	Class, Association	-
Domain	Domain	Domain	Domain	Domain	-

### OOM Mappings

OOM objects can be mapped to other model objects as follows:

OOM Source Objects	CDM Target Objects	LDM Target Objects	OOM Target Objects	XSM Target Objects
Class	Entity, Association, Relationship	Entity, Relationship, Inheritance	Class	Element, complex type

OOM Source Objects	CDM Target Objects	LDM Target Objects	OOM Target Objects	XSM Target Objects
Attribute	Entity attribute, Association attribute	Entity attribute, Inheritance attribute	Attribute	Element, Complex type
Generalization	-	Inheritance	Generalization	-
Association	Association	Entity, Relationship	-	-
Domain	Domain	Domain	Domain	-

### XSM Mappings

XSM elements and complex types and their attributes can only serve as source objects for mapping to other XSM elements, complex types and attributes, but they can serve as the targets for mappings from OOM or PDM source objects.

## Object to Relational (O/R) Mapping

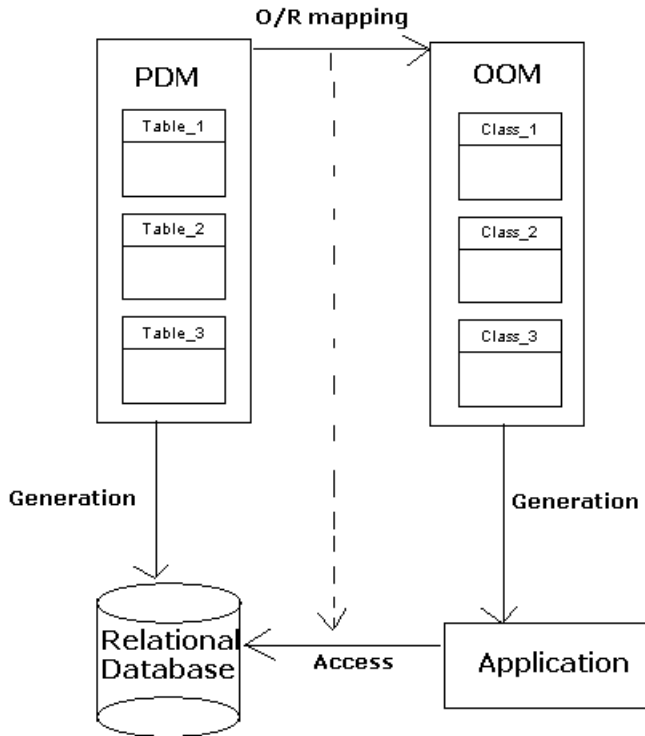
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Developers tend to use object-oriented programming languages like Java, to develop business objects and components. These objects can be stored in a database. A problem arises when the user tries to store objects in a relational database because object modeling describes a system through objects that have identity, behavior and encapsulated state whereas relational modeling describes a system by its data.

Furthermore, object codes in an OOM for a given object language are often different than codes used in a relational database. This requires that you modify object codes after generating an OOM into a PDM or a PDM into an OOM to be compliant with the object language.

You can use object mapping to bypass this impedance-mismatch.

The following schema illustrates the link between classes and tables to store objects in a relational database:



Object persistence implies to store and extract objects in a relational database.

### Mapping Classes with PDM Objects

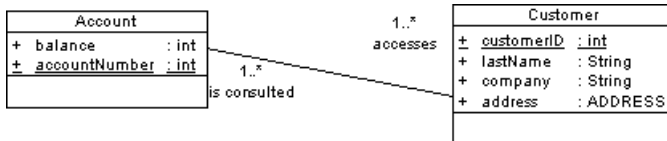
When a class inherits from a non-generated class via a generalization link, the attributes of the class appear in the Selection dialog box in order to let you create a mapping with these inherited attributes. The attributes of a non-generated derived class also appear in the Selection dialog box.

### Mapping Associations with PDM Objects

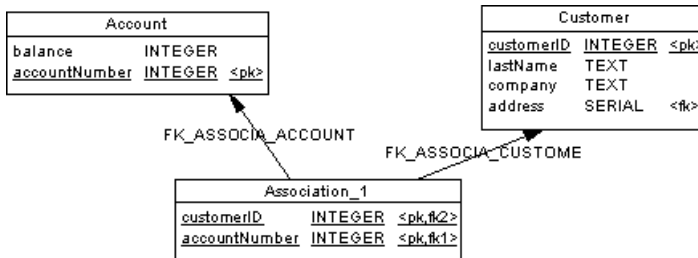
O/R mapping on an association allows you to define the *role navigability* of an association in the database. When an association role is not navigable, there is no need to design a mapping for the association since no information is transmitted between the classes. However, when an association role is navigable, you have to set up the structure for data transmission within the database. In relational databases, data transmission is implemented via foreign keys designed to relate a record in one table with a record in another.

The type of mapping for an association depends on the association multiplicity:

- One-to-one or one-to-many associations can be mapped to a reference in the source model. This reference is used in the database to transfer data and migrate key columns to the appropriate table
- Many-to-many associations have to be mapped to an associative table. This table is created to maintain a relationship between two or more tables in a relational database. The columns contained in the associative table are the combination of the keys in the tables involved in the reference. For example, the following classes have a many-to-many association:



In a relational database, this association is mapped to the following associative table:



## SQL Queries

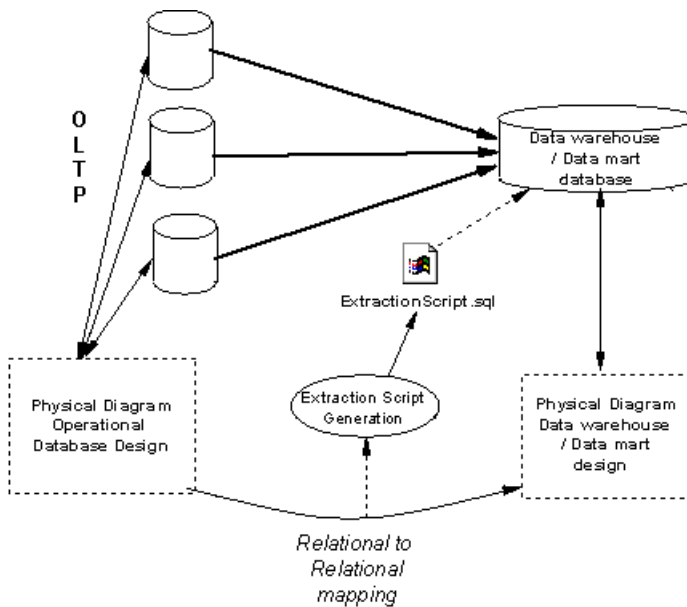
When the association roles are navigable, the following queries are automatically computed:

Query	Action
Select (Role A)	Retrieves related class A instances for the role A defined on class B
Insert (Role A)	Associates an instance of class A with class B. It is computed only when the source association is an associative table
Delete (Role A)	Deletes from class B the association with class A. This query is computed only when the source association is an associative table
Select (Role B)	Retrieves related class B instances for the role B defined on class A
Insert (Role B)	Associates an instance of class B with class A. This query is computed only when the source association is an associative table
Delete (Role B)	Deletes from class A the association with class B. This query is computed only when the source association is an associative table

## Mappings between Operational, Data Warehouse, and OLAP Databases

Data warehousing requires the extraction, transformation, and loading of data from operational systems to a data warehouse database. You can map PDM objects to represent links between operational and data warehouse data and from the data warehouse data and OLAP cubes.

You can model operational and data warehouse data structures in PDMs, and specify mappings to identify the operational data sources of the data warehouse. These mappings can be used to generate extraction scripts to populate the data warehouse with operational data:

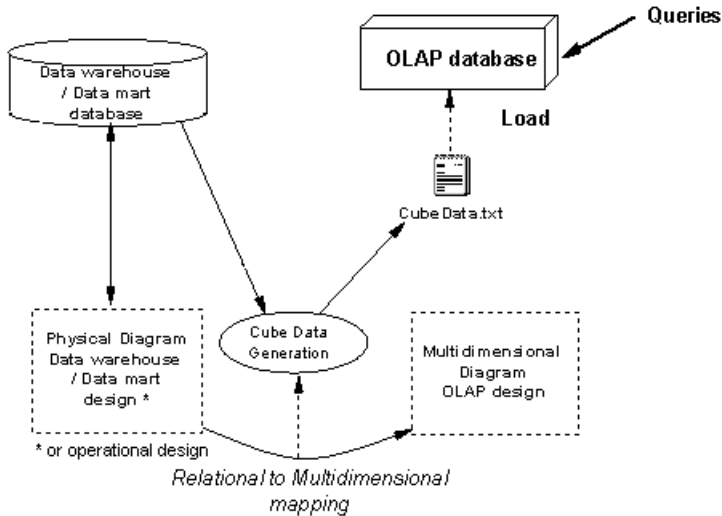


The following table lists the objects that are mapped in this kind of relational-to-relational mapping:

Operational object	Data warehouse object
Table	Table (Fact or Dimension type)
Column	Column

You can map physical objects to OLAP objects, and use these mappings to generate cube data in text files to be loaded by OLAP engines. The mapping for a physical object (dimension or fact) is used to supply data for the cube dimensions or cube measures in OLAP databases. The

tables in the data source need not be of dimension or fact type. Once the source tables or views are identified, you can define mappings between attributes or measures and table columns:



When you use the Rebuild Cubes feature to create cubes and dimensions from fact and dimension tables, the mapping between source tables and OLAP objects is automatically performed.

The **Select** sub-tab displays the entire SQL statement used to select data in the data source. This statement is automatically generated. The Generate Cube Data feature uses this SQL statement to fill the text files used to populate cubes in an OLAP database.

---

**Note:** For more information about rebuilding cubes and generating cube data, see the Building Multidimensional Diagrams chapter in the *Data Modeling* guide.

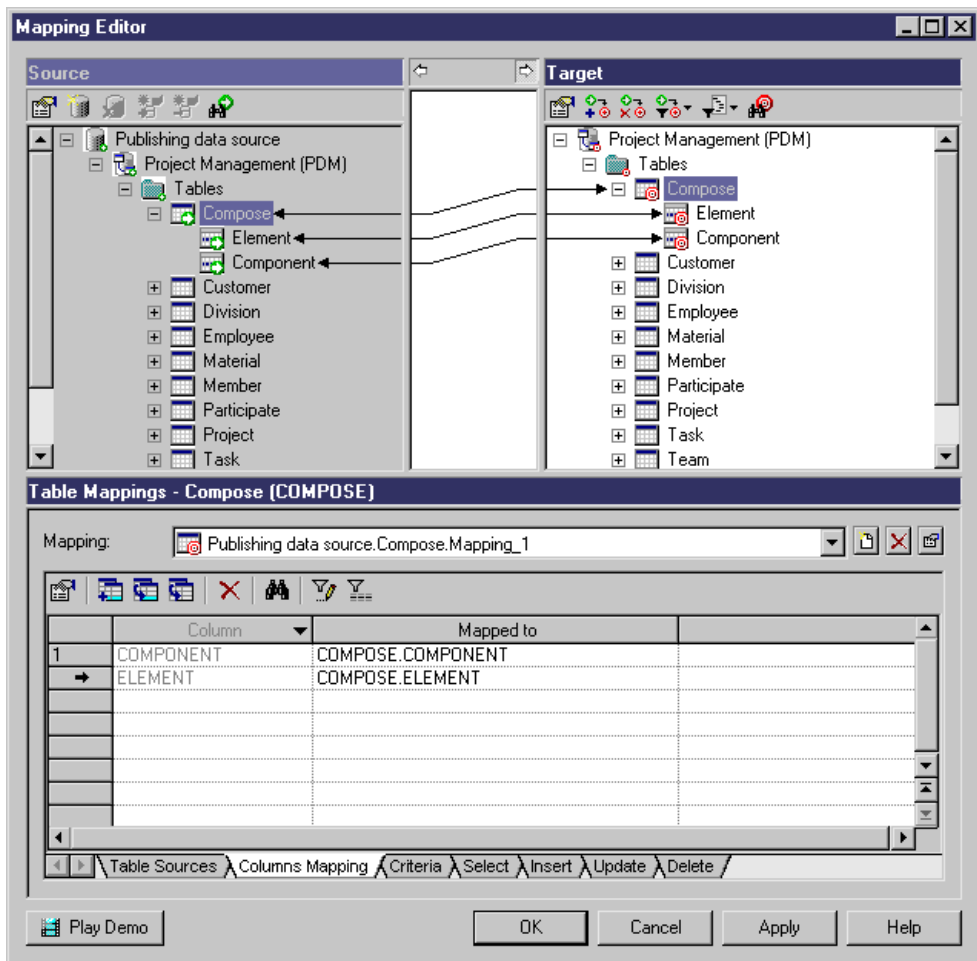
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## The Mapping Editor

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The Mapping Editor provides a global view of all the mappings to objects in your model, allowing you to quickly identify mapped and unmapped objects.

To open the Mapping Editor, select **Tools > Mapping Editor**. If no data source is defined in your model, you will be prompted to create one with the Data Source Creation Wizard (see *Creating a Data Source* on page 413).



The Mapping Editor window is divided into three panes:

- The Source pane – has a gray background and is, by default, on the left of the window. For more information, see *Mapping Editor Source pane* on page 408.
- The Target pane – has a white background and is, by default, on the right of the window. The model from which you launch the Mapping Editor is displayed in the Target pane, and the mappings are saved in this model. For more information, see *Mapping Editor Target pane* on page 409.
- The Mappings pane - can contain a mapping list or the same content as the content of the Mappings tab of an object's property sheet. If you define a mapping for an object using the Mapping Editor, the Mappings tab is automatically updated in the object's property sheet. For more information, see *Mapping Editor Mappings pane* on page 411.

**Note:** Click the Play Demo tool in the lower-left corner of the Mapping Editor window to launch a video that briefly illustrates its main features.





## Mapping Links and Symbols

When a mapping is created, a non-editable link line is drawn between the mapped objects. The arrow specifies the direction of the data transfer. When an arrow is displayed on both extremities of the link, it means the data can be extracted from the source to target and vice versa.

A link extends from the source pane to the target pane and passes through an area between the two panes. If you click a link:

- In the Source pane – you open the property sheet of the source object.
- In the Target pane – you open the property sheet of the target object.
- In the middle area - you display the mapping in the Mappings pane.

A small symbol is displayed in the bottom right-hand corner of the icons and also on their respective parent hierarchy icon to ease readability:

Pane	Mapped object icon	Parent hierarchy icon
Source (green)		
Target (red)		

When you define a mapping for an object (a table, for example) a mapping is automatically defined for its sub-objects (columns, for example) when their name matches the name of the source sub-objects.

## Creating a Mapping from the Mapping Editor

You can create a mapping in the Mapping Editor in any of the following ways:

- Drag an object from one pane and drop it on an object in the other.
- Select an object in each of the target and source panes, and then click the Create Mapping tool.
- Select an object in each of the target and source panes, and then click the Create Mapping tool in the Mappings pane.
- Select an object in each of the target and source panes, right-click one, and select Create Mapping.
- Right click a data source and select Generate Default Mappings.

---

**Note:** When dragging and dropping, you can either create a mapping if no mapping is defined for an object icon or reuse and complement an existing mapping. When using the Create Mapping tools or contextual menu command, you can create several different mappings for the same target object. Each mapping object is added to the Mapping list and you can access its property sheet.

---

## Generate Default Mappings

The Generate Default Mapping feature allows you to automatically create mappings between source and target objects having the same name. When an object in the target model is mapped to an object in the source model, their sub-objects are automatically mapped when their name and code match.

## Automatic Mapping

When objects in the Source and Target pane are mapped, their sub-objects are automatically mapped if the current model (target) contains sub-objects whose name and code match those of the sub-objects in the source models.

You can force the mapping using the Generate Mapping tool in the *Sub-Object* sub-tab of the Mappings pane to automatically generate a mapping between sub-objects with same name or code in the source and target models.

---

**Note:** You can multi-select object icons in the Source pane by holding down the SHIFT key while clicking, and map them simultaneously to a target object.

---

## Creating a Mapping by Dragging and Dropping

You can create a mapping by dragging one or more objects from the Source pane and dropping them onto an object in the Target pane.

Drag one or more objects from the Source pane and drop it onto an object in the Target pane.

A visual link is drawn between the objects and a small symbol is displayed on the source and the target object icons. The mapping details display in the Mappings pane.

---

**Note:** If a mapping is already defined for an object icon, the drag and drop feature reuse the existing mapping to complement it.

---

The pointer becomes a barred circle when it is over an impossible drop position.

When a source object in a multi-selection cannot be dropped in the selected place in the Target pane, the whole selection is rejected.

The result of a drag and drop depends on the objects being dragged and where you drop them:

- **Object > Object** - The objects are mapped together, along with any sub-objects that have the same name and code. The mapping is displayed in the Mapping list in the Mappings pane. The source object is in the Sources sub-tab and the mapping of its sub-objects displays in the Sub-Object Mapping sub-tab.
- **Sub-object > sub-object** – [where the sub-objects were not mapped because their names are different, and you have to "force" the mapping] The objects are mapped together and this mapping is added to the list of attributes mappings in the Sub-Object Mapping sub-tab.

- **Sub-object owned by a different object > sub-object** - The objects are mapped together and this mapping is added to the list of attribute mappings in the Sub-Object Mapping sub-tab.
- **Sub-object or object > folder** – The object (and its sub-objects if any) are created in the appropriate folder in the target model and are mapped to their respective source objects. Objects are displayed as new mappings in the Mapping list, and sub-objects are added to the list of attribute mappings in the Sub-Object mapping sub-tab.
- **Sub-object owned by a different object > folder** [XML target only] – The object owning the sub-object is mapped to the target object (and displays in the Sources sub-tab), and the sub-object is mapped to a new created sub-object in the target model, and added to the list of attributes mappings in the Sub-Object mapping sub-tab.

[XML Specifics] As an XML element can correspond to a simple type containing only an elementary value (for example <Name>Bill</Name>), you can directly map an element to a class attribute, an element attribute or to a table column using the drag and drop feature.

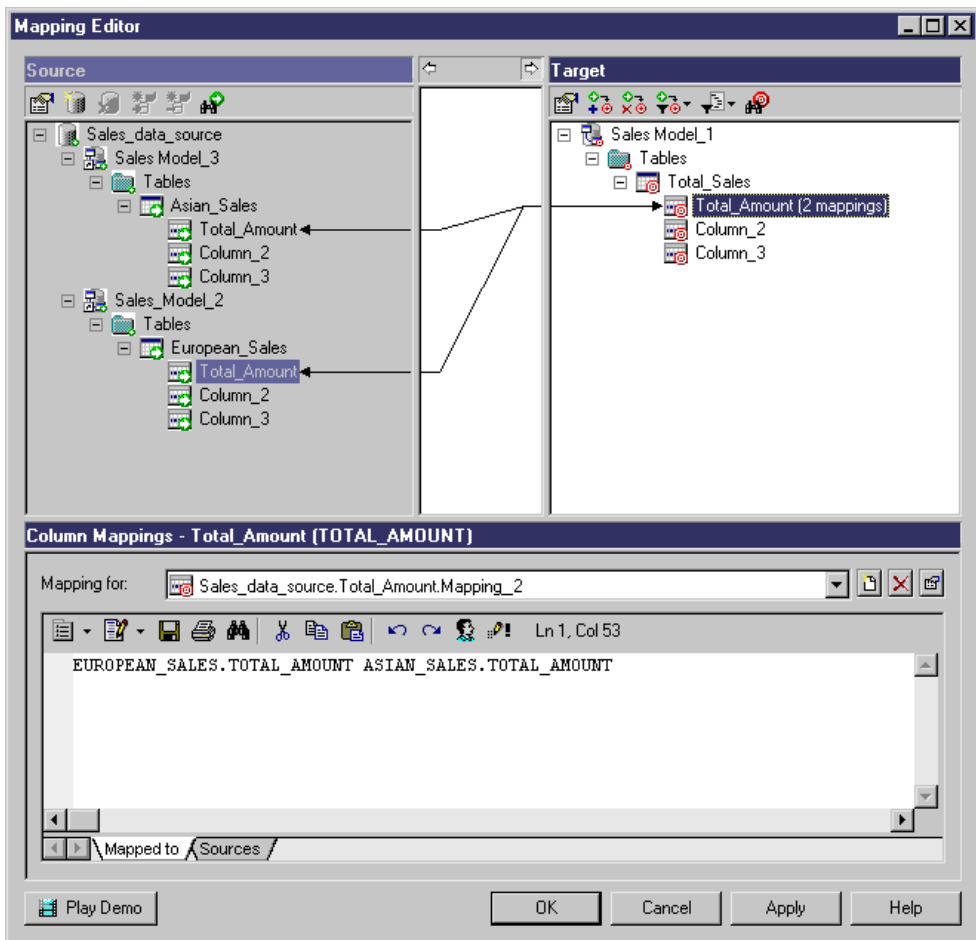
### **Creating a Mapping with the Create Mapping Tool**

You can create a mapping using the Create Mapping tool on the Mapping Editor toolbar.

1. Select one or more object icons in the Source pane and select an object icon in the Target pane.
2. Click the Create Mapping tool in the Target pane toolbar.
3. [If one of the selected source objects is ambiguous (a folder for example)] A selection dialog opens. Select an appropriate object from the list, and then click OK.

A visual link is drawn between the objects and a small symbol is displayed on the source and the target object icons. The mapping details display in the Mappings pane.

In the following example, a mapping is defined between the tables EUROPEAN\_SALES in Model\_2 and ASIAN\_SALES in Model\_3 and the table TOTAL\_SALES in Model\_1. Each table has a column called TOTAL AMOUNT. You can define column TOTAL AMOUNT in TOTAL\_SALES as the sum of total amounts in EUROPEAN\_SALES and ASIAN\_SALES:



### **Creating a Mapping with the Create Mapping Tool in the Mappings Pane**

You can create a mapping using the Create Mapping tool from the Mappings pane.

1. Select an object in the Target pane .

*or*

[if the target object is a sub-object] Select one or more objects in the Source pane and then select an object in the Target pane .

2. Click the Create Mapping tool in the Mappings pane.

A visual link is drawn between the objects and a small symbol is displayed on the source and the target object icons. The mapping details display in the Mappings pane.

If the target object is an object owing sub-objects, a selection dialog box is displayed to let you select one or more sources for the target. Then they are displayed in the *ObjectSources* sub-tab

of the Mappings pane. Besides, sub-objects that match are automatically mapped and are displayed in the *Sub-Objects* Mapping sub-tab.

If the target object is a sub-object, you also need to select one or more object icons in the Source pane. The mapping expression is displayed in the *Mapped to* sub-tab that you can modify. You can also add other source objects using the Add Sources tool in the *Sources* sub-tab.

### **Creating a Mapping Using an Object's Contextual Menu**

You can create a mapping using the Create Mapping command from the contextual menu of an object icon either in the Target or in the Source pane.

Note that this command is only available for object to object and sub-object to sub-object mappings.

1. Select an object icon in the Target pane and select one or more object icons in the Source pane.

*or*

Select one or more object icons in the Source pane and select an object icon in the Target pane.

2. Right-click the object icon in the Source or in the Target pane and select Create Mapping.

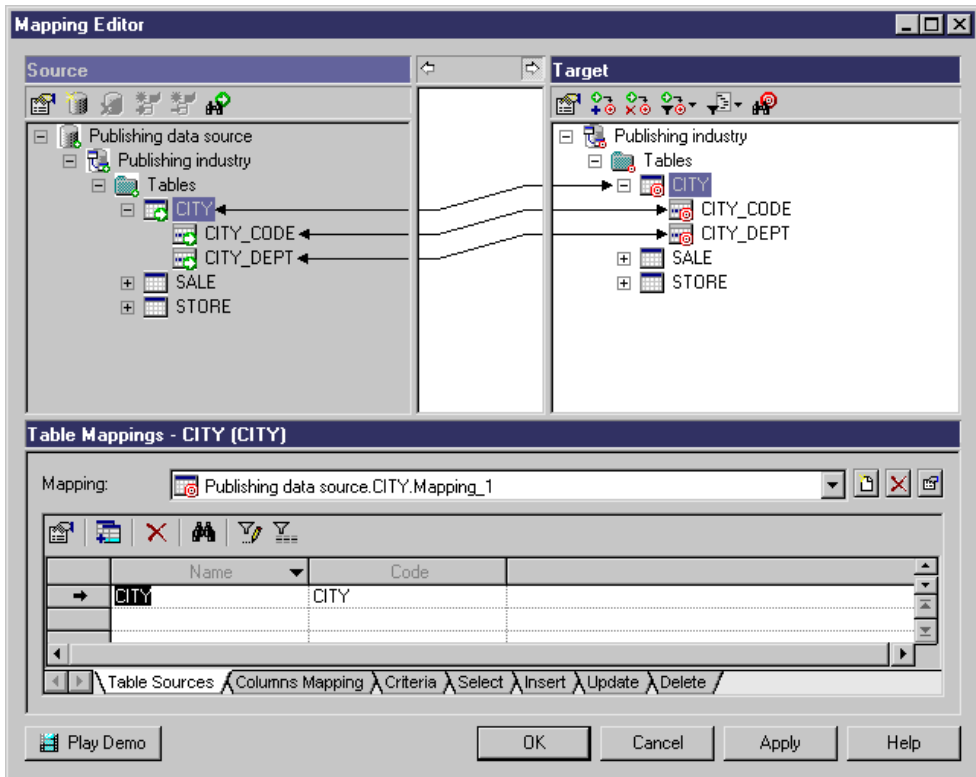
A visual link is drawn between the objects and a small symbol is displayed on the source and the target object icons. The mapping details display in the Mappings pane.

### **Mapping Examples**

This topic contains different mapping examples.

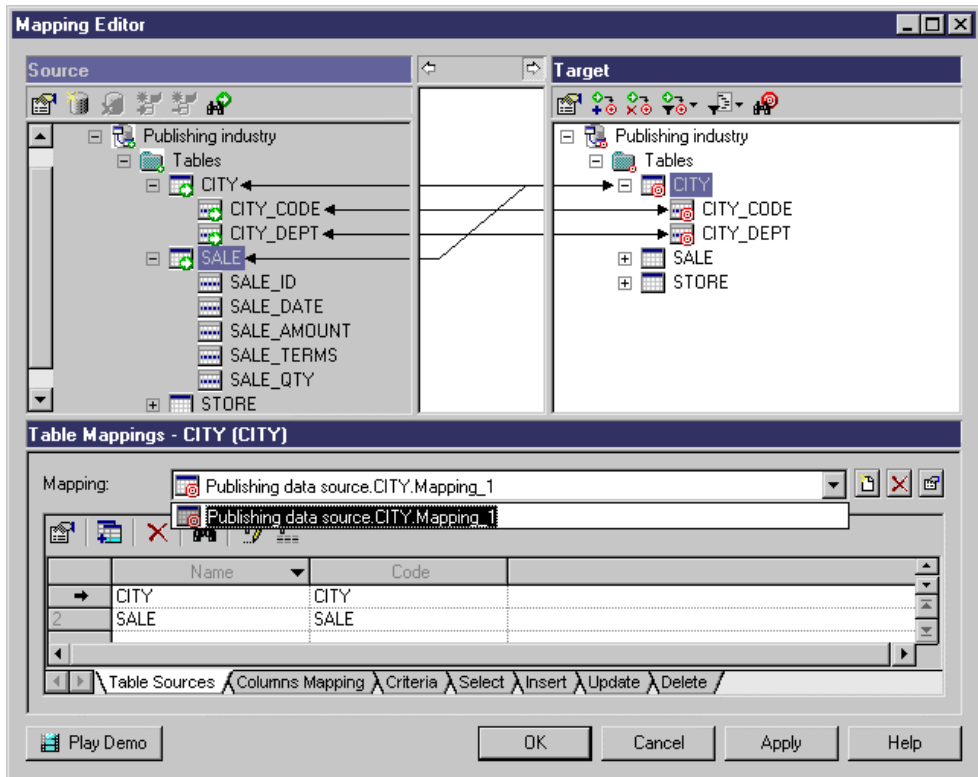
#### **Simple Mapping**

A simple mapping can be designed as follows. The CITY table and its columns in the Source pane are mapped to the CITY table and its columns in the Target pane. Note that columns mapped automatically:



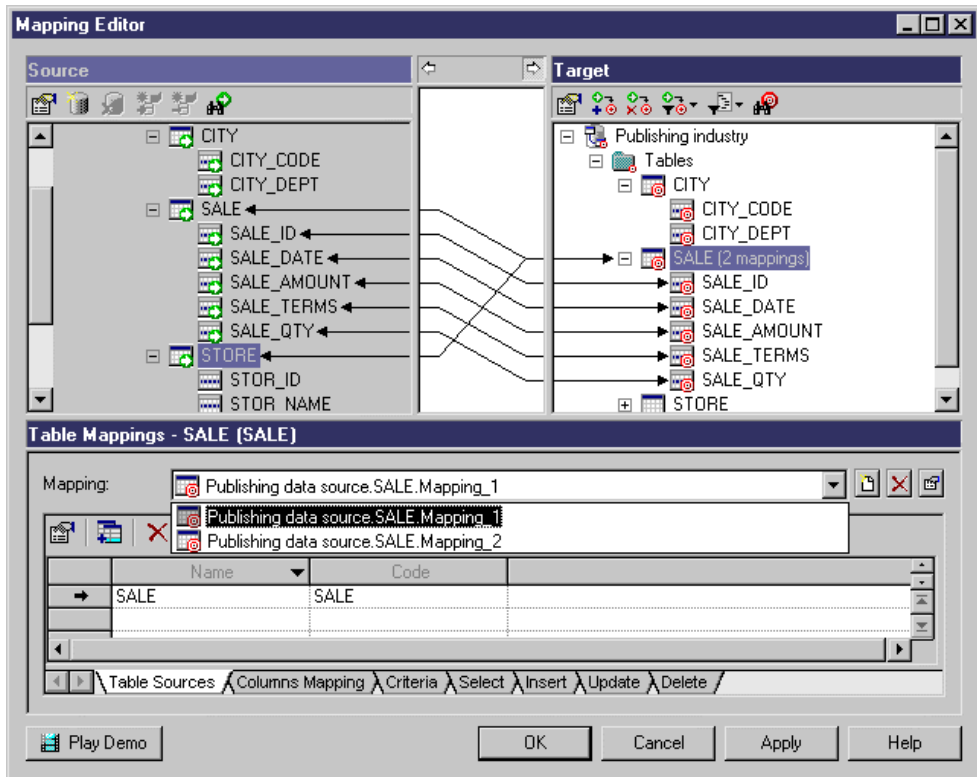
### Multiple Sources Mapping

A mapping with multiple sources can be designed as follows. The CITY table in the Target pane has two sources (CITY and SALE tables):



### Different Mappings for the Same Target

A same target object can have different mappings. The SALE table in the Target pane is mapped to the SALE table (Mapping\_1) and to the STORE table (Mapping\_2) in the Source pane:



### Creating Forward and Reverse Mappings

You primarily create mappings from one or more source models to the target model. These *forward mappings* define how to populate the objects of the current model with those of the data source model.

In forward mapping mode, the Source pane is on the left side of the window, the target pane is on the right side, and the right-hand arrow in the middle area is depressed:









You can also create *reverse mappings*, which define how to populate the objects of the source models with those of the current model. To do this, click the left-hand arrow in the middle area. What was originally the source model is renamed to the target:



When you create a mapping in this mode, PowerDesigner defines a default reverse mapping (bi-directional link) when the access type of the data source (see *Creating a data source* on page 413) is Read/Write or Write-only.

You can modify the default reverse mapping by switching Source and Target panes and edit the Insert, Update and Delete sub-tabs in the Mappings pane. These tabs summarize the reverse mapping for a given mapping. Mappings are always owned by the model on the right-hand side.

Depending on whether you are editing the source model mappings or the target model mappings, the following types of links display. Solid lines indicate links that can be edited in the current mode (forward or reverse), while dotted lines indicate links that cannot be edited in the current mode:

Edit...mappings	Type of link	Description
Current model		Forward mapping with potential reverse mapping (bi-directional link).
		Forward mapping only.
		Reverse mapping with no forward mapping defined.
Data source models		Reverse mapping with potential forward mapping (bi-directional link).
		Reverse mapping only.
		Forward mapping with no reverse mapping defined.

Reverse mappings can be required when, for example, data has several sources and you want to define how the data in the current model objects is inserted, updated or deleted in the data source model objects.

### **Modifying the Default Mapping Syntax**

The Object Expression Editor dialog box allows you to build a textual or an XPATH expression from a list of objects.

The XPath expression allows you to locate a node (an element with its ramifications) in the hierarchical tree structure of an XML document.

When an XML mapping has several sources, the XPATH expression is built using the concatenation of the XPATH expression for each source object separated by a comma.

The Object Expression Editor dialog box is divided into specific panes containing the information shown below:

Information	Pane location
Objects types	Upper left part of the dialog box
Available objects	Upper right part of the dialog box
Expression script textbox	Lower part of the dialog box

The list of available objects depends on the selected object type. You can double-click individual objects from the list of available objects for insertion in the expression script textbox at the cursor last position.

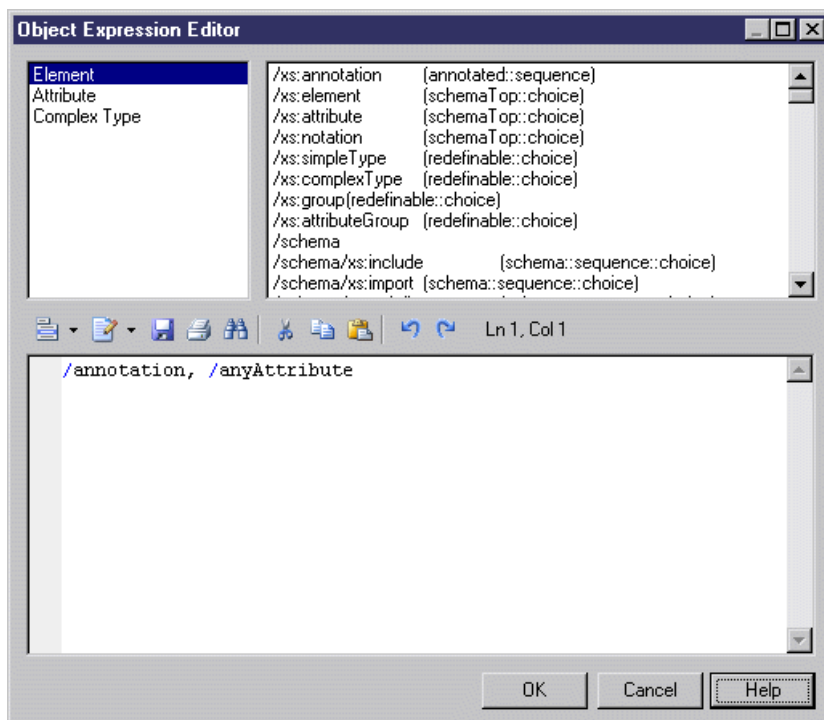
When you commit your changes in the Expression script textbox, the object expression is updated in the "Mapped to" box of the *object* mapping property sheet.

1. Click the expression script textbox where you want to insert the textual or XPATH script.
2. Select an object type from the upper left part of the dialog box.

For example, select Elements to display the list of available elements. The list of available objects of this type is displayed in the upper right part of the dialog box.

3. Double-click the available object that you want to add to the script.

The item is added to the expression script.



4. Click OK.

## **Mapping Editor Source Pane**

The Source pane displays all the data sources and their source models showing all the objects that can be mapped.







You need to create at least one data source and declare models in the list of data source models to define where (in which database or model) data should be extracted to be transferred to the model in the Target pane. You can create several data sources.

A data source can contain several models, you can select the source models among a list of models open in the current workspace.

The Source pane always displays a gray background ; it is primarily displayed on the left in the Mapping Editor. However, the Source pane is displayed on the right pane in case of reverse mapping editing.

For more information about reverse mapping, see *Creating Mappings from the Mapping Editor* on page 396.

The following toolbar helps you manage sources:

<b>Tool</b>	<b>Description</b>
	Properties - Opens the property sheet of the selected source object.
	Create Data Source - Launches the Data Source Creation Wizard that allows you to name a data source, specify an access type, a model type and select source models. See <i>Creating a data source</i> on page 413.
	Delete Data Source - Deletes the selected data source. Related mappings, if any, are automatically deleted.
	Add Model to Data Source - Adds one or more source models to an existing data source from a selection dialog box.
	Remove Model from Data Source - Removes the selected source model from the data source. Related mappings, if any, are automatically deleted.
	Find Source Object - Finds an object in the Source pane and highlights it.

## **Mapping Deletion and Object Deletion in the Source Pane**

The following table lists how you can delete mappings and objects in the Source pane.

Type of deletion	Short keys
Mapping deletion	del key on a mapped object in the Source pane to delete the mapping with its target object in the Target pane  Contextual menu: Delete Mapping
Object deletion	shift+del combination key to delete a selected object in the Source pane  Contextual menu: Delete

### **Generate Default Mappings**





You can right click a data source and select Generate Default Mappings. The Generate Default Mapping feature allows you to automatically create mappings between source and target objects having the same name. When an object in the target model is mapped to an object in the source model, their sub-objects are automatically mapped when their name and code match.



### **Mapping Editor Target Pane**

The Target pane displays the model where data is extracted. It is primarily displayed on the right in the Mapping Editor. However, the Target pane is displayed on the left pane in case of reverse mapping.

For more information about reverse mapping, see *Creating forward and reverse mappings* on page 405.

The following toolbar helps you manage mappings in the target model:

Tool	Description
	Properties - Opens the property sheet of the selected target object.
	Create Mapping - Creates a mapping between selected source and target objects. The mapping is materialized by a link and the mapping details appear in the Mappings pane. The tool behavior depends on the two selected objects.
	Delete Mappings - Deletes all the mappings for the selected target object.
	Filter Mappings - Filters mappings to show: <ul style="list-style-type: none"> <li>• All mappings</li> <li>• Only mappings of the selected object</li> <li>• Only mappings of the selected object and its sub-objects</li> </ul>

Tool	Description
	Filter Objects - Filters objects to show: <ul style="list-style-type: none"> <li>• All objects</li> <li>• Only objects with mappings</li> <li>• Only objects without mappings</li> </ul>
	Find Target Object - Finds an object in the Target pane and highlights it.

### **Create Mapping Tool Behavior**

Depending on the selected objects in the Source and Target panes, using the Create Mapping tool can lead to diverse behaviors:

Selected source >target objects	What happens...
Folder, model or sub-object > object	A selection dialog box opens to let you select an appropriate object in the source model.
Object > object Sub-object > sub-object	Objects are automatically mapped together with their respective sub-objects if any when their name and code match.
Object > sub-object	A selection dialog box opens to let you select an appropriate sub-object from the selected object in the source model.

For more information about objects and their sub-objects, see *Creating a mapping from the Mapping Editor* on page 398.

### **Mapping Deletion and Object Deletion in the Target Pane**

The following table lists how you can delete mappings and objects in the Target pane.

Type of deletion	Short keys
Mapping deletion	del key on a mapped object in the Target pane to delete the mapping with its source object in the Source pane  Contextual menu: Delete Mapping
Object deletion	shift+del combination key to delete a selected object in the Target pane  Contextual menu: Delete

For mapping deletion, you can also use the Delete Mappings tool from the Target pane toolbar.

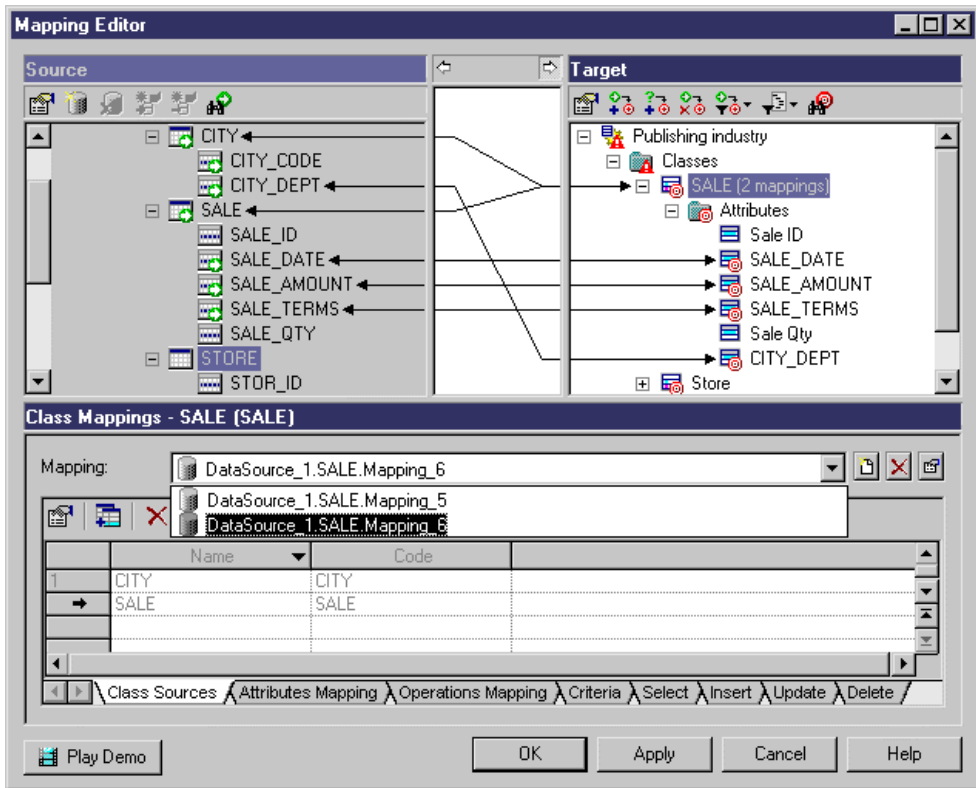
## Mapping Editor Mappings Pane

When you create a mapping, it is displayed in the Mapping list in the lower part of the Mapping Editor dialog box, called the Mappings pane.

The Mappings pane content changes automatically depending on the object you select in the Target pane:



Selected object	Mappings pane displays...
Folder, model or package	A summary of the mappings it contains.
Object	The same content as the Mapping tab in the object property sheet: Sources of the mapped object, mappings of its sub-objects if any, criteria, and SQL queries to execute the mapping if any.
Sub-object	The same content as the object mapping property sheet ("Mapped to" expression and the sources of the sub-object, which are PDM, OOM, XSM or CDM source objects for the target object).


You can create several different mappings for a single target object. Also, the same target object can have several sources. In the following illustration the *SALE* class has two different mappings *Mapping\_5* and *Mapping\_6*. Also *Mapping-6* has two sources: *CITY* and *SALE*.



All the mappings for a selected object in the Target pane are displayed in the Mapping list located in the lower part of the Mapping Editor dialog box. You can select one and modify it using the different queries sub-tabs displayed in the lower part of the Mappings pane, or by clicking the Properties tool to the right of the Mapping list to open its property sheet (see *Object Mappings Properties* on page 415).

The following tools help you manage mappings for a data source in the Mappings pane:

Tool	Description
	Create Mapping - Creates a mapping for a data source that you can further define using the Mapped to sub-tab or queries sub-tabs located at the bottom part of the dialog box (PDM data source only). By default, you are prompted to create a data source if no data source exist for the model when you click the Create Mapping tool. Then, you have to declare one or more source models in order to select source objects from a selection list. If sub-objects match, they are automatically mapped. Each time you click the Create Mapping tool for the current object, it creates a new mapping for the same data source if only one data source exists. Otherwise you have to select one from the list of available data sources to proceed.
	Delete Current Mapping - Deletes the current mapping for the data source. The link that materializes the mapping between the Source and the Target panes is also deleted.

Tool	Description
	Properties - Opens the property sheet of the current mapping.

### Use Case Scenario

You have a target object but you do not know its sources yet. You create a mapping using the Create Mapping tool. The mapping object can be compared to a container for the target object and its source objects. A selection dialog box opens to let you select one or more sources for your target object that is then displayed in the *Object Sources* sub-tab in the Mappings pane.

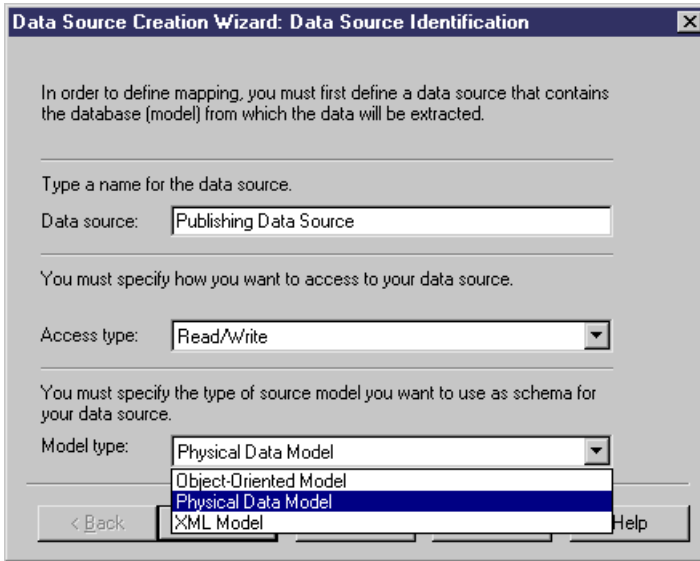
Then you have to select the sub-objects (source and target) to map using the sub-object column for the target and the Mapped to column for the source in the *Sub-Object* mapping sub-tab.

Then you can configure SQL queries using the Criteria, Select, Insert, Update and Delete sub-tab, as a mapping consists in performing modifications in the data source using SQL.

### Creating a Data Source

A data source provides a connection to one or more other models for mappings and (in the PDM) can also provide a connection to a database. You are prompted to create a data source with a wizard the first time you open the Mapping Editor or click the **Create Mapping** tool on an object property sheet **Mappings** tab.

1. On the Data Source Identification page, enter a name for the data source, and then specify an access type. The selected type controls which types of queries (for PDM data sources) are available in the Mappings pane, and the existence of forward and reverse mappings. You can choose between:
  - Read/Write – Enables Criteria, Select, Insert, Update and Delete queries.
  - Read-Only - Enables Criteria and Select queries. You can only create forward (Source > Target) mappings to a read-only data source, and such sources are not displayed during reverse mapping (Target > Source). For more information about forward and reverse mappings, see *Creating forward and reverse mappings* on page 405.
  - Write-Only - Enables Criteria, Insert, Update and Delete queries. You can only create reverse mappings to a write-only data source, and such sources are not displayed during forward mapping
2. Select the type of the model to use as the data source.



3. Click **Next** to go to the Source Model Selection page.
4. Select one or more models from the list of open models in the workspace, and then:
  - For data sources created from an object's **Mapping** tab - click **Finish** to create the data source and open a selection dialog to choose the external object to map to.
  - For data sources created from the Mapping Editor - click **Next** to go to the Options page. By default, the **Create default mappings** option, which creates mappings where possible based on shared names, is selected. Click **Finish** to create the data source and proceed to the Mapping Editor.

To create additional data sources in the Mapping Editor, click the **Create Data Source** tool. To add additional models to a data source, click the **Add Model to Data Source** tool.

### **Data Source Properties**

You can modify an object's properties from its property sheet. To open a data source property sheet, double-click its diagram symbol or its Browser entry in the Data Sources folder.

The General tab contains the following properties:

Property	Description
Name	Name of the item which should be clear and meaningful, and should convey the item's purpose to non-technical users
Code	Technical name of the item used for generating code or scripts, which may be abbreviated, and should not generally include spaces
Comment	Descriptive label for the data source

Property	Description
Access type	Controls which types of queries (for PDM data sources) are available in the Mappings property sheet or in the Mappings pane of the Mapping Editor, and also controls the existence of forward and reverse mappings. For more information about forward and reverse mappings, see <i>Creating a data source</i> on page 413.
Model Type	Type of model(s) being used as data source. See <i>Chapter 12, Object Mappings</i> on page 389

The following tabs are also available:

- **Models** - Lists the models associated with the data source. Use the **Add Models** tool to add models open in the current workspace.
- **Database Connection** - [for data sources created in a PDM] Contains the parameters needed to connect to the database associated with the data source. Click the **Select a Data Source tool** to specify an ODBC data source or connection profile (see *Connecting to a Data Source* on page 30).
- **Cost** - [for data sources created in a PDM that supports lifecycle modeling] Lets you specify the cost per GB of storage for the data source along with the compression rate, which is used to estimate the relative size of the data once it has been loaded to the data warehouse (where 100% indicates no compression).
- **Data Movement (Lifecycle)** - [for data sources created in a PDM that supports lifecycle modeling] Lets you define parameters to connect to a remote database, whose data will be loaded into the warehouse.

## Object Mappings Properties

Click the **Properties** button to the right of the **Mapping** field on the **Mapping** tab of an object property sheet or in the Mappings pane of the Mapping Editor to open the mapping property sheet. The tabs available for a particular mapping depend on the objects being mapped.




The **General** tab contains the following properties:

Property	Description
Data Source	Name of the data source where data is extracted.
Target	Name of the target object that owns the mapping.
Parent	[Sub-object only] Specifies the name of the parent object.
Name	Specifies the name of the mapping.
Code	Specifies the technical name of the mapping.
Comment	Descriptive comment for the mapping.

Property	Description
Mapped to	Specifies the mapping expression. You can edit the expression directly in this field or click, the <b>Edit</b> tool to open it in a dedicated editor (see <i>Modifying the Default Mapping Syntax</i> on page 406). To recover the default expression click to release the <b>User-Defined</b> button.

The following tabs are also available:

- **Sources** - Lists the source objects mapped to the object. Use the **Add Sources** tool to add additional source objects to the list.
- **Sub-Object Mappings** - Lists the sub-objects of the mapped object that are mapped with sub-objects of the object.

Tool	Description
	Add Mapping - Select additional source sub-objects to map. After adding sub-objects, select the sub-objects to map them against in the <b>Mapped to</b> column.
	Create from Sources - Copy sub-objects from the source object to the object. The name, code, description, annotation, and comment are copied and the data types are converted in order to match the current model.
	Generate Mapping - Automatically generate mappings between sub-objects with the same name or code in the source and target models.

Click the Ellipsis button in the **Mapped to** column to edit the source expression for the sub-objects.

- **Operation Mappings** - [OOM classes only] Lists the operations and queries associated with the mapping. Allows you to associate a SQL query to the operation. When an operation implies action on the database, like data retrieval or data update, you can associate this operation with a SQL query that will execute an action in the database. Usually, this query is a SELECT statement used to retrieve one or several instances of the current class according to the operation parameter. It can also be an UPDATE query. In the context of an EJB, the SQL query mapped to an operation is used to implement finder or select methods.
- **Criteria** - Allows you to specify join criteria between source objects. For example:  
EMPLOYEE.ID < 100
- **Query** - Computes a SQL query from the information in the other tabs to retrieve or update data in the database. If you modify the SQL query, it can no longer be automatically calculated, even when you update the mapping. You can recover the computed expression by clicking to release the **User-Defined** tool.

A Select query is available for a forward mapping, and Insert, Update and Delete queries for a reverse mapping:

- The **Select** tab retrieves attribute values of class instances from the database using the class identifying attributes. For example:

```
select
  USER.USERNAME "USERNAME" ,
  USER.PASSWORD "PASSWORD"
from USER
```

- The **Insert** tab creates an instance of the class and saves it with its attributes. For example:

```
insert into USER(
  USER.USERNAME,
  USER.PASSWORD)
values (
  %USERNAME%,
  %PASSWORD%)
```

- The **Update** tab displays a statement that allows you to update attribute values of class instances apart from identifying attributes. For example:

```
update USER
set USER.USERNAME = %USERNAME%,
  USER.PASSWORD = %PASSWORD%
```

- The **Delete** tab displays a statement that allows to delete a class instance from the database using its identifying attributes. For example:

```
delete line* from USER
```

To modify the default syntax of the queries, edit the `SelectStatement`, `InsertStatement`, `UpdateStatement`, and `DeleteStatement` entries in the Profile category of the object language or extended model definition (see *Chapter 3, Extending Your Models with Profiles in Customizing and Extending PowerDesigner*).

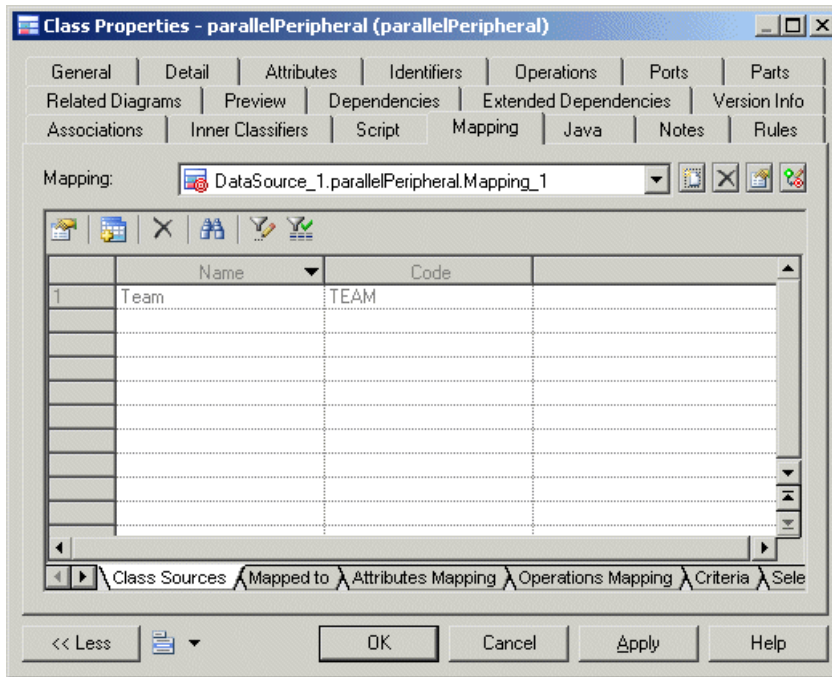
## Creating Mappings from an Object's Property Sheet

You can create mappings individually for a given object from the **Mapping** tab of its property sheet.

The Mapping tab is equivalent to the Mappings pane in the Mapping Editor (see *The Mapping Editor* on page 396).

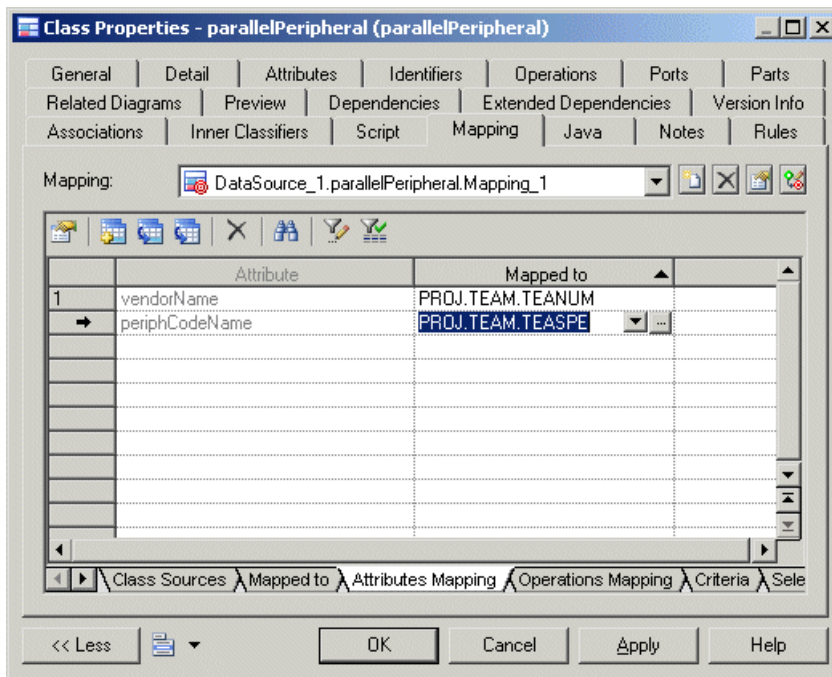
1. Open the property sheet of the object and click the **Mapping** tab.
2. Click the **Create Mapping** tool to the right of the **Mapping** list to create a mapping for the target object. If:
  - No data source has yet been created in the model you will be prompted to create one (see *Creating a Data Source* on page 413).
  - Several data sources are available, you will be prompted to select one and click **OK**.
3. Select the object from the data source to map to the present object and click **OK** to create the mapping.

The name and code of the object are displayed in the Object Sources sub-tab and a mapping is created in the Mapping list.



4. [optional] Click the **Add Objects** tool to select more source objects to map with the object.
5. Click the **Sub-Object Mapping** sub-tab and add or remove mappings between sub-objects (see *Object Mappings Properties* on page 415)

To automatically generate mappings for sub-objects that share a name, click the **Generate Mapping** tool.



6. [optional] Review the other mapping tabs (see *Object Mappings Properties* on page 415) and edit them as appropriate.
7. [optional] Click the **Launch Mapping Editor** tool to review your mappings in the Mapping Editor.

## Modifying the Default Mapping of a Sub-object

You can modify the default mapping created for a sub-object. The Attribute Mappings property sheet can be used to fine-tune the mapping between a sub-object in the target object and sub-objects in data source objects.

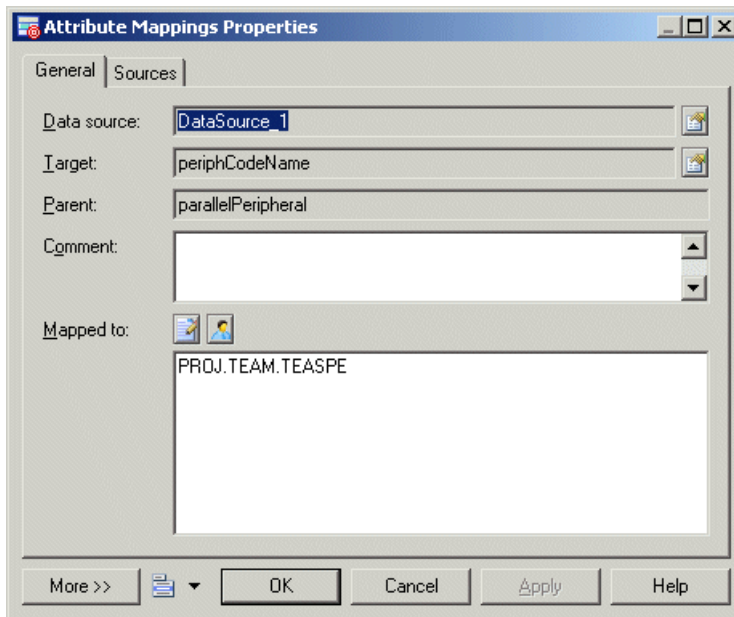
In the "*Mapped to*" box, you can see the attribute expression. By default, sub-objects used in this expression are prefixed by their parent object. You can customize the content of the "Mapped to" box by inserting comments manually. You can also click the Ellipsis button and use the SQL Editor (for PDM data source) or the Object Expression Editor (for other data sources) to modify the default mapping syntax. To recover the default sub-object expression, click the User-defined tool.

In the *Sources* tab, it is possible to select several sub-objects and map them with the target sub-object. To do so, you have to use the Add Sources tool to select sub-objects from the list of sub-objects belonging to the source objects mapped to the target object. When you add sub-objects from the Sources tab, and you have not modified the sub-object expression, the content of the "Mapped to" box in the General tab is updated.

1. In the Mapping tab, select the Attributes Mapping sub-tab to display the corresponding tab.
2. Select a sub-object in the list and click the Properties tool to display the Attribute Mappings Properties dialog box.
3. Click the Sources tab and click the Add Sources tool to select source sub-objects from a selection dialog box and click OK.

The sub-objects appear in the Sources list.

4. Click the General tab to display the corresponding tab. The selected sub-objects appear in the "Mapped to" box.



5. Click OK.

## CHAPTER 13 Impact and Lineage Analysis

PowerDesigner provides powerful tools for analyzing the dependencies between model objects. When you perform an action on a model object, you can use:

- Impact Analysis – to analyze the effect of the action on the objects that depend on the initial object.
- Lineage Analysis – to identify the objects that influence the initial object.

Most of the time, the action is a deletion or a change, such as changing the data type of a primary key column – the impact analysis shows which other tables and columns are impacted by the change. The action can also be user-defined (see *Creating a user-defined action* on page 446).

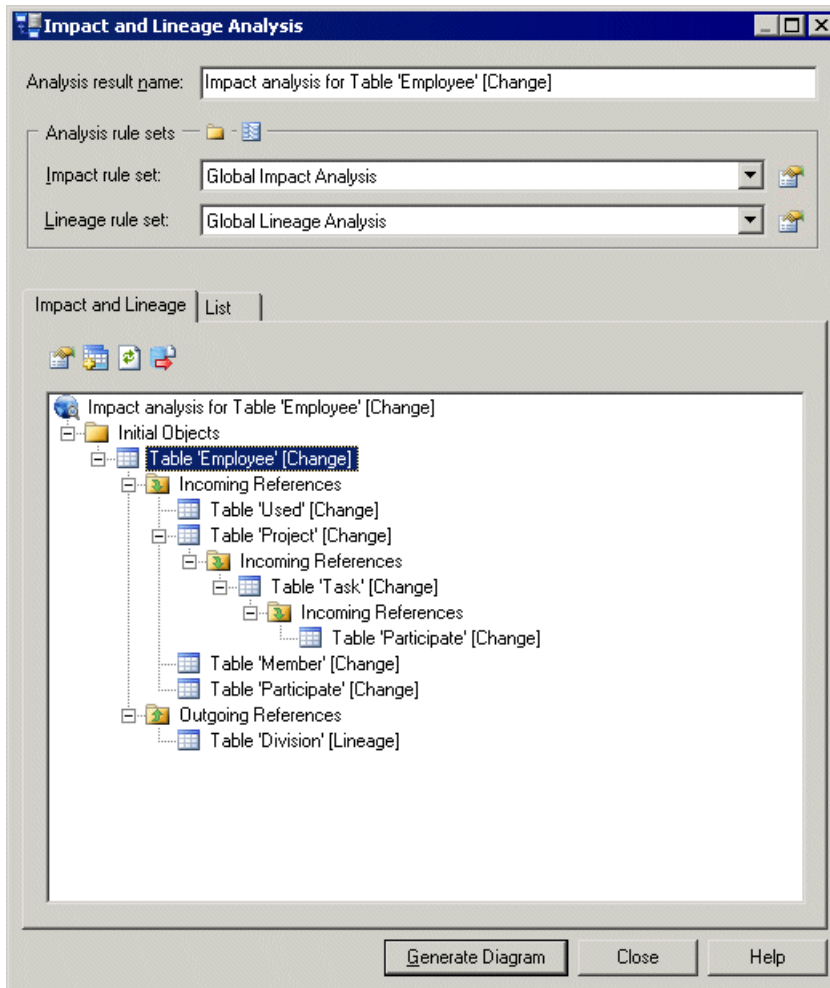
The analysis applies analysis rule sets to one or more initial objects. You can use the rule sets shipped with PowerDesigner or create your own rule sets (see *Working with Analysis Rule Sets Resource Files* on page 439). You can also refine your analysis at any time, by for example changing the analysis rule sets to be used (see *Refining an Impact and Lineage Analysis* on page 432).

Each initial object is analyzed and displayed as a node with categories of influencing and/or dependent objects.

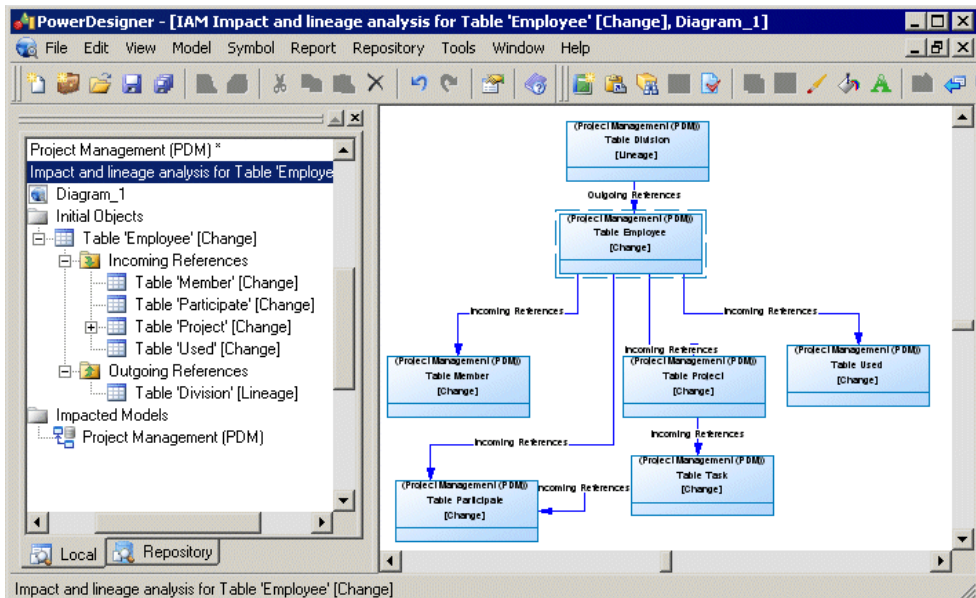
PowerDesigner lets you review your analysis in two ways:

- Preview – which displays the analysis in a temporary tree form (see *Reviewing an Analysis in Preview* on page 424).
- Impact and Lineage Model (IAM) – which displays the analysis in a diagram that can be saved (see *Reviewing an Analysis in an IAM Model* on page 428).

The following example shows an impact and lineage analysis in preview. The Impact and Lineage tab shows all the objects that depend on the 'Employee' table (impact analysis), which is the initial object, and all the objects that influence it (lineage analysis).



The following example shows the same impact and lineage analysis in an IAM. The 'Employee' table is displayed in the center of the diagram with its influencing objects above it and its dependent objects beneath it:



## Launching an Impact and Lineage Analysis

You analyze the impact of a change to your model from the Impact and Lineage Analysis dialog box, which lets you review your analysis through:

- A preview – the impact and lineage analysis displays in a tree form (see *Reviewing an Analysis in Preview* on page 424).
  - An Impact and Lineage Model (IAM) – the impact and lineage analysis displays in a diagram (see *Reviewing an Analysis in an IAM Model* on page 428).
1. Open an impact and lineage analysis in any of the following ways:
    - Select an object in the Browser or in the diagram and press **ctrl+F11**.
    - Select one or more objects in the diagram and select **Tools > Impact and Lineage Analysis**.
    - Right-click an object symbol in the diagram and select **Edit > Impact and Lineage Analysis**.
    - Right-click an object entry in the Browser and select **Impact and Lineage Analysis**.
    - [when deleting an object] Click the **Impact** button on the Confirm Deletion dialog box.
    - Open an object's property sheet, click the Dependencies tab, and then click the **Impact Analysis** button.

2. [Optional] Enter a name for your analysis result. This will be the name of the generated model (see *Reviewing an Analysis in an IAM Model* on page 428).
3. Select an impact rule set for your analysis. You can choose one of the following predefined rule sets:
  - Conceptual Impact Analysis – to restrict the analysis to objects impacted by modeling changes on the initial object, such as a modification on a requirement definition.
  - Data Impact Analysis – to identify the use, if any, of a value contained in the initial object.
  - Delete Impact Analysis – [default when deleting an object] to restrict the analysis to objects that are directly impacted by the deletion of the initial object.
  - Global Impact Analysis – [default when not deleting an object] to identify all the objects that depend on the initial object.
  - None – no impact rule set is selected.
4. Select a lineage rule set for your analysis. You can choose one of the following predefined rule sets:
  - Conceptual Lineage Analysis – to justify the modeling existence of the initial object, and ensure it fulfills a well-identified need.
  - Data Lineage Analysis – to identify the origin of the value contained in the initial object.
  - Global Lineage Analysis – [default when not deleting an object] to identify all the objects that influence the initial object.
  - None – [default when deleting an object] no lineage rule set is selected.
5. [optional] Click the Properties tool next to each rule set to review it (see *Editing analysis rules* on page 444).

The analysis displays in the Impact and Lineage tab of the dialog box (see *Reviewing an Analysis in Preview* on page 424). You can click the **Generate Diagram** button to graphically view the analysis in its default diagram (see *Reviewing an Analysis in an IAM Model* on page 428).

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**Note:** You can click the Select Path tool to change the default folder for analysis rule sets, or click the List of Rule Sets tool to open the List of Impact and Lineage Analysis Rule Sets window, and review a specific rule.

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## Reviewing an Analysis in Preview

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The impact and/or lineage analysis preview displays when you select an impact and/or lineage rule set in the Impact and Lineage Analysis dialog box.

For more information, see *Launching an impact and lineage analysis* on page 423.

The impact and/or lineage analysis preview lets you review the application of your chosen analysis rules to the initial object and the impact on its impact and lineage objects on the following tabs:

- Impact and Lineage – to both identify the objects impacted by a change on the initial object and the objects that influence the initial object (see *Preview Impact and Lineage tab* on page 425).
- List – to save the analysis in RTF or CSV format, or print it (see *Preview List tab* on page 426).

In addition, you can customize and refine the analysis by adding or removing initial objects for example, changing the action on an object, and so on (see *Refining an Impact and Lineage Analysis* on page 432).

## **Preview Impact and Lineage Tab**

The *Impact and Lineage* tab displays the result of the analysis.

This tab displays in a tree form:

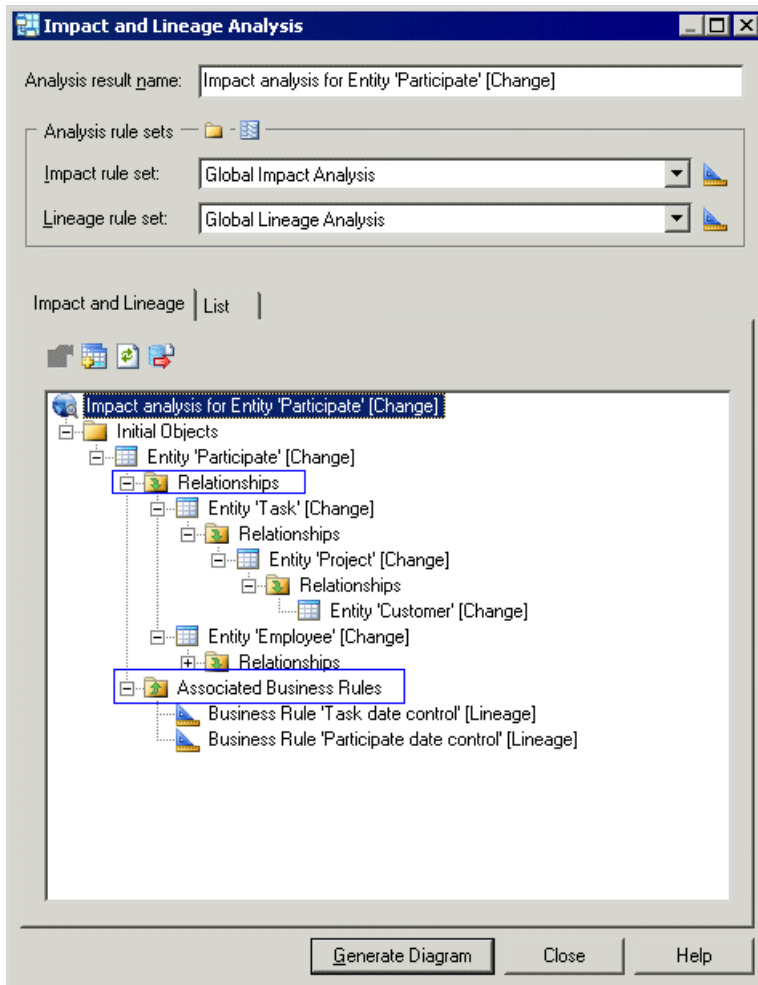
- the result of the application of the selected impact rules on the initial object and on its dependent objects, including external shortcuts to other models.
- the result of the application of the selected lineage rules on the initial object in order to identify its influencing objects.

Each item in the tree displays an [*action*] information for impact analysis to designate the type of action that is applied to it and a [*lineage*] information for lineage analysis to designate lineage items.

You can modify the default action associated with an item (see *Creating a user-defined action* on page 446). Each action is propagated through analysis rules and may, in turn, provoke other actions.

For information about the various tools on the Impact and Lineage tab, see *Impact and Lineage tab tools* on page 428.

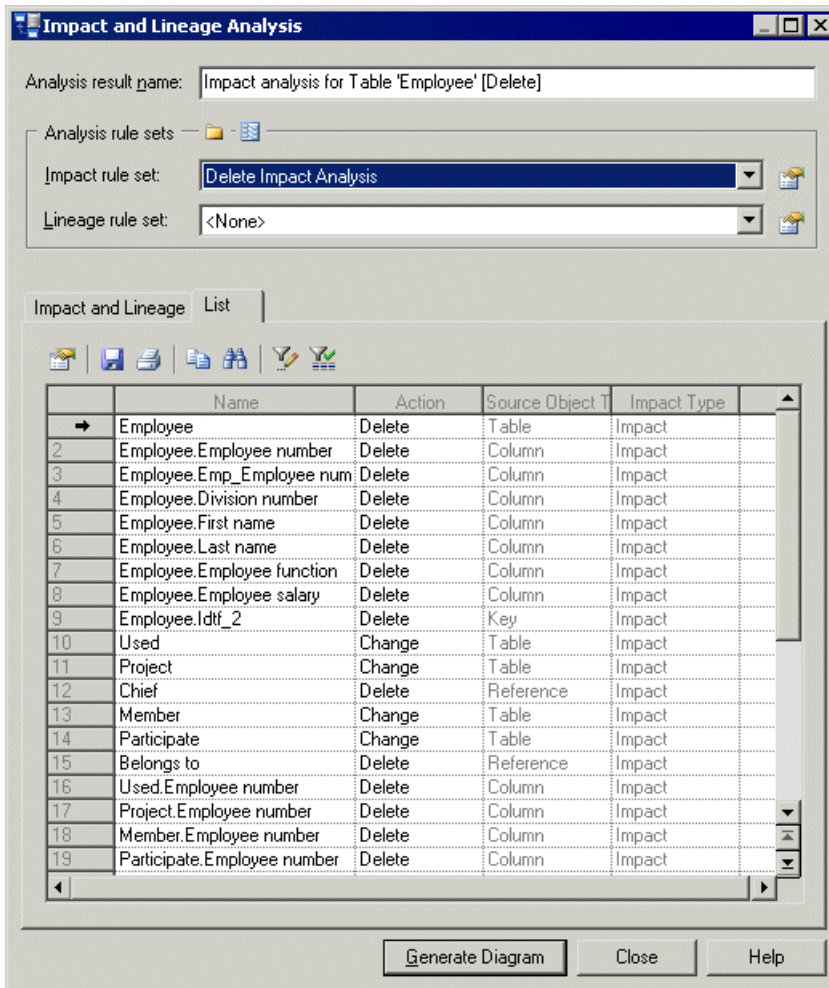
The following example shows how a change on the 'Participate' entity affects its relationships and which objects influence it:








## Preview List Tab



The *List* tab displays a tabular report of all the objects contained in the impact and lineage analysis. You can customize the report by filtering which attributes you want to view, save the report in RTF or CSV format, and print it.

The following example shows the impact analysis of the deletion of the Employee table. You can see in the Action column that the Chief reference is also deleted, for example, and that the Project table is changed.







The following tools are available on the preview List tab:

Tool	Description
	Properties – Displays the property sheet of the selected object in the list.
	Save – Saves the list in RTF (for MS Word) or CSV (for MS Excel) format.
	Print – Prints the list.
	Copy – Copies the list in RTF or CSV format.
	Find a Row – Opens the Find dialog box to let you search the list for a specific object.

Tool	Description
	Customize Columns and Filter – Opens the Customize Columns and Filter dialog box to let you select attributes to display in the list and also specify expressions to filter by. For example, you can select attributes specific to impact and lineage analysis such as "Action", which specifies the action type. For more information, see <i>Customizing Object List Columns and Filtering Lists</i> on page 120.
	Enable/Disable Filter - Enables or disables the filter on the list.

## Impact and Lineage Tab Tools

The following tools are available on the preview Impact and Lineage tab:

Tool	Description
	Properties – Opens the property sheet of the selected item.
	Add Initial Objects – Opens an object selection dialog box to let you add objects to analyze.
	Re-Analyze – Recalculates the dependent or influencing objects of the initial object using the analysis rule sets. Since this tool applies only to the initial object, you must select the root object to re-analyze the entire tree.
	Check out Dependencies from Repository – If the current model contains links to other closed models that are checked in into the repository, checks out these dependencies. For more information, see <i>Understanding cross-model dependencies during the analysis</i> on page 437.

In addition, there are many actions available from the item's contextual menu in the tree (see *Refining an Impact and Lineage Analysis* on page 432 and *Working with Analysis Rule Sets Resource Files* on page 439).

**Note:** If an object is dependent multiple times then, for performance reasons, only the first entry is displayed in detail in the tree. You can right-click subsequent undeveloped entries and select *Go to First Occurrence* to jump to this first occurrence.

## Reviewing an Analysis in an IAM Model

You generate an Impact Analysis Model (IAM) by clicking the Generate Model button on the Impact and Lineage Analysis dialog box.

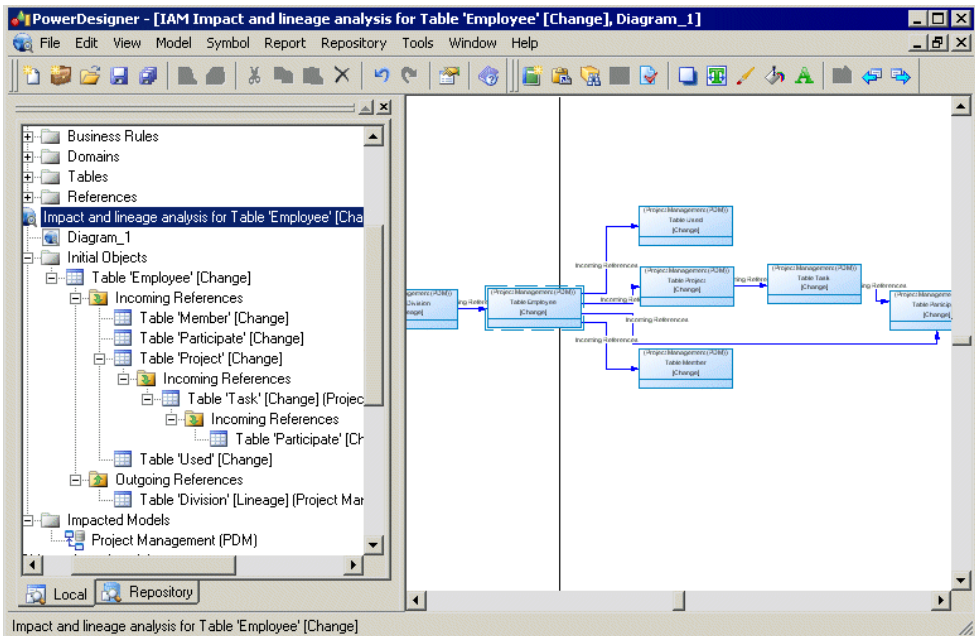
For more information, see *Launching an impact and lineage analysis* on page 423.

You can review the application of the selected analysis rules to the initial object and the impact on its dependent impact and lineage objects graphically in an IAM. Generating an IAM allows you to save a snapshot of the analysis at a given time, as well as benefit from a range of features such as comparing models (see *Chapter 7, Comparing and Merging Models* on page 259) or

managing model's versions with the Repository (see the *Working with the Repository* manual).

In addition, you can customize and refine the analysis by adding or removing initial objects for example, changing the action on an object, changing IAM's options, and so on (see *Refining an Impact and Lineage Analysis* on page 432).

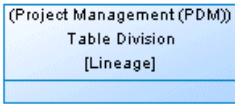

The following example shows an impact and lineage analysis on the Employee table, which is surrounded by a dotted line. Influencing (lineage) objects are displayed to the left of the initial object, and dependent (impact) objects are displayed to the right of it. Links between the objects represent the analysis rules that propagate actions on objects:



### IAM Objects in the Diagram

The following object types are automatically generated:

Object	Symbol	Description
Initial object		Model object to analyze. The initial object symbol has the shape and format of its referenced object. For example the initial object referencing an OOM use case has an ellipse shape.





Object	Symbol	Description
Impacted object		Model object impacted by the analysis of the initial object. This can be its dependent or influencing object. The impacted object symbol has the shape and format of its referenced object. For example the impacted object referencing a PDM table has a rectangle shape.
Link		Analysis rule between initial objects and impacted objects.

**Note:** You can complement your diagram, by adding graphical objects, such as notes or decorative symbols.

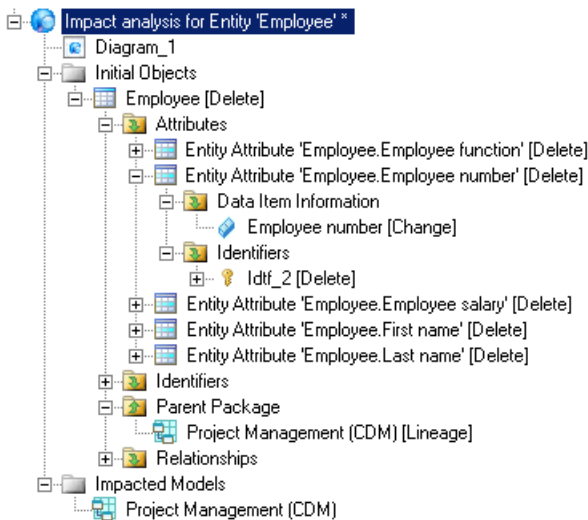
## IAM Objects in the Browser

The IAM Browser provides a hierarchical view of all your model objects, and allows you to rapidly navigate between them.

The typical hierarchy of objects in the IAM Browser tree is as follows:

Symbol	Description
 Initial Objects	Contains one or more initial objects with their dependent and influencing objects grouped by object type. Categories correspond to the initial object's collections, which propagate the impact or lineage analysis rule sets selected for the analysis. You can change the display of these collections (see <i>Controlling the display of object collections</i> on page 445). Each object in the tree displays an [action], which designates the type of modification that is applied to it. You can modify the default action associated with an object (see <i>Creating a user-defined action</i> on page 446).
 Impacted Models	Contains the initial objects' models and any other models affected by an action on an initial object. Affected models can be discovered by: <ul style="list-style-type: none"> <li>external shortcuts or replication links, when those models are opened during the analysis.</li> <li>dependencies checking out from the repository, when those models are closed.</li> </ul>
	Identifies an impact category containing dependent objects.
	Identifies a lineage category containing influencing objects.

The following example shows how the deletion of the Employee entity affects its identifiers, relationships, attributes, and parents. In addition, you can see that the Employee number attribute is deleted, but the Employee number data item is only changed:



## Reviewing the List of Analysis Objects

You can review in the IAM the global list of analysis objects from the List of Analysis Objects dialog box, save this list under a particular format, such as .csv or .rtf or print it.

You can right-click an object in the list to access a contextual menu offering the following options:

- Find in Diagram
- Find in Browser
- Impact and Lineage Analysis
- Edit
- Properties
- Extended menus (created with the Resource Editor)

Select **Model > Analysis Objects**.

## Reviewing the List of Analysis Models

You can review in the IAM the global list of analysis models from the List of Analysis Models dialog box.

You can right-click a model in the list to access a contextual menu offering the following options:

- Find in Browser
- Impact and Lineage Analysis
- Edit
- Properties

- Extended menus (created with the Resource Editor)

Select **Model > Analysis Models**.

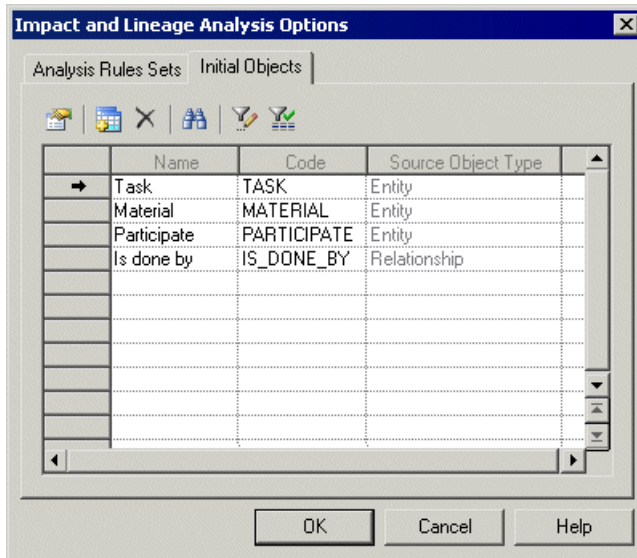
## Refining an Impact and Lineage Analysis

When reviewing your analysis, you can refine it by removing or adding initial objects, changing the analysis rule sets to be used, and/or customizing actions. If you have generated an IAM, you can customize the display preferences and model options, print the model, and/or compare it with another IAM.

### Removing or Adding Initial Objects From/to the Analysis

Change the focus of your analysis by removing or adding initial objects.

- You can remove initial objects from the analysis in any of the following ways:
  - [from the IAM] Select **Tools > Change Analysis Options** to open the **Impact and Lineage Analysis Options** dialog box. Click the **Initial Objects** tab, select one or more objects in the list and click the Delete tool.



- Right-click an object in the preview tree and select **Remove**.
- Right-click an object in the diagram and press **Del**.
- You can add initial objects to the analysis in any of the following ways:
  - [from the IAM] Select **Tools > Change Analysis Options** to open the Impact and Lineage Analysis Options dialog box. Click the Initial Objects tab, click the Add Objects tool to open a selection dialog box, select one or more objects to add to the analysis, and then click OK.

- [from preview] Click the Impact and Lineage tab, click the Add Objects tool to open a selection dialog box, select one or more objects to add to the analysis, and then click OK.

## Removing Collections of Influencing and Dependent Objects

You can remove objects collections from the analysis to make it more readable.

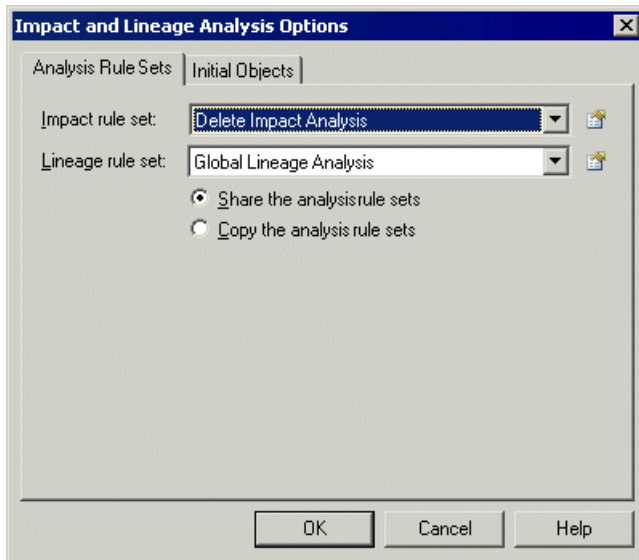
- You can remove collections of influencing and dependent objects in any of the following ways:
  - [from the IAM] Right-click an object's collection in the Browser or a link in the diagram, and select Remove.
  - [from preview] Right-click an object's collection in the tree, and select Remove.
- You can redisplay the removed collections at once by re-analyzing your model in any of the following ways. If you want to redisplay individual collections use the Impact Analysis Objects or the Lineage Analysis Objects dialog box (see *Controlling the display of object collections* on page 445).
  - [from the IAM] Select **Tools > Re-Analyze** to redisplay all the collections in the model or right-click an object in the Browser or in the diagram, and select Re-Analyze to redisplay the object's collections.
  - [from preview] Click the root node or an object in the tree and click the Re-Analyze tool to redisplay all the collections in the model or only the object's collections or right-click the root node or an object in the tree, and select Re-Analyze.

## Changing the Analysis Rule Sets

You can change the rule sets used to analyze your change to see it from a different point of view, by for example moving from a data impact analysis to a conceptual impact analysis.

You can change analysis rule sets in any of the following ways:

- [from the IAM] Select **Tools > Change Analysis Options** to open the Impact and Lineage Analysis Options dialog box. Select an impact rule set and/or a lineage rule set, select Share or Copy for the rule sets definitions, and click OK to close the dialog box and apply the new rules to the initial objects.



- [from preview] Select an impact rule set and or a lineage rule set to apply the new rules to the initial objects in the tree.

## Customizing Actions

The predicted effect on an object in the analysis is called an action. You can modify actions using the following commands available from the initial and dependent objects contextual menu in the preview or in the IAM:

- Change Action Description – opens the Action Description dialog box, which lets you select one or more actions, which have been previously defined in the current rule set (see *Creating a user-defined action* on page 446).
- Change Action to [Delete].
- Change Action to [Change].

## Printing the Analysis

You can print out your analysis from the preview List tab or from the IAM or create an IAM list report in order to document and discuss your proposed changes.

You can print the analysis in any of the following ways:

- [from Preview] Click the List tab and select the Print tool (see *Preview List tab* on page 426).
- [from the IAM] Select **File > Print** to print the diagram (see *Printing Diagrams* on page 171).
- [from the IAM] Select **Reports > List Report Wizard** to create a list report for an object type and print it (see *List Reports* on page 216).

## Comparing Two Analysis

Since the IAM is a PowerDesigner model, you can compare the content of two IAMs in order to:

- Follow up evolutions in models manipulated by different development teams.
- Evaluate the differences that exist between the models.

The comparison window displays the objects contained within the models in a tree format, and highlights the differences between them.

To compare two IAM's you have to:

- Select **Tool > Compare Models** to open the Select Models to Compare dialog box.

For detailed information about comparing models, see *Chapter 7, Comparing and Merging Models* on page 259.

## Customizing the IAM Environment

The IAM environment includes a set of parameters and configuration options that define various aspects of the model content and behavior.

### IAM Model Properties

The model property sheet displays the definition of the current IAM. You can check the last analysis date of your model or add a comment for example.

To open an IAM property sheet, double-click its Browser entry.

The General tab contains the following properties:

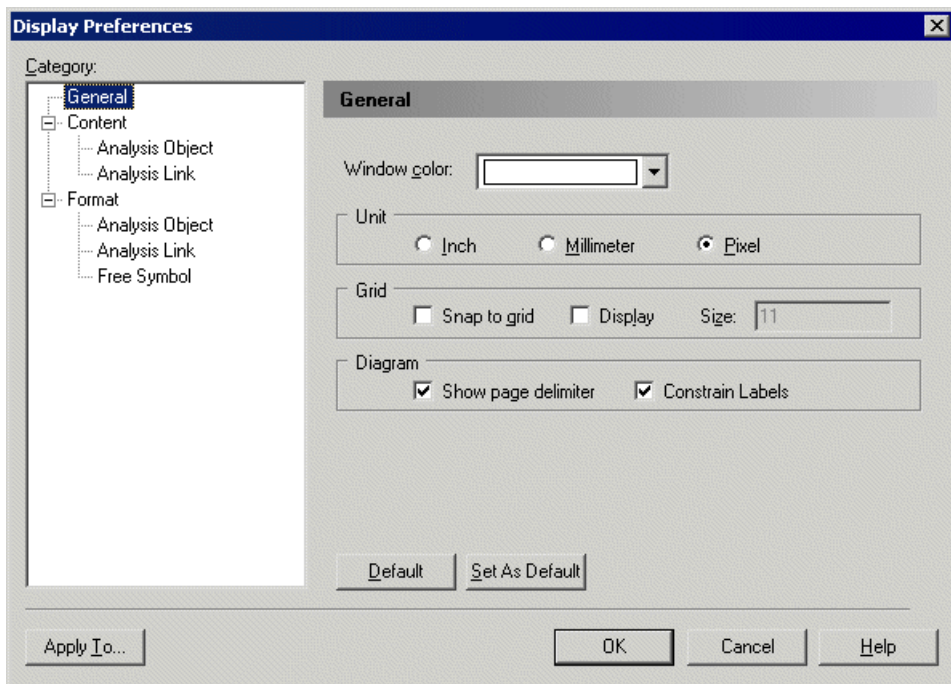
Property	Description
Name	Specifies the name of the model, which should be clear and meaningful, and should convey its purpose to non-technical users.
Code	Specifies the technical name of the item used for generating code or scripts, which may be abbreviated, and should not include spaces.
Comment	Provides descriptive information about the model.
Filename	Specifies the location of the model file. This field is empty if the model has never been saved.
Author	Specifies the author of the model. If you enter nothing, the Author field in diagram title boxes displays the user name from the model property sheet Version Info tab. If you enter a space, the Author field displays nothing.
Version	Specifies the version of the model. You can use this box to display the repository version or a user defined version of the model. This parameter is defined in the Title page of the model display preferences.

Property	Description
Default diagram	Specifies the diagram displayed by default when you open the model.
Last analysis date	[Read-only] Computed date of the last model analysis, which is updated every time you re-analyze the model. Click the Re-Analyze tool to re-analyze the model and update the computed date.

### Setting IAM Display Preferences

PowerDesigner display preferences allow you to customize the format of object symbols and the information that is displayed on them.

To set IAM display preferences, select **Tools > Display Preferences** or right-click the diagram background, and select Display Preferences from the contextual menu.



For information about changing the format of symbols, see *Format Display Preferences* on page 301. The following sections list the options available to customize the information displayed on IAM object symbols.

**Analysis Object Display Preferences**

To set display preferences for analysis objects, select **Tools > Display Preferences**, and select the analysis object sub-category in the left-hand Category pane.

Preference	Description
Model name	Displays the model name of the analysis object.
Object type	Displays the type of the analysis object.
Action	Displays the action name of the analysis object.
Highlight initial object	Displays a dotted line around the symbol of the initial object.

**Analysis Link Display Preferences**

To set display preferences for analysis links, select **Tools > Display Preferences**, and select the analysis link symbol sub-category in the left-hand Category pane.

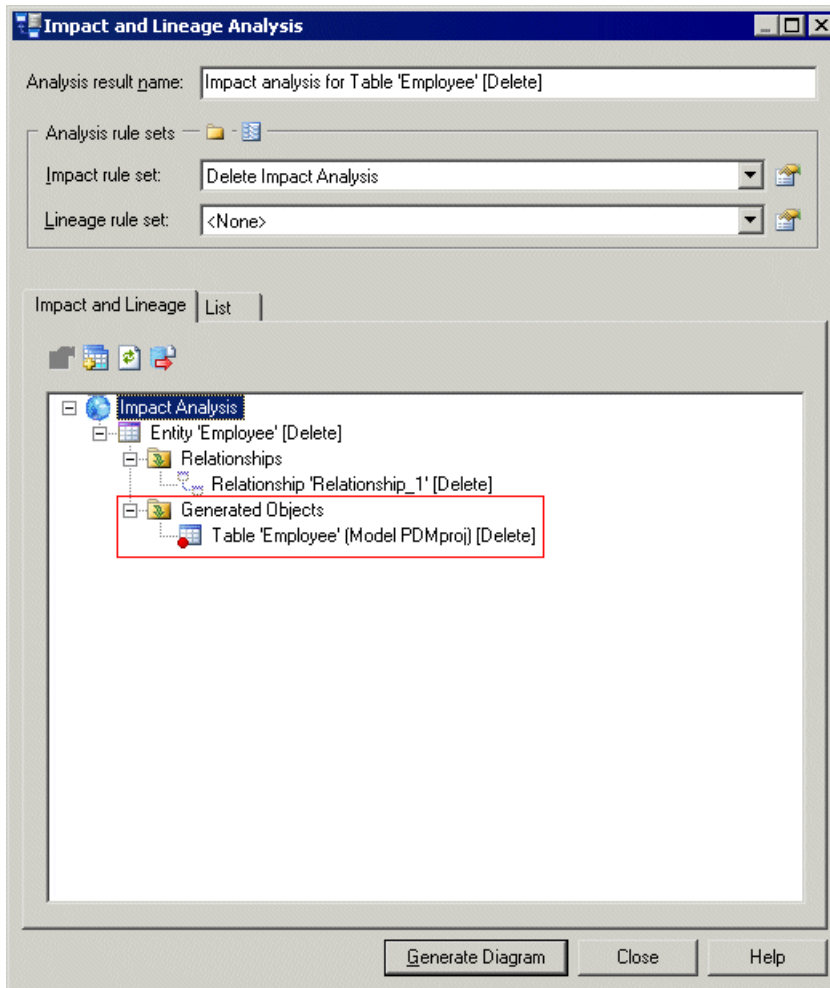
Preference	Description
Name	Displays the name of the link.

**Understanding Cross-model Dependencies During the Analysis**

When you generate a model to another model or create an external shortcut, you create cross-model dependencies, which are taken into account during impact and lineage analysis.

When an object belonging to an unavailable related model is encountered a red dot is displayed on the object icon and the analysis is interrupted. To keep on with the analysis, you have to open the related model by right-clicking the object in the IAM Browser or in the preview, and select Open Model.

In the following example, the Employee entity is used to generate the Employee table in the PDMproj model. This dependency is listed under the Generated Objects folder and a red dot is displayed on the Employee table to indicate that its parent model is closed:



Because the repository computes and saves external dependencies information in the checked in models, you can retrieve from the repository information about external dependencies in a model if the related model is also checked in.

You can check cross-model dependencies out from the repository in any of the following ways:

- [from the IAM] Right-click the impacted model node in the Browser, and select Check Out Dependencies from Repository.
- [from preview] Click the Check Out Dependencies from Repository tool in the toolbar.

## Working with Analysis Rule Sets Resource Files

An impact and lineage analysis provides a report on a list of impacted objects (dependent or influencing objects), when an action on an initial object is performed. This report is obtained from the application of one or more analysis rule sets to the initial object.

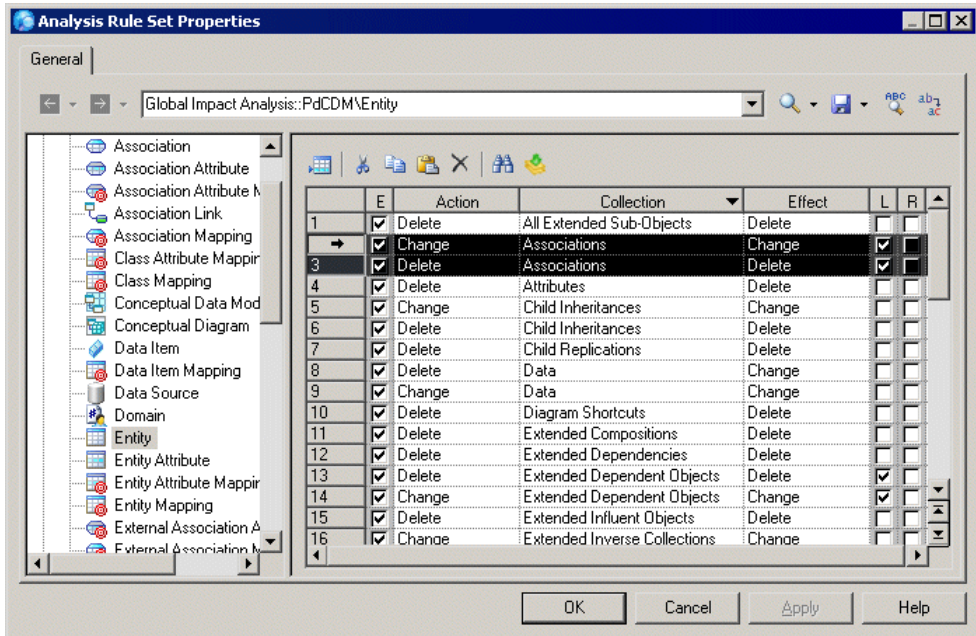
An analysis rule set resource file is an XML file with a .rul extension, which contains impact or lineage analysis rules specified on PowerDesigner metamodel objects collections (see *Understanding dependencies* on page 440).

PowerDesigner ships with rule sets that you can customize in the Resource Editor. You can also create your own rule sets.

The following rule sets are available:

Type	Rule Set	Description
Impact	Conceptual Impact Analysis	Restricts the analysis to objects impacted by modeling changes on the initial object, such as a modification on a requirement definition.
	Data Impact Analysis	Identifies the use, if any, of a value contained in the initial object.
	Delete Impact Analysis	Restricts the analysis to objects that are directly impacted by the deletion of the initial object.
	Global Impact Analysis	Identifies all the objects that depend on the initial object.
Lineage	Conceptual Lineage Analysis	Justifies the modeling existence of the initial object, and ensures it fulfills a well-identified need.
	Data Lineage Analysis	Identifies the origin of the value contained in the initial object.
	Global Lineage Analysis	Identifies all the objects that influence the initial object.

The following example shows the Global Impact Analysis Rule Set open in the Resource Editor:



In the above example the Entity metaclass is selected, and displays the list of its associated analysis rules. The second analysis rule in the list states that if an entity is changed (Action column), then its associations (Collection column) will also be changed (Effect column). The third rule states that if an entity is deleted then its associations will also be deleted.

## Understanding Dependencies

Each metaclass (object) in the PowerDesigner metamodel is semantically linked with other objects within the same model, or between different models.

These dependencies appear as categories in an analysis, and can belong to different types of *collections*. You specify analysis rules on collections to determine their behavior when an action on an associated metaclass occurs.

The following types of collections are available:

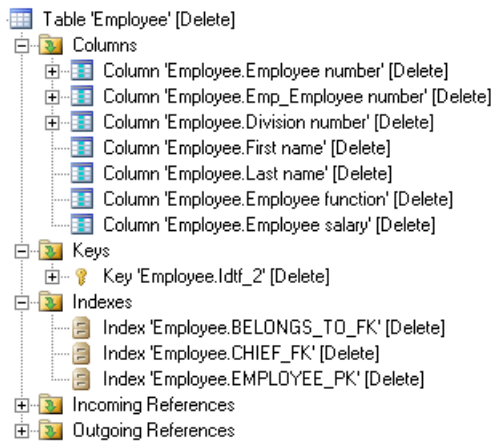
- Direct collection – objects directly related to the object. This link is displayed as an association in the metamodel, and the objects usually appear in a list in the object property sheet. For example, attributes in an entity, or data in a process.
- Inverse collection – objects on which the initial object depends and which are displayed on the Dependencies tab. For example, diagrams where an object is displayed, or references using a table.
- Calculated collection – user-defined collection used to display a list of associated objects with a user-defined semantics on the Dependencies tab. For example, in a model where

columns and domains can diverge, you can create a calculated collection on the domain metaclass that lists all the columns that use the domain and have an identical data type.

- Extended collection – user-defined collection used to define an additional link between two selected metaclasses or stereotypes, and displayed on the Dependencies tab. For example, you can specify an extended collection in the package metaclass and specify FileObject as the target metaclass in order to attach documents containing use case specifications to the different packages of a model.

For more information about creating calculated and extended collections, see the *Extending your Models with Profiles* chapter in the *Customizing and Extending PowerDesigner* manual.

The following example shows that deleting the Employee table will also affect its Columns, Keys, Indexes, Incoming and Outgoing References collections:



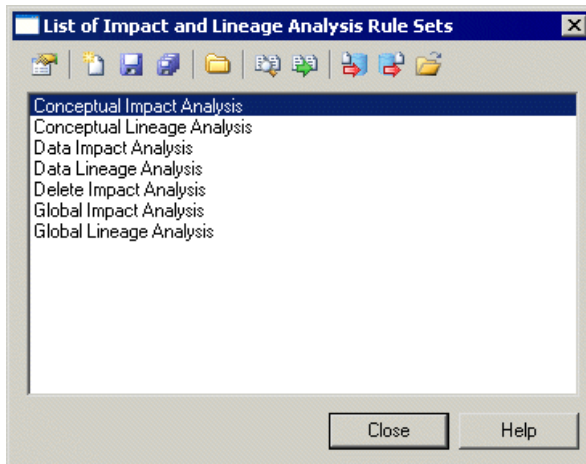
## Opening an Analysis Rule Set

You can review analysis rule sets in the Resource Editor.

If you want to edit a rule set, see *Editing analysis rules* on page 444.

You can open an analysis rule set in any of the following ways:

- [From the Tool menu, without any open model] Select **Tools > Resources > Impact and Lineage Analysis Rule Sets** to open the List of Impact and Lineage Analysis Rule Sets window, which shows all the available analysis rule sets, select a rule set, and then click the Properties tool to open it.



For information about the tools available in the List of Impact and Lineage Analysis Rule Sets window, see the Resource Files and the Public Metamodel chapter in the *Customizing and Extending PowerDesigner* manual.

- [from the IAM] Select **Tools > Change Analysis Options**, and click the Properties tool next to the rule set to open it.
- [from preview] Click the Properties tool next to the rule set to open it.

## Creating an Analysis Rule Set

You can create your own rule sets, which will be available in the List of Impact and Lineage Analysis Rule Sets window.

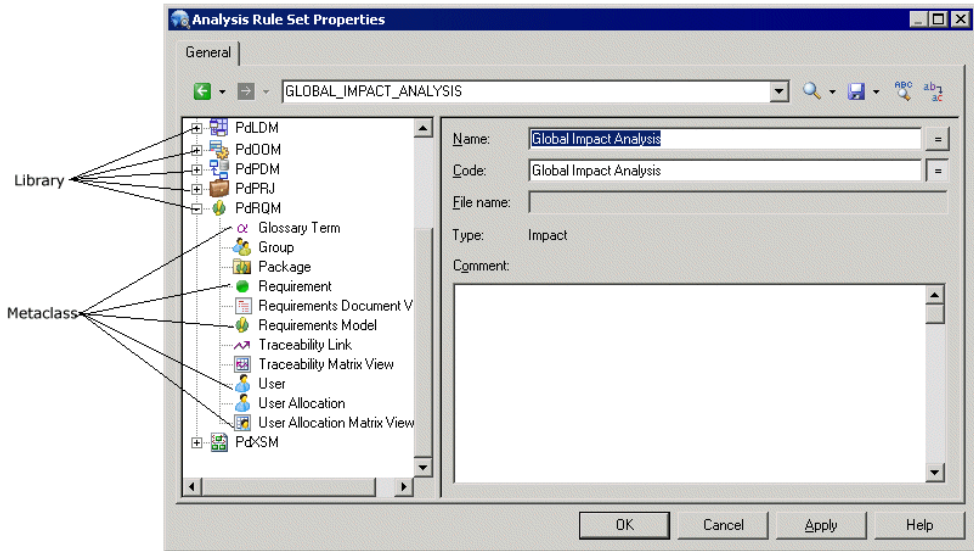
1. Select **Tools > Resources > Impact and Lineage Analysis Rule Sets** to open the List of Impact and Lineage Analysis Rule Sets window, which shows all the available rule sets.
2. Click the New tool to open the New Analysis Rule Set dialog box, and enter the name that you want to appear in the List of Impact and Lineage Analysis Rule Sets window.
3. Select one of the following options:
  - Impact – to create an impact analysis rule set.
  - Lineage – to create a lineage analysis rule set.
4. Select a rule set from the Copy From list. This allows you to create a new analysis rule set that is identical to the original set apart from the name.
5. Click OK to open a standard Save As dialog box, enter a filename and then click OK to open the new rule set in the Resource Editor.

In order to populate the new analysis rule set, see *Editing analysis rules* on page 444.

## Analysis Rule Set Properties

Analysis rule sets contain a list of analysis rules for each metaclass contained in the PowerDesigner metamodel libraries.

All analysis rule set files can be opened in the Resource Editor, and have the same basic category structure:



For more information about using the Resource Editor, see "Working with the Resource Editor" in the Resource Files and the Public Metamodel chapter in the *Customizing and Extending PowerDesigner* manual.

The root node of each file contains the following properties:

Property	Description
Name	Specifies the name of the analysis rule set.
Code	Specifies the code of the analysis rule set.
File name	[read-only] Specifies the path to the .rul file.
Type	Specifies the type of the analysis rule set (impact or lineage).
Comment	Specifies additional information about the analysis rule set.

The following libraries are available. You can expand any of these libraries, and select a metaclass in order to display its associated analysis rules:

Library name	Corresponding model
PdBPM	Business Process Model
PdCDM	Conceptual Data Model
PdCommon	Objects common to all models
PdEAM	Enterprise Architecture Model
PdFRM	Free Model
PdILM	Information Liquidity Model
PdLDM	Logical Data Model
PdOOM	Object Oriented Model
PdPDM	Physical Data Model
PdPRJ	Project Model
PdRQM	Requirements Model
PdXSM	XML Model

For more information about libraries and metaclasses, see the Resource Files and the Public Metamodel chapter in the *Customizing and Extending PowerDesigner* manual.

## Editing Analysis Rules

You edit analysis rules in the Resource Editor.

1. Open an analysis rule set in the Resource Editor (see *Opening an analysis rule set* on page 441).
2. Click a library to expand its available metaclasses tree.
3. Click a metaclass in the tree to display its analysis rules.
4. Select an analysis rule, and edit its properties (see *Analysis rule set properties* on page 443). You can also create or delete analysis rules.
5. Click OK to save the rule set and close the dialog box.

---

**Note:** When you modify an analysis rule, you can apply the changes to all the rules in the set that have the same specified properties by clicking the Apply Changes to Rule Set tool.

---

### Analysis Rule Properties

The following properties are available for each analysis rule:

Property	Description
E [Enable]	Enables the rule for use in the analysis.

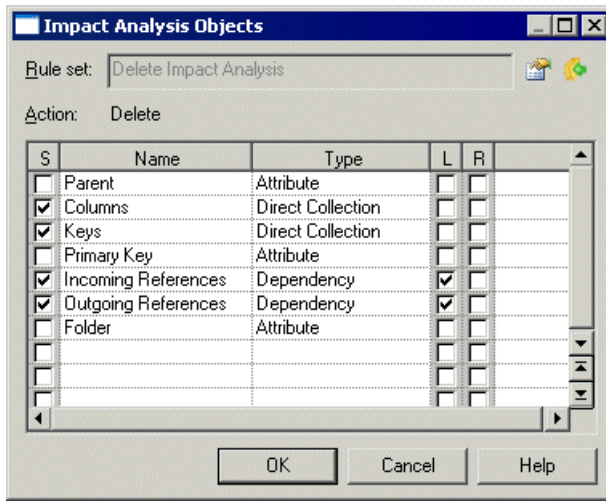
Property	Description
Action	Specifies the action on the metaclass, which triggers the application of the rule. Select or enter an action in the list. You can also create a user-defined action (see <i>Creating a user-defined action</i> on page 446). For lineage analysis rules, "Lineage" is the only possible value.
Collection	Specifies the name of the metaclass collection on which the rule is applied. Select a collection from the list. For more information about collections (see <i>Understanding dependencies</i> on page 440).
Effect	Specifies the effect propagated to objects in the collection. Select or enter an action in the list. You can also create a user-defined action (see <i>Creating a user-defined action</i> on page 446). For lineage analysis rules, "Lineage" is the only possible value.
L [Replace Link Object by Ex- tremity]	Hides the link in the IAM Browser and diagram and/or in the preview tree in order to simplify the display and view only the link extremity.
R [Recursive]	Propagates the effect recursively to the dependent objects of the objects in the collection.

## Controlling the Display of Object Collections

Control the way in which the collections of an initial object or of its dependent and influencing objects can be displayed to narrow or widen the analysis.

You can specify user-defined collections that can be part of the analysis. For more information, see the Extending your Models with Profiles chapter in the *Customizing and Extending PowerDesigner* manual.

1. Open the Impact (or Lineage) Analysis Objects dialog box in any of the following ways:
  - [from the IAM] Right-click an object in the Browser or in the diagram, and select **Change Impact Analysis Objects** or **Change Lineage Analysis Objects**.
  - [from preview] Right-click an object in the tree, and select **Change Impact Analysis Objects** or **Change Lineage Analysis Objects**.



2. Select or clear any of the following check boxes in order to control the display of one or more collections:
  - **S** [Selected] - Displays the corresponding collection.
  - **L** [Replace link object by extremity] - If the object is a link, hides it to simplify the display and view only the link extremity.
  - **R** [Recursive] - Displays recursive collections in a single list.
3. [optional] Click the **Properties** tool to open the analysis rule set properties in the Resource Editor and edit the properties (see *Analysis rule set properties* on page 443).
4. [optional] Click the **Apply Changes to Rule Set** tool to apply the current changes to the original rule set saved in the Resource Editor.
5. Click **OK** to close the dialog box.

The display of the selected object collections is updated in the IAM Browser and diagram or in the preview tree. If you re-analyze your model, only the default collections will be preserved. These collections are available when at least one analysis rule is specified for them in a rule set.

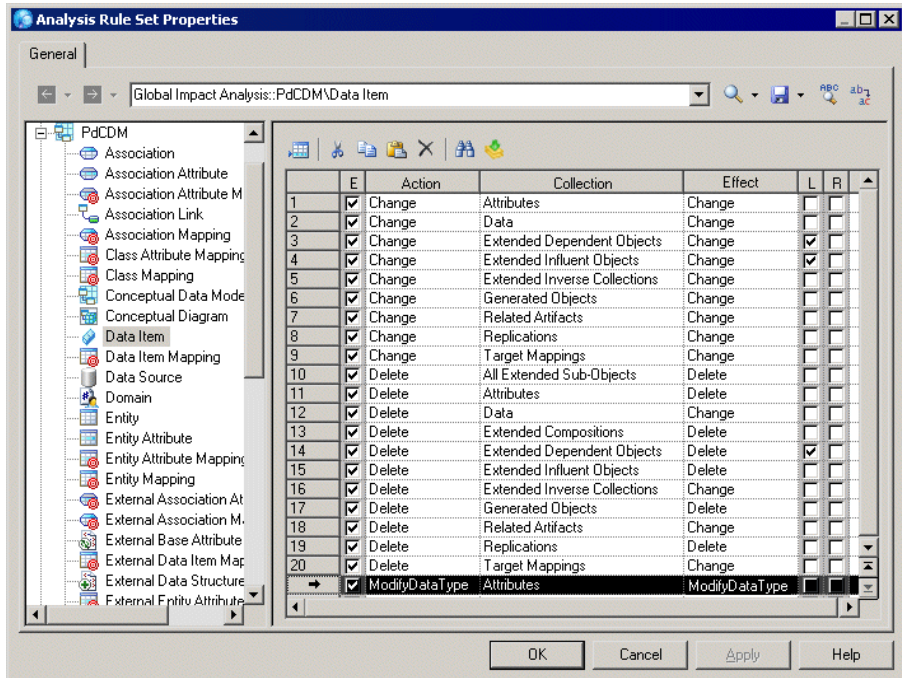
## Creating a User-defined Action

You can specify a user-defined action on an object to analyze its consequences. You must previously create the appropriate analysis rule in the Resource Editor.

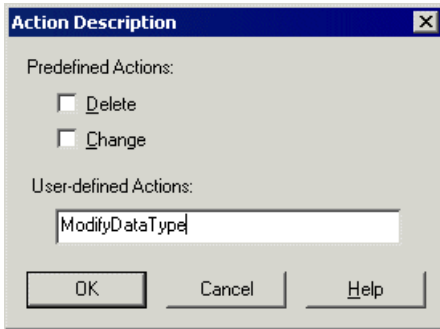
In the following example, we will create an impact analysis rule, which specifies that a ModifyDataType action on the Data Item metaclass changes its attributes.

1. Open an impact analysis rule set in the Resource Editor (see *Opening an analysis rule set* on page 441).
2. Click the PdCDM library to expand its available metaclasses tree.

3. Select Data Item in the tree, and create the appropriate rule by specifying the following options:
  - Action – enter ModifyDataType, which specifies the action on the data item, and triggers the impact analysis rule. The Enable check box is automatically selected.
  - Collection – select Attributes, which specifies the metaclass collection for which you define the impact rule.
  - Effect – enter ModifyDataType, which specifies the action that is propagated to attributes.



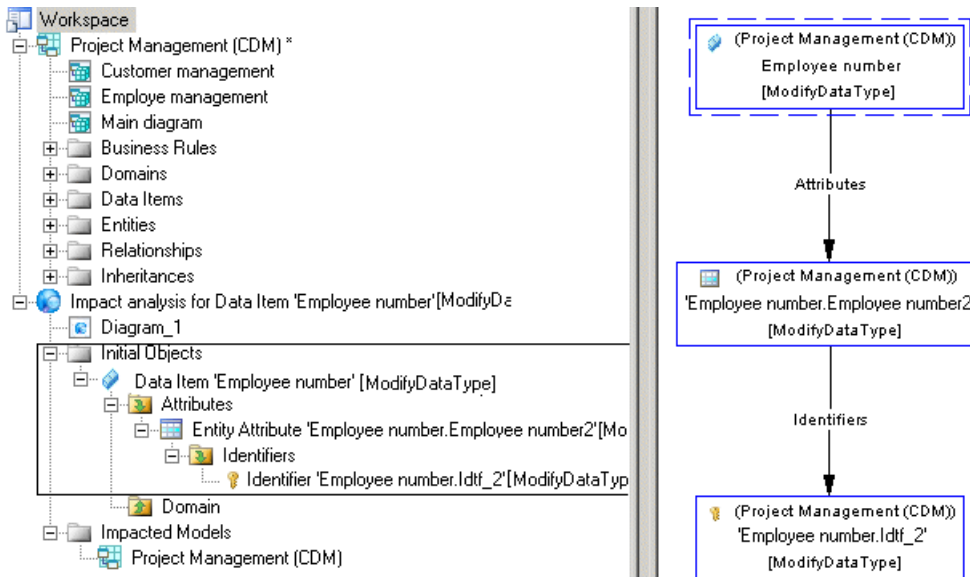
4. Click OK to save the rule set and close the dialog box.
5. Open the Action Description dialog box in any of the following ways:
  - [from the IAM] Right-click a data item in the Browser or in the diagram, and select Change Action Description.
  - [from preview] Click the Impact and Lineage tab, right-click a data item in the tree, and then select Change Action Description.
6. Enter ModifyDataType in the User-defined Actions field:



You can enter several actions in a single word using semicolons as separators.

7. Click OK to close the dialog box.

The following example shows how the [ModifyDataType] action on the Employee number data item affects its Employee number2 attribute, which in turns affects its Idtf\_2 identifier:



## IAM Custom Checks

PowerDesigner does not provide any predefined checks for the data testing of an IAM. However, you can create custom checks in an extended model definition.

For more information about how to create custom checks, see "Defining the script of a custom check" in the Extending your Models with Profiles chapter in the *Customizing and Extending PowerDesigner* manual.

You can check an IAM in any of the following ways:

- Press F4, or
- Select **Tools > Check Model**, or
- Right-click the diagram background and select Check Model from the contextual menu

The Check Model Parameters window opens, which allows you to specify the kinds of checks to perform, and the objects to apply them to. For detailed information about this window and correcting problems reported, see *Checking a Model* on page 92.



## PART III

# Working with PowerDesigner Plugins

The chapters in this part explain how to use PowerDesigner in the Eclipse and Microsoft Visual Studio development environments.



# CHAPTER 14 Working with the PowerDesigner Plugin for Eclipse

The PowerDesigner plugin for Eclipse is available for Eclipse v3.2 to v3.5. Additional features are available when working in Eclipse.

The PowerDesigner plugin for Eclipse has the following limitations:

- You cannot use the Copy/Paste/Rename features available in the Eclipse contextual menu for PowerDesigner resources.
- In the standalone PowerDesigner application, you can modify the source code of a class or interface from its property sheet Preview tab. This feature is not available in the plugin for Eclipse.
- You cannot export an Eclipse project containing PowerDesigner resources. If you want to export a project, you must deselect any PowerDesigner resources on the File system page of the Export wizard or the export will fail.

## Getting Started with the PowerDesigner Plugin for Eclipse

During your installation of PowerDesigner, you can choose to install a plugin to allow you to use PowerDesigner within your Eclipse environment. The PowerDesigner plugin for Eclipse is available for Eclipse v3.2 to v3.5.

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**Note:** For information about PowerDesigner features specific to Eclipse, see *Chapter 14, Working with the PowerDesigner Plugin for Eclipse* on page 453.

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When you launch the Eclipse platform for the first time, it opens the workbench window, which initially displays the Resource perspective. A perspective defines the initial set and layout of views in the workbench window.

The Resource perspective contains different views:

- The *Navigator* view displays a tree view of the projects and their resources
- The *Editor* area displays the content of the projects and resources
- The *Outline* view displays a content outline of the file being edited. (Except for a plain text file)
- The *Tasks* view lists and marks all the tasks and problems to be solved

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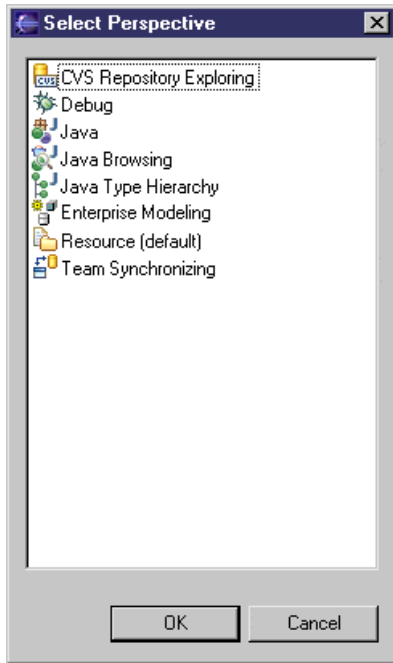
**Note:** The PowerDesigner plugin for Sybase Workspace, which is called Enterprise Modeling, includes all the features of the standard PowerDesigner plugin for Eclipse. When modeling within the Sybase Workspace environment, we recommend that you use the Enterprise Modeling perspective.

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## Activating the PowerDesigner Perspective

Click the title bar of a view to make it active. (The title bar turns blue). The name of the active perspective is shown in the title bar of the window and its icon is pushed-in in the shortcut bar. We recommend you use the PowerDesigner perspective.

1. Click the Open a Perspective icon in the shortcut bar and select **Other**, or select **Window > Open Perspective > Other**, to open the Select Perspective dialog box:



2. Select PowerDesigner in the list of perspectives, and then click OK to display the PowerDesigner perspective in the workbench window.

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**Note:** Once you have activated the PowerDesigner perspective, a PowerDesigner icon is displayed in the shortcut bar, which you can click when you need to activate the PowerDesigner perspective

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## Activating PowerDesigner Toolbars

Specific toolbars are set by default in the PowerDesigner perspective. If for some reason, they do not appear in the toolbar section, you can activate them manually.

1. Select **Window > Customize Perspective** or right-click the toolbar section and select **Customize Perspective** in the contextual menu, to open the Customize Perspective dialog box.

2. In the Shortcuts tab:
  - Select New in the Submenus list, and PowerDesigner in the Shortcut Categories tree view. The Model icon is selected in the Shortcuts list.
  - Select Open Perspective in the Submenus list, and PowerDesigner in the Shortcuts list.
  - Select Show View in the Submenus list, and Sybase in the Shortcut Categories tree view. The Model Explorer, Modeling Output and Modeling Result List icons are selected in the Shortcuts list.
3. In the Commands tab, select WorkSpace Modeling Diagram, WorkSpace Modeling Standard and WorkSpace Modeling View.
4. Click OK.

The PowerDesigner toolbars appear next to the Eclipse toolbars. These toolbars are common to all PowerDesigner modules. Module-specific toolbars will appear automatically when you open or create a model.

### Using the Window Menu

The Window menu supports all the features concerning perspectives:

Feature	Description
Open Perspective	Opens a perspective.
Show View	Displays a view among the following: Bookmarks, Model Explorer, Navigator, Outline, Output, Properties, Modeling Result List, Tasks, Other.
Customize Perspective	Opens a dialog box where you select items to be displayed in the current perspective.
Save Perspective As	Saves the current perspective with a predefined or user-defined name, for future use.
Reset Perspective	Resets the current perspective to its default parameters.
Close Perspective	Closes the current perspective.
Close All Perspectives	Closes all perspectives open in the workbench window.

### PowerDesigner Perspective Components

The PowerDesigner perspective contains the following components:

- *Model Explorer* – Equivalent to the standard PowerDesigner Browser. Allows you to manage the objects you use to perform a modeling task. It displays your models and the objects belonging to them in a tree view, and allows you to rapidly navigate between them. The Model Explorer also has a tab that gives you access to a PowerDesigner repository, where you can store all your models and associated files.

- *Navigator*- displays a tree view of all the resource files attached to Eclipse projects open in the workbench window. These resource files can be model files, diagram files, source code files, specification files, or any type of file. You can use the Navigator to open models, create new projects and models, or even open object property sheets.
- *Editor Area* – Equivalent to the standard PowerDesigner canvas. The primary pane that displays your present model diagram or report outline.
- *Modeling Output* - shows the progress of any PowerDesigner process, such as checking a model or generating or reverse engineering a database.
- *Modeling Result List* - displays the results of a search or a model check.

## Creating a Modeling Project in Eclipse

You can create a modeling project in Eclipse to group together all your models and other resources.

1. Select **File > New > Project** to open the New Project window:
2. Select **PowerDesigner > Modeling Project** in the list of Wizards and click Next to open the PowerDesigner New Project window.
3. Specify the project name and location, and select the type of PowerDesigner project to create. PowerDesigner project templates allow you to create projects that are already populated with models and/or that contain matrices that help you to follow various modeling frameworks, such as FEAF.
4. Click OK to create the project.

For detailed information about working with projects, see *Chapter 2, Projects and Frameworks* on page 37.

## Creating a Model in Eclipse

A model is the basic work unit in PowerDesigner. Every model is contained within a project, and contains at least one diagram and any number of other objects. Though a model may be split into packages for organizational reasons or may contain several diagrams, it remains the fundamental basis for your modeling work.

1. Select **File > New > Model** to open the New Model dialog box.

If there is no project open in the Navigator view, the *Create a new project* option is selected by default and the *Add to an existing project* option is disabled. An Eclipse project will then be created for the new model.

*or*

If there are projects already open in the Navigator view, you can select the *Add to an existing project* option.

Select a project. (The new model will appear in the Navigator view within the existing project)

2. If you selected an existing project, click Next.

Expand (+) the project, and if it contains folders, select the sub-folder where folder in which the new model will appear.

You can also create a folder or a sub-folder, to do so select the project or a folder, click the *New Folder* button, and type a name in the New Folder dialog box and click OK. (The new model will appear in the Navigator view within the new folder)

3. Click Finish in the Eclipse *New model* dialog box.

The New dialog box is displayed.

4. Select the appropriate model for your needs by clicking on it. Note that the tabs on the right of the dialog box change depending on the model currently selected.
5. Type a name in the Model name box. This is the name of the model. The code of the model, which may be used for script or code generation, is derived from this name according to the model naming conventions. You can modify the name and/or code at any time from the model property sheet by right-clicking the model entry in the Model Explorer and selecting Properties from the contextual menu.
6. Choose any appropriate options in the right hand tabs (for example, if you are creating a PDM, you will specify a particular DBMS to model or, for an OOM, you will specify an object language).
7. If you are creating a BPM, OOM, or PDM, you can also specify the type of diagram you want to start with (you can add additional diagrams to your model later by right-clicking on the model in the Model Explorer and selecting *New Diagram\_Type*).
8. Click OK. The new model will be created in your project in the Model Explorer, and its default diagram will be opened in the editor area.

## Importing an Existing Model into Eclipse

To open an existing model you have to import it into Eclipse.

1. Select **File > Import** to open the Import dialog box.
2. Select Model in the list and click Next.
3. Type a model filename in the corresponding box or click the Browse button to select a model from a selection dialog box.
4. Select the Create a linked resource check box if you want to associate the model to the current project without copying the file to the project location.
5. Select an existing project or create a new project where to open the existing model and click Finish.

The model default diagram is displayed in the Editor area.

## Setting PowerDesigner Eclipse Preferences

The PowerDesigner plugin for Eclipse provides options to customize your environment.

1. In Eclipse, select **Window > Preferences** to open the Preferences dialog.
2. Select **Sybase, Inc > PowerDesigner** or **Enterprise Modeling** and set preferences as appropriate:

Preference	Description
Close diagram editors on exit	By default, when you restart Eclipse, any diagrams that were previously open will be automatically reloaded. Select this option to prevent reloading.
Flag diagram editor as dirty if parent model requires save	Select this option if you want to be reminded that a model has been modified before you save the changes.
Automatically merge models on code-to-model synchronization	Select this option if you want the merge process to be silent during reverse engineering.

3. Click **OK**.

For information about the standard PowerDesigner options and preferences, see *Chapter 8, Customizing Your Modeling Environment* on page 277.

## Generating an Eclipse Java Project from an OOM

---

You can model the structure of your Java application (including EJBs, Servlets, and JSPs) in a PowerDesigner OOM and then generate an Eclipse Java Project in which you will complete the implementation of the classes, and from which you will compile, package, deploy, and debug the application.

You can use the PowerDesigner plugin for Eclipse to enable round-trip engineering for Java development:

- Perform high level analysis and design using PowerDesigner
  - Design and create Java components in PowerDesigner
  - Generate an Eclipse Java project containing the following files:
    - A `.project` file - that defines the name of the project and the build commands
    - A `.classpath` file - that defines the source directory, the binary directory and the list of libraries
    - Source files and other files
    - A `build.xml` for Ant build script - to specify the necessary build tasks and libraries.
  - Finish the implementation of Java classes within the generated Eclipse project
  - Compile, package, deploy and debug the application
  - Reverse engineer the final Java code to synchronize the PowerDesigner model
1. Select **Tools > General Options** and click the Variables category, then add the following variables if they are not already present:
    - `ECLIPSE_HOME` - your Eclipse home directory

- J2EE\_HOME - your J2EE SDK home directory
  - JWSDF\_HOME - [optional] your Java Web Service Developer Pack home directory
2. [optional] Preview the Eclipse `.project`, `.classpath` and Ant `build.xml` files by right-clicking the model node in the Browser and selecting Properties. Each of the files is available on its own sub-tab on the **Preview** tab of the property sheet.
  3. Select **Language > Generate Java Code** to open the Generation dialog.
  4. Enter the project folder where you want to generate the files in the **Directory** field. The name of this folder will be used as the project name.
  5. Verify that Eclipse is selected on the **Targets** tab.
  6. [optional] Click the **Selection** tab and specify the packages, classes and interfaces that you want to generate. By default, all objects are generated.
  7. Click the **Options** tab and review the generation options, including those that control the Eclipse version to generate for and whether to overwrite existing `.project` and `.classpath` files.
  8. [optional] Click the **Generated Files** tab and specify which files will be generated. By default, all files are generated
  9. Click **OK** to generate the Eclipse Java project.

If you are generating a new project from the PowerDesigner plugin for Eclipse, the project opens automatically.

When generating code for an existing project, you must refresh the project by right-clicking the project in the Eclipse Package Explorer and selecting **Refresh**.

If you have generated the Eclipse project from outside Eclipse, you will need to import the project into Eclipse by selecting **File > Import**.

## Synchronizing an OOM with Its Java Source

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You can synchronize an Object Oriented Model (OOM) with its Java source code, so that each time you modify the model, a source code file is automatically created (for a new object) or updated (for an existing object). Similarly, each time you modify a source code file and save the changes, they appear in the diagram and the Model Explorer.

You can activate synchronization from the Model Explorer or Navigator. A model is synchronized *per package*. The default package regroups all the objects at the root of the model. Once a package has been synchronized with a model, you cannot synchronize it with another model.

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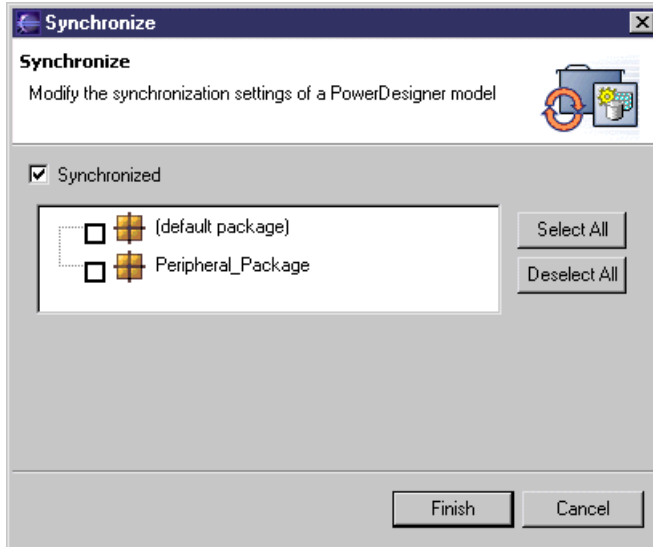
**Note:** Synchronize is only available for OOMs targeted with Java.

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## Activating Synchronization from the Model Explorer

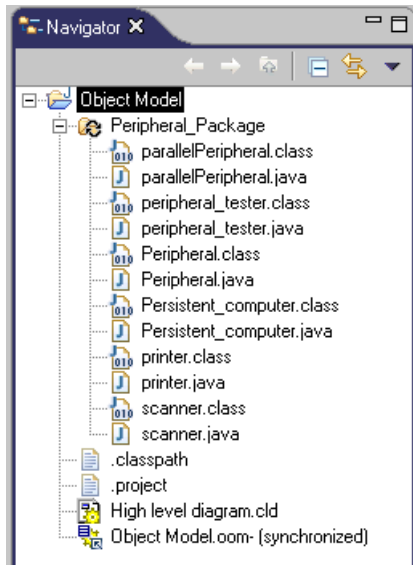
You can activate the synchronization of an OOM from the Model Explorer.

1. In the Model Explorer, right-click the model and select Synchronize to open the Synchronize dialog box.
2. Select the Synchronized check box, and then select the packages you want to synchronize with their source code. The default package regroupes all the objects at the root of the model.



3. Click Finish.

A Java file (.java) and compiled file (.class) appear for each object in the synchronized packages of the Navigator.



If you double-click a Java or a compiled file, its source code is displayed in the Editor area.

Note the synchronized symbol on the package icon...

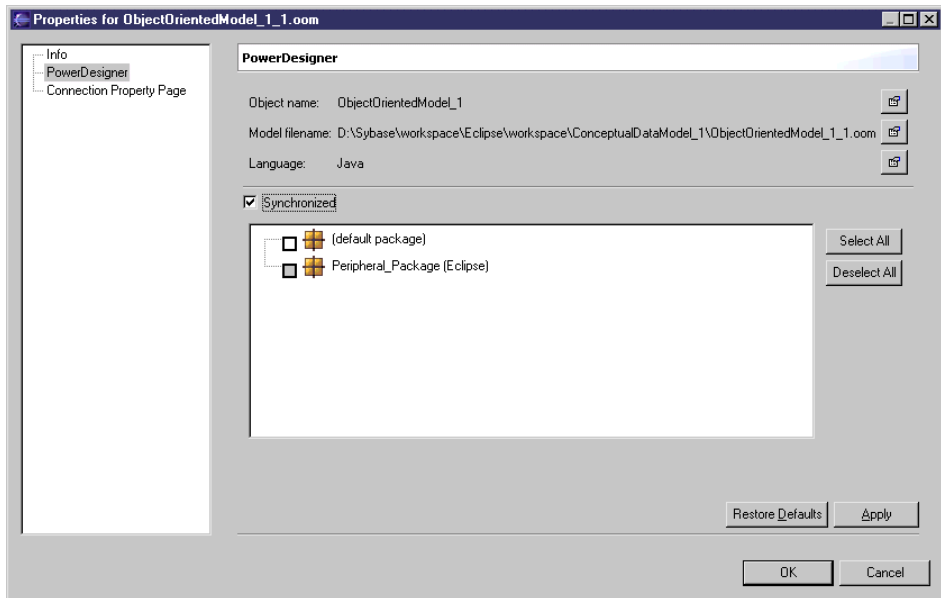


...and the (synchronized) mention beside the model resource.

## **Activating Synchronization from the Navigator**

You can activate the synchronization of an OOM from the Navigator.

1. In the Navigator, right-click the model and select Properties to open the model Properties dialog box.
2. Select PowerDesigner in the left pane and the Synchronized check box in the PowerDesigner page.



3. In the Synchronized group box, select the packages you want to synchronize with their source code. The default package regroups all the objects at the root of the model.
4. Click OK.

A Java file (.java) and a compiled file (.class) appear for each object in the synchronized packages of the Navigator.

If you double-click a Java or a compiled file, its source code is displayed in the Editor.

## **Synchronization Example**

The following example is developed from the synchronized OOM, demo.oom

### **Refresh Source Code**

If you change generation templates, you can regenerate source code manually with the Refresh Source Code feature:

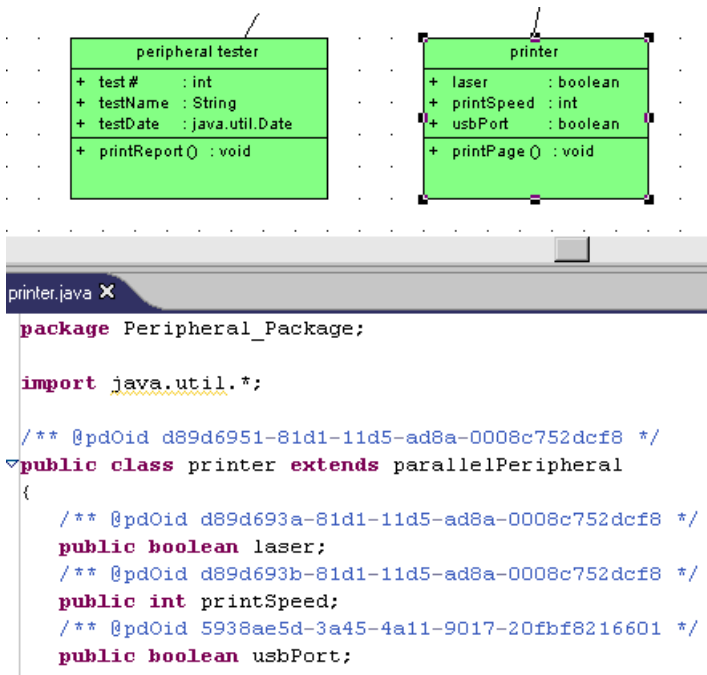
- In the Model Explorer, right-click a class, an interface, a synchronized package or model item, and select Refresh Source Code
- In a class diagram, right-click a class, an interface or a package symbol, and select Refresh Source Code

### **Creating and Deleting an Attribute in a Synchronized Model**

You can create and delete an attribute in a synchronized model.

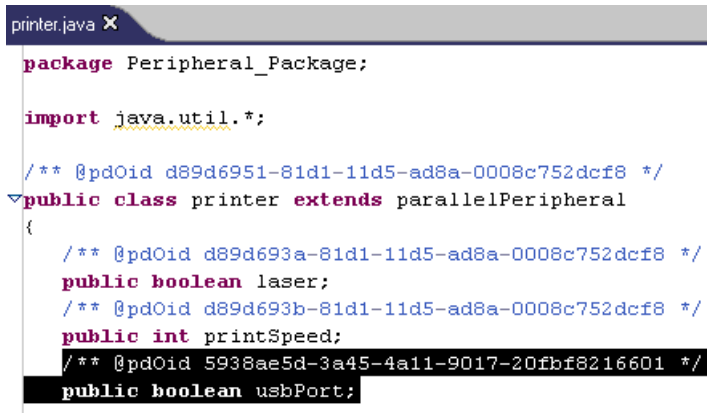
1. Double-click the printer symbol, select the Attributes tab, and add a usbPort attribute with a boolean data type and a public visibility.





Note that the usbPort attribute is displayed in the synchronized source code.

4. Delete the code concerning the usbPort attribute.



5. Select **File > Save** in the Eclipse menu bar.

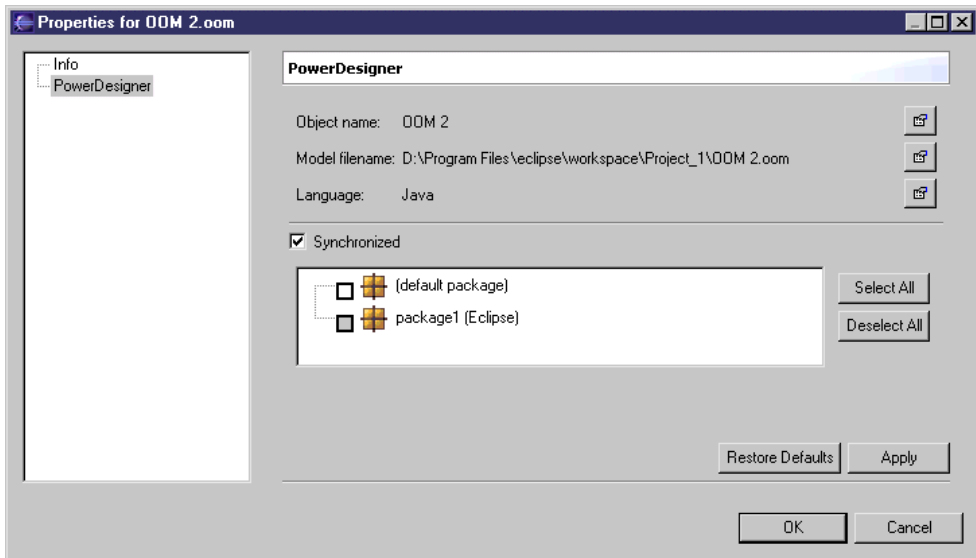
The usbPort attribute disappears from the printer symbol because the printer class in the OOM has been synchronized with its source code.

printer	
+ laser	: boolean
+ printSpeed	: int
+ printPage()	: void

## Synchronizing a Package

You cannot only synchronize a package with one set of source files and each set of source files with one OOM package.

If you try to synchronize a second model with a package, its check box is unavailable:



## Deactivating Synchronization

If you decide to deactivate synchronization, the model and its source code remain as they were after the last synchronization.

You can deactivate synchronization in the following ways:

- In the Model Explorer, right-click the model item and select Synchronize in the contextual menu, deselect Synchronized, and click Finish.
- In the Navigator, right-click the model and select Properties in the contextual menu, deselect Synchronized in the PowerDesigner page, and click OK.
- In the Navigator, right-click a synchronized package and select Unsynchronize.

## Navigating Between an OOM and Its Java Source Code

Once you have synchronized an OOM with its Java source code, you can use the Find In Diagram and the Model Object Properties features in the contextual menus of the Model Explorer, the Navigator and the source code files.

### Find In Diagram

The Find In Diagram feature allows you to locate an object in a diagram from the Navigator or a source code file.

### Locating an Object from the Navigator

The Find In Diagram feature allows you to locate an object in a diagram from the Navigator. In the Navigator, right-click an object Java file and select **Find In Diagram**.

The object symbol is displayed selected (with handles) in the center of the diagram.

### Locating an Object from a Source Code File

The Find In Diagram feature allows you to locate an object in a diagram from a source code file.

1. Double-click the name of an object in a source code file in order to select it.
2. Right-click the object name and select **Find In Diagram**.

The object symbol is displayed selected (with handles) in the center of the diagram.

---

**Note:** To display the Outline view, select **Window > Show View > Outline**. Activate a model diagram. When you click an object in the Outline view, it triggers a Find In Diagram. The object symbol is displayed selected (with handles) in the center of the diagram.

---

### Model Object Properties

The Model Object Properties feature allows you to display an object property sheet from the Navigator or a source code file.

### Displaying an Object Property Sheet from the Navigator

The Model Object Properties feature allows you to display an object property sheet from the Navigator.

Right-click an object Java file in the Navigator and select Model Object Properties in the contextual menu.

The object property sheet is displayed. You can now define or modify the object properties.

### **Displaying an Object Property Sheet from a Source Code File**

The Model Object Properties feature allows you to display an object property sheet from a source code file.

1. Double-click the name of an object in a source code file.

The object name is selected.

2. Right-click the object name and select Model Object Properties in the contextual menu.

The object property sheet is displayed. You can now define or modify the object properties.



# CHAPTER 15 Working with the PowerDesigner Plugin for Visual Studio

The PowerDesigner plugin for Microsoft Visual Studio and Team Foundation is available for Visual Studio 2005 to 2008. Additional features are available when working in Visual Studio.

## Getting Started with the PowerDesigner Plugin for Visual Studio

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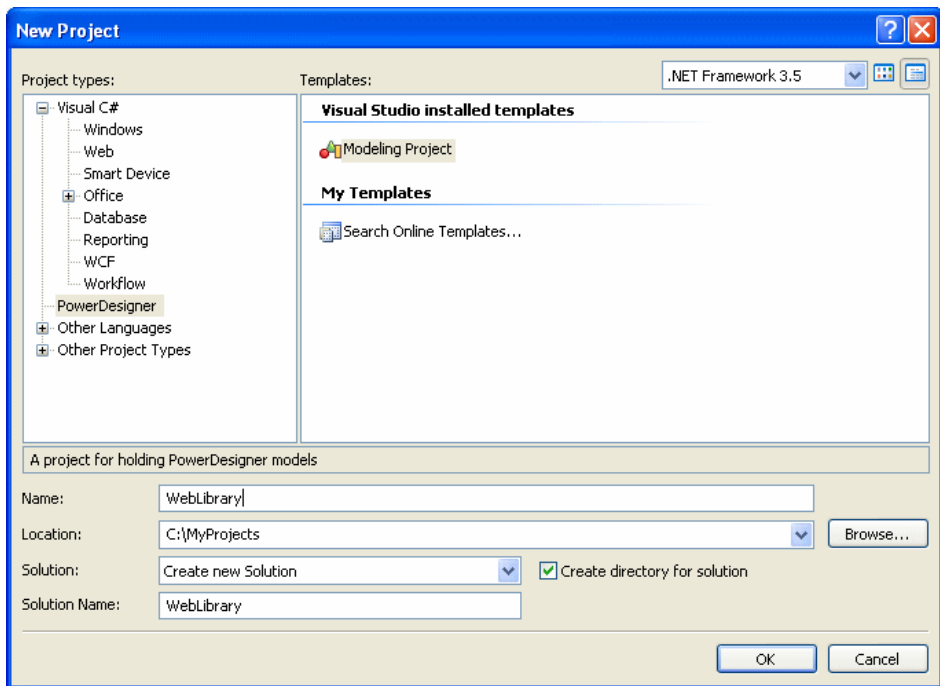
During your installation of PowerDesigner, you can choose to install a plugin to allow you to use PowerDesigner within your Visual Studio environment. The PowerDesigner plugin for Microsoft Visual Studio and Team Foundation is available for Visual Studio 2005 to 2008.

All Visual Studio development takes place in "solutions", which contain "projects". You can create PowerDesigner models directly within a solution, or within any type of project, including the PowerDesigner-specific "modeling project".

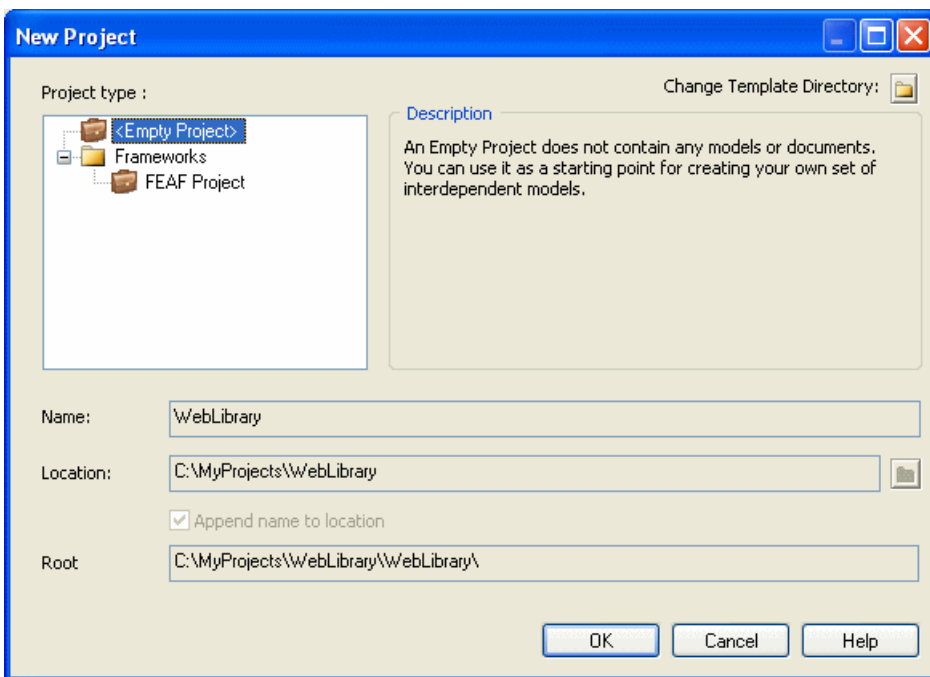
### Creating a Modeling Project in Visual Studio

You can create a modeling project in its own standalone solution, or add a modeling project to an existing solution.

1. [optional] Open an existing solution to which you want to add the modeling project.
2. Select **File > New > Project** to open the New Project window:



3. Select PowerDesigner in the Project types pane, and then Modeling Project in the Templates pane.
4. Enter a name for the project, and specify a location for its files.
5. Select one of the following options in the Solution field:
  - Add to Solution – to add the project to an existing solution
  - Create new Solution – to create a new solution.
6. Click OK to go to the PowerDesigner New Project window:



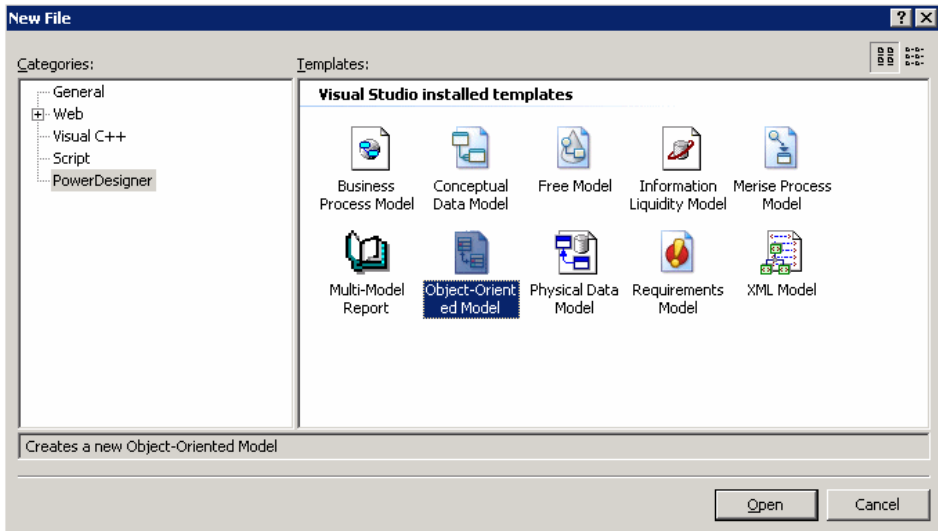
7. Select the type of PowerDesigner project to create. PowerDesigner project templates allow you to create projects that are already populated with models and/or that contain matrices that help you to follow various modeling frameworks, such as FEAF.
8. Confirm the name, location, and root, and click OK to create the project.

For detailed information about working with projects, see *Chapter 2, Projects and Frameworks* on page 37.

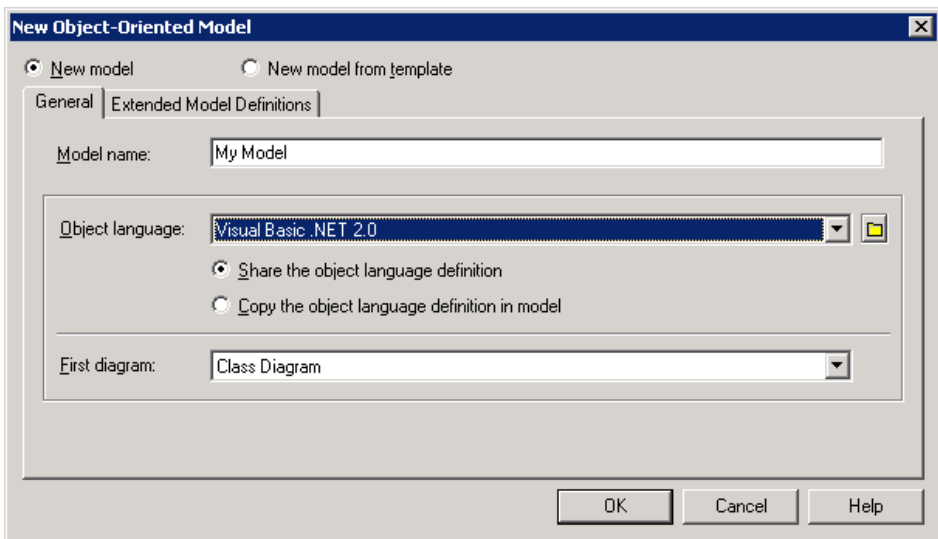
## Creating a Model in Visual Studio

You can create any of the model types supported by PowerDesigner from within Visual Studio. The following procedure focuses on how to create an object-oriented model (OOM).

1. Select a project in the Solution Explorer.
2. Select **File** > **New** > **File** to open the New File window:



3. Select PowerDesigner in the Categories pane, and the type of model that you want to create in the Templates pane.
4. Click OK to open the New Model window:



5. Select one of the following radio buttons:
  - New model – Creates a new, standard, model.
  - New model from template – Creates a model from a model template, which can contain pre-configured options, preferences, extensions, and objects. For more information, see *Model Templates* on page 97.

6. Enter a model name. The code of the model, which is used for script or code generation, is derived from this name according to the model naming conventions.
7. Select an Object language from the list.

Object languages are defined in dedicated XML files (with a .XOL extension), which are provided as part of your PowerDesigner installation in the "\Resource Files\Object Languages" directory, and contain all the syntax and specifications for each target language.

8. Select one of the following radio buttons:

- Share the object language definition – use the original object language file in the "Resource Files\Object Languages" directory. Any changes made to the object language are shared by all linked OOM.
- Copy the object language definition in model –copy the object language file to the model. The copied object language is saved with the OOM and cannot be used without it. It is not affected by modifications made to the original language in the Object Languages directory.

For more information on object language properties and customizing an object language, see "Resource File Reference" and "Working with the Resource Editor" in the Resource Files and the Public Metamodel chapter of the *Customizing and Extending PowerDesigner* manual.

9. Select the type of the first diagram in the First Diagram list. The first type of diagram selected remains in memory, and is the default for the next time when you create a new OOM.

You can create as many diagrams as you need in the same OOM. They are sorted alphabetically in the Model Explorer, except the diagram specified here, which is always the first in the list.

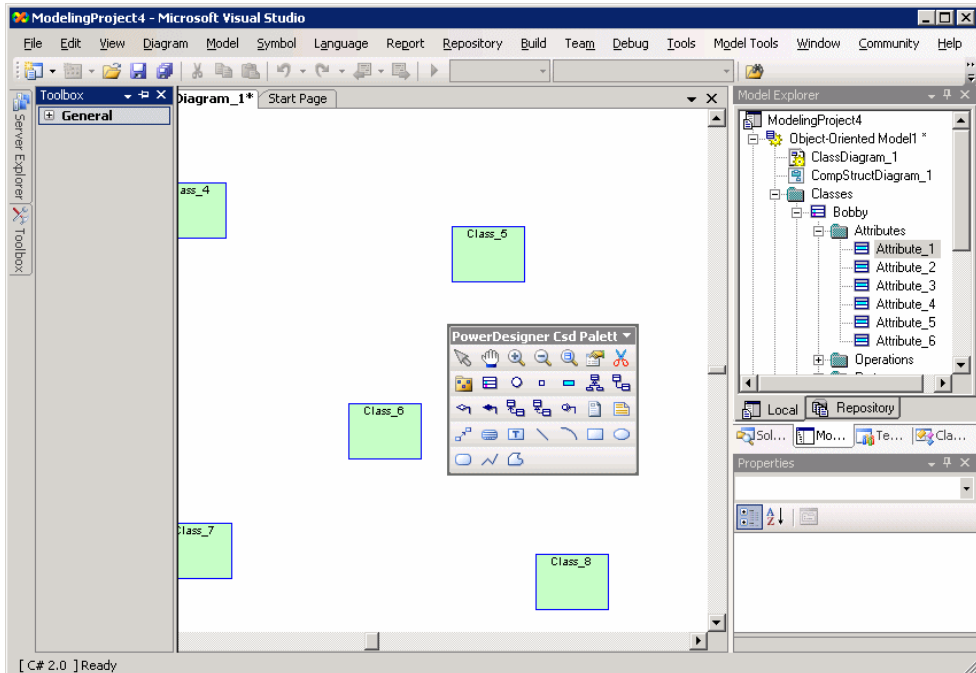
10. [optional] If you want to attach one or more extended model definitions to complement the selected object language, click the Extended Model Definitions tab, and select the extended model definitions of your choice.

For more information on attaching extended model definition to a model, see "Extended Model Definitions" in the Resource Files and the Public Metamodel chapter of the *Customizing and Extending PowerDesigner* manual.

11. Click OK to create the OOM.

## The Visual Studio Development Environment

The Visual Studio development is highly configurable, with many different explorers and other windows that can be moved all over the screen and be docked and tabbed together. Consequently, the screen below shows only one possible configuration:



The main screen areas displayed here are as follows:

- The Toolbox is equivalent to the PowerDesigner Palette, and is the area where you choose tools to build your diagrams.
- The Document Window is equivalent to the PowerDesigner canvas, and is the space where you build your model diagrams.
- The Model Explorer is equivalent to the PowerDesigner Browser, and lists all the models in your project along with all their model objects displayed in a tree view.
- The Properties window is equivalent to a PowerDesigner property sheet, and lists the properties of the currently selected object. Note that regular PowerDesigner property sheets are also available.

## PowerDesigner Menus

The following PowerDesigner-specific menus are available in the Visual Studio menu bar:

- Diagram [View in the standard PowerDesigner interface] – tools for manipulating model diagrams

- Model – lists of model objects
- Symbol – tools for manipulating diagram symbols
- Language/Database etc. – depending on the type of model currently open in the document window, this menu will change to provide tools for manipulating the subject of your model, including code generation and reverse-engineering
- Repository – tools for working with the PowerDesigner model repository
- Model Tools [Tools in the standard PowerDesigner interface] – tools for manipulating the model

Other PowerDesigner menu functions are integrated into the standard Visual Studio menus.

## Working with an RQM and Visual Studio Team System




A PowerDesigner Requirements Model (RQM) is used to create a hierarchy of project requirements that must be fulfilled during the development of the project.

For detailed information about developing and using an RQM, see the *Requirements Modeling* guide.

You can export RQM requirements to one or more Visual Studio Team System projects and then create task work items to structure how the requirements will be fulfilled. Doing so, permits you to link the power and simplicity of a PowerDesigner hierarchical RQM to your use of the Visual Studio Team System.

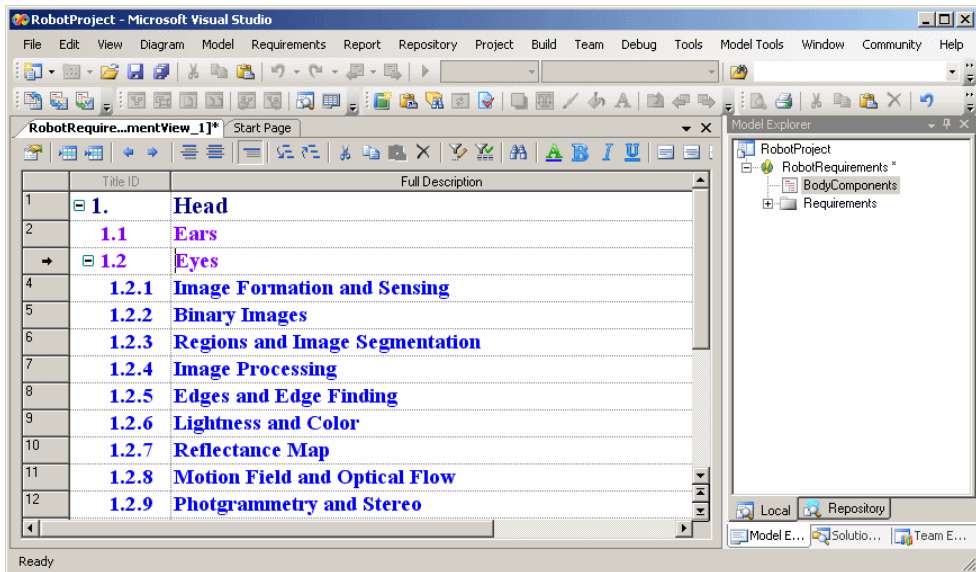
### The RQM/Team Project Toolbar

The RQM displays the following toolbar when you are connected to a Team System server:

Icon	Description
	Import Requirements – imports requirement work items from a Team System project to an RQM. See <i>Importing Team Project Work Items to an RQM</i> on page 480.
	Export Requirements – exports requirements from an RQM as work items to a Team System project. See <i>Exporting RQM Requirements to a Team Project</i> on page 476.
	Update Requirements – updates the content (for example, description, status) of requirements already exported to a Team System project. See <i>Updating Requirement Work Items Linked to an RQM</i> on page 482.

## Exporting RQM Requirements to a Team Project

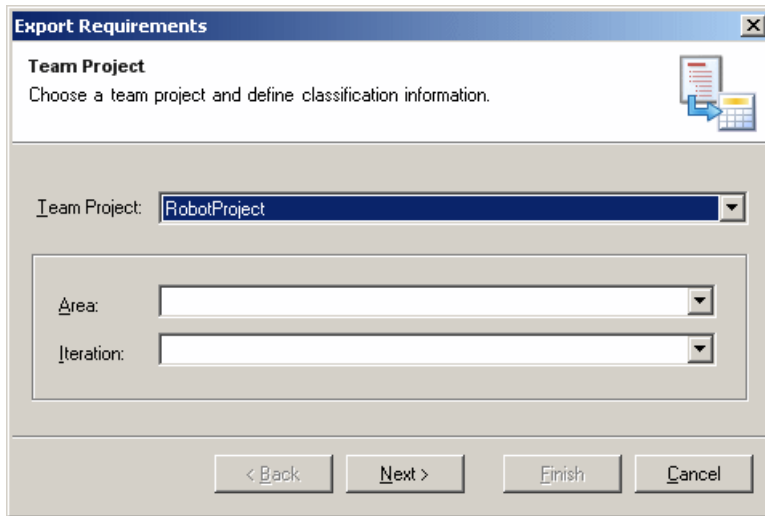
Once you have created a requirements model you can export your requirements to a Team project as work items. The exported requirements retain a memory of their place in the requirements hierarchy:



To begin an export, you must be connected to a Team System server and have created a Team project to receive your requirements.

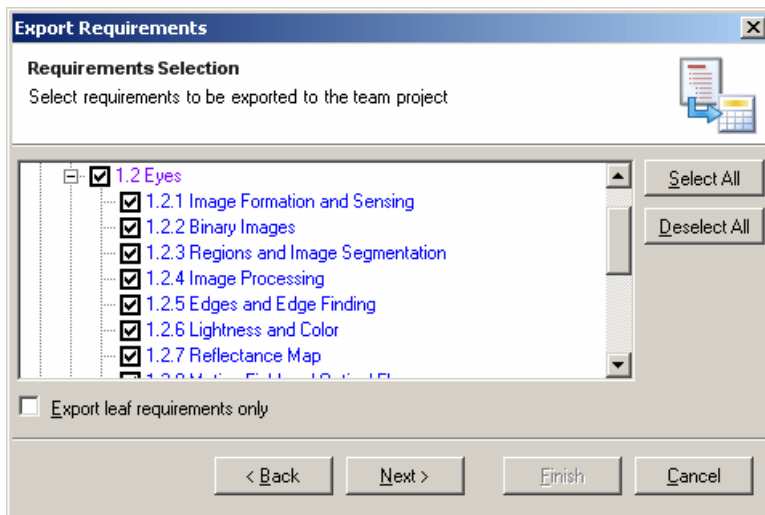
You can export requirements from a single RQM to many Team projects by running the export wizard multiple times, but you cannot export the same individual requirement to more than one project.

1. Review the Team Explorer pane to ensure that you are connected to a Team System server, and that you have created an project to receive your requirements.
2. Select **Team > Requirements > Export** (or click the Export Requirements tool) to open the Export Requirements wizard.
3. The Team Project screen allow you to specify to which project you will export your requirements and, optionally, an Area and/or Iteration, if these have been defined for the project.



Note that, although you cannot select multiple projects to export to on this screen, you can relaunch the wizard as many times as necessary to export your requirements to a variety of projects.

4. Click Next to continue. The Requirements Selection screen allows you to specify which requirements you want to export. All requirements are shown except those that have already been exported to another project, or to another area or iteration of the present project.



Specify a requirement to export by selecting its checkbox. If you select the Export leaf requirements only checkbox, then only those requirements without children will be exported.

5. Click Next to continue. The Work Item Type screen allows you to specify the type of work item to which your RQM requirements will be exported. You can select an existing type or create a new one.

Requirement Property	Work Item Field
Title	Title
Code	(None)
DescriptionText	Description

This screen also allows you to specify how the properties of the RQM requirements will be mapped to the fields of the designated work item type. Certain fields, such as the Title and Description are hard-coded and cannot be changed. You can choose a Work Item Field for the other properties by clicking on the entry, and then selecting the appropriate field (or Add, in the case of a new work item type) from the list.

If you select to create a new work item type, you must create a new field for each of the Requirement Properties you want to export by clicking in the Work Item Field column and selecting Add from the menu, and specifying a Name for the field.

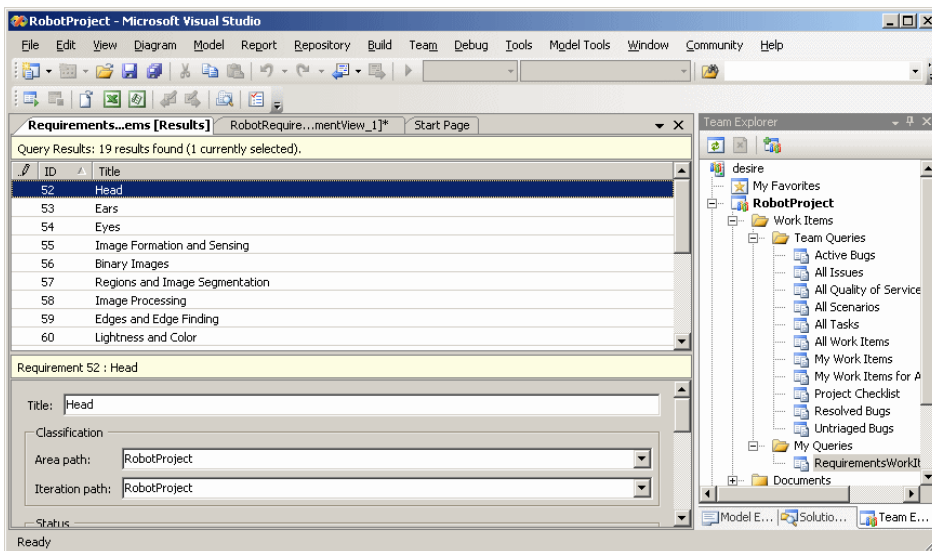
Note that any mappings set at this stage cannot be changed for subsequent exports, although you can specify additional property-to-field mappings.

6. Click Finish to begin the export. When it is complete, you can view the work items that you have created by accessing one of the standard queries in the Team Explorer, or writing your own.

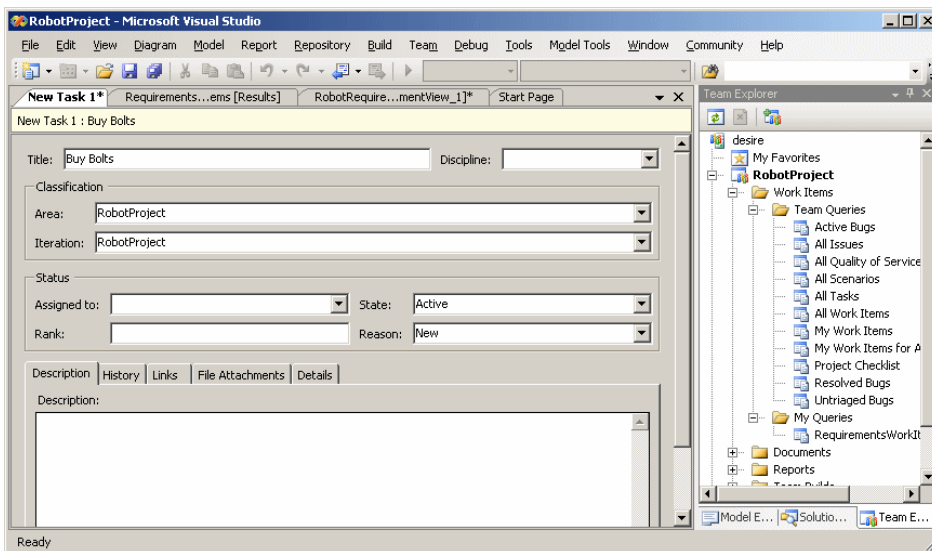
## Linking Work Items to Requirements

Once your requirements have been exported into Team project work items, you will need to create associated work items (generally of type Task), in order specify how they will be fulfilled. You may link multiple Tasks and other work items to your requirements and, in general, treat them like any other work items.

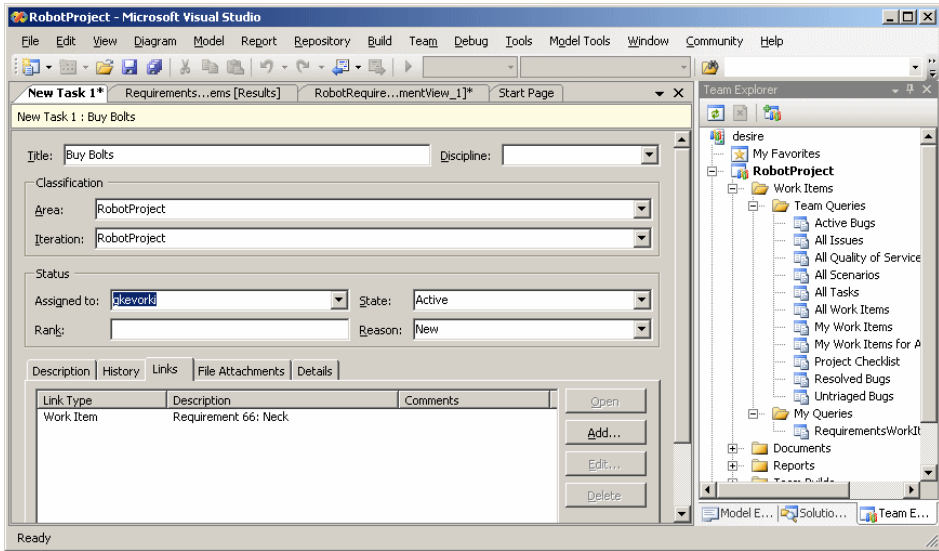
1. Display your requirement work items by using the All Work Items team query, or by writing your own. In the window below, I have written a query called RequirementsWorkItems to display only the requirements:



2. Right-click a requirement in the list, and select **Add Related Work Item > Task** (or another work item type) to create the new work item:



3. Complete whichever fields you deem necessary in order to specify the nature of the work item. If you click on the **Links** sub-tab, you will see that it is linked to the original requirement.

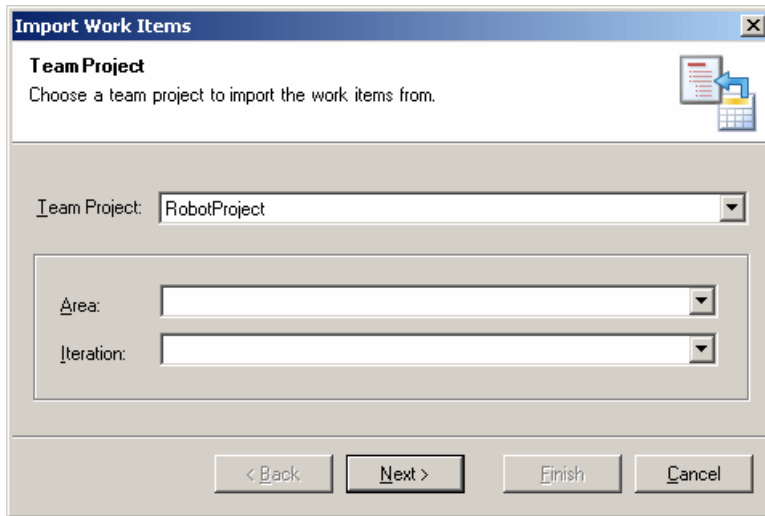


For more information about the Team system, see your Microsoft documentation.

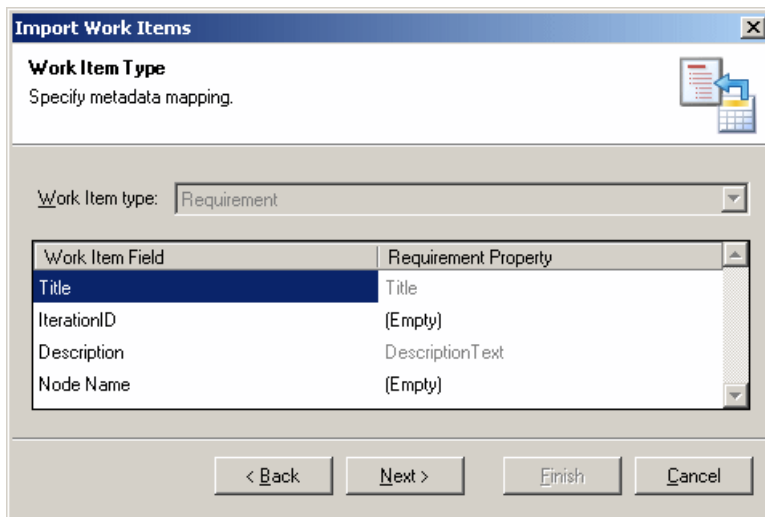
## Importing Team Project Work Items to an RQM

We recommend that you begin by developing an RQM, export your requirements to a Team project, and then add tasks to fulfill the requirements. However, there may be a situation where you develop requirements in the Team project, and then wish to import them to a new or existing RQM.

1. Review the Team Explorer pane to ensure that you are connected to a Team System server, and that the project from which you want to import is available.
2. Open a new or existing RQM in Visual Studio, and select **Team > Requirements > Import** (or click the Import Requirements tool) to open the Import Work Items Wizard.
3. The Team Project screen allow you to specify from which project you will import your work items and, optionally, an Area and/or Iteration, if these have been defined for the project.



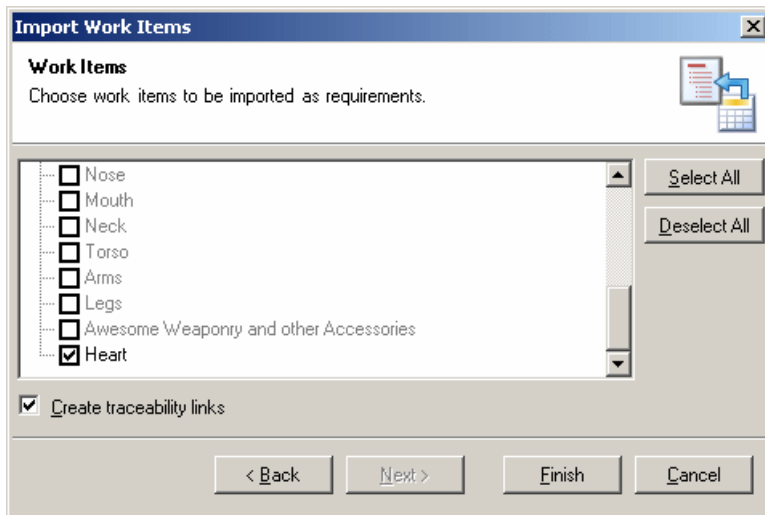
4. Click Next to continue. The Work Item Type screen allows you to specify the type of work item from which your RQM requirements will be imported. Note that the type may not be changeable if you have previously specified a mapping during an export for this project.



This screen also allows you to specify how the fields of the designated work item type will be mapped to the properties of the RQM requirements. Note that certain fields, such as the Title and Description, cannot be changed. You can choose a Requirement Property for the other fields by clicking on the entry, and then selecting the appropriate property from the list.

Note that any mappings set at this stage cannot be changed for subsequent imports, although you can specify additional field-to-property mappings.

5. Click Next to continue. The Work Items screen allows you to specify which requirements you want to import. Work Items appear greyed and cannot be selected if they are already linked to requirements in the current or another requirements model.



Select the Create traceability links checkbox if you want to retain links between the requirement work items in your Team project and the RQM. Note that traceability links can only be created for work items that are not already linked with another RQM.

6. Click Finish to begin the import. Any hierarchy defined between the work items will also be preserved.

## Updating Requirement Work Items Linked to an RQM

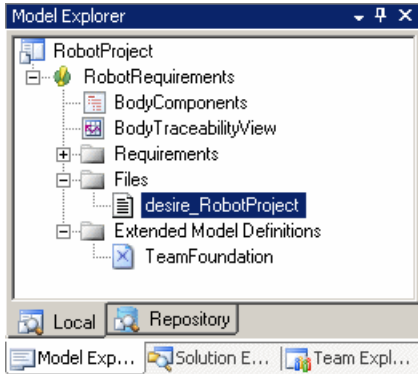
Once you have exported your requirements from an RQM to a Team System project, it is possible that you will continue to edit the details of these items (by adding or editing a detailed description, changing the status, or any of the other available properties). To cascade these edits to your requirements work items held with a Team System project, simply select **Team > Requirements > Update** (or click the Update Work Items tool).

The Update tool refreshes all the requirement work items exported to any number of Team System projects. Note that it does not export any new requirements (this requires that you use the Export tool) and that it does not update any changes made in requirement work items to their counterparts in the RQM.

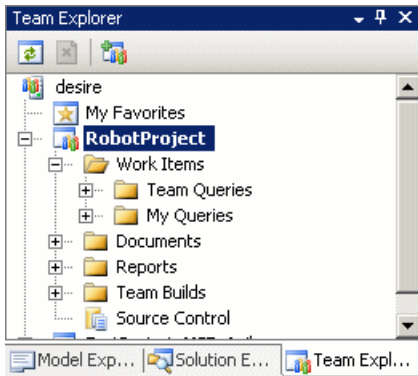
## Navigating Between RQMs and Team Projects

PowerDesigner provides various methods for navigating between an RQM and a Team System project

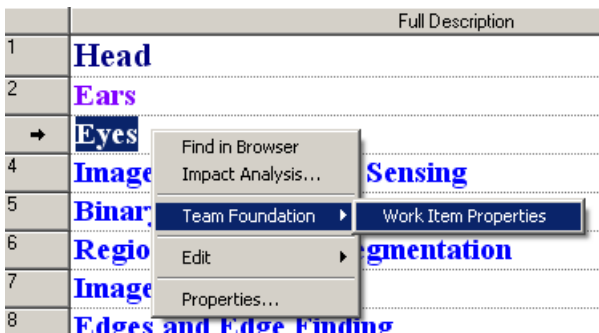
When working in the Model Explorer, you can, at any time, double-click the file named after your Team server and project (auto-generated in the Files folder):



Doing so will navigate to the linked Team Project in the Team Explorer:



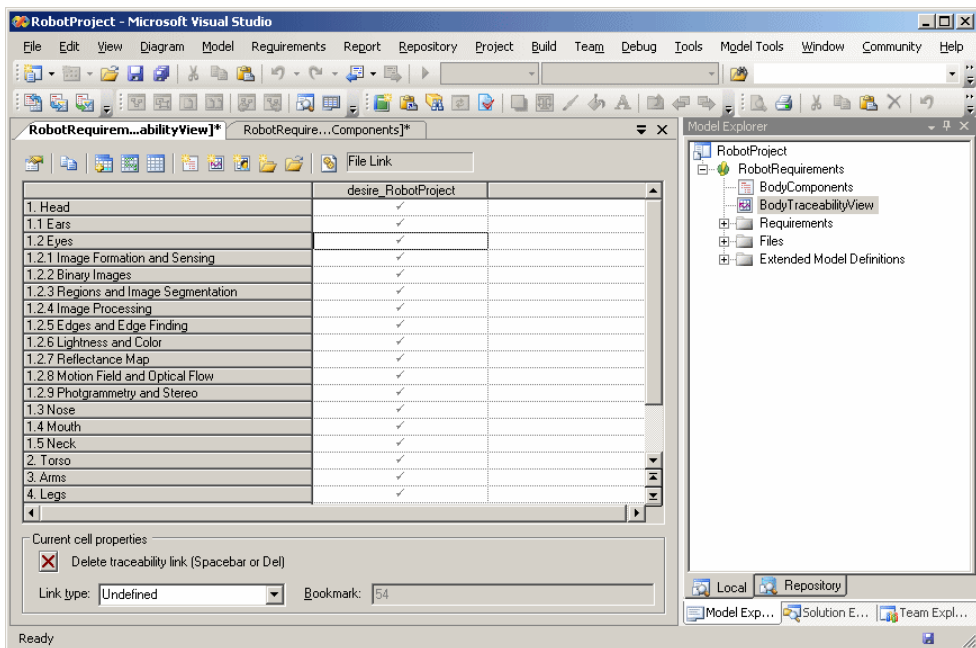
To navigate to a particular requirement work item (linked via a traceability link to an RQM requirement), right-click the requirement in an RQM document view, and select **Team Foundation > Work Item Properties** from the contextual menu:



## Creating a Traceability Links Matrix to Track Requirement Work Items

A Traceability Links Matrix View can list all the traceability links between your requirements and work items.

1. Select **Requirements > Create a Traceability Matrix View**.
2. In the Matrix View toolbar, click the Change Traceability Matrix Type tool, and then select the External files radio button in the dialog box.
3. Click OK. The Matrix View will display a column for each of the Team System projects to which you have exported requirements, with a check mark in the cell of each requirement that is linked to a work item by a traceability link:

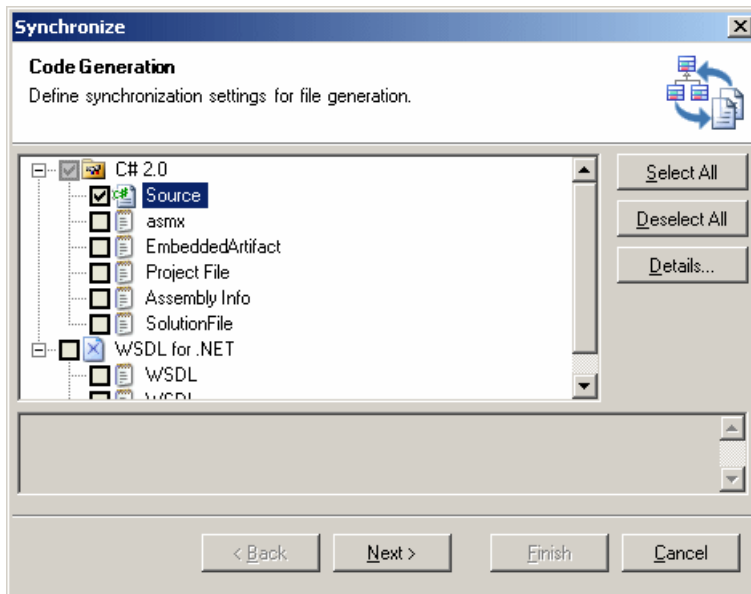


For more information about the Traceability Matrix View, see the *Requirements Modeling* guide.

You can also view the links to work items by opening the property sheet of a requirement and clicking the Traceability Links tab. Select the link and then click the Properties tool to go to the associated work item:



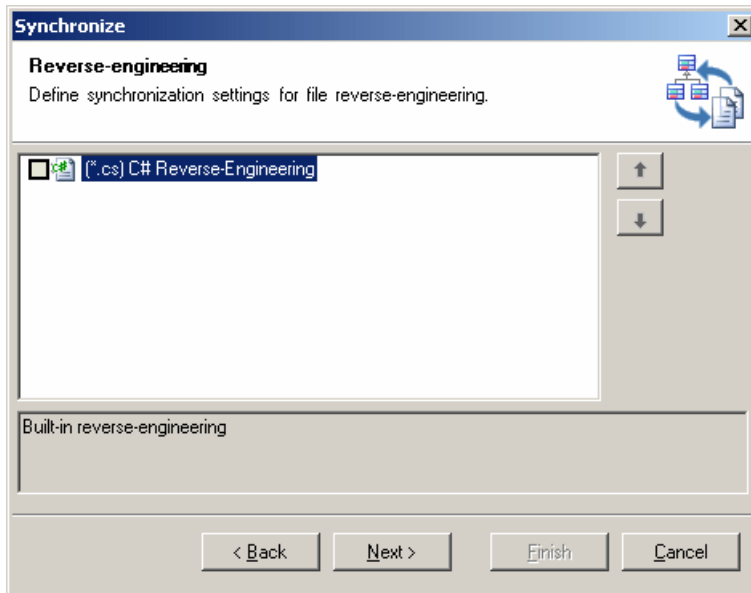
2. Select the model in the Solution Explorer, and then click the Synchronize tool in the toolbar (or Synchronize from the contextual menu) to open the Synchronize dialog at the Code Generation page:



3. This page allows you to specify file types that will be synchronized for forward generation (i.e. changes made to model objects will be cascaded down immediately to the code files). File types are organized by generation targets (C# 2.0 and WSDL for .NET in the screenshot above), and defined in the resource file or extended model definition for the target.

Select the file types that you want to synchronize for forward generation.

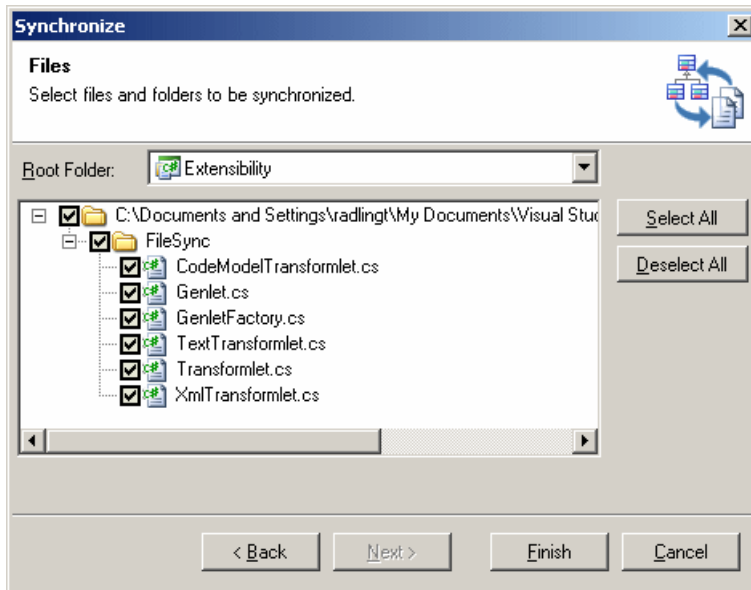
4. [optional] Select a file type and click the Details button to open the Generation Details dialog (see *Custom Generation Post-Processing with Genlets* on page 488 for more information):
5. Click Next to move to the Reverse-engineering page of the Synchronization dialog:



This page, which is available only for C# and Visual Basic projects only) allows you to specify file types that will be synchronized for reverse-engineering (i.e. changes made in the code files will be cascaded up immediately to the model objects).

Select the file types that you want to synchronize for reverse-engineering.

6. Click Next to move to the Files page of the Synchronization dialog:



This page allows you to specify the specific files that will be synchronized, and where they will be generated.

By default:

- If the model is located directly in a solution folder (outside of a project) or in a modeling project, the files are generated at the root of the solution, and project files are added as projects in the Solution Explorer.
- If the model belongs to any other project type, the files are generated by default at the root of the project, or in another folder within the project specified in the Root Folder field.

If there is the possibility of a conflict because both model object and file already exist, the file will not be selected to generate by default, and its checkbox will carry a small red cross. To force synchronization and specify who will have priority, click the checkbox and select Overwrite file or Overwrite model from the contextual menu. You can also click Select All select all the files for overwriting.

7. Select the files that you want to synchronize and click Finish.

The wizard generates and marks as synchronized all the specified files.

### **Controlling Synchronization**

Once you have synchronized your model and files, the synchronization tool and Synchronize/Unsyncronize contextual menu options become available for each file to permit you to disable or enable synchronization on a file-by-file basis.

Note that a record of the synchronization state of all the files in the solution is stored in a file with the name of the project or solution and the extension ".pdsync".

1. Select the file in the Solution Explorer. If the file is currently synchronized, the Synchronize tool is displayed as depressed in the Solution Explorer toolbar.
2. Click the Synchronize tool to change the state of the file. If the file was not previously synchronized, the Merge Model window will open to enable you to review the changes that synchronization will make.

## **Custom Generation Post-Processing with Genlets**

Model-code synchronization provides a powerful method for visualizing your code and providing a strong link between your source files and model objects. PowerDesigner genlets enable you to additionally automate post-generation transformations and handle complex merging of changes to your files.

Genlets are small .NET classes that can be automatically invoked by the synchronization process to perform transformations on the generated files.

There are two kinds of genlets:

- Transformlets – perform a transformation on a generated file. They allow you to define reusable cross-target policies to be applied to generated code. For example, you could use

transformlets to add a standard header and footer to every file or to ensure that every static field name begins with an underscore

You can chain multiple transformlets together to perform various steps in a transformation.

- Mergelets – are of use whenever a given file is being regenerated and the target content may change independently of the model. This may be the case with an XML document in which some sections are generated from a model and others are modified by another system or where standard code skeletons are generated and custom code is added inside the code editor.

In the case of source code, mergelets can be used to maximize readability by preserving order and formatting over multiple generation cycles, by comparing and merging elements at the code model level addresses this issue.

Although especially useful for languages that do not offer partial class support (facilitating the separation of generated and user code), code model mergelets may nonetheless be of use with the VB and C# programming languages. Only one mergelet may be used for each generation.

PowerDesigner provides C# templates for three forms of transformlets and mergelets:

- Text genlets– transform any text file
- Xml genlets - manipulate XML data via the System.Xml classes
- Code-model genlets - use VisualStudio parsers and the CodeModel API to traverse and transform source files

### Creating a Genlet

You create genlets in a C# or other .NET projects.

1. Right-click your project in the Solution Explorer and select **Add > New Item**.
2. In the Add New Item dialog, expand the PowerDesigner category and select the File Synclets item.
3. Choose a genlet type, specify a name, and then click OK to create the item. The editor opens to display the genlet template:

```

using System;
using System.Text;

using Sybase.PowerDesigner.VisualStudio.Extensibility.FileSync;

namespace Genlets
{
    /// <summary>
    ///
    /// </summary>
    [Genlet(DisplayName = "TextTransformlet1", Description = "")]
    class TextTransformlet1 : TextTransformlet
    {
        /// <summary>Implements the text transform</summary>
        /// <param name="text">input text</param>
        /// <returns>transformed text</returns>
        protected override string TextTransform(string text)
        {
            // TODO: implement your text transform here
            throw new NotImplementedException();
        }
    }
}

```

4. Enter your transformation code and save the file:

```

using System;
using System.Text;

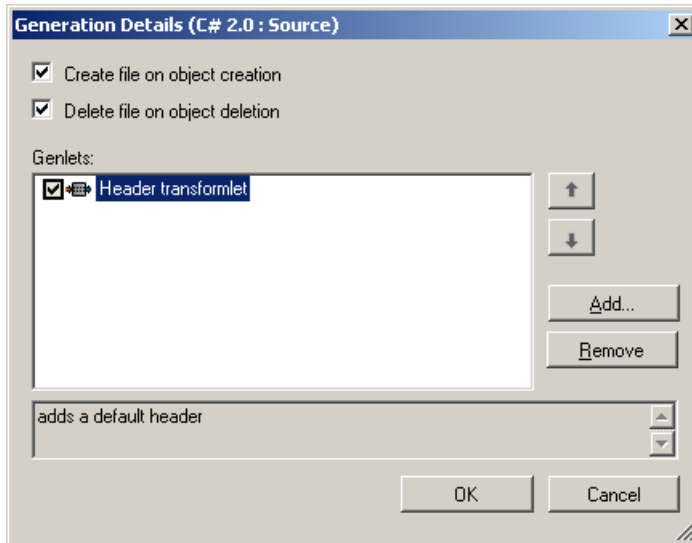
using Sybase.PowerDesigner.VisualStudio.Extensibility.FileSync;

namespace MyGenlets
{
    /// <summary>
    ///
    /// </summary>
    [Genlet(DisplayName = "Header Transformlet",
        Description = "Adds a default header ")]
    class TextTransformlet1 : TextTransformlet
    {
        /// <summary>Implements the text transform</summary>
        /// <param name="text">input text</param>
        /// <returns>transformed text</returns>
        protected override string TextTransform(string text)
        {
            string header = "// My Header\r\n";
            return header + text;
        }
    }
}

```

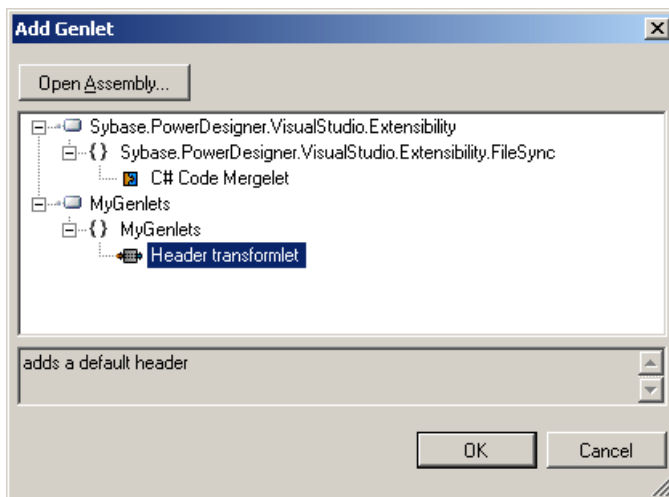
5. Right-click your model in the Solution Explorer and select Synchronize, to open the Synchronization wizard (see *Code Synchronization* on page 485).

- On the Code Generation page, select a file type (for example Source), and click the Details button to open the Generation Details dialog:



This dialog allows you to specify whether to synchronize object and file creation and deletion, and also to add any genlets.

- Click the Add button to open the Add Genlet dialog:



Select the genlet to add (or click the Open Assembly button to choose additional assemblies from which to select your genlets) and click OK to return to the Generation Details dialog, and then click OK again to return to the Synchronize dialog.

8. [optional] Select a transformlet and use the Up and Down arrows to change its position in the chain of genlets. Use the Remove button to remove the selected genlet.
9. Once you have completed the Synchronization wizard and generated your files, the transformation specified will have been applied to all the files of the specified type.

Note that changes to genlets are not automatically updated in synchronized files. When you change a genlet, you must then click the Refresh tool in order to force a synchronization.

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