



# Firebird Maestro

## **User's guide**

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# 1 Welcome to Firebird Maestro!

**Firebird Maestro** is the premier Windows GUI admin tool for Firebird development and management. It allows you to make all the database operations easy and fast.

## **Basic Firebird Maestro features**

### **Support of the latest Firebird features**

Use Firebird Maestro to work with Firebird from 1.0 to 5.0. Among other features and objects implemented in the latest versions of the server, our software supports indexes by expressions, sequences that were implemented in Firebird 2.0, boolean datatype and identity columns (Firebird 3.0), and a lot of other useful things.

### **Easy database management**

Firebird Maestro allows you to work with [remote servers](#)<sup>[14]</sup> with restricted access via SSH tunneling. Firebird Maestro allows you to create new databases and drop existing ones. Database profiles give you the opportunity to connect to databases in one touch and work with the selected databases only. See the [Database Management](#)<sup>[24]</sup> for details.

### **Powerful database object management**

Firebird Maestro provides you with an ability to manage database objects in various ways. For example, you can perform operations with a group of objects as well as with a single object in [Object Manager](#)<sup>[61]</sup>, sort, group and filter the database objects within [Object Browser](#)<sup>[60]</sup>, copy an object from one database to another by a drag-and-drop operation inside the explorer tree, use Windows clipboard to copy a set of objects and so on. For details turn to the [Database Object Management](#)<sup>[64]</sup> section.

### **Working with tables and table subobjects**

Firebird Maestro wizards and editors allow you to create, edit and drop tables as well as their *fields*, *indexes*, and *foreign keys* in a couple of simple operations. See the [Tables](#)<sup>[66]</sup> section to learn more.

### **Building and executing queries**

Firebird Maestro provides two powerful tools which allow you either to edit query text directly with syntax highlighting and code completion or to build a query diagram visually selecting tables and fields, setting links between tables and so on. You can find the detailed description in the [Queries](#)<sup>[149]</sup> section.

### **Powerful data management tools**

Firebird Maestro puts at your disposal a complete set of data management tools with viewing, editing, grouping, sorting and filtering abilities, lookup editors, master-detail data view, BLOB Viewer/Editor, data export, data import and SQL dump modules and more. See the [Data Management](#)<sup>[165]</sup> to learn the details.

### **Wide choice of additional tools**

Firebird Maestro provides you with a number of tools for working with database metadata and SQL scripts, including Script Runner, SQL Script Editor with code folding and script explorer. Moreover, it gives such tools as Schema Designer, BLOB Viewer, Diagram Viewer, Data Analysis, Dependency Tracker, SQL Generator, Report Designer, and a lot of others. To learn more, see the [Database Tools](#)<sup>[200]</sup> section.

**Security management**

Firebird Maestro gives you a comfortable access to Firebird security features.

**Firebird server maintenance**

Firebird server maintenance operations such as backup and restore database, shutdown database and bringing database online are easy and fast to perform in Firebird Maestro. Proceed to the [Server\\_Maintenance](#)<sup>[253]</sup> section for detailed information.

**Full customization according to your preferences and needs**

In Firebird Maestro you can customize the behavior of all its tools, select a user interface scheme and set a lot of other preferences. All the options and their meanings are listed within the [Options](#)<sup>[260]</sup> dialog description.

## 1.1 System Requirements

### Client environment

- Pentium PC or higher;
- Windows NT4/2000/XP/Vista/Windows 7/Windows 8/Windows 10/Windows 11;
- 512 MB RAM (1 GB recommended);
- 25 MB of free hard disk space;
- SVGA-compatible video adapter.

### Server environment

- Firebird from 1.0 to 5.0.

## 1.2 Installation

To install **Firebird Maestro** for the first time on your PC:

- download the Firebird Maestro distribution package from the [download page](#) at our site;
- run setup.exe from the local folder and follow the instructions of the installation wizard;
- find the Firebird Maestro shortcut in the corresponding program group of the Windows Start menu after the installation is completed.

To upgrade the installed copy of Firebird Maestro to the latest version:

- download the Firebird Maestro executable file from the [download page](#) at our site;
- unzip downloaded file to any local folder, e.g. *c:\unzipped*;
- exit from Firebird Maestro if it is running;
- replace previous version of Firebird Maestro by copying unzipped files to the Firebird Maestro folder;
- run Firebird Maestro using its shortcut in the Windows Start menu.

You can also use the full distribution package to upgrade your current version of Firebird Maestro. In this case you should repeat the steps of the first-time installation. Note that the full distribution package is larger than a single executable file.

## 1.3 How can I purchase Firebird Maestro?

Thank you for your interest in purchasing **Firebird Maestro!**

You can select licensing options and register Firebird Maestro at its [on-line order page](#). It is possible to purchase on-line, by fax, mail, toll-free phone call, or place a purchase order. We send the software activation key by email within 24 hours after completion of the order process. If you have not received the activation key within this period, please contact our [sales department](#).

All our products and bundles are shipped with 12 months of free upgrades (minor and major ones) or with 36 months of free upgrades for a quite small additional fee. After this period you may renew your license for the next 12(36) months with a 50% discount.

Firebird Maestro has a free 30-day trial. Upon purchasing the product you confirm that you have tested it and you are completely satisfied with its current version.

To obtain technical support, please visit the [appropriate section](#) on our website or contact us by email to [support@sqlmaestro.com](mailto:support@sqlmaestro.com).

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## 1.5 About SQL Maestro Group

**SQL Maestro Group** is a privately-held company producing high-quality software for database administrators and developers. The united team of eminently qualified developers is pleased to create new software products for commercial, academic and government customers worldwide. We do our best to design and develop products that remove complexity, improve productivity, compress time frames, and increase database performance and availability. We are glad to realize that our products take usual chores upon themselves, so that our customers could have more time left for their creative work.

The company was founded in 2002 as an essential partner for every business that is trying to harness the explosive growth in corporate data. SQL Maestro Group employs an international team concentrating their efforts on cutting-edge DBA tools development.

The slogan of our company is **The Shortest Path to SQL**. It is aimed to denote that we set to create easy-to-use products meant for those who appreciate comfort, friendly program interface and support when working with SQL servers.

- We are pleased to facilitate your job.
- We aim at being of considerable assistance to our clients.
- We feel contented doing our beloved work.

At present, our company offers a series of Windows GUI admin tools for SQL management, control and development of the following servers: **MySQL, Microsoft SQL Server, PostgreSQL, Oracle, SQL Anywhere, DB2, SQLite, Firebird, and MaxDB**. We also produce universal tools to be used for administering any database engine accessible via ODBC driver or OLE DB provider. Such products may be the clear-cut decision for those who constantly work with several database servers.

**SQL Maestro** is the premier Windows GUI admin tool for database development, management, and control.

It provides you with the ability to perform all the necessary database operations such as creating, editing, copying, extracting and dropping database objects; moreover, you can build queries visually, execute queries and SQL scripts, view and edit data including BLOBs, represent data as diagrams, export and import data to/from most popular file formats, manage users and their privileges (if possible), and use a lot of other tools designed for making your work with your server comfortable and efficient.



**SQL PHP Generator** is a powerful tool for creating database-driven web applications visually. It allows you to generate high-quality PHP scripts for working with tables, views and queries through the web. You needn't have any programming background to use it.



**SQL Data Wizard** is a high-capacity Windows GUI utility for managing your data.

It provides you with a number of easy-to-use wizards for performing the required data manipulation easily and quickly. The tool allows you to export data from Firebird tables and queries to most popular formats, import data into the tables, generate SQL dump of selected tables, and export/import BLOB fields from/to files.



**SQL Code Factory** is a premier GUI tool aimed at the SQL queries and scripts development.

It allows you to manage SQL queries and scripts using such useful features as code folding, code completion and syntax highlighting, build query visually, execute several queries at a time, execute scripts from files, view and edit result data with filtering, sorting and grouping abilities, export data to as many as 14 file formats including Excel, RTF and HTML, import data from Excel, CSV, XML and text files, view and edit BLOBs in various way, build diagrams based on Oracle data, and much more.



**Database Converter** is a user friendly tool to migrate any local or remote ADO-compatible database to Firebird.

Such tools transfer database schema and data and are equipped with native support for the most popular database servers.



**Data Sync** is a powerful and easy-to-use tool for database contents comparison and synchronization.

Such tools can be useful for database administrators, developers and testers that need a quick, easy and reliable way to compare and synchronize their data.



The software products are constantly optimized for the latest server versions support.

You can use the following contact information if necessary:

Our web-site [www.sqlmaestro.com](http://www.sqlmaestro.com)

Postal address: **SQL Maestro Group**  
140 Broadway, Suite 706  
New York City, New York 10005  
United States

**Thank you for your interest to our company!**

## 1.6 What's new

Please find out the latest Firebird Maestro news at <http://www.sqlmaestro.com/products/firebird/maestro/news/>

## 2 Getting Started

The topics in this section provide some basic information about Firebird Maestro, what it is for and what you can do with it.

### How to get started:

- [Connect to a database with Firebird Maestro](#) <sup>[13]</sup>
- [Explaining user interface](#) <sup>[17]</sup>
- [How Firebird Maestro looks when you start it for the first time](#) <sup>[18]</sup>
- [Shortcut keys](#) <sup>[23]</sup>

### Learning more:

- ❑ Study the [Overview of Database Object Management](#) <sup>[39]</sup> section for detailed instructions on using Firebird Maestro.
- ❑ See [Database Tools](#) <sup>[200]</sup> and [Queries](#) <sup>[149]</sup> sections for instructions on more advanced procedures!
- ❑ Find out more about [Working with Data in Firebird Maestro](#) <sup>[165]</sup>.
- ❑ Customize the way Firebird Maestro works, see [Program Options](#) <sup>[260]</sup> for full details.

## 2.1 Connect to a database

To manage an existing database with Firebird Maestro, you have to [create the according database profile](#)<sup>[26]</sup> first. A profile stores database connection settings, and some additional options to customize the way the software works with the database. After the creation database profiles appear as nodes in the Explorer tree on the left (profile properties can be later changed with [Database Profile Editor](#)<sup>[29]</sup>).

When the profile is created you can connect to the database. To do so, select the database in the [Explorer tree](#)<sup>[36]</sup>, or either select the [Database | Connect to Database](#) main menu item or use the [Connect to Database](#) item of the popup menu. You can also double click the database node in the explorer tree. If connection succeeds, the database node expands displaying the tree of database objects (tables, views, procedures, etc). The database becomes ready for your activities.

### How can I disconnect from a database?

In order to disconnect from a database you should first select the database in the explorer tree, then either

- select the [Database | Disconnect from Database](#) main menu item
- or
- use the [Disconnect from Database](#) item of the popup menu.

See also: [Connection parameters](#)<sup>[14]</sup>

## 2.2 Connection parameters

Firebird Maestro allows you to connect to Firebird servers directly or via Secure SHell (SSH) tunnel.

- **Direct connection**

Direct connection is the most preferable connection mode.

- **SSH tunnel connection**

If your Firebird server does not allow direct connections from remote workstations, you can establish connection to intermediate SSH server and forward all Firebird commands through the [Secure SHell \(SSH\) tunnel](#).

Irrespectively of a connection mode you should specify common credentials as follows:

### Protocol

Select "Standard server" to connect to a local or remote standalone Firebird server or "Embedded server 2.5-" / "Embedded server 3.0+" to use the embedded Firebird servers that come with the software (2.5 and 3.0 accordingly).

### Host

The name of machine the Firebird server and database file resides on. It is usually possible to specify TCP/IP address instead of name (like 192.168.12.34), however this functionality is not built into Firebird, instead, it is provided by underlying network layer (e.g. WinSock2), and for some implementations/configurations it can be much slower than using name. In case the server is not localhost, specify the TCP/IP port as [Port number](#).

### Login information

Since Firebird 2.1, Windows authentication has been used for configuring the server authentication mode along with the traditional login info, requiring users to log in using a user name and password defined in the security database. To use [Windows authentication](#), check the corresponding box. Under the right conditions, this may be the most secure way to authenticate on Windows. Otherwise, set the following server security options:

**User name** The username used to connect to Firebird. User names are case insensitive on the server.

**Password** The password for the user account on server. The server checks the user name and password against the security database. Case sensitivity is retained for the comparison. Only first 8 characters of Password are verified.

**Role** Specify the role that the user adopts on connection to the database or leave it blank. Regardless of role memberships granted, the user has the privileges of a role at connect time only if a [Role](#) clause is specified in the connection. The user must have previously been granted membership in the role to gain the privileges of that role.

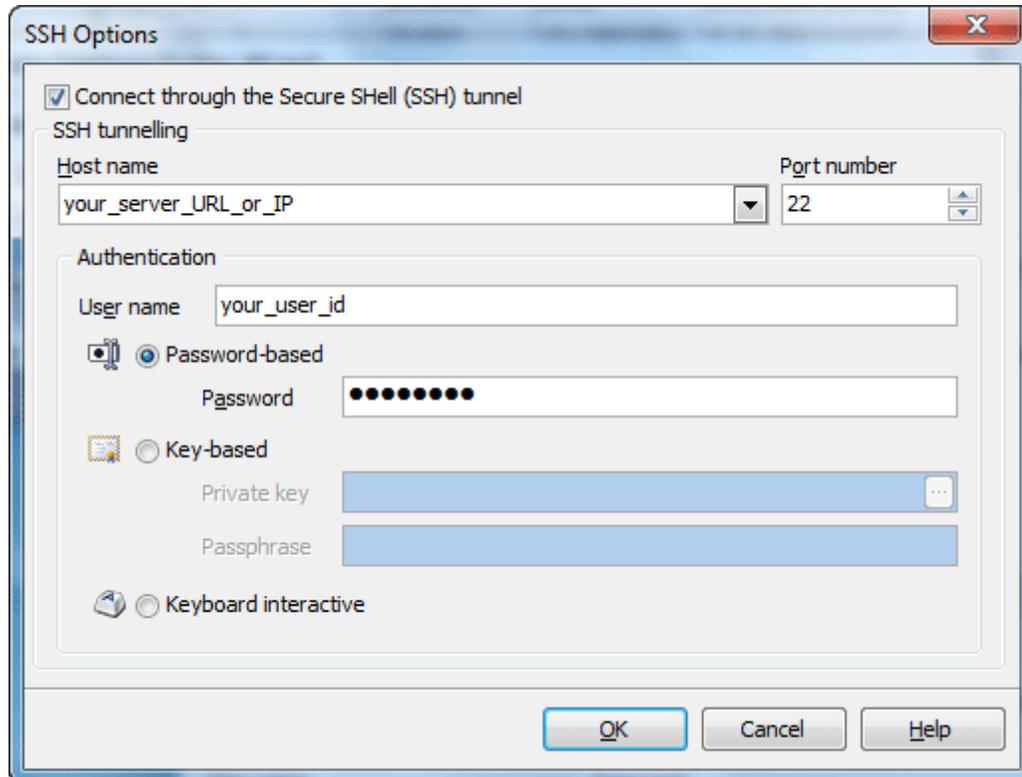
### Database name

This is either a full name of the database file (as seen from the server), or an alias defined in the server's [aliases.conf](#) file.

### More about SSH tunnel connection

To establish connection to intermediate SSH server and forward all Firebird commands through the secure tunnel, you need to:

1. Check [I can connect to the server directly or via SSH tunneling](#).
2. Follow the [Configure SSH options](#) link to open the SSH Options window.



3. Check [Connect through the Secure Shell \(SSH\) tunnel](#) and complete the following fields:

#### Host name

Specify the host name or IP of your site. Note, that Firebird host name always should be set relatively to the SSH server. For example, if both of Firebird and SSH servers are located on the same computer, you should specify localhost as Host name instead of server's external host name or IP address.

#### Port number

Enter the port number for the SSH server.

4. Enter valid [User name](#) for the remote server and select the [Authentication](#) method and set corresponding credentials.

#### Password-based

Set the [password](#) corresponding to the specified user.

### Key-based

Specify the path to the [Private key](#) file with the corresponding [Passphrase](#) to log in to the remote server. Firebird Maestro accepts keys in **ssh.com** or **OpenSSH** formats. To convert a private key from PuTTY's format to one of the formats supported by our software, [use the PuTTYgen utility](#) that can be freely downloaded from the [PuTTY website](#).

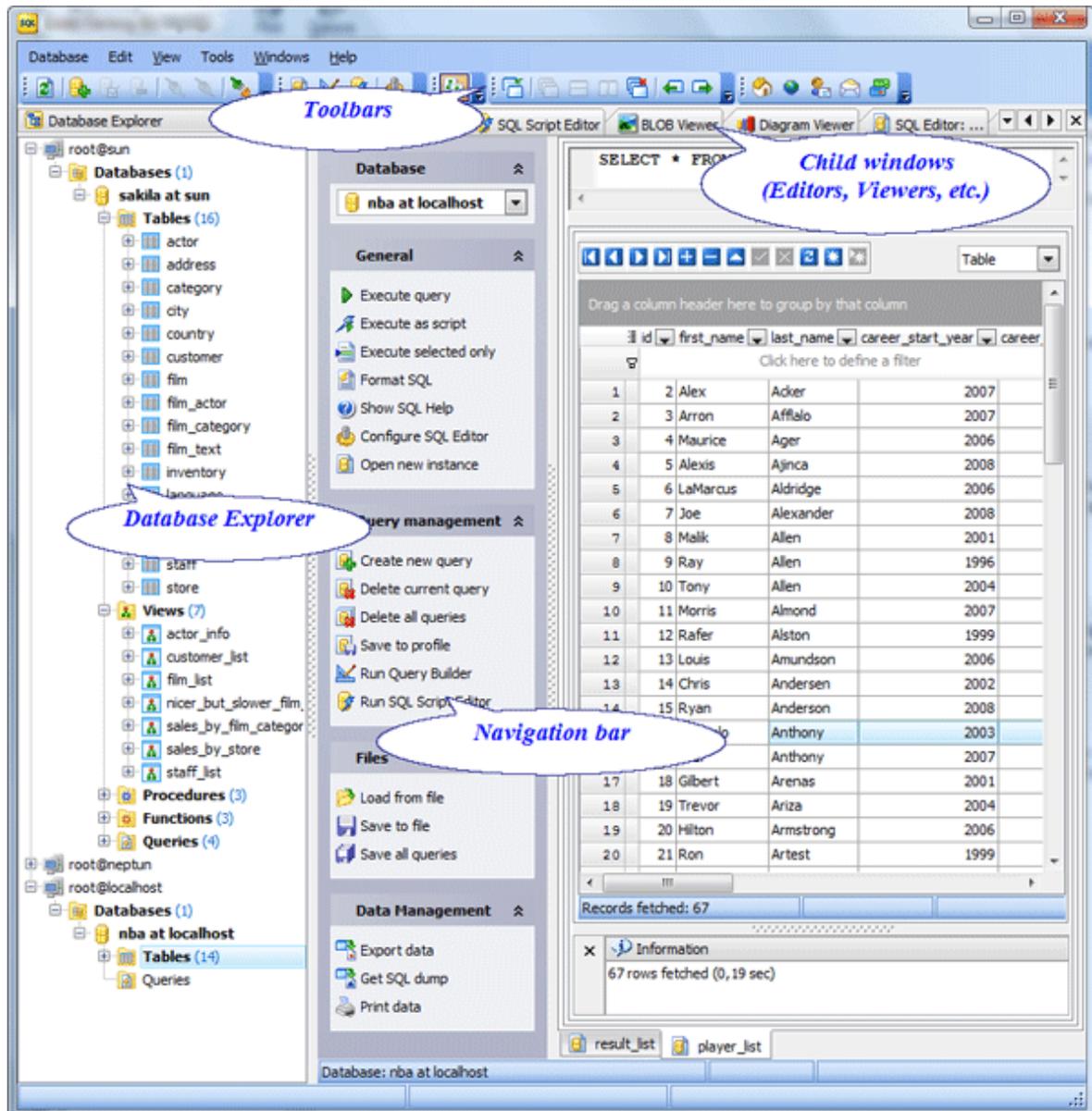
### Keyboard interactive

Keyboard authentication is the advanced form of password authentication, aimed specifically at the human operator as a client. During keyboard authentication zero or more prompts (questions) is presented to the user. The user should give the answer to each prompt (question). The number and contents of the questions are virtually not limited, so certain types of automated logins are also possible.

## 2.3 Explaining user interface

The SQL Maestro Group products are famous for their clear and intuitive user interface. The programs are built around the three-pane workspace that includes the [database explorer](#) and child windows consisting of the [navigation bar](#) and [work area](#).

This topic provides a brief guide to the components of Firebird Maestro's user interface. For detailed descriptions, see below.



### Database Explorer

The [Database Explorer](#)<sup>[36]</sup> occupies the left side of Firebird Maestro main window. It represents all the connected databases objects [including system objects](#)<sup>[30]</sup>.

The explorer provides the fastest way to reach the object properties, to perform the following operations with database profiles using the popup menu:

- create new objects (database profiles, database objects, table objects...);
- edit currently selected objects;
- remove currently selected objects from the explorer tree;
- duplicate objects;
- rename objects if available and edit object comments out of the object editor.

See also: [Filtering explorer content](#)<sup>[59]</sup>

## Editors and Viewers

According to the MDI style implementation the Firebird Maestro tools and editors are opened in appropriate windows. Each window consists of a navigation bar and work area. The software supports Classic and Tabbed MDI.

See also: [Switching between windows](#)<sup>[21]</sup>, [Tabbed MDI](#)<sup>[19]</sup>

## Navigation bar

The [Navigation Bar](#) contains a set of logically grouped links provided to realize the corresponding actions. Just position the mouse over a link and wait for a second to display the appropriate action shortcut making it possible for experienced users to control the program almost entirely with the keyboard.

See also: [Shortcut keys](#)<sup>[23]</sup>

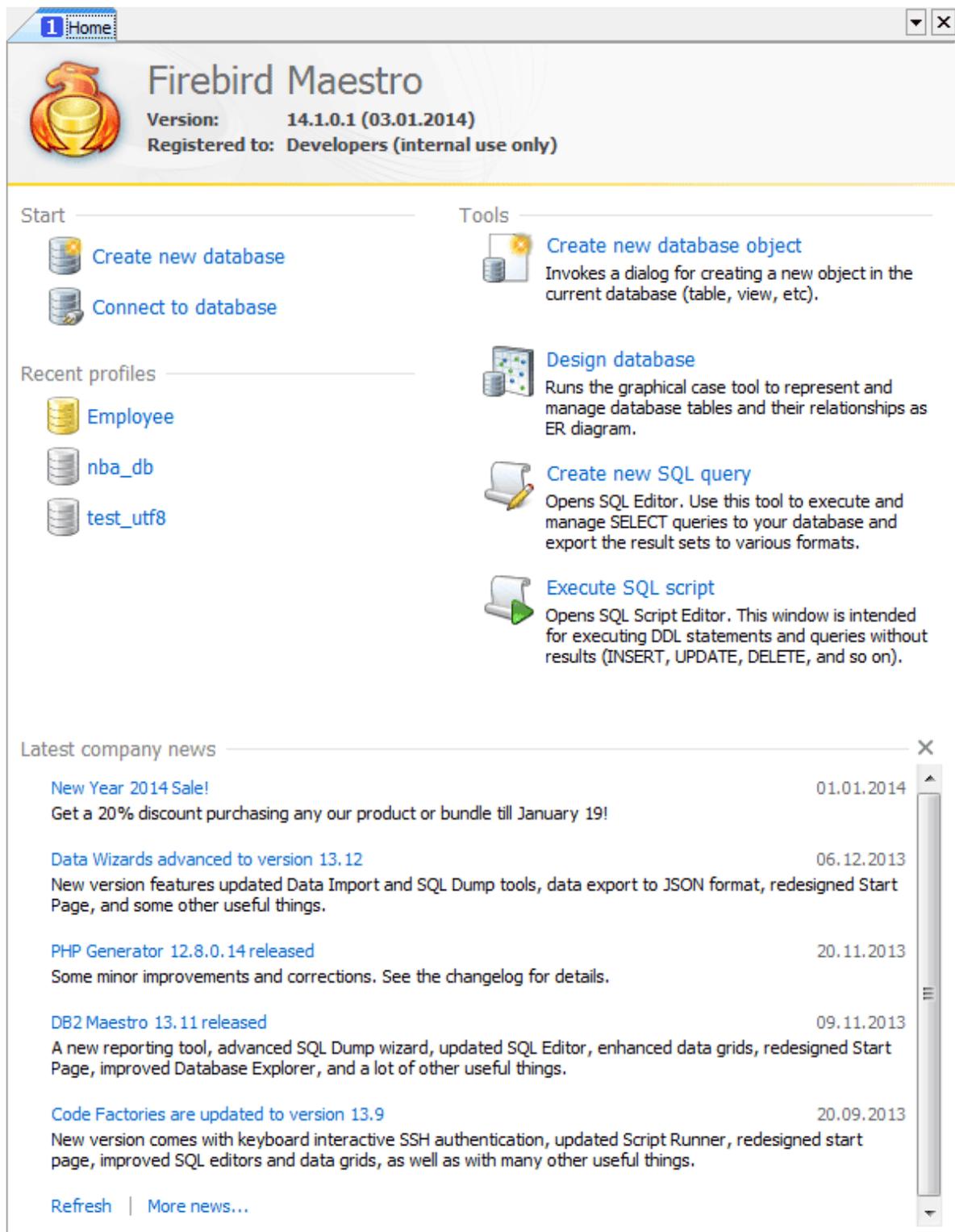
## Toolbars

The bars occupy the top of the main window. The [Toolbars](#) provide quick access to the most frequently-used functions. Just position the mouse over a tool and wait for a second to display a brief text describing what it is for.

### 2.3.1 First time started

This is how Firebird Maestro looks when you run it for the first time. The [Create new database](#)<sup>[36]</sup> and [Connect to database](#)<sup>[26]</sup> links allow you to start working with a new and existing databases.

The window provides you with quick access to the [Create Database Object](#)<sup>[40]</sup> dialog, [Schema Designer](#)<sup>[233]</sup>, [SQL Editor](#)<sup>[151]</sup>, and [SQL Script Editor](#)<sup>[202]</sup> recently used database profiles. At the bottom of the page the latest company news and current discount programs are represented.



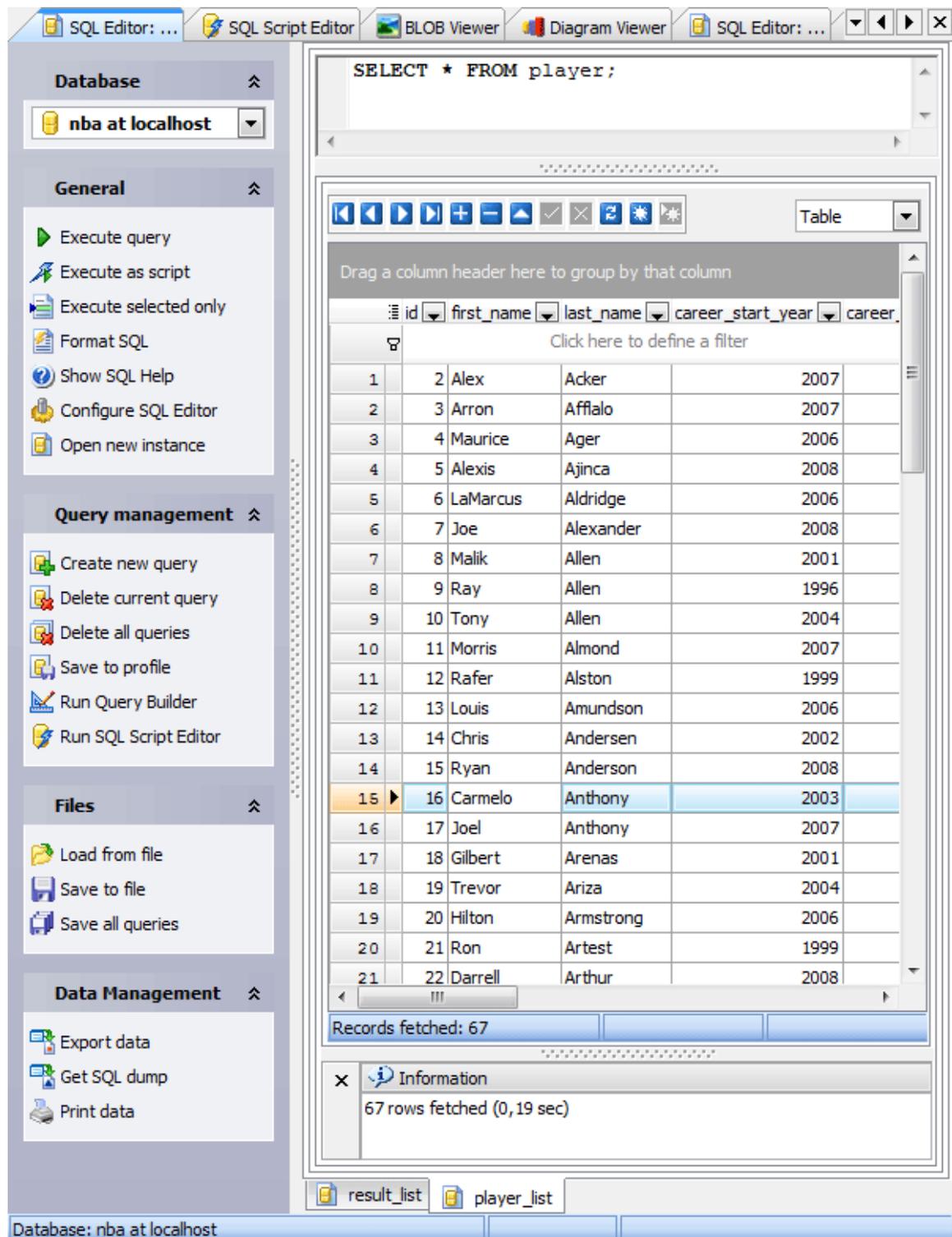
### 2.3.2 Tabbed MDI

Firebird Maestro provides you with a possibility to choose (Options|Application) your favorite UI. Among the **classic MDI style** the **tabbed MDI style** is also available.

---

Applying the style you'll get all the objects editors opening on separate sheets. You can move from one sheet to another by clicking the sheet tabs at the bottom of the working area. The tab for the active sheet is underlined in the color you choose; tabs for inactive sheets are fully colored.

You can switch between the sheets with corresponding sheet tabs or using **Ctrl+Tab**. If you don't see the tool you want, click the tab scrolling buttons to display the tab, and then click the tab. You can also move the sheets.

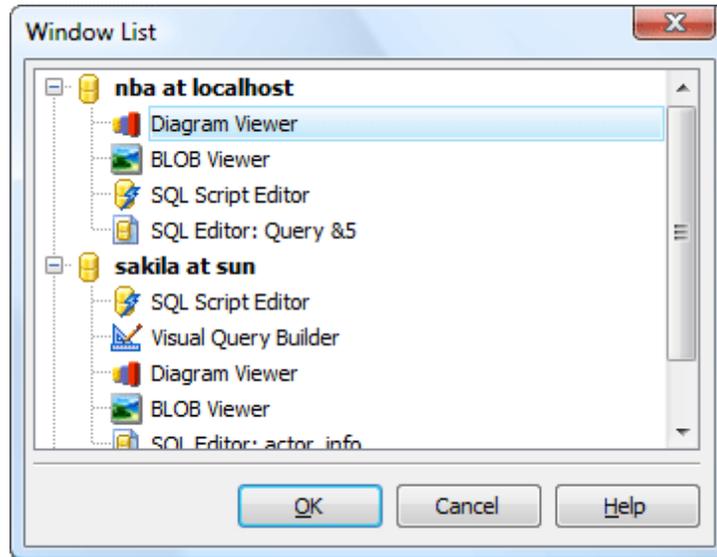


### 2.3.3 Switching between windows

The [Window List](#) dialog allows you to switch the child application windows quickly. To open the dialog select the [Windows | Window List...](#) item of the main menu or use the

**Alt+O** hot keys combination.

Most of the windows are linked according to their active databases and displayed in the form of a tree, e.g. [Table Editor](#), [SQL Editor](#), [Diagram Viewer](#), etc. Windows which are common for the entire program are shown as separate nodes of the tree.



To activate the window you need, select one of the window tree items and click the **OK** button.

## 2.4 Shortcut keys

The following table describes the default shortcut keys in Firebird Maestro.

<b>Interface</b> <sup>17</sup>	
Window list	<b>Alt+O</b>
Previous Window	<b>F6</b>
Next Window	<b>Ctrl+F6</b>
Show Database Explorer	<b>F11</b>
Refresh	<b>F5</b>
Exit	<b>Alt+F4</b>
Firebird Maestro help	<b>F1</b>
<b>Clipboard</b>	
Cut	<b>Ctrl+X</b>
Copy	<b>Ctrl+C</b>
Paste	<b>Ctrl+V</b>
Select all	<b>Ctrl+A</b>
Find	<b>Ctrl+F</b>
Replace	<b>Ctrl+H</b>
Search again	<b>F3</b>
Undo	<b>Ctrl+Z</b>
Redo	<b>Shift+Ctrl+Z</b>
<b>SQL Editors</b> <sup>15f</sup>	
Open SQL Editor	<b>Ctrl+E</b>
Open SQL Script Editor	<b>Ctrl+R</b>
Open Visual Query Builder	<b>Ctrl+Q</b>
Execute query	<b>(F9) or (F8)</b>
Execute query as script	<b>(Shift+F9) or (Shift+F8)</b>
Execute selected only	<b>(Alt+F9) or (Alt +F8)</b>
Go to line	<b>Ctrl+G</b>
Format selected SQL	<b>Ctrl+Alt+F</b>
Create new query	<b>Ctrl+N</b>
Delete current query	<b>Ctrl+Alt+D</b>
Load script from file	<b>Ctrl+O</b>
<b>Database management</b> <sup>24</sup>	
Create a new database profile	<b>Shift+Ctrl+P</b>
Edit an existing database profile	<b>Shift+Ctrl+E</b>
Rename a database profile (object)	<b>F2</b>
Remove database profile	<b>Shift+Ctrl+R</b>
Connect to the database	<b>Shift+Ctrl+C</b>
Disconnect from the database	<b>Shift+Ctrl+D</b>
Create a database object	<b>Shift+Ctrl+N</b>
Object Browser	<b>Shift+Ctrl+O</b>
Open BLOB Viewer	<b>Ctrl+B</b>

### 3 Databases and Database Profiles

Firebird Maestro allows you to manipulate databases by means of database profiles. Profile contains database connection settings and a set of options to automatize common manipulations with databases (a possibility to connect to the database at Firebird Maestro startup, login prompt before connection, etc.). To start working with databases in Firebird Maestro, you should create database profile(s) first.

Use the following links for details:

#### ■ **How can I create a new database?**

Use for this purpose [Create Database Wizard](#)<sup>[38]</sup>. In order to run the wizard you should either

- select the Database | Create New Database... main menu item
- or
- use the Create New Database... item of the popup menu.

Using Create Database Wizard set the Create profile after creating the database option to create a new profile and open the Database Profile Properties dialog after the database is created.

#### ■ **How can I change attributes of an existing database?**

To edit a database:

- select the database to edit in the explorer tree;
- edit database properties within the appropriate tabs of [Database Editor](#)<sup>[38]</sup>.

#### ■ **How can I drop an existing database?**

In order to drop a database you should first select the database to drop in the explorer tree and establish connection (if you are not connected to the database yet), then either

- select the Database | Drop Database main menu item
- or
- use the Drop Database item of the popup menu

and confirm dropping in the dialog window to complete the operation.

#### ■ **How can I create new database profiles?**

In Firebird Maestro database profiles are created within [Create Database Profiles Wizard](#)<sup>[38]</sup>. In order to run the wizard you should either

- select the [Database | Create Database Profiles...](#) main menu item
- or
- use the [Create Database Profiles...](#) item of the popup menu.

Using [Create Database Profiles Wizard](#) set the necessary connection and authorization options and click the [Ready](#) button to complete the operation.

#### ■ **How can I edit existing database profile options?**

Database connection properties and profile options are edited within the [Database Profile Properties](#)<sup>[28]</sup> dialog window. In order to open the dialog for the selected database profile you should either

- select the [Database | Edit Database Profile...](#) main menu item
- or
- use the [Edit Database Profile...](#) item of the popup menu.

#### ■ **How can I remove database profiles?**

In order to remove a database profile you should first select the database profile in the explorer tree, then either select the [Database | Remove Database Profile](#) main menu item, or use the [Remove Database Profile](#) item of the popup menu and confirm removing profile in the dialog window to complete the operation.

#### ■ **How can I connect to a database?**

In order to connect to a database you should first select the database in the explorer tree, then either

- select the [Database | Connect to Database](#) main menu item
- or
- use the [Connect to Database](#) item of the popup menu.

#### ■ **How can I disconnect from a database?**

In order to disconnect from a database you should first select the database in the explorer tree, then either

- select the [Database | Disconnect from Database](#) main menu item
- or
- use the [Disconnect from Database](#) item of the popup menu.

## 3.1 Creating Database Profiles

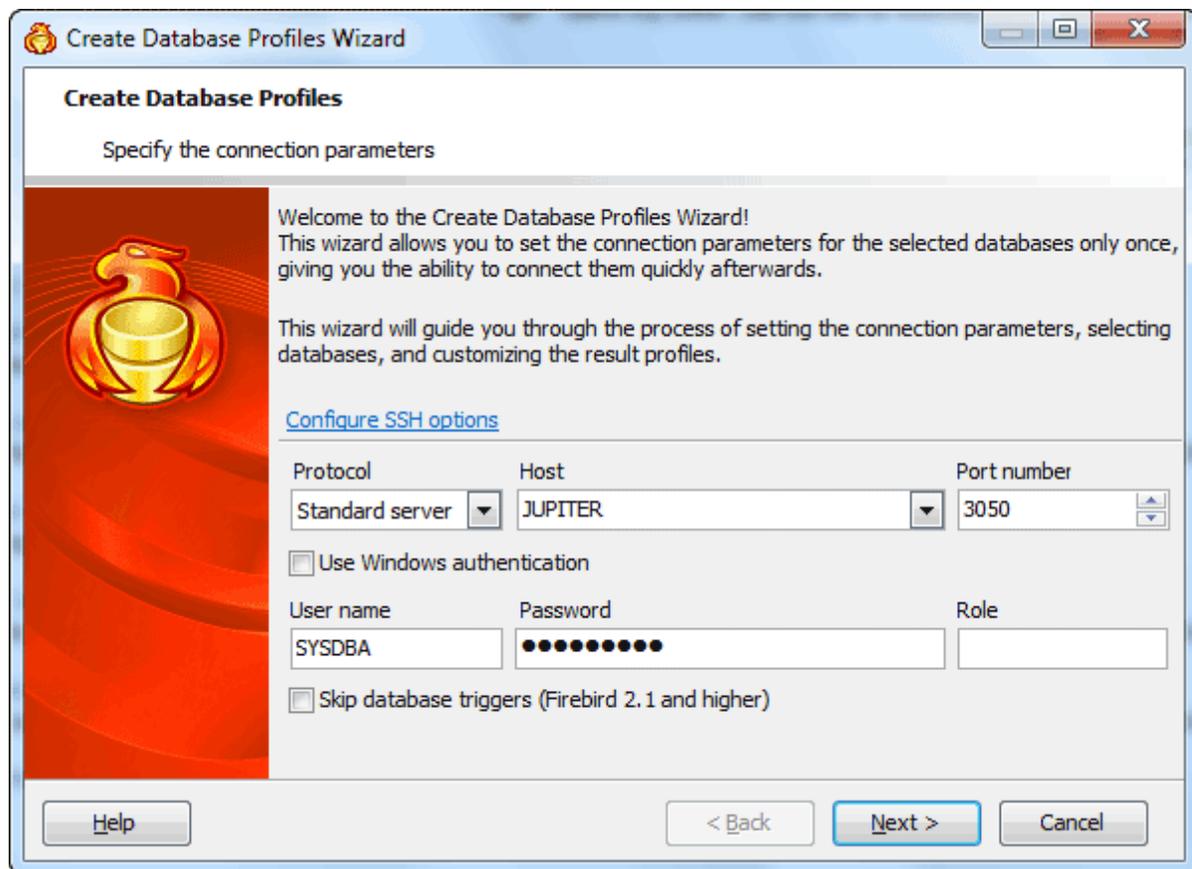
Create Database Profiles Wizard allows you to create a single database profile or several profiles from one host. To run the wizard, select the [Database | Create Database Profiles...](#) main menu item, or press the **Shift+Ctrl+P** hot keys combination. You can also use the [Create Database Profiles](#) button of the main toolbar.

- [Set connection properties](#)<sup>[26]</sup>
- [Specify database profile options](#)<sup>[26]</sup>

**See also:** [Edit Database Profile Dialog](#)<sup>[29]</sup>

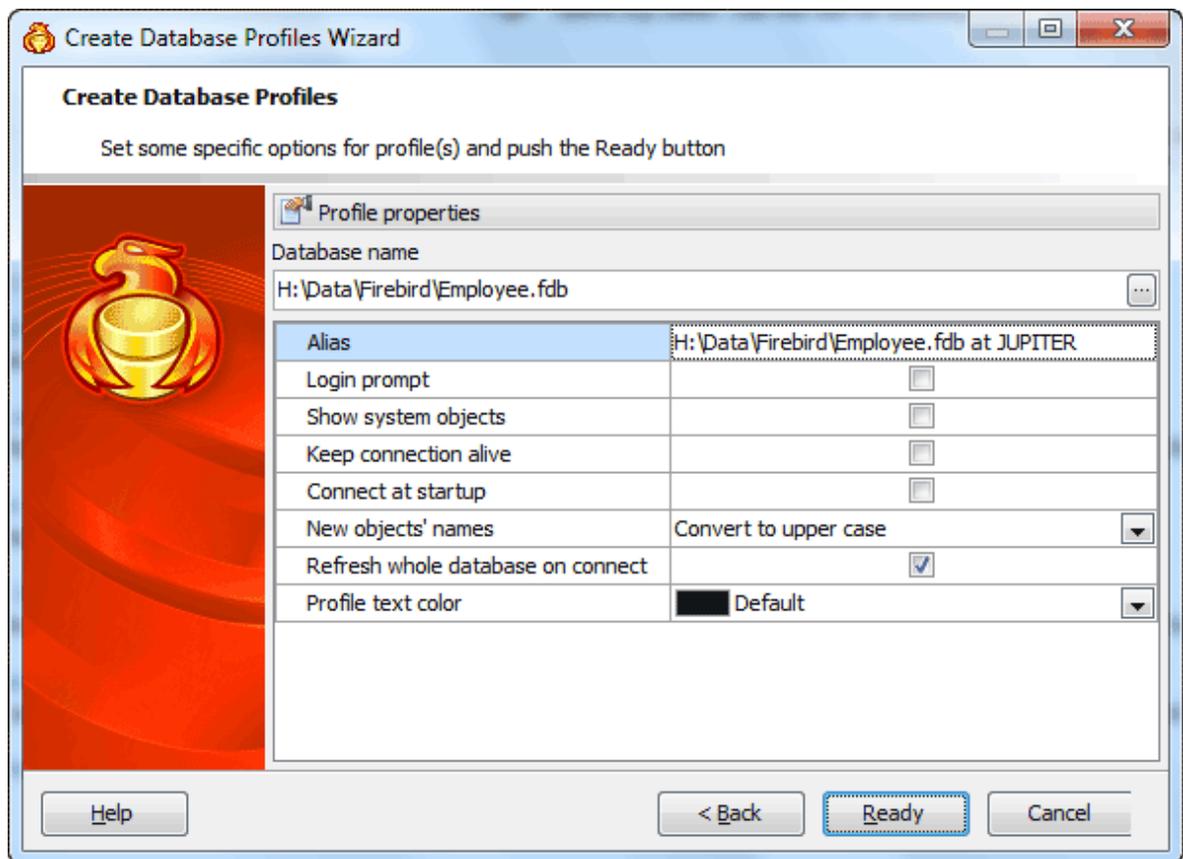
### 3.1.1 Setting connection properties

Specify Firebird [connection properties](#)<sup>[14]</sup> to be used on further connections.



### 3.1.2 Setting profile options

To create a new profile, set the database name you want to connect.



**Login prompt before connection**

Use the option to enable Firebird Maestro to prompt for user name and password every time you connect to the database.

**Show system objects**

Check the box to make system objects visible.

**Keep connection alive**

Check the box for pinging server before each query execution.

**Connect at startup**

With this option on connection to the profile database is automatically established at the application startup.

**New objects' names (Don't change case, Convert to upper case, Convert to lower case)**  
The option allows you to specify the newly created objects case.

**Refresh whole database on connect**

Use the option along with the **Show empty schemas** explorer options to hide/show empty schemas in the explorer tree.

**Profile text color**

Select the color to be used to represent the database profile name at the Explorer tree. For example this option may be useful to mark development and production databases in different colors in order to prevent casual metadata or data changes in the production.

---

Click the [Ready](#) button when done to start working with the selected databases in Firebird Maestro.

## 3.2 Editing Database Profile

Use the [Edit Database Profile](#) dialog to edit the profile properties set on its creation. To open the dialog, select the database in the explorer tree, then select the [Database | Edit Database Profile...](#) main menu item or press the **Shift+Ctrl+E** hot key combination. You can also use the [Edit Database Profile](#) button of the main toolbar.

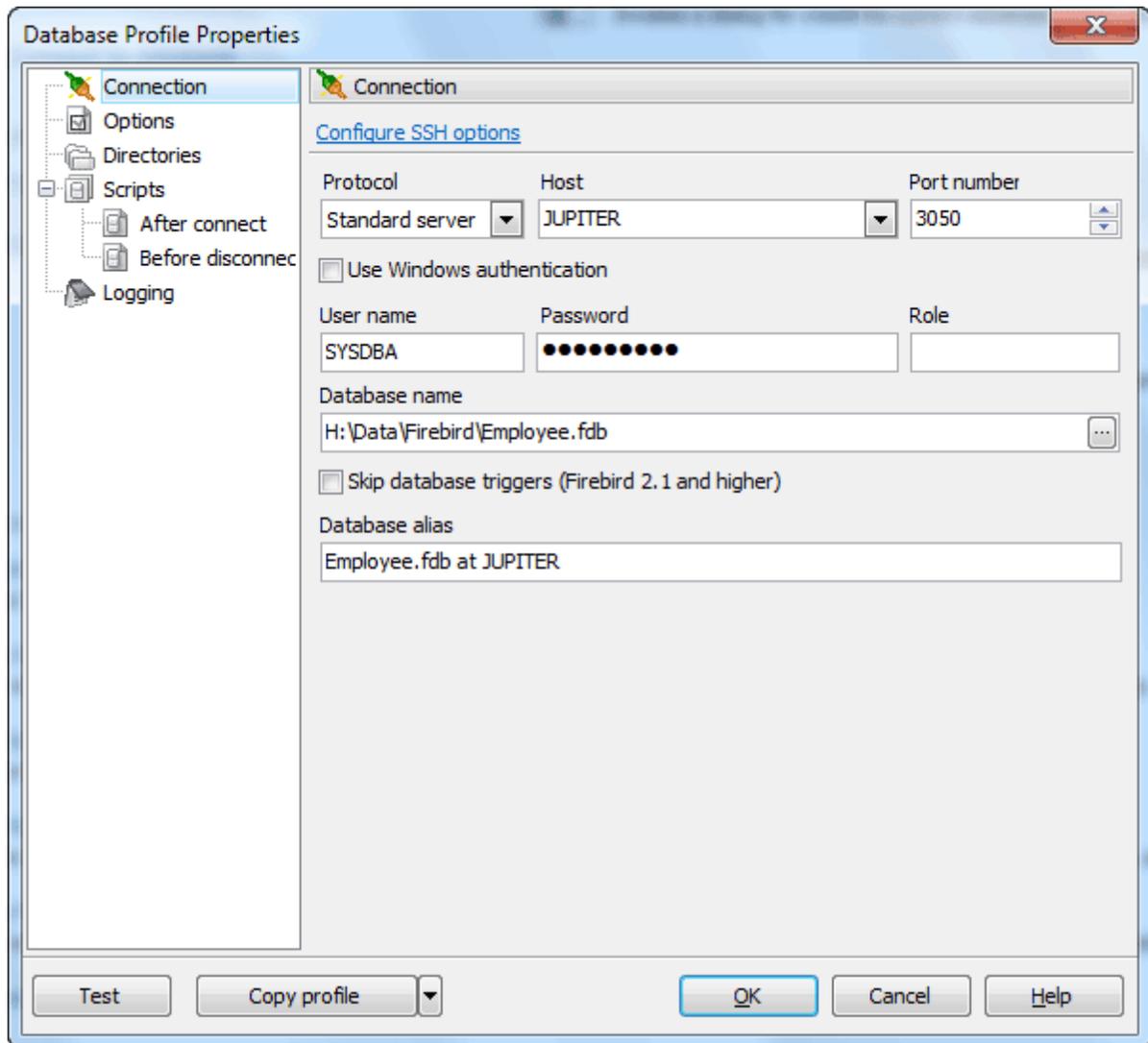
Instead of manual profile options editing you can copy all the options from the another existing profile with the [Copy profile](#) button.

- [Editing database connection properties](#) <sup>[29]</sup>
- [Settings database options](#) <sup>[30]</sup>
- [Setting default directories for database tools](#) <sup>[32]</sup>
- [Editing obligatory scripts to execute](#) <sup>[32]</sup>
- [Setting log options and file names](#) <sup>[33]</sup>

**See also:** [Create Database Profile Wizard](#) <sup>[26]</sup>

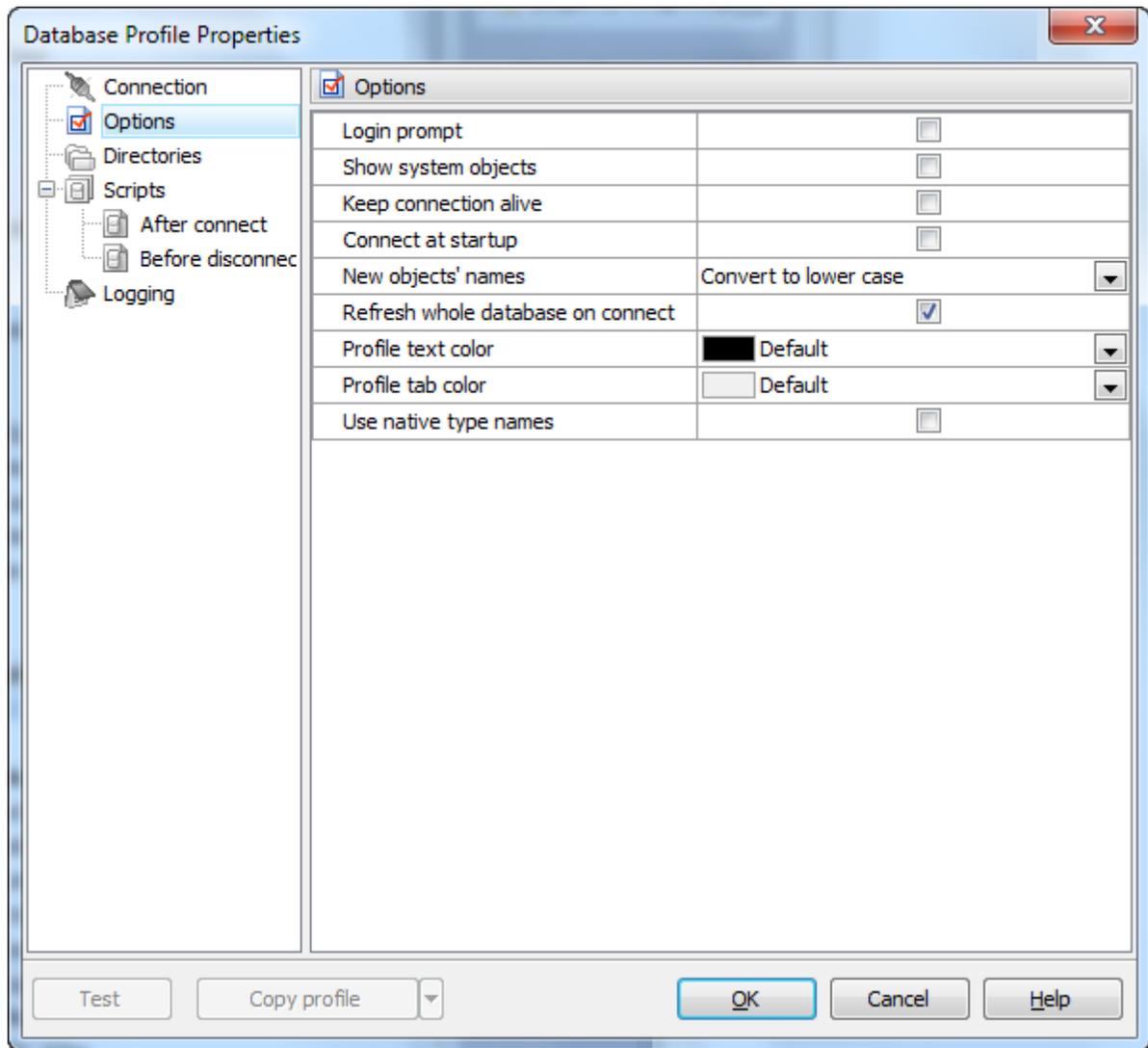
### 3.2.1 Editing connection properties

The tab allows you to change [connection properties](#) <sup>[14]</sup> of an existing database profile. Here you can change the database group, database info and edit the database alias, an optional name to display the database in the Explorer tree and in all the application tools.



### 3.2.2 Setting profile options

Customize database options according to your needs. The detailed description is given below.



Login prompt

Use the option to enable Firebird Maestro to prompt for user name and password every time you connect to the database.

Show system objects

Check the option to make system objects visible.

Keep connection alive

Check the box for pinging server before each query execution.

Connect at startup

With this option on connection to the profile database is automatically established at the application startup.

**New objects' names (Don't change case, Convert to upper case, Convert to lower case)**

Use the option to change the case for newly created objects.

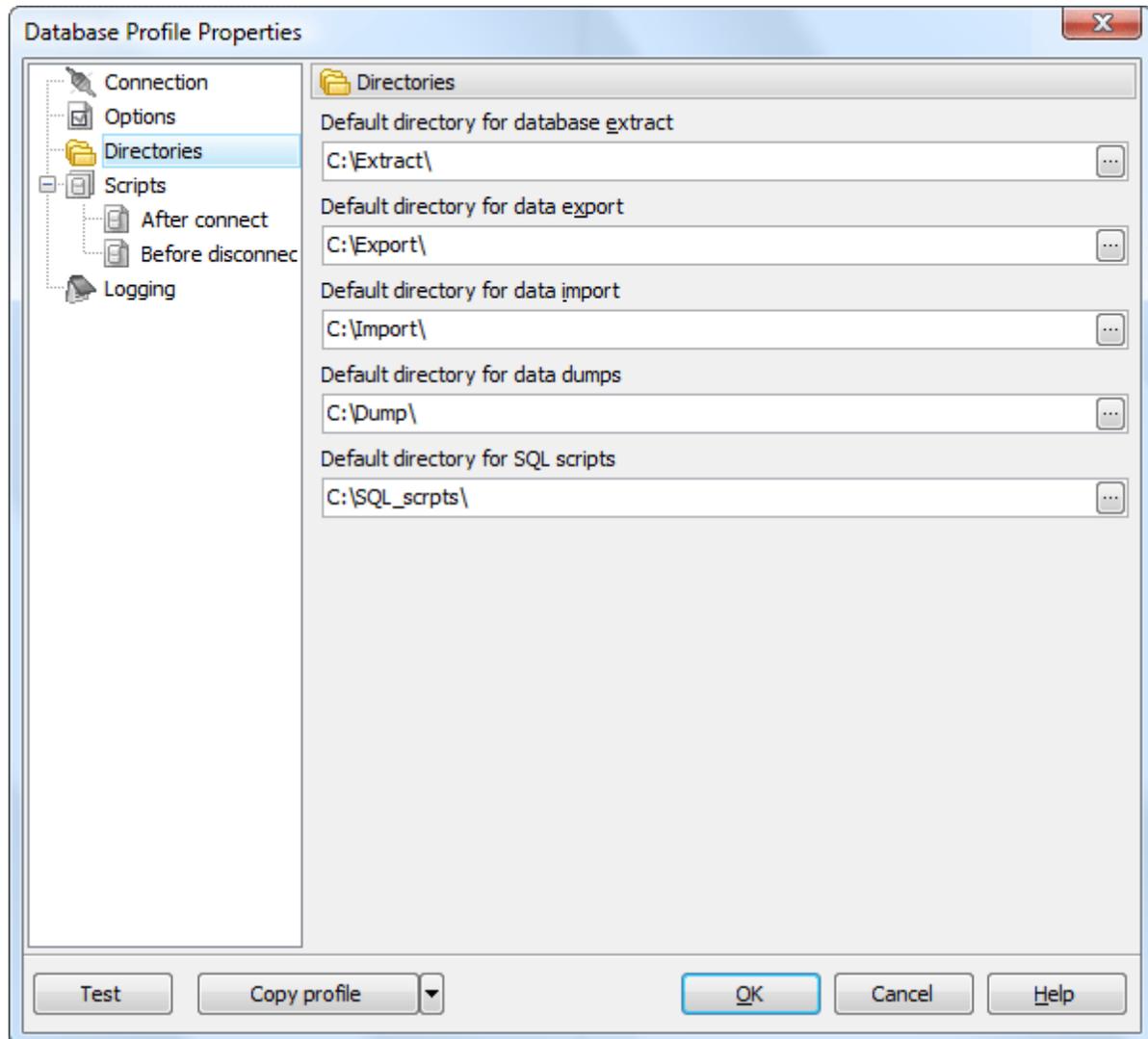
Refresh whole database on connect

Use the option along with the [Show empty schemas](#)<sup>266</sup> explorer options to hide/show empty schemas in the explorer tree.

You can also change here the font color the profile name is represented at the Explorer tree.

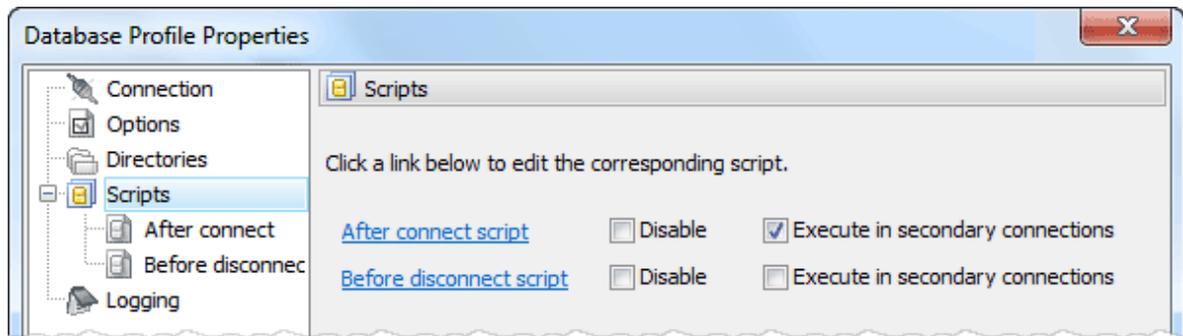
### 3.2.3 Setting default directories

Use the tab to specify the [default directories](#) respectively for database extract, data export, data import, table backup/restore and data dump.

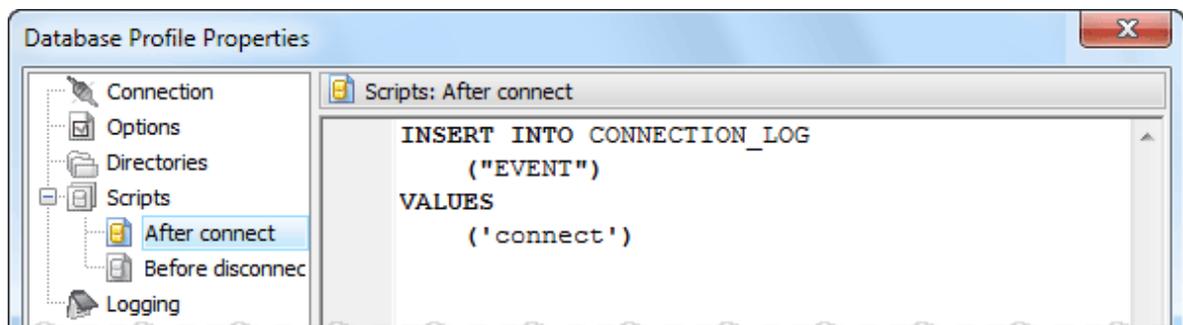


### 3.2.4 Editing obligatory scripts to execute

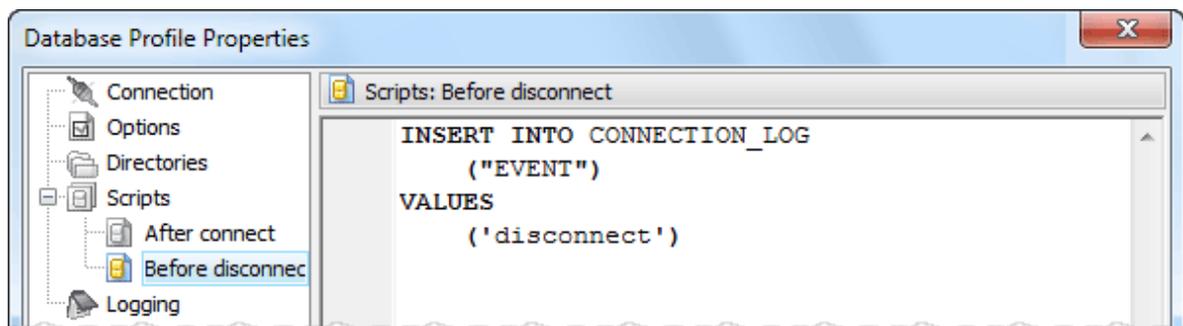
Use the tab to specify the obligatory scripts to execute in all database connections established by the software (on executing queries, browsing objects data, etc.). There is a possibility to enable/disable a written script.



Below you can find an example of an obligatory script to execute after Firebird Maestro will connect to the database. The script writes a connect time to the log table.

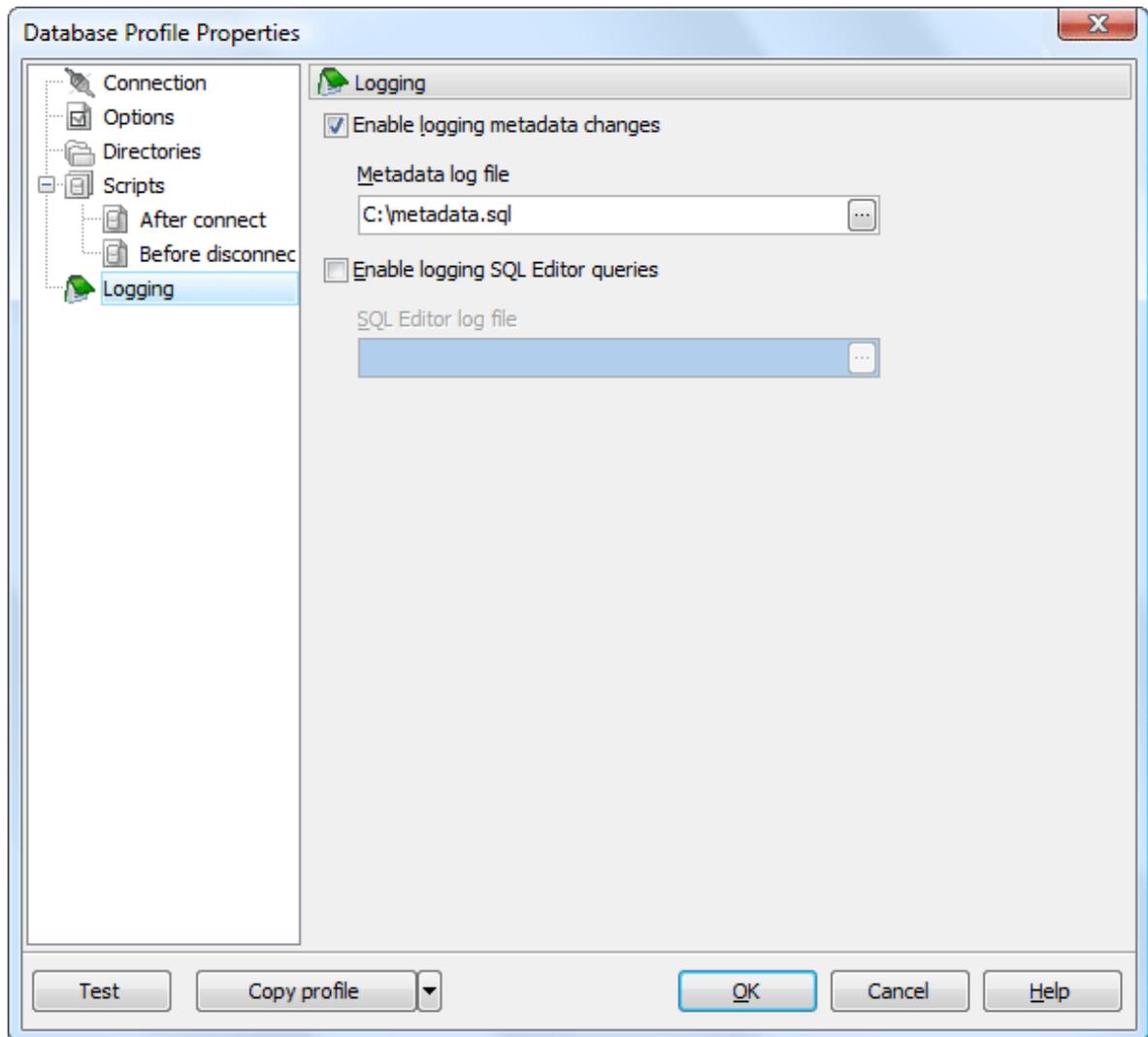


The next screen represents the example of an obligatory script to execute before Firebird Maestro will disconnect from the database. The script writes a disconnect time to the log table.



### 3.2.5 Setting log options

Enable/disable [metadata changes logging](#) and [SQL query logging](#) and specify the corresponding log file names if necessary.



### 3.2.6 Statistics

This tab allows you to view usage statistics for the current profile. Click the **Reset Statistics** button to clear all the displayed values.

**Statistics**

Creation time	N/A
Last modification time	N/A
Number of connections	6
Last connection time	18.08.2017 16:14:16
Total uptime	2:03:51:22

Reset statistics

## 3.3 Create Database Wizard

To run the Create Database Wizard, select the Database | Create New Database... main menu item or click the Create New Database button on the main toolbar.

- [Setting database connection properties](#)<sup>[36]</sup>
- [Specifying database properties](#)<sup>[36]</sup>

**See also:** [Database Editor](#)<sup>[38]</sup>

### 3.3.1 Setting connection properties

Set the [connection properties](#)<sup>[14]</sup> of the new database. If the Create profile after creating the database option is checked, the [Edit Database Profile](#)<sup>[29]</sup> dialog is opened after the new database is created.

**Create Database Wizard**

**Create Database**

Specify connection properties and the name for a new database

Welcome to the Create Database Wizard!  
This wizard allows you to create a new database and optionally create its profile in the Database Explorer.

This wizard will generate the SQL statement for creating the database and execute it on the server.

[Configure SSH options](#)

Protocol	Host	Port number
Standard server	JUPITER	3050

Use Windows authentication

User name	Password	Role
SYSDBA	●●●●●●●●	

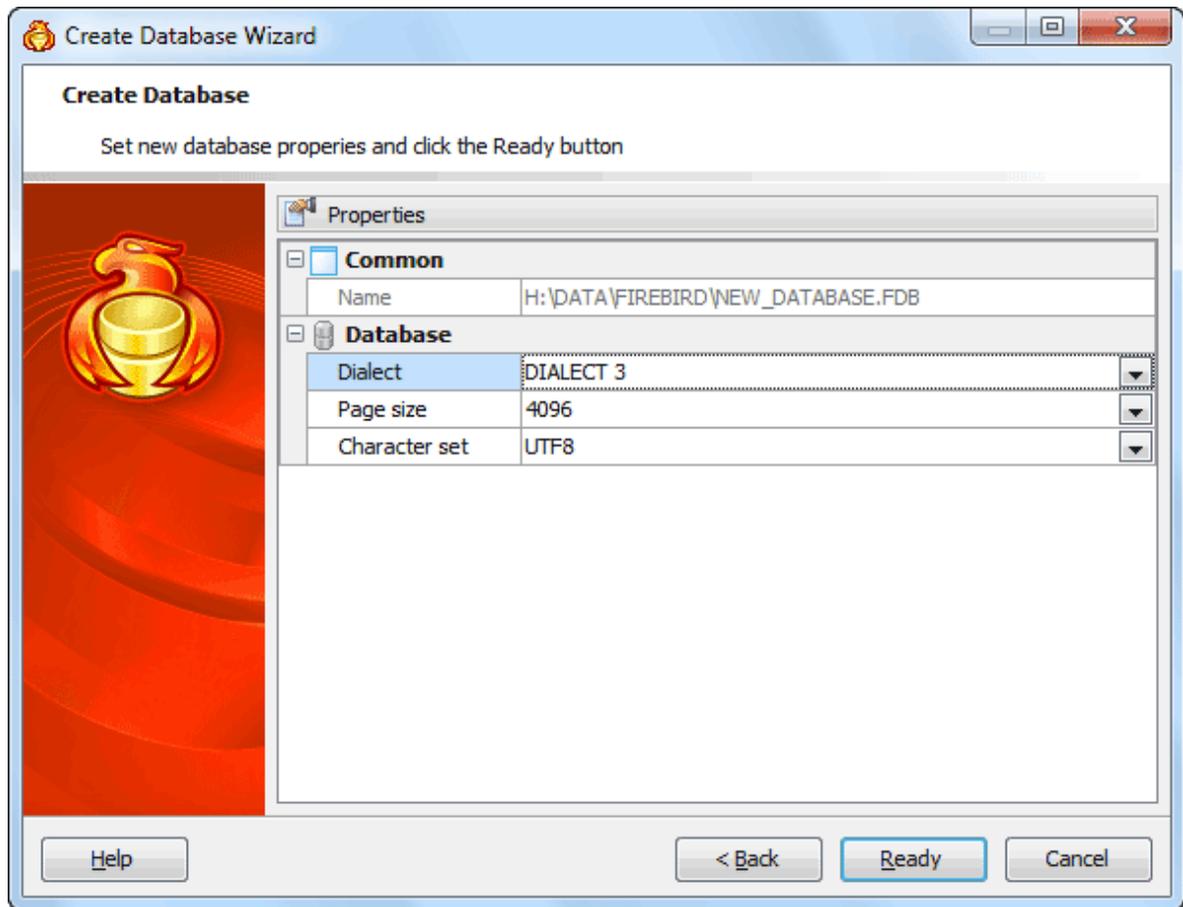
Database name  
H:\Data\Firebird\new\_database.fdb

Create profile after creating the database

Help < Back Next > Cancel

### 3.3.2 Specifying database properties

**The next wizard step** allows you to set common database options. All fields below are optional, i.e. it is not obligatory for you to fill them.



#### Character set

Sets default character set for a database.

#### SQL Dialect

Defines the SQL Dialect for database access.

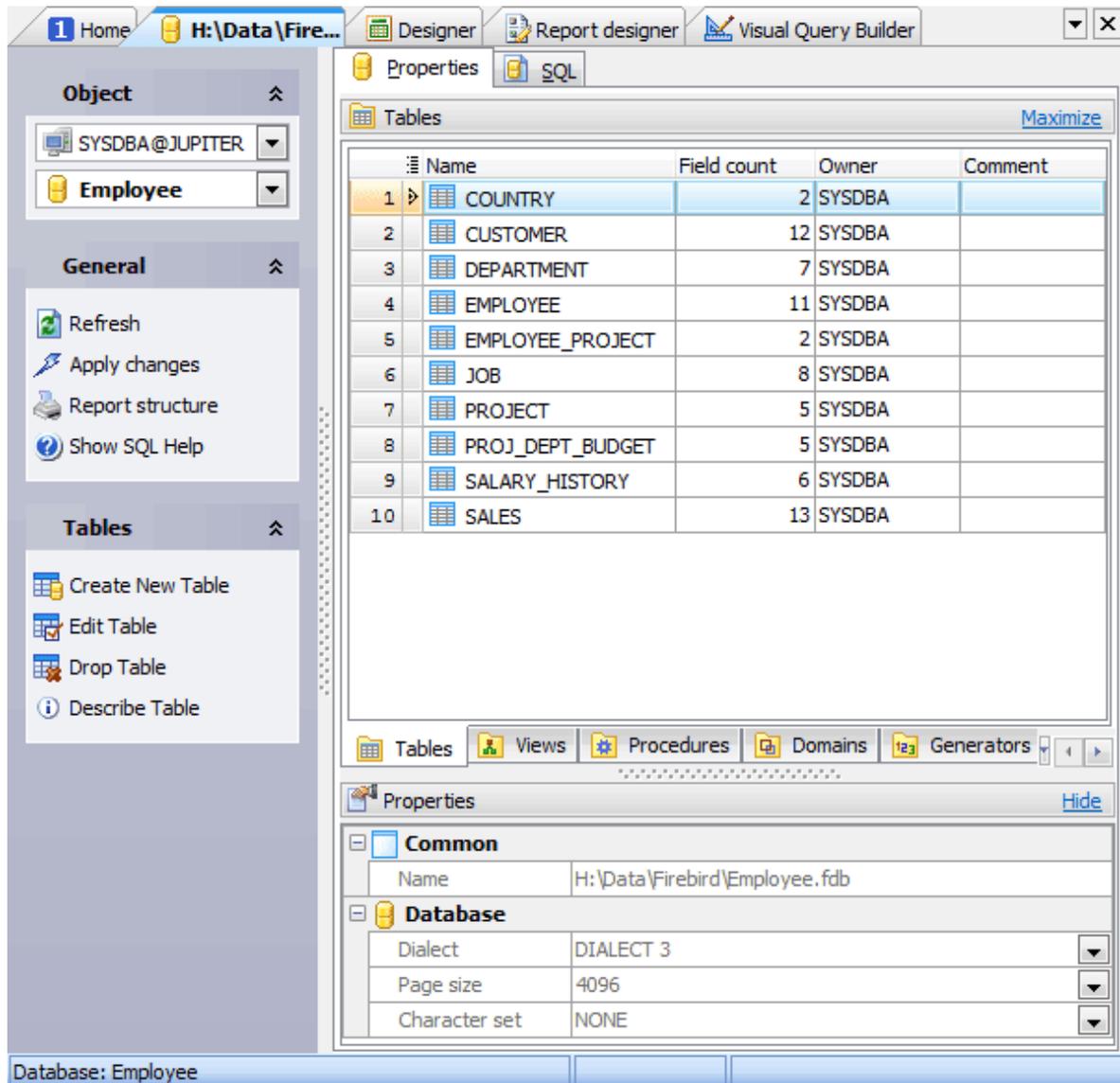
#### Page size

Defines size, in bytes, for database pages.

### 3.4 Database Editor

Database Editor allows you to browse, add, edit and delete all objects of the selected database and its main properties.

To open the editor, use popup menu of the database node at the Explorer tree.



#### Subitems

Every tab is intended for managing corresponding database objects (e.g. *tables*, *views*, *queries*, etc.). Open the object in its editor by double-clicking or pressing the **Enter** key. The popup menu allows you to create new, edit or drop the selected database objects. Using this menu you can also create a copy of the object.

You can operate on several objects at a time. For this you have to select database objects with the **Shift** or the **Ctrl** key pressed. After the group of objects is selected, you can operate on it, e.g. delete several objects at once, as it was a single object.

## 4 Database Object Management

Firebird Maestro provides you with several tools to manage and navigate Firebird objects. To browse and modify objects, at least one connection to a database should be established.

- [Browse Database Objects](#) <sup>[56]</sup>
- [Create New Objects](#) <sup>[40]</sup>
- [Edit Existing Objects](#) <sup>[43]</sup>
- [Duplicate Objects](#) <sup>[51]</sup>

The options to create or edit an object in Firebird Maestro follow the parameters defined by Firebird. If you need clarification on what an option means or how it should be used, see Firebird's documentation for more information. The documentation provides detailed description of objects, including their purpose, properties, and restrictions. The Firebird Maestro manual provides you with only brief review of Firebird objects.

## 4.1 Create Objects

Firebird Maestro provides a number of [Create Object Wizards](#)<sup>[40]</sup> to accomplish the most facile Firebird object creation.

There are several ways to invoke the necessary Create Object Wizard:

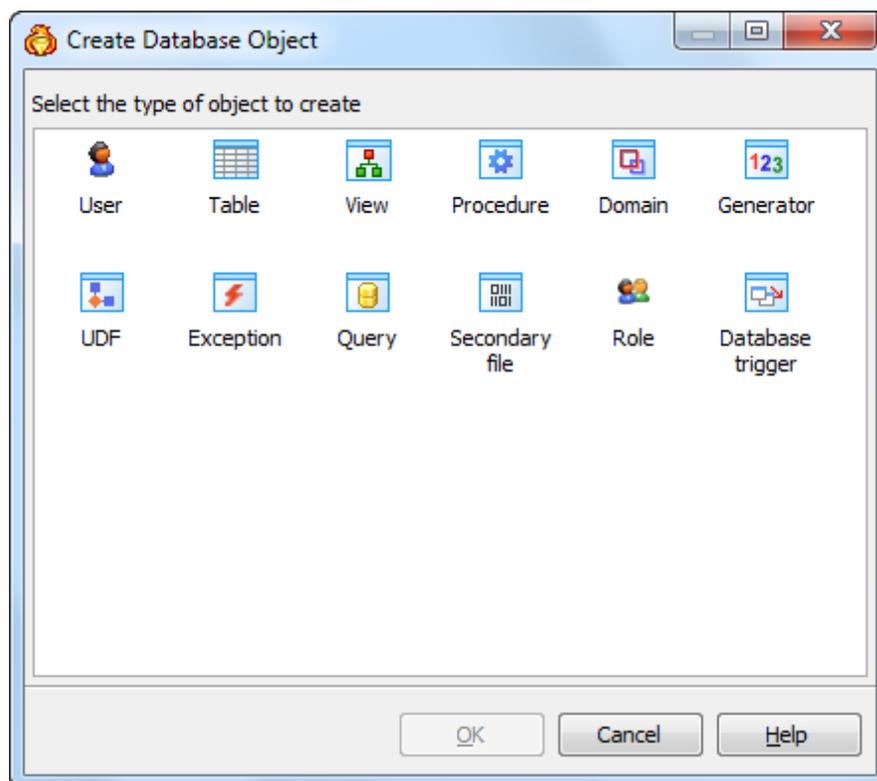
- select the **Object | Create Database Object...** main menu item;
- select the necessary icon (table, query, view, trigger, etc.) in the [Create Database Object](#)<sup>[40]</sup> dialog

or

- select the object list (Tables, Views, Triggers, etc.) or any object from that list in the Explorer tree (**Object Manager** and **Object Browser**);
- select the **Create New Table (View, Trigger, etc.)...** item from the popup menu or press **Insert**.

### 4.1.1 Create Database Object Dialog

The [Create Database Object](#) dialog allows you to create any type of database object supported by Firebird Maestro. To open the dialog select the **Object | Create Database Object...** main menu item or use the **Shift+Ctrl+N** hot keys combination. Select an object type icon and click the **OK** button to invoke the corresponding wizard or dialog.



### 4.1.2 Overview of Create Objects Wizards

Several steps of Create Object Wizards are common for all of them. This part purpose is the formulation of the basic principles for the [Create Object Wizard](#) organization.

- On the [first wizard step](#)<sup>[41]</sup> you need to specify the new object name.
- On the second one you have to define all the object properties. To clear up the object properties meanings see the appropriate topic of the respective Create Object Wizard section.
- Some objects has subitems (e.g. each table contains fields, indexes, procedures have parameters, etc). In this case the next step allows you to manage such subobjects of the object being created. We recommend you to store the following shortcuts in order to speed your work: the Ins key adds a new subobject, the Enter key displays the subobject's editor, and the Del key drops the subobject.
- The [next wizard step](#)<sup>[42]</sup> is final. It is provided to sum up the [Create Object Wizard](#) operation.

**Note:** There are some objects to have an additional [Create Object Wizard](#) steps. The detailed description of the steps you can find at the appropriate topic of the corresponding section.

**See also:**

- [Create Table Wizard](#)<sup>[66]</sup>
- [Create View Wizard](#)<sup>[94]</sup>
- [Create UDF Wizard](#)<sup>[111]</sup>
- [Create Domain Wizard](#)<sup>[118]</sup>
- [Create Sequence Wizard](#)<sup>[130]</sup>
- [Creation of a New Query](#)<sup>[149]</sup>
- [Create Role Wizard](#)<sup>[133]</sup>
- [Create Procedure Wizard](#)<sup>[103]</sup>
- [Create Exception Wizard](#)<sup>[127]</sup>
- [Create Database Trigger Wizard](#)<sup>[139]</sup>

#### 4.1.2.1 Setting object name

Select the container (table, schema, database, etc.) for the new object from the list of available containers and enter the new object [name](#) in the respective box.

**Note:** the name of the object must be unique among all the object names in its container. Moreover, all the objects that are source of data need unique names among themselves. You can use any identifier that is allowed by Firebird server.

Welcome to the Create Table Wizard!  
This wizard allows you to set up all the table properties, and create the new table according to these settings.

This wizard will guide you through the process of building the initial table structure and setting its properties.

Schema  
NBA

Table name  
PLAYER

#### 4.1.2.2 Viewing common information

At this step common information about the object to be created is displayed. Select the [Open object editor after creating option](#) to open the appropriate [Object Editor](#) after the new object is created. Click the [Ready](#) button to complete creation of the object.

The following schema is selected:  
NBA

The following table will be created:  
PLAYER

Open table editor after creating

Click "Ready" to create a new table.

## 4.2 Edit Objects

Firebird Maestro allows you to view and modify existing database objects in several ways:

- edit object comment with the [Describe Object](#)<sup>[49]</sup> dialog;
- briefly view and modify [object properties](#)<sup>[49]</sup>;
- view and modify the object including subitems within the object editor.

To open an [Object Editor](#)<sup>[43]</sup>, just double click its node in the [Database Explorer](#) tree. Of course this action is also available through popup menus, navigation bars, and so on.

### 4.2.1 Overview of Object Editors

[Database Object Editors](#) are the basic Firebird Maestro tools for working with existing objects. The proper editor can be opened automatically after the object is created. You can also open the necessary object editor with the corresponding items of popup menus of the [Explorer Tree](#)<sup>[36]</sup>, [Object Manager](#)<sup>[61]</sup> or [Object Browser](#)<sup>[60]</sup>.

The editors consist of a several tabs. Some tabs are similar for all editors. This part purpose is to formulate the basic principles of all [Object Editors in Firebird Maestro](#).

- To edit object options such as name, owner, etc. use the [Properties](#) tab. To understand an option, see the appropriate topic of the corresponding [Object Editor](#) manual section and Firebird documentation.

This tab also allows you to manage objects belonging to the selected one. To reset any tab to default settings, open it when holding the **Ctrl** key.

- Use the [Permissions](#)<sup>[44]</sup> tab to manage access privileges (grants) of the corresponding object.
- In a similar manner, some objects called grantees (e.g. users or roles) can have rights to do something with other objects (e.g. a user can read data from a table). This relationship can be set up at the [Grants](#)<sup>[44]</sup> tab.
- Object correlation with another Firebird objects is represented on [Dependencies](#)<sup>[45]</sup>.
- Most of objects have a possibility to be created from an SQL script (SQL definition). If so, the corresponding script is available at the [SQL](#)<sup>[47]</sup> tab of the editor.
- There is a [Result](#) tab in editors of such routines as functions and procedures that can take parameters, perform calculations or other actions, and return a result. You can [execute](#)<sup>[48]</sup> any routine directly from its editor.

**Note:** Some object editors have additional tabs. The detailed description of them you can find at the appropriate topic of the corresponding section.

To apply the changes, select the [Apply Changes](#) item in the [Navigation bar](#) or use **Ctrl+F9** or **Ctrl+F7** shortcut keys.

It is also possible to modify object properties without opening the object editor: use the **Object Properties** item of the popup menu of the selected object from the explorer tree.

**See also:**

- [Table Editor](#) <sup>[68]</sup>
- [View Editor](#) <sup>[98]</sup>
- [UDF Editor](#) <sup>[113]</sup>
- [Domain Editor](#) <sup>[120]</sup>
- [Sequence Editor](#) <sup>[131]</sup>
- [Role Editor](#) <sup>[133]</sup>
- [Procedure Editor](#) <sup>[107]</sup>
- [Exception Editor](#) <sup>[127]</sup>
- [Database Trigger Editor](#) <sup>[140]</sup>

#### 4.2.1.1 Permissions of the Object

The **Permissions** grid allows you to manage access privileges (grants) of users, roles, procedures, views and triggers.

Grants give specific privileges for an object ( *tables, procedures, views, etc.*) to one or more users, *roles, procedures, views* and *triggers*.

Grantee	Create	Select	Insert	Update	Delete	Drop
<b>Users</b>						
accountants@%		●	●	●		
admin@%	●	●				●
alex@%		●				
clerks@MERCURY	●	●				
developers@URAN	●	●				●
john@%		●				
john@localhost		●				
managers@%		●				
mary@%		●				
root@%		●				
root@localhost		●				

Using the grid you can grant/revoke privileges as well as sort and filter displayed grantees.

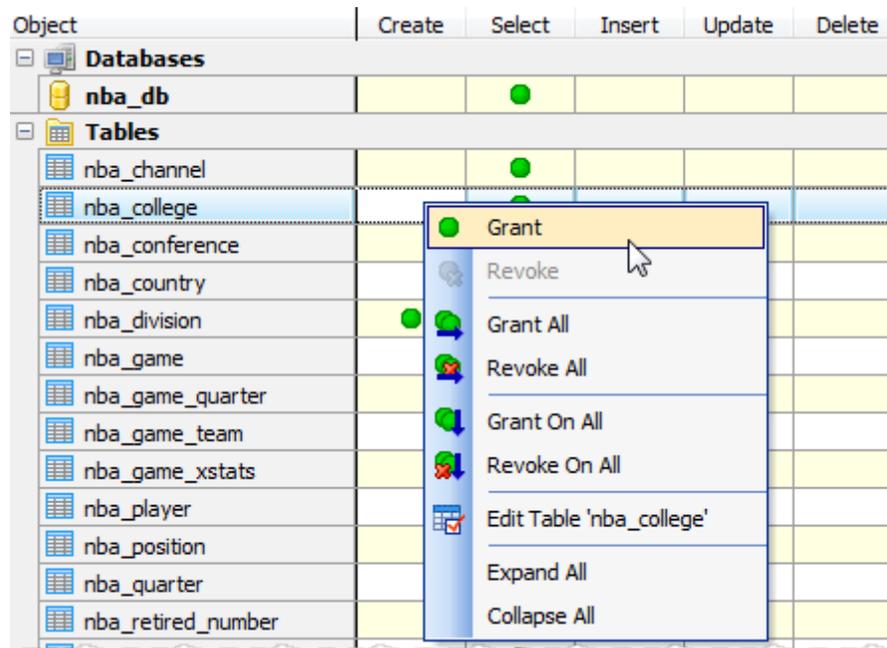
**See also:** , [Roles](#) <sup>[132]</sup>, [Procedures](#) <sup>[102]</sup>, [Views](#) <sup>[93]</sup>, [Triggers](#) <sup>[86]</sup>

#### 4.2.1.2 Object grants

The Grants grid allows you to manage access privileges (grants) of the current object.

A grant gives specific privileges on an object (*table, view, procedure*) to the current one.

All objects are grouped by kind. Filter the object kinds using the checkboxes at the bottom of the window. Using the grid you may sort and filter data.



To grant the subject privilege on the object double-click an empty field; to revoke the privilege double-click a grant with grant option.

Use grid's popup menu to *grant*, *grant all*, *grant with grant option*, *grant all with grant option*, *grant on all*, *grant on all with grant option*, *revoke*, *revoke all* and *revoke on all*:

- select the **Grant** item to grant the subject privilege on the object;
- select the **Grant All** item to grant all the privileges on the object;
- if the **Grant With Grant Option** item is selected, the recipient of the privilege may in turn grant it to others (without a grant option specified, the recipient cannot do that; at present, grant options can only be granted to individual subject, not to groups or Public);
- select the **Grant All With Grant Option** item to grant with grant options the privilege on all the objects of the kind;
- select **Grant On All** or **Grant On All With Grant Option** to grant or grant with grant options respectively the subject privilege on all the objects;
- to revoke the privilege, all the privileges on the object or the privileges on all the server objects select the **Revoke**, **Revoke All** or **Revoke On All** items respectively.

Using the popup menu you can also collapse or expand all the object kinds.

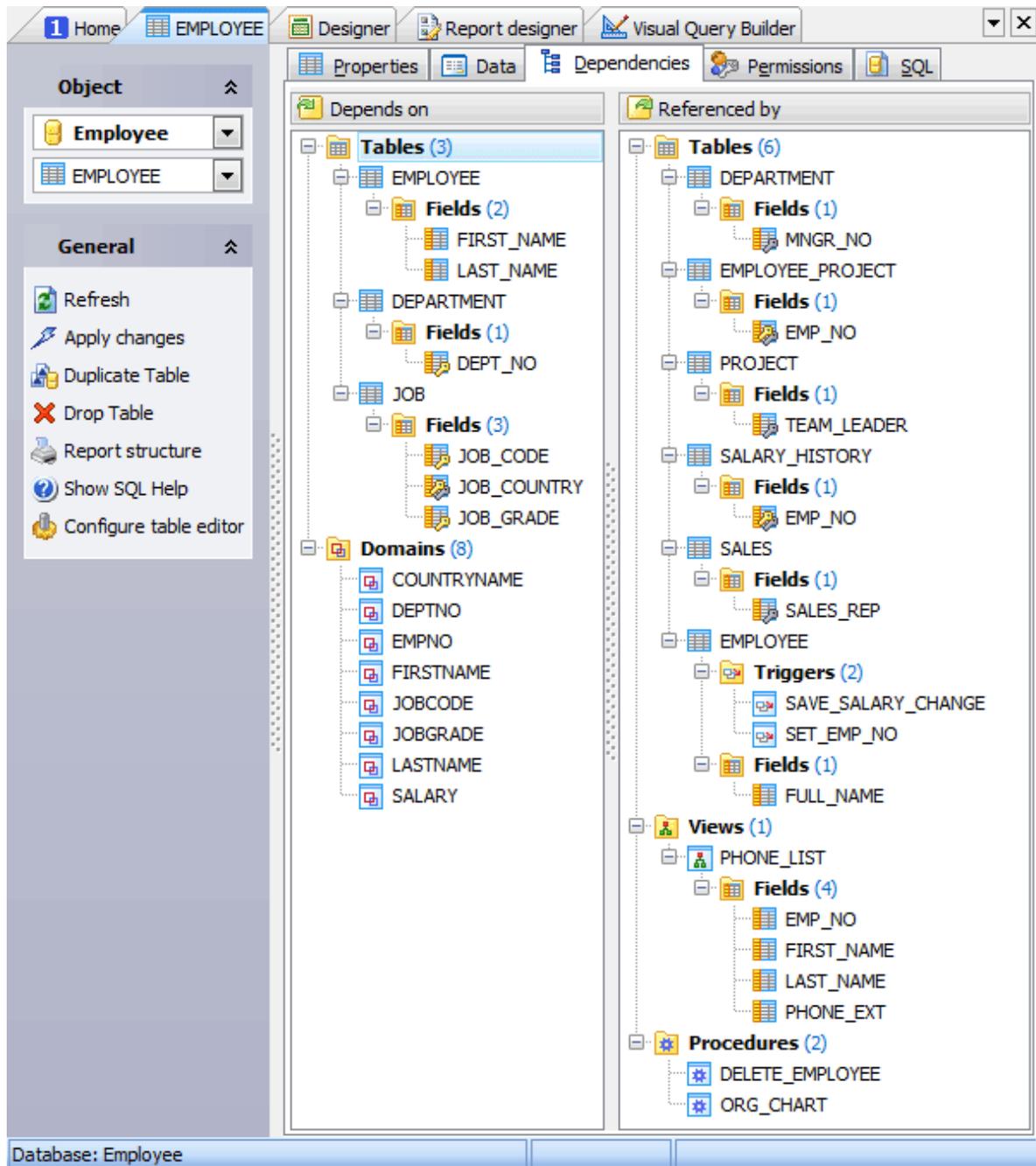
#### 4.2.1.3 Object Dependencies

When you create complex database structures involving many tables with foreign key constraints, views, triggers, UDFs, etc. you will implicitly create a net of dependencies between the objects. For instance, a table with a foreign key constraint depends on the table it references. We tried to create a software to make your work easier, i.e. to give you the tools for efficient database objects management. The **Dependencies** tab allows you to control the correlation of objects efficiently.

The **Depends on** window represents all the objects the current object depends on.

The **Referenced by** window contains the tree of database objects constituting the dependency relationship on the current object.

Use items of the popup menu to edit the selected object in **Object Editor** or to drop the object.



#### 4.2.1.4 SQL Definition

The [SQL](#) tab displays the SQL definition for the object with all its properties. Bear in mind that this text is read-only. If you want to change the object definition, use the appropriate editor tabs instead, or copy the text to the Windows Clipboard to paste it in [SQL Editor](#) or [SQL Script Editor](#).

The SQL definition window allows you to browse the text effectively. The popup menu and the extensive system of hot keys give you the opportunity to search expressions within the text, to select the whole text for copying it to the Windows Clipboard, to save the definition to the *\*.sql* or *\*.txt* files, to print the document, etc.

You can customize the displayed definition using the [Editors & Viewers](#)<sup>283</sup> options.

The [Properties](#) item of the popup menu displays the [Options](#) dialog in which you can establish optional settings concerning the current database.

The [Code Folding](#) item group makes it possible to view either the whole text or its logical parts (regions). Each region can be collapsed and extended.

In [extended mode](#) the whole text is displayed (set by default)

In [collapsed mode](#) the text is hidden behind one text line denoting the first line of the collapsed region.

[Navigation Bar](#) on the [SQL](#) tab allows you to copy the object's SQL definition (DDL) to the [SQL Script Editor](#) for future modifications.

#### 4.2.1.5 Parameter Editor

The editor allows you to change the [Parameter name](#), [Data type](#) (Firebird 2.1+ supports using of domains on declaring the data types of arguments in stored procedures), and the [Default](#) value that specifies a parameter value to be used when no value is explicitly supplied.

Use the [Scope](#) box to set whether parameter is *Input*, or *Output*

#### Mechanism (for UDFs)

Set the return mechanism of the UDF parameter (The property is available when the *IS RETURN* option is checked). The available mechanisms are:

- *BYREFERENCE*: specifies that the return value should be passed by reference;
- *FREE IT*: frees memory of the return value after the UDF finishes running;
- *BY VALUE*: specifies that the return value should be passed by value;
- *BY DESCRIPTOR*: specifies that the return value should be passed by descriptor.

#### Is Return (for UDFs)

If checked, the UDF returns this parameter.

Use the **Size** edit box to define the length of the parameter value for float, char and other data types and the **Precision** edit box to define the precision of the parameter value, e.g. for decimal data type.

#### Charset

Define the charset for the CHAR and VARCHAR data types.

Check the **Suppress domain check values** box (available if a domain has been selected as parameter data type) to declare the argument or variable using the data type of the domain, without inheriting CHECK constraints and the DEFAULT value (if declared in the domain).

#### 4.2.1.6 Executing functions and procedures

**Procedure Editor** provides an opportunity to execute current routine by opening the **Results** tab, by clicking the **Execute** item of the **Navigation Bar**, or by pressing the **F9** key.

If the procedure has parameters, Firebird Maestro will ask you to specify the values for these parameters in the **Input parameters** dialog which appears before the procedure execution. **Input parameters** dialog allows you to specify the values for all input parameters. After changes are made, click the **OK** button to execute the UDF, or the **Cancel** button to abort the execution.

Parameter Values			
(↕) @conference_id int	2		
(↕) @division_id int	2		
(↕) @team_id int	1		
History			
Date and time	@conference_id	@division_id	@team_id
▶ 18.02.2010 17:44:44	2	2	1
18.02.2010 17:44:19	1	1	4
18.02.2010 17:42:41	1	3	2
18.02.2010 17:42:18	1	2	7

Firebird Maestro supports **Parameter History**. Values that have been set previously as the routine parameters are represented in the **History** tab of the **Input Parameter** dialog with a date and time of their last using. Double click a necessary set of values to set them as the routine parameters. You can manage the **Parameter History** with **Delete history** item and **Clear history** links.

The result of the successfully executed routine can be found within the **Results** tab of **Procedure Editor**.

**Note:** If any unsaved changes are applied to the routine being currently edited, the execution of the routine is impossible until changes are saved by the **Compile** procedure item of the **Navigation Bar**.

## 4.2.2 Modify Object Properties

You can rename all objects those can be renamed with the corresponding option of the popup menu of the object at the Explorer tree. To edit other properties of the selected object without opening its editor, use the **Object Properties** dialog. To open this dialog, select the according item of the same popup menu. To clear up the object properties meanings, see the appropriate topic of the respective **Object Editor** section.

## 4.2.3 Describe Objects

Essentially a comment is the most often altered object property. To simplify it's editing, the Firebird Maestro provides an ability to **Describe the object** within the **Database Explorer** immediately without opening of the object's editor.

Step-by-step:

- Select the necessary object in the explorer tree;
- Choose the [Describe Object...](#) item in the popup menu;
- Edit object comments within the [Describe Object](#) window;
- To commit the changes, push [OK](#) button.

## 4.3 Duplicate Objects

Firebird Maestro offers several ways of objects duplicating.

1. **Duplicate Object Wizard.** The wizard is the most flexible tool of the coping. Along with a possibility to adjust the new object definition it allows you to copy data (for tables). But it consists of [several steps](#)<sup>[51]</sup> and takes more time than other manners.
2. **Duplicate Object** window allows you to attune new object's SQL definition. It is preferred for creation a copy of selected object. [Here](#)<sup>[53]</sup> you can find some additional info.
3. By **Drag-n-Drop**<sup>[54]</sup> **operation.**

### 4.3.1 Duplicate Object Wizard

The [Duplicate Object Wizard](#) allows you to create a new database object with the same properties as the existing one. It is the most flexible tool of copying objects provided by Firebird Maestro. It also allows you to copy data of the selected table to the new one.

To run the wizard select the [Object | Duplicate Database Object...](#) main menu item.

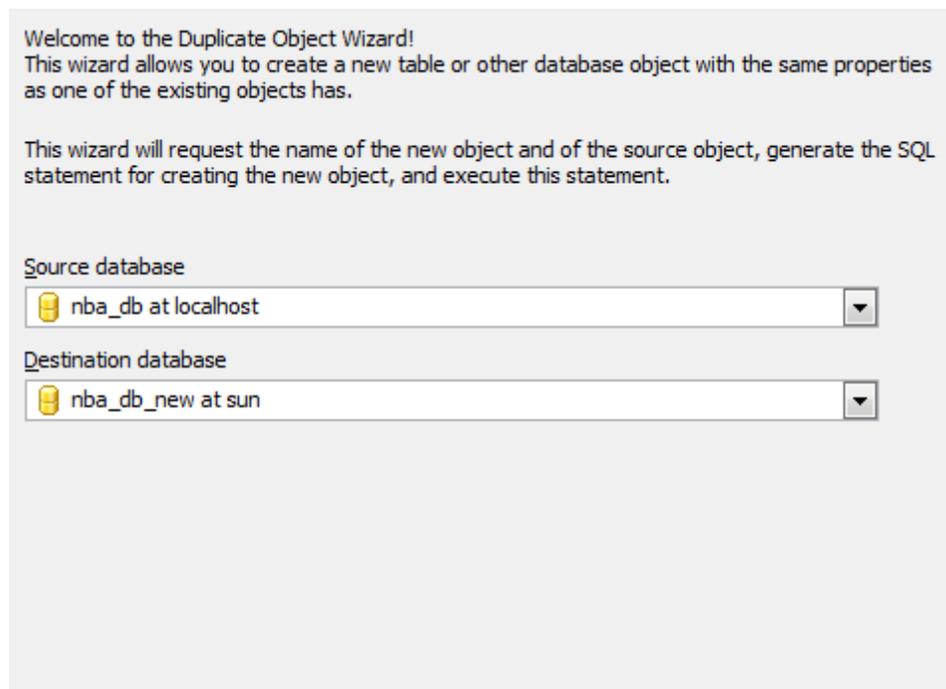
- [Selecting source and destination databases](#)<sup>[51]</sup>
- [Selecting object to duplicate](#)<sup>[52]</sup>
- [Modifying definition of a new object](#)<sup>[53]</sup>

**See also:** [Create Database Object](#)<sup>[40]</sup>

#### 4.3.1.1 Selecting source and destination databases

Select the database containing a source object from the list of connected databases, and then specify the database for the duplicated object.

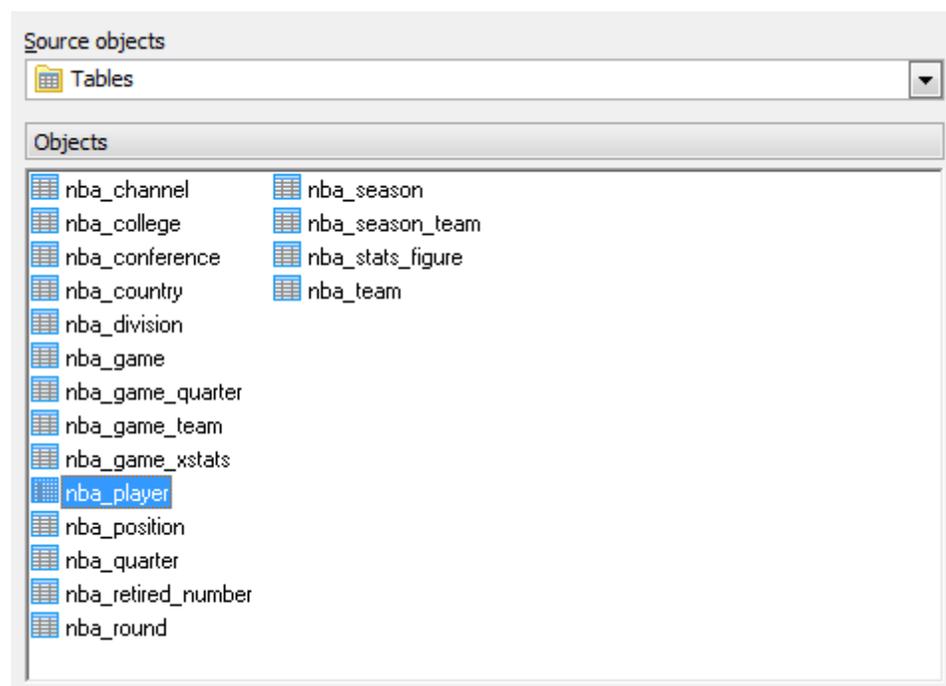
You should connect to the destination database beforehand (see [Database Management](#)<sup>[24]</sup>).



#### 4.3.1.2 Selecting object to duplicate

Specify a database object to create the new one with the same properties.

1. Select the type of the object to duplicate from the [Source objects](#) drop-down list.
2. Pick up the necessary object from the list.



#### 4.3.1.3 Modifying new object definition

The last wizard step allows you to edit the new object definition directly.

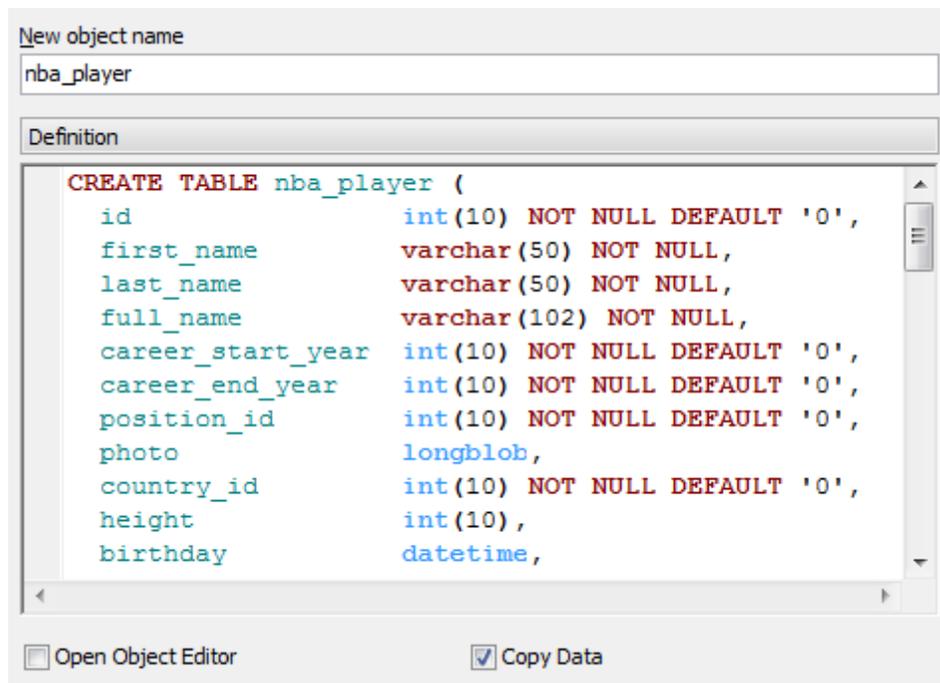
Use this step to edit the name of object been creating ([New Object Name](#)). By default Firebird Maestro generates the new object definition with the same name if the duplicating is to the source database, or like "%SOURCE\_OBJECT\_NAME%01" otherwise.

**Note:** the name of the object must be unique among all the object names in its container. Moreover, all the objects that are source of data need unique names among themselves. You can use any identifier that is allowed by Firebird server.

You can edit the result SQL statement manually, add or remove fields, change field types, using the [New object definition](#) text area. Click the [Ready](#) button to complete the operation.

The detailed description of Firebird database objects is observed in [Firebird SQL Reference](#).

Check the according boxes to [Copy Data](#) (only for tables) and to [Open Object Editor](#) after the duplicating.

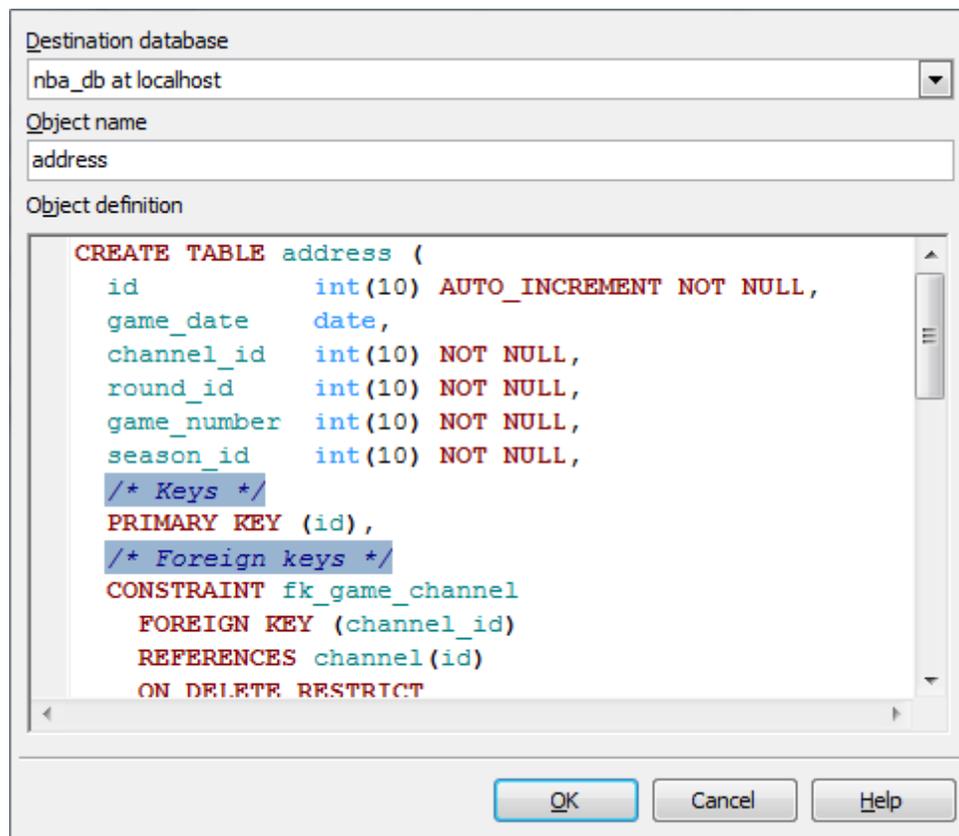


```
CREATE TABLE nba_player (
  id          int(10) NOT NULL DEFAULT '0',
  first_name  varchar(50) NOT NULL,
  last_name   varchar(50) NOT NULL,
  full_name   varchar(102) NOT NULL,
  career_start_year int(10) NOT NULL DEFAULT '0',
  career_end_year int(10) NOT NULL DEFAULT '0',
  position_id int(10) NOT NULL DEFAULT '0',
  photo       longblob,
  country_id  int(10) NOT NULL DEFAULT '0',
  height      int(10),
  birthday    datetime,
```

#### 4.3.2 Duplicate Selected Object

Within the [Duplicate Object](#) window you can duplicate a selected object fast and with some modifications.

It is available from the corresponding link of the object's popup menu at the [Database Explorer](#).



Select the [database](#) for a new object from the list of connected databases first.

Enter the [name](#) for the new object.

**Note:** the name of the object must be unique among all the object names in its container. Moreover, all the objects that are source of data need unique names among themselves. You can use any identifier that is allowed by Firebird server.

You can also edit the SQL [definition](#) of the object if necessary (add or remove fields, change field types, etc.).

### 4.3.3 Copy, Paste and Drag-n-Drop features

Firebird Maestro provides you with an ability of copying database objects within the database or even from one database to another (in this case you should connect to both the source and the destination databases first).

To copy an object, just drag the object in a source window (such as [Database Explorer](#), [Object Manager](#), [Object Browser](#)) and drop it to the target container in another window. You also can use the [Edit | Copy](#) and the [Edit | Paste](#) main menu items or the **Ctrl+C**/**Ctrl+V** hot keys combinations respectively. Copying several objects at a time is also available.

It is also possible to drag and drop objects between [Database Explorer](#), [Object Manager](#), [Object Browser](#) and [SQL Editor](#) or [SQL Script Editor](#). This works as follows:

**SQL Editor:** after dropping the object you will get a query to retrieve object data (e.g. `SELECT * FROM table_name`) or the full name of the object if it doesn't contain data (domains, indexes, etc.).

**SQL Script Editor:** after dropping the object you will get its SQL definition if applicable.

**See also:** [Database Explorer](#), [Object Manager](#), and [Object Browser](#)

## 4.4 Browse Objects

Firebird Maestro allows to browse objects stored in a Remote Server database in several ways:

- [Database Explorer](#)<sup>[56]</sup>: objects are represented as a hierarchy (grouped by kind and listed under the according Firebird servers/database node, provided with subobjects if exist)
- [Object Browser](#)<sup>[60]</sup>: an extension of explorer with ability to sort, group, filter and multiple select objects.
- [Object Manager](#)<sup>[61]</sup>: an extension of the explorer with ability to select several objects at a time (to copy, drop, etc.)

All tool allows you to drag-and-drop between them and to perform all necessary operations upon database objects.

### 4.4.1 Database Explorer

Database Explorer is the basic feature of Firebird Maestro which allows you to perform practically all necessary operations upon databases and their objects. The Database Explorer area occupies the left side of the Firebird Maestro main window. All the objects at the Explorer tree are grouped by kind and listed under the according Firebird servers/database node.

To start working with a database you need to create its profile first. The conception of database profiles gives you an opportunity to connect to databases in one touch and work with the selected databases only.

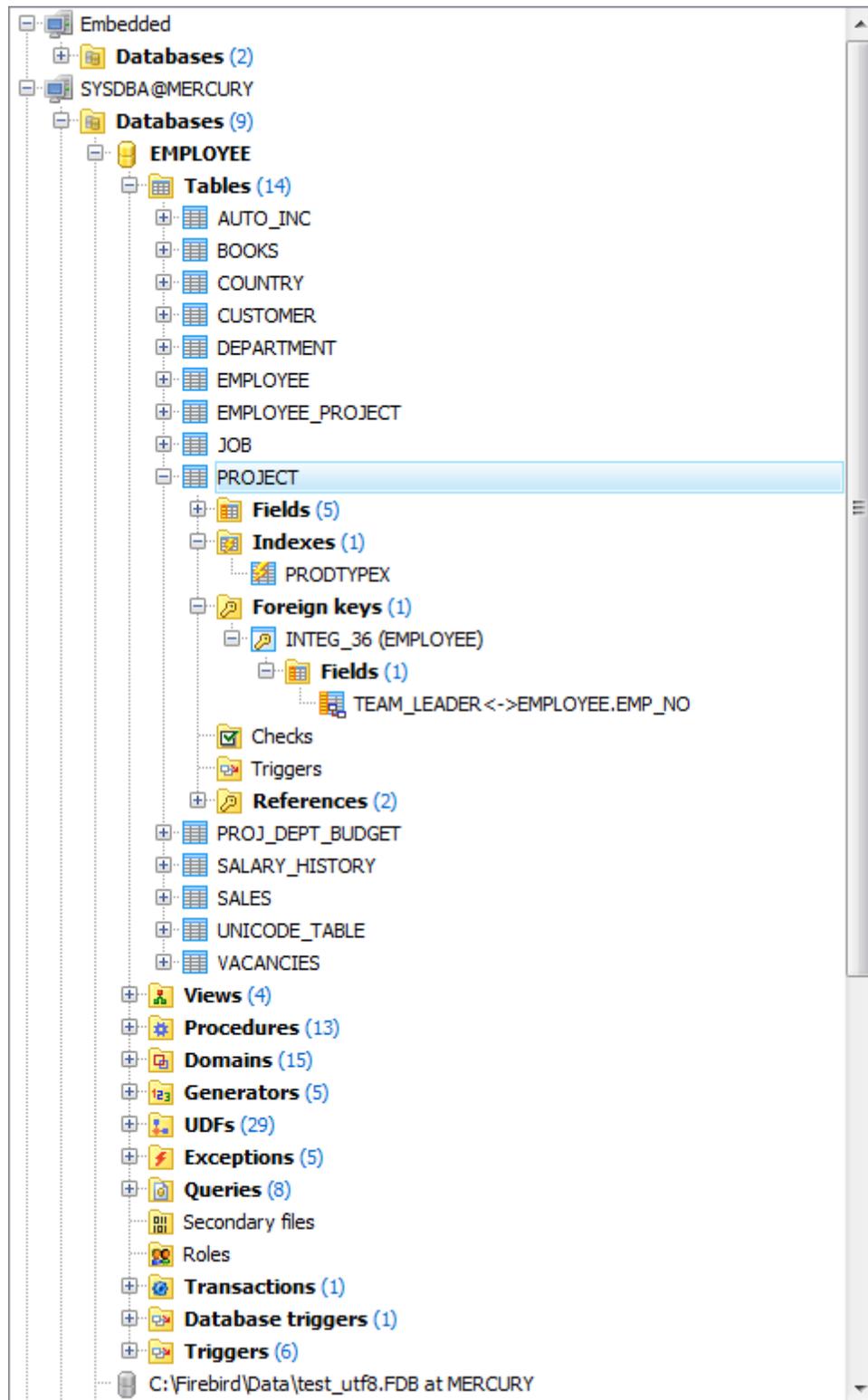
**See also:** [Object Manager](#)<sup>[61]</sup>, [Object Browser](#)<sup>[60]</sup>

**Note:** In case your databases have a large quantity of objects you can speed up the object search by typing first letters of the object name in the explorer area.

**Note:** [Explorer options](#)<sup>[266]</sup> allow you to hide/display table subobjects, represent system objects in different color, etc.

The sections below describe each of these actions in detail.

- [What operation can I accomplish upon database profiles within the Explorer Tree?](#)<sup>[57]</sup>
- [How can I connect to a database?](#)<sup>[56]</sup>
- [How can I disconnect from a database?](#)<sup>[58]</sup>
- [What operations can I accomplish upon database objects within the Explorer Tree?](#)<sup>[58]</sup>
- [Can I copy a database object from one database to another?](#)<sup>[58]</sup>
- [Can I filter Explorer content?](#)<sup>[59]</sup>
- [How can I create new/drop a database?](#)<sup>[59]</sup>



### Operations upon database profiles in the Explorer Tree

Using popup menu of the Explorer area you can realize the following operations:

- [create new database profiles](#) (the Create Database Profiles... item);
- rename currently selected database profile (the Rename Database Profile... item);
- [edit currently selected database profile](#) (the Edit Database Profile... item);
- reorder existing database profiles (the Reorder Databases...item of Databases node's popup menu or using drag-n-drop);
- reorder servers (the Reorder Servers...item of a server's popup menu);
- remove currently selected database profile from the explorer tree (the Remove Database Profile item);
- remove all profiles of selected server (the Remove all Profiles item of Databases node's popup menu).

In addition to these operations, Database Explorer gives you an ability to reorder existing profiles by performing drag-and-drop operations within the explorer tree.

### How can I connect to a database?

You can establish connection to a database in Database Explorer by selecting the database profile and double-clicking it or pressing the Enter key (alternatively, you may use the Shift+Ctrl+C hot key combination). The same operation is also available through the Connect to Database item from the explorer popup menu, or through the Database | Connect to Database main menu item.

**Note:** the number of expected server connections is from 1 to 1024.

### How can I disconnect from a database?

You can abort connection from a database in Database Explorer by selecting the database profile and pressing the Shift+Ctrl+D hot key combination. The same operation is also available through the Disconnect from Database item from the explorer popup menu, or through the Database | Disconnect from Database main menu item.

### Operations upon database objects

Database Explorer allows you to perform the following operations with database objects using its popup menu (note that the popup menu contains object-specific items only when some database object is currently selected in the explorer tree):

- create a new database object (the Create New Object... item);
- edit currently selected database object (using the Edit Object... item, pressing the Enter key or double-clicking the database object);
- drop the selected object from the database (the Drop Object... item);
- rename the selected database object (the Rename Object... item);
- edit the database object properties (the Object properties ... item);
- duplicate the selected object (the Duplicate Object... item).
- run the Object Browser tool (the Browse ... item).

### Can I copy a database object from one database to another?

Database Explorer provides you with an ability of copying database objects from one database to another. To perform this operation, you should connect to both the source and the destination databases first. After the connection is established, simply drag and drop an object to copy from the source database to the corresponding node (Tables,

Queries, etc.) of the destination database.

**Note:** You also can use the Edit | Copy and the Edit | Paste main menu items to copy/paste a database object using Windows clipboard (alternatively, you may use the Ctrl+C/Ctrl+V hot keys combinations respectively).

#### How can I create new/drop a database?

To create a new Firebird database (not existing on your Firebird server) with Database Explorer, select the Create New Database... item from the popup menu and set all the necessary options within the [Create Database Wizard](#).

To drop an existing database using Database Explorer, connect to the database you wish to drop, select the Drop Database item from the popup menu of the database and confirm dropping in the dialog window.

**Note:** Alternatively, you can use the Database | Create New (Drop) Database main menu item to perform these operations.

#### 4.4.1.1 Filtering explorer content

Firebird Maestro allows you to reduce the number of represented objects in the explorer tree. To hide seldom usable objects, filter your explorer content.

Filter Panel is available through the View | Show Filter Panel main menu item.

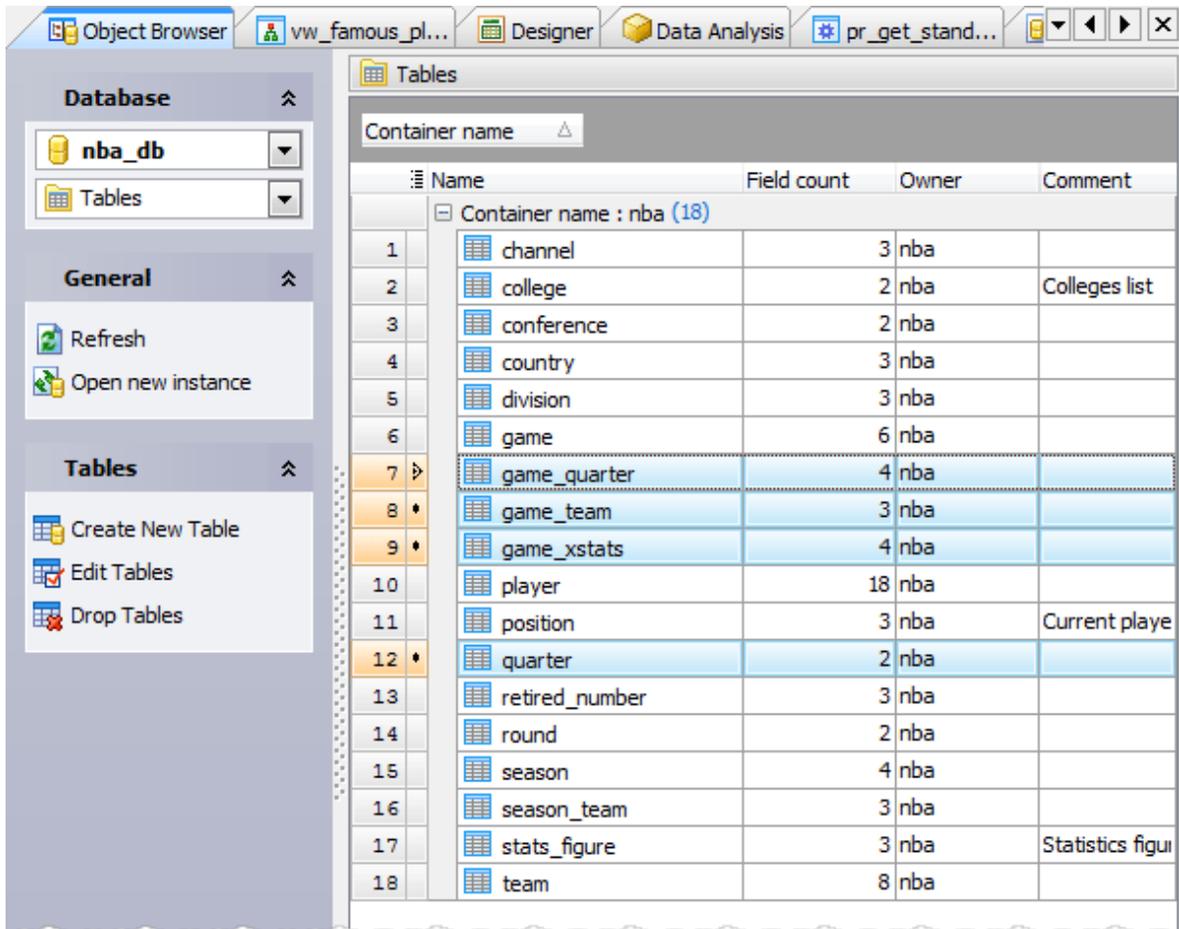
- Specify the Filter expression. The expression can contain any part of object name combined with an asterisk ('\*') as a wildcard character and a question-mark ('?') as a mask character.
- Define the Filtered objects, object types for filtering in the explorer tree.
- Check the according radio button (Show by expression, Hide by expression) to define whether database objects will be shown or hidden in accordance with the filter expression.
- Click Apply button.

**Note:** A filter expression, if applied to the content of Database Explorer, is applied to the content of [Object Manager](#) and [Object Browser](#) as well.

## 4.4.2 Object Browser

Object Browser is a tool for operating on database objects designed as an extension of [Database Explorer](#) with ability to *sort*, *group* and *filter* the database objects. It also provides such operation as multiple selecting of objects (for *copying*, *dropping*, etc.) and the ability of using drag-and-drop operations between [Object Browser](#) and [Database Explorer](#). To open [Object Browser](#) select the [Object | Object Browser](#) main menu item.

**Note:** At least one connection to a database should be established to make [Object Browser](#) available.



### Sorting database objects

[Object Browser](#) represents database objects in a grid. The object kind to display is defined on the top of the [Navigation bar](#). The columns correspond to the objects properties and rows correspond to the objects. Click the column caption to sort objects by the values of this column in the ascending or descending mode. The navigation buttons allow you to open current object editor, create new or drop the existing one.

As [Object Manager](#) the browser allows you to operate on several objects at a time. You have an opportunity to select a batch of objects and after the object group is selected, you can operate on it (e.g. *drop several objects at once*) as if it were a single object.

The unique feature of the Firebird Maestro is an opportunity of drag-and-drop operations between [Object Browser](#) and [SQL Editor](#), [SQL Script Editor](#). After the action objects are represented in [SQL Editor](#) as SQL queries (if they contain data) or as their full name in the database otherwise. [SQL Script Editor](#) displays the objects as SQL definition.

### Grouping database objects

You can group grid objects by any of the columns by dragging the column header to the destination area. Now all the records are displayed as subnodes to the grouping row value as shown in the picture. To reverse grouping, just drag the column name from the upper area back.

### Filtering database objects

You can filter objects in the grid using one of the following methods:

- use the drop-down button in the column caption area to filter objects by the value of the selected column
- click the drop-down button in the column caption area, then select the [Custom](#) item and build a simple filter within the dialog in the following way: select a logical operator for checking the column values (like is less than, is greater than, etc) and set the value to be checked by this operator in the neighboring box; then set the second condition if necessary in the following way and set the relation between these two conditions, whether both of them should be matched or just one of them; use the '\_' character to represent any single symbol in the condition and the '%' character to represent any series of symbols in the condition

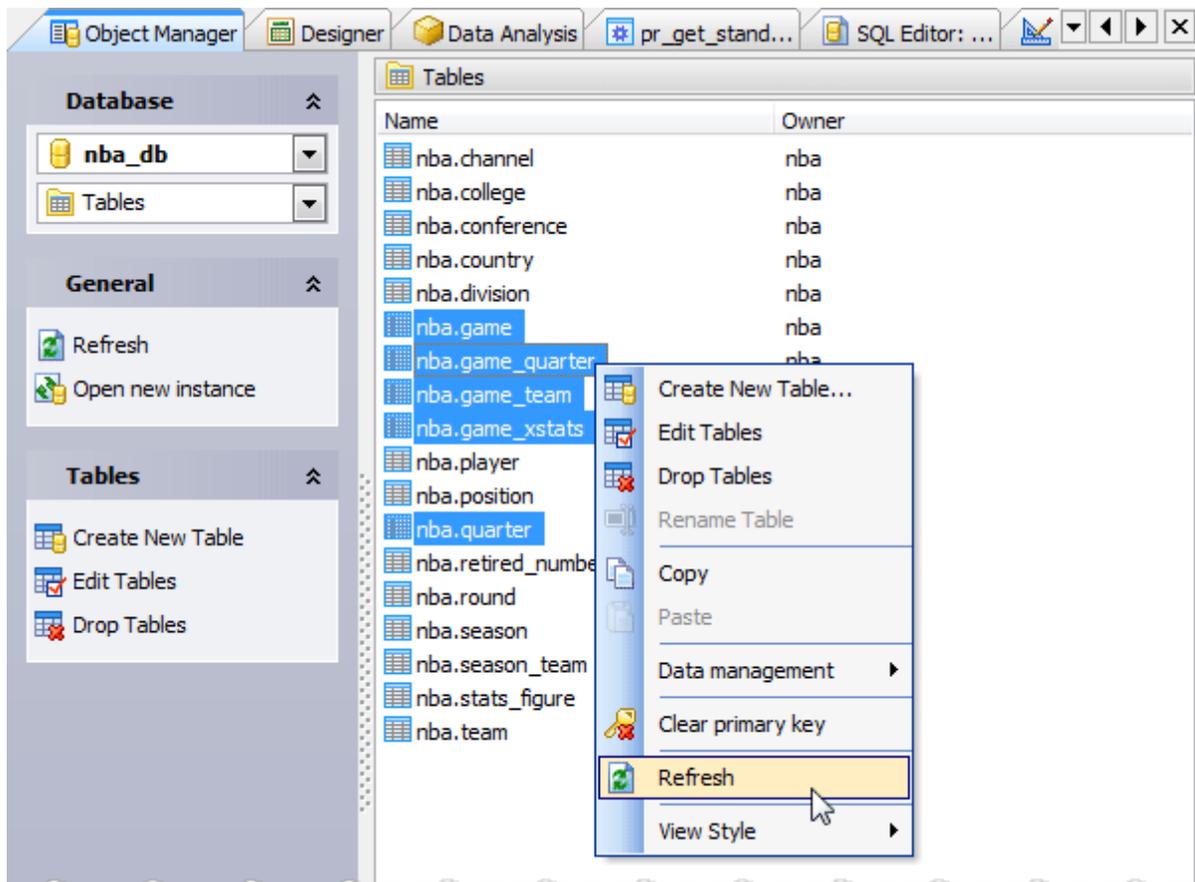
After you set a filter, the filtering panel becomes visible at the bottom of the grid where you can see the active filtering condition and easily enable or disable it by clicking the check box on the left. Using this panel you can also customize your filter in a more complicated way by clicking the [Customize](#) button and building your filter within the FilterBuilder dialog.

**See also:** [Object Manager](#)<sup>[61]</sup>, [Data View](#)<sup>[106]</sup>

## 4.4.3 Object Manager

[Object Manager](#) is a tool for operating on database objects designed as an extension of the [Database Explorer](#)<sup>[36]</sup> with advanced features, such as multiple selecting of objects (for *copying*, *dropping*, etc.) and the ability of using drag-and-drop operations between [Object Manager](#) and [Database Explorer](#) as well as between two instances of the [Object Manager](#). To open [Object Manager](#) select the [Object | Object Manager](#) main menu item.

**Note:** At least one connection to a database should be established to make [Object Manager](#) available.



### Using popup menu

The popup menu of [Object Manager](#) may have different content depending on the current selection. The common menu items allow you to switch the object list view between four standard modes (*large icons*, *small icons*, *list* and *report*), refresh the current view, and select all the objects in the view. If none of objects are currently selected, other menu items are unavailable to use, except of the one for creating a new object. If one or more objects are selected, clipboard operations (such as copy and paste) become available as well as the items for editing and dropping selected object(s). If the current object type of the Object Manager is "Tables", the *Empty Table(s)* menu item is also available.

### Multiple selecting of database objects

[Object Manager](#) allows you to operate on several objects at a time. You have an opportunity to select a batch of objects and after the object group is selected, you can operate on it (e.g. *drop several objects at once*) as if it were a single object.

**See also:** [Object Browser](#)

## 4.4.4 Filter Builder Dialog

Filter Builder Dialog allows to limit represented objects according to specified conditions. It may be useful for filtering records in data grids of Table Editors, SQL Editor or Visual Query Builder as well as to filter database objects in Object Browser, and on setting a condition on a new view creating. All these cases are similar, see how it works on the

following example.

## 5 Database Objects

The following list contains database objects supported by Firebird Maestro. To work with database objects you should [connect to the database](#) first.

- [Tables](#)
- [Views](#)
- [UDFs](#)
- [Domains](#)
- [Sequences](#)
- [Roles](#)
- [Procedures](#)
- [Exceptions](#)
- [Database Triggers](#)
- [Packages](#)
- [Package Bodies](#)
- [DDL Triggers](#)

## 5.1 Tables

Firebird Maestro allows you to manipulate tables with easy: add new tables to the database, modify existing ones, browse table options and data. The sections below describe each of these actions in detail.

### ■ How can I add a new table?

New tables are created within [Create Table Wizard](#)<sup>[66]</sup>. In order to run the wizard you should either

- select the [Object | Create Database Object...](#) main menu item;
- select the [Table](#) icon in the [Create Database Object](#) dialog

or

- select the [Tables](#) list or any object from that list in the explorer tree;
- select the [Create New Table...](#) item from the popup menu.

To create a new table with the same properties as one of the existing tables has:

- select the [Object | Duplicate Database Object...](#) main menu item;
- follow the instructions of [Duplicate Object Wizard](#).

### ■ How can I work with an existing table?

Tables can be edited within [Table Editor](#)<sup>[66]</sup>. In order to run the editor you should either

- select the table for editing in the explorer tree (type the first letters of the table name for quick search);
- select the [Edit Table...](#) item from the popup menu

or

- open [Schema \(Database\) Editor](#) and the [Tables](#) tab there;
- select the table to edit;
- press the **Enter** key or select the [Edit Table](#) item from the popup menu (alternatively, you may use the corresponding link of the [Navigation Bar](#)).

You can also view and edit table properties without launching [Table Editor](#):

- select the table for editing in the explorer tree (type the first letters of the table name for quick search);
- select the [Table Properties...](#) item from the popup menu;
- edit table properties within the [Table Properties](#) dialog.

### ■ How can I drop the existing table?

To drop a table:

- select the table to drop in the explorer tree;
- select the [Drop Table](#) item from the popup menu

or

- open [Schema \(Database\) Editor](#) and the [Tables](#) tab there;
- select the table to drop;
- press the **Delete** key or select the [Drop Table](#) item from the popup menu (alternatively, you may use the corresponding link of the [Navigation Bar](#))

and confirm dropping in the dialog window.

Table Editor allows you to work with table data including [master-detail views](#)<sup>[70]</sup>, generate [simple SQL statements](#)<sup>[241]</sup>, [CRUD procedures](#)<sup>[242]</sup> to work with this table, and [split the table](#)<sup>[243]</sup> into two separate tables.

### 5.1.1 Create Table Wizard

[Create Table Wizard](#) guides you through the process of creating a new database table. The basic principles of Create Object Wizards in Firebird Maestro are explained in a [separate topic](#)<sup>[40]</sup>. Below you will find a description of wizard steps that are unique for the current object.

#### Name

The name of the table being created as it was specified at the previous step.

#### Owner

You can specify here the name of the Firebird server user that will own the new table, or leave this field blank to use the default user (namely, the user executing the command). By default, only the owner of an object can perform various operations with the object. In order to allow other users to operate it, privileges must be granted. (However, users that have the superuser attribute can always access any object.)

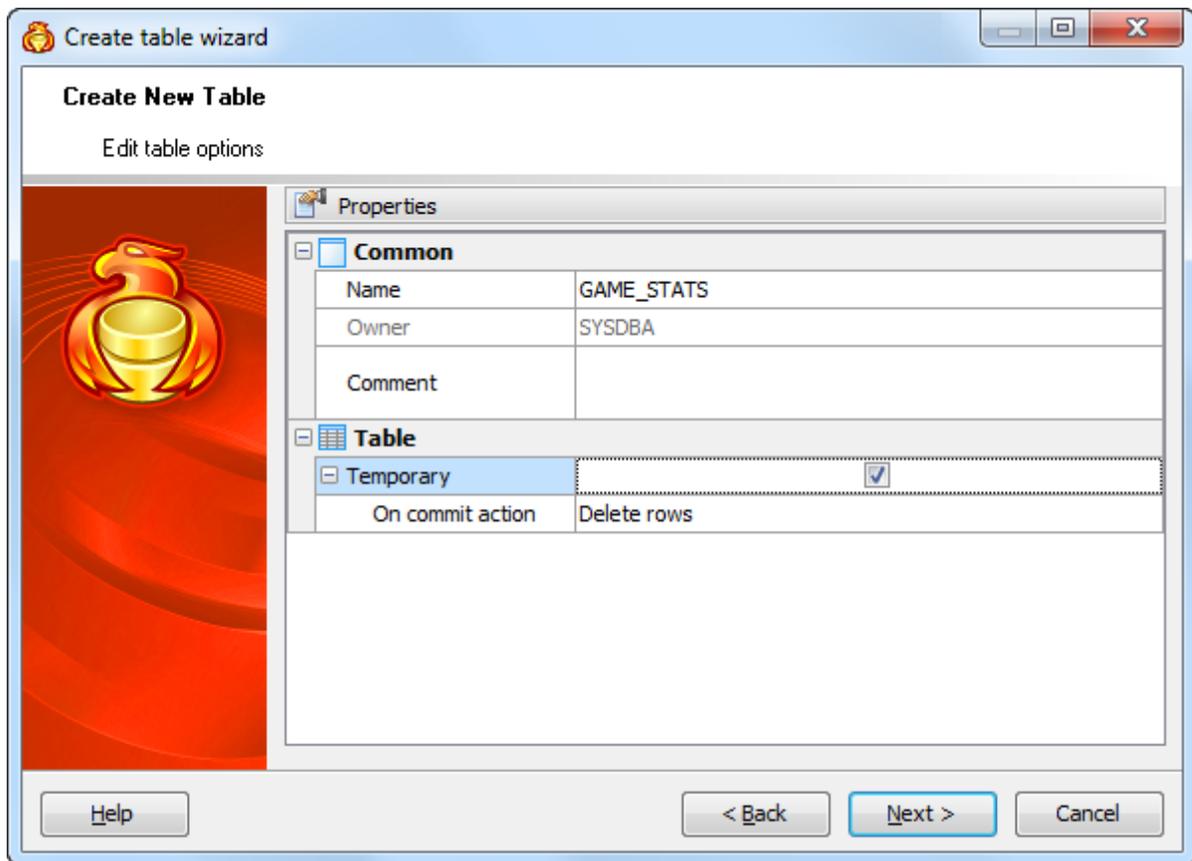
#### Comment

Set the optional text to describe the new table.

Check the [Temporary](#) box to create a global temporary tables (Firebird 2.1+). Global temporary tables are tables that are stored in the system catalogue with permanent metadata, but with temporary data. Data from different connections (or transactions, depending on the scope) are isolated from each other, but the metadata of such tables are shared among all connections and transactions. In case the option is ON, select the [On commit action](#):

[Delete action](#) Data in the given table are deleted from the database immediately after the end of the transaction.

[Preserve rows](#) Data left in the given table after the end of the transaction remain in database until the connection ends.

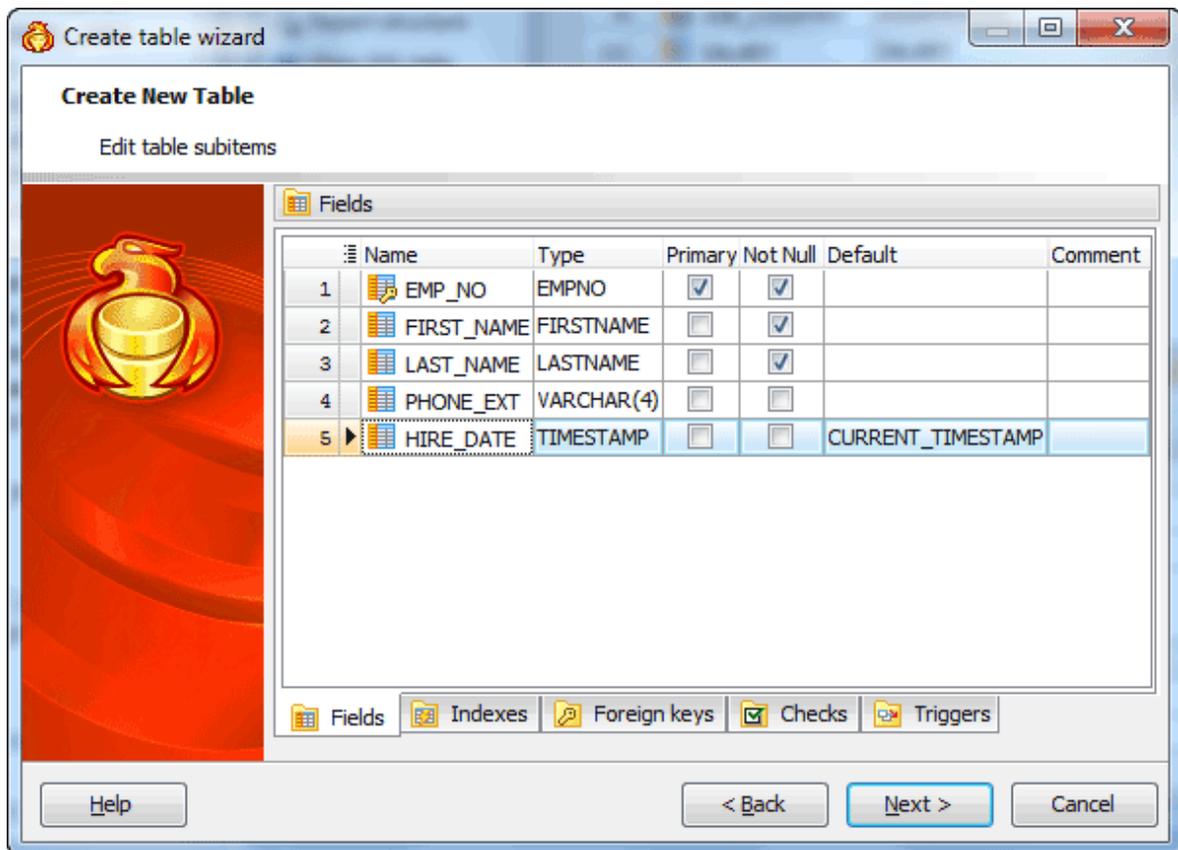


### Adding table subitems

On this step of the wizard you can fulfill the new table with fields, indexes, and foreign keys. To add a new object:

- Choose the necessary page ([Fields](#) - to add table fields, [Indexes](#) - table indexes, and so on);
- Follow the corresponding link of the tab's pop-up menu;
- Specify properties of the new object. To find the description of [field](#)<sup>[72]</sup>, [foreign\\_key](#)<sup>[81]</sup>, [check](#)<sup>[84]</sup>, [trigger](#)<sup>[87]</sup>, and [index](#)<sup>[78]</sup>, follow the according link.

The popup menu of each tab allows to edit, drop, reorder, and rename specified objects, etc.



Click **Add All** or **Add** to include table(s) to table definition. Use the **Remove** or **Remove All** items to exclude table(s) from the list.

## 5.1.2 Table Editor

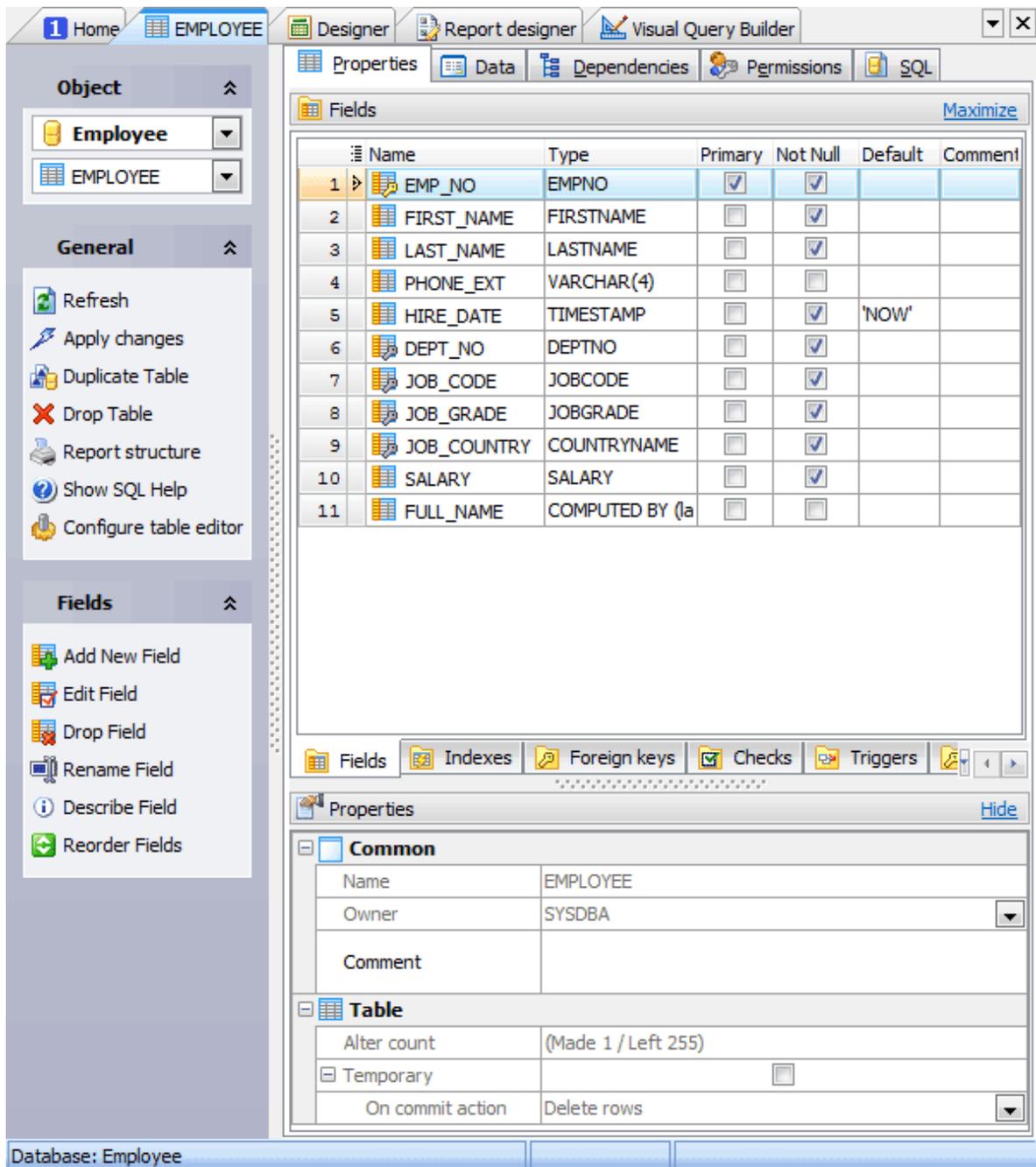
**Table Editor** allows you to create, edit and drop table fields, indexes, foreign keys, manage table data and other table subobjects. It can be opened automatically after the table is created and is available on editing the table. To open **Table Editor**, double-click the corresponding node at the **Explorer Tree** or **Object Manager**.

The basic principles of Object Editors in Firebird Maestro are explained in a [separate topic](#)<sup>[43]</sup>. Below you will find a description of editor tabs that are unique for the current object.

- [Editing table properties](#)<sup>[68]</sup>
- [Viewing table data](#)<sup>[70]</sup>

### 5.1.2.1 Editing table properties

The **Properties** section allows you to view general table properties and also to modify a comment for the table.



### Subitems

Every tab is intended for work with defined *objects* (*fields, indexes, etc.*). To modify any object, double click it or use grid's popup menu. The menu also allows you to add new, rename, describe, copy/paste, and drop selected objects. To operate with several objects at a time, select them with the **Shift** or the **Ctrl** key pressed. After a group of objects is selected you can operate with it, e.g. *delete several objects at once*, as if it is a single object.

**See also:** [Fields](#)<sup>[72]</sup>, [Foreign Keys](#)<sup>[81]</sup>, [Checks](#)<sup>[84]</sup>, [Triggers](#)<sup>[88]</sup>, and [Indexes](#)<sup>[78]</sup>.

### Owner

You can view the name of the table **Owner**.

By default, only the owner of an object can perform various operations with the object. In order to allow other users to operate it, privileges must be granted. (However, users that have the superuser attribute can always access any object.)

### Comment

This field contains a comment to the table.

### Alter count

Defines the amount of table alters that were made and left. If Left alter account is close to zero, you are recommended to [backup](#)<sup>[254]</sup> and [restore](#)<sup>[256]</sup> the database. Otherwise, if the left alter count is equal to 0, you cannot change metadata of this table.

The checked **Temporary** option means the table is a global temporary tables (Firebird 2.1+). The **On commit action** defines the kind of the temporary table.

**Delete action** Data in the given table are deleted from the database immediately after the end of the transaction.

**Preserve rows** Data left in the given table after the end of the transaction remain in database until the connection ends.

To apply the changes, select the **Apply Changes** item in the **Navigation bar** or use **Ctrl+F9** or **Ctrl+F7** shortcut keys.

It is also possible to modify object properties without opening the object editor: use the **Object Properties** item of the popup menu of the selected object from the explorer tree.

## 5.1.2.2 Managing table data

The **Data** tab displays the table data as a grid or as info cards (see [Data View](#)<sup>[166]</sup> for details). To edit/add a table record, use **Data Input Form** or type the new data directly in the grid (card). To export/import/get SQL dump of the table data, invoke corresponding modules from the grid's popup menu. To view and edit the content of BLOB columns, run [BLOB Editor](#)<sup>[177]</sup>.

### Lookup editors

Lookup editor displays the content of parent table's columns within the drop-down window. Firebird Maestro enables a lookup editor for a column linked by a foreign key with a single column from another table. To get the corresponding data, double click the field or use **F2** shortcut and press **Alt+Down Arrow Key**.

1	7	LINDA	WILLIAMS	LINDA.WILLIAMS@sakilacustomer.org		1
2	8	BARBARA	JONES	BARBARA.JONES@sakilacustomer.org		1
1	9	ELIZABETH	BROWN	ELIZABETH.BROWN@sakilacustomer.org		1
2		address_id	address	district	city_id	postal_code
1	5	5	1913 Hanoi Way	Nagasaki	463	35200
2	6	6	1121 Loja Avenue	California	449	17886
2	7	7	692 Joliet Street	Attika	38	83579
1	8	8	1566 Inegl Manor	Mandalay	349	53561
2	9	9	53 Idfu Parkway	Nantou	361	42399
1	10	10	1795 Santiago de Compostela Way	Texas	295	18743
2	11	11	900 Santiago de Compostela Parkway	Central Serbia	280	93896
2	12	12	478 Joliet Way	Hamilton	200	77948
1	21	DONNA	THOMPSON	DONNA.THOMPSON@sakilacustomer.org		1

### Master-Detail Data View

To get data in the [master-detail](#) view mode (multiple detail pages are displayed for a single master row), use the [Show/Hide details](#) link at the editor's navigation bar. This mode allows you add/edit/delete data of detail pages. To open/close the appropriate detail page click the +/- icon or use +/- shortcuts.

6	+	710	Mountain Bike Socks, L	SO-B909-L	White	3,3963	9,5
7	+	711	Sport-100 Helmet, Blue	HL-U509-B	Blue	13,0863	34,99
8	-	712	AWC Logo Cap	CA-1098	Multi	6,9223	8,99
1 SalesOrderDetail (ProductID)							
SalesOrderID SalesOrderDetailID OrderQty ProductID UnitPrice UnitPriceDisc							
Click here to define a filter							
1		71938		113283	1	712	5,394
2		71897		112902	4	712	5,394
3		71858		112375	3	712	5,394
4		71902		112962	3	712	5,394
5		71797		111053	6	712	5,394
6		71816		111457	4	712	5,394
7		71784		110761	10	712	5,394
8		71783		110748	11	712	5,2142
9		71782		110670	10	712	5,394
9	+	713	Long-Sleeve Logo Jersey, S	LJ-0192-S	Multi	38,4923	49,99
10	+	714	Long-Sleeve Logo Jersey, M	LJ-0192-M	Multi	38,4923	49,99
11	+	715	Long-Sleeve Logo Jersey, L	LJ-0192-L	Multi	38,4923	49,99

### Import from Clipboard

Firebird Maestro supports data import from clipboard. It is supposed that columns within the data block are separated by the tabulation symbol, records are separated by

newlines and the first line of the data block contains column headers.

Example:

```
ColHeader1 ColHeader2
R1C1      R1C2
R2C1      R2C2
```

The same data format is supported by a lot of other applications, so the ability allows you to copy data from MS Excel, another table or view, or even from a data set from a different DBMS especially if it is opened with an appropriate our product.

### Uploading files as BLOBs

Firebird Maestro allows you to upload files as BLOBs into a table. For this purpose the file names must contain the information on the record they need to be placed to: the files need to be named in the same manner and include content of one or several table columns that can uniquely identify each row. To import files, specify the file name template using file name tags (i.e. %id%, %user%, where 'id' and 'user' are the fact table columns). You can also set the default file to be uploaded to NULL fields.

Example:

Suppose we have a table 'employee' with Non-Blob data as follows:

```
Id      User
1       Max
2       July
```

And we need to import the 1.jpg and 2.jpg files to a BLOB column of the table. The files are stored in the "D:\Images" directory. In this case we need to specify the "D:\Images\%Id%.jpg" file name template.

## 5.1.3 Fields

Table columns are created and edited within the [Field Editor](#).

### ■ How to add a new column to a table?

To add a new table column, you should either:

- open the table in [Table Editor](#) and the [Fields](#) tab there;
- press the **Insert** key or select the [Add New Field...](#) item from the popup menu (alternatively, you may use the corresponding link of the [Navigation Bar](#))

or

- select the table in the explorer tree and use the [Create New Field](#) popup menu item

or

- select the table [Fields](#) node or any field within the table in the explorer tree and use the [Add New Field...](#) popup menu item.

### ■ How to edit an existing table field?

Table fields are edited within the [Field Editor](#)<sup>[72]</sup> dialog window. In order to open the dialog you should either

- open the table in [Table Editor](#) and the [Fields](#) tab there;
- press the **Enter** key or select the [Edit Field](#) item from the popup menu (alternatively, you may use the corresponding link of the [Navigation Bar](#))

or

- select the field to edit in the explorer tree and use the [Edit Field](#) popup menu item.

You can change the name of the field using the [Rename Field](#) dialog. To open the dialog you should either

- select the field to rename in the explorer tree;
- select the [Rename Field](#) item from the popup menu

or

- open the table in [Table Editor](#) and the [Fields](#) tab there;
- select the field to rename;
- select the [Rename Field](#) item from the popup menu (alternatively, you may use the corresponding link of the [Navigation Bar](#)).

#### ■ How to drop an existing table field?

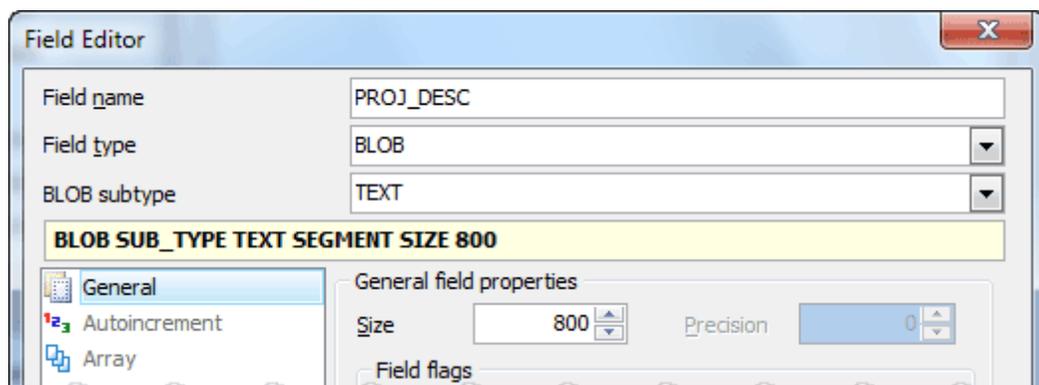
To drop the table field:

- select the field to drop in the explorer tree;
- select the [Drop Field](#) item from the popup menu

or

- open the table in [Table Editor](#) and the [Fields](#) tab there;
- press the **Delete** key or select the [Drop Field](#) item from the popup menu (alternatively, you may use the corresponding link of the [Navigation Bar](#))

and confirm dropping in the dialog window.



To specify the [Data Type](#), select it from the drop-down list.

**Note:** the name of the object must be unique among all the object names in the table. You can use any identifier that is allowed by Firebird server.

### Subtype

Specify subtype for BLOB. The subtypes are used to categorize the data type when defining BLOBs. A subtype is a positive or negative numerical value, which indicates the type of BLOB data. The following subtypes are predefined in InterBase/Firebird:

- 0*: Standard blob, non-specified binary data;
- 1*: Text blob, e.g. memo fields;
- Text*: Alternative for defining subtype 1;
- Positive value*: Reserved for InterBase;
- Negative value*: User-defined blob subtypes.

### Segment size

A BLOB segment size can be defined to increase the performance when inputting and outputting blob data.

Using the menu to the left from the [Field Editor](#) window you can specify different field properties.

- [Setting general field options](#) <sup>[74]</sup>
- [Setting autoincrement options](#) <sup>[76]</sup>
- [Array declaration](#) <sup>[77]</sup>

#### 5.1.3.1 Setting general field options

##### General field properties

Here you can define the [Size](#) of the field value for NUMERIC, DECIMAL, CHAR and VARCHAR data types as well as the [Precision](#) for NUMERIC and DECIMAL data types.

##### Field flags

Not Null

Forbids the NULL values for the field.

Unique

Includes the field into the unique key (index).

Primary Key

With this option checked this field becomes the only field within a primary key. If you check this field, you will not be able to set this attribute for any other field in the table. So if you want to create a compound primary key, do not check this field but create a primary key through the Indexes tab of [Table Editor](#) <sup>[68]</sup> or at the appropriate step of [Create Table Wizard](#) <sup>[69]</sup>.

##### Charset

Defines charset for CHAR, VARCHAR and BLOB data types.

##### Collate

Establishes the default sorting behavior for the column.

##### Default value

Specifies a default column value. The possible alternatives are described below.

Value	Description	Example
-------	-------------	---------

<i>Literal</i>	Inserts a specified string, numeric value, or date value.	123, 'ABC'
<i>NULL</i>	Enters a NULL value.	NULL
<i>USER</i>	Enters the user name of the current user. Column must be of compatible text type to use the default.	USER

### Computed

Specifies that the value of the column data is calculated from *expression* at runtime and is therefore there is no allocated storage space in the database.

- *expression* can be any arithmetic expression valid for the datatypes in the expression;
- any columns referenced in *expression* must exist before they can be used in *expression*;
- *expression* cannot reference Blob columns;
- *expression* must return a single value, and cannot return an array.

### Comment

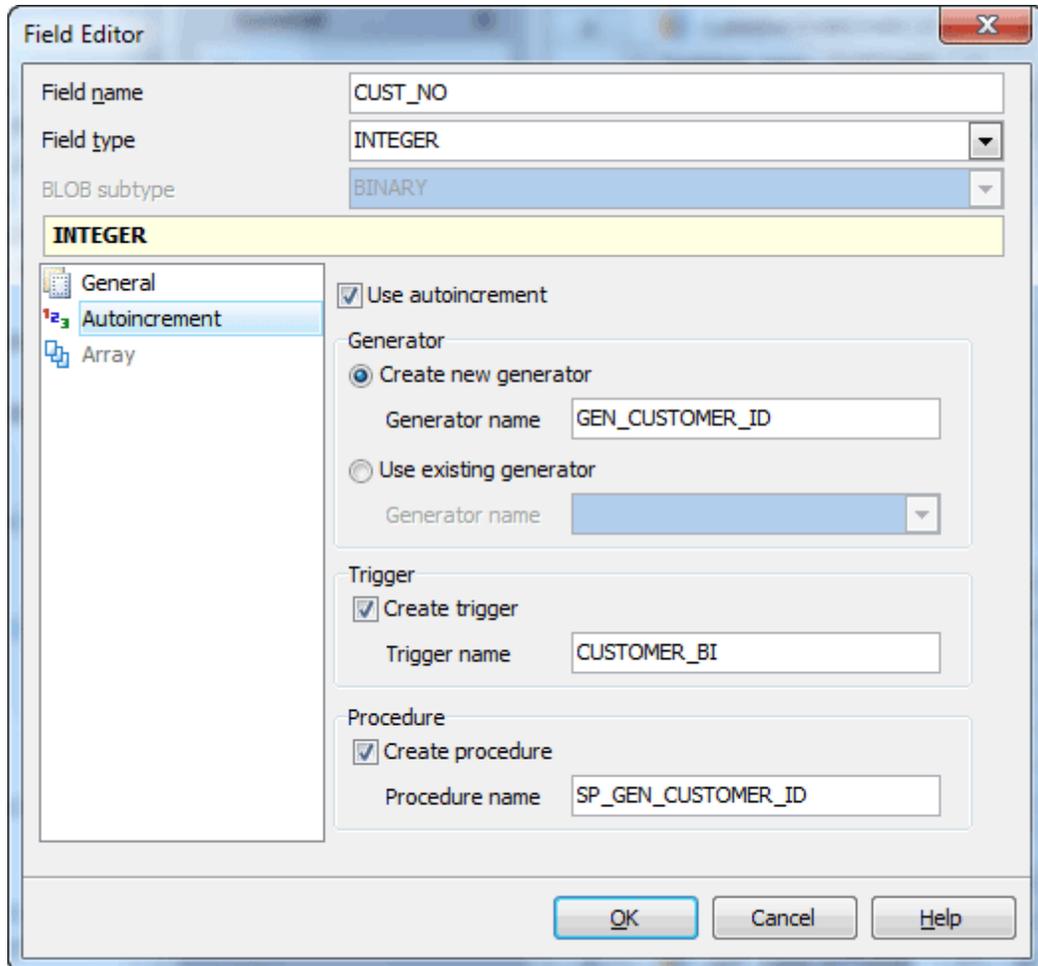
This field stores a comment to the field.

The screenshot shows the 'Field Editor' dialog box with the following configuration:

- Field name:** HIRE\_DATE
- Field type:** TIMESTAMP
- BLOB subtype:** BINARY
- General field properties:**
  - Size: 0
  - Precision: 0
  - Field flags:
    - Not null
    - Primary key
    - Identity (3.0 and higher)
- Charset:** (empty)
- Collate:** (empty)
- Default value:** CURRENT\_DATE
- Computed:** (empty)
- Comment:** (empty)

### 5.1.3.2 Setting autoincrement options

This node is available when SMALLINT, INTEGER, BIGINT, NUMERIC or DECIMAL field type is selected.



Use autoincrement

If checked, the field is autoincrement.

**Generator**

**Create new generator**

If selected, a new generator will be created for this field.

**Use existing generator**

If selected, an existing generator will be used for this field.

**Generator name**

Defines the name of a new or existing generator.

**Trigger**

Create trigger

If checked, the trigger realizing autoincrement function will be created for the field.

**Trigger name**

Defines the name of an autoincrement trigger.

**Procedure**

Create procedure

If checked, the procedure realizing autoincrement function will be created for the field.

**Procedure name**

Defines the name of an autoincrement procedure.

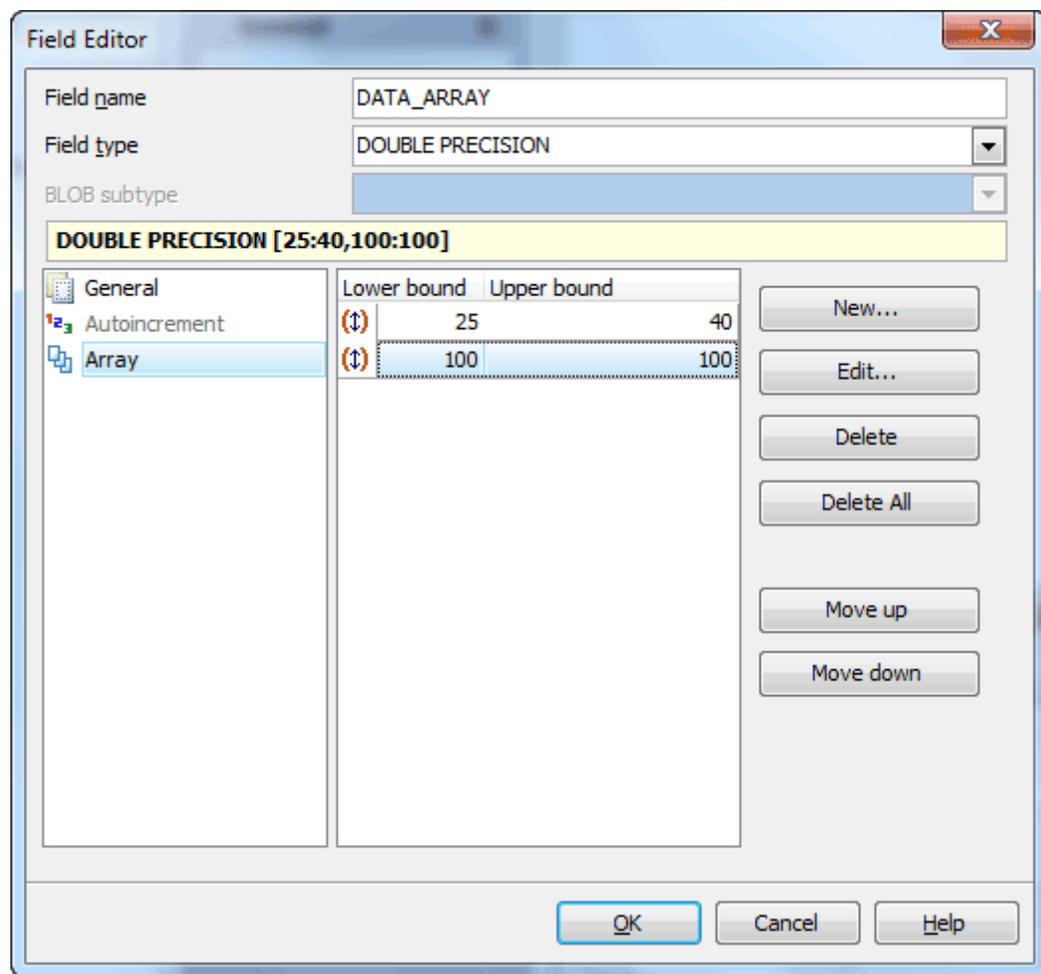
**5.1.3.3 Array declaration**

This node is available, when `SMALLINT`, `INTEGER`, `BIGINT`, `FLOAT`, `DOUBLE PRECISION`, `NUMERIC`, `DECIMAL`, `DATE`, `TIME`, `TIMESTAMP`, `CHAR` or `VARCHAR` field type is selected.

Click the [Add](#) button to add a new dimension and set its properties in [Dimension Editor](#).

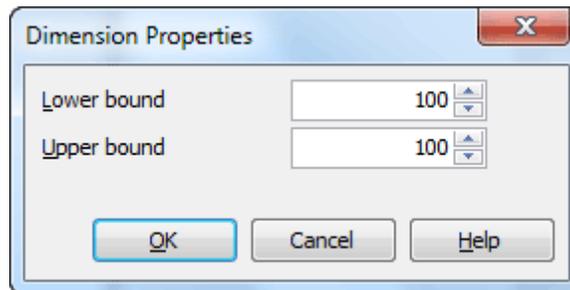
Click the [Edit](#) button to edit the selected dimension, or the [Delete](#) button to delete one.

To move among array dimensions, you can use [Move up](#) and [Move down](#) buttons.



Use [Lower bound](#) and [Upper bound](#) to set the bounds of the array dimension within

Dimension Editor.



## 5.1.4 Indexes

**Indexes** are primarily used to enhance database performance (though inappropriate use may result in slower performance). The key field(s) for the index are specified as column names, or alternatively as expressions written in parentheses in Firebird server version 2.0 and higher. Multiple fields can be specified if the index method supports multicolumn indexes.

### ■ How can I create a table index?

Table indexes are created within the [Index Properties](#) dialog window. In order to open the dialog you should either

- open the table in [Table Editor](#) and the [Indexes](#) tab there;
- press the **Insert** key or select the [Add New Index...](#) item from the popup menu (alternatively, you may use the corresponding link of the [Navigation Bar](#))

or

- select the table in the explorer tree and use the [Create New Index](#) popup menu item

or

- select the table [Indexes](#) node or any index within the table in the explorer tree and use the [Add New Index...](#) popup menu item.

### ■ How can I edit an existing index?

Table indexes are edited within the [Index Properties](#) dialog window. In order to open the dialog you should either

- open the table in [Table Editor](#) and the [Indexes](#) tab there;
- press the **Enter** key or select the [Edit Index](#) item from the popup menu (alternatively, you may use the corresponding link of the [Navigation Bar](#))

or

- select the index to edit in the explorer tree and use the [Edit Index](#) popup menu item.

You can change the name of the index using the [Rename Index](#)

dialog. To open the dialog you should either

- select the index to rename in the explorer tree;
- select the [Rename Index](#) item from the popup menu

or

- open the table in [Table Editor](#) and the [Indexes](#) tab there;
- select the index to rename;
- select the [Rename Index](#) item from the popup menu (alternatively, you may use the corresponding link of the [Navigation Bar](#)).

#### ■ **How can I drop a table index?**

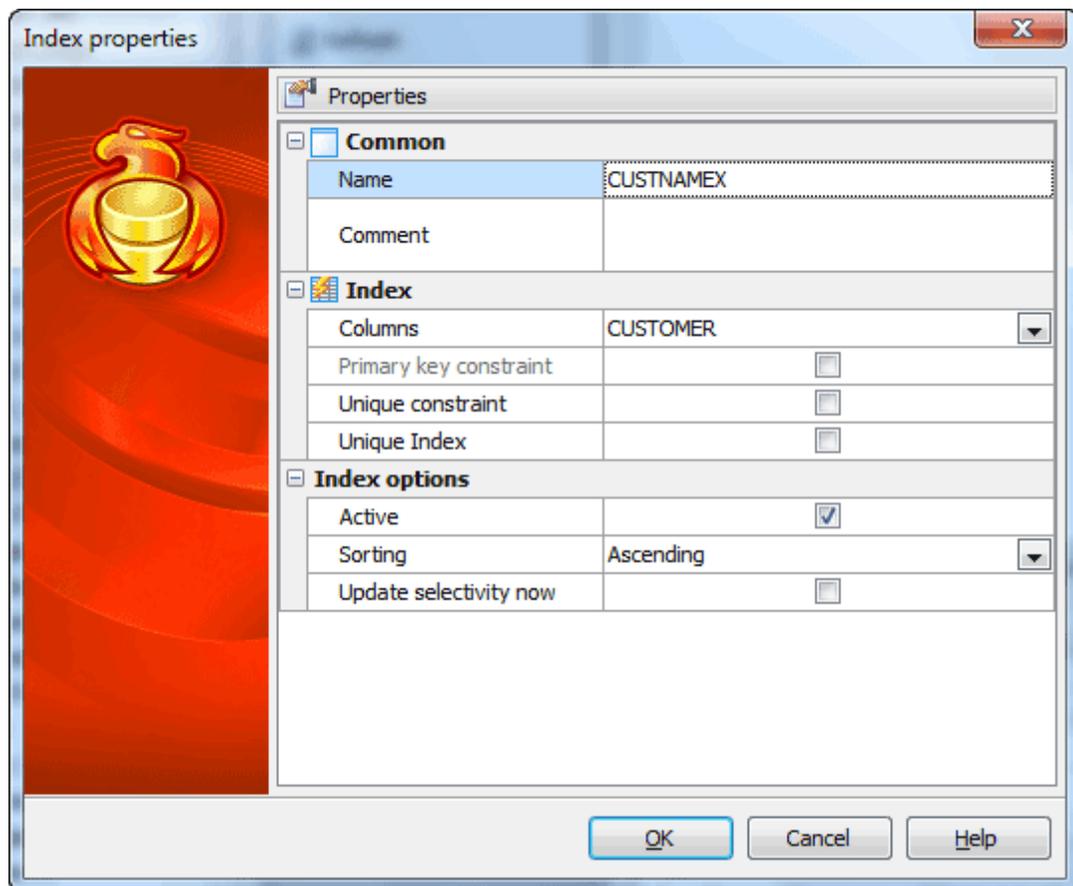
To drop the table index:

- select the index to drop in the explorer tree;
- select the [Drop Index](#) item from the popup menu

or

- open the table in [Table Editor](#) and the [Indexes](#) tab there;
- press the **Delete** key or select the [Drop Index](#) item from the popup menu (alternatively, you may use the corresponding link of the [Navigation Bar](#))

and confirm dropping in the dialog window.



Use the **Columns** drop-down list to select a key field(s) for the index.

#### Expression

This field is available since Firebird 2.0. An index field can be an expression computed from the values of one or more columns of the table row. This feature can be used to obtain fast access to data based on some transformation of the basic data. For example, an index computed on `upper(col)` would allow the clause `WHERE upper(col) = 'JIM'` to use an index. To set the index expression, use the Add expression button and enter the expression in the corresponding window.

#### Example

Suppose, there is a table *Employee* with the *salary* and *premium* fields and queries as follows are executed very often.

```
SELECT *
FROM "Employee"
WHERE "salary"+"premium">5000;
```

To create an index making such queries faster, set *salary+premium* as the index expression.

#### Primary key constraint

With this option checked this field becomes a compound primary key. It is useful in case the table has more than one primary key. If checked, creates a primary key constraint.

Defines primary key constraint of table. A primary key is one or more columns, and their collective contents are guaranteed to be unique. A primary key column must also define the NOT NULL attribute. A table can have only one primary key.

[Unique constraint](#)

Check the option to permit no duplicate values. A unique column must also define the NOT NULL attribute. A table can have one or more unique keys.

[Unique Index](#)

If checked, creates a unique index for the table, i.e. the database system ensures that no two rows of the specified table have the same values in the indexed columns. In this way, if two rows both contain the NULL value for all columns of an index, the two index values are not considered to be identical. If at least one column does not contain the NULL value, two rows that have the same value in all non-NULL columns are considered to be identical.

[Active](#)

If checked, makes the index available for use. You can uncheck this option to temporarily deactivate the index.

[Sorting](#)

Sorts columns in ascending/descending order, the default order if none is specified.

[Update selectivity](#)

Check this box to recompute the selectivity of the index. You can also perform this action using the popup menu from the Indexes tab.

## 5.1.5 Foreign Keys

A foreign key is a field (or collection of fields) in one table that uniquely identifies a row of another table. In other words, a foreign key is a column or a combination of columns that is used to establish and enforce a link between the data in two tables.

**Note:** To create a foreign key constraint, it is necessary to have this privilege for both the referencing and referenced tables.

### **How can I add a new foreign key?**

Foreign keys are created within the [Foreign Key Properties](#)  dialog window. In order to open the dialog you should either

- open the table in [Table Editor](#) and the [Foreign Keys](#) tab there;
  - press the **Insert** key or select the [Add New Foreign Key...](#) item from the popup menu (alternatively, you may use the corresponding link of the [Navigation Bar](#))
- or
- select the table in the explorer tree and use the [Create New Foreign Key](#) popup menu item
- or
- select the table [Foreign Keys](#) node or any foreign key within the table in the explorer tree and use the [Add New Foreign Key...](#) popup menu item.

### ■ How can I edit an existing foreign key?

Foreign Keys are edited within the [Foreign Key Properties](#) <sup>[81]</sup> dialog window. In order to open the dialog you should either

- open the table in [Table Editor](#) and the [Foreign Keys](#) tab there;
- press the **Enter** key or select the [Edit Foreign Key](#) item from the popup menu (alternatively, you may use the corresponding link of the [Navigation Bar](#))

or

- select the foreign key to edit in the explorer tree and use the [Edit Foreign Key](#) popup menu item.

You can change the name of the foreign key using the [Rename Foreign Key](#) dialog. To open the dialog you should either

- select the foreign key to rename in the explorer tree;
- select the [Rename Foreign Key](#) item from the popup menu

or

- open the table in [Table Editor](#) and the [Foreign Keys](#) tab there;
- select the foreign key to rename;
- select the [Rename Foreign Key](#) item from the popup menu (alternatively, you may use the corresponding link of the [Navigation Bar](#)).

### ■ How can I drop a foreign key?

To drop the foreign key:

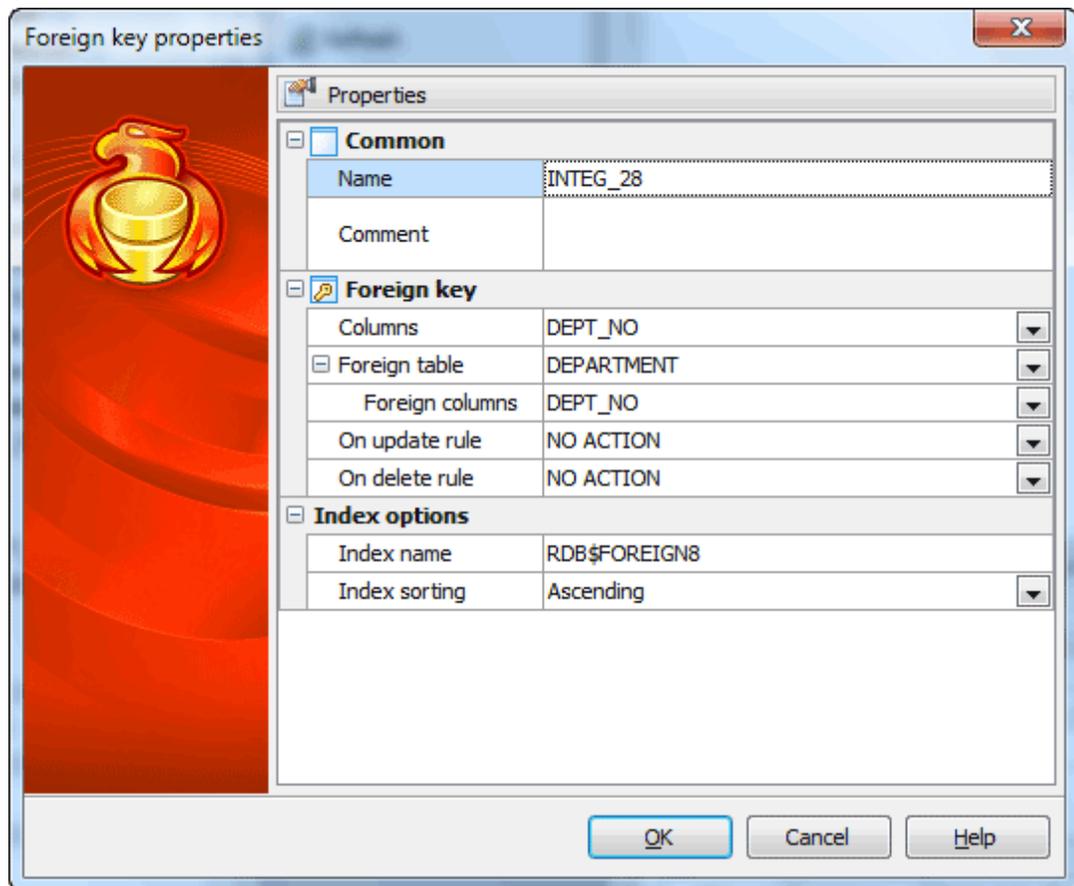
- select the foreign key to drop in the explorer tree;
- select the [Drop Foreign Key](#) item from the popup menu

or

- open the table in [Table Editor](#) and the [Foreign Keys](#) tab there;
- press the **Delete** key or select the [Drop Foreign Key](#) item from the popup menu (alternatively, you may use the corresponding link of the [Navigation Bar](#))

and confirm dropping in the dialog window.

Set the Foreign Key [Name](#), select [Columns](#) from the [Available Fields](#) list to include into the foreign key, select the Foreign Table [Name](#) from the drop-down list and its fields from the list to include, set other foreign key properties and apply the changes by clicking the [OK](#) button.



All the fields which are included into the Foreign Key must be included into indexes as well. See [Indexes](#) for details.

Set rules **ON DELETE** and **ON UPDATE** from the respective drop-down lists.

- **NO ACTION** Produce an error indicating that the deletion or update will create a foreign key constraint violation. If the constraint is deferred this error will be produced at constraint check time if there still exist any referencing rows. This is the default action.
- **CASCADE** Delete any rows referencing the deleted row, or update the value of the referencing column to the new value of the referenced column, respectively.
- **SET NULL** Set the referencing column(s) to null.
- **SET DEFAULT** Set the referencing column(s) to their default values.

#### Index name

Specify the index name for the foreign key.

#### Index sorting

*Ascending.* Sorts columns in ascending order, the default order if none is specified.

*Descending.* Sorts columns in descending order.

## 5.1.6 Checks

A [check](#) constraint is the most generic constraint type. It allows you to specify that the value in a certain column must satisfy a Boolean (truth-value) expression.

The [Check Properties](#) editor allows you to add a new check constraint or edit an existing one. This dialog can be invoked from [Table Editor](#)<sup>[84]</sup>, or via the popup menu of the corresponding nodes of the explorer tree.

### ■ How can I add a new check?

Checks are created within [Check Properties](#)<sup>[84]</sup>. In order to run the wizard you should either

- open the table in [Table Editor](#) and the [Checks](#) tab there;
- press the **Insert** key or select the [Add New Check...](#) item from the popup menu (alternatively, you may use the corresponding link of the [Navigation Bar](#))

or

- select the table in the explorer tree and use the [Create New Check...](#) popup menu item

or

- select the table [Checks](#) node or any check within the table in the explorer tree and use the [Add New Check...](#) popup menu item.

### ■ How can I edit an existing check?

Checks are edited within the [Check Properties](#)<sup>[84]</sup> dialog window. In order to open the dialog you should either

- open the table in [Table Editor](#) the [Checks](#) tab there;
- press the **Enter** key or select the [Edit Check](#) item from the popup menu (alternatively, you may use the corresponding link of the [Navigation Bar](#))

or

- select the check to edit in the explorer tree and use the [Edit Check](#) popup menu item.

You can change the name of the check using the [Rename Check](#) dialog. To open the dialog you should either

- select the check to rename in the explorer tree;
- select the [Rename Check](#) item from the popup menu

or

- open the table in [Table Editor](#) and the [Checks](#) tab there;
- select the check to rename;
- select the [Rename Check](#) item from the popup menu (alternatively, you may use the corresponding link of the [Navigation Bar](#)).

### ■ How can I drop a check?

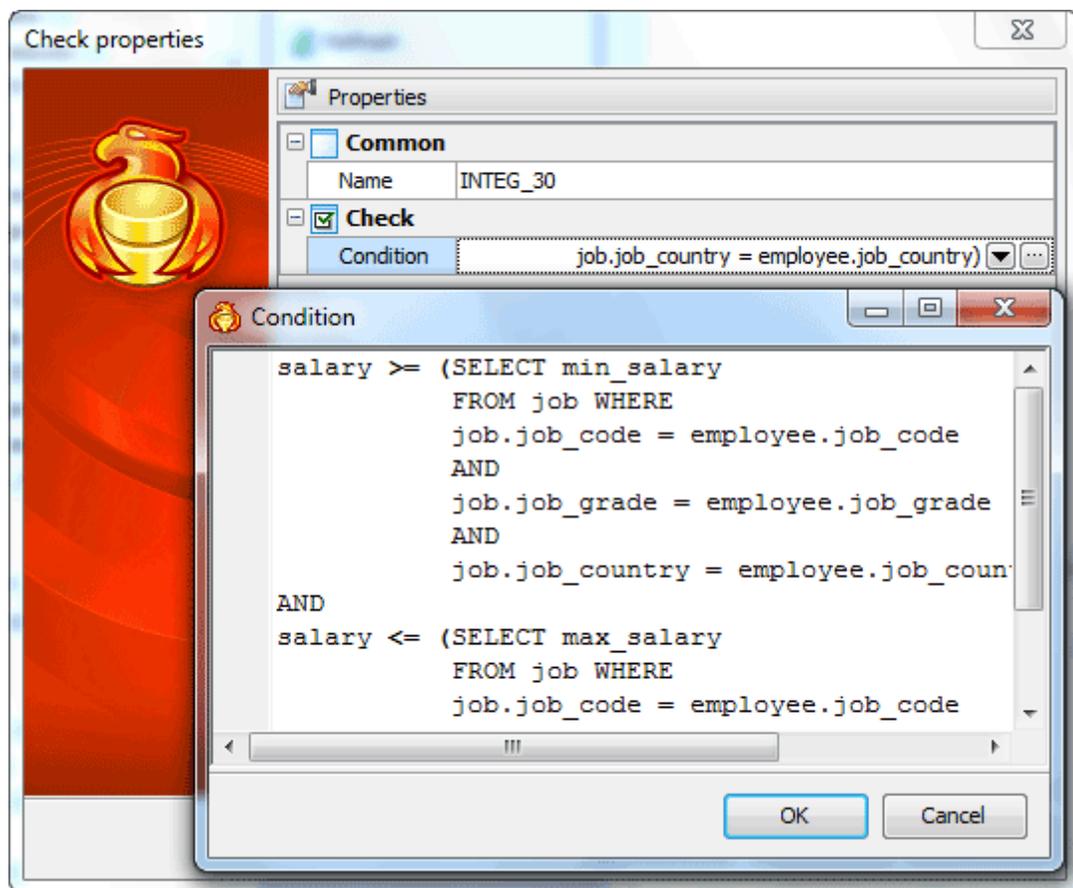
To drop the check:

- select the check to drop in the explorer tree;
- select the **Drop Check** item from the popup menu

or

- open the table in **Table Editor** and the **Checks** tab there;
- press the **Delete** key or select the **Drop Check** item from the popup menu (alternatively, you may use the corresponding link of the **Navigation Bar**)

and confirm dropping in the dialog window.



#### Name

The name of the check constraint.

#### Condition

Specify an expression producing a Boolean result which new or updated rows must satisfy for an insert or update operation to succeed. Expressions evaluating to **True** or **Unknown** succeed. In case any row of an insert or update operation produce a **FALSE** result an error exception is raised and the insert or update does not alter the database.

For example, you can specify the following condition for check, if you want to control the inserted salary value.

```
salary >= (SELECT min_salary FROM job WHERE
            job.job_code = employee.job_code AND
            job.job_grade = employee.job_grade AND
            job.job_country = employee.job_country) AND
salary <= (SELECT max_salary FROM job WHERE
            job.job_code = employee.job_code AND
            job.job_grade = employee.job_grade AND
            job.job_country = employee.job_country)
```

## 5.1.7 Triggers

A **trigger** is a specification that the database should automatically execute a particular function whenever a certain type of operation is performed. A trigger can be defined to execute before or after an INSERT, UPDATE, or DELETE operation, either once per modified row, or once per SQL statement. In Firebird 1.5 and higher multi-action trigger semantics is supported. If a trigger event occurs, the trigger fires.

### ■ How can I add a new trigger?

Triggers are created within [Create Trigger Wizard](#)<sup>[87]</sup>. In order to run the wizard you should either

- open the table in [Table Editor](#) and the [Triggers](#) tab there;
- press the **Insert** key or select the [Add New Trigger...](#) item from the popup menu (alternatively, you may use the corresponding link of the [Navigation Bar](#))

or

- select the table in the explorer tree and use the [Create New Trigger...](#) popup menu item

or

- select the table [Triggers](#) node or any trigger within the table in the explorer tree and use the [Add New Trigger...](#) popup menu item.

### ■ How can I edit an existing trigger?

Triggers are edited within the [Trigger Editor](#)<sup>[88]</sup> dialog window. In order to open the dialog you should either

- open the table in [Table Editor](#) and the [Triggers](#) tab there;
- press the **Enter** key or select the [Edit Trigger](#) item from the popup menu (alternatively, you may use the corresponding link of the [Navigation Bar](#))

or

- select the trigger to edit in the explorer tree and use the [Edit Trigger](#) popup menu item.

You can change the name of the trigger using the [Rename Trigger](#) dialog. To open the dialog you should either

- select the trigger to rename in the explorer tree;
- select the [Rename Trigger](#) item from the popup menu

or

- open the table in [Table Editor](#) and the [Triggers](#) tab there;
- select the trigger to rename;
- select the [Rename Trigger](#) item from the popup menu (alternatively, you may use the corresponding link of the [Navigation Bar](#)).

#### ■ **How can I drop a trigger?**

To drop the trigger:

- select the trigger to drop in the explorer tree;
- select the [Drop Trigger](#) item from the popup menu

or

- open the table in [Table Editor](#) and the [Triggers](#) tab there;
- press the **Delete** key or select the [Drop Trigger](#) item from the popup menu (alternatively, you may use the corresponding link of the [Navigation Bar](#))

and confirm dropping in the dialog window.

#### 5.1.7.1 **Create Trigger Wizard**

[Create Trigger Wizard](#) guides you through the process of creating of a new table trigger.

The basic principles of Create Object Wizards in Firebird Maestro are explained in a [separate topic](#)<sup>[40]</sup>. Below you will find a description of wizard steps that are unique for the current object.

##### **Specifying trigger properties**

In Firebird 1.5 and higher triggers are enhanced to enable them to handle multiple row-level operations conditionally

To define a new trigger, you need to set its.

##### [Comment](#)

This field contains a comment to the table trigger.

##### [Active](#)

If checked, it is specified that a trigger action takes effect when fired.

##### [Event \(INSERT, UPDATE, DELETE\)](#)

Specifies the table operation that causes the trigger to fire.

##### [Type](#)

**BEFORE**

Specifies that the trigger fires before the associated operation takes place.

**AFTER**

Specifies that the trigger fires after the associated operation takes place.

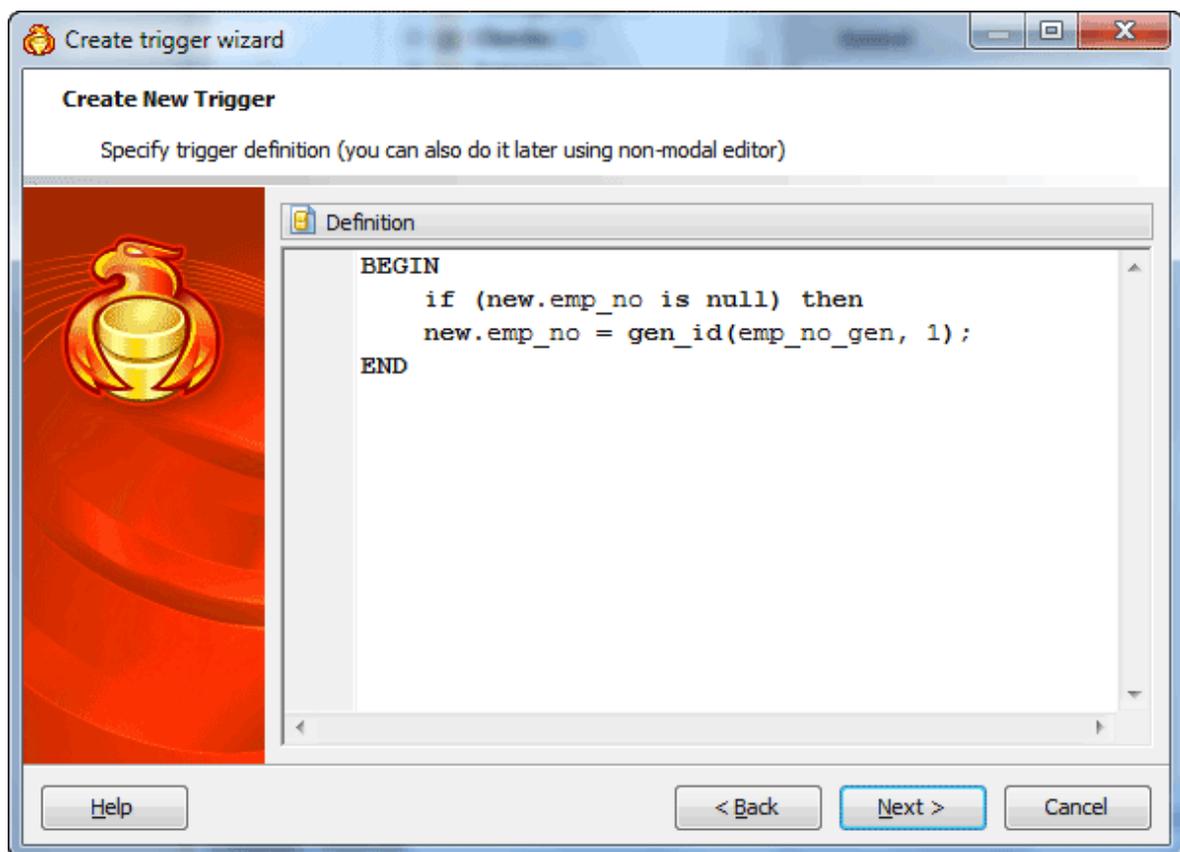
**Position**

Specifies firing order for triggers before the same action or after the same action; the number must be an integer between 0 and 32,767, inclusive. Lower-number triggers fire first.

**Specifying trigger definition**

Here you can specify the trigger [definition](#). Specify the trigger steps to be executed when the trigger fires. The step is optional: you can do it later using a non-modal editor.

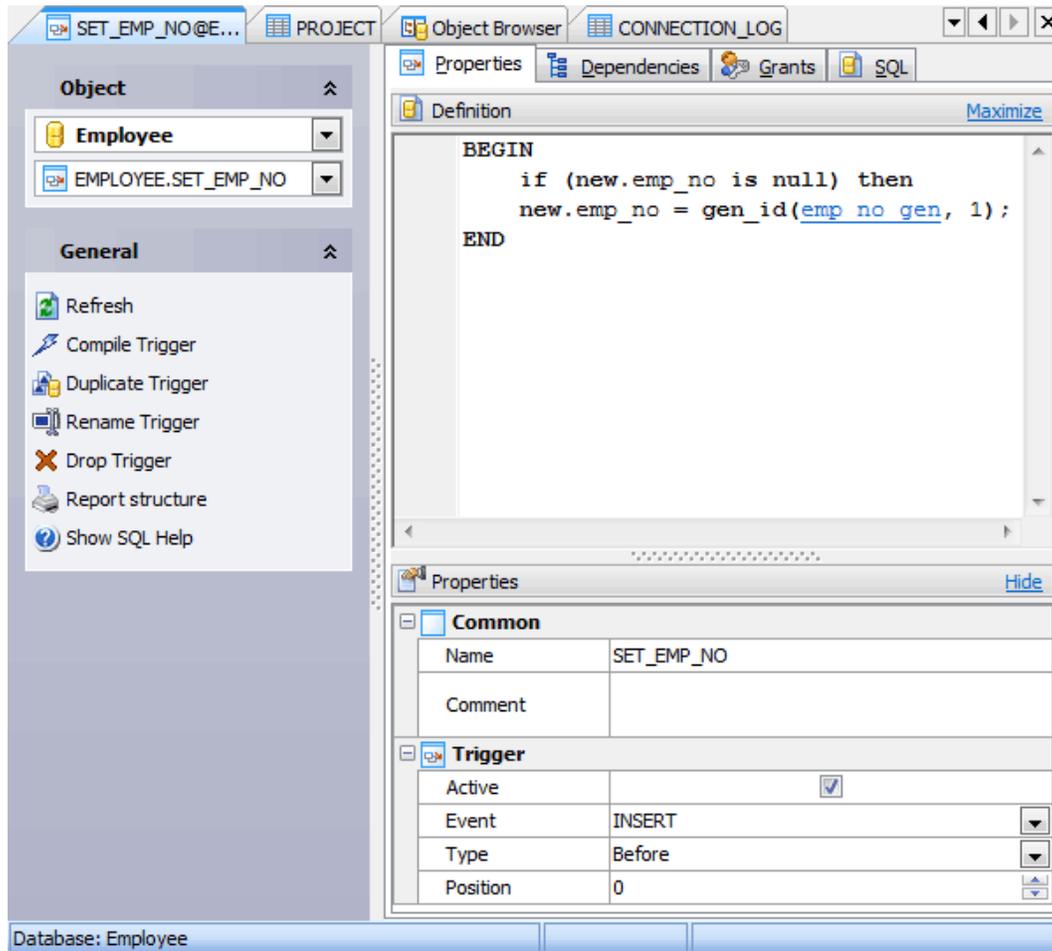
For example, for the table *Employee* it is possible to create after update save salary change trigger with the following definition:

**5.1.7.2 Trigger Editor**

[Trigger Editor](#) can be opened automatically after the trigger is created and is available on editing the trigger.

The basic principles of Object Editors in Firebird Maestro are explained in a [separate topic](#)<sup>43</sup>. Below you will find a description of editor tabs that are unique for the current

object.



The main tab of the editor consists of several parts:, trigger definition, and trigger properties.

### Definition

Defines the trigger conditions and actions.

### Properties

#### Name

Here you can view and change the trigger name.

**Note:** the name of the object must be unique among all the object names in its container. Moreover, all the objects that are source of data need unique names among themselves. You can use any identifier that is allowed by Firebird server.

#### Comment

This field contains a comment to the trigger.

#### Active

If checked, specifies that the trigger action takes effect when fired.

### Event (*INSERT, UPDATE, DELETE*)

Specifies the table operation that causes the trigger to fire.

#### Type

##### *BEFORE*

Specifies that the trigger fires before the associated operation takes place.

##### *AFTER*

Specifies that the trigger fires after the associated operation takes place.

#### Position

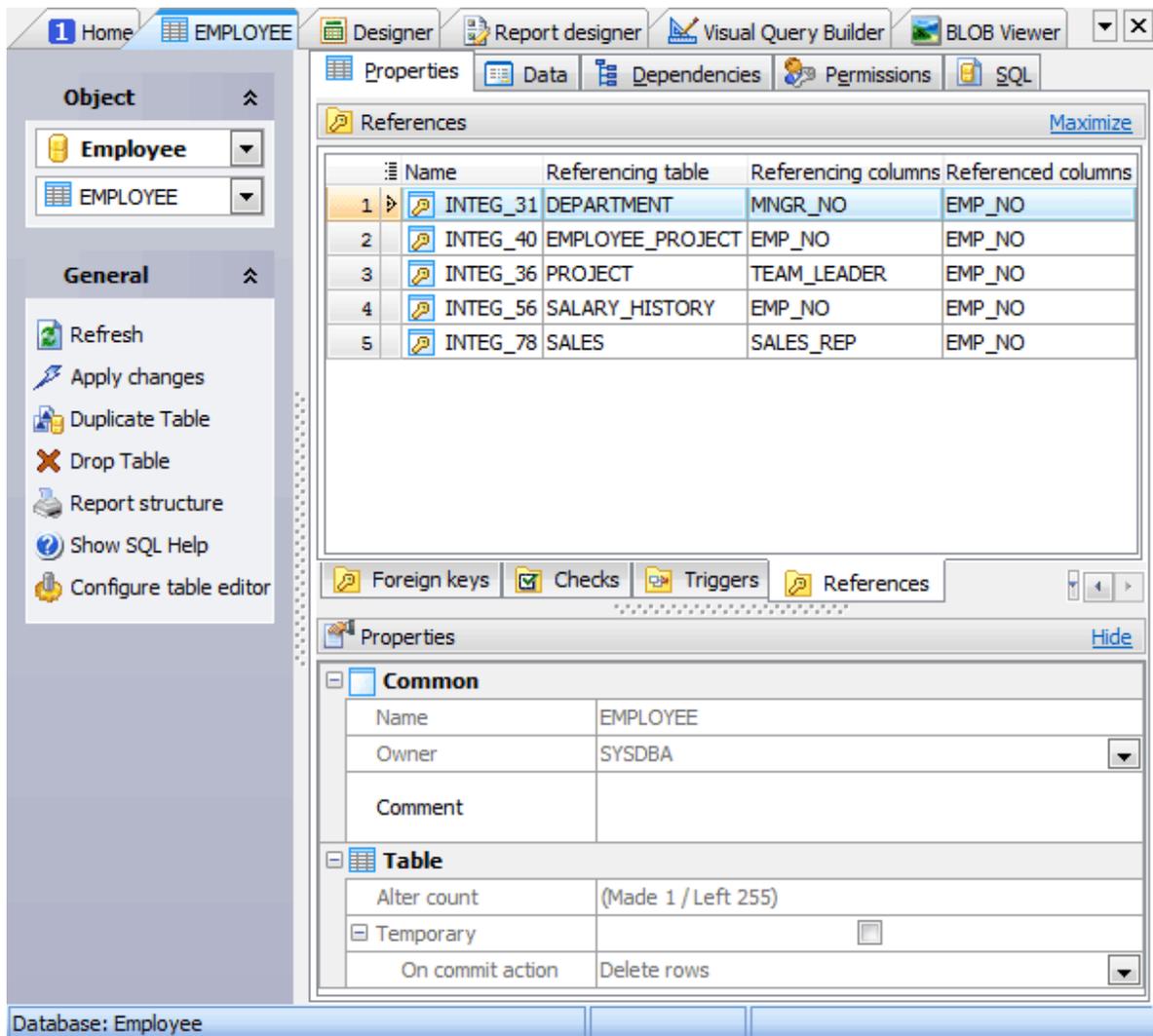
Specifies firing order for triggers before the same action or after the same action; the number must be an integer between 0 and 32,767, inclusive. Lower-number triggers fire first.

To apply the changes, select the [Apply Changes](#) item in the [Navigation bar](#) or use **Ctrl+F9** or **Ctrl+F7** shortcut keys.

It is also possible to modify object properties without opening the object editor: use the [Object Properties](#) item of the popup menu of the selected object from the explorer tree.

## 5.1.8 Foreign Key References

A foreign key specifies that the values in a column (or a group of columns) must match the values appearing in some row of another table. The [Foreign Key References](#) tab allows you to manage foreign keys created in other tables and reference for columns of the current one. Table objects are managed within the corresponding tab of [Table Editor](#) [F8]. Unlike *tables* or *views*, Foreign Key References are actually not database objects. These are only references to foreign keys. They are designed specially for easy foreign keys management.



**See also:** [Foreign Keys](#)

### How can I add a new foreign key reference?

Table foreign key references are edited within the [Foreign Key Editor](#) dialog window. In order to open the dialog you should either

- open the table in [Table Editor](#);
- open the [Subitems](#) item and the [Foreign Keys References](#) tab there;
- press **Enter** key or select the [Edit Foreign Key](#) item from the popup menu

or

- select the foreign key to edit in the appropriate table group of the explorer tree and use the [Edit Foreign Key](#) popup menu item.

### How can I edit an existing foreign key reference?

Table foreign key references are edited within the [Foreign Key Editor](#) dialog window. In order to open the dialog you should either

- open the table in [Table Editor](#);
- open the [Subitems](#) item and the [Foreign Keys References](#) tab there;
- press **Enter** key or select the [Edit Foreign Key](#) item from the popup menu

or

- select the foreign key to edit in the appropriate table group of the explorer tree and use the [Edit Foreign Key](#) popup menu item.

#### ■ **How can I drop a foreign key reference?**

To drop the foreign key reference:

- open the table in [Table Editor](#);
- open the [Subitems](#) item and the [Foreign Keys References](#) tab there;
- press **Delete** key or select the [Drop Foreign Key](#) item from the popup menu;

or

- select the foreign key to drop in the appropriate table group of the explorer tree and use the [Drop Foreign Key](#) popup menu item.

and confirm dropping in the dialog window.

## 5.2 Views

[Views](#) are useful for allowing users to access a set of relations (tables) as if it were a single table, and limiting their access to just that. Views can also be used to restrict access to rows (a subset of a particular table).

### ■ How can I create a new view?

New views are created within [Create View Wizard](#)<sup>[94]</sup>. In order to run the wizard you should either

- select the [Object | Create Database Object...](#) main menu item;
  - select the [View](#) icon in the [Create Database Object](#) dialog
- or
- select the [Views](#) list or any object from that list in the explorer tree;
  - select the [Create New View...](#) item from the popup menu
- or
- open [Schema \(Database\) Editor](#) and the [Views](#) tab there;
  - press the **Insert** key or select the [Create New View](#) item from the popup menu (alternatively, you may use the corresponding link of the [Navigation Bar](#)).

To create a new view with the same properties as one of the existing views has:

- select the [Object | Duplicate Database Object...](#) main menu item.
- follow the instructions of [Duplicate Object Wizard](#).

### ■ How can I edit an existing view definition?

Views can be edited within [View Editor](#)<sup>[95]</sup>. In order to run the editor you should either

- select the view for editing in the explorer tree (type the first letters of the view name for quick search);
  - select the [Edit View...](#) item from the popup menu
- or
- open [Schema \(Database\) Editor](#) and the [Views](#) tab there;
  - select the view to edit;
  - press the **Enter** key or select the [Edit View](#) item from the popup menu (alternatively, you may use the corresponding link of the [Navigation Bar](#)).

You can change the name of the view using the [Rename View](#) dialog. To open the dialog you should either

- select the view to rename in the explorer tree;
  - select the [Rename View](#) item from the popup menu
- or
- open [Schema \(Database\) Editor](#) and the [Views](#) tab there;

- select the view to rename;
- select the [Rename View](#) item from the popup menu (alternatively, you may use the corresponding link of the [Navigation Bar](#)).

#### ■ **How can I drop a view?**

To drop a view:

- select the view to drop in the explorer tree;
- select the [Drop View](#) item from the popup menu

or

- open [Schema \(Database\) Editor](#) and the [Views](#) tab there;
- select the view to drop;
- press the **Delete** key or select the [Drop View](#) item from the popup menu (alternatively, you may use the corresponding link of the [Navigation Bar](#))

and confirm dropping in the dialog window.

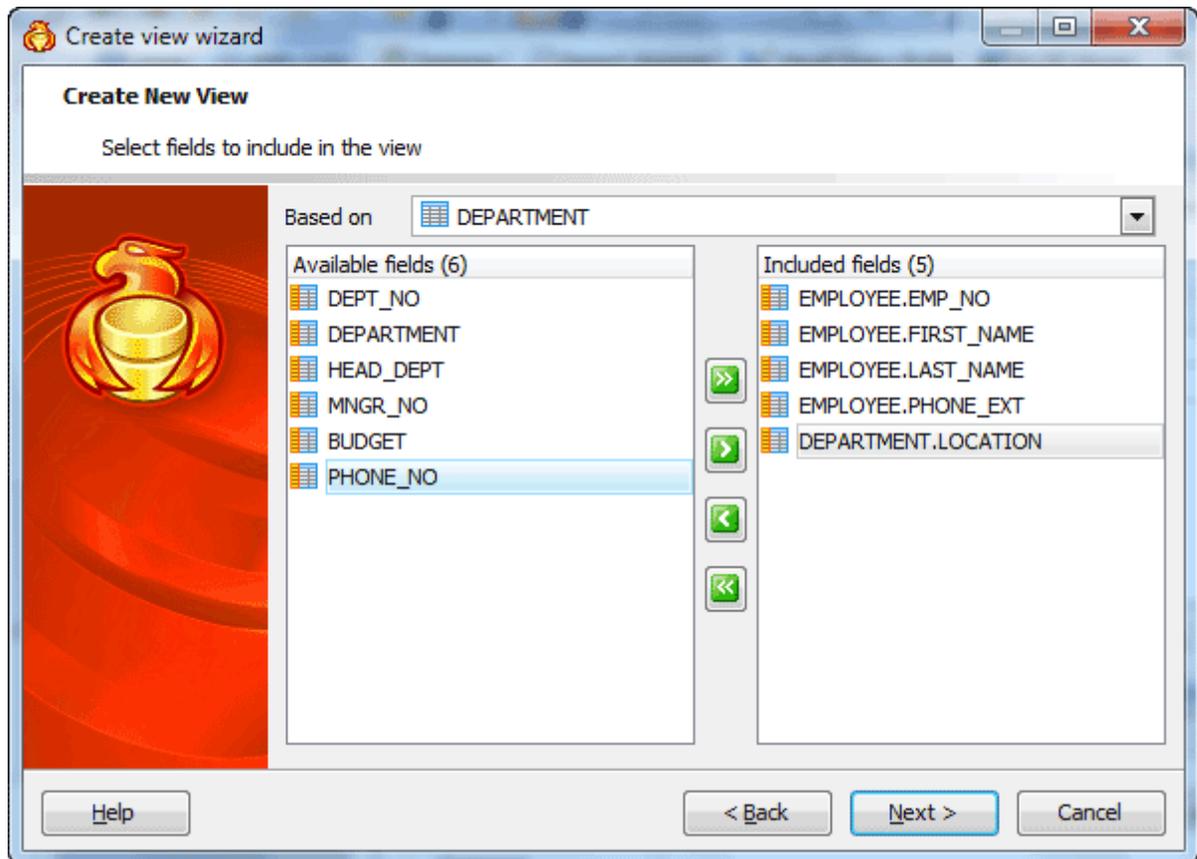
### 5.2.1 **Create View Wizard**

[Create View Wizard](#) guides you through the process of creating a new view. See [How To Create View](#)<sup>[33]</sup> to learn how to run this wizard.

The basic principles of Create Object Wizards in Firebird Maestro are explained in a [separate topic](#)<sup>[40]</sup>. Below you will find a description of wizard steps that are unique for the current object.

#### **Selecting fields for a new view**

Select a table or a view from the [Based on](#) drop-down menu. Then specify which fields will be used in the new view. Use [Add All](#) or [Add Selected](#) buttons to include field(s) into view definition. Use the [Remove Selected](#) or [Remove All](#) items to exclude field(s) from the view's field list. Click the [Next](#) button to proceed.



### Specifying view options

#### Name

You may specify here the name of the view being created.

#### Owner

Defines the owner of the new view. By default, only the owner of an object can perform various operations with the object. In order to allow other users to operate it, privileges must be granted. (However, users that have the superuser attribute can always access any object.)

#### Comment

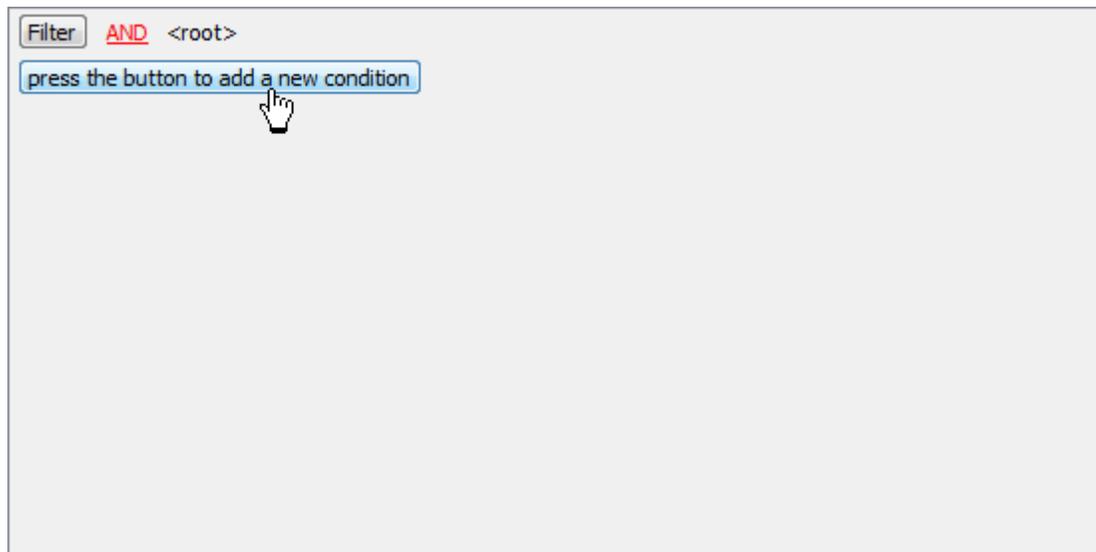
The box allows you to set optional text describing the view.

### Specifying the WHERE condition

Firebird Maestro provides the [Filter Builder](#) dialog to facilitate a creating of the WHERE condition.

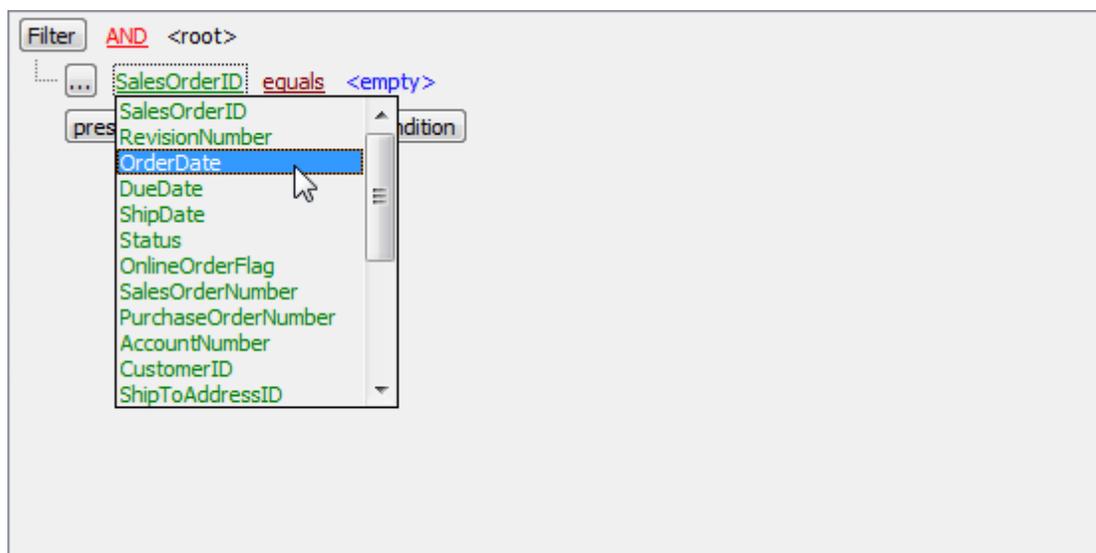
#### ■ Adding a new condition to the filter

Suppose we need to select orders from the sample table *Orders* made between 01.02.2010 and 10.02.2010. These criteria are applied to the *OrderDate* column. Press the button to add this condition. Alternatively, you can use the [Filter](#) button and select the [Add Condition](#) option from the drop-down menu.



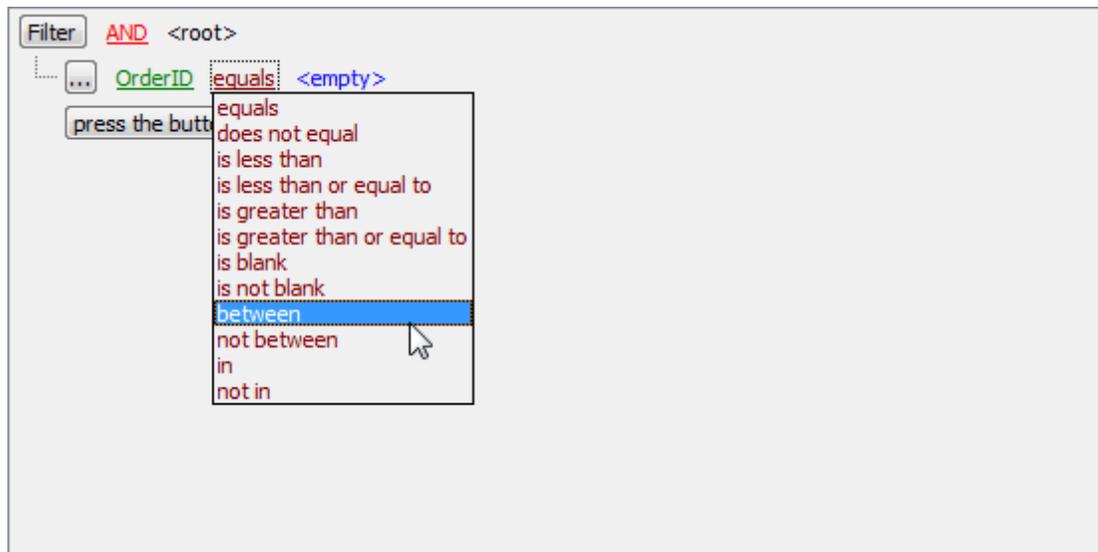
#### ■ Setting a filter criteria in the condition

Select the *OrderDate* column in the drop-down list of the available columns.



#### ■ Setting an operator in the condition

Set the proper operator. In our example it is BETWEEN.



#### ■ Setting criteria values in the condition

Next, you need to specify the range values for the selected operator. The editor used in value boxes is determined by the editor type assigned to the corresponding column.



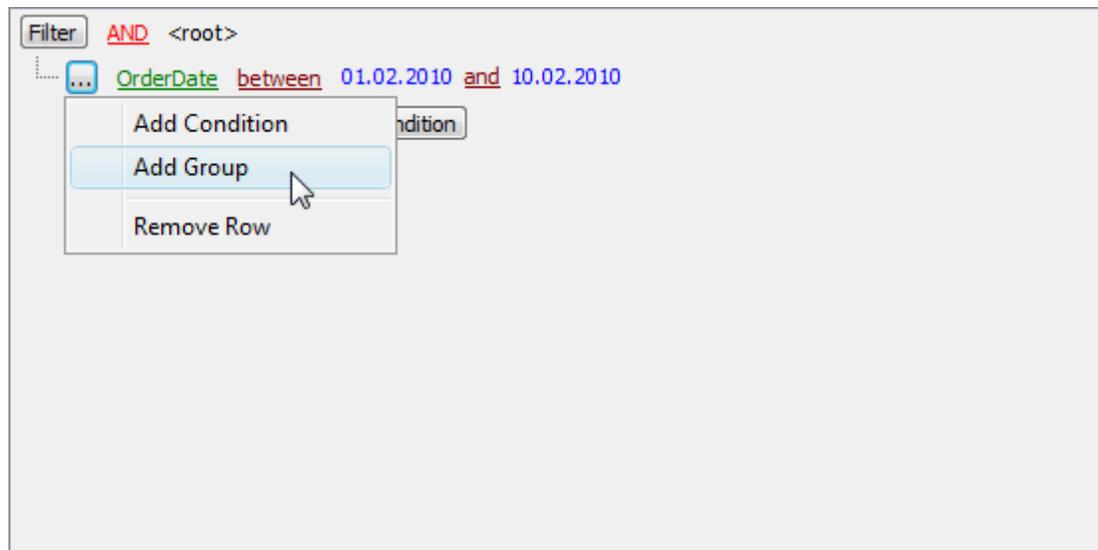
Now use the [Apply](#) button to see the filter result.

You can add additional conditions to the same root level to be combined by the AND operator.

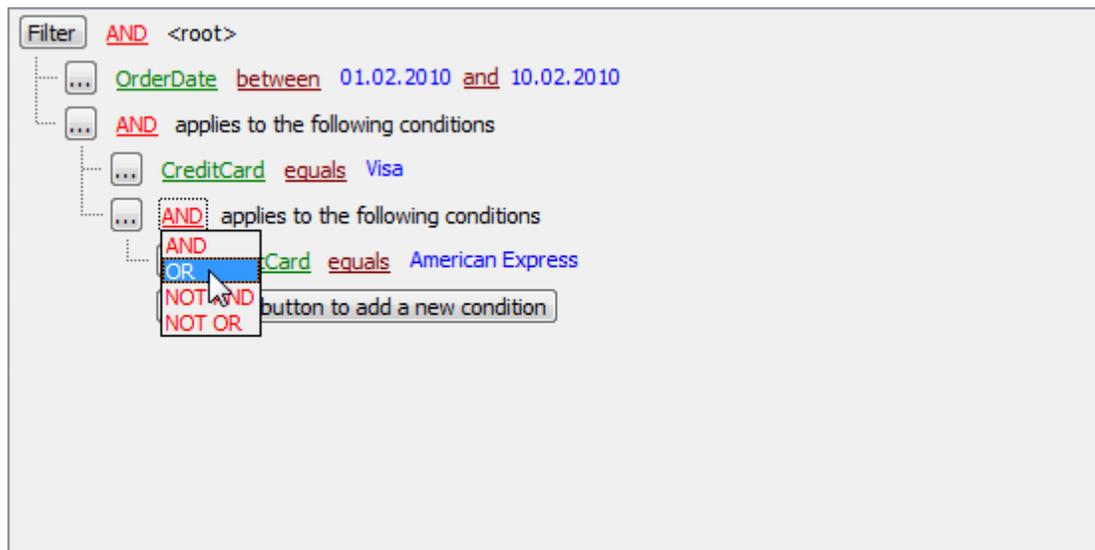
#### ■ Adding a new group

Suppose we need to select orders made between 01.02.2010 and 10.02.2010 and paid via 'Visa' or 'American Express'. This is a complex filter condition combining

two simple conditions with the OR operator. Conditions from the same root level are combined by the AND operator. To add a condition combined with the previous one with the OR (NOT AND, NOT OR) operator, use a new group of conditions.



The next screen represents the finished filter conditions for this example.



## 5.2.2 View Editor

**View Editor** allows you to edit the existing view definition (view name and the SELECT statement it implements).

The basic principles of Object Editors in Firebird Maestro are explained in a [separate topic](#)<sup>43</sup>. Below you will find a description of editor tabs that are unique for the current object.

- [Editing view properties](#)<sup>99</sup>

- [Viewing data](#)<sup>[100]</sup>

See also: [Create View Wizard](#)<sup>[94]</sup>

The screenshot displays the Firebird Maestro View Editor for a view named 'PHONE\_LIST'. The interface includes a top menu bar with 'Home', 'Designer', 'PHONE\_LIST', 'Report designer', and 'Visual Query Builder'. Below the menu is a toolbar with 'Properties', 'Data', 'Dependencies', 'Permissions', and 'Grants'. The left sidebar contains sections for 'Object' (with 'Employee' and 'PHONE\_LIST' selected), 'General' (with options like Refresh, Compile View, Duplicate View, Rename View, Drop View, Report structure, and Show SQL Help), and 'Fields' (with Edit Field and Describe Field options). The main area is divided into 'Fields', 'Triggers', and 'Body' tabs. The 'Fields' tab shows a table of fields:

Name	Type	Comment
1 EMP_NO	EMPNO	
2 FIRST_NAME	FIRSTNAME	
3 LAST_NAME	LASTNAME	
4 PHONE_EXT	VARCHAR	
5 LOCATION	VARCHAR	
6 PHONE_NO	PHONENUMBER	

The 'Body' tab shows the SQL definition for the view:

```
CREATE VIEW PHONE_LIST
(
  EMP_NO,
  FIRST_NAME,
  LAST_NAME,
  PHONE_EXT,
  LOCATION,
  PHONE_NO
)
AS
SELECT
  emp_no, first_name, last_name, phone_ext,
FROM employee, department
WHERE employee.dept_no = department.dept_n
```

At the bottom, the 'Properties' tab is visible, showing the 'Common' section with the following details:

Common	
Name	PHONE_LIST
Owner	SYSDBA
Comment	

The status bar at the bottom indicates 'Database: Employee'.

### 5.2.2.1 Editing view properties

View Editor provides you with an ability to edit view properties. The **Properties** tab allows you to change the view name, view definition, the view owner and the comment for the view.

### Subitems

Every tab is intended for managing some view [subitems](#) (e.g. *fields*, *triggers*). Each object can be opened in its editor. Use grid's popup menu to create new, edit or drop the selected view subitems. Using the popup menu you can also copy the selected objects to clipboard or paste previously copied objects.

You can operate on several objects at a time. For this you have to select view objects with the **Shift** or the **Ctrl** key pressed. After a group of objects is selected you can operate on it, e.g. *delete several objects at once*, as if it were a single object.

**See also:** [Fields](#)<sup>[72]</sup>, [Triggers](#)<sup>[86]</sup>

### Body

You can edit the view definition in this box (including view name).

Use the [Name](#) field to specify the view name.

**Note:** the name of the object must be unique among all the object names in its container. Moreover, all the objects that are source of data need unique names among themselves. You can use any identifier that is allowed by Firebird server.

### Owner

Represents the view owner. By default, only the owner of an object can perform various operations with the object. In order to allow other users to operate it, privileges must be granted. (However, users that have the superuser attribute can always access any object.)

### Comment

This field stores a comment to the view.

To apply the changes, select the [Apply Changes](#) item in the [Navigation bar](#) or use **Ctrl+F9** or **Ctrl+F7** shortcut keys.

It is also possible to modify object properties without opening the object editor: use the [Object Properties](#) item of the popup menu of the selected object from the explorer tree.

#### 5.2.2.2 Viewing data

The [Data](#) tab displays the data represented in the view as a grid (see [Data View](#) for details). The popup menu of this tab and the Data Management navigation bar allow you to export data, get SQL dump, set the value of the selected record to *Null* or to *Now* (for [Date](#) values). In tables with BLOB fields you can also call BLOB Editor to view and edit the BLOB fields.

The screenshot displays the Firebird Maestro application interface. The main window shows a data table with the following columns: EMP\_NO, FIRST\_NAME, LAST\_NAME, PHONE\_EXT, and LOCATION. The table contains 25 rows of employee data. The status bar at the bottom indicates 'Records fetched: 42/42' and 'LIMIT 1'. The sidebar on the left contains sections for 'Object' (Employee, PHONE\_LIST), 'General' (Refresh, Compile View, Duplicate View, Rename View, Drop View, Report structure, Show SQL Help), and 'Data Manage...' (Generate query, Data input form, Export data, Get SQL dump, Import data, Print data).

EMP_NO	FIRST_NAME	LAST_NAME	PHONE_EXT	LOCATION
1	Terri	Lee	256	Monterey
2	Oliver H.	Bender	255	Monterey
3	Mary S.	MacDonald	477	San Franci
4	Michael	Yanowski	492	San Franci
5	Robert	Nelson	250	Monterey
6	Kelly	Brown	202	Monterey
7	Stewart	Hall	227	Monterey
8	Walter	Steadman	210	Monterey
9	Leslie	Johnson	410	San Franci
10	Carol	Nordstrom	420	San Franci
11	Bruce	Young	233	Monterey
12	Ashok	Ramanathan	209	Monterey
13	Dana	Bishop	290	Monterey
14	T.J.	Green	218	Monterey
15	Phil	Forest	229	Monterey
16	Jennifer M.	Burbank	289	Monterey
17	Mark	Guckenheimer	221	Monterey
18	Katherine	Young	231	Monterey
19	Roger	De Souza	288	Monterey
20	Leslie	Phong	216	Monterey
21	Bill	Parker	247	Monterey
22	Scott	Johnson	265	Monterey
23	Sue Anne	O'Brien	877	Burlington,
24	Kevin	Cook	894	Burlington,
25	Chris	Papadopoulos	887	Burlington,

Database: Employee

## 5.3 Procedures

A stored [procedure](#) is a self-contained program written in Firebird procedure and trigger language, and stored as part of a database metadata. Stored procedures can receive input parameters from and return values to applications.

### ■ How can I create a new procedure?

New procedures are created within [Create Procedure Wizard](#)<sup>[103]</sup>. In order to run the wizard you should either

- select the [Object | Create Database Object...](#) main menu item;
  - select the [Procedure](#) icon in the [Create Database Object](#) dialog
- or
- select the [Procedures](#) list or any object from that list in the explorer tree;
  - select the [Create New Procedure...](#) item from the popup menu
- or
- open [Database Editor](#) and the [Procedures](#) tab there;
  - press the **Insert** key or select the [Create New Procedure](#) item from the popup menu (alternatively, you may use the corresponding link of the [Navigation Bar](#)).

To create a new procedure with the same properties as one of the existing procedures has:

- select the [Object | Duplicate Database Object...](#) main menu item;
- follow the instructions of [Duplicate Object Wizard](#).

### ■ How can I edit an existing procedure definition?

Procedures can be edited within [Procedure Editor](#)<sup>[107]</sup>. In order to run the editor you should either

- select the procedure for editing in the explorer tree (type the first letters of the procedure name for quick search);
  - select the [Edit Procedure...](#) item from the popup menu
- or
- open [Database Editor](#) and the [Procedures](#) tab there;
  - select the procedure to edit;
  - press the **Enter** key or select the [Edit Procedure](#) item from the popup menu (alternatively, you may use the corresponding link of the [Navigation Bar](#)).

You can change the name of the procedure using the [Rename Procedure](#) dialog. To open the dialog you should either

- select the procedure to rename in the explorer tree;
  - select the [Rename Procedure](#) item from the popup menu
- or
- open [Database Editor](#) and the [Procedures](#) tab there;
  - select the procedure to rename;

- select the [Rename Procedure](#) item from the popup menu (alternatively, you may use the corresponding link of the [Navigation Bar](#)).

#### ■ **How can I execute a procedure?**

To execute a procedure:

- select the procedure in the explorer tree (type the first letters of the procedure name for quick search);
- select the [Edit Procedure...](#) item from the popup menu;
- execute the procedure using the [Execute](#) link of the [Navigation Bar](#)

or

open [Database Editor](#) and the [Procedures](#) tab there;

- select the procedure to execute;
- press the **Enter** key or select the [Edit Procedure](#) item from the popup menu, or use the corresponding link of the [Navigation Bar](#);
- execute the procedure using the [Execute](#) link of the [Navigation bar](#).

#### ■ **How can I drop a procedure?**

To drop a procedure:

- select the procedure to drop in the explorer tree;
- select the [Drop Procedure](#) item from the popup menu

or

- open [Database Editor](#) and the [Procedures](#) tab there;
- select the procedure to drop;
- press the **Delete** key or select the [Drop Procedure](#) item from the popup menu (alternatively, you may use the corresponding link of the [Navigation Bar](#))

and confirm dropping in the dialog window.

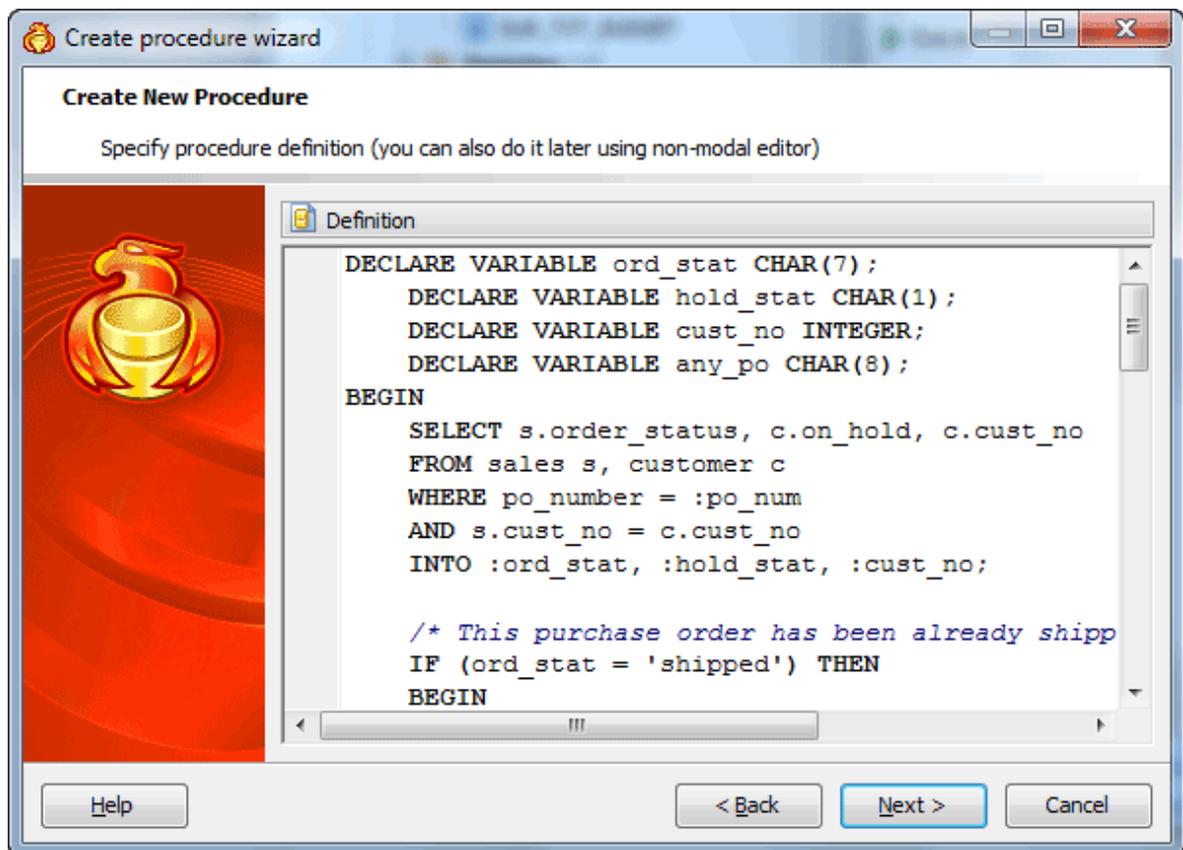
### 5.3.1 Create Procedure Wizard

[Create Procedure Wizard](#) guides you through the process of creating a new procedure. See [How To Create Procedure](#)<sup>[102]</sup> for instructions on running this wizard.

The basic principles of Create Object Wizards in Firebird Maestro are explained in a [separate topic](#)<sup>[40]</sup>. Below you will find a description of wizard steps that are unique for the current object.

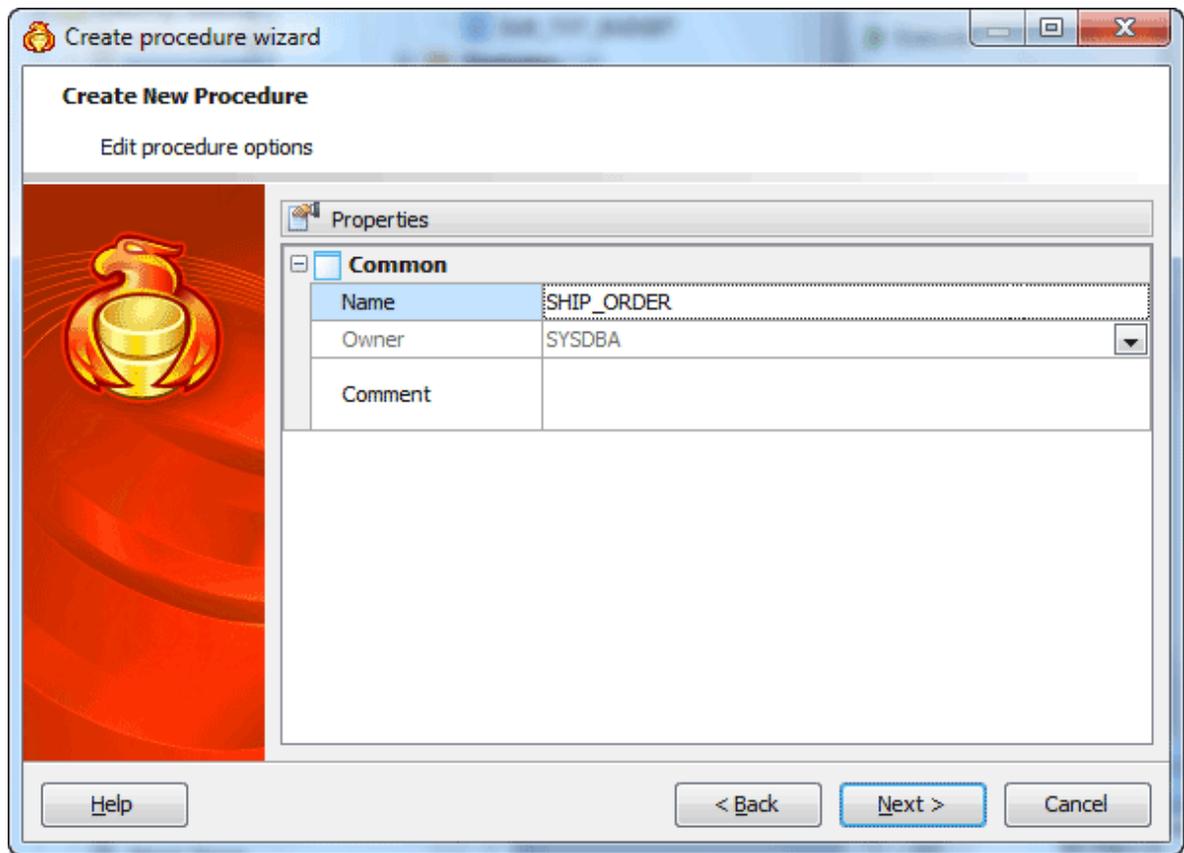
- [Specifying procedure options](#)<sup>[104]</sup>
- [Managing parameters of a new procedure](#)<sup>[105]</sup>
- [Specifying procedure definition](#)<sup>[106]</sup>

**See also:** [Procedure Editor](#)<sup>[107]</sup>



### 5.3.1.1 Specifying procedure options

Specify procedure options according to your needs. The detailed description is given below.



#### Name

The new procedure name as it was set on the previous step.

#### Owner

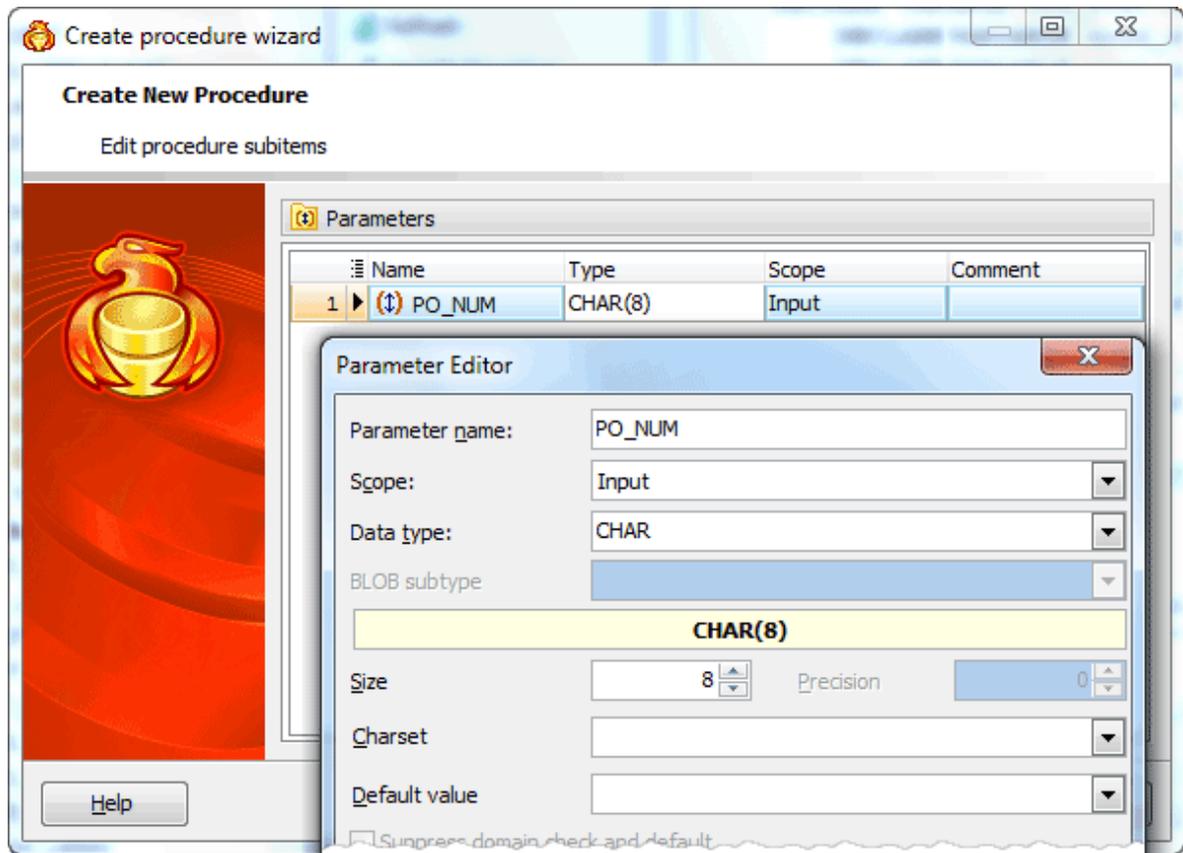
Defines the owner for the procedure. By default, only the owner of an object can perform various operations with the object. In order to allow other users to operate it, privileges must be granted. (However, users that have the superuser attribute can always access any object.)

#### Comment

Specify a comment for the procedure.

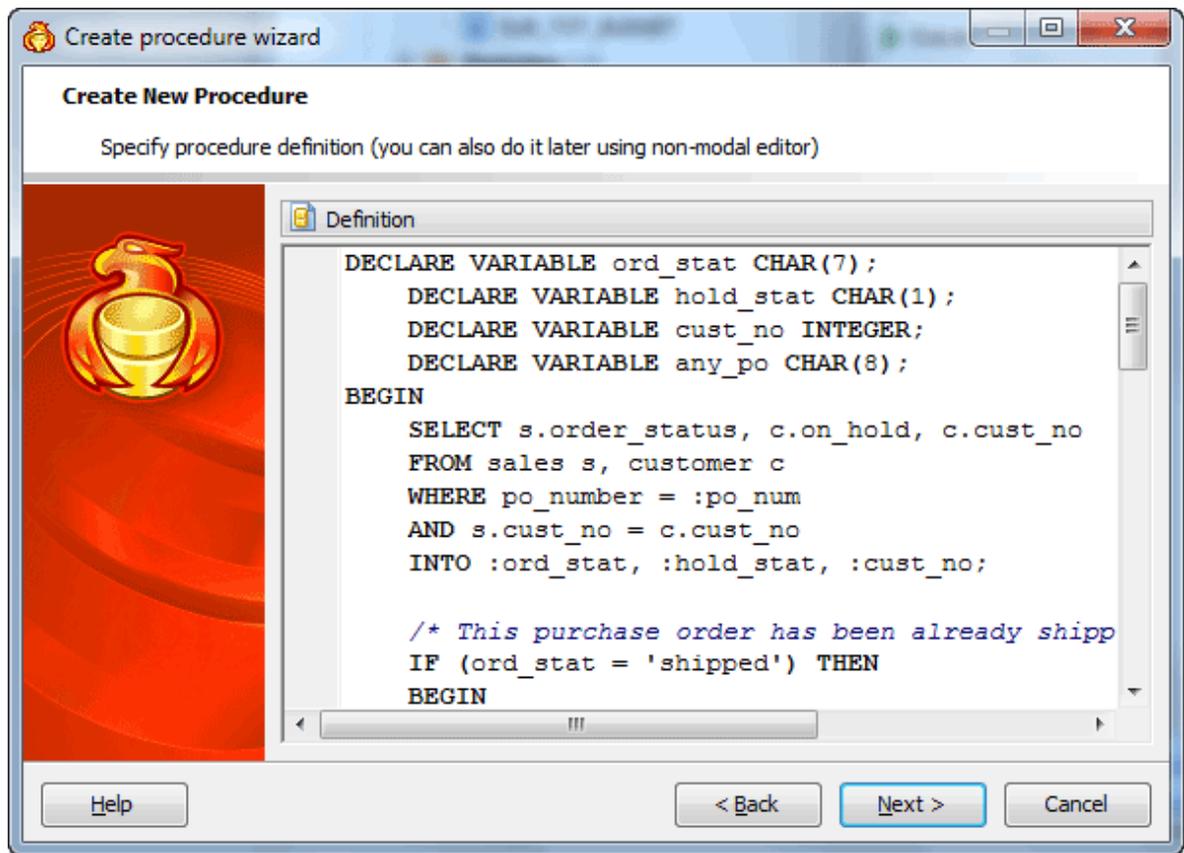
### 5.3.1.2 Managing parameters

Use the pop-up menu or press **Insert** to add a new parameter and set its properties in [Parameter Editor](#)<sup>47</sup>. Press **Enter** or use the appropriate pop-up menu item to edit the selected parameter, or the **Delete** to delete one.



### 5.3.1.3 Specifying procedure definition

At this step you can specify the SQL definition for the new procedure. The step is optional: you can do it later using a non-modal editor.



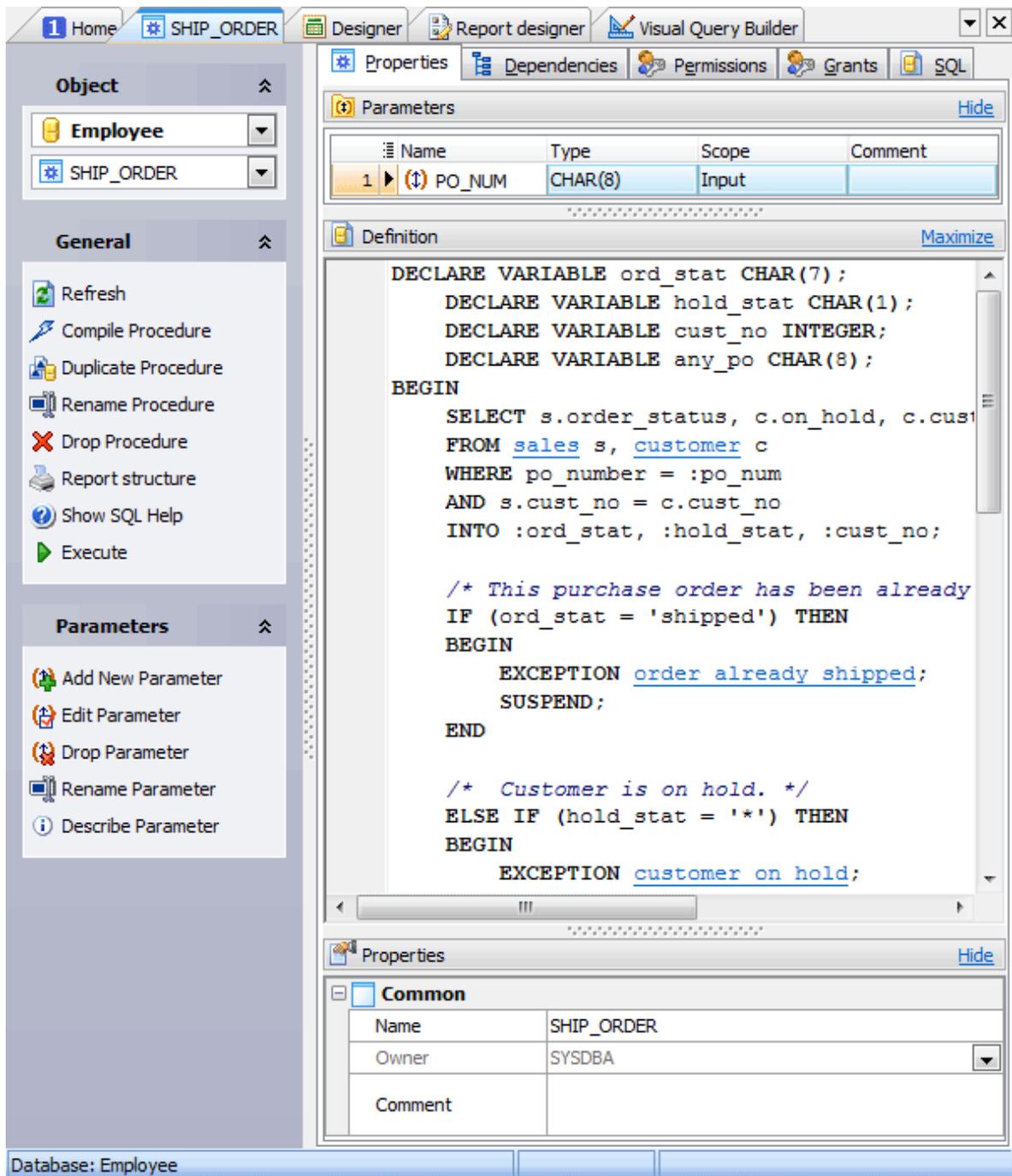
### 5.3.2 Procedure Editor

Procedure Editor allows you to execute the existing procedures or edit their definition ( *procedure name*, *parameter list*, *procedure body*, etc.). It opens when you create a new procedure or edit the existing one (see [How to edit procedure](#)<sup>[102]</sup> for details).

The basic principles of Object Editors in Firebird Maestro are explained in a [separate topic](#)<sup>[43]</sup>. Below you will find a description of editor tabs that are unique for the current object.

- [Editing procedure properties](#)<sup>[108]</sup>

**See also:** [Create Procedure Wizard](#)<sup>[103]</sup>



### 5.3.2.1 Editing properties

The [Parameters/Variables](#) tabs allow you to manage procedure parameters and variables. You can specify input, output parameters, and procedure variables using corresponding tabs. Use grids' popup menu allows you to add, edit parameters in [Parameter Editor](#)<sup>47)</sup>. Popup menu also allows you to drop, rename parameters and variables.

Parameters can be edited within the [Parameter Editor](#) dialog window. In order to open the dialog you should

- open the object in its editor and the [Parameters](#) tab there;
- select the parameter to edit;
- press the **Enter** key or select the [Edit Parameter](#) item from the popup menu (alternatively, you may use the corresponding link of the [Navigation Bar](#)).

#### Name

Defines the procedure name.

**Note:** the name of the object must be unique among all the object names in its container. Moreover, all the objects that are source of data need unique names among themselves. You can use any identifier that is allowed by Firebird server.

#### Owner

There is the owner for the procedure. By default, only the owner of an object can perform various operations with the object. In order to allow other users to operate it, privileges must be granted. (However, users that have the superuser attribute can always access any object.)

#### Comment

This field contains a comment to the procedure.

To apply the changes, select the [Apply Changes](#) item in the [Navigation bar](#) or use **Ctrl+F9** or **Ctrl+F7** shortcut keys.

It is also possible to modify object properties without opening the object editor: use the [Object Properties](#) item of the popup menu of the selected object from the explorer tree.

## 5.4 UDFs

User defined functions (UDFs) are implemented in SQL Firebird for the purpose of functionality extension. The use of existing Dynamic Link Libraries (DLL) is implied in this case. Moreover, you can create a DLL in any supporting system capable of creating files of this format (for example, you can use Borland Delphi, Borland C++, Microsoft Visual C++, etc.). Then you are to place the DLL file in the program `\Udf` directory. Afterwards you declare the necessary functions in your database. Firebird will invoke the library from this directory, and you will be able to use the UDFs as they were native Firebird functions. See [Declare external function \(Firebird SQL Reference\)](#) to learn more about UDFs. SQL Anywhere allows to define user-specific database functions. In an SQL statement, you can then use these user-defined database functions in the same way as any other predefined functions.

### ■ How can I create a new UDF?

New UDFs are created within [Create UDF Wizard](#)<sup>[111]</sup>. In order to run the wizard you should either

- select the [Object | Create Database Object...](#) main menu item;
- select the UDF icon in the [Create Database Object](#) dialog

or

- select the UDFs list or any object from that list in the explorer tree;
- select the [Create New UDF...](#) item from the popup menu

or

- open [Database Editor](#) and the UDFs tab there;
- press the **Insert** key or select the [Create New UDF](#) item from the popup menu (alternatively, you may use the corresponding link of the [Navigation Bar](#)).

To create a new UDF with the same properties as one of the existing UDFs has:

- select the [Object | Duplicate Database Object...](#) main menu item;
- follow the instructions of [Duplicate Object Wizard](#).

### ■ How can I edit an existing UDF definition?

UDFs can be edited within [UDFEditor](#)<sup>[113]</sup>. In order to open the editor you should either

- select the UDF for editing in the explorer tree (type the first letters of the UDF name for quick search);
- select the [Edit UDF](#) item from the popup menu

or

- open [Database Editor](#) and the UDFs tab there;
- select the UDF to edit;
- press the **Enter** key or select the [Edit UDF](#) item from the popup menu (alternatively, you may use the corresponding link of the [Navigation Bar](#)).

You can change the name of the UDF using the [Rename UDF](#) dialog:

- select the UDF to rename in the explorer tree;
- select the [Rename UDF](#) item from the popup menu.

#### ■ **How can I drop a UDF?**

To drop a UDF:

- select the UDF to drop in the explorer tree;
- select the [Drop UDF](#) item from the popup menu

or

- open [Database Editor](#) and the [UDFs](#) tab there;
- select the UDF to drop;
- press the **Delete** key or select the [Drop UDF](#) item from the popup menu (alternatively, you may use the corresponding link of the [Navigation Bar](#))

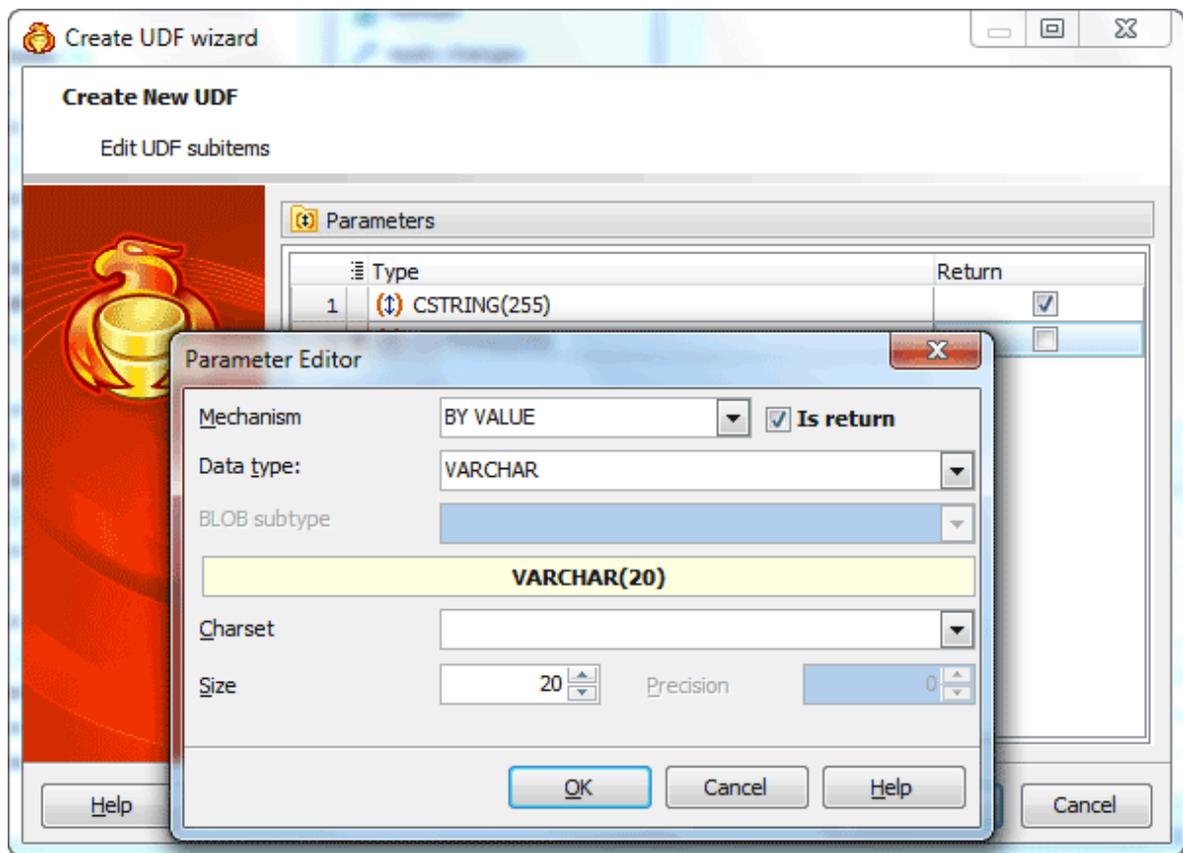
and confirm dropping in the dialog window.

### 5.4.1 Create UDF Wizard

[Create UDF Wizard](#) guides you through the process of creating a new UDF. See [How To create UDF](#)<sup>[110]</sup> for instructions on running this wizard.

The basic principles of Create Object Wizards in Firebird Maestro are explained in a [separate topic](#)<sup>[40]</sup>. Below you will find a description of wizard steps that are unique for the current object.

Specify the properties for the new UDF according to your needs. The detailed description is given below.



### Specifying UDF properties

#### Name

Specify a name for the function.

#### Comment

Supply a comment to the UDF if necessary.  
Defines the data type of the function result.

#### Language

The field stores the name of the language the function is implemented in. Select either of the available languages: *SQL*, *C*, *internal*, or the name of a user-defined procedural language. For backward compatibility, the name may be enclosed by single quotes.

Check the **Strict** option to indicate that the function always returns NULL whenever any of its arguments are null. If this option is specified, the function is not executed when there are null arguments; a null result is assumed automatically instead. Uncheck the **Strict** option to indicate that the function will be called normally when some of its arguments are null. It is then the function author's responsibility to check for null values if necessary and to respond in the appropriate way.

#### Execution Privileges

Select *Invoker* to indicate that the function is to be executed with the privileges of the user that calls it (the default value).

Select *Definer* to specify that the function is to be executed with the privileges of the user that created it.

### Stability

Set the attribute to inform the system whether it is safe to replace multiple evaluations of the function with a single evaluation, for run-time optimization. If none of these appear, *Volatile* is the default assumption.

*Immutable* indicates that the function always returns the same result when given the same argument values; that is, it does not do database lookups or otherwise use information not directly present in its argument list. If this option is given, any call of the function with all-constant arguments can be immediately replaced with the function value.

*Stable* indicates that within a single table scan the function will consistently return the same result for the same argument values, but that its result could change across SQL statements. This is the appropriate selection for the functions in which the results depend on database lookups, parameter variables (such as the current time zone), etc. Also note that the *current\_timestamp* family of functions qualify as stable, since their values do not change within a transaction.

*Volatile* indicates that the function value can change even within a single table scan, so no optimizations can be made. Relatively few database functions are volatile in this sense; some examples are *random()*, *currval()*, *timeofday()*. Note that any function that has side-effects must be classified volatile (even if its result is quite predictable) to prevent calls from being optimized away; an example is *setval()*.

**Note:** You can also add the function definition within the [Properties](#)<sup>[114]</sup> tab of [Function Editor](#)<sup>[113]</sup>.

### Lib name

Define the file name identifying the library that contains the UDF.

### Entry point

Define the string specifying the name of the UDF in the source code as stored in the UDF library.

### Managing parameters of a new UDF

Use popup menu [Add New Parameter...](#) item to add a new parameter and set its properties in [Parameter Editor](#)<sup>[47]</sup>. Use the [Edit](#) and [Delete](#) items to manage UDF parameters. If a UDF has either no parameters or no return parameters then the UDF returns integer type by default.

## 5.4.2 UDF Editor

[UDF Editor](#) allows you to execute the existing UDF, and edit its definition (UDF name, parameter list, etc.). In order to open the editor you should either

- select the UDF for editing in the explorer tree (type the first letters of the UDF name for quick search);
  - select the [Edit UDF](#) item from the popup menu
- or
- open [Database Editor](#) and the [UDFs](#) tab there;
  - select the UDF to edit;
  - press the **Enter** key or select the [Edit UDF](#) item from the popup menu (alternatively, you may use the corresponding link of the [Navigation Bar](#)).

The basic principles of Object Editors in Firebird Maestro are explained in a [separate topic](#)<sup>[43]</sup>. Below you will find a description of editor tabs that are unique for the current

object.

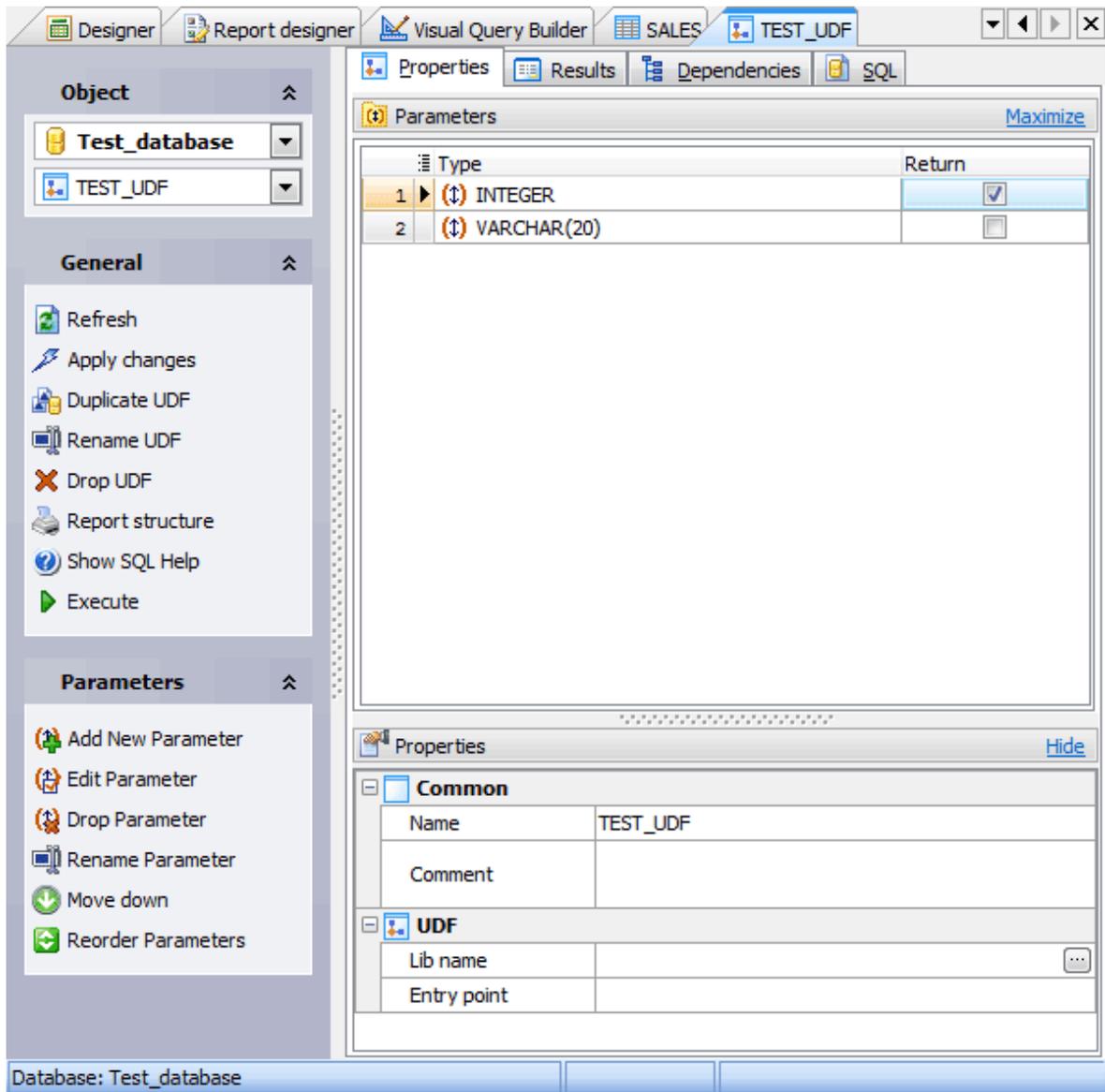
- [Editing UDF properties](#)<sup>[114]</sup>
- [Viewing UDF results](#)<sup>[116]</sup>

#### 5.4.2.1 Editing properties

The [Parameters](#) tab contains the list of the current UDF parameters with its options. Here you can view the [Name](#) and the [Type](#) of each UDF parameter and also supply a [Comment](#) for the parameter.

Parameters can be edited within the [Parameter Editor](#) dialog window. In order to open the dialog you should

- open the object in its editor and the [Parameters](#) tab there;
- select the parameter to edit;
- press the **Enter** key or select the [Edit Parameter](#) item from the popup menu (alternatively, you may use the corresponding link of the [Navigation Bar](#)).



### Name

You can edit the UDF name here. The name of the UDF must be unique among all the UDF names in the database.

### Comment

Specify a comment to the UDF if necessary.

### Lib name

Define the file name identifying the library that contains the UDF.

### Entry point

Define the string specifying the name of the UDF in the source code as stored in the UDF library.

You can find the detailed description of UDF properties in `DECLARE EXTERNAL FUNCTION`

(Firebird SQL References) topic.

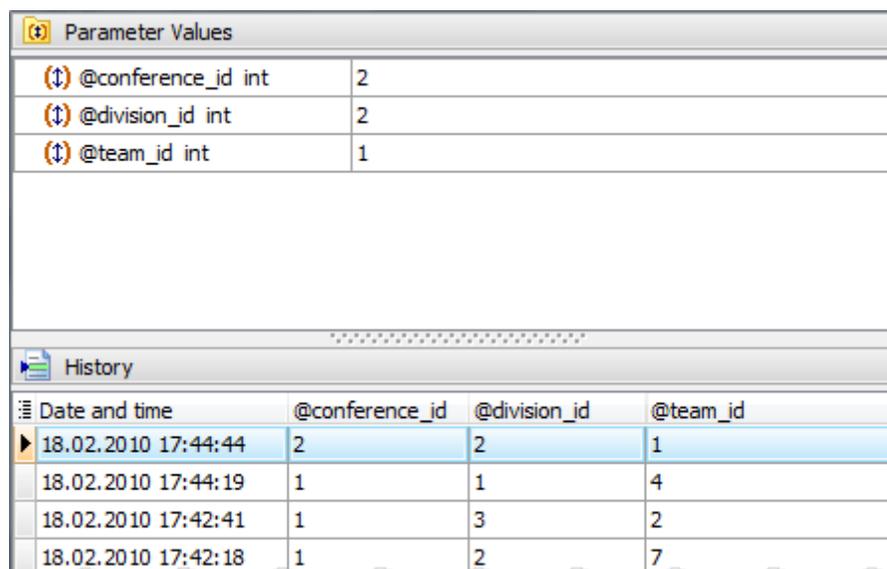
To apply the changes, select the [Apply Changes](#) item in the [Navigation bar](#) or use **Ctrl+F9** or **Ctrl+F7** shortcut keys.

It is also possible to modify object properties without opening the object editor: use the [Object Properties](#) item of the popup menu of the selected object from the explorer tree.

#### 5.4.2.2 Viewing UDF results

[Procedure Editor](#) provides an opportunity to execute current routine by opening the [Results](#) tab, by clicking the [Execute](#) item of the [Navigation Bar](#), or by pressing the **F9** key.

If the procedure has parameters, Firebird Maestro will ask you to specify the values for these parameters in the [Input parameters](#) dialog which appears before the procedure execution. [Input parameters](#) dialog allows you to specify the values for all input parameters. After changes are made, click the [OK](#) button to execute the UDF, or the [Cancel](#) button to abort the execution.



The screenshot shows two windows from Firebird Maestro. The top window is titled 'Parameter Values' and contains a table with three rows of input parameters. The bottom window is titled 'History' and contains a table with four columns: 'Date and time', '@conference\_id', '@division\_id', and '@team\_id'. It lists four previous executions of the routine with their respective parameter values and timestamps.

Parameter Values	
@conference_id int	2
@division_id int	2
@team_id int	1

Date and time	@conference_id	@division_id	@team_id
18.02.2010 17:44:44	2	2	1
18.02.2010 17:44:19	1	1	4
18.02.2010 17:42:41	1	3	2
18.02.2010 17:42:18	1	2	7

Firebird Maestro supports [Parameter History](#). Values that have been set previously as the routine parameters are represented in the [History](#) tab of the [Input Parameter](#) dialog with a date and time of their last using. Double click a necessary set of values to set them as the routine parameters. You can manage the [Parameter History](#) with [Delete history](#) item and [Clear history](#) links.

The result of the successfully executed routine can be found within the [Results](#) tab of [Procedure Editor](#).

**Note:** If any unsaved changes are applied to the routine being currently edited, the execution of the routine is impossible until changes are saved by the [Compile](#) procedure item of the [Navigation Bar](#).

## 5.5 Domains

**Data domains** are useful for abstracting common table fields into a single location for maintenance. For example, *an email address* column may be used in several tables, all with the same properties. Define a domain and use that instead of setting up each table constraint individually.

### ■ How can I create a new Domain?

New Domains are created within Create Domain Wizard. In order to run the wizard you should either

- select the [Object | Create Database Object...](#) main menu item;
  - select the [Domain](#) icon in the [Create Database Object](#) dialog
- or
- select the [Domains](#) list or any object from that list in the explorer tree;
  - select the [Create New Domain...](#) item from the popup menu
- or
- open [Database Editor](#) and the [Domains](#) tab there;
  - press the **Insert** key or select the [Create New Domain](#) item from the popup menu (alternatively, you may use the corresponding link of the [Navigation Bar](#)).

To create a new Domain with the same properties as one of the existing Domains has:

- select the [Object | Duplicate Database Object...](#) main menu item;
- follow the instructions of [Duplicate Object Wizard](#).

### ■ How can I edit an existing Domain?

Domains can be edited within [Domain Editor](#)<sup>[120]</sup>. In order to run the editor you should either

- select the Domain for editing in the explorer tree (type the first letters of the Domain name for quick search);
  - select the [Edit Domain...](#) item from the popup menu
- or
- open [Database Editor](#) and the [Domains](#) tab there;
  - select the Domain to edit;
  - press the **Enter** key or select the [Edit Domain](#) item from the popup menu (alternatively, you may use the corresponding link of the [Navigation Bar](#)).

You can change the name of the Domain using the [Rename Domain](#) dialog. To open the dialog you should either

- select the Domain to rename in the explorer tree;
  - select the [Rename Domain](#) item from the popup menu
- or

- open [Database Editor](#) and the [Domains](#) tab there;
- select the Domain to rename;
- select the [Rename Domain](#) item from the popup menu (alternatively, you may use the corresponding link of the [Navigation Bar](#)).

#### ■ How can I drop a Domain?

To drop a Domain:

- select the Domain to drop in the explorer tree;
- select the [Drop Domain](#) item from the popup menu

or

- open [Database Editor](#) and the [Domains](#) tab there;
- select the Domain to drop;
- press the **Delete** key or select the [Drop Domain](#) item from the popup menu (alternatively, you may use the corresponding link of the [Navigation Bar](#))

and confirm dropping in the dialog window.

### 5.5.1 Create Domain Wizard

New Domains are created within Create Domain Wizard. In order to run the wizard you should either

- select the [Object | Create Database Object...](#) main menu item;
- select the [Domain](#) icon in the [Create Database Object](#) dialog

or

- select the [Domains](#) list or any object from that list in the explorer tree;
- select the [Create New Domain...](#) item from the popup menu

or

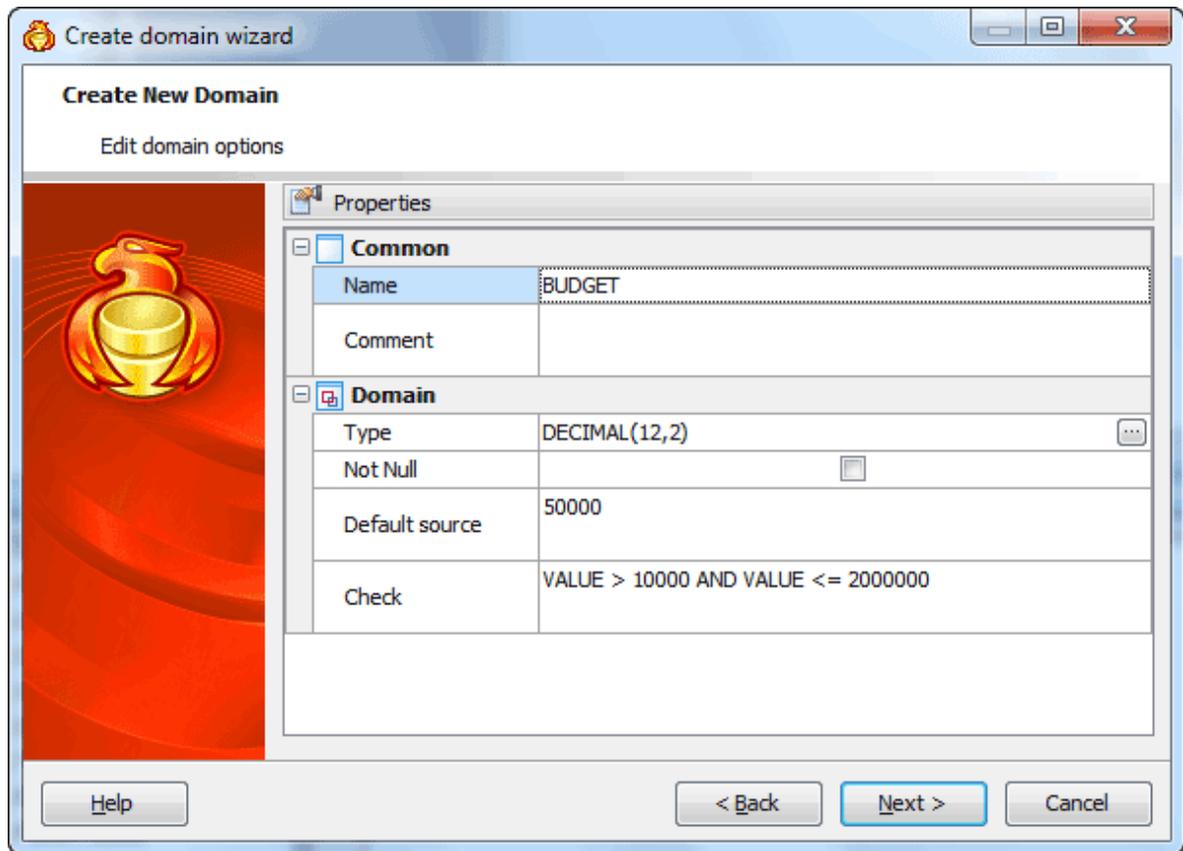
- open [Database Editor](#) and the [Domains](#) tab there;
- press the **Insert** key or select the [Create New Domain](#) item from the popup menu (alternatively, you may use the corresponding link of the [Navigation Bar](#)).

To create a new Domain with the same properties as one of the existing Domains has:

- select the [Object | Duplicate Database Object...](#) main menu item;
- follow the instructions of [Duplicate Object Wizard](#).

The basic principles of Create Object Wizards in Firebird Maestro are explained in a [separate topic](#)<sup>[40]</sup>. Below you will find a description of wizard steps that are unique for the current object.

Specify the properties for the new Domain according to your needs. The detailed description is given below.



#### Name

Specify a name for the domain.

#### Comment

Supply a comment to the Domain if necessary.

#### Data type

Select the underlying SQL data type for the domain.

#### Not Null

The checkbox indicates that the values of the Domain are not allowed to be null.

#### Charset

Define the charset for the CHAR, VARCHAR and BLOB data types.

#### Collate

Specify a collation sequence for the domain.

#### Check

Creates a single CHECK constraint for the domain (Check constraint can be like *VALUE <operator> value* or *VALUE [NOT] BETWEEN value AND value*, etc.).

#### Default source

Specifies the default column value that is entered when no other entry is made; possible values are:

*literal* — inserts a specified string, numeric value, or date value;  
*NULL* — enters a NULL value;  
*USER* — enters the current user name; the column must be of compatible character type to use the default.

Array

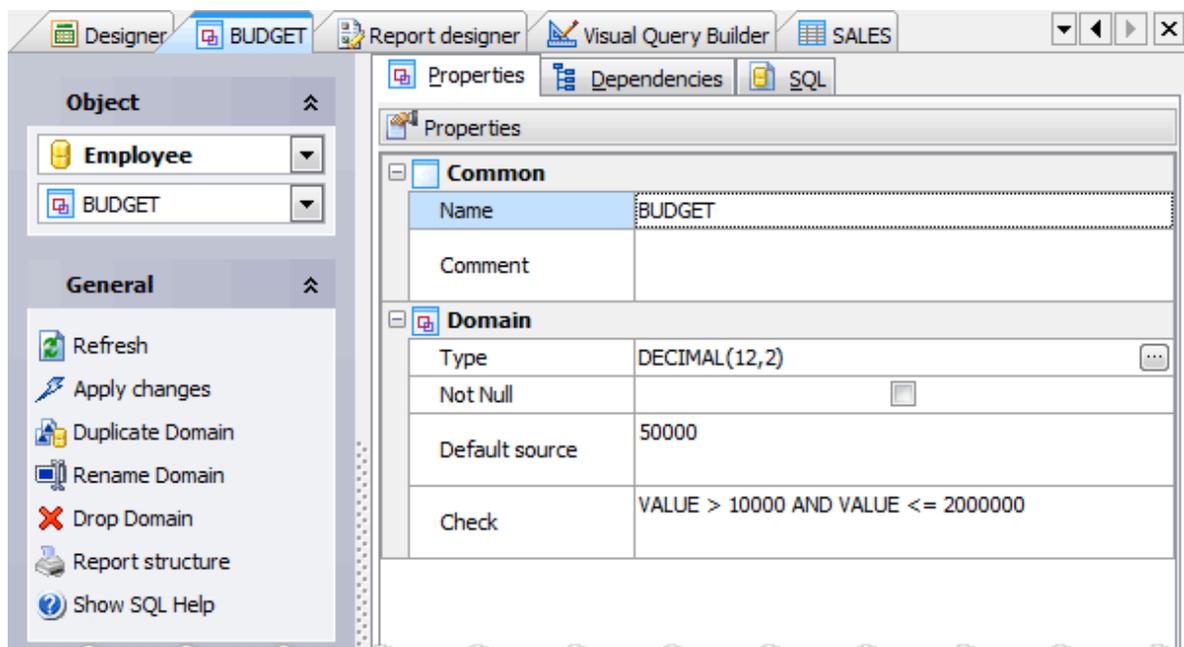
Define multidimensional arrays of a specified type.

## 5.5.2 Domain Editor

[Domain Editor](#) is opened automatically after a new Domain is created and is available on editing the existing one (see [Edit Domain](#)<sup>[117]</sup> for details).

The basic principles of Object Editors in Firebird Maestro are explained in a [separate topic](#)<sup>[43]</sup>. Below you will find a description of editor tabs that are unique for the current object.

[Domain Editor](#) provides you with an ability to edit Domain properties. The [Properties](#) tab allows you to change the Domain name, the Domain owner, etc.



### Name

Here you can view and edit the Domain name. The name of the Domain must be unique among all the Domain names in the schema.

### Comment

This field stores a comment to the Domain.

### Data type

Select the underlying SQL data type for the domain.

Not Null

The checkbox indicates that the values of the Domain are not allowed to be null.

#### Charset

Define the charset for the CHAR, VARCHAR and BLOB data types.

#### Collate

Specify a collation sequence for the domain.

#### Check

Creates a single CHECK constraint for the domain (Check constraint can be like *VALUE <operator> value* or *VALUE [NOT] BETWEEN value AND value*, etc.).

#### Default source

Specifies the default column value that is entered when no other entry is made; possible values are:

*literal* — inserts a specified string, numeric value, or date value;

*NULL* — enters a NULL value;

*USER* — enters the current user name; the column must be of compatible character type to use the default.

#### Array

The field displays dimension of array.

To apply the changes, select the [Apply Changes](#) item in the [Navigation bar](#) or use **Ctrl+F9** or **Ctrl+F7** shortcut keys.

It is also possible to modify object properties without opening the object editor: use the [Object Properties](#) item of the popup menu of the selected object from the explorer tree.

## 5.6 Packages

A package is a group of procedures and functions managed as one entity. The notion of “packaging” the code components of a database operation addresses several objectives:

- Modularisation
- To facilitate dependency tracking
- To facilitate permission management
- To enable “private scope”

Packaged routines do not have individual privileges. The privileges act on the package. Privileges granted to packages are valid for all package body routines, including private ones, but are stored for the package header.

All programming languages have the notion of routine scope, which is not possible without some form of grouping. Firebird packages also work like Delphi units in this regard. If a routine is not declared in the package header (interface) and is implemented in the body (implementation), it becomes a private routine. A private routine can only be called from inside its package.

### ■ How can I create a new package?

New packages are created within [Create Package Wizard](#)<sup>[123]</sup>. In order to run the wizard you should either

- select the [Object | Create Database Object...](#) main menu item;
- select the [Package](#) icon in the [Create Database Object](#) dialog

or

- select the [Package](#) list or any object from that list in the explorer tree;
- select the [Create New Package...](#) item from the popup menu

or

- open the schema in [Schema Editor](#) and the [Packages](#) tab there;
- press the **Insert** key or select the [Create New Package...](#) item from the popup menu (alternatively, you may use the corresponding link of the [Navigation Bar](#)).

To create a new package with the same properties as one of the existing package has:

- select the [Object | Duplicate Database Object...](#) main menu item;
- follow the instructions of [Duplicate Object Wizard](#).

### ■ How can I edit an existing package?

Packages can be edited within [Package Editor](#)<sup>[123]</sup>. In order to run the editor you should either

- select the package for editing in the explorer tree (type the first letters of the package name for quick search);
- select the [Edit Package ...](#) item from the popup menu

or

- open the schema in [Schema Editor](#) and the [Packages](#) tab there;

- select the package to edit;
- press the **Enter** key or select the [Edit Package](#) item from the popup menu (alternatively, you may use the corresponding link of the [Navigation Bar](#)).

You can change the name of the package using the [Rename Package](#) dialog. To open the dialog you should either

- select the package to rename in the explorer tree;
- select the [Rename Package](#) item from the popup menu

or

- open the schema in [Schema Editor](#) and the [Packages](#) tab there;
- select the package to rename;
- select the [Rename Package](#) item from the popup menu (alternatively, you may use the corresponding link of the [Navigation Bar](#)).

#### ■ **How can I drop a package?**

To drop a package:

- select the package to drop in the explorer tree;
- select the [Drop Package](#) item from the popup menu

or

- open the schema in [Schema Editor](#) and the [Packages](#) tab there;
- select the package to drop;
- press the **Delete** key or select the [Drop Package](#) item from the popup menu (alternatively, you may use the corresponding link of the [Navigation Bar](#))

and confirm dropping in the dialog window.

### 5.6.1 Create Package Wizard

[Create Package Wizard](#) guides you through the process of creating a new database package. See [How To Create Package](#)<sup>[122]</sup> for instructions on running this wizard.

The basic principles of Create Object Wizards in Firebird Maestro are explained in a [separate topic](#)<sup>[40]</sup>. Below you will find a description of wizard steps that are unique for the current object.

To create a new package, set its name, a comment (optional) and specify the package definition. You can type it on the corresponding step of Create Package Wizard or do it later using non-modal editor.

**See also:** [Package Editor](#)<sup>[123]</sup>

### 5.6.2 Package Editor

[Package Editor](#) can be opened automatically after the database package is created and is available on editing (see [Editing Packages](#)<sup>[122]</sup> for details).

The basic principles of Object Editors in Firebird Maestro are explained in a [separate topic](#)<sup>[43]</sup>. Below you will find a description of editor tabs that are unique for the current object.

**See also:** [Create Package Wizard](#)<sup>[123]</sup>



The editor allows you to modify package definition and a comment to the package.

## 5.7 Package bodies

Firebird packages come in two parts: a header (keyword `PACKAGE`) and a body (keyword `PACKAGE BODY`). This division is very similar to a Delphi unit, the header corresponding to the interface part and the body corresponding to the implementation part.

The package is created first and the package body follows. Whenever a packaged routine determines that it uses a certain database object, a dependency on that object is registered in Firebird system tables. Thereafter, to drop, or maybe alter that object, you first need to remove what depends on it. As it is a package body that depends on it, that package body can just be dropped, even if some other database object depends on this package. When the body is dropped, the header remains, allowing you to recreate its body once the changes related to the removed object are done.

On the package creation the corresponding body is created. To specify its definition, select the package body in the [Explorer](#) tree and select the [Edit Package Body...](#) item from the popup menu.

## 5.8 Exceptions

An [exception](#) is a user-defined error with an associated message for use in stored procedures and triggers. Available in DSQL and isql.

### ■ How can I create a new exception?

New exceptions are created within [Create Exception Wizard](#)<sup>[127]</sup>. In order to run the wizard you should either

- select the [Object | Create Database Object...](#) main menu item;
  - select the [Exception](#) icon in the Create Database Object dialog
- or
- select the [Exceptions](#) list or any object from that list in the explorer tree;
  - select the [Create New Exception...](#) item from the popup menu
- or
- open the database in [Database Editor](#) and the [Exceptions](#) tab there;
  - press the **Insert** key or select the [Create New Exception...](#) item from the popup menu (alternatively, you may use the corresponding link of the [Navigation Bar](#)).

To create a new exception with the same properties as one of the existing exceptions has:

- select the [Object | Duplicate Database Object...](#) main menu item;
- follow the instructions of [Duplicate Object Wizard](#).

### ■ How can I edit an existing exception?

Exceptions can be edited within [Exception Editor](#)<sup>[127]</sup>. In order to run the editor you should either

- select the exception for editing in the explorer tree (type the first letters of the exception name for quick search);
  - select the [Edit Exception ...](#) item from the popup menu
- or
- open the database in [Database Editor](#) and the [Exceptions](#) tab there;
  - select the exception to edit;
  - press the **Enter** key or select the [Edit Exception](#) item from the popup menu (alternatively, you may use the corresponding link of the [Navigation Bar](#)).

### ■ How can I drop an exception?

To drop an exception:

- select the exception to drop in the explorer tree;

- select the [Drop Exception](#) item from the popup menu
- or
- open the database in [Database Editor](#) and the [Exceptions](#) tab there;
  - select the exception to drop;
  - press the **Delete** key or select the [Drop Exception](#) item from the popup menu (alternatively, you may use the corresponding link of the [Navigation Bar](#))

and confirm dropping in the dialog window.

### 5.8.1 Create Exception Wizard

[Create Exception Wizard](#) guides you through the process of creating a new exception. See [How To Create exception](#)<sup>[126]</sup> for instructions on running this wizard.

The basic principles of Create Object Wizards in Firebird Maestro are explained in a [separate topic](#)<sup>[40]</sup>. Below you will find a description of wizard steps that are unique for the current object.

#### Comment

This field stores a comment to the exception.

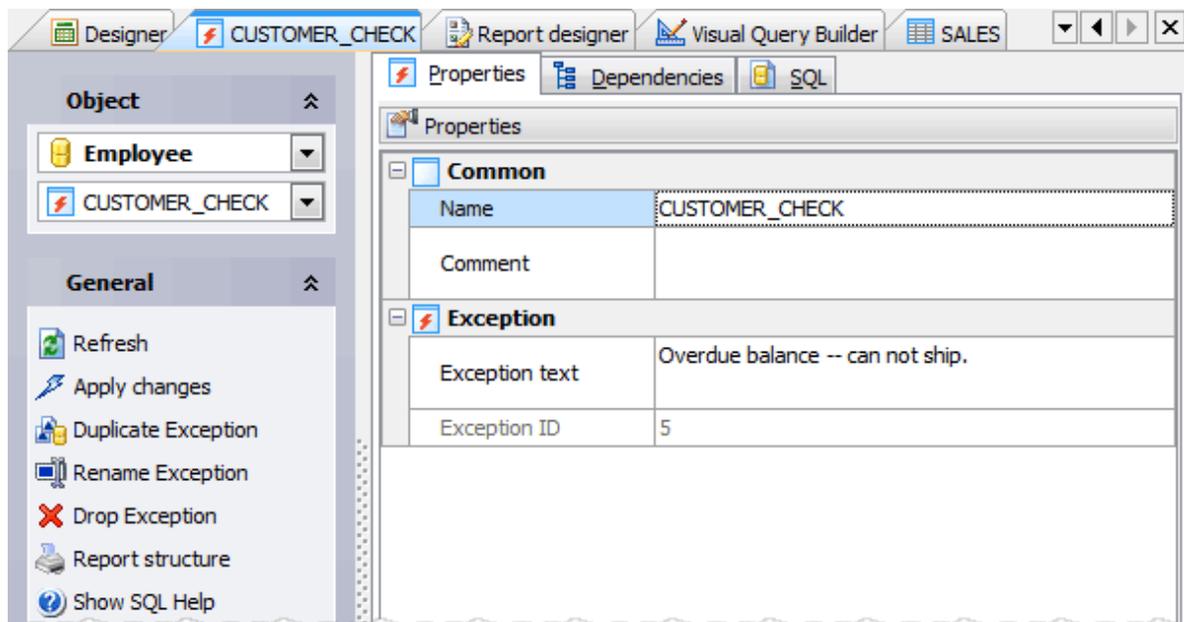
#### Exception text

Defines exception message containing alphanumeric characters and punctuation; maximum length = 78 characters. (see [Create Exception](#) (Firebird SQL Reference))

### 5.8.2 Exception Editor

[Exception Editor](#) allows you to edit the exception properties, view the SQL statement for creating the exception, etc. It opens when you create a new exception or edit the existing one (see [How to edit exception](#)<sup>[126]</sup> for details).

The basic principles of Object Editors in Firebird Maestro are explained in a [separate topic](#)<sup>[43]</sup>. Below you will find a description of editor tabs that are unique for the current object.



Specify exception properties according to your needs. The detailed description is given below.

#### Name

Defines a name for the exception. The name of the exception must be unique among all the exception names in the database.

#### Comment

This field stores a comment to the exception.

#### Exception text

Defines exception message containing alphanumeric characters and punctuation.

#### Exception ID

Shows ID number of the exception.

You can find the detailed description of exception properties in Create Exception (Firebird SQL Reference).

To apply the changes, select the [Apply Changes](#) item in the [Navigation bar](#) or use **Ctrl + F9** or **Ctrl+F7** shortcut keys.

It is also possible to modify object properties without opening the object editor: use the [Object Properties](#) item of the popup menu of the selected object from the explorer tree.

## 5.9 Sequences

A sequence (generator) is a sequential number that can be automatically inserted in a column with the `GEN_ID()` function. A sequence is often used to ensure a unique value in a PRIMARY KEY, such as an invoice number, that must uniquely identify the associated row. In Firebird 2.0 and higher SEQUENCE has been introduced as a synonym for GENERATOR, in accordance with SQL-99.

### ■ How can I create a new sequence?

New sequences are created within [Create Sequence Wizard](#)<sup>[130]</sup>. In order to run the wizard you should either

- select the [Object | Create Database Object...](#) main menu item;
  - select the [Sequence](#) icon in the Create Database Object dialog
- or
- select the [Sequences](#) list or any object from that list in the explorer tree;
  - select the [Create New Sequence...](#) item from the popup menu
- or
- open the schema in [Schema Editor](#) and the [Sequences](#) tab there;
  - press the **Insert** key or select the [Create New Sequence](#) item from the popup menu (alternatively, you may use the corresponding link of the [Navigation Bar](#)).

To create a new sequence with the same properties as one of the existing sequences has:

- select the [Object | Duplicate Database Object...](#) main menu item;
- follow the instructions of [Duplicate Object Wizard](#).

### ■ How can I edit an existing sequence?

Sequences can be edited within [Sequence Editor](#)<sup>[131]</sup>. In order to run the editor you should either

- select the sequence for editing in the explorer tree (type the first letters of the sequence name for quick search);
  - select the [Edit Sequence ...](#) item from the popup menu
- or
- open the schema in [Schema Editor](#) and the [Sequences](#) tab there;
  - select the sequence to edit;
  - press the **Enter** key or select the [Edit Sequence](#) item from the popup menu (alternatively, you may use the corresponding link of the [Navigation Bar](#)).

### ■ How can I drop a sequence

To drop a sequence:

- select the sequence to drop in the explorer tree;
  - select the [Drop Sequence](#) item from the popup menu
- or
- open the schema in [Schema Editor](#) and the [Sequences](#) tab there;
  - select the sequence to drop;
  - press the **Delete** key or select the [Drop Sequence](#) item from the popup menu (alternatively, you may use the corresponding link of the [Navigation Bar](#))

and confirm dropping in the dialog window.

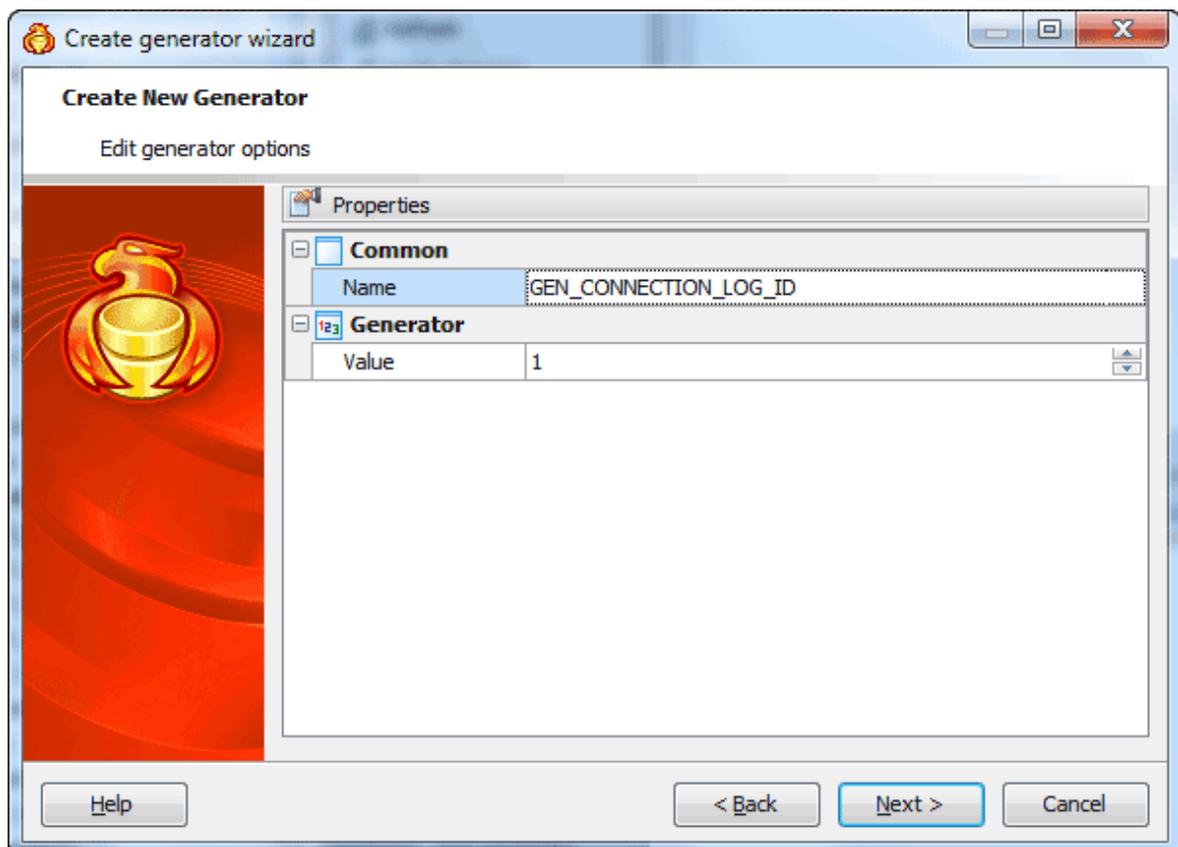
### 5.9.1 Create Sequence Wizard

Sequences may be created with [Create Sequence Wizard](#). Just specify the wizard options according to your needs.

The basic principles of Create Object Wizards in Firebird Maestro are explained in a [separate topic](#)<sup>[40]</sup>. Below you will find a description of wizard steps that are unique for the current object.

#### Value

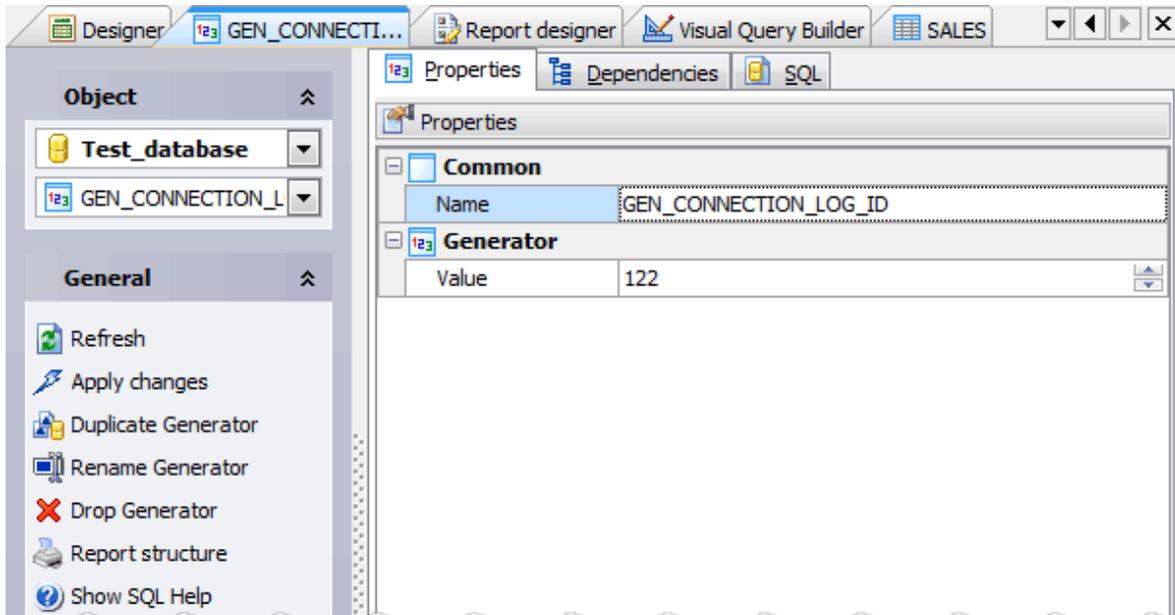
Defines the starting value for the new generator.



## 5.9.2 Sequence Editor

Use [Sequence Editor](#) to change properties of existing sequences. The editor can be opened automatically after [the sequence is created](#)<sup>[130]</sup> or from the Explorer Tree and Object Manager.

The basic principles of Object Editors in Firebird Maestro are explained in a [separate topic](#)<sup>[43]</sup>. Below you will find a description of editor tabs that are unique for the current object.



### Name

Here you can rename the sequence.

### Value

Resets the value of an existing sequence (generator) to the specified value.

To apply the changes, select the [Apply Changes](#) item in the [Navigation bar](#) or use **Ctrl+F9** or **Ctrl+F7** shortcut keys.

It is also possible to modify object properties without opening the object editor: use the [Object Properties](#) item of the popup menu of the selected object from the explorer tree.

## 5.10 Roles

**Roles**, as well as users, can be granted privileges. These roles can be granted to users which, in their turn, inherit the privilege list that has been granted to the role. Using roles can simplify security administration in databases with a large number of users or with a complex security system.

### ■ How can I create a new role?

New roles are created within [Create Role Wizard](#)<sup>[133]</sup>. In order to run the wizard you should either

- select the [Object | Create Database Object...](#) main menu item;
- select the **Role** icon in the [Create Database Object](#) dialog

or

- select the **Roles** list or any object from that list in the explorer tree;
- select the [Create New Role...](#) item from the popup menu

or

- open the database in [Database Editor](#) and the **Roles** tab there;
- press the **Insert** key or select the [Create New Role...](#) item from the popup menu (alternatively, you may use the corresponding link of the [Navigation Bar](#)).

To create a new role with the same properties as one of the existing roles has:

- select the [Object | Duplicate Database Object...](#) main menu item;
- follow the instructions of [Duplicate Object Wizard](#).

### ■ How can I edit an existing role?

Roles can be edited within [Role Editor](#)<sup>[133]</sup>. In order to run the editor you should either

- select the role for editing in the explorer tree (type the first letters of the role name for quick search);
- select the [Edit Role ...](#) item from the popup menu

or

- open the database in [Database Editor](#) and the **Roles** tab there;
- select the role to edit;
- press the **Enter** key or select the [Edit Role](#) item from the popup menu (alternatively, you may use the corresponding link of the [Navigation Bar](#)).

You can change the name of the role using the [Rename Role](#) dialog. To open the dialog you should either

- select the role to rename in the explorer tree;
- select the [Rename Role](#) item from the popup menu

or

- open the database in [Database Editor](#) and the [Roles](#) tab there;
- select the role to rename;
- select the [Rename Role](#) item from the popup menu (alternatively, you may use the corresponding link of the [Navigation Bar](#)).

#### ■ **How can I drop a role?**

To drop a role (note that you can drop database roles only):

- select the role to drop in the explorer tree;
- select the [Drop Role](#) item from the popup menu

or

- open the database in [Database Editor](#) and the [Roles](#) tab there;
- select the role to drop;
- press the **Delete** key or select the [Drop Role](#) item from the popup menu (alternatively, you may use the corresponding link of the [Navigation Bar](#))

and confirm dropping in the dialog window.

### 5.10.1 Create Role Wizard

[Create Role Wizard](#) guides you through the process of creating a new database role. See [How To Create role](#)<sup>[132]</sup> to learn how to run this wizard.

The basic principles of Create Object Wizards in Firebird Maestro are explained in a [separate topic](#)<sup>[40]</sup>. Below you will find a description of wizard steps that are unique for the current object.

#### [Managing role members](#)

The wizard step allows to define users

### 5.10.2 Role Editor

[Role Editor](#) allows you to edit role properties and permissions. It can be open automatically after the role is created and is available on editing (see [How to edit role](#)<sup>[132]</sup> for details).

The basic principles of Object Editors in Firebird Maestro are explained in a [separate topic](#)<sup>[43]</sup>. Below you will find a description of editor tabs that are unique for the current object.

The [Permissions](#) tab allows you to include/exclude users to the current role. It is equal to setting USAGE privileges to users.

**See also:** [Grant](#) (Firebird SQL Reference)

#### [Name](#)

The field allows you to view the role name.

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To apply the changes, select the [Apply Changes](#) item in the [Navigation bar](#) or use **Ctrl+F9** or **Ctrl+F7** shortcut keys.

It is also possible to modify object properties without opening the object editor: use the [Object Properties](#) item of the popup menu of the selected object from the explorer tree.

## 5.11 DDL Triggers

A *DDL trigger* is a type of database trigger, which purpose is to enable restrictions to be placed on users who attempt to create, alter or drop a DDL object. DDL triggers are available in Firebird 3.x. The following users can create, alter or drop DDL triggers and access the trigger-related switches in the Firebird utilities:

- the database owner
- SYSDBA
- a user logged in under the RDB\$ADMIN role
- a user having the ALTER DATABASE metadata privilege.

### ■ How can I create a new DDL trigger?

New DDL Triggers are created within [Create DDL Trigger Wizard](#)<sup>[136]</sup>. In order to run the wizard you should either

- select the [Object | Create Database Object...](#) main menu item;
  - select the [DDL Trigger](#) icon in the [Create Database Object](#) dialog
- or
- select the [DDL Triggers](#) list or any object from that list in the explorer tree;
  - select the [Create New DDL Trigger...](#) item from the popup menu
- or
- open the database in [Database Editor](#) and the [DDL Triggers](#) tab there;
  - press the **Insert** key or select the [Create New DDL Trigger...](#) item from the popup menu (alternatively, you may use the corresponding link of the [Navigation Bar](#)).

To create a new DDL Trigger with the same properties as one of the existing DDL Triggers has:

- select the [Object | Duplicate Database Object...](#) main menu item;
- follow the instructions of [Duplicate Object Wizard](#).

### ■ How can I edit an existing DDL trigger?

DDL Triggers can be edited within [DDL Trigger Editor](#)<sup>[137]</sup>. In order to run the editor you should either

- select the DDL Trigger for editing in the explorer tree (type the first letters of the DDL Trigger name for quick search);
  - select the [Edit DDL Trigger ...](#) item from the popup menu
- or
- open the database in [Database Editor](#) and the [DDL Triggers](#) tab there;
  - select the DDL Trigger to edit;
  - press the **Enter** key or select the [Edit DDL Trigger](#) item from the popup menu (alternatively, you may use the corresponding link of the [Navigation Bar](#)).

You can change the name of the DDL Trigger using the [Rename DDL Trigger](#) dialog. To open the dialog you should either

- select the DDL Trigger to rename in the explorer tree;
- select the [Rename DDL Trigger](#) item from the popup menu

or

- open the database in [Database Editor](#) and the [DDL Triggers](#) tab there;
- select the DDL Trigger to rename;
- select the [Rename DDL Trigger](#) item from the popup menu (alternatively, you may use the corresponding link of the [Navigation Bar](#)).

#### ■ **How can I drop a DDL trigger?**

To drop a DDL Trigger:

- select the DDL Trigger to drop in the explorer tree;
- select the [Drop DDL Trigger](#) item from the popup menu

or

- open the database in [Database Editor](#) and the [DDL Triggers](#) tab there;
- select the DDL Trigger to drop;
- press the **Delete** key or select the [Drop DDL Trigger](#) item from the popup menu (alternatively, you may use the corresponding link of the [Navigation Bar](#))

and confirm dropping in the dialog window.

### 5.11.1 Create DDL Trigger Wizard

[Create DDL Trigger Wizard](#) guides you through the process of creating a new DDL trigger. See [How To Create DDL trigger](#)<sup>[135]</sup> for instructions on running this wizard.

The basic principles of Create Object Wizards in Firebird Maestro are explained in a [separate topic](#)<sup>[40]</sup>. Below you will find a description of wizard steps that are unique for the current object.

To create a new DDL Trigger, specify the following options: a comment (optional), the Active option, the events which execution cause the DDL trigger to fire, select whether the trigger will fire [Before](#) or [After](#) specified events.

To add events, use the ellipse button (...) and specify event types and groups in the Add Event dialog. If an event group is specified, the DDL trigger fires after execution of any event from this group.

Use the [Position](#) clause to specify the order in which multiple triggers on the same situation fire.

Specify the trigger steps to be executed when the DDL trigger fires as trigger [Definition](#).

**See also:** [DDL Trigger Editor](#)<sup>[137]</sup>

## 5.11.2 DDL Trigger Editor

[DDL Trigger Editor](#) allows you to edit DDL trigger definition (DDL trigger name, DDL trigger comment, etc.). It can be opened when you create a new DDL trigger or edit the existing one (see [DDL Triggers](#)<sup>[135]</sup> for details).

The basic principles of Object Editors in Firebird Maestro are explained in a [separate topic](#)<sup>[43]</sup>. Below you will find a description of editor tabs that are unique for the current object.

- [Editing DDL trigger properties](#)<sup>[137]</sup>

**See also:** [Create DDL Trigger Wizard](#)<sup>[135]</sup>

### 5.11.2.1 Editing DDL trigger properties

Specify DDL Trigger options according to your needs. The detailed description is given below.

#### Definition

The field contains the definition of the DDL trigger. It describes the trigger conditions and actions. The trigger actions specified in the Transact-SQL statements go into effect when the DDL operation is tried. Triggers can include any number and kind of Transact-SQL statements, with exceptions.

#### Name

Displays the DDL trigger name.

#### Comment

Specify a comment to the DDL trigger.

#### Events

This field allows you to specify the events execution of which causes a DDL trigger to fire. Click ellipse button (...) on the right of the events text area to select this events or event groups using the [Add Event Dialog](#).

#### Active

Disabling a trigger does not drop it. The DDL trigger still exists as an object in the current database/server.

Use the [Position](#) clause to modify the order in which multiple triggers on the same situation fire.

To apply the changes, select the [Apply Changes](#) item in the [Navigation bar](#) or use **Ctrl+F9** or **Ctrl+F7** shortcut keys.

It is also possible to modify object properties without opening the object editor: use the [Object Properties](#) item of the popup menu of the selected object from the explorer tree.

## 5.12 Database triggers

Database triggers were implemented in Firebird 2.1. The triggers are user-defined PSQL modules that can be designed to fire in various connection-level and transaction-level events.

### ■ How can I create a new database trigger?

New database triggers are created within [Create Database Trigger Wizard](#).<sup>[139]</sup> In order to run the wizard you should either

- select the [Object | Create Database Object...](#) main menu item;
- select the [Database Trigger](#) icon in the [Create Database Object](#) dialog

or

- select the [Database Trigger](#) list or any object from that list in the explorer tree;
- select the [Create New Database Trigger...](#) item from the popup menu.

To create a new database trigger with the same properties as one of the existing database trigger has:

- select the [Object | Duplicate Database Object...](#) main menu item;
- follow the instructions of [Duplicate Object Wizard](#).

### ■ How can I edit an existing database trigger?

Database triggers can be edited within [Database Trigger Editor](#).<sup>[140]</sup> In order to run the editor you should either

- select the database trigger for editing in the explorer tree (type the first letters of the database trigger name for quick search);
- select the [Edit Database Trigger ...](#) item from the popup menu

or

- open the database in [Database Editor](#) and the [Database Triggers](#) tab there;
- select the database trigger to edit;
- press the **Enter** key or select the [Edit Database Trigger](#) item from the popup menu (alternatively, you may use the corresponding link of the [Navigation Bar](#)).

You can change the name of the database trigger using the [Rename Database Trigger](#) dialog. To open the dialog you should either

- select the database trigger to rename in the explorer tree;
- select the [Rename Database Trigger](#) item from the popup menu

or

- open the database in [Database Editor](#) and the [Database Triggers](#) tab there;
- select the database trigger to rename;

- select the [Rename Database Trigger](#) item from the popup menu (alternatively, you may use the corresponding link of the [Navigation Bar](#)).

#### ■ How can I drop a database trigger?

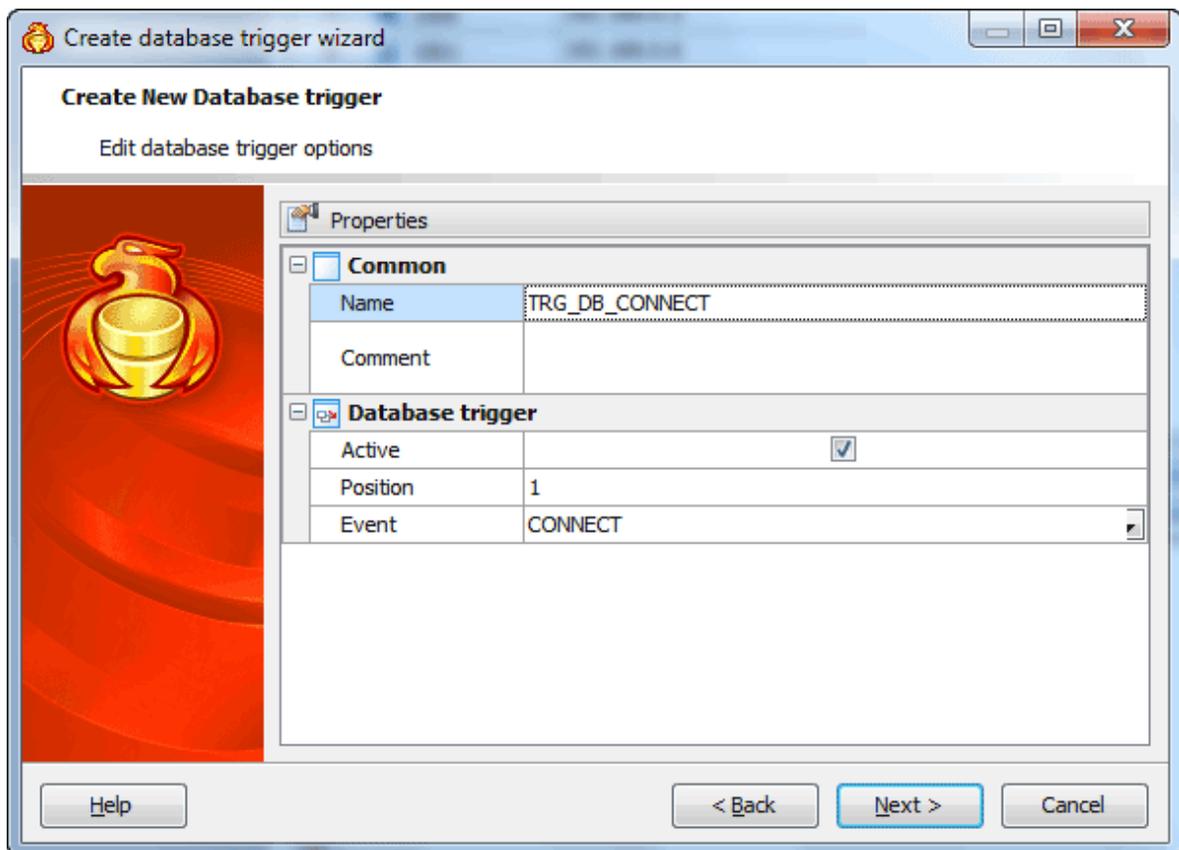
To drop a database trigger:

- select the [database trigger](#) to drop in the explorer tree;
- select the [Drop Database Trigger](#) item from the popup menu (alternatively, you may use the corresponding link of the [Navigation Bar](#))

and confirm dropping in the dialog window.

### 5.12.1 Create Database Trigger Wizard

[Create Database Trigger Wizard](#) guides you through the process of creating a new trigger. See [How To Create Database Trigger](#)<sup>[138]</sup> for instructions on running this wizard. Only database owner and SYSDBA can do database triggers DDL.



The basic principles of Create Object Wizards in Firebird Maestro are explained in a [separate topic](#)<sup>[40]</sup>. Below you will find a description of wizard steps that are unique for the current object.

The wizard step was supplied to define common database trigger properties.

#### Name

The field represents the new database trigger name as it was set on the previous wizard step.

#### Comment

Enter some words to comment the database trigger or leave it blank.

#### Active

Check the option to enable the trigger.

#### Event

Use the popup menu to select the new database trigger event.

#### CONNECT

- Database connection established
- A transaction is started
- Triggers are fired - uncaught exceptions rollback the transaction, disconnect the attachment and are returned to the client

#### DISCONNECT

- The transaction is committed
- A transaction is started
- Triggers are fired - uncaught exceptions rollback the transaction, disconnect the attachment and are swallowed
- The transaction is committed
- The attachment is disconnected

#### TRANSACTION START

- Triggers are fired in the newly user created transaction - uncaught exceptions are returned to the client and the transaction is rolled-back.

#### TRANSACTION COMMIT

- Triggers are fired in the committing transaction - uncaught exceptions rollback the triggers savepoint, the commit command is aborted and the exception is returned to the client.
- Note: for two-phase transactions the triggers are fired in "prepare" and not in commit.

#### TRANSACTION ROLLBACK

- Triggers are fired in the rolling-back transaction - changes done will be rolled-back together with the transaction and exceptions are swallowed.

#### Specifying trigger definition

Use this step to specify the trigger steps to be executed when the trigger fires. You can also do it later using non-modal editor.

### 5.12.2 Database Trigger Editor

Database Trigger Editor can be opened automatically after the trigger is created and is available on editing (see [Editing Triggers](#)<sup>[138]</sup> for details).

The basic principles of Object Editors in Firebird Maestro are explained in a [separate topic](#)<sup>[43]</sup>. Below you will find a description of editor tabs that are unique for the current object.

Database Trigger Editor provides you with an ability to edit trigger properties. The Properties tab allows you to change the trigger name, the trigger definition, and the trigger events.

#### Name

Use the field to rename the database trigger.

#### Active

Check the option to enable the trigger.

#### Event

Use the field to change the database trigger event:

CONNECT	<ul style="list-style-type: none"><li>• Database connection established</li><li>• A transaction is started</li><li>• Triggers are fired - uncaught exceptions rollback the transaction, disconnect the attachment and are returned to the client</li></ul>
DISCONNECT	<ul style="list-style-type: none"><li>• The transaction is committed</li><li>• A transaction is started</li><li>• Triggers are fired - uncaught exceptions rollback the transaction, disconnect the attachment and are swallowed</li><li>• The transaction is committed</li><li>• The attachment is disconnected</li></ul>
TRANSACTION START	<ul style="list-style-type: none"><li>• Triggers are fired in the newly user created transaction - uncaught exceptions are returned to the client and the transaction is rolled-back.</li></ul>
TRANSACTION COMMIT	<ul style="list-style-type: none"><li>• Triggers are fired in the committing transaction - uncaught exceptions rollback the triggers savepoint, the commit command is aborted and the exception is returned to the client.</li><li>• Note: for two-phase transactions the triggers are fired in "prepare" and not in commit.</li></ul>
TRANSACTION ROLLBACK	<ul style="list-style-type: none"><li>• Triggers are fired in the rolling-back transaction - changes done will be rolled-back together with the transaction and exceptions are swallowed.</li></ul>

To apply the changes, select the [Apply Changes](#) item in the [Navigation bar](#) or use **Ctrl+F9** or **Ctrl+F7** shortcut keys.

It is also possible to modify object properties without opening the object editor: use the [Object Properties](#) item of the popup menu of the selected object from the explorer tree.

## 6 Server Objects

With Firebird Maestro you can accomplish all the popular actions of server administration. Note that before working with server objects you should connect to any server database first (see [Database Management](#)<sup>[24]</sup>).

The following list contains the most common server objects supported by Firebird Maestro.

- [Databases](#)<sup>[144]</sup>;
- [User](#)<sup>[146]</sup>.

Below you can find some common ways of server object management.

### ■ Creating of a new server object

New server objects are created within the appropriate [Create Object Wizard](#). In order to run the wizard you should either

- select the corresponding object list (such as [Users](#)) or any object from that list and then use the [Create New...](#) item from the popup menu

### ■ Editing of an existing server object

Server objects are edited within the corresponding [Object Editor](#). In order to open the editor you should either

- select the server object for editing in the explorer tree (type the first letters of the object name for quick search);
- select the [Edit Object](#) item from the popup menu

or

- open the server in [Server Editor](#) and the corresponding objects' tab there;
- select the server object to edit;
- press the **Enter** key or select the [Edit Object](#) item from the popup menu (alternatively, you can use the corresponding link of the [Navigation Bar](#)).

### ■ Dropping of a server object

To drop the existing server object:

- select the server object to drop in the explorer tree;
- select the [Drop Object](#) item from the popup menu

or

- open the server in [Server Editor](#) and the appropriate objects' tab there;
- select the server object to drop;
- press the **Delete** key or select the [Drop Object](#) item from the

popup menu (alternatively, you may use the corresponding link of the [Navigation Bar](#))

and confirm dropping in the dialog window.

## 6.1 Databases

Firebird Maestro allows you to manipulate databases by means of database profiles. Profile contains database connection settings and a set of options to automatize common manipulations with databases (a possibility to connect to the database at Firebird Maestro startup, login prompt before connection, etc.). To start working with databases in Firebird Maestro, you should create database profile(s) first.

Use the following links for details:

### ■ **How can I create a new database?**

Use for this purpose [Create Database Wizard](#)<sup>[36]</sup>. In order to run the wizard you should either

- select the Database | Create New Database... main menu item
- or
- use the Create New Database... item of the popup menu.

Using Create Database Wizard set the Create profile after creating the database option to create a new profile and open the Database Profile Properties dialog after the database is created.

### ■ **How can I change attributes of an existing database?**

To edit a database:

- select the database to edit in the explorer tree;
- edit database properties within the appropriate tabs of [Database Editor](#)<sup>[37]</sup>.

### ■ **How can I drop an existing database?**

In order to drop a database you should first select the database to drop in the explorer tree and establish connection (if you are not connected to the database yet), then either

- select the Database | Drop Database main menu item
- or
- use the Drop Database item of the popup menu

and confirm dropping in the dialog window to complete the operation.

### ■ **How can I create new database profiles?**

In Firebird Maestro database profiles are created within [Create Database Profiles Wizard](#)<sup>[38]</sup>. In order to run the wizard you should either

- select the [Database | Create Database Profiles...](#) main menu item

or

- use the [Create Database Profiles...](#) item of the popup menu.

Using [Create Database Profiles Wizard](#) set the necessary connection and authorization options and click the [Ready](#) button to complete the operation.

#### ■ **How can I edit existing database profile options?**

Database connection properties and profile options are edited within the [Database Profile Properties](#)<sup>[?] ↗</sup> dialog window. In order to open the dialog for the selected database profile you should either

- select the [Database | Edit Database Profile...](#) main menu item

or

- use the [Edit Database Profile...](#) item of the popup menu.

#### ■ **How can I remove database profiles?**

In order to remove a database profile you should first select the database profile in the explorer tree, then either select the [Database | Remove Database Profile](#) main menu item, or use the [Remove Database Profile](#) item of the popup menu and confirm removing profile in the dialog window to complete the operation.

#### ■ **How can I connect to a database?**

In order to connect to a database you should first select the database in the explorer tree, then either

- select the [Database | Connect to Database](#) main menu item

or

- use the [Connect to Database](#) item of the popup menu.

#### ■ **How can I disconnect from a database?**

In order to disconnect from a database you should first select the database in the explorer tree, then either

- select the [Database | Disconnect from Database](#) main menu item

or

- use the [Disconnect from Database](#) item of the popup menu.

## 6.2 Users

A user is a registration record that is available in all databases on the server. Only *superuser* can manage users.

### ■ How can I create a new user?

New users are created within [Create User Wizard](#)<sup>[147]</sup>. In order to run the wizard you should either

- select the [Users](#) list or any object from that list in the explorer tree and then use the [Create New User](#) item from the popup menu
- or
- open the server in [Server Editor](#) and the [Users](#) tab there and press **Insert** or select the [Create New User](#) item from the popup menu (Alternatively, use the corresponding link of the [Navigation Bar](#)).

### ■ How can I edit an existing user?

Users are edited within [User Editor](#)<sup>[147]</sup>. In order to run the editor you should either

- select the user for editing in the explorer tree (type the first letters of the user name for quick search);
  - select the [Edit User](#) item from the popup menu
- or
- open the server in [Server Editor](#) and the [Users](#) tab there;
  - select the user to edit;
  - press the **Enter** key or select the [Edit User](#) item from the popup menu (alternatively, you can use the corresponding link of the [Navigation Bar](#)).

### ■ How can I drop a user?

To drop the existing user:

- select the user to drop in the explorer tree;
  - select the [Drop User](#) item from the popup menu
- or
- open the server in [Server Editor](#) and the [Users](#) tab there;
  - select the user to drop;
  - press the **Delete** key or select the [Drop User](#) item from the popup menu (alternatively, you may use the corresponding link of the [Navigation Bar](#))

and confirm dropping in the dialog window.

## 6.2.1 Create User Wizard

[Create User Wizard](#) guides you through the process of creating a new user. See [How To Create User](#)<sup>[146]</sup> to learn how to run this wizard.

The basic principles of Create Object Wizards in Firebird Maestro are explained in a [separate topic](#)<sup>[40]</sup>. Below you will find a description of wizard steps that are unique for the current object.

The field **Name** contains the new user name as it was set on the previous wizard step. Use it to edit the name of user being made.

Use this step also to specify the new user **Password** and confirm it.

### First name

This parameter allows you to set the user's first name. This is helpful when identifying users from their login name which may be abbreviated.

### Middle name

This parameter allows you to set the user's middle name. This is helpful when identifying users from their login name which may be abbreviated.

### Last name

This parameter allows you to set the user's last name. This is helpful when identifying users from their login name which may be abbreviated.

## 6.2.2 User Editor

[User Editor](#) is the basic Firebird Maestro tool for working with existing users. It can be opened automatically after the user is created and is available on editing the user (see [How to edit user](#)<sup>[146]</sup> for details).

The basic principles of Object Editors in Firebird Maestro are explained in a [separate topic](#)<sup>[43]</sup>. Below you will find a description of editor tabs that are unique for the current object.

The **Properties** tab of this editor allows you to change the user password, the user grants.

### Name

Here you can view the user name.

### Password

Here you can change the user's password.

### User ID

Is used on some POSIX systems to enter the Unix userid as found in /etc/passwd and /etc/group configuration files.

### Group ID

Is used on some POSIX systems to enter the Unix groupid as found in /etc/passwd and /etc/group configuration files.

#### First name

This parameter allows you to set the user's first name. This is helpful when identifying users from their login name which may be abbreviated.

#### Middle name

This parameter allows you to set the user's middle name. This is helpful when identifying users from their login name which may be abbreviated.

#### Last name

This parameter allows you to set the user's last name. This is helpful when identifying users from their login name which may be abbreviated.

To apply the changes, select the [Apply Changes](#) item in the [Navigation bar](#) or use **Ctrl+F9** or **Ctrl+F7** shortcut keys.

It is also possible to modify object properties without opening the object editor: use the [Object Properties](#) item of the popup menu of the selected object from the explorer tree.

#### User objects

Objects that are having this user as an owner are managed within the [Objects](#) tab of User Editor. Double click a row to open the necessary object editor. Use grid's popup menu items to edit, drop or rename object.

## 7 Queries

Firebird Maestro provides several tools for working with SQL queries:

- [SQL Editor](#)<sup>[151]</sup> for editing the query text directly and executing SELECT queries;
- [Visual Query Builder](#)<sup>[156]</sup> for building SELECT, INSERT, UPDATE and DELETE queries visually;
- [SQL Script Editor](#)<sup>[202]</sup> for executing SQL scripts.

Both SQL Editor and Visual Query Builder supports [parameters in queries](#)<sup>[155]</sup>

Save frequently used queries to profiles and manage them in the same way as if they were database objects. This means that you can view queries in the explorer tree, in [Object Manager](#) and [Object Browser](#), use them in [BLOB Viewer](#) and [Diagram Viewer](#), perform drag-and-drop operation upon them, and copy them to clipboard like you copy an object.

### ■ **How can I create a new SQL query?**

New queries can be created either in [SQL Editor](#) or in [Visual Query Builder](#).

To create a new query in [SQL Editor](#):

- select the [Tools | SQL Editor](#) main menu item;
- select the [Create New Query](#) item from the navigation bar;
- edit the query text on the [Editor](#) tab of [SQL Editor](#).

To create a new query in [Query Builder](#):

- select the [Tools | Visual Query Builder](#) main menu item;
- build the query on the [Diagram](#) tab of [Visual Query Builder](#).

Firebird Maestro also provides you with [SQL Generator](#), a tool to create simple SQL statements.

### ■ **How can I save a query to a file/profile?**

To save an existing query from the editor:

- to save the query to profile, use the [Save to profile](#) link from the [Navigation bar](#).
- to save the current query to an `*.sql` file, select the [Save to file](#) item from the [Navigation bar](#);
- to save all the opened queries to one file, select the [Save all queries](#) item from the [Navigation bar](#);
- to save the designed diagram, select the [Save diagram](#) item from the [Navigation bar](#) of the [Diagram](#) tab of [Visual Query Builder](#).

### ■ **How can I edit an existing SQL query?**

Queries can be opened either in [SQL Editor](#) or in [Visual Query Builder](#).

You can open the query directly from the Explorer tree with a double click or using popup menu. By default it will be opened in [SQL Editor](#).

To edit a query from file, open [SQL Editor](#) (the [Tools | SQL Editor](#) main menu item) and use [Load From File](#) from the [Navigation Bar](#) of [SQL Editor](#) to load a query from an `*.sql` file.

To edit a query in [Query Builder](#), open the builder (the [Tools | Visual Query Builder](#) main menu item) and then perform one of the following operations:

- to edit a query from a profile, drag it from the [Explorer](#) and drop on the [Editor](#) tab;
- to load a previously saved diagram, use the [Load Diagram](#) item from the [Navigation Bar](#);
- to load a query from an `*.sql` file, open the [Editor](#) tab and select the [Load query](#) item from the [Navigation Bar](#) .

On the [Query Builder](#) opening the [Diagram](#) tab contains the last edited query.

### ■ **How can I execute an SQL query?**

To execute a query:

- create a new query or open the existing one;
- select the [Execute Query](#) item from the navigation bar of [SQL Editor](#) or [Visual Query Builder](#) respectively;
- view/edit the returned data on the [Result](#) tab.

## 7.1 SQL Editor

[SQL Editor](#) is a tool for creating and executing SELECT queries. It allows you to create and edit SQL text for the query, prepare and execute queries, and view the results of execution. To open [SQL Editor](#), select the [Tools | SQL Editor](#) main menu item. The most popular query management actions (creating, editing, deleting) are covered by the corresponding [topic](#)<sup>[149]</sup>.

To use the editor for working with several queries, open new query tab with the [Create new query](#) link on the Navigation bar. With the tabs' popup menu you can create a new query, close existing one, save the query to profile, etc even if editor's navigation bar is closed. Queries' tabs [can be](#)<sup>[267]</sup> displayed at the all sides of the editor (bottom, top, left or right).

For more information about query executing and working with query result see the [corresponding topic](#)<sup>[153]</sup>.

### ■ Working with query text

The [popup menu](#) of the editing area provides you with standard operations for working with text such as *Cut* (**Ctrl+X**), *Copy* (**Ctrl+C**), *Paste* (**Ctrl+V**), *Undo* (**Ctrl+Z**), *Redo* (**Shift+Ctrl+Z**) along with a possibility to convert selected text to different cases (*lower*, *UPPER*, and *NameCase*).

You can also comment/uncomment selected text (**Shift+Ctrl+.** and **Shift+Ctrl+,** shortcuts respectively). If no text is selected, the whole line will be commented. By the way, it is not necessary to select commented text to uncomment it, just press **Shift+Ctrl+.** having the cursor inside the commented text. Both kinds of comments (single-line and multi-line) are supported. [SQL Formatter](#)<sup>[152]</sup> is also at your disposal.

SQL Editor allows you to use [Visual Query Builder](#)<sup>[156]</sup> modal instance to design query visually and load the result query text directly in the editor area. For this purpose use the [Design query](#) link of the editor area's popup menu.

### ■ Code completion

Firebird Maestro provides you with code completion (as on the screen below) to select from a list of tables, columns, views, or other objects without having to manually enter the object's name in the editor. You can activate the completion list by pressing the **Ctrl+Space** key combination.

### ■ Syntax highlighting

Database objects are highlighted in the text. You can open the proper object editor by clicking the object name in the text with the **Ctrl** key pressed or with the [Find Object](#) link on the [Navigation bar](#). To adjust the highlighting settings, use [SQL highlight options](#)<sup>[287]</sup>.

### ■ Line modification markers

Lines of code that have been edited during the current session are indicated with a yellow line in the left margin of the editor. When you save the file, the yellow markers turn green. Thus at any time, yellow markers show changed but unsaved

lines of code, and green markers show changes in this session that have been saved.

#### ■ Find and replace text

Use find and replace to search for, and optionally, replace text in the [SQL Editor](#). To open [Find text/Replace text](#) window, use [Edit | Find/Replace](#) main menu item, corresponding link of popup menu, or **Ctrl+F/Ctrl+H** shortcut. You can also use the [Search again](#) link to apply recent Find text dialog.

#### ■ Transaction management

SQL Editor supports the explicit transaction management. You can execute queries either in [autocommit mode](#) (default behavior) or [manage transactions manually](#). In the second case you have to issue `COMMIT` or `ROLLBACK` statements (it is also possible to use the corresponding links at the editor's navigation bar).

#### ■ Managing the query text

To load query from .sql file, use the corresponding link on the Navigation bar. You can also find there links allowing you to save query text to file, export the contents of the editor to RTF and HTML formats (to file or to clipboard), copy the selected text from to clipboard as a ready-to-use string written in one of the following programming languages: C#, C++, Delphi (Object Pascal), and Java, and also print/preview the contents of the editor.

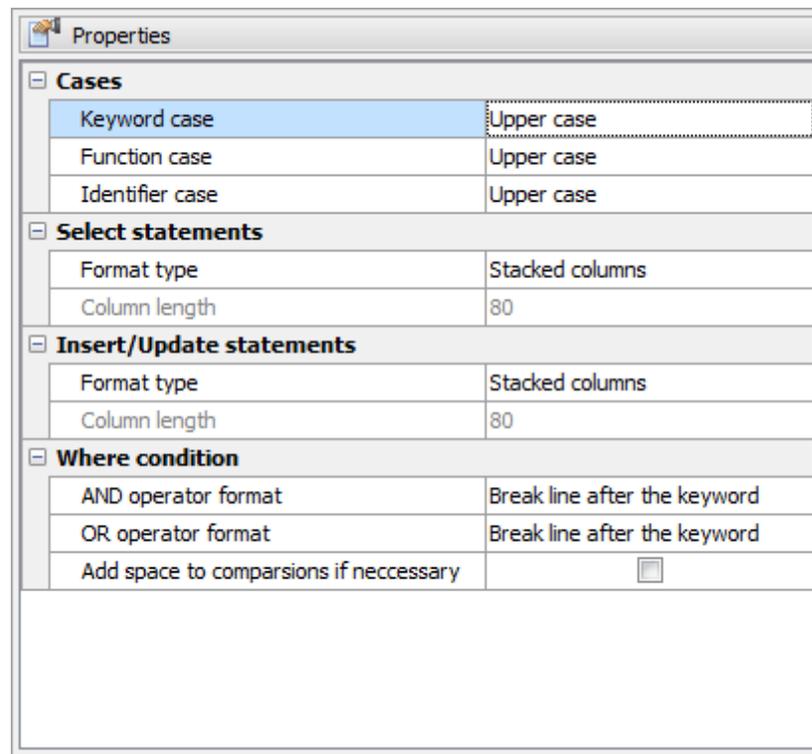
**See also:** [Visual Query Builder](#)<sup>[156]</sup>, SQL Script Editor, [SQL Editor Options](#)<sup>[267]</sup>

### 7.1.1 SQL Formatter

Firebird Maestro provides you with [SQL Formatter](#) for DML statements (`SELECT`, `INSERT`, `UPDATE` and `DELETE`). It can be invoked through the [Format SQL](#) link on the [SQL Editor's](#) navigation bar (**Ctrl+Alt+D** shortcut).

The following options allows you to tune up SQL scripts according to your preferences.

- Cases (for keywords, functions, and identifiers);
- Format type and column length for `INSERT/UPDATE`, and `SELECT` statements;
- `AND` and `OR` operators format.



## 7.1.2 Executing query

SQL Editor provides you with several variants of the query executing.

- To execute all statements of the text area with result data, click the [Execute query](#) item of the Navigation bar or use **F5**, **F8**, or **F9** shortcuts. Statements of each tab of SQL Editor are executed together in a separate thread in order to continue your work with the software while the query is executing.
- You can also [execute query as script](#) (**Shift+F5**, **Shift+F8**, **Shift+F9**). In this case the query does not return data.
- To execute only a selected part of the query text, use [Execute selected only](#) or the **Alt+F5**, **Alt+F8**, **Alt+F9** shortcuts.
- There is also a possibility to execute a statement at the cursor position. For this purpose, use the [Execute at cursor link](#) at the Navigation bar or use the **Ctrl+F5**, **Ctrl+F8**, or **Ctrl+F9** shortcuts.

If the query text is correct, the query is executed, and if the query statement is supposed to return data (e.g. SELECT statement), the [Result](#) tab opens with the data returned by the query. If an error occurs while executing the query, execution stop is stopped and the appropriate error message is displayed in the Information tab.

The [Result](#) area displays the result data in grid. All principles of working with data you can find in [Data Management](#)<sup>165</sup> section.

The screenshot shows the SQL Maestro interface. On the left is a sidebar with sections: Database (sdb\_demo at sun), General (Execute query, Execute as script, etc.), Query management (Create new query, Delete current query, etc.), Files (Load from file, Save to file, etc.), and Data management (Export data, Get SQL dump, Print data). The main window contains a SQL Editor with the following query:

```

SELECT
  NBA.GAME.GAME_DATE,
  HOME_TEAM.CAPTION AS HOME_TEAM,
  (SELECT
    SUM(NBA.GAME_QUARTER.SCORE) AS FIELD_1
  FROM NBA.GAME_QUARTER
  WHERE
    (NBA.GAME_QUARTER.GAME_ID = NBA.GAME.ID)
    (NBA.GAME_QUARTER.TEAM_ID = HOME_TEAM.ID)
  (SELECT
    SUM(NBA.GAME_QUARTER.SCORE) AS FIELD_2
  FROM NBA.GAME_QUARTER
  WHERE
    (NBA.GAME_QUARTER.GAME_ID = NBA.GAME.ID)
    (NBA.GAME_QUARTER.TEAM_ID = HOME_TEAM.ID)
  )

```

Below the editor is a results grid with columns: GAME\_DATE, HOME\_TEAM, HOME\_TEAM\_SCORE. The grid shows 11 rows of data for games on 28.10.2008 and 29.10.2008. A status bar at the bottom indicates "Records fetched: 1315".

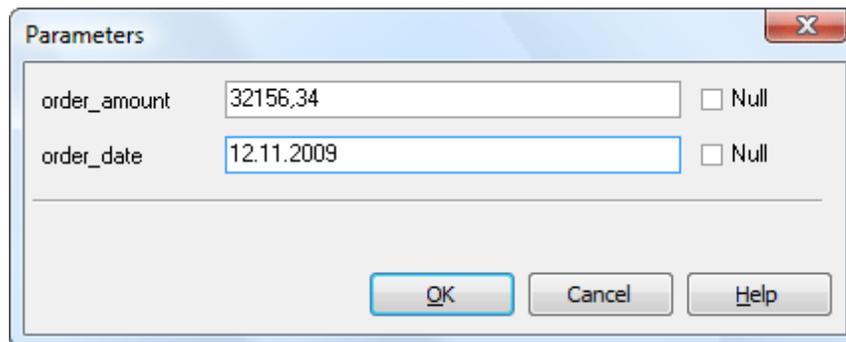
	GAME_DATE	HOME_TEAM	HOME_TEAM_SCORE
1	28.10.2008	Boston Celtics	
2	28.10.2008	Chicago Bulls	1
3	28.10.2008	Los Angeles Lakers	
4	29.10.2008	Philadelphia 76ers	
5	29.10.2008	Orlando Magic	
6	29.10.2008	Washington Wizards	
7	29.10.2008	New York Knicks	1
8	29.10.2008	Detroit Pistons	1
9	29.10.2008	Minnesota Timberwolves	
10	29.10.2008	Oklahoma City Thunder	
11	29.10.2008	San Antonio Spurs	

Information: 1315 rows fetched (0,56 sec)

### 7.1.3 Query Parameters

Both [SQL Editor](#)<sup>[157]</sup> and [Visual Query Builder](#)<sup>[156]</sup> admit to using parameters inside the query text. A parameter is a kind of variable. Its value can be specified just before the query execution in the [Parameters](#) window. In the query text the parameter should appear as an identifier with a colon (':') at its beginning, e.g. `:param1`.

The [Parameters](#) dialog is used to specify the query parameters as well as values of the input parameters of procedures or functions before the execution. Enter parameter values and click the **OK** button to apply the values and execute the query or use the **Cancel** button to abort the execution.



**Note:** To allow use parameters in query text, check the corresponding option at the [Tools](#)<sup>[264]</sup> tab of Firebird Maestro Options.

## 7.2 Visual Query Builder

[Visual Query Builder](#) is provided for building data manipulation statements visually. It allows you to create and edit queries without knowledge of SQL, prepare and execute queries, and view the results of the execution. Builder can produce *INSERT*, *UPDATE* and *DELETE* statements as well as the *SELECT* statements containing subqueries and/or *UNIONS*. One instance of the builder can be used only for one query at a time. To open [Visual Query Builder](#), select the [Tools | Query Builder](#) main menu item.

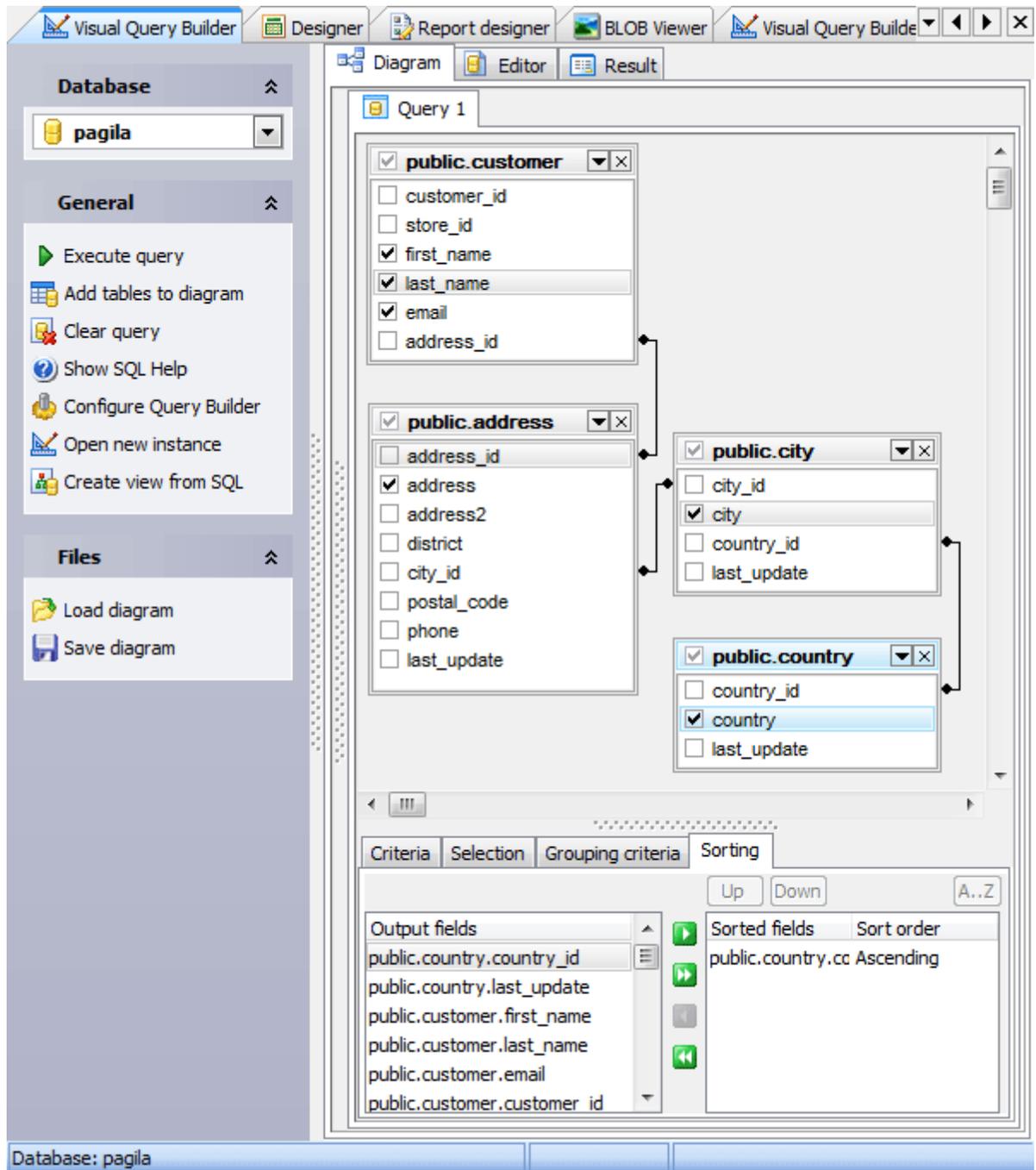
The most popular query management actions (creating, editing, deleting) are covered by the corresponding [topic](#)<sup>[149]</sup>.

Builder consists of 3 tabs:

- [Diagram](#)<sup>[157]</sup> - to create a query from a graphical interface,
- [Editor](#)<sup>[162]</sup> - to modify the query text before its executing,
- [Result](#)<sup>[163]</sup> (appears after the query executing) - for working with data the query returns.

The builder also allows you to create a view based on the prepared query. For this purpose after the query creating and possibly testing use the Create view from SQL link at the Navigation bar to invoke the corresponding window, and specify [view\\_properties](#)<sup>[94]</sup>.

**See also:** [SQL Editor](#)<sup>[151]</sup>, [Visual Query Builder Options](#)<sup>[269]</sup>, [Query Parameters](#)<sup>[155]</sup>



### 7.2.1 Creating query diagram

The **Diagram** tab is the main area of Visual Query Builder. Using its graphical interface you can select tables and views, join or select columns, and add conditions to the statement.

The **Query Explorer** field occupies the left side of Visual Query Builder main window. All the queries included in the result query (unions, subqueries) are represented at the Query Explorer for prompt access. They are grouped by kind and listed under the according node.

Below step-by-step description of query diagram creating.

- **Select the statement type** from the drop-down list at the top of the **Diagram** tab (*SELECT, INSERT, UPDATE, DELETE*).

**Add required tables to the Diagram area.**

Use the **Add Table(s)** link of the area popup menu and select tables from the opened window (Use **Ctrl** or **Shift** pressed to select several tables).

To add only one table, simply drag it from the **Database Explorer** or from **Object Manager/Browser** to the **Diagram** area.

To remove the object, close its window or select the object and press the **Delete** key.

**Pick up columns with data to output**

To include a table field to the query, tick off the option box to the left of the field name in the list or double-click it to see the blue icon next to the field name.

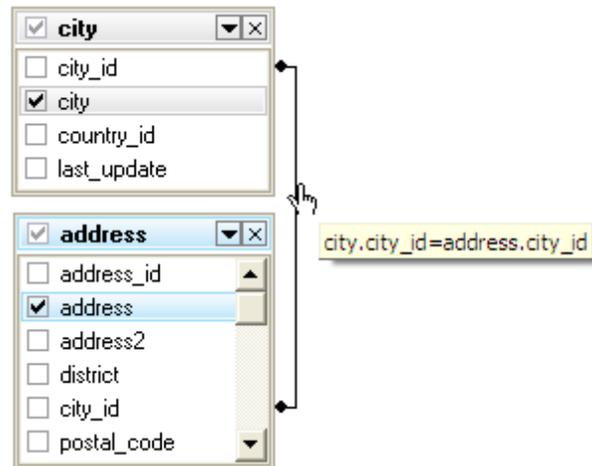


To include all the table fields, tick off the option box to the left of the table caption. In case none fields is included, the SQL statement is generated as `SELECT * FROM <Table_Name>`, i.e. all the fields are selected.

To remove the fields from the query, uncheck the corresponding boxes.

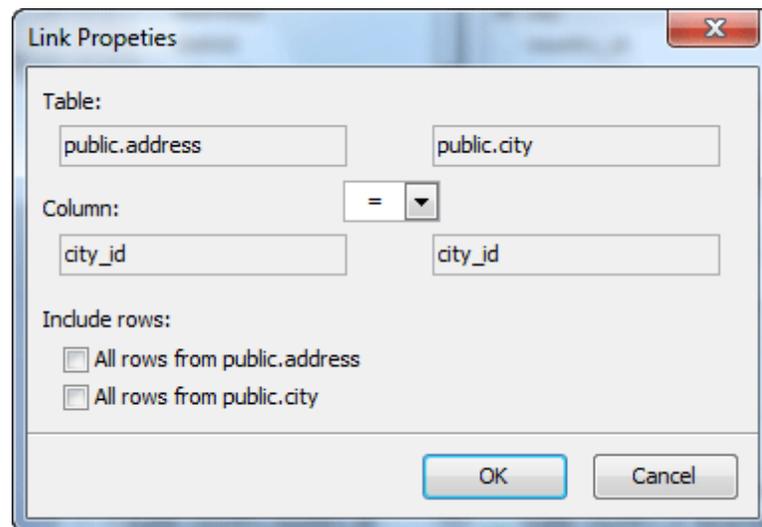
**Join tables if necessary**

Visual Query Builder supports *INNER JOIN*, *LEFT OUTER JOIN*, and *RIGHT OUTER JOIN*. To associate database objects by two fields, drag a field from the first object's field list to a field from another object's field list. This will set a link between these objects by the selected fields. After you finish dragging, a line will appear between the linked fields. By default *INNER JOIN* syntax will be used.



You can view the properties of the object association from the query tab directly. Just set the cursor to the link line. A hint containing the association condition will appear.

To edit the properties, select the [Properties](#) item from the popup menu. A dialog window will appear, there you can change the association condition by selecting it from the list (`=`, `>`, `<`, `>=`, `<=`, `<>`). To create *LEFT OUTER JOIN* / *RIGHT OUTER JOIN* statements, check *All rows from first\_table*/*All rows from second\_table* from the window.



To remove a link between objects, select the [Delete Link](#) item from the popup menu.

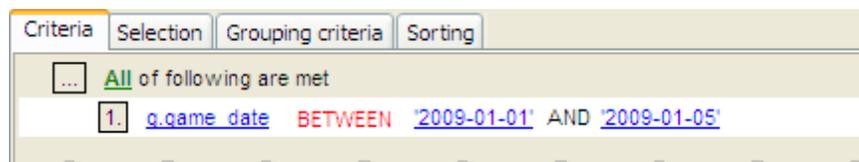
To delete all the links of an object, click the '-' button next to the object alias. To insert a point to the link line, select the [Insert Point](#) item from the popup menu, and the new point will appear. Using the point you can move the link line. It does not cause any changes in the query but makes the diagram performance vivid and the visual building more obvious.

#### ■ Specify WHERE condition

**Criteria** tab allows you to set the selection conditions. To add a condition, click the button on the left and select the [Add condition](#) item in the popup menu. Edit the condition by clicking its parts and setting their values. Clicking the button to the left of the condition string activates the popup menu which allows you to add a new condition of the same enclosure level, add a new enclosure level, delete the current condition, open or close the condition if it is composite.

A simple condition string contains three fields: an argument, a condition and a second argument (if required for the condition). Clicking each field allows you to set its value. Clicking the argument field make it possible to edit the argument as a text field. You can set a table name or a definite value in this field. The popup menu of the field in the editing mode which contains the [Insert Field](#) function (also called by the **Shift+Enter** hot keys combination).

This function allows you to choose a field from the list of all the table fields available in the query. The popup menu of the condition field allows you to specify the condition you need. The way of proceeding the condition is set in the upper string of the area (*All, Any, None, or Not all* of the following are possible variants). Click the underlined word to modify it.



#### ■ Create subquery if necessary

You can add one or more subqueries to further limit the tables and records returned from a *SELECT* statement when setting a *WHERE* condition in the query builder. To add subquery:

- open [Criteria](#) tab;
  - click the button on the left and select the [Add condition](#) item in the popup menu;
  - right click on an argument field and use the [Insert query](#) link of the popup menu;
  - build the subquery in the new query tab that have appeared in the [Diagram](#) area,
- or
- open [Selection](#) tab;
  - use the [Insert query](#) link of the popup menu;
  - build the subquery in the new query tab that have appeared in the [Diagram](#) area.

#### ■ Use column aliases

You can set/edit the object alias directly from the query tab by double-clicking the object caption.

Criteria Selection Grouping criteria Sorting			
<input type="checkbox"/> Select only unique records			
Source field name	Name of output field	Aggregate	Grouping
nba.game.game_date	Game_date		
home_team.caption	caption		
(SELECT SUM(nba.game_quarter.score)	Home_team_score		
(SELECT SUM(nba.game_quarter.score)	Away_team_score		
away_team.caption	caption		
nba.channel.short_caption	short_caption		

In case the alias is used as the expression's column name use the **Selection** tab displays the output fields of the query. It allows you to edit the names of the query or CASE output fields, set their displaying order and set the aggregate functions (*SUM*, *MIN*, *MAX*, *AVG*, etc.) for each field.

<i>AVG</i>	Returns the average of the values in a group
<i>BIT_AND</i>	Returns the bitwise AND of all bits in the expression.
<i>BIT_OR</i>	Returns the bitwise OR of all bits in the expression.
<i>COUNT</i>	Returns the total number of items in a column. This function does not ignore NULL values when calculating results.
<i>GROUP_CONCAT</i>	Returns a string result with the concatenated non-NULL values from a group.
<i>MAX</i>	Returns the maximum value for the column.
<i>MIN</i>	Returns the minimum value for the column.
<i>STD</i>	Returns the population standard deviation of the expression.
<i>STDDEV</i>	Returns the sample standard deviation of a numeric expression evaluated over a set.
<i>SUM</i>	Returns the sum of all the values in the expression.
<i>VARIANCE</i>	Returns the population standard variance of the expression.

To remove the field from the list, select the **Delete current row** item from the popup menu of the field row.

To modify the input query field, double-click it and then type the field name or select one from the drop-down list.

To modify the output query field name, double-click it and enter the field name.

#### ■ **DISTINCT option**

To specify removal of duplicate rows from the result set, open the **Selection** tab and check the **Select only unique records** box.

#### ■ **Add HAVING statement**

Set the conditions to be included into the HAVING statement within the **Grouping Criteria** tab. They are set in the same way as the *WHERE* conditions. To set the aggregate function for the field, double-click the field row in the **Aggregate** column and then type the function name or select one from the drop-down list.

#### ■ **ORDER BY clause**

Set the way of sorting the query records within the [Sorting](#) tab. The field list on the left represents all the output query fields; the list on the right contains fields by which the query records will be sorted. To move the field from one list to another, drag the selected field or use the [Add](#) and [Remove](#) buttons. To change the sorting order, select a field in the right list and move it using the [Up](#) and [Down](#) buttons.

To change the sorting direction, select a field in the right list and switch the direction (*Ascending, Descending*) using the [A..Z/Z..A](#) button.

### ■ **Create UNIONS**

To combine the result from multiple `SELECT` statements into a single result set, use the [Add union](#) link of the Query Explorer popup menu.

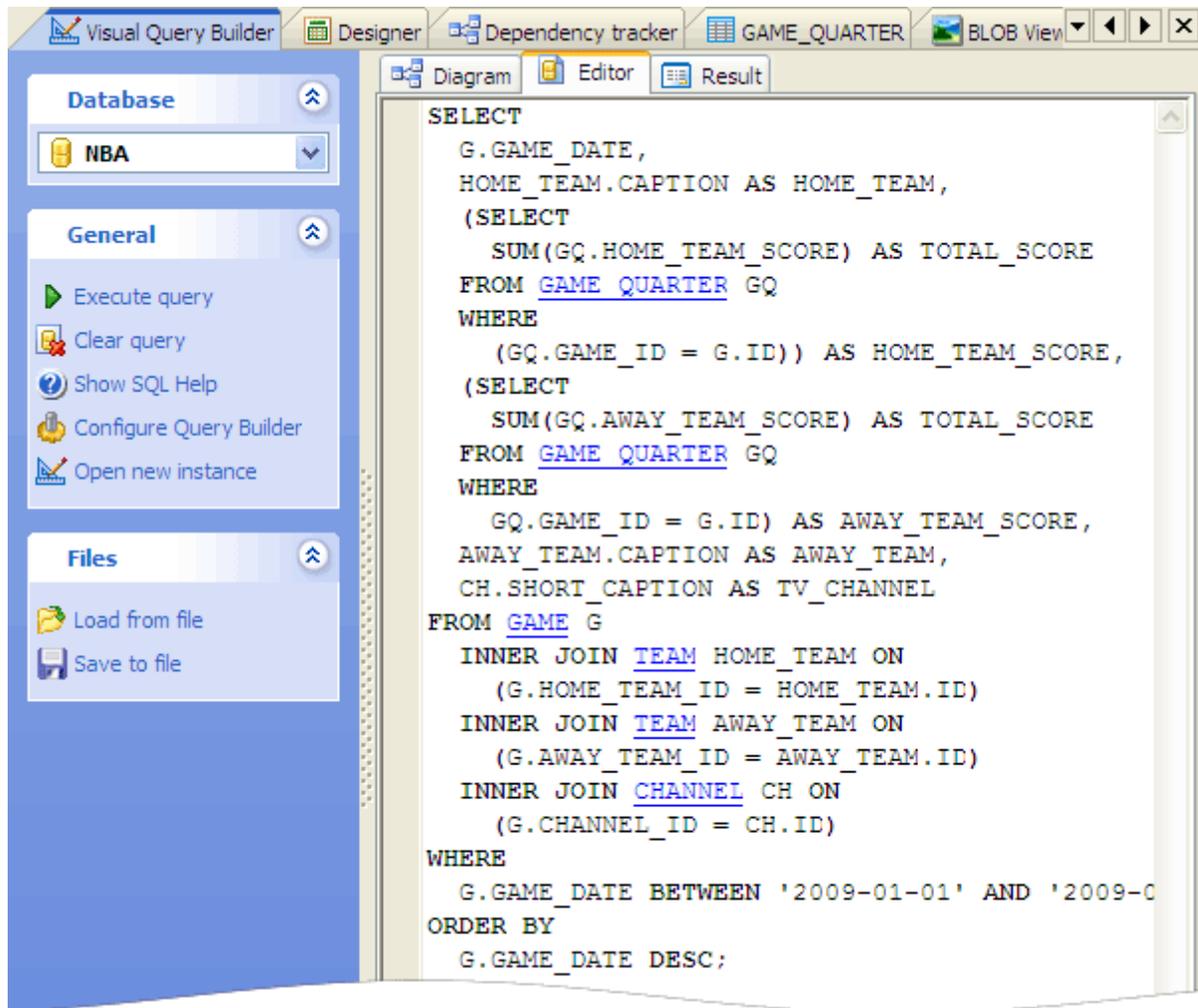
**Note:** The column names from the first `SELECT` statement are used as the column names for the results returned.

Selected columns listed in corresponding positions of each `SELECT` statement should have the same data type.

## 7.2.2 Working with editor area

In the [Editor](#) area the query text is automatically generated while you are building the query.

You can edit this text according to the rules of SQL, and all the changes will be displayed on the [Diagram](#) page of [Visual Query Builder](#).



### 7.2.3 Executing query

To execute the query select the **Execute** item in the navigation bar. After that the **Result** tab is displayed. This page contains the result data returned by the query, as a grid (see **Data View** for details). The popup menu of this tab and the items of the navigation bar allow you to export data and get SQL dump.

The screenshot displays the SQL Maestro Visual Query Builder interface. On the left sidebar, the 'Database' section is set to 'pagila'. The 'General' section includes options like 'Show SQL Help', 'Configure Query Builder', 'Open new instance', and 'Create view from SQL'. The 'Data Management' section includes 'Export data', 'Get SQL dump', and 'Print data'. The main window shows a query result for the 'country' table. The table has three columns: 'first\_name', 'last\_name', and 'email'. The results are grouped by country: 'United Kingdom' (9 rows) and 'United States' (14 rows). The status bar at the bottom indicates 'Records fetched: 599' and an information window shows '599 rows fetched (0, 19 sec)'. The database name 'pagila' is also visible in the bottom status bar.

	* first_name	* last_name	email
	NULL	NULL	NULL
country : United Kingdom (9)			
1	ANNE	POWELL	ANNE.POWELL@sakilacustomer.
2	APRIL	BURNS	APRIL.BURNS@sakilacustomer.c
3	ARMANDO	GRUBER	ARMANDO.GRUBER@sakilacust
4	CECIL	VINES	CECIL.VINES@sakilacustomer.o
5	DAN	PAINE	DAN.PAINE@sakilacustomer.org
6	GILBERT	SLEDGE	GILBERT.SLEDGE@sakilacustom
7	MARSHALL	THORN	MARSHALL.THORN@sakilacusto
8	MATTIE	HOFFMAN	MATTIE.HOFFMAN@sakilacusto
9	SANDRA	MARTIN	SANDRA.MARTIN@sakilacustom
country : United States (36)			
1	ALICE	STEWART	ALICE.STEWART@sakilacustome
2	ANA	BRADLEY	ANA.BRADLEY@sakilacustomer.
3	ASHLEY	RICHARDSON	ASHLEY.RICHARDSON@sakilacu
4	BETTY	WHITE	BETTY.WHITE@sakilacustomer.c
5	BILL	GAVIN	BILL.GAVIN@sakilacustomer.org
6	BRANDY	GRAVES	BRANDY.GRAVES@sakilacustom
7	BRYAN	HARDISON	BRYAN.HARDISON@sakilacusto
8	CAROLE	BARNETT	CAROLE.BARNETT@sakilacustor
9	CAROLINE	BOWMAN	CAROLINE.BOWMAN@sakilacus
10	CASSANDRA	WALTERS	CASSANDRA.WALTERS@sakilac
11	CLINTON	BUFORD	CLINTON.BUFORD@sakilacustor
12	DIANA	ALEXANDER	DIANA.ALEXANDER@sakilacustc
13	EVA	RAMOS	EVA.RAMOS@sakilacustomer.or
14	IAN	STILL	IAN.STILL@sakilacustomer.org

## 8 Data Management

Query results and table data are displayed on the [Data](#)<sup>[70]</sup> or [Result](#)<sup>[153]</sup> tabs of [Table Editor](#)<sup>[68]</sup>, [SQL Editor](#)<sup>[151]</sup> or [Visual Query Builder](#)<sup>[156]</sup>.

Data are displayed as a grid (or as info cards) which provide a lot of useful features such as editing, grouping, sorting, filtering, etc. See [Data View](#)<sup>[166]</sup> for details.

Navigation bars of these tabs as well as popup menus of their working areas places at your disposal the following functions for managing data:

- [Export Data](#)<sup>[182]</sup> allows you to export data to various formats, including MS Excel, MS Access, RTF, HTML, PDF and more.
- [Get SQL Dump](#)<sup>[189]</sup> exports data to the SQL script as a number of INSERT statements.
- [Import Data](#)<sup>[192]</sup> provides you with possibility to import data from MS Excel, MS Access, DBF, XML, TXT, and CSV.
- [Edit BLOB](#)<sup>[177]</sup> allows you to view and edit the content of BLOB and TEXT fields.

## 8.1 Data View

Firebird Maestro represents all data (stored in tables and views, results of queries and procedures) in [grid](#)<sup>[167]</sup> or in [info cards](#)<sup>[172]</sup>. By default, data is displayed in a grid - tabular view of data. To change the type of the data representation, use the drop-down list at the top of the tab. Both of the data representations support UNICODE/UTF-8 data. The status bar displays the number of records in the current data set. To reset grid to default settings, open the Data tab when holding the **Ctrl** key.

	CUST_NO	CUSTOMER	CONTACT_FIRST	CONTACT_LAST	PHONE_NO	ADDRESS
1	1001	Signature Design	Dale J.	Little	(619) 530-2710	15...
2	1002	Dallas Technologies	Glen	Brown	(214) 960-2233	P. 4
3	1003	Buttle, Griffith and Co.	James	Buttle	(617) 488-1864	230
4	1004	Central Bank	Elizabeth	Brocket	61 211 99 88	66
5	1005	DT Systems, LTD.	Tai	Wu	(852) 850 43 98	400
6	1006	DataServe International	Tomas	Bright	(613) 229 3323	200
7	1007	Mrs. Beauvais	NULL	Mrs. Beauvais	NULL	P.C
8	1008	Anini Vacation Rentals	Leilani	Briggs	(808) 835-7605	330
9	1009	Max	Max	NULL	22 01 23	1 E
10	1010	MPM Corporation	Miwako	Miyamoto	3 880 77 19	2-6
11	1011	Dynamic Intelligence Corp	Victor	Granges	01 221 16 50	Flo
12	1012	3D-Pad Corp.	Michelle	Roche	1 43 60 61	22
13	1013	Lorenzi Export, Ltd.	Andreas	Lorenzi	02 404 6284	Via

Records fetched: 15/15      LIMIT 1000 OFFSET 0

### Navigation buttons

Both data representations are equipped with navigation buttons. They are represented at the top of the data tab and allow you to navigate between records and to accomplish common operations:

- To add a new record, use the *Plus* button or the **Insert** shortcut.
- To delete a new record, use the *Minus* button or the **Delete** shortcut.
- To edit an existing record, push the corresponding button or invoke the [Data Input Form](#)<sup>[173]</sup> using popup menu of the necessary record, with **Ctrl+Alt+D** shortcut, or with the corresponding link at the Navigation bar. To edit a field value, click it and enter the new one inline.

The pagination option allows you to limit the number of browsed records. By default, the number of records represented in grid at once is 1000. To change the number of records represented in the current grid, enter the necessary value in the pagination bar. To specify the default one or to disable pagination, use the [data grid option](#)<sup>[276]</sup>.

### Navigation bar

The Data management group of the Navigation bar allows to invoke [Data Input Form](#)<sup>[173]</sup>, [SQL Editor](#)<sup>[151]</sup> with SELECT query, [Data Export](#)<sup>[182]</sup>, and [Data Import](#)<sup>[192]</sup> modules using corresponding links, also get [SQLdump](#)<sup>[189]</sup> of the current data set and print current data with enabled preview in WYSIWYG mode.

**See also:** [Table Editor](#)<sup>[68]</sup>, [SQL Editor](#)<sup>[151]</sup>, [Visual Query Builder](#)<sup>[156]</sup>

### 8.1.1 Working with data grid

Our software offers two grid modes:

- the full grid mode is a fully functional data representation equipped with abilities to filter and to sort data;
- the simple grid mode is provided for working with large number of records. For speed-up data fetching, filtering and sorting abilities are not enabled in this mode. The notification bar at the top of the grid (see the picture below) announces that the grid has been switched to the simple mode.

The grid has been switched to the simple mode because of the query returned more than 4000 rows (you can customize this number in the [Options](#) dialog). Filtering, sorting and grouping features are not enabled in this mode.

Other actions:  
[Switch to full mode now](#) | [Always use full mode](#) | [Dismiss this message](#)

CNO	TITLE	FIRSTNAME	NAME	ZIP	ADDRESS
3000	Mrs	Jenny	Porter	10580	1340 N. Ash Street, #3
3100	Mr	Peter	Brown	48226	1001 34th St., APT.3
3200	Company	NULL	Datasoft	90018	486 Maple St.
3300	Mrs	Rose	Brian	75243	500 Yellowstone Drive, #2
3400	Mrs	Mary	Griffith	20005	3401 Elder Lane
3500	Mr	Martin	Randolph	60615	340 MAIN STREET, #7
3600	Mrs	Sally	Smith	75243	250 Curtis Street
3700	Mr	Mike	Jackson	45211	133 BROADWAY APT. 1
3800	Mrs	Rita	Doe	97213	2000 Humboldt St., #6
3900	Mr	George	Howe	75243	111 B Parkway, #23
4000	Mr	Frank	Miller	95054	27 5th St., 76
4100	Mrs	Susan	Baker	90018	200 MAIN STREET, #94
4200	Mr	Joseph	Peters	92714	700 S. Ash St., APT.12
4300	Company	NULL	TOOLware	20019	410 Mariposa St., #10
4400	Mr	Antony	Jenkins	20903	55 A Parkway, #15
4401	Company	NULL	MagicStrawberry	78146	76 Highland Road, #120
4402	Company	NULL	OrangeHand	78609	212 Oak Avenue #30

Records fetched: 4495

**Information**  
 4495 rows fetched ( 2,00 sec)

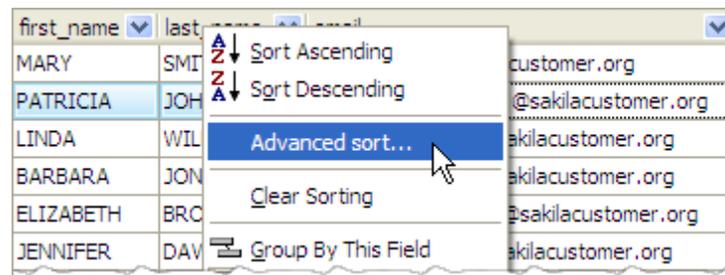
By default, the grid automatically switches to the simple mode for queries returning more than 5000 records (the number can be customized in the [Options](#) dialog).

The following abilities are not available in the simple grid mode:

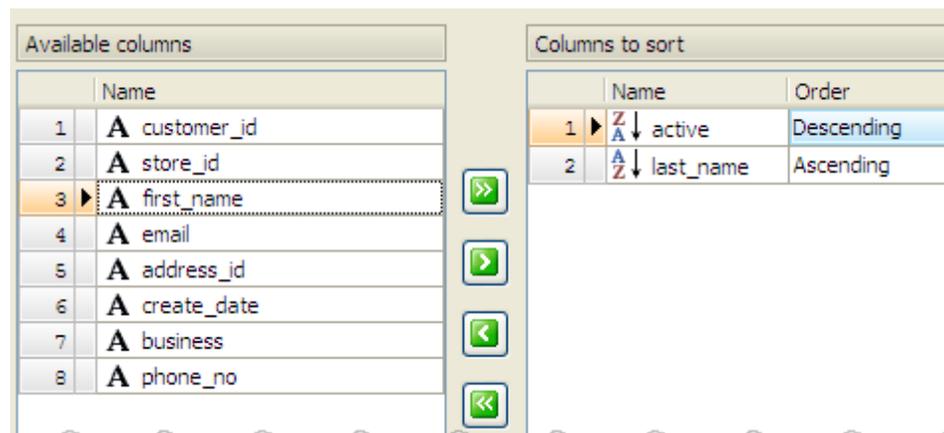
■ **Sorting data (only in the full grid mode)**

Click the column caption to sort data by the values of this column. To select sort order (ascending or descending), use popup menu of the column caption.

To sort data on a combination of grid columns, use the [Advanced sort...](#) link of the popup menu of the grid's header. The [Advanced sorting](#) window will be shown.



Select there the columns you want to sort from the Available columns list in the order of priority. Specify the sort order if necessary and click OK.



To cancel the sorting order, press **Ctrl** and click on the sorted column caption.

#### ■ Filtering represented records (only in the full grid mode)

There are several ways to filter data represented in grid. See [the corresponding topic](#)<sup>[174]</sup> to find out their descriptions.

#### ■ Hiding selected columns

You can show/hide columns using a button in the left top corner of the grid. Just check/uncheck the column in the drop-down list.

city_id	address	last_update	phone
<input type="checkbox"/>	address_id	MySakila Drive	15.02.2006 4:45:30
<input checked="" type="checkbox"/>	address	MySQL Boulevard	15.02.2006 4:45:30
<input type="checkbox"/>	address2	Workhaven Lane	15.02.2006 4:45:30 14033335568
<input type="checkbox"/>	district		
<input checked="" type="checkbox"/>	city	11 Lillydale Drive	15.02.2006 4:45:30 6172235589
<input type="checkbox"/>	postal_code	13 Hanoi Way	15.02.2006 4:45:30 28303384290
<input checked="" type="checkbox"/>	phone	21 Loja Avenue	15.02.2006 4:45:30 838635286649
<input checked="" type="checkbox"/>	last_update	20 Joliet Street	15.02.2006 4:45:30 448477190408

#### ■ Columns reordering

To reorder columns, use drag-n-drop.

### ■ Grouping records

You can group grid data by any of the columns by dragging the column header to the destination area. Now all the records are displayed as subnodes to the grouping row value as shown in the picture. To reverse grouping, just drag the column name from the upper area back.

The screenshot shows a data grid with the following columns: ID, team1ID, team2ID, score1, score2, refereeID, and comments. The data is grouped by 'round' and 'date'. The current view shows round 3, with dates 24.08.2004, 25.08.2004, and 30.08.2004. The row for date 25.08.2004 and ID 28 is selected.

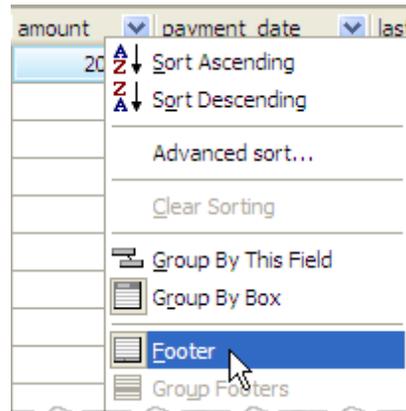
ID	team1ID	team2ID	score1	score2	refereeID	comments
round : 1						
round : 2						
round : 3						
date : 24.08.2004						
date : 25.08.2004						
24	6	2	3	0	8	Jeffers brukte 34 minutter pa a vinne
22	1	4	3	0	17	I den hundrede kampen i alle konkurra
29	16	5	1	2	19	Southamptons slapp inn mal i sin 11. li
27	9	13	0	2	0	Fulhams forste tap denne sesongen,
28	14	18	2	2	18	Newcastle skuffer i arets Premier Leag
26	19	17	1	1	12	Det ble uavgjort pa Hawthornes etter
date : 30.08.2004						
31	12	8	0	0	1	Igjen skuffet Manchester United mot
date : 14.12.2004						
round : 4						
round : 5						
date : 11.09.2004						
date : 12.09.2004						
date : 13.09.2004						
round : 6						

Records fetched: 380

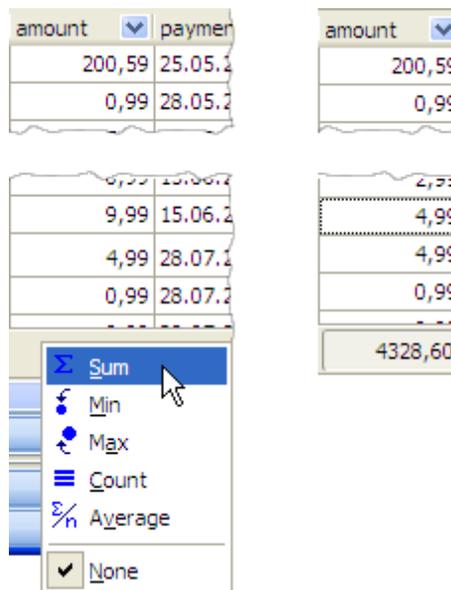
**Information**  
380 rows fetched ( 0,64 sec)

### ■ Using aggregate functions

To get a sum of column values, a min or a max value, an average column value or an amount of records, use Data Grid Footer. Select the Footer item at the grid caption's popup menu.



It will be shown at the bottom of the grid. The popup menu of the footer allows you to get an aggregate function result calculated with the corresponding column values.



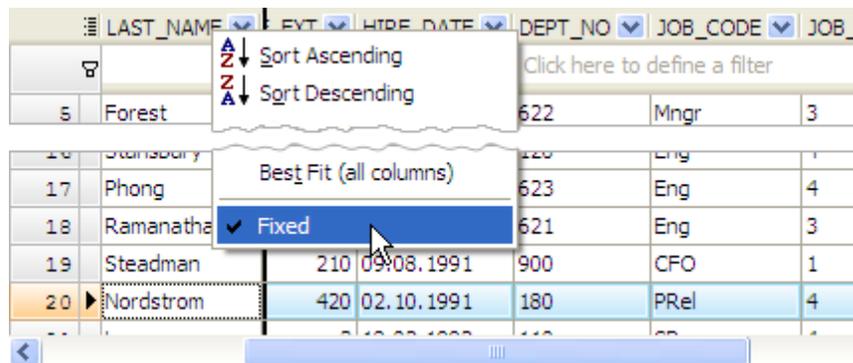
For grouped data use **Group Footers**.

### ■ Data alignment

The grid's header popup menu allows to align column data. Use the **Alignment** link and select the alignment type.

### ■ Fixing columns

You can fix grid columns to view them permanently when working with other grid data. To fix a column, choose the corresponding item from the grid's header popup menu.

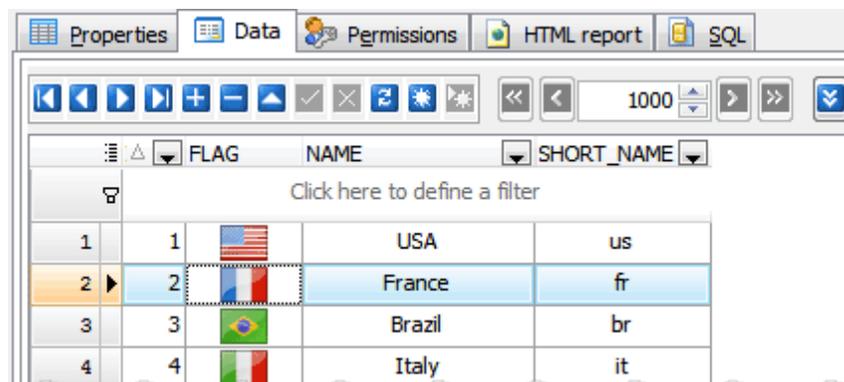


### ■ Row numbering

There is also a possibility to display row numbers in grids. You can [adjust](#)<sup>[278]</sup> the corresponding column to yours liking.

### ■ Inline images

It is possible to display images directly in the grid as on the picture below.



To enable/disable this view mode, open the *Enable inline images* window using the *Manage inline images* item of the column popup menu. The window options allow to set or change the image fitting and specify the row height. To add new images or change existing ones, use [BLOB Editor](#)<sup>[177]</sup> (see below).

### ■ Working with BLOBs

To [edit a BLOB field](#)<sup>[177]</sup>, double click the field, or use the corresponding popup menu item. There are also possibilities to export all BLOBs stored in the table column to files and import BLOBs from a directory to the table columns. In this case you need to set the Target directory, specify the template to be used for file names and the column BLOBs to be exported from (imported to).

## 8.1.2 Working with info cards

**Info cards** correspond to the records. You can [filter records by custom conditions](#)<sup>[174]</sup> and edit data directly in info cards or with [Data Input Form](#)<sup>[173]</sup>.

id: 18 first_name: Gilbert last_name: Arenas career_start_year: 2001 career_end_year: 0 position_id: 6 photo: country_id: 1 height: 193 birthday: 06.01.1982 weight: 97,5 college_id: 15 current_team_id: 12 current_number: 0	id: 20 first_name: Hilton last_name: Armstrong career_start_year: 2006 career_end_year: 0 position_id: 11 photo: country_id: 1 height: 211 birthday: 11.11.1984 weight: 106,6 college_id: 7 current_team_id: 27 current_number: 12	id: first_name: Darrell last_name: Arthur career_start_year: career_end_year: position_id: photo: country_id: height: birthday: 25.03.198 weight: college_id: current_team_id: current_number:
id: 19 first_name: Trevor last_name: Ariza career_start_year: 2004 career_end_year: 0 position_id: 10 photo: country_id: 1 height: 203 birthday: 30.06.1985 weight: 95,3 college_id: 2 current_team_id: 5 current_number: 3	id: 21 first_name: Ron last_name: Artest career_start_year: 1999 career_end_year: 0 position_id: 10 photo: country_id: 1 height: 201 birthday: 13.11.1979 weight: 117,9 college_id: 16 current_team_id: 22 current_number: 96	id: first_name: D.J. last_name: Augustin career_start_year: career_end_year: position_id: photo: country_id: height: birthday: 10.11.198 weight: college_id: current_team_id: current_number:

Records fetched: 67

### 8.1.3 Data input form

Use [Data Input Form](#) to add new records or edit existing ones. To invoke the dialog, use the corresponding link from the popup menu or **Ctrl+Alt+D** shortcut.

The dialog's fields contain the values of the current grid row. Use the **Insert** button to enter values of a new record and the **Post** button to update the current row. The **Cancel** button reverts all the field values within a form to their initial values (or to the last posted values). The **Previous** and **Next** buttons allow you to switch between grid records without closing the dialog.

Controls containing values of primary and foreign key columns are marked with the 'gold key' and 'silver key' images accordingly. Controls containing values of required (NOT NULL) columns are marked with a red asterisk.

There are possibilities to use lookup editors on working with columns linked with foreign keys, a calendar for *timestamp* columns and a calculator for *decimal* ones.

#### 8.1.4 Data filtering

Firebird Maestro support filtering records by the following methods:

- **Filter by a column value**

Select the **Use as Filter** item from the field popup menu to filter records by the current column value.

- **Filter by several column values**

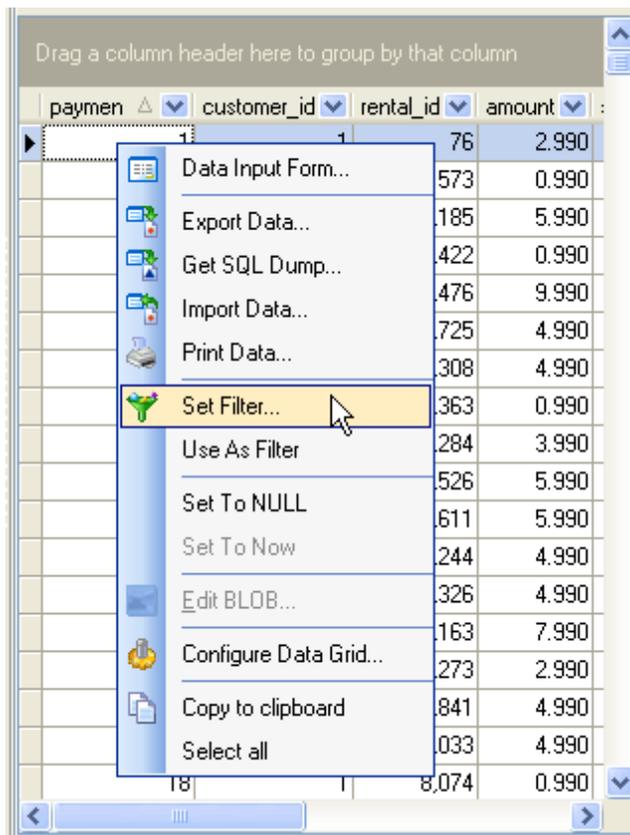
Use the drop-down button in the column caption area to filter records by the selected column value(s) or enter the filter condition directly in [the filter row](#)<sup>[28]</sup>.

#### Filter by two operators

Invoke simple filter dialog using the [Custom](#) item of the column caption area drop-down list. Select a logical operator for checking the column values (like "is less than", "is greater than", etc.) and set the value to be checked by this operator in the next box; then set the second condition if necessary in the following way and set the relation between these two conditions, whether both of them should be matched or just one of them; use the '\_' character to represent any single symbol in the condition and the '%' character to represent any series of symbols in the condition.

#### Filter by any custom criteria

To filter data according to more difficult custom conditions, use the Filter Builder dialog. To invoke the dialog, use the [Set Filter](#) link of popup menu or click the [Customize](#) button on the [Filter](#) panel. This panel is visible if any filtering is already applied to the grid (you can use column header menu or grid menu for quick filtering).



The dialog also allows to save filter criteria to an external file for future use.

After you set a filter, the filtering panel becomes visible at the top/bottom of the grid

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where you can see the active filtering condition and easily enable or disable it by clicking the check box on the left. To customize the filtering process, use [filter options](#)<sup>[28†]</sup>.

The [Copy current filter as SQL condition to clipboard](#) feature is useful in case the same compound filter is applied several times. Just once apply the filter, copy to clipboard as SQL condition, paste to [SQL Editor](#)<sup>[15†]</sup> and save as a query. You can also use [Generate query](#) link on the Navigation bar.

**See also:** [Data View](#)<sup>[166†]</sup>, [Table Editor](#)<sup>[68†]</sup>, [SQL Editor](#)<sup>[15†]</sup>, [Visual Query Builder](#)<sup>[156†]</sup>

## 8.2 BLOB Editor

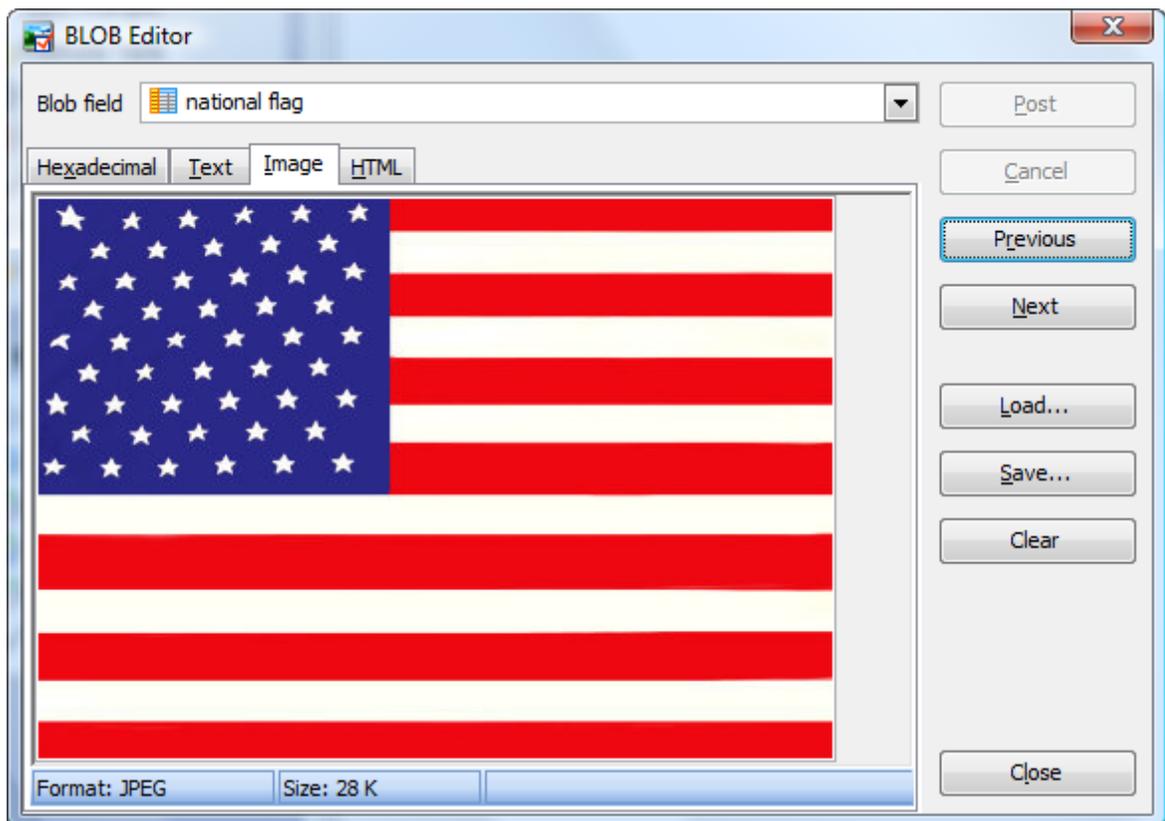
BLOB Editor is a tool to view and edit BLOB data in the following ways: [hexadecimal dump](#)<sup>[178]</sup>, [plain text](#)<sup>[178]</sup>, [graphical image](#)<sup>[177]</sup>, [HTML page](#)<sup>[179]</sup>, or [PDF document](#)<sup>[180]</sup>. BLOB Editor is invoked from [data grid](#)<sup>[166]</sup> of any [table editor](#)<sup>[68]</sup> or the result tab of [SQL Editor](#)<sup>[151]</sup> and [Visual Query Builder](#)<sup>[156]</sup> by double clicking of the BLOB field to be edited or with the Edit BLOB link of the field's popup menu. The editor also can be called from [BLOB Viewer](#)<sup>[211]</sup> with the Edit current BLOB button.

With BLOB Editor you can work with all BLOB columns of the grid. To switch between columns, select the necessary one from the BLOB field list.

BLOB Editor allows you to navigate between the grid records using the [Previous](#) and [Next](#) buttons. You can load the new BLOB content and save or clear it using corresponding buttons. After changes are made, click the Post button to apply the changes or the [Cancel](#) button to discard them.

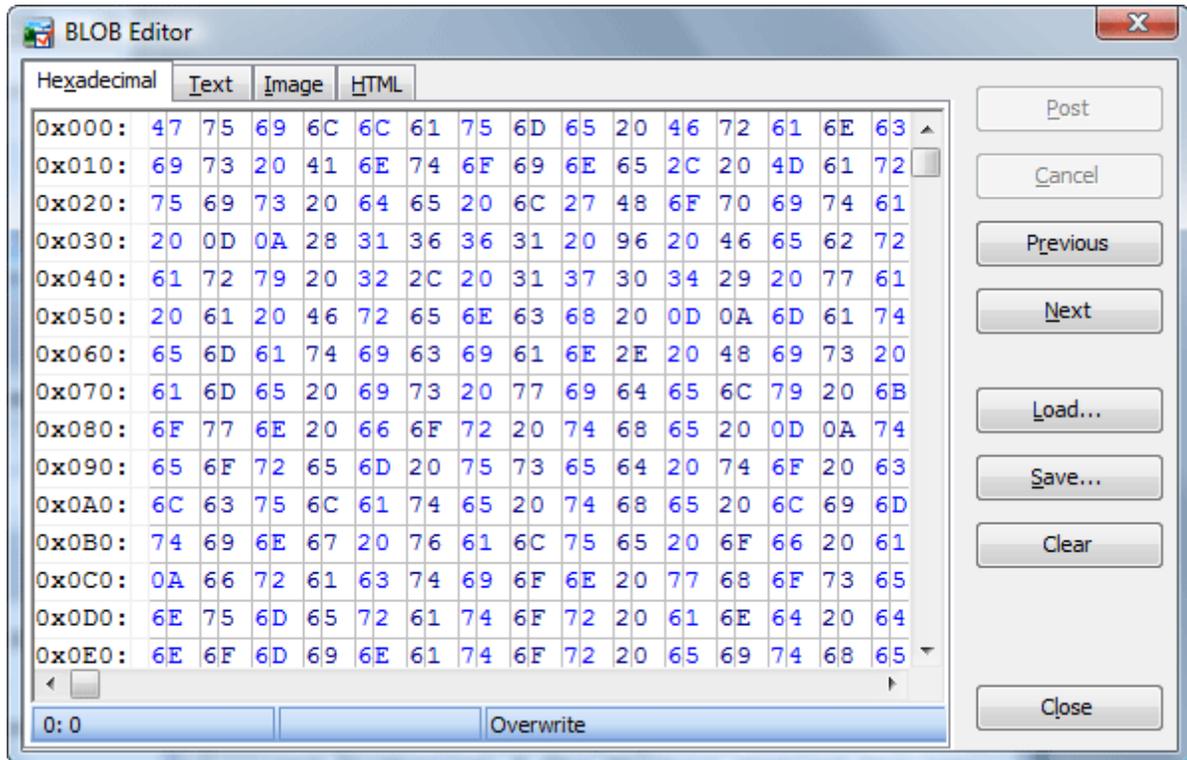
### 8.2.1 Editing as image

The [Image](#) panel of BLOB Editor displays field data as graphical image. Use the Save and Load buttons to save the image to a file or load an image from a file. A graphical representation of BLOB data supports five image formats: BMP, Windows metafile, JPEG, GIF and PNG.



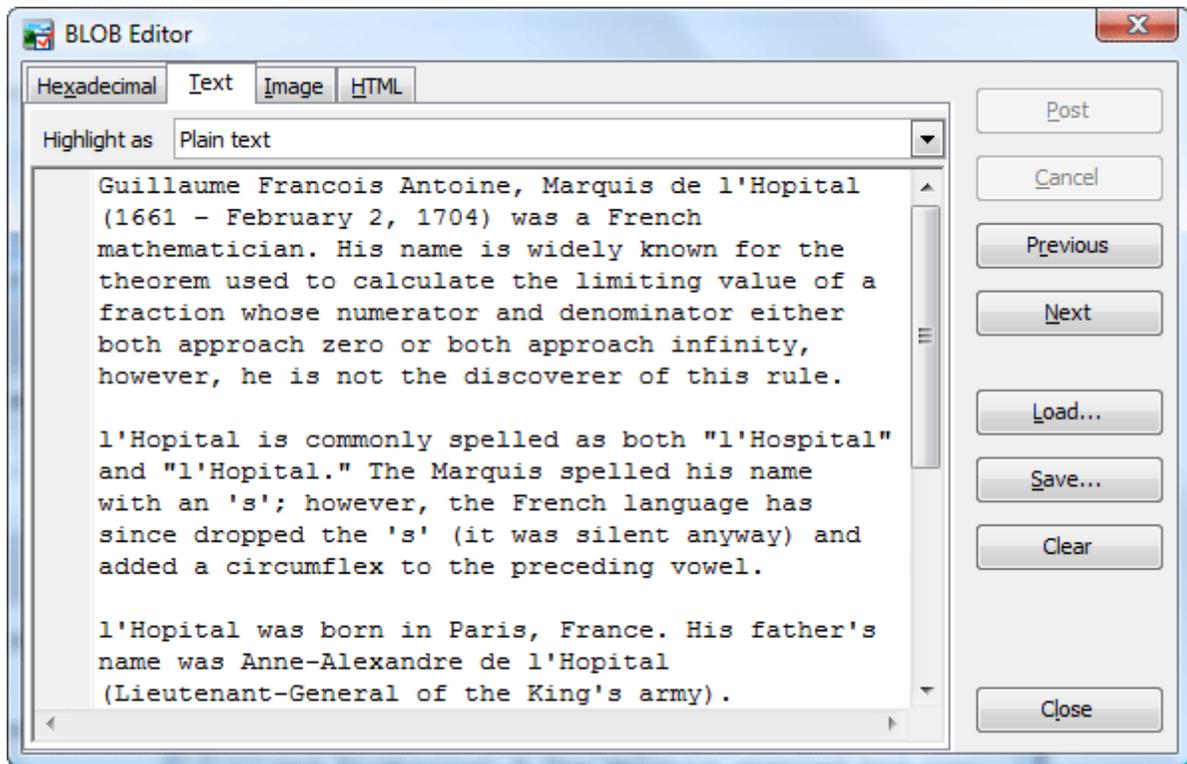
## 8.2.2 Editing as hexadecimal dump

The **Hexadecimal** panel allows you to edit data in hexadecimal mode. To load/save a hexadecimal dump from/to a file, use the corresponding buttons. Use the Insert key to switch between Insert and Overwrite modes.



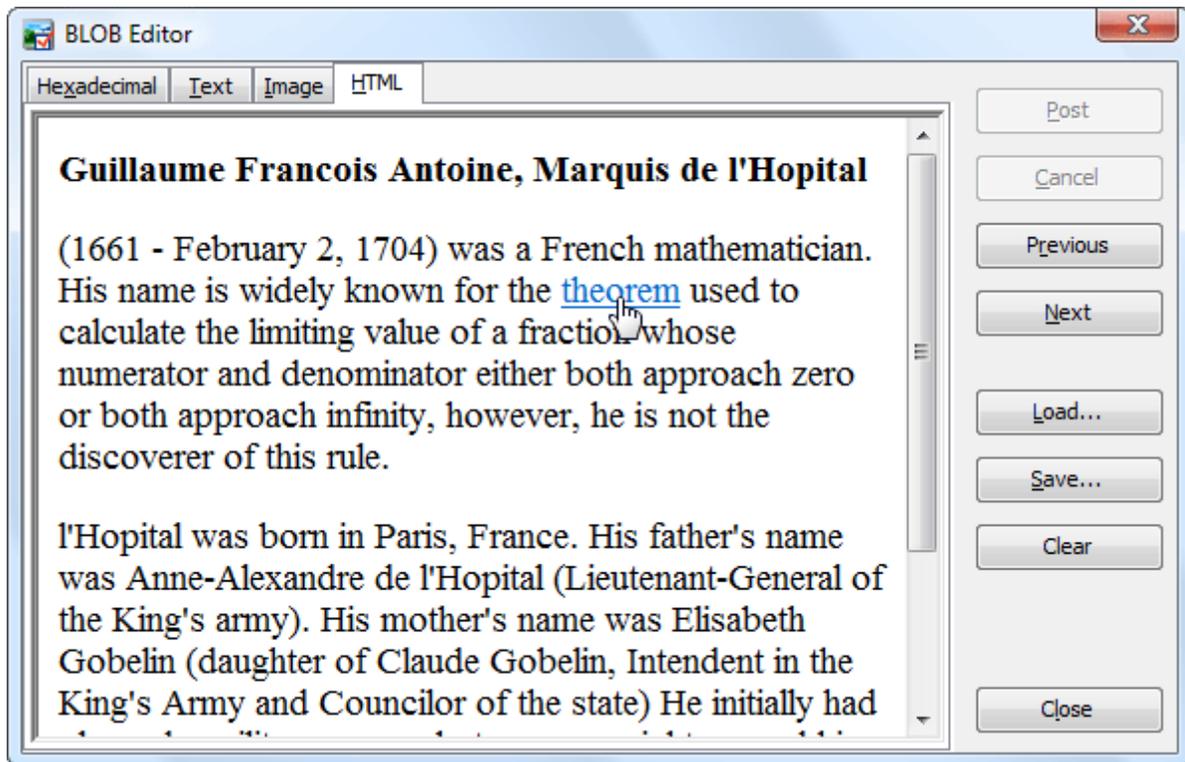
## 8.2.3 Editing as plain text

The **Text** panel allows you to edit data as a simple text. Several types of text highlighting are available (*Plain text, SQL, XML, Java, VBScript, JScript, Cmd batch, PHP, CSS, UnixShell Script, INI, and HTML*). The popup menu of the panel allows you to invoke Find Text, Replace Text and Go to line dialogs.



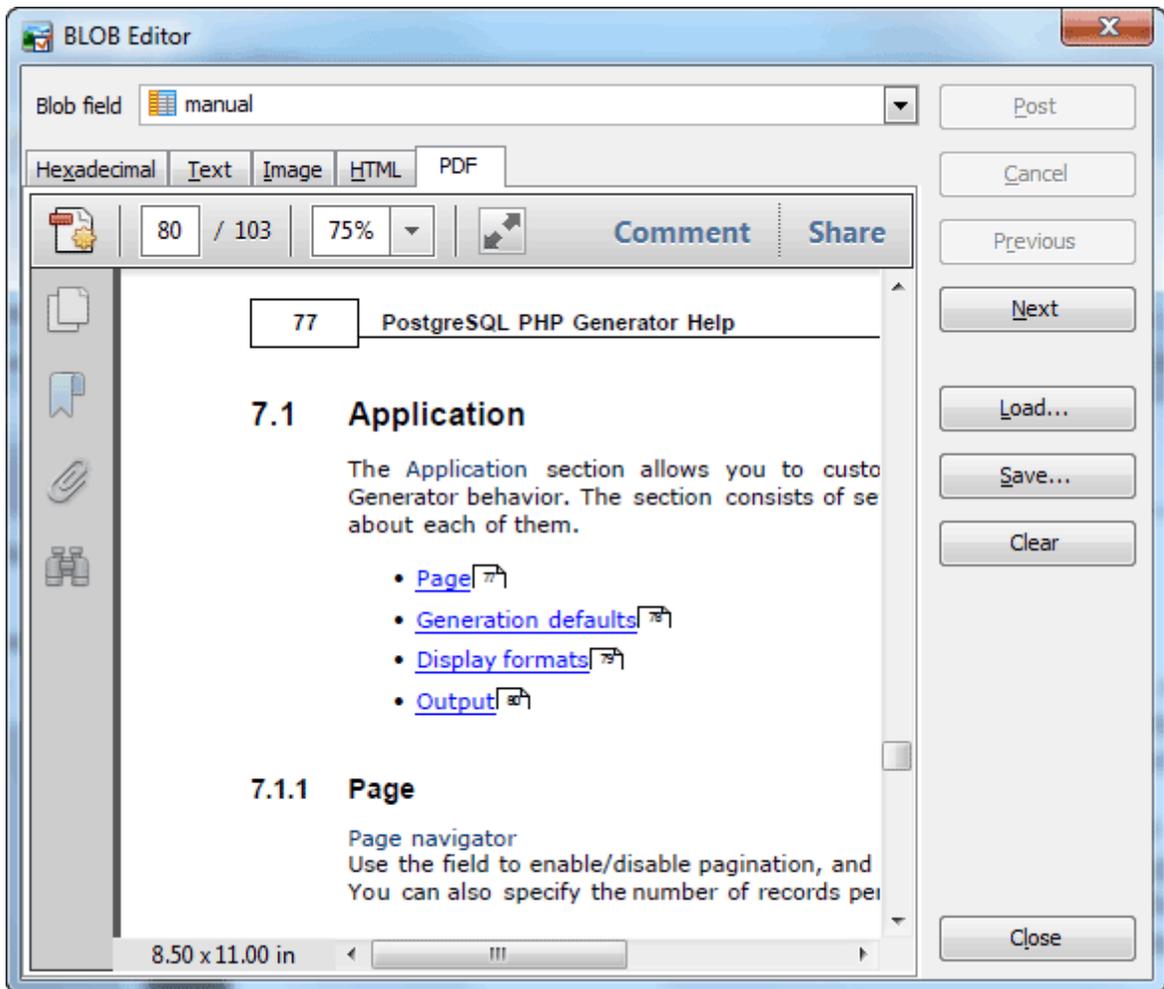
#### 8.2.4 Editing as HTML

The [HTML](#) panel presents field data as HTML. You can load a new content of the current field from a .html file or type it manually within the [Text](#) tab of the editor.



### 8.2.5 Editing as PDF document

The PDF panel presents field data as PDF document. To accomplish common operations with data, use the Adobe Reader toolbar.



## 8.3 Export Data Wizard

Data Export wizard is a tool to save data from Firebird tables, views, and queries to the most popular formats. It allows you to fully customize output files including header and footer, fonts, colors, and data formats.

Export Data tool supports:

- Microsoft Office Excel 97-2003, 2007
- CSV
- HTML
- XML
- Text
- Microsoft Office Word 97-2003, 2007
- Microsoft Office Access
- OpenDocument Spreadsheet
- OpenDocument Text
- DBF
- PDF
- RTF
- DIF
- SYLK
- LaTeX.

In order to run the wizard you should either

- open the table in [Table Editor](#);
- go on to the [Data](#) tab

or

- open and execute the query in [SQL Editor](#) or [Query Builder](#);
- proceed to the [Result](#) tab

and select the [Export Data](#) item from the [Navigation Bar](#).

To export your data,

- [Set the format and the name](#) <sup>[182]</sup> of the destination file;
- Specify such additional options of the result file as [header and footer](#) <sup>[183]</sup>, [formats applied to exported data](#) <sup>[184]</sup> and [some format-specific options](#) <sup>[185]</sup>;
- [Select columns](#) <sup>[184]</sup> you want to include into result files;
- [Specify other export options](#) <sup>[188]</sup>.

**See also:** Get SQLDump, [Import Data Wizard](#) <sup>[192]</sup>

### 8.3.1 Setting destination file name and format

Select one of the available destination formats and set the name for the result file. The file name extension in the [Destination file name](#) box varies according to the selected export type.

The file name may contain current timestamp with the `%ts:TIMESTAMP_FORMAT%` string. Examples of valid log file names:

*dbname\_export\_%ts:yyyy\_mm\_dd%.log*  
*export\_%ts:yyyy\_mm\_dd\_hh\_mm%.log*  
*%ts:yyyy\_mm\_dd\_hh\_mm\_ss%.log*

Destination format

Select one of the available destination formats.

- Microsoft Office Excel 97 - 2003
- Microsoft Office Excel 2007 - 2010
- Delimiter-separated values (CSV, DSV, TSV)
- Text file (Fixed-width columns)
- HTML
- XML
- Other

Microsoft Office Word 97 - 2003

Destination file

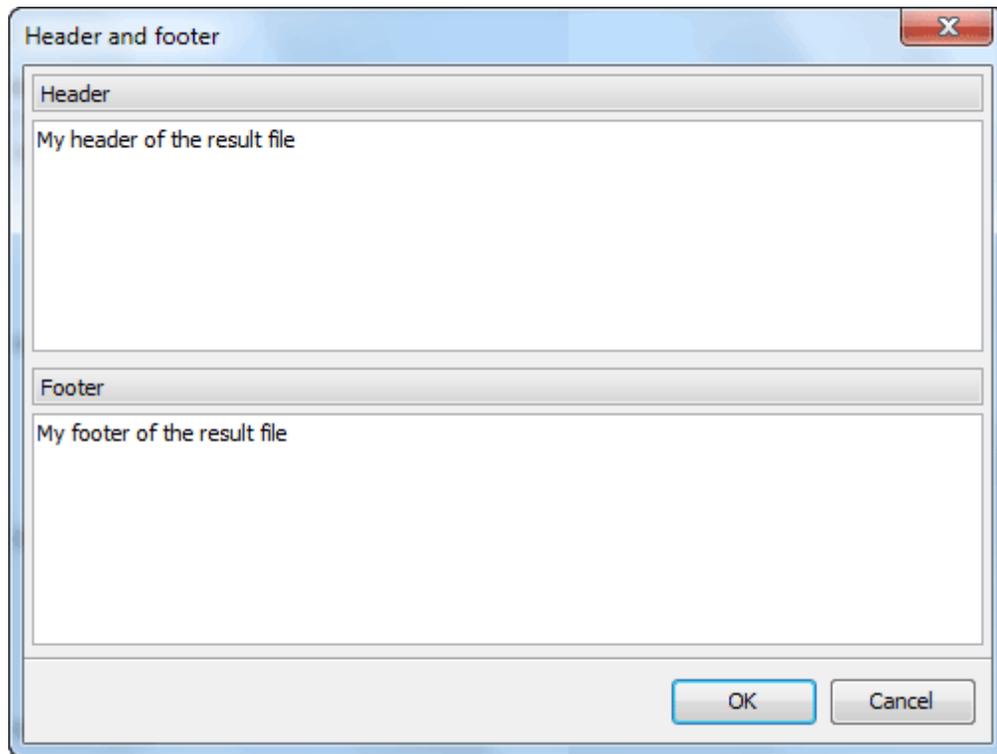
Select or enter the result file name and specify the encoding if necessary. To add current timestamp to the result file name, use the %ts:TIMESTAMP\_FORMAT% string (for example, %ts:yyyy\_mm\_dd%). Hint: you can set default directory for data export in the Edit Database Profile dialog.

File name: C:\Data\Excel\Customers.xls

Encoding: ANSI

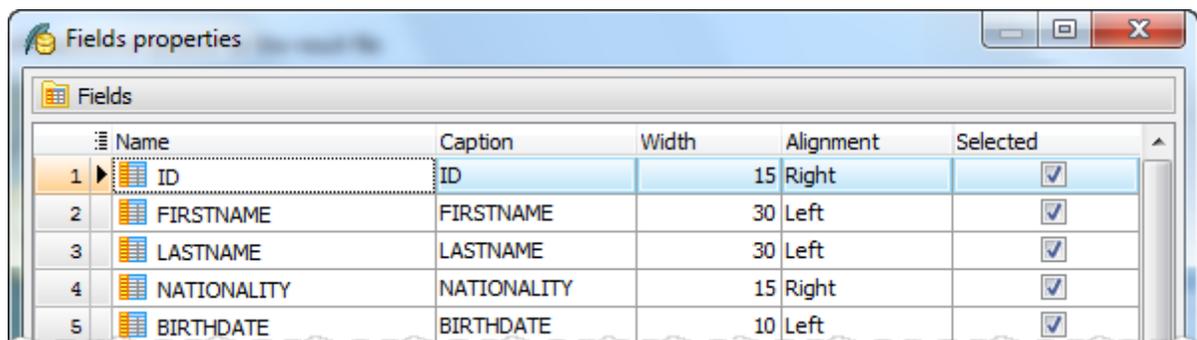
### 8.3.2 Setting header and footer

To specify the result file's header and footer, double click the corresponding button and complete fields of the [Header and Footer](#) window.



### 8.3.3 Selecting fields for export

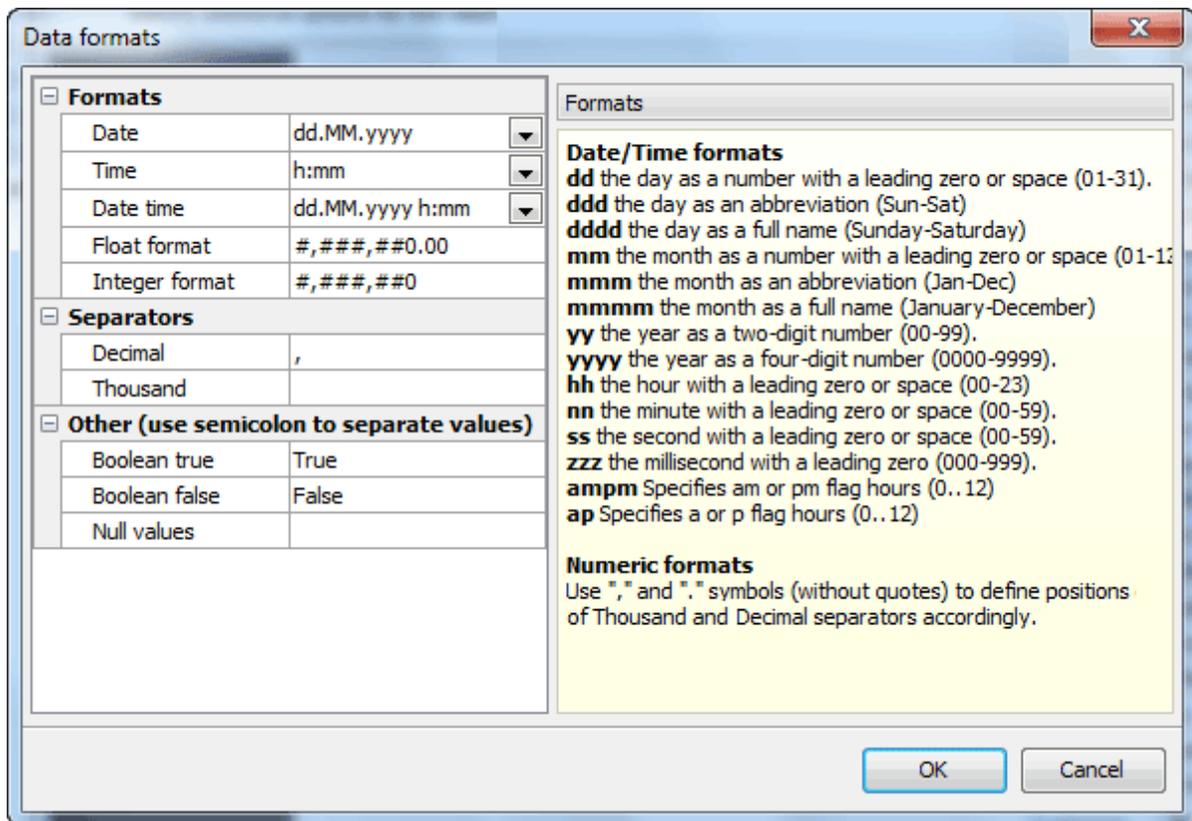
Uncheck the Selected box to exclude the corresponding field from the export, specify a Caption to be used for the result column, and also width, and alignment for output columns (when applicable).



	Name	Caption	Width	Alignment	Selected
1	ID	ID	15	Right	<input checked="" type="checkbox"/>
2	FIRSTNAME	FIRSTNAME	30	Left	<input checked="" type="checkbox"/>
3	LASTNAME	LASTNAME	30	Left	<input checked="" type="checkbox"/>
4	NATIONALITY	NATIONALITY	15	Right	<input checked="" type="checkbox"/>
5	BIRTHDATE	BIRTHDATE	10	Left	<input checked="" type="checkbox"/>

### 8.3.4 Adjusting data formats

This step allows you to customize formats applied to exported data. Edit the format masks to adjust the result format in the way you need.



### 8.3.5 Setting format-specific options

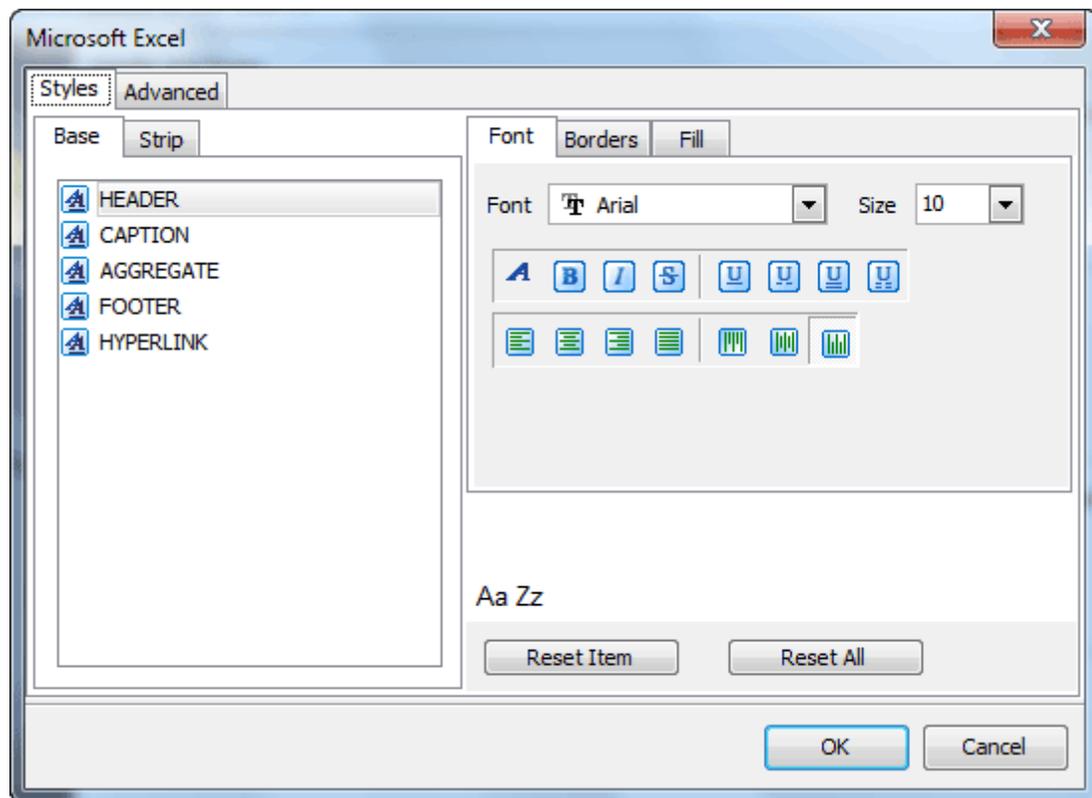
Each format supposes corresponding additional export options. Use the wizard option to adjust export properties depending on the target file format you have selected earlier. The following formats are at your disposal: [Microsoft Excel](#)<sup>[186]</sup>, Microsoft Excel 2007, [CSV](#)<sup>[187]</sup>, [Text](#)<sup>[187]</sup>, [HTML](#)<sup>[186]</sup>, [XML](#)<sup>[187]</sup>, Microsoft Word, Microsoft Word 2007, Microsoft Access, OpenDocument Spreadsheet, OpenDocument Text, DBF, PDF, RTF, DIF, SYLK, and LaTeX.

#### Microsoft Excel

The **Data Format** tab contains general options, which allow you to adjust the format for each kind of Excel cells. This means that you can specify such parameters as font, borders, filling color and method, etc. for each entity (such as data field, header, footer, caption, data, hyperlink and so on) separately. Also it is possible to create styles to make target Excel file be striped by columns or rows (the **Styles** tab).

The **Extensions** tab provides a possibility to add hyperlinks and notes to any cell of target file. Click the **Plus** button to add a new hyperlink or note to target Excel sheet and adjust its parameters. Click the **Minus** button to delete added hyperlink or note.

The **Advanced** tab allows you to define page header, page footer and title for target Excel sheet.



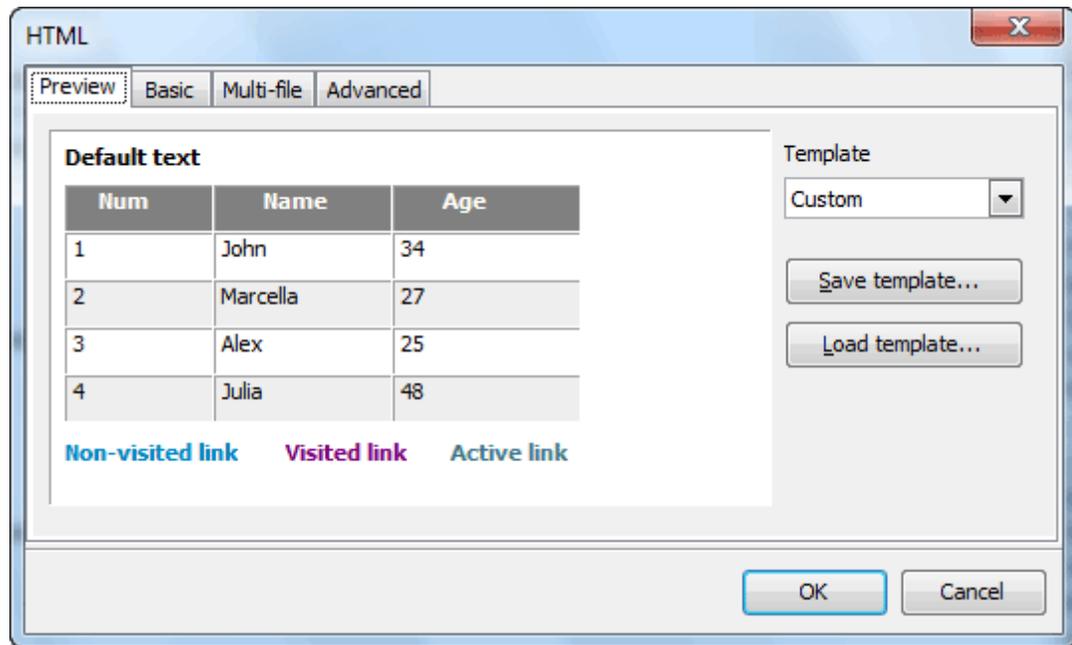
## HTML

The **Preview** tab allows you to select the style of HTML file from a number of built-in templates provided by the **Templates** combo box. You can choose any of these templates, customize it by clicking on objects in the preview panel, and save it as a custom template using the **Save template** button. Use the **Load template** button to load previously saved custom templates from hard disk.

The **Basic** tab allows you to specify basic parameters of target HTML file, such as its title, cascade style sheet options, etc.

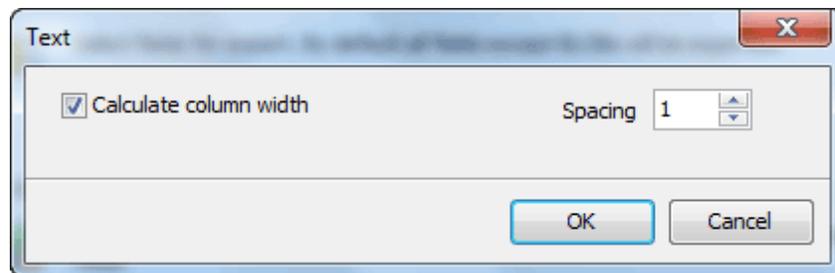
The **Multi-file** tab provides you with a possibility to split target HTML file into several separated files. This tab allows you to specify the record count for a single file, set an option to generate an index HTML file, and add an ability of navigation between each other to each of exported files.

The **Advanced** tab contains such HTML options as default font, background, cell padding and spacing, etc.



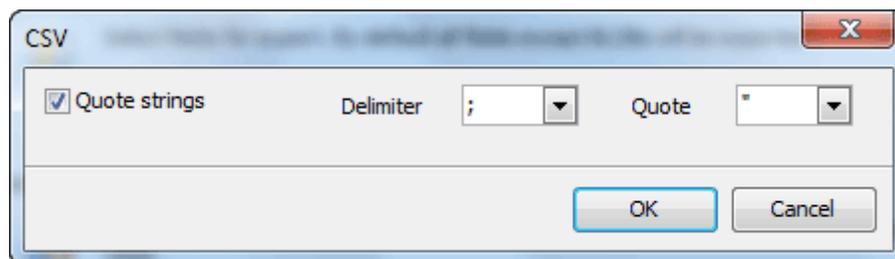
#### Text files

Set the [Calculate](#) column width options on if you want each column of target file to be adjusted to the maximum number of characters in it. The [Spacing](#) option specifies the number of spaces between columns in the target file.



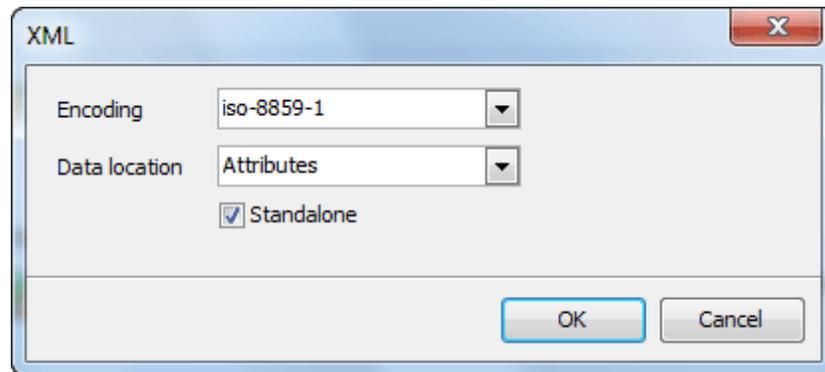
#### CSV files

You can specify column separator and optional values quote character for the target file on this step.



#### XML documents

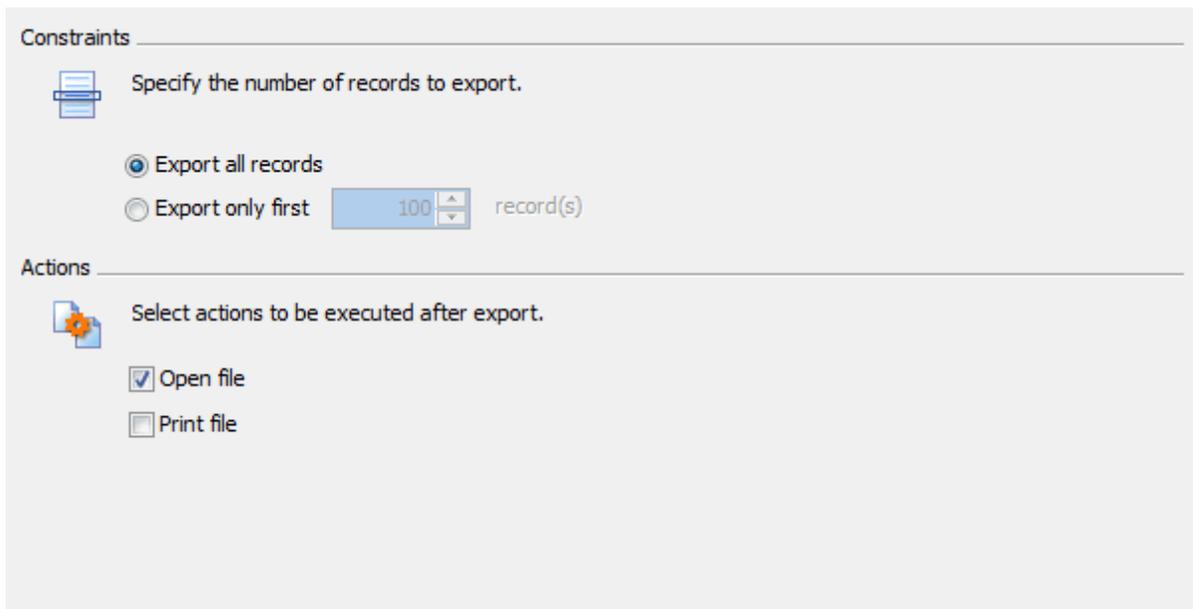
Specify XML document encoding in the [Encoding](#) edit box and set the Standalone option on if you wish the target document to be standalone.



### 8.3.6 Setting common export options

Use this step to specify options to be applied to all exported data:

- Select the number of records to be exported from each table: a fixed number or all records.
- Specify actions to be executed after the export. To open the result files in the associated program (MS Excel, Notepad, default browser, etc), check the [Open file](#) box. To send the result files to the default printer, use the [Print file](#) checkbox.



## 8.4 Get SQL Dump

[Get SQL Dump Wizard](#) allows you to export data from a table or a query result to the SQL script as a number of INSERT statements.

In order to get a SQL dump from a table or a query:

- open the table in [Table Editor](#) or open and execute query in [SQL Editor](#) or [Query Builder](#);
- open the [Data](#) tab or the [Result](#) tab respectively;
- use the [Get SQL Dump](#) item of the [Navigation Bar](#).
- [Selecting fields to include in the result INSERT statement](#) <sup>[189]</sup>
- [Specifying dump options](#) <sup>[190]</sup>

**See also:** [Export Data Wizard](#) <sup>[182]</sup>, [SQL Script Editor](#) <sup>[202]</sup>

Data script

Specify the data dump options.

Use multi-row INSERT statements  
Record count per each statement: 500  
 Commit after each statement

Use separate single-row INSERT statements  
Commit after: 500

Statement syntax  
Native (Firebird)

Add the "Create Table" statement to the top of the dump

Output

You can either open the generated dump in the SQL Script Editor or save it to a file.

Send to script editor  
 Save to file

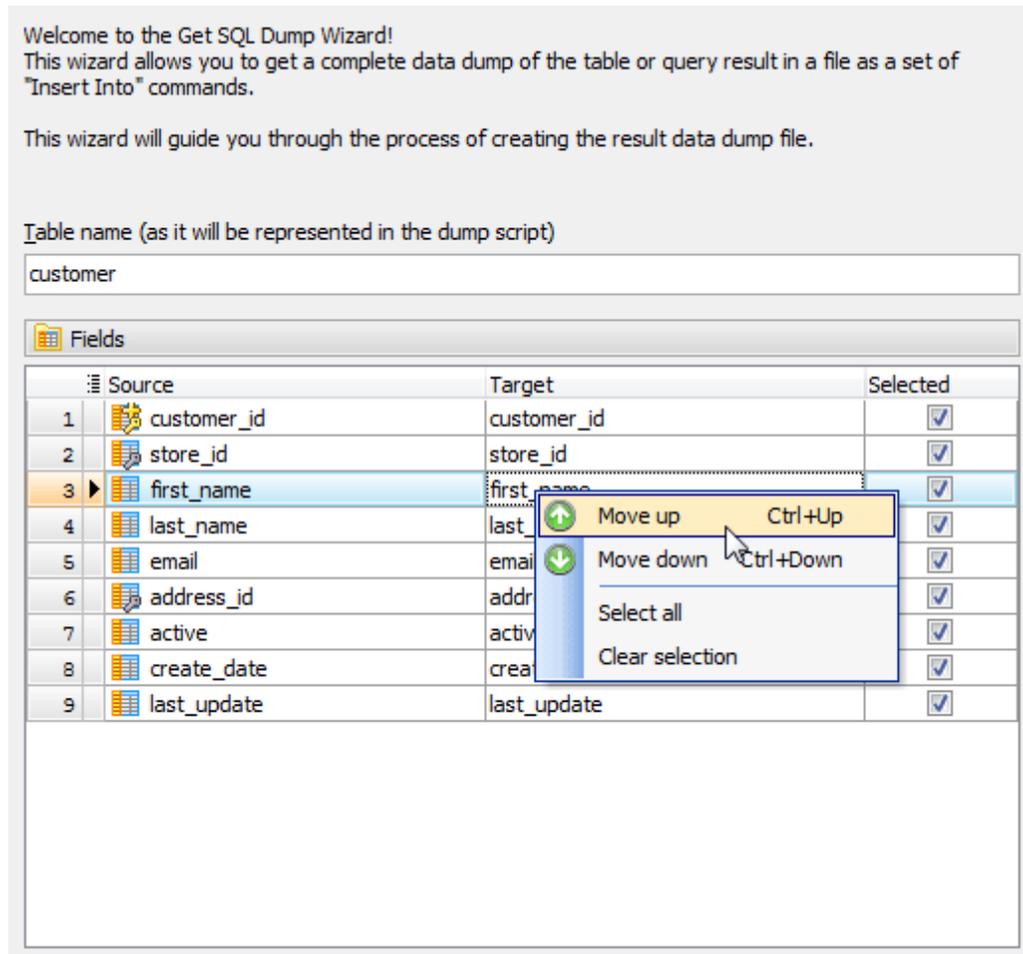
File name: C:\SQL\_Scripts\COUNTRY.sql  
Encoding: ANSI

Click "Ready" to dump your data.

### 8.4.1 Selecting fields

The first wizard step allows you to specify the table name as it will be included in the result script.

You can also select the fields to be included in the result *INSERT* statement. All the table fields are included into the **Selected fields** list by default. If you do not want some fields to be exported, move them back to the **Available fields** list. *Text*, *GUID*, *Date*, *Time*, and *DateTime* columns are included in the result *INSERT* statements according to the **Storage Options** of the [Database Profile](#)<sup>[30]</sup>.



## 8.4.2 Specifying dump options

Select the data dump mode to be used (**Multi-row *INSERT* statements** or **separate single-row *INSERT* statements**) and specify commits' frequency.

To add the "CREATE TABLE" to the top of the dump, check the corresponding box.

Get SQL Dump Wizard allows you to send the result script to [SQL Script Editor](#)<sup>[202]</sup> or to save it to a specified file. Select the **Send to script editor** option to load the result to the editor. To save the result to the file, enter the script file name (\*.sql).

Click the **Ready** button to start the process.

Data script

 Specify the data dump options.

Use multi-row INSERT statements  
Record count per each statement

Commit after each statement

Use separate single-row INSERT statements  
Commit after

Statement syntax

Add the "Create Table" statement to the top of the dump

Output

 You can either open the generated dump in the SQL Script Editor or save it to a file.

Send to script editor

Save to file

File name  ...

Encoding

Click "Ready" to dump your data.

## 8.5 Import Data Wizard

[Import Data Wizard](#) provides you with a graphical user interface to import data from the most popular files formats into existing Firebird tables. It allows you to adjust data formats, empty target tables, execute custom SQL scripts, etc.

Import Data tool supports:

- Microsoft Office Excel 95-2003
- Microsoft Office Excel 2007
- Microsoft Office Access
- Microsoft Office Access 2007
- Delimiter-separated values (CSV, DSV, TSV)
- DBF
- Text files
- XML
- ODBC data sources (any database accessible via an ODBC driver or OLE DB provider, such as SQL Server, MySQL, Oracle, MS Access, Sybase, DB2, PostgreSQL, etc.)

In order to run the wizard you should

- open the table in [Table Editor](#);
- go on to the [Data](#) tab;
- select the [Import Data](#) item from the [Navigation Bar](#).

To import data,

- [Set the format](#)<sup>[193]</sup> of the input data and the source file name;
- [Map source file columns and target table fields](#)<sup>[195]</sup>;
- [Specify other import options](#)<sup>[196]</sup>.

Source format

Select one of the available source formats.

- Microsoft Office Excel 97 - 2003
- Microsoft Office Excel 2007
- Microsoft Office Access
- Microsoft Office Access 2007
- Delimiter-separated values (CSV, DSV, TSV)
- Text file (Fixed-width columns)
- DBF
- XML
- ODBC data source

Source file

Select or enter the source file name and specify the encoding if necessary.

File name	Password	Encoding
<input type="text" value="D:\Data\Excel\employee.xls"/>	<input type="text"/>	<input type="text" value="ANSI"/>
Connection string	Identifier quote characters	
<input type="text"/>	<input type="text" value="None (table_name)"/>	
Data source	Data location	Delimiter
<input type="text" value="Employee_list"/>	<input type="text" value="Attributes"/>	<input type="text"/>
		Quote
		<input type="text"/>

See also: [Export Data Wizard](#)<sup>182)</sup>

### 8.5.1 Setting source file name and format

1. Select the format of the source file.
2. Specify the file you want to import. The file name extension in the **File name** box varies according to the selected import type. The wizard allows you to import data from several files at a time.

To import data from multiple files with the same structure, set the mask of the file names to the corresponding field. To see the list of matching files, use with the button on the right.

**Example 1:**

Suppose, you need to import data from the following tables:

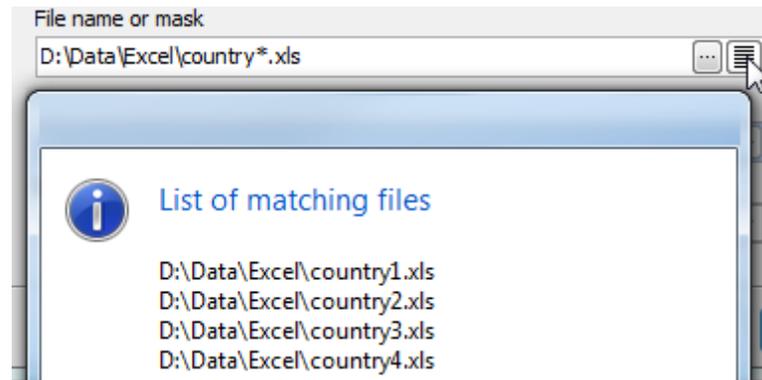
*D:\Data\Excel\country1.xls*

*D:\Data\Excel\country2.xls*

*D:\Data\Excel\country3.xls*

*D:\Data\Excel\country4.xls*

The mask for these file names is *D:\Data\Excel\country\*.xls*.



3. For ODBC data sources specify the [connection string](#) to be used to connect to the data source.
4. Select the data source to import: a table of MS Access database or a spreadsheet of MS Excel.
5. Enter the password to the database (MS Access).
6. For CSV file set the delimiter and quote characters.
7. Select source file [Encoding](#).
8. For .XML files, define the [XPath](#) to the data to be imported to the selected table and select whether data is stored in Attributes or in Subnodes.

### Example 2:

To import data from the following .xml file, use XPath=*/Employees/Employee* and Data location=*Subnodes*

```
<?xml version="1.0" encoding="utf-8"?>
<Employees>
  <Employee>
    <ID>1</ID>
    <FirstName>Klaus</FirstName>
    <LastName>Salchner</LastName>
    <PhoneNumber>410-727-5112</PhoneNumber>
  </Employee>
  <Employee>
    <ID>2</ID>
    <FirstName>Peter</FirstName>
    <LastName>Pan</LastName>
    <PhoneNumber>604-111-1111</PhoneNumber>
  </Employee>
</Employees>
```

### Example 3:

To import data from the .xml file below, use XPath=*DATAPACKET/Data/Item* and Data location=*Attributes*

```
<?xml version="1.0"?>
```

```
<DATAPACKETVersion="2.0">
<Data>
  <Item ID="1" FirstName="Klaus" LastName="Salchner" PhoneNumber="410-727-
5112" />
  <Item ID="2" FirstName="Peter" LastName="Pan" PhoneNumber="604-111-1111" />
</Data>
</DATAPACKET>
```

## 8.5.2 Setting the accordance between source and target columns

The wizard provides you with several ways to map input data to the target table columns.

- You can map columns automatically by order with the [Auto Fill](#) and [Auto fill all maps](#) buttons.
- You can do it manually using the drop-down list of [Source column](#) fields.
- To map columns visually, open [Map builder](#)<sup>[196]</sup> with the [Build map](#) link.

It's useful to save a specified map to a file for further using it in the next wizard sessions. To save a map, use the [More...](#) button and follow the [Save map](#) link.

To see the 100 first rows of input file or output table, use the [More...](#) button and follow the [View source data](#) or [Preview results](#) links respectively.

You can also specify [Replacements](#) to be applied to the selected column before the import and [data format masks](#)<sup>[197]</sup> used for the input file.

To exclude the first file row, use the [File contains column header](#) checkbox.

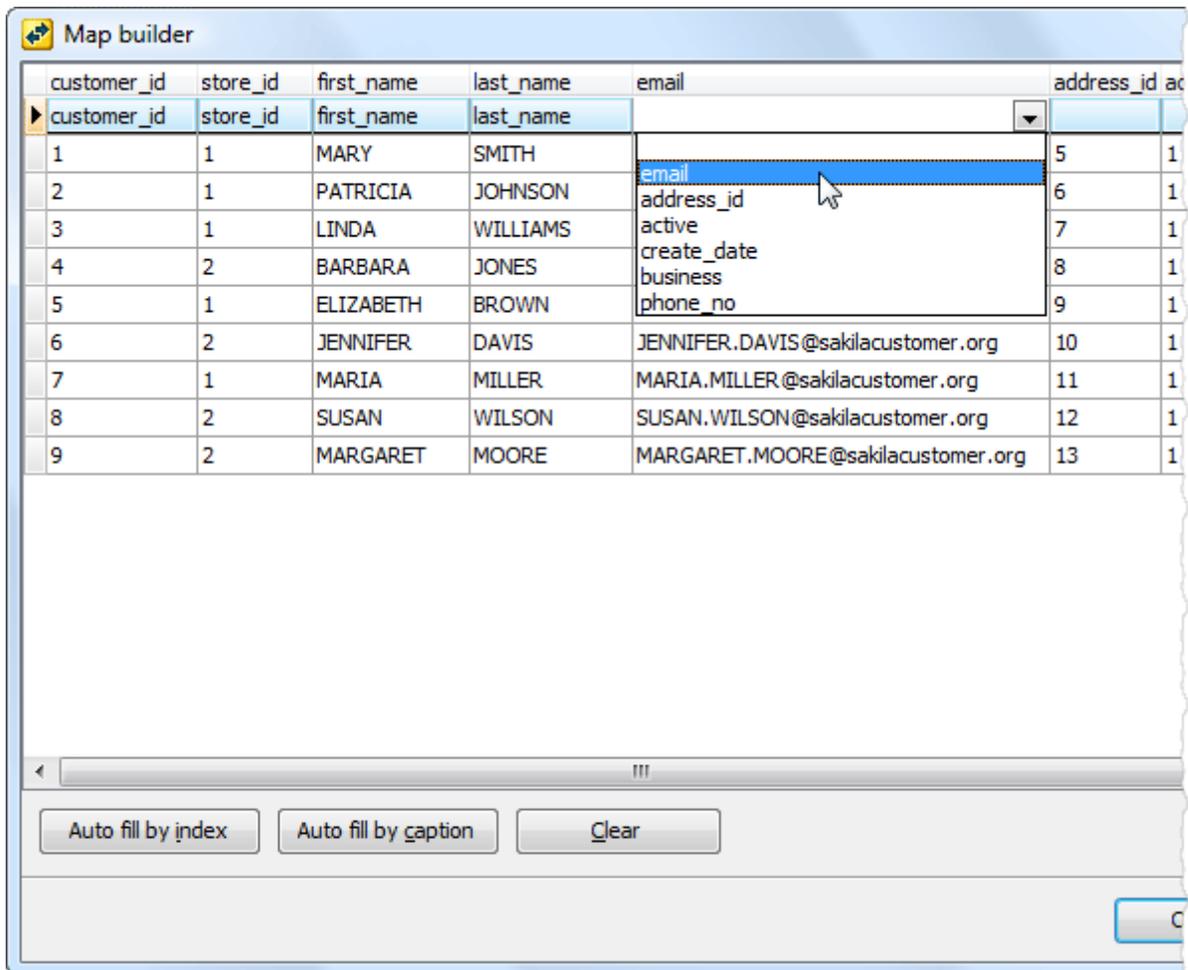
Columns				
	Target field	Source column	Replacements	Empty values interpretation
1	film_id	A		
2	title	B		As Null
3	description	C		As Null
4	release_year	D		
5	language_id	E		
6	original_language_id	F		
7	rental_duration	G		
8	rental_rate	H		
9	length	I		
10	replacement_cost	J		
11	rating	K		As Null
12	last_update	L		
13	special_features	M		As Null
14	fulltext			As Null

Auto fill   Clear   Define columns...   Data formats...   More...

File contains column headers

### 8.5.2.1 Map builder

To specify the accordance between source and target columns visually, use popup menu of the upper row to map source file columns to target table fields.



For text files define columns bounds first. To add a bound, double-click near the column data in the builder area. To map a column to a target table field, select the field in the Target field list and then click between the bounds.

Target field	Offset	Width
1 customer_id	0	5
2 store_id	5	6
3 first_name	11	46
4 last_name	57	46
5 email	103	52
6 address_id	155	6
7 active	161	6
8 create_date	167	6

0	10	20
custo	store	first_name
1	1	MARY
2	1	PATRICIA
3	1	LINDA
4	2	BARBARA
5	1	ELIZABETH
6	2	JENNIFER
7	1	MARIA

### 8.5.2.2 Data formats

Use the window fields to indicate format masks of the source data imported to the table. It allows the application to import data correctly.

The components of the date time format mask are represented at the window. Compose

your date, time, and date time format mask of this components and separators. The following table contains some types of input fields and suggests masks to import them.

To import these input data correctly	Use these format masks
June 29	mmm dd
Jun 29, 2009	mmmm dd, yyyy
Tue Jun 14 16:50:49	dddmmm dd hh:nn:ss
01/15/09 08:26 AM	mm/dd/yy h:nn ampm

You can also set decimal and thousand separators, and custom NULL,TRUE and FALSE values. If you have several values to be imported to NULL(TRUE, FALSE) value, use semicolons to separate them.

<table border="1"> <tr><td colspan="2"><b>Formats</b></td></tr> <tr><td>Date</td><td></td></tr> <tr><td>Time</td><td></td></tr> <tr><td>Date time</td><td></td></tr> <tr><td colspan="2"><b>Separators</b></td></tr> <tr><td>Decimal</td><td>,</td></tr> <tr><td>Thousand</td><td>#160</td></tr> <tr><td colspan="2"><b>Other (use semicolon to separate values)</b></td></tr> <tr><td>Boolean true</td><td>True</td></tr> <tr><td>Boolean false</td><td>False</td></tr> <tr><td>Null values</td><td>;NULL</td></tr> </table>	<b>Formats</b>		Date		Time		Date time		<b>Separators</b>		Decimal	,	Thousand	#160	<b>Other (use semicolon to separate values)</b>		Boolean true	True	Boolean false	False	Null values	;NULL	<table border="1"> <tr><td colspan="2"><b>Date time formats</b></td></tr> <tr><td><b>dd</b></td><td>the day as a number with a leading zero or space (01-31).</td></tr> <tr><td><b>ddd</b></td><td>the day as an abbreviation (Sun-Sat)</td></tr> <tr><td><b>dddd</b></td><td>the day as a full name (Sunday-Saturday)</td></tr> <tr><td><b>mm</b></td><td>the month as a number with a leading zero or space (01-12).</td></tr> <tr><td><b>mmm</b></td><td>the month as an abbreviation (Jan-Dec)</td></tr> <tr><td><b>mmmm</b></td><td>the month as a full name (January-December)</td></tr> <tr><td><b>yy</b></td><td>the year as a two-digit number (00-99).</td></tr> <tr><td><b>yyyy</b></td><td>the year as a four-digit number (0000-9999).</td></tr> <tr><td><b>hh</b></td><td>the hour with a leading zero or space (00-23)</td></tr> <tr><td><b>nn</b></td><td>the minute with a leading zero or space (00-59).</td></tr> <tr><td><b>ss</b></td><td>the second with a leading zero or space (00-59).</td></tr> <tr><td><b>zzz</b></td><td>the millisecond with a leading zero (000-999).</td></tr> <tr><td><b>ampm</b></td><td>Specifies am or pm flag hours (0..12)</td></tr> <tr><td><b>ap</b></td><td>Specifies a or p flag hours (0..12)</td></tr> </table>	<b>Date time formats</b>		<b>dd</b>	the day as a number with a leading zero or space (01-31).	<b>ddd</b>	the day as an abbreviation (Sun-Sat)	<b>dddd</b>	the day as a full name (Sunday-Saturday)	<b>mm</b>	the month as a number with a leading zero or space (01-12).	<b>mmm</b>	the month as an abbreviation (Jan-Dec)	<b>mmmm</b>	the month as a full name (January-December)	<b>yy</b>	the year as a two-digit number (00-99).	<b>yyyy</b>	the year as a four-digit number (0000-9999).	<b>hh</b>	the hour with a leading zero or space (00-23)	<b>nn</b>	the minute with a leading zero or space (00-59).	<b>ss</b>	the second with a leading zero or space (00-59).	<b>zzz</b>	the millisecond with a leading zero (000-999).	<b>ampm</b>	Specifies am or pm flag hours (0..12)	<b>ap</b>	Specifies a or p flag hours (0..12)
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<b>ap</b>	Specifies a or p flag hours (0..12)																																																				

### 8.5.3 Customizing common options

On the wizard step you can set the number of records to import, whether the tool import all table records or only the specified number. In the second case you can set the number of records to skip.

#### Logging

This options group let you to manage logging of the import process.

#### Scripts

There are many cases where the import process is necessary to correct with additional scripts. So to disable table indexes before the importing, specify the corresponding scripts to be executed before and after the process.

The typical example of usage of the [Before each table](#) and [After each table](#) scripts is the import data to autoincrement columns of several tables. In this case it's neseccary to set the corresponding scripts:

```
SET IDENTITY_INSERT %table_name% ON
and
```

```
SET IDENTITY_INSERT %table_name% OFF
```

to be executed before and after import data to each table correspondingly.

### Import mode

If the [Update existing records](#) option is turned ON, the records will be either updated or inserted: an UPDATE will be performed when a target row exists in the table and an INSERT is performed when the target row does not exist.

## 9 Database Tools

**Firebird Maestro** provides a number of powerful tools for working with databases.

The following tools are available:

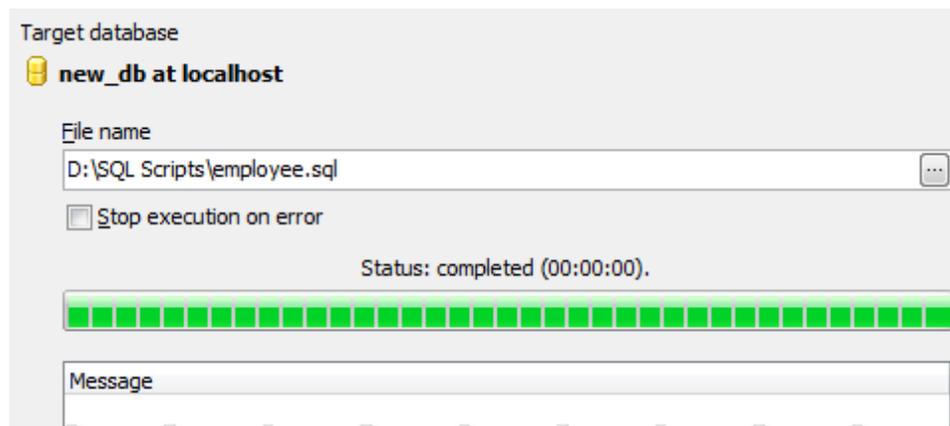
- [SQL Editor](#)<sup>[15†]</sup>  
Creates and executes SQL queries.
- [Visual Query Builder](#)<sup>[156†]</sup>  
Builds queries visually.
- [Script Runner](#)<sup>[20†]</sup>  
Executes SQL scripts to the database.
- [SQL Script Editor](#)<sup>[202†]</sup>  
Allows to edit and execute SQL scripts.
- [Extract Database Wizard](#)<sup>[204†]</sup>  
Extracts the database objects and data to the SQL script, which can be executed later to reserve the database structure and data.
- [Generate Database Report Wizard](#)<sup>[209†]</sup>  
Generates the database HTML or PDF report for structure of selected object in a whole or partially.
- [BLOB Viewer](#)<sup>[21†]</sup>  
Displays a content of BLOB fields in different representations.
- [Diagram Viewer](#)<sup>[217†]</sup>  
Represents data from a table or a query as a diagram in various ways.
- [Data Analysis](#)<sup>[22†]</sup>  
Allows to slice and dice information efficiently according your business rules.
- [Report Designer](#)<sup>[226†]</sup>  
Prepares data for reading, viewing, and printing in a polished look.
- [Schema Designer](#)<sup>[233†]</sup>  
Allows to represent database tables and relationships as ER diagrams.
- [Transaction Browser](#)<sup>[238†]</sup>  
A very useful feature for DBAs to monitor the users' activity.
- [SQL Generator](#)<sup>[241†]</sup>  
Provides you with a set of simple SQL statements.
- Simple tools for [DML procedures](#)<sup>[242†]</sup> and [Updatable views](#)<sup>[244†]</sup> generation allow to create a bunch of CRUD procedures automatically.

## 9.1 Script Runner

[Script Runner](#) is designed for executing of SQL scripts that don't require modifications. The window can be invoked from the [Tools](#) menu or with the [Execute script from file](#) link of [SQL Script Editor](#)<sup>[202]</sup>.

Script Runner allows to execute .sql files as well as archived scripts directly from .zip files. In case archived files this tool unpacks zip archives to temporary files by itself for further executing. The tool neither starts any implicit transactions before executing the script nor issues COMMIT or ROLLBACK commands after the executing.

To execute a script with Script Runner, set the file name and the [Stop execution on error](#) option value. This option allows to view all the execution errors (OFF). The specified script will be executed immediately on the database which name is represented at the top of the window.



## 9.2 SQL Script Editor

[SQL Script Editor](#) is designed for SQL scripts editing and executing. The editor does not display results of SELECT queries. To work with such queries' data, use [SQL Editor](#)<sup>[15]</sup>. If you have a script that is ready to use, execute it with [Script Runner](#)<sup>[20]</sup>. To open [SQL Script Editor](#), select the [Tools | SQL Script Editor](#) main menu item.

To work with a script within [SQL Script Editor](#), load it from an `.sql` file or type it in the editor area directly. To prevent mistakes in SQL syntax, the editor supports syntax highlighting, code completion and divides the script text into logical parts that can be individually collapsed or expanded (code folding). All the logical parts are represented at the [Explorer](#) at the [Navigation bar](#). It allows you to transfer to the proper script fragment quickly by clicking the corresponding node in the tree.

[SQL Script Editor](#) allows you to execute the whole SQL script or only its selected part. To make the executing of a large script much faster, execute the script directly from a file with [Script Runner](#)<sup>[20]</sup>. By default, if a user opens a file larger than 100K, [SQL Script Editor](#) will suggest him to execute the script file without opening it in the editor. This file size may be changed at the editor's [options](#)<sup>[26]</sup> tab.

The screenshot displays the Firebird Maestro SQL Script Editor interface. The left sidebar shows a tree view of the database structure, including Databases, Users, Roles, Database triggers, Domains, Tables (3), Views, Procedures, Generators, Exceptions, and UDFs. The main editor window shows the following SQL script:

```

CREATE TABLE EMPLOYEE (
  EMP_NO      EMPNO NOT NULL,
  FIRST_NAME  "FIRSTNAME" NOT NULL,
  LAST_NAME   "LASTNAME" NOT NULL,
  PHONE_EXT   VARCHAR(4),
  HIRE_DATE   TIMESTAMP DEFAULT 'NOW' I
  DEPT_NO     DEPTNO NOT NULL,
  JOB_CODE    JOBCODE NOT NULL,
  JOB_GRADE   JOBGRADE NOT NULL,
  JOB_COUNTRY COUNTRYNAME NOT NULL,
  SALARY      SALARY NOT NULL,
  FULL_NAME   COMPUTED BY (last_name |
/* Keys */
PRIMARY KEY (EMP_NO),
/* Checks */
CHECK ( salary >= (SELECT min_salary I
                    job.job_code = (
                    job.job_grade =
                    job.job_country
                    salary <= (SELECT max_salar
                    job.job_code = (
                    job.job_grade =
                    job.job_country

/* Foreign keys */
FOREIGN KEY (DEPT_NO)
  REFERENCES DEPARTMENT (DEPT_NO)
  ON DELETE NO ACTION
  ON UPDATE NO ACTION,
FOREIGN KEY (JOB_CODE, JOB_GRADE, JOB
  REFERENCES JOB (JOB_CODE, JOB_GRADE,
  ON DELETE NO ACTION
  ON UPDATE NO ACTION
);

CREATE INDEX NAMEX
  ON EMPLOYEE
  (LAST_NAME, FIRST_NAME);

SET TERM ^ ;

CREATE TRIGGER SAVE SALARY CHANGE FOR EI

```

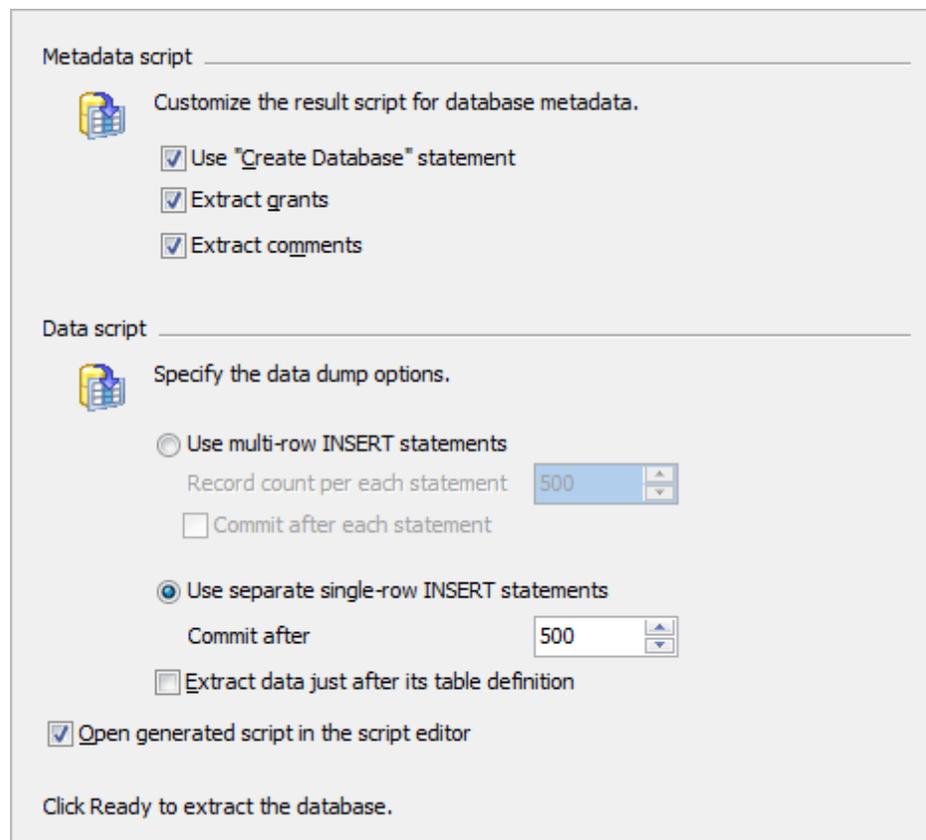
## 9.3 Extract Database

Using [Extract Database Wizard](#) you can extract database objects and data to a SQL script, e.g. for backup purposes. To run this wizard select the [Tools | Extract Database](#) main menu item.

Use the [More...](#) button to save the extract configuration for future use or to load the previously saved configuration for faster extract.

- [Selecting database to extract and the target script file name](#)<sup>[204]</sup>
- [Selecting database objects to extract their structure](#)<sup>[205]</sup>
- [Selecting database objects to extract their data](#)<sup>[206]</sup>
- [Customizing script options](#)<sup>[207]</sup>

**See also:** [Get SQLDump Wizard](#)<sup>[189]</sup>



The screenshot shows the configuration window for the Extract Database Wizard, divided into two sections: Metadata script and Data script.

**Metadata script**

Customize the result script for database metadata.

- Use "Create Database" statement
- Extract grants
- Extract comments

**Data script**

Specify the data dump options.

- Use multi-row INSERT statements
  - Record count per each statement: 500
  - Commit after each statement
- Use separate single-row INSERT statements
  - Commit after: 500
  - Extract data just after its table definition
- Open generated script in the script editor

Click Ready to extract the database.

### 9.3.1 Selecting the database and the target file name

Select the [source database](#) to extract and set the [target script file name](#).

Select the components to be extracted: object definitions, table data or both.

Welcome to the Extract Database Wizard!  
This wizard allows you to extract the database structure and table data into the SQL script.

This wizard will guide you through the process of selecting schema objects and data tables and setting other options for generating the result script.

Source database  
NORTHWIND at MERCURY

Script file name  
NORTHWIND.sql

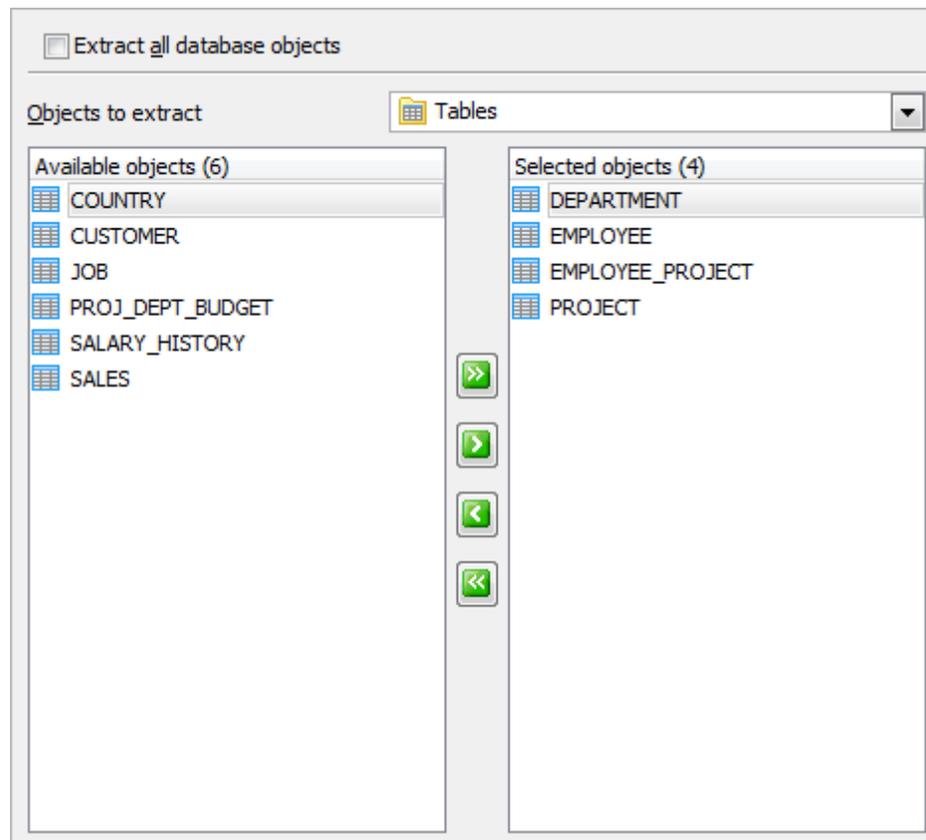
You can select to extract either database structure, or table data only, or both.  
Which components would you like to extract?

Extract both of structure and data  
 Extract structure only  
 Extract data only

### 9.3.2 Selecting objects to extract their structure

Select the database object to be extracted or check the [Extract all database objects](#) option to extract all objects from the database.

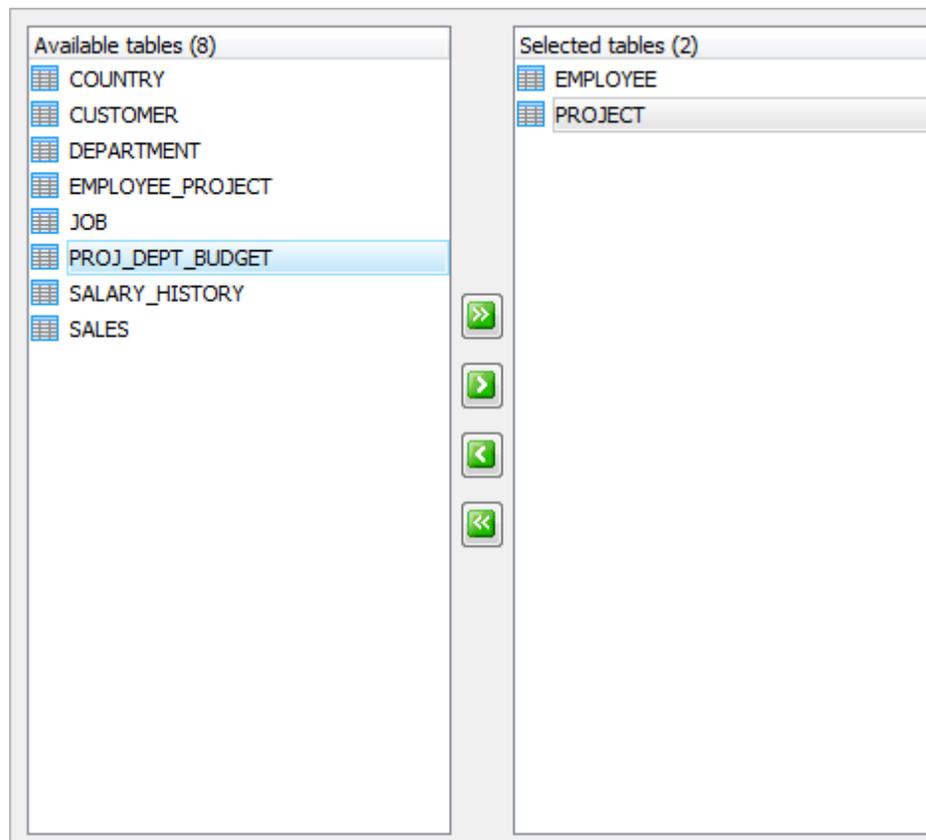
**Note:** this step is not available if you select the extract data only mode when [selecting components to be extracted](#) <sup>(2024)</sup>.



### 9.3.3 Selecting objects to extract their data

Select the tables to extract their data by moving them from the [Available tables](#) list to the [Selected tables](#) list.

**Note:** this step is not available if you select the extract structure only mode when [selecting components to be extracted](#) <sup>(2024)</sup>.



### 9.3.4 Customizing script options

Adjust the result script for database metadata according to your needs. To include/exclude the following statements into the script, check the corresponding boxes: *CREATEDATABASE*, *DROPDATABASE IF EXISTS*, *DROP IF EXISTS* statements for database objects, and foreign key checks.

Select the data dump mode to be used ([Multi-row INSERT statements](#) or [separate single-row INSERT statements](#)) and specify commits' frequency.

You can also set extract data after its table definition.

Fill the [Open generated script](#) in the [script editor](#) box to load the result script to [SQL Script Editor](#)<sup>[202]</sup>.

Click the [Ready](#) button to start the extraction process.

Metadata script \_\_\_\_\_

 Customize the result script for database metadata.

- Use "Create Database" statement
- Extract grants
- Extract comments

Data script \_\_\_\_\_

 Specify the data dump options.

Use multi-row INSERT statements

Record count per each statement

Commit after each statement

Use separate single-row INSERT statements

Commit after

Extract data just after its table definition

Open generated script in the script editor

Click Ready to extract the database.

## 9.4 Generate Database Report

With the help of [Generate Database Report Wizard](#) you can create HTML or PDF report for the structure of the selected object in the whole or partially. To run this wizard select the [Tools | Generate Database Report](#) main menu item.

- [Selecting reporting elements and setting other report options](#)<sup>[209]</sup>
- [Specifying reporting objects and editing styles](#)<sup>[209]</sup>

Type	Selected	Individual Page
Tables	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
Views	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
Procedures	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
UDFs	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
Rules	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
Defaults	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
Fields	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Indexes	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
Default Constraints	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>

Show report after generating
  Show empty properties

Click "Ready" to generate the report.

### 9.4.1 Selecting reporting elements and setting other report options

Select the [report object](#) and the [report format](#) items, set the [report title](#) and the [report path](#) options in the respective boxes.

Welcome to the Database Report Wizard!  
 This wizard allows you to create HTML or PDF report for the structure of the selected object in a whole or partially.  
 This wizard will guide you through the process of selecting reporting elements and setting other report options.

Reported object:

Report title:

Report path:

Report format:

### 9.4.2 Reporting objects and editing styles options

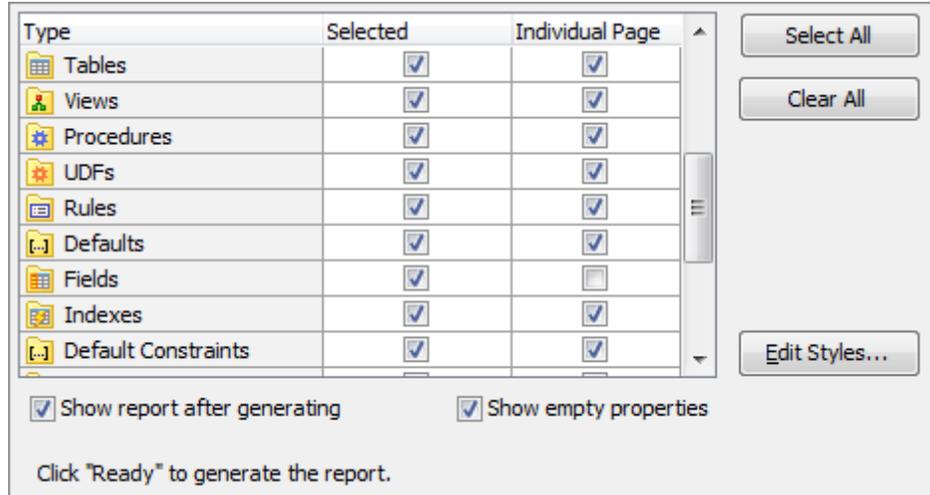
This step allows you to select the essential objects to report and to specify the output format and style using [Report Style Editor](#)<sup>[210]</sup>.

- Show report after generating

If checked, opens the result files in the associated program after making the report.

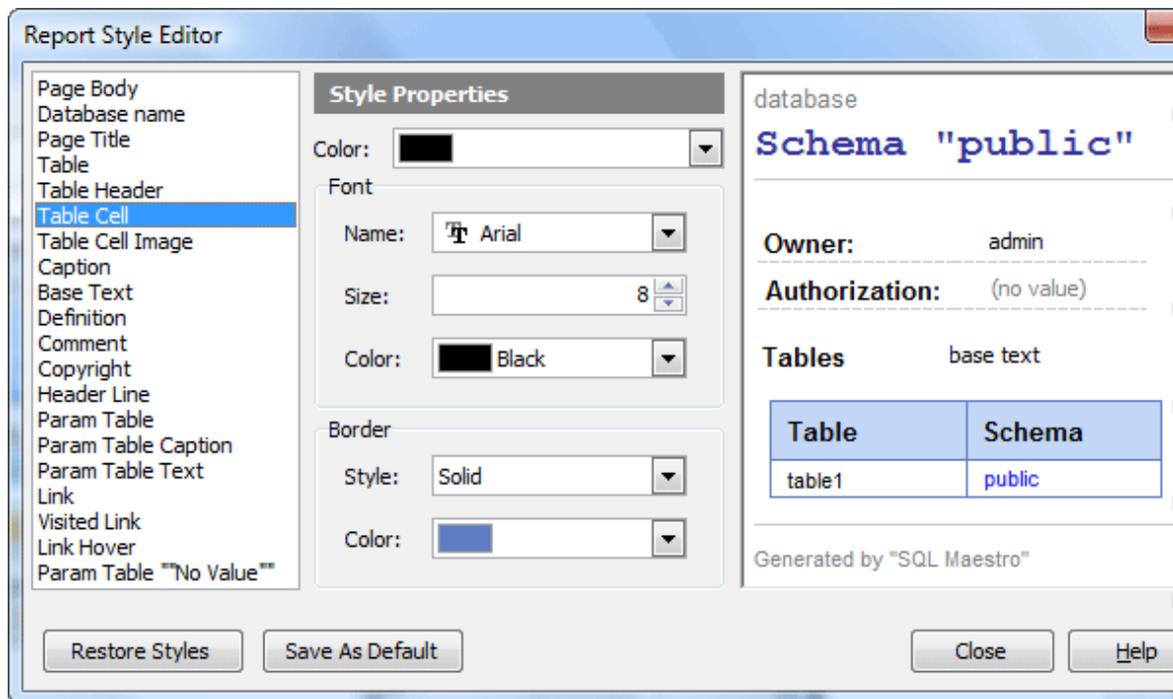
Show empty properties

If checked, allows you to report objects even if they are empty.



### 9.4.3 Editing database report style

Using Report Style Editor you can specify style properties of a report including font size, color and name for different elements.



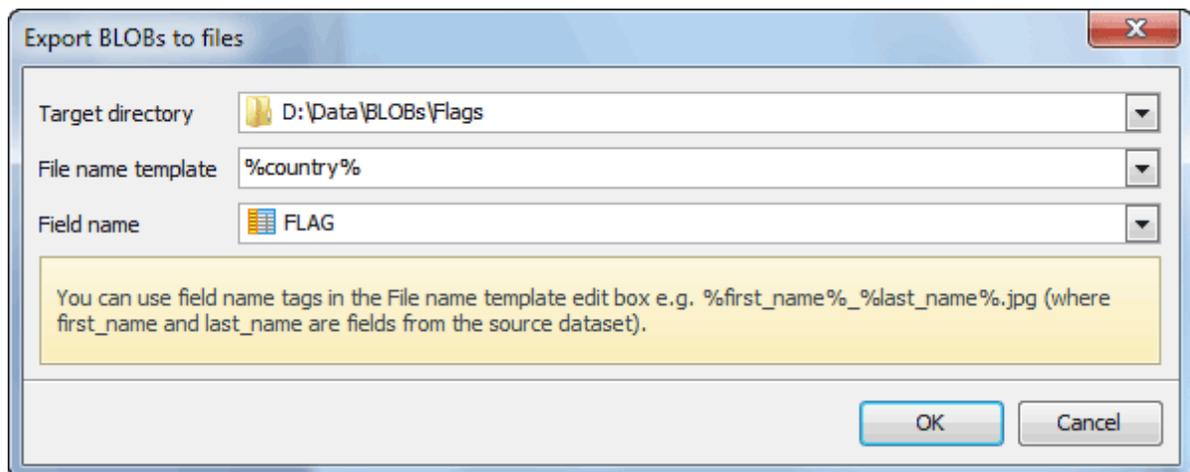
## 9.5 BLOB Viewer

BLOB Viewer allows you to view the content of the BLOB fields in various representations.

- [Viewing BLOB field as hexadecimal dump](#)<sup>[211]</sup>
- [Viewing BLOB field as plain text](#)<sup>[212]</sup>
- [Viewing BLOB field as graphical image](#)<sup>[213]</sup>
- [Viewing BLOB field as HTML](#)<sup>[214]</sup>
- [Viewing BLOB field as PDF](#)<sup>[215]</sup>

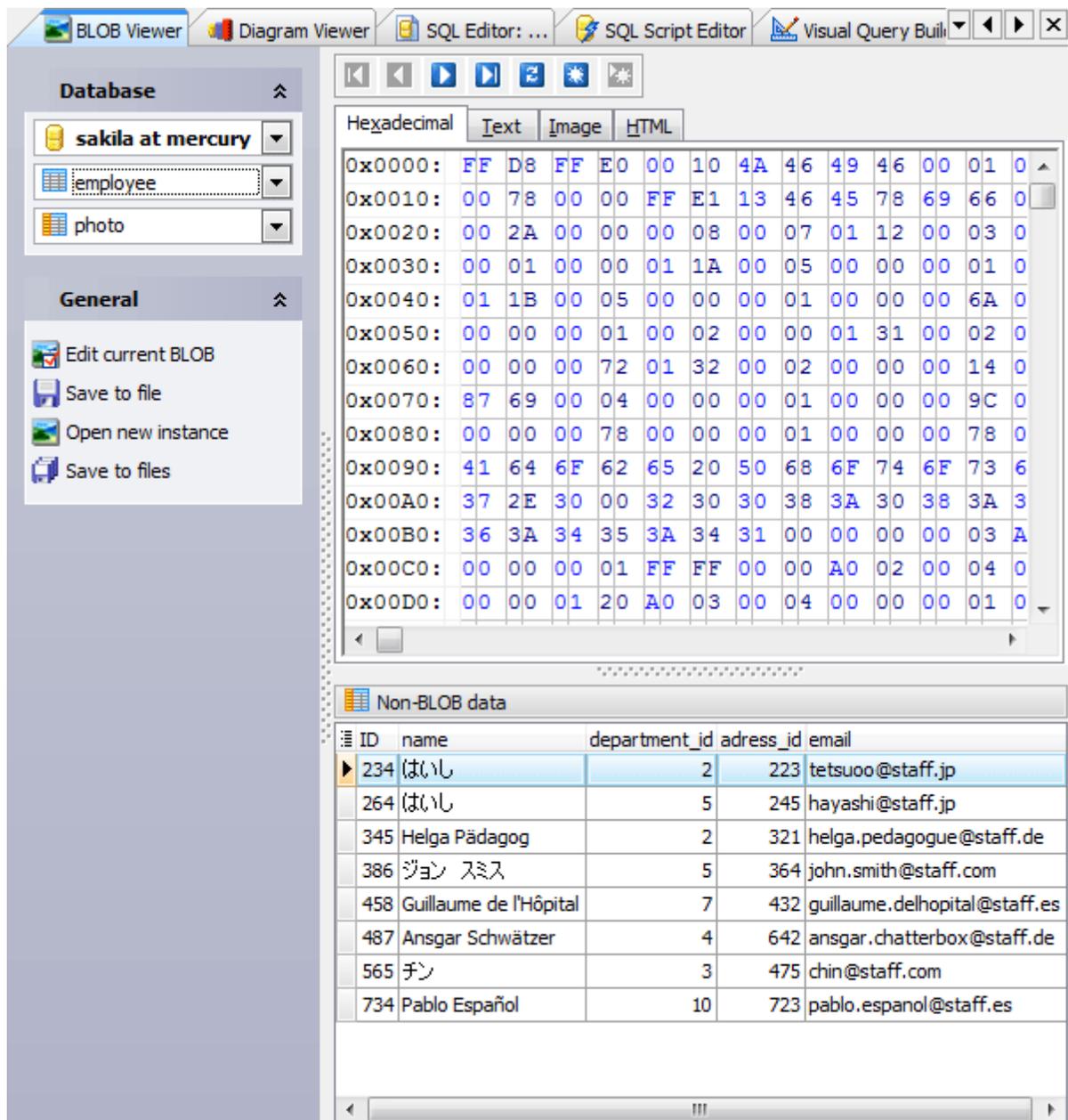
**See also:** [BLOB Editor](#)<sup>[177]</sup>

BLOB Viewer also allows you to save all BLOBs from a table or view to a given directory. Just click **Save to files** on the **Navigation bar** and fill all fields in the **Export BLOBs** window shown below. You can use table columns' names enclosed in % as a file name template.



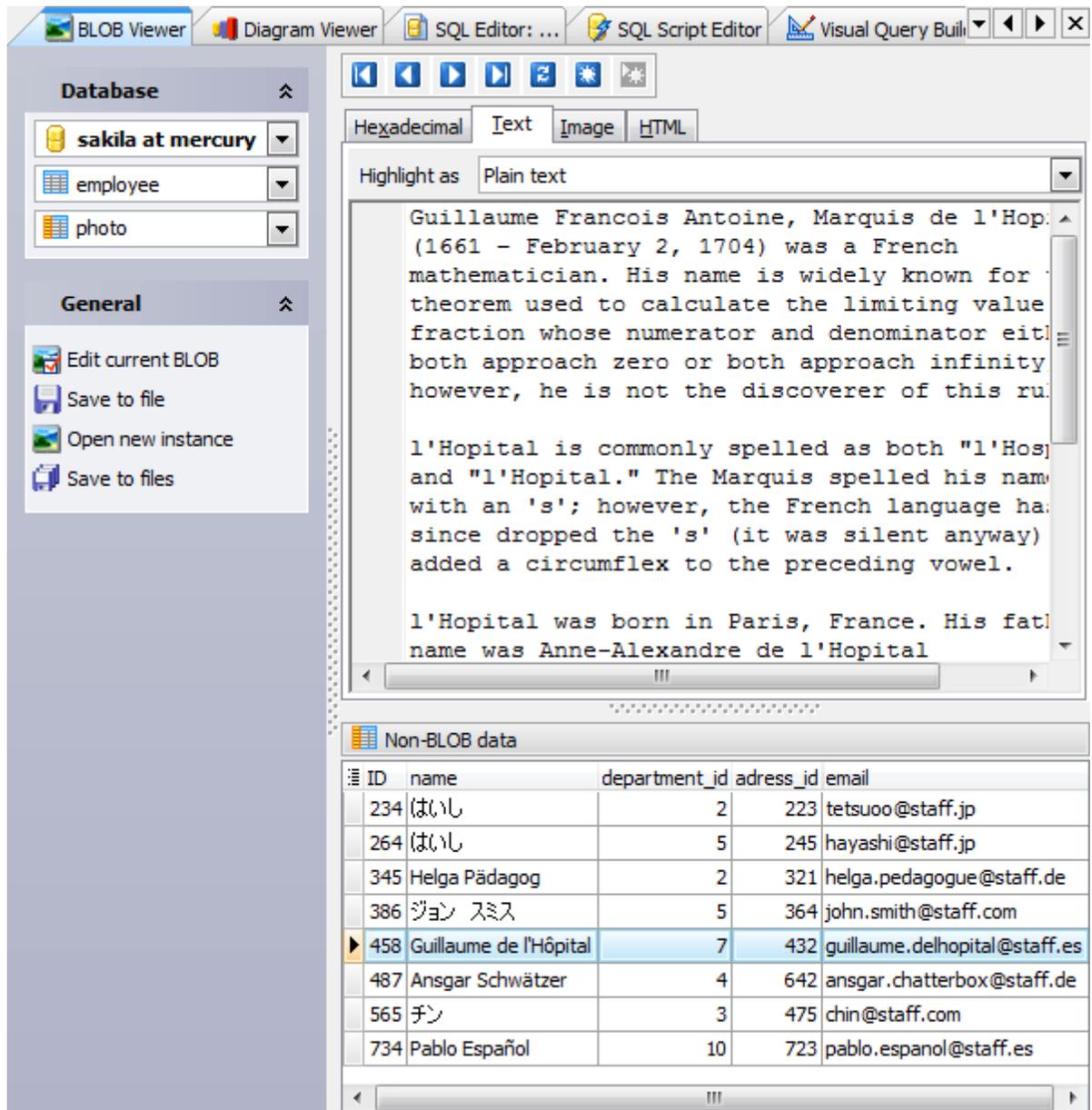
### 9.5.1 Viewing as hexadecimal dump

The **Hexadecimal** panel allows you to view data in hexadecimal mode.



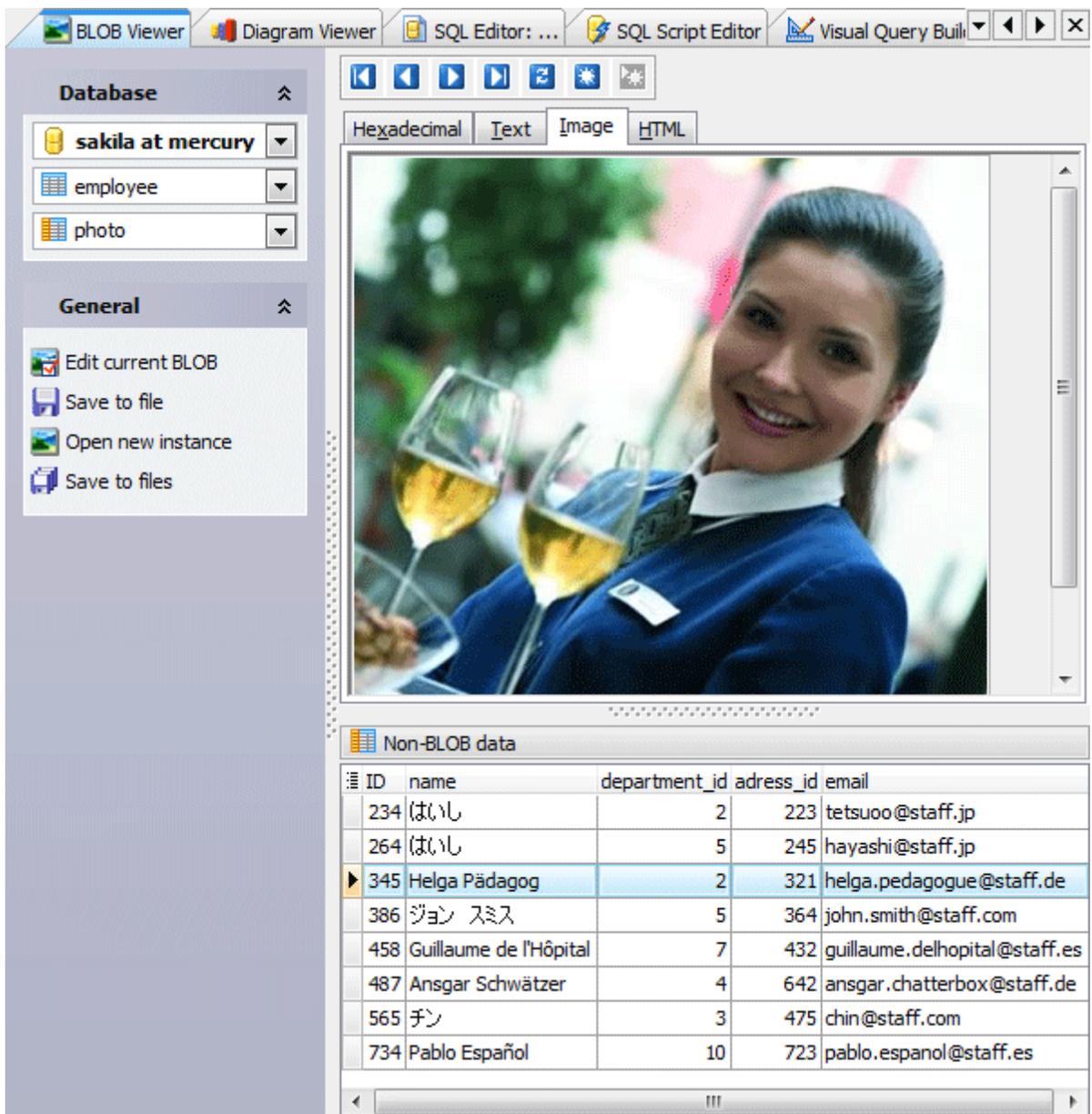
## 9.5.2 Viewing as plain text

The **Text** panel allows you to view data as simple text. For your convenience several types of text highlighting are available (*Plain text*, *HTML*, *JScript*, *CSS*, *PHP*, *XML*, *SQL*, and *SQLite DDL*). The popup menu of the panel provides you to **Find** or **Replace** a necessary text fragment.



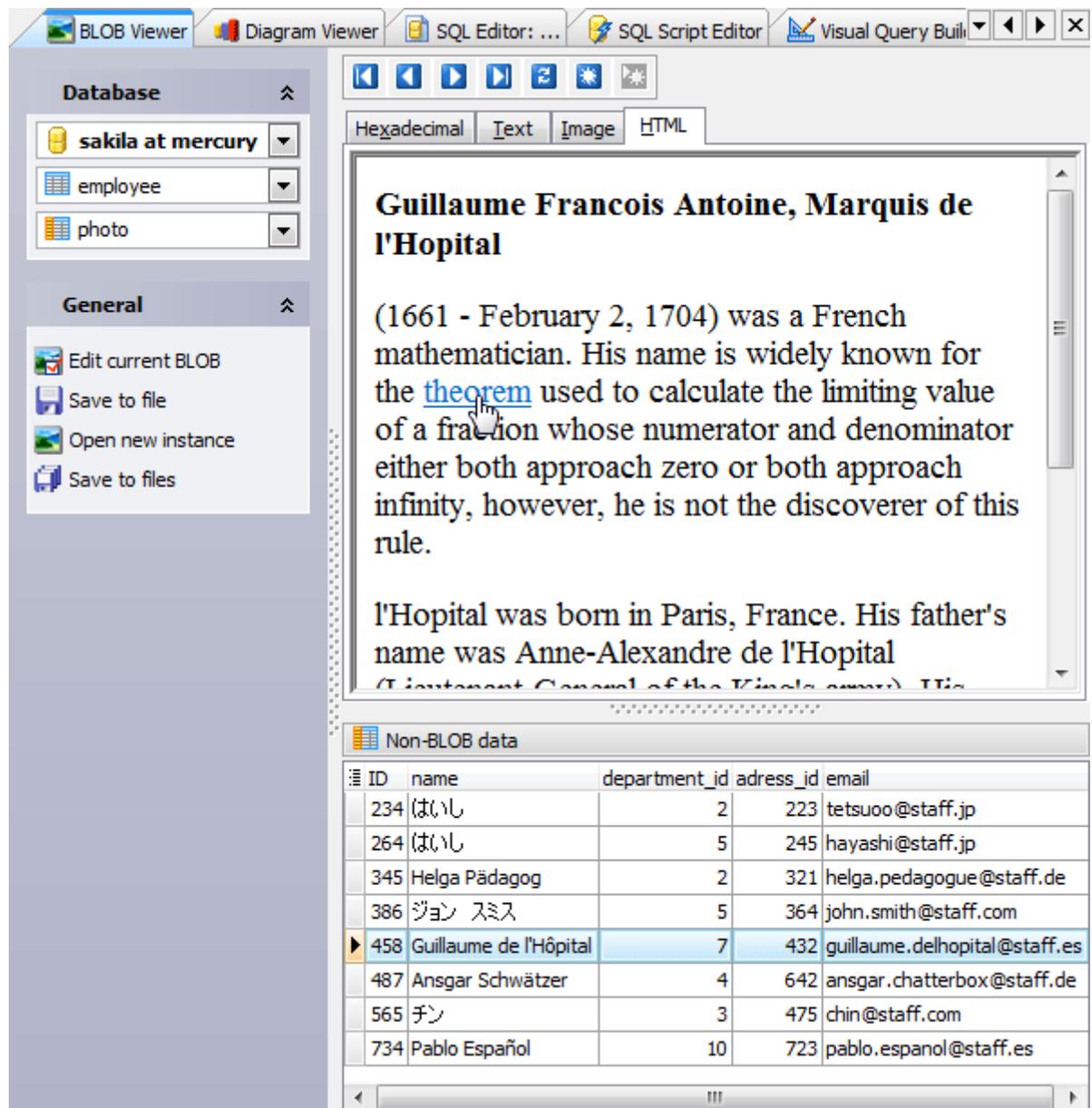
### 9.5.3 Viewing as image

The [Image](#) panel displays field data as image.



## 9.5.4 Viewing as HTML

The [HTML](#) panel displays field data as HTML.



### 9.5.5 Viewing as PDF

The PDF panel allows you to browse PDF data stored in the database.

The screenshot shows a database tool interface with the following components:

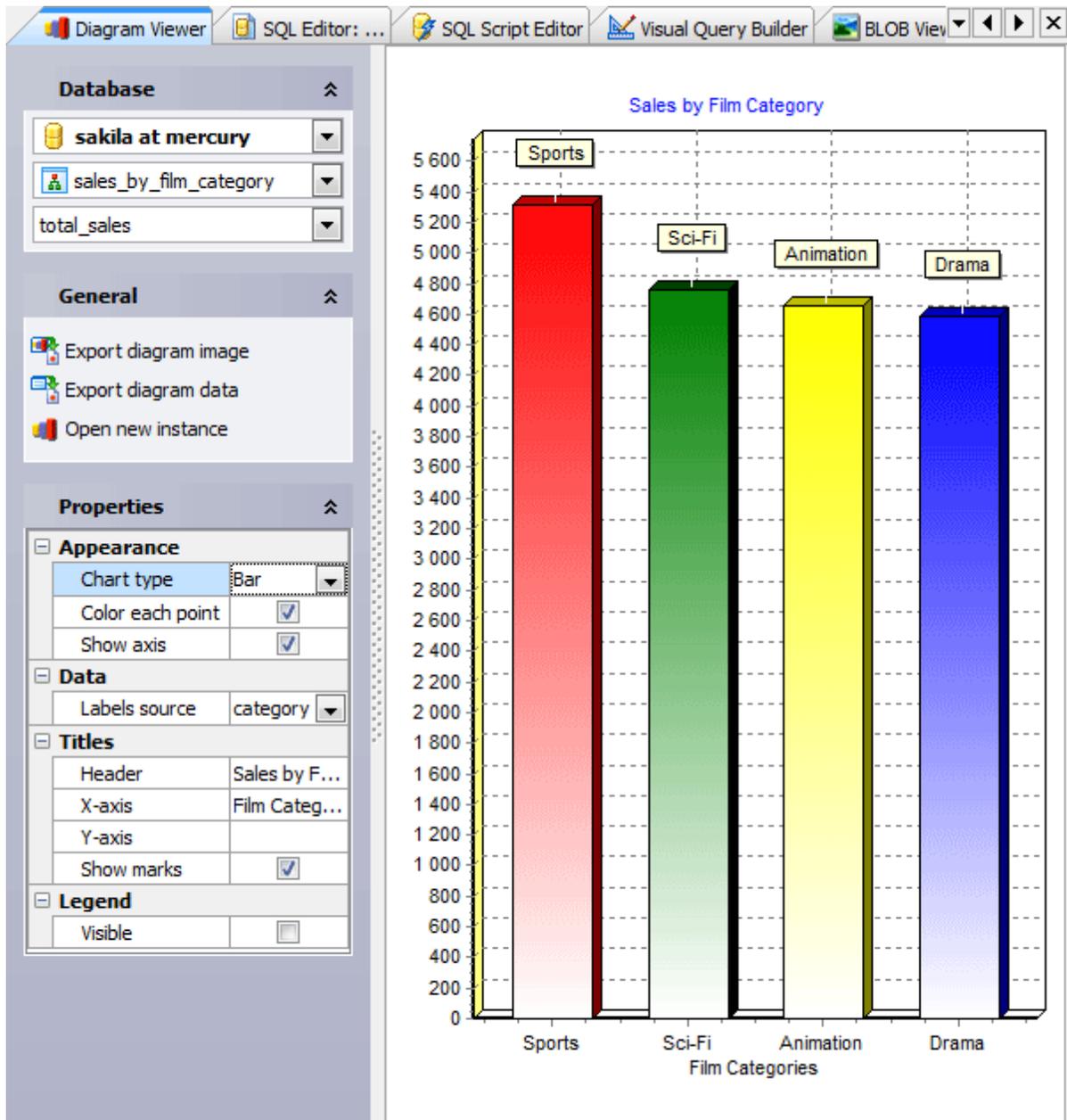
- Top Bar:** Contains tabs for BLOB Viewer, SQL Script Editor, Data Analysis, Visual Query Builder, and Designer.
- Left Sidebar:**
  - Database:** Includes dropdowns for 'test\_utf8 at d', 'public.software', and 'manual'.
  - General:** Includes buttons for 'Edit current BLOB', 'Save to file', 'Open new instance', and 'Save to files'.
- Main Content Area:**
  - Navigation icons (back, forward, search, etc.) and a toolbar with 'Hexadecimal', 'Text', 'Image', 'HTML', and 'PDF' options.
  - Page navigation: '18 / 103', '75%' zoom, and 'Comment / Share' buttons.
  - Content: A help page titled 'PostgreSQL PHP Generator Help' with a section '2 Getting started'. It includes sub-sections for 'Connection properties', 'Script connection properties', and 'Projects'.
  - Bottom of content area: '8.50 x 11.00 in' and a scrollbar.
- Bottom Panel:** A table titled 'Non-BLOB data' with the following data:

id	full_name	description_id
1	PostgreSQL PHP Generator	1
2	Code Factory for MySQL	3
3	SQLite DataWizard	2
4	MS SQL Maestro	4

## 9.6 Diagram Viewer

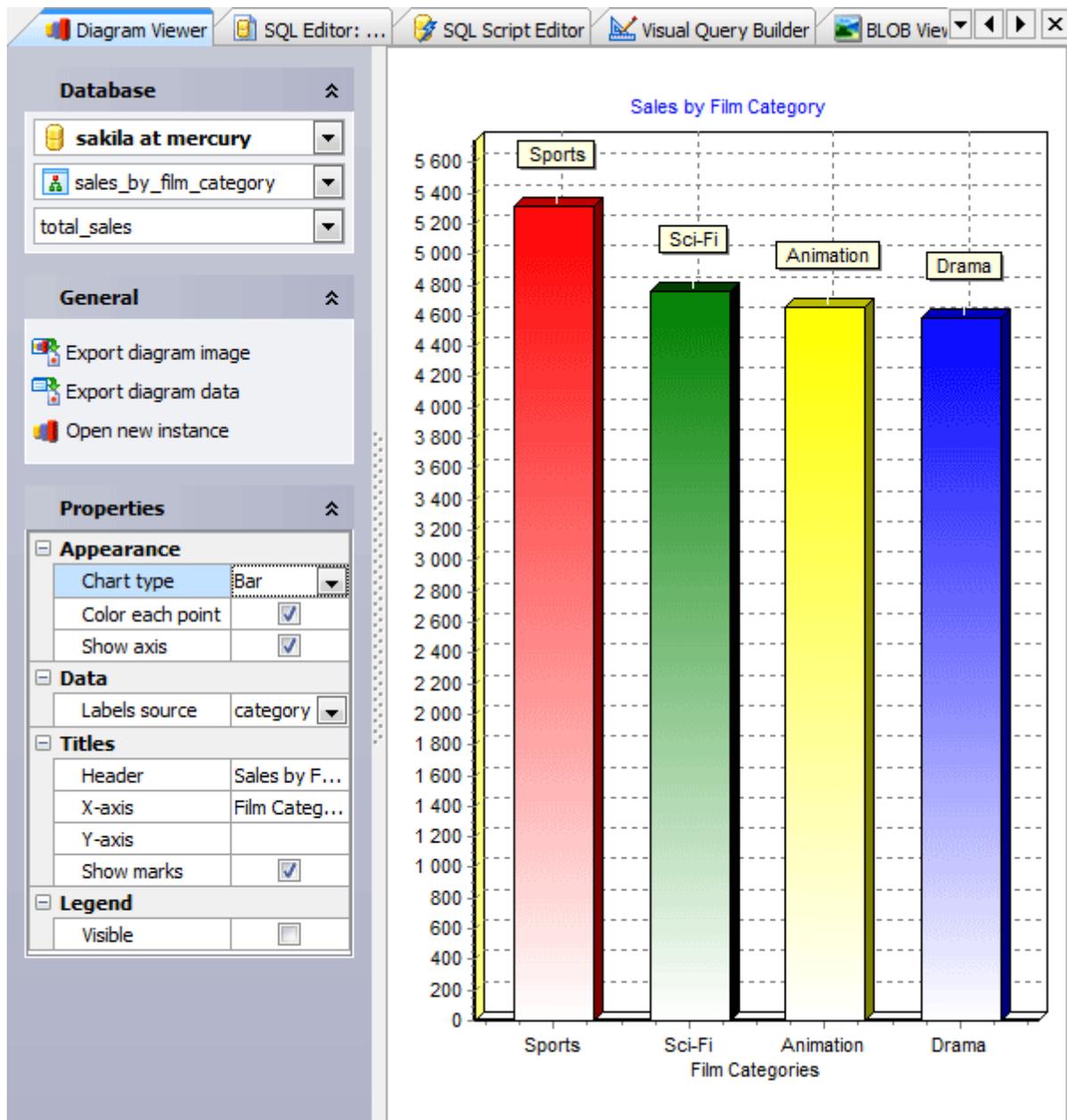
Diagram Viewer is a tool for representing data from a table or a query as a diagram in various ways. This means you can build a diagram represented as bars, lines, areas, points or pies, colored or not, with axis visible or not; specify axis labels source, diagram header and more. The Diagram Viewer also has the [Export diagram image](#)<sup>[218]</sup> and the [Export diagram data](#) features implemented, with a lot of formats supported.

- [Customizing diagram options](#)<sup>[218]</sup>
- [Exporting diagram as a graphical image](#)<sup>[219]</sup>



## 9.6.1 Customizing diagram properties

To build a diagram in *Diagram Viewer*, you should select the source field(s) to be represented in the diagram first. Only numeric types of fields can be used in the diagram, and each selected field corresponds to a separated diagram series. Fields are selected by checking items in the third combo box from the top in the *Database* group of the *Navigation Bar*. If the combo box is empty then either data source is not yet selected or it contains no numeric fields.



*Diagram Viewer* provides a special control for customizing the diagram properties. This control is located in the Properties group of the *Navigation Bar* and consists of four separate subgroups:

### Appearance

Contains properties responsible for major diagram appearance:

- **Chart type** - defines a way of how the diagram will be represented: as bars, lines, areas, points, pies, or fast lines
- **Color each points** - if checked, each bar, point, line or sector of the diagram has an individual color; if not checked, all the points are colored red
- **Show axis** - defines if the diagram has the axis and background grid or not

### Data

Contains the **Labels source** property which allows you to specify the field for X-axis labels as well as for diagram pointmarks .

### Titles

Contains properties for defining titles for different parts of the diagram:

- **Header** - defines the title appeared on the top of the diagram
- **X-axis** and **Y-axis** - define the titles for diagram axis
- **Show marks** - defines if the diagram point marks are visible or not

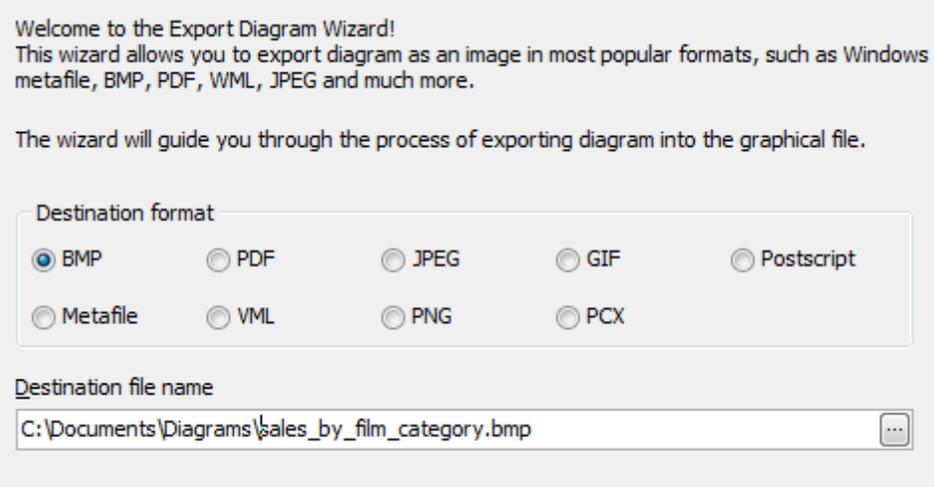
### Legend

The only **Visible** property of this subgroup specifies whether the legend rectangle should be represented on the right side of the diagram or not.

## 9.6.2 Exporting diagram image

**Diagram Viewer** provides an ability to export current diagram to a file as graphical image. This ability is constituted in **Export Diagram Wizard** which can be invoked by the **Export diagram image** item of the **Navigation Bar**.

Select the desired graphical format in the **Destination format** radio group and specify the file name in the **Destination file name** box.



Welcome to the Export Diagram Wizard!  
This wizard allows you to export diagram as an image in most popular formats, such as Windows metafile, BMP, PDF, WML, JPEG and much more.  
The wizard will guide you through the process of exporting diagram into the graphical file.

Destination format

BMP     PDF     JPEG     GIF     Postscript  
 Metafile     VML     PNG     PCX

Destination file name

C:\Documents\Diagrams\sales\_by\_film\_category.bmp

Set the destination width and height by the corresponding spin edits. Check or uncheck the **Keep aspect ratio** option to keep the image ratio for exported image or not. Check the **Open exported image in associated program** option to view the image after the export is done.

Image size

Width  Height

Keep aspect ratio

Open exported diagram in associated program

Click "Ready" to export the diagram.

## 9.7 Data Analysis

**Data Analysis** is a tool to define a multidimensional model with analytic calculations to analyze information also called OLAP cube. Such cubes could effectively be re-oriented. So the tool allows you to view data in various ways, such as displaying all the cities down the page and all the products across a page and then immediately view it in another way. Because this re-orientation involves re-summarizing very large amounts of data, this new view of the data has to be generated efficiently to avoid wasting the analyst's time, i.e. within seconds, rather than the hours a relational database and conventional report-writer might have taken. It allows you to focus on business rules rather than creating dozens and dozens of reports. To run Data Analysis, choose [Tools | Data Analysis](#) main menu item.

To get an OLAP cube:

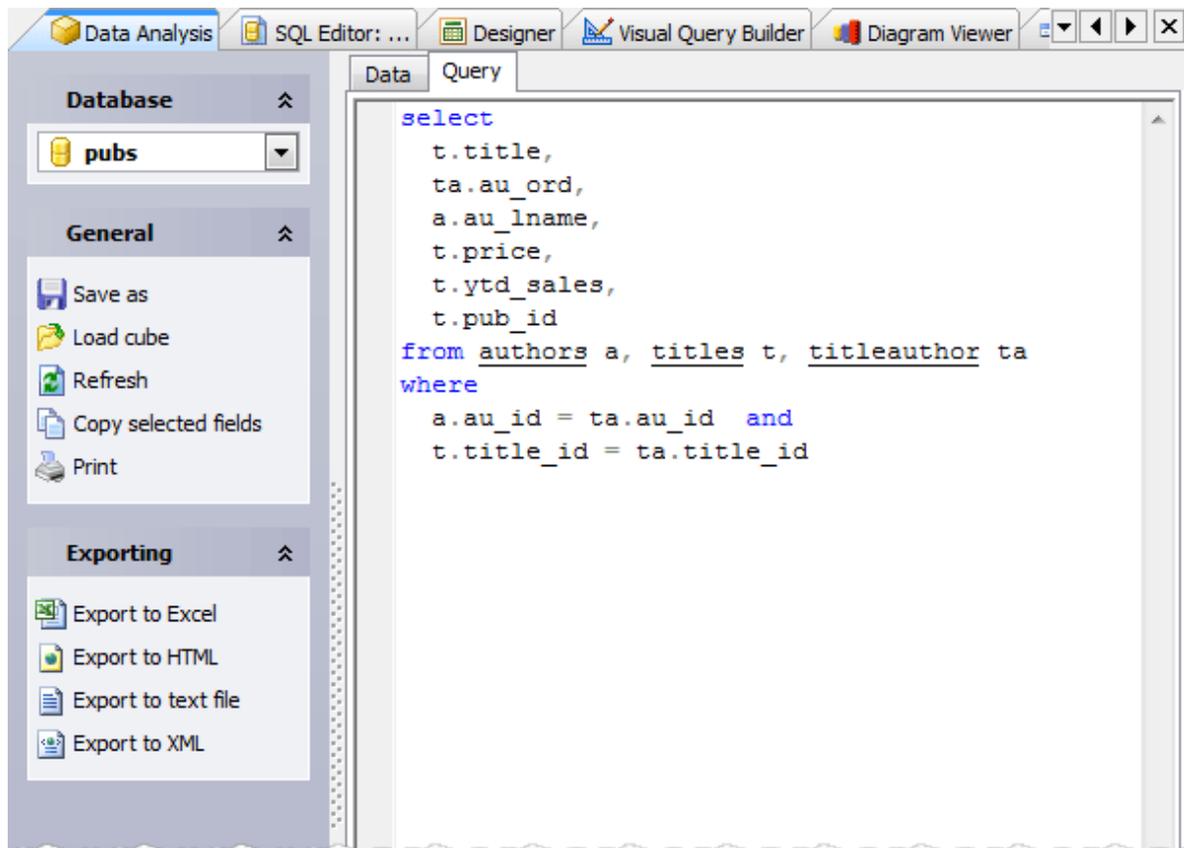
- [Input SELECT query](#)<sup>222</sup> in the [Query](#) window or load it from the .cub file.
- [Manage report data](#)<sup>223</sup> in the [Data](#) window.

The Data Analysis tool allows you to save the created OLAP cube to .cub file, print it, or export it to Excel, HTML, XML, and text file.

au		pub id			
au Iname	title	0736	0877	1389	Grand Total
<input type="checkbox"/> Bennet	The Busv Executive's Database Guide			19,99	19,99
<input type="checkbox"/> Blotchet-Halls	Fiftv Years in Buckingham Palace Kitchens		11,95		11,95
<input type="checkbox"/> Carson	But Is It User Friendly?			22,95	22,95
<input type="checkbox"/> DeFrance	The Gourmet Microwave		2,99		2,99
<input type="checkbox"/> Dull	Secrets of Silicon Valle			20,00	20,00
<input type="checkbox"/> Green	The Busv Executive's Database Guide			19,99	19,99
	You Can Combat Computer Stress!	2,99			2,99
Green Total		2,99		19,99	22,98
<input type="checkbox"/> Grindlesbv	Sushi. Anvone?		14,99		14,99
<input type="checkbox"/> Hunter	Secrets of Silicon Valle			20,00	20,00
<input type="checkbox"/> Karsen	Computer Phobic AND Non-Phobic Individuals: Beh		21,59		21,59
<input type="checkbox"/> Lockslev	Emotional Security: A New Alorithm	7,99			7,99
	Net Etiquette				
Lockslev Total		7,99			7,99
<input type="checkbox"/> MacFeather	Computer Phobic AND Non-Phobic Individuals: Beh		21,59		21,59
	Cooking with Computers: Surreptitious Balance Sh			11,95	11,95
MacFeather Total			21,59	11,95	33,54
<input type="checkbox"/> O'Leary	Cooking with Computers: Surreptitious Balance Sh			11,95	11,95
	Sushi. Anvone?		14,99		14,99
O'Leary Total			14,99	11,95	26,94
<input type="checkbox"/> Pantelev	Onions. Leeks. and Garlic: Cooking Secrets of the		20,95		20,95
<input type="checkbox"/> Ringer	Is Anger the Enemy?	21,90			21,90
	Life Without Fear	7,00			7,00
	The Gourmet Microwave		2,99		2,99
Ringer Total		28,90	2,99		31,89
<input type="checkbox"/> Straight	Straight Talk About Computers			19,99	19,99
<input type="checkbox"/> White	Prolonod Data Deprivation: Four Case Studies	19,99			19,99
<input type="checkbox"/> Yokomoto	Sushi. Anvone?		14,99		14,99
<input type="checkbox"/> del Castillo	Silicon Valle Gastronomic Treats		19,99		19,99
Grand Total		59,87	147,02	146,82	353,71

### 9.7.1 Input SELECT query

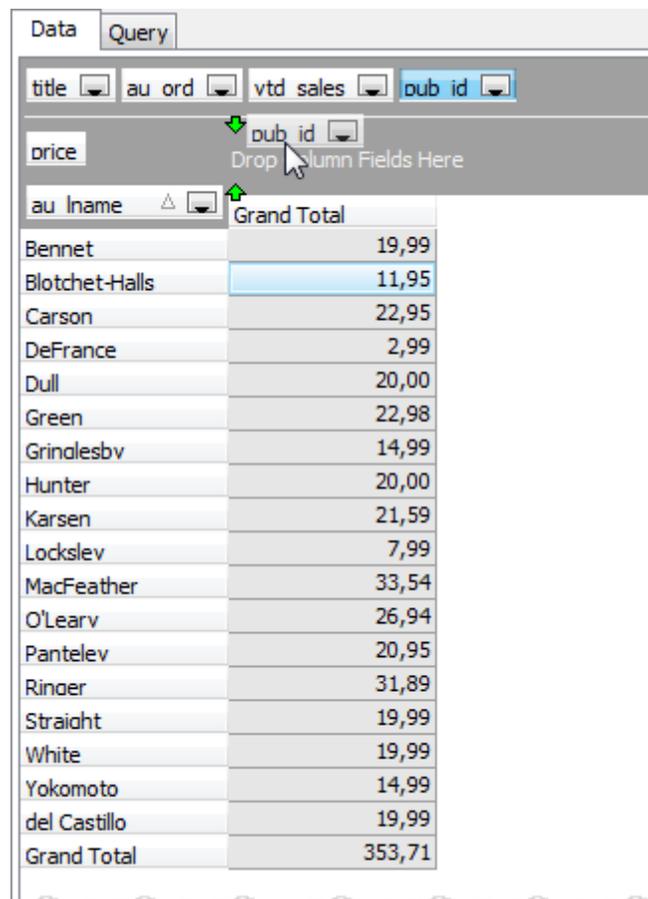
To get an [OLAP cube](#)<sup>[223]</sup>, enter SELECT query as a snowflake schema, represented by centralized fact tables (with numeric data) which are connected to multiple dimensions (the numeric data to be categorized by). Input the query text in the SQL Editor area directly or use "drag-n-drop" operation SQL Editor or Visual Query Builder areas and the Query tab of Data Analysis.



## 9.7.2 Managing report data

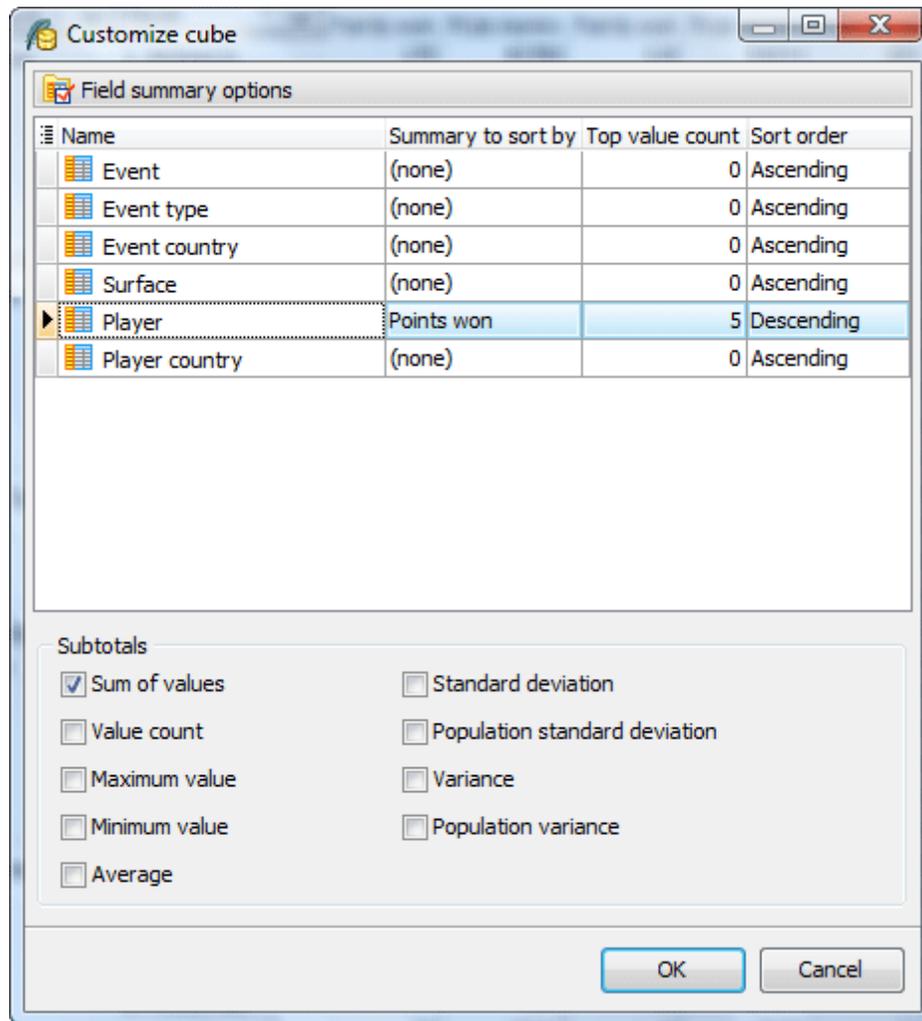
The [Data](#) tab allows you to manipulate the created OLAP cube appearance. At the beginning all the [query](#)<sup>[22]</sup> columns are arranged at the top of the tab. Put them according to your business rules: drag numeric columns to be filtered and summarized corresponding to the chosen columns and rows to the [Data Fields](#) area; place necessary columns to [Column Fields](#) / [Row Fields](#) areas respectively.

**Note:** Use for the Data Fields area only numerical columns.



au lname	Grand Total
Bennet	19,99
Blotchet-Halls	11,95
Carson	22,95
DeFrance	2,99
Dull	20,00
Green	22,98
Grindlesbv	14,99
Hunter	20,00
Karsen	21,59
Lockslev	7,99
MacFeather	33,54
O'Learv	26,94
Pantelev	20,95
Ringer	31,89
Straight	19,99
White	19,99
Yokomoto	14,99
del Castillo	19,99
Grand Total	353,71

To set the aggregates calculated on the numeric columns, use the [Customize cub](#) window opened with the corresponding link at the Navigation bar. The window provides you also with an ability to specify columns the summary to be sorted by, the sort order and the max number of records represented in grid.



## 9.8 Report Designer

**Report Designer** allows you to create database reports, define reports appearance in your own style, equip it with master-detail data views, aggregate functions, and images and control the result with the ability of simultaneous previewing. To run Report Designer, choose [Tools | Report Designer](#) main menu item.

To create a report, you need to:

- [specify data sources](#)<sup>[228]</sup> for the data to be used in the report;
- [add all necessary objects](#)<sup>[228]</sup> to the report template;
- set the objects' format within the [Inspector window](#)<sup>[230]</sup>.

The prepared report pages are available immediately at the [Preview](#) window where you can browse it, save to it an .smr file, or print.

### Report Designer in Action

The screenshot shows the Report Designer application with a report titled "Weekly Report on Rental" for "Sakila comp. 2012" dated "04.28.2012". A note states "Payments with amounts less than \$3 are highlighted in red." The design includes a header with a film reel icon, a table for staff details, and a payment table. A context menu is open over the "Page Footer" option, listing various report elements like Report Title, Report Summary, Page Header, Header, Footer, Master Data, Detail Data, Subdetail Data, and various data levels.

### Report Preview

The preview window displays the final report layout. It features a header with a film reel icon, the title "Weekly Report on Rental", the company name "Sakila comp. 2012", the date "Date: 04.28.2012", and a note: "Payments with amounts less than \$3 are highlighted in red." Below the header is a table for staff details and a payment table. The payment table shows dates and amounts, with amounts less than \$3 (2.99 and 0.99) highlighted in red.

First name	Last name	E-mail
Mike	Hillyer	Mike.Hillyer@sakilastaff.com

Payment	
Date	Amount
04.26.2012	2.99
04.27.2012	0.99
04.23.2012	5.99
04.26.2012	4.99
04.23.2012	4.99
04.24.2012	3.99
04.23.2012	5.99
04.28.2012	4.99

## 9.8.1 Designer Tools and Objects

A blank report is presented as a paper page. At any place on the page, a user is able to add objects, which can display different information (such as text and/or graphics), as well as to define report's appearance. There is a possibility to use rulers and a grid with a specified size in the Design tab. To enable/disable these options, follow the [Configure](#) link at the [Navigation Bar](#) and check the corresponding boxes.

### Datasources

To use content of a table (view) column data in a report,

- check the necessary database is selected as Database at the Navigation Bar;
- drag the table which data to be used in the report to the Datasources pane at the Navigation Bar;
- drag the necessary column from this pane and drop it to the necessary location on a report page.

### Designer tools:

#### Select tool

The standard tool to select objects, modify their sizes, etc.

#### Hand tool

The tool allows dragging a report page.

#### Zoom tool

When the button is pressed, clicking on the left button doubles the zoom (adds 100%), while clicking the right one zooms out by 100%. When holding the left mouse button while dragging, the selected area would be zoomed.

#### Edit text tool

Clicking on the text object allows editing its contents right on the report page. If you hold the left mouse button when moving the cursor, the text object appears in the selected place, and then its editor launches.

#### Copy format tool

The button becomes enabled when the text object is selected. When clicking on the text object with the left button, it copies formatting, which has the previously selected text object, into the object.

### Available objects:

**Band objects** allow to specify where, when, and how to display data and information in reports. Bands are used for logically placing the objects it contains at a location on the output page. Insert Band adds an area with definite behaviour according to its type such basic bands as Header, Footer, Title, and Summary, and databands whose allow to print data from database tables such as Master Data, Detail Data, etc.

**Text object** displays one or several text lines within the rectangular area.

**Picture object** displays a graphic file in BMP, JPEG, ICO, WMF, or EMF format.

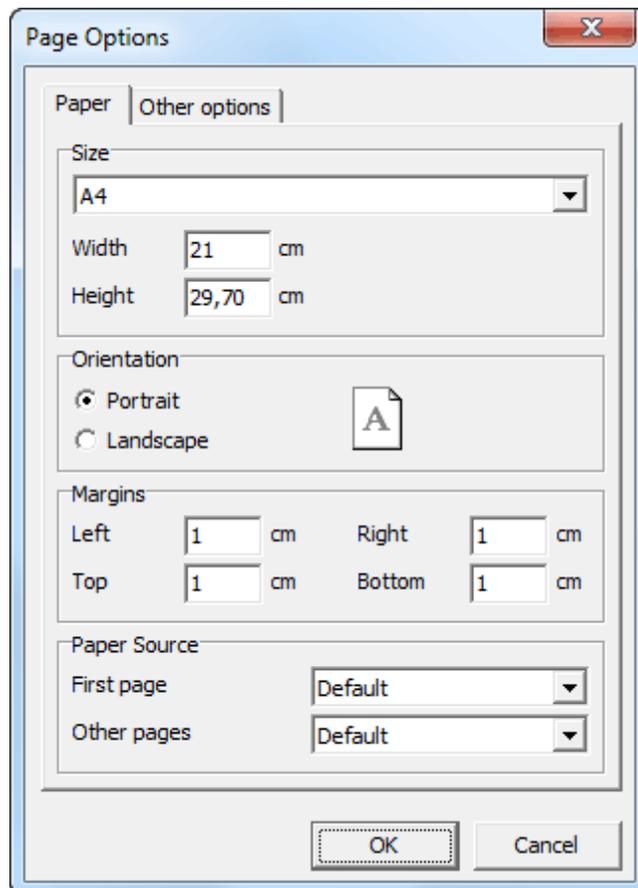
**Subreport object** allows inserting an additional report design page inside the basic one.

**System text** displays service information (date, time, page number, etc), as well as aggregate values.

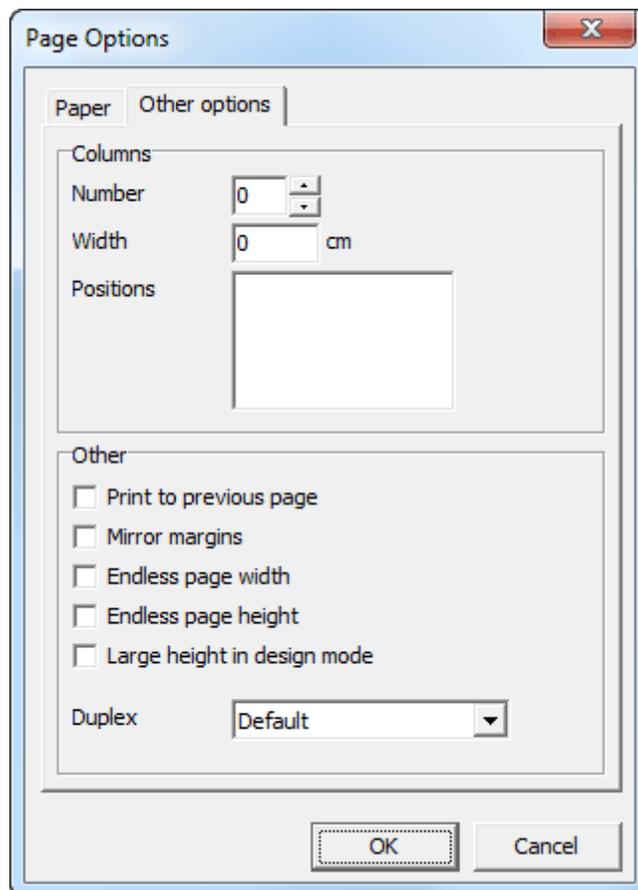
[Draw object](#) represents different geometrical figures (diagonal line, rectangle, rounded rectangle, ellipse, triangle, and diamond).

### Page options

This dialogue allows you to set the page settings of the prepared. To invoke the window, use the [Edit...](#) link of the page blank space popup menu. The dialogue has two pages: [Paper](#) and [Other options](#). On the [Paper](#) page, you can select size and alignment of paper, as well as set margins. In [Paper source](#) drop-down lists you can select a printer tray for the first page and the rest of the report pages.



On [Other Options](#) you can set the number of columns for multi-column reports' printing. The current settings are displayed in the designer.



The [Print to previous page](#) flag allows you to print pages, beginning from blank space of the previous page. This option can be used in case when a report template consists of several pages or when printing batch (composite) reports.

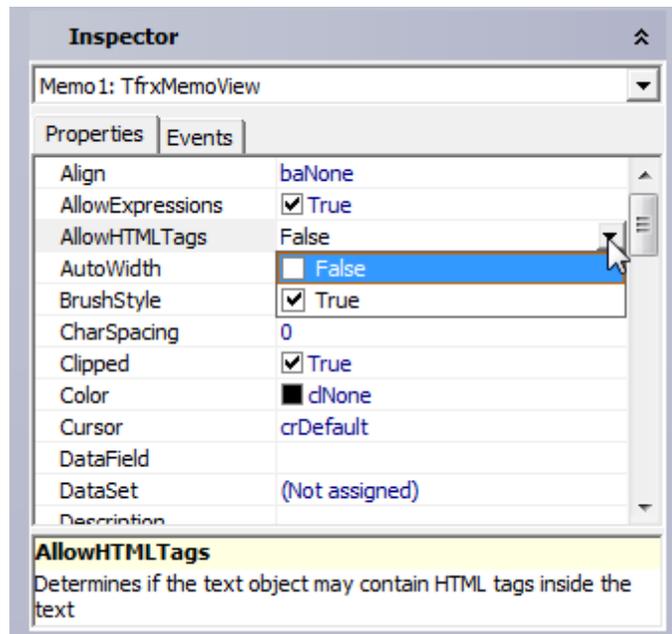
The [Mirror margins](#) option switches right and left margins of page for even pages during previewing or printing a report.

The [Endless page width & height](#) option increases page's sizes depending on number of data records on the page (when running a report). In this case you will see one big page in the preview window instead of several standard size pages.

The [Large height in design mode](#) option increases page's height several times more. This feature can be useful if many bands are located in the page, and must be used when working with the overlay band. This only effects the page height in design mode.

## 9.8.2 Object Inspector

[Object Inspector](#) pane allows you to specify the appearance of each report object in detail. To setup object properties, select it at the Design area or select it from the popup menu at the top of the pane. Now all the properties of the object are available for editing. The most of properties are provided by a set of available values. The description of the selected option is displayed at the bottom of the pane.



Below you can find a brief description of several options.

**Align** - set here the align option of the object according to the list.

**AllowExpressions** - enables the ability to display not only a static text, but expressions as well.

**AllowHTMLTags** - Enables using some simple HTML tags inside the text of an object. This option is disabled by default. Here is the list of supported tags:

<b> - bold text;

<i> - text in italic;

<u> - underlined text;

<sub> - subscript;

<sup> - superscript;

<font color> - font color;

<nowrap> - text which does not get broken up when using **WordWrap**, but gets transported wholly.

**Font:** there are abilities to specify the charset, font color, font name, and font size, and also set the bold, italic, underline, strike out attributes.

**Frame:** You can set as the color, the style and the shadow for all the frame, as well as for each frame line.

**BrushStyle** - type of object filling.

**CharSpacing** - space between symbols in pixels.

**GapX, GapY** - text indents from object's left and top boundaries (in pixels).

**LineSpacing** - space between lines (in pixels).

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**ParagraphGap** – the first paragraph line indent (in pixels).

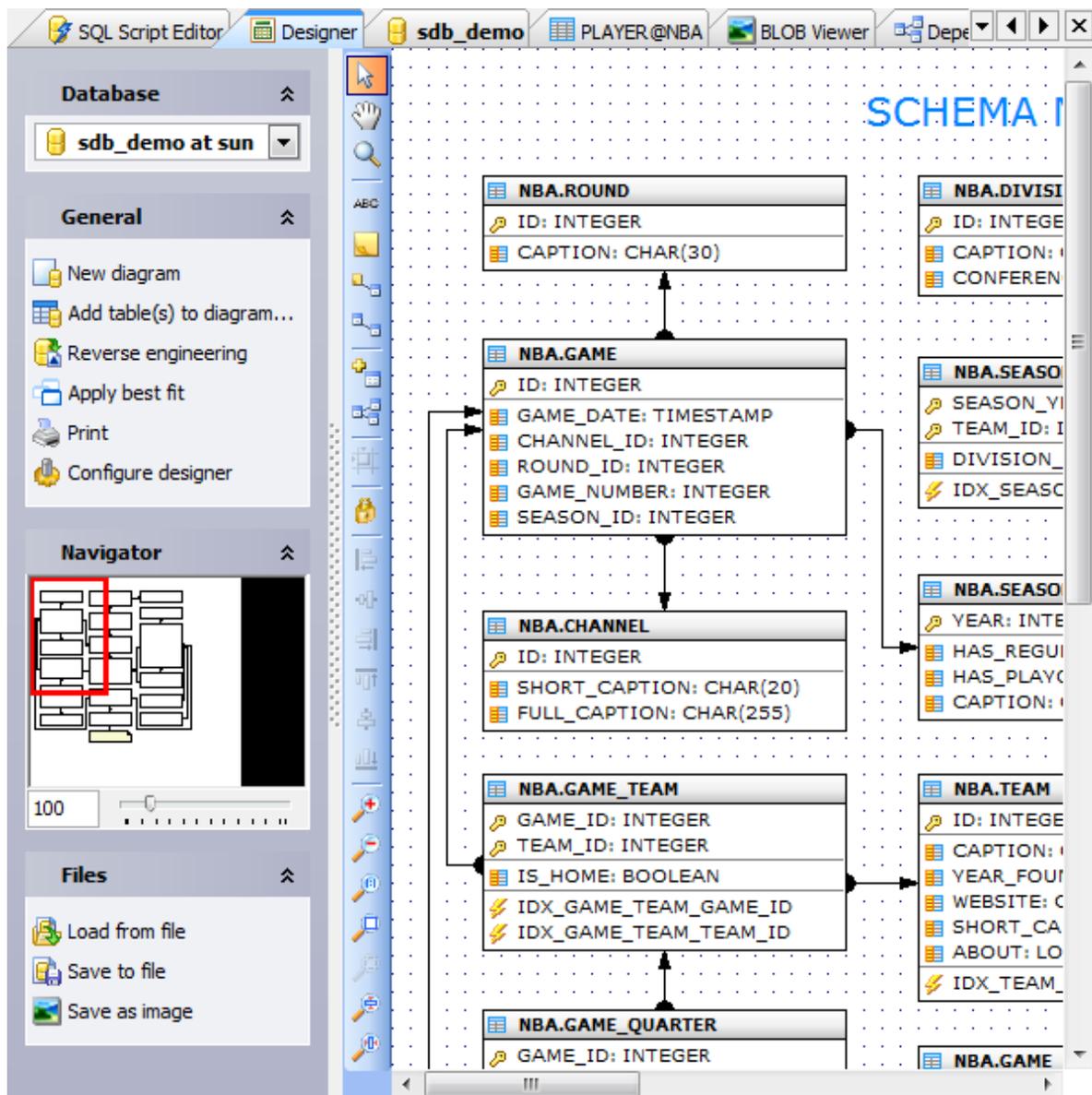
**Rotation** - specify the angle of the text rotation in the field.

**WordWrap** - if it is disabled, the long lines will be simply cut off.

## 9.9 Schema Designer

Schema Designer allows you to create physical Entity Relationship Diagram that will represent objects in your Firebird database. A diagram represents the tables of your database and the relationships between them. The tool is intended for reverse engineering and database modification in an easy and powerful way. It helps you to simplify database maintenance.

A diagram of your database can help you define operational aspects of your application logic that you might otherwise overlook. Also, a well-defined data diagram that accurately represents your tasks can be helpful in orienting employees to goals and operations. The data diagram can also serve as an invaluable communications tool for both internal and external constituents.



Below you can find answers for the following questions:

- [How can I add a table to a diagram?](#)<sup>[234]</sup>
- [How can I add a relationship between tables?](#)<sup>[234]</sup>
- [How can I delete a diagram object?](#)<sup>[234]</sup>
- [How can I work with diagram objects?](#)<sup>[235]</sup>

**See also:** [Designer Navigation bar](#)<sup>[235]</sup>, [Schema Designer Toolbox](#)<sup>[235]</sup>.

### Adding a table

You can add an existing Firebird table to the diagram using popup menu in the working area, or with the corresponding link on the [Navigation bar](#)<sup>[235]</sup>.

To create a new table, use the appropriate item of the popup menu in the working area. The table will be created in the current database.

Tables also may be dragged on the diagram from [Explorer](#) and the similar to [Explorer](#) tools like [Object Manager](#) and [Object Browser](#).

Moreover, [Designer](#) provides you with a possibility to represent all the tables and relationships existing in the database automatically (the [Reverse engineering](#) link of the [Navigation bar](#)). At that the database contents will be represented on a diagram in the most compact and vivid manner.

All the diagram objects are available for editing. Just double click the object (table or relationship) to view/edit its properties within the corresponding editor.

### Adding a relationship between tables

At adding to a diagram tables that reference on each other, the relationships between tables are represented automatically. The [Schema Designer](#) tool also allows you to add new foreign keys to the diagram tables. Thereto you can do the following.

Select a table (child table)

- Use the [Create new...](#) item of the popup menu to launch [Foreign Key Properties](#)<sup>[81]</sup> window.
- Specify there properties of the relationship been created.

Moreover you can add a reference graphically:

- Choose the [Create relation](#) tool on the [Toolbox](#)<sup>[235]</sup>. Your mouse cursor will change its appearance.
- Then click on the table (child table) that will have foreign key and then click on the second table (parent table) whose primary key will be referred by the new foreign key.
- Specify properties of the relationship been created in the [Foreign Key Properties](#)<sup>[81]</sup> window.

With the [Create new...](#) item of the popup menu you can also add a new field, an index, a trigger, etc. to the selected table. For more information about object properties see: [Field Editor](#)<sup>[72]</sup>, [Index Editor](#)<sup>[78]</sup>, [Create Trigger Wizard](#)<sup>[87]</sup>.

### Deleting of the diagram objects

To hide a table (several tables) or a relationship between tables, select the objects and click [Remove selection](#) link of the popup menu or [Navigation bar](#). You can also use the **Del**

key for this purpose.

It's also possible to physically delete a table/foreign key from the database: just select the object to delete and use the appropriate item of the popup menu.

### **Editing of a diagram appearance**

Movement of a table/several tables along the diagram is realized with dragging or pressing **Ctrl**+arrows. You can use **Shift**+arrows to change width/height of table/several tables representation.

[Designer](#) also allows you to edit shape of the line representing foreign key relations/logical relations. In order to break the line you should

- Select the relationship.
- Press **Ctrl** and click on the necessary line section to create a new node.
- Position the node by dragging.

You can also delete a node on the line. Thereto

- Select the relationship.
- Press **Alt** and click the node to delete. In that case the near nodes will be united by a straight line.

## **9.9.1 Designer Navigation Bar**

The [Navigation Bar](#) of [Schema Designer](#) provides you the following opportunities:

Use the [Database](#) drop-down list to move around your Firebird databases.

There are also links for adding a [New diagram](#) or an existing [table to diagram](#) quickly.

### [Reverse engineering](#)

The link provides you to create a new diagram with all the database tables and

### [Apply best fit](#)

Use the link to dispose tables on the diagram in the most clear manner.

### [Remove selection](#)

The link cancels current object selection.

Use [Print](#) to see the print preview of the diagram.

Certainly, it's possible to customize [Schema Designer](#) with [Configure designer](#). For more information see [Schema Designer Customization](#)<sup>[273]</sup>.

The [Navigator](#) part allows you to adjust the scale of the diagram and the position of the visible part.

Besides the [Navigation bar](#) allows you to [Load a diagram from file](#), [Save to file](#), and [Save as image](#) (Bitmap, GIF and JPEG formats are supported).

## **9.9.2 Schema Designer Toolbox**

The toolbox is located on the left side of the [Schema Designer's](#) working area.



### Move

The tool is intended for selection of diagram objects. Use the tool then click anywhere inside of the object. Double click opens the corresponding [Object Editor](#).

To select multiple objects, use the tool then click and drag a selection rubber-band so that the rubber-band box encompasses the objects you want to select, and then release the mouse button.

To add objects to the list of already selected objects again, use the Move tool then click anywhere inside of the object holding the **Shift** button. To quick launch of the tool, use **M** shortcut.



Use [Create text box](#) to add [title and comments](#) on your diagram. Click on the necessary place and double-click on the appeared box to enter a text. You can also tune up the text font, color and size with [Text options](#) of the box popup menu. To quick launch of the tool, use **XX** shortcut.



Moreover you can add notes and also links between them and diagram elements using



[Create note](#) and [Create link to note](#) links. To quick launch of the tools, use **N** and **L** shortcuts accordingly.



### Lock

The tool to locking/unlocking diagram objects. This feature prevents your diagram from unforeseen changes: when the diagram is locked, you can neither move/resize/delete existing objects nor add new ones.



[Hand](#) tool moves a diagram within its window. To quick launch of the tool, use **H** shortcut.



[Zoom](#) magnifies and reduces the view of a diagram. To zoom out, hold the Alt key. To quick launch of the tool, use **Z** shortcut.

There are also tools allowing to  [Create table](#) and  [Create relation](#) directly from the [Designer](#). To quick launch of the tool, use **T** and **R** shortcut.

Below you can find toolset for aligning the selected objects by left and right edges, by horizontal and vertical centers, tops and bottoms.

Click the [Zoom in](#) button in the options bar to magnify to the next preset percentage.

When the image has reached its maximum magnification level, the command is dimmed.

Click the [Zoom out](#) button in the options bar to reduce to the previous preset percentage. When the image has reached its maximum reduction level, the command is dimmed.

Click the [Zoom 1:1](#) button to display a diagram at 100%.

Pay attention to the [Fit diagram](#) function, that pick-up properly scaling factor to display your diagram fully. For your convenience the [Fit selected](#), [Fit height](#), and [Fit width](#) were added.

## 9.10 Transaction Browser

**Transaction Browser** is very useful tool for DBAs who want to monitor the users' activity (in fact, there are potentially thousands of transactions in a database at any one time). You can view details for each session (such as connect time, database name, client host, last SQL statement executed and more) as well as group and filter transactions.

To access the [Transaction Browser](#) window, select the corresponding item from the [Tools](#) menu.

**Note:** [Transaction Browser](#) is available only for Firebird 2.1 and higher.

Transactions [Maximize](#)

Drag a column header here to group by that column

ID	Terminal	User	Database	Logon time
1 3091	192.168.0.5	SYSDBA	C:\FIREBIRD\DATA\EMPLOYEE2.FDB	16.03.2010 13:40:23
2 3093	192.168.0.5	SYSDBA	C:\FIREBIRD\DATA\EMPLOYEE2.FDB	16.03.2010 13:40:24
3 3095	192.168.0.5	SYSDBA	C:\FIREBIRD\DATA\EMPLOYEE2.FDB	16.03.2010 13:40:25
4 3097	192.168.0.5	ADMIN	C:\FIREBIRD\DATA\EMPLOYEE2.FDB	16.03.2010 13:44:04
5 3099	192.168.0.4	SYSDBA	C:\FIREBIRD\DATA\EMPLOYEE2.FDB	16.03.2010 13:46:08
6 3101	192.168.0.5	SYSDBA	C:\FIREBIRD\DATA\EMPLOYEE2.FDB	16.03.2010 13:47:28

6

---

Properties [Hide](#)

**Common**

Name	3095 192.168.0.5@SYSDBA
ID	3095

**User transaction**

ID	3095
Login	SYSDBA
Connect time	16.03.2010 13:40:25
Database name	C:\FIREBIRD\DATA\EMPLOYEE2.FDB
Auto undo	<input checked="" type="checkbox"/>
Auto commit	<input type="checkbox"/>

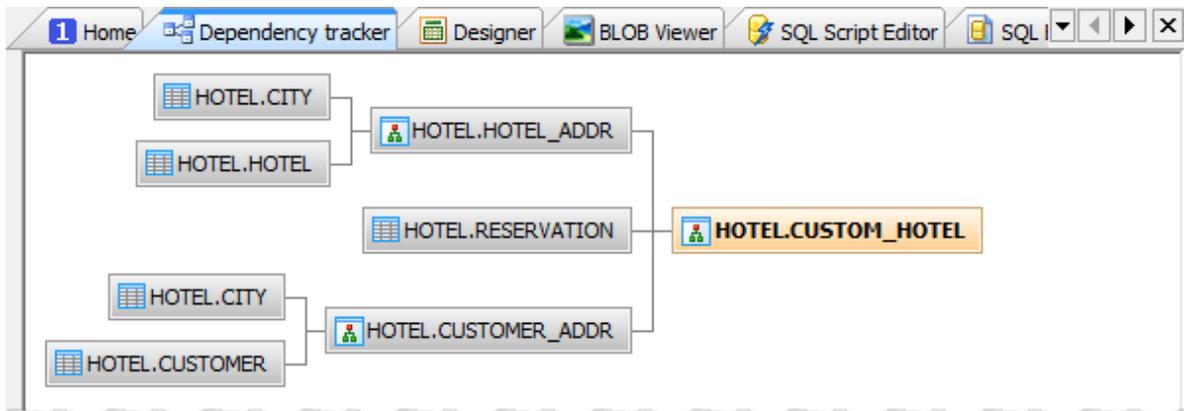
Transaction Last SQL

## 9.11 Dependency tracker

**Dependency tracker** is a tool to browse all-level dependencies of a schema object (table, view, function, etc). To display dependencies of an object, drag and drop it from the Explorer tree (or Object Manager, Object Browser) to the tracker's working area.

This tool allows you to see the way any database object is involved in the net of scheme dependencies. The selected object is displayed in a highlighted rectangle in the center of the working area. The right side of this area represents objects depending on the selected one. The left side represents objects on which the selected object depends.

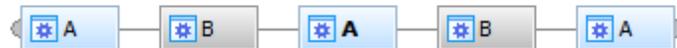
To highlight all occurrences of an object in the diagram, click the appropriate rectangle. Double click an object to change the tracker focus to this object. Right click a rectangle to display a popup menu with common operations related to the appropriate object.



The recursive dependencies are marked with a semicircle. This means marked object depends on itself directly or via other objects.

### Example

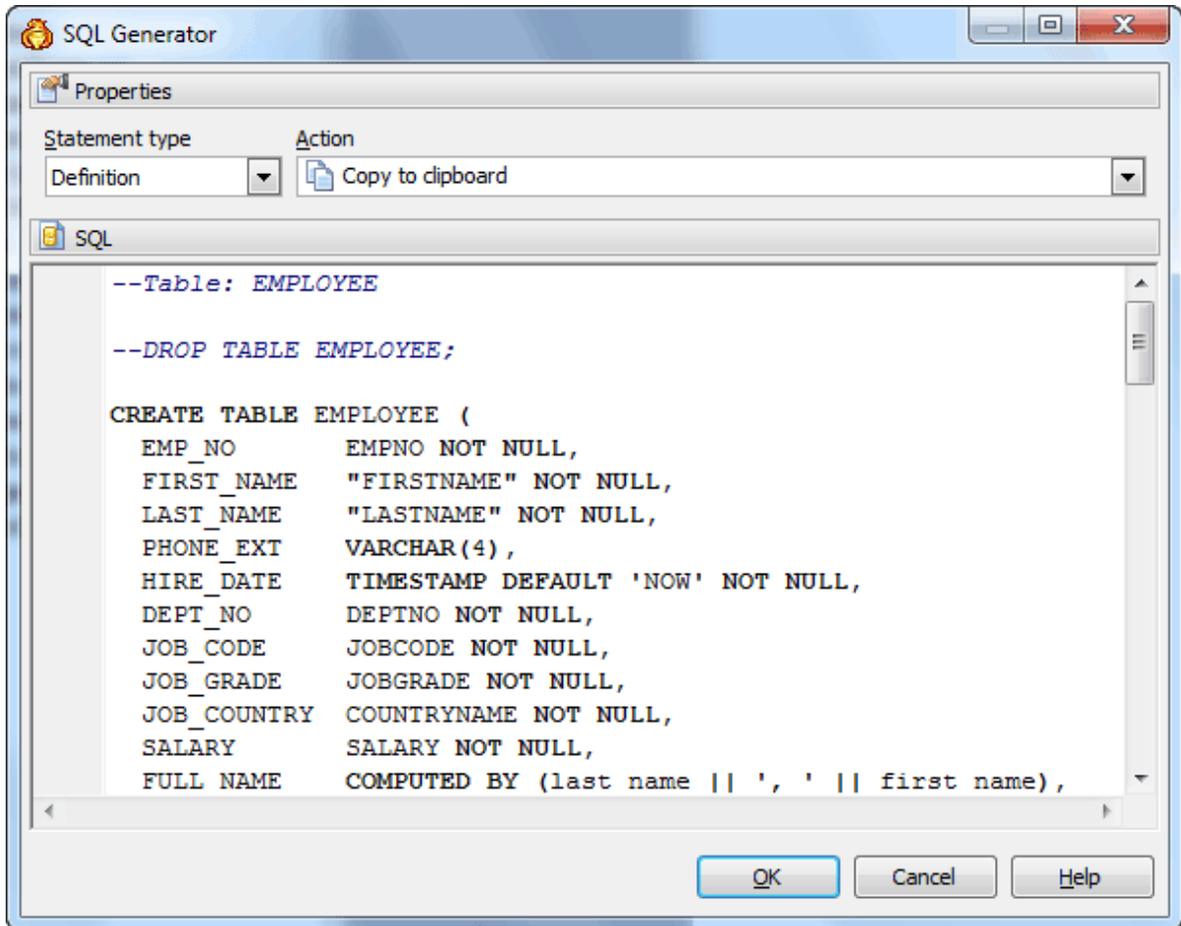
Suppose we have two procedures A and B calling each other. The tracker displays these dependencies in the following way:



## 9.12 SQL Generator

Among other features Firebird Maestro provides you with SQL Generator, a tool to create simple SQL statements. Just choose a database object, select statement type (Definition, Select, Insert, Update, or Delete) and the destination device (Clipboard, File, SQL Editor, SQL Script Editor).

The SQL Generator window can be invoked from the Explorer tree.



## 9.13 DML procedures generation

Firebird Maestro allows you to create DML (also known as CRUD) procedures automatically. CRUD is an acronym for the four essential database operations: Create, Read, Update, and Delete. The application designer has many choices for accomplishing the CRUD operations but the most efficient choice in terms of Firebird performance is to create a set of stored procedures to perform the operations.

### **The reasons for using DML Procedures instead of allowing ad hoc SQL statements are:**

- The best possible performance

After the first use of each stored procedure, the plan for executing the procedure is cached in the server's procedure cache. For subsequent invocations of the stored procedure, the plan is reused. This avoids the parsing and optimization steps with their overhead.

- Removing of the SQL code from the other layers of the application

By removing the SQL statements from the application code, all the SQL can be kept in the database.

- Preventing of SQL injection attacks

Anytime a client application uses string concatenation to create SQL statements, there is a possibility of a SQL injection attack. In short, these attacks involve clever entry of SQL in the data entry fields of an application in such a way that the SQL statements executed are different from the ones intended by the programmer. They require that the application developer is careless about not cleaning any user input to prevent the attack.

- Preventing of casual table browsing and modifications

If an application uses ad hoc SQL statements, the users of the application must have the required permissions on the database tables. Once they are given permission on the tables, they can work with them in any application that can read and manipulate the data such as Excel, Word and various report writers. Casual examination of the data and even updates that bypass the application's business rules become possible. Stored procedures have long been used to prevent casual browsing and updates. This is implemented by granting permission to execute the CRUD stored procedures to the users and revoking permission to access the tables directly.

### **To generate DML procedure,**

- select the [Object | Generate DML procedures...](#) main menu item (to create procedures for several tables) or use the corresponding popup menu item of the table's node at the Explorer tree (to create procedures for one table).
- Specify tables the procedures will be created for (in case of several tables).
- Uncheck the operations the procedures will not be created for. By default the procedures are generated for inserting, reading, updating, and deleting of table data.
- Adjust templates of procedures names.
- Select the action to perform after the generation. The created definitions can be copied to Clipboard, saved to a file, sent to SQL Script Editor or executed immediately.

Options

**Procedures to create**

Select procedure	<input checked="" type="checkbox"/>
Update procedure	<input checked="" type="checkbox"/>
Insert procedure	<input checked="" type="checkbox"/>
Delete procedure	<input checked="" type="checkbox"/>

**Naming**

Select procedure name	sp_sel_%TableName%
Update procedure name	sp_upd_%TableName%
Insert procedure name	sp_ins_%TableName%
Delete procedure name	sp_del_%TableName%
Parameter name	p_%ColumnName%

Action to perform after generation

Execute immediately

## 9.14 Generation of updatable views

To generate updatable view,

- select the **Object | Generate updatable views...** main menu item (to create views for several tables) or use the corresponding popup menu item of the table's node at the Explorer tree (to create a view for one table).
- Specify tables the views will be created for (in case of several tables).
- Specify the abilities to be available on working with the view data. By default the views are generated for inserting, updating, and deleting of table data.
- Adjust the name templates of views and corresponding triggers.
- Select the action to perform after the generation. The created definitions can be copied to Clipboard, saved to a file, sent to SQL Script Editor or executed immediately.

Abilities	
Insert	<input checked="" type="checkbox"/>
Update	<input checked="" type="checkbox"/>
Delete	<input checked="" type="checkbox"/>

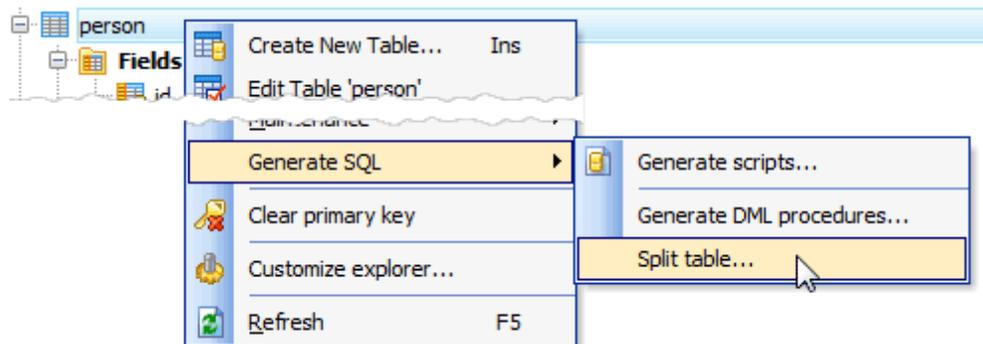
  

Naming	
View name	V_ %TableName%
Insert trigger name	TR_BI_ %TableName%
Update trigger name	TR_BU_ %TableName%
Delete trigger name	TR_BD_ %TableName%

Action to perform after generation

## 9.15 Split table

It's not an uncommon situation when new requirements arise, or when you need to enforce referential integrity on a set of columns, and the best decision is to split a table into two separate tables. Firebird Maestro provides you with [Split Table Wizard](#), a simple tool to generate a bunch of SQL scripts to modify the primary table, to create a secondary table with a primary key, and to transfer data from the primary table to the secondary one without duplicating of data. To invoke the wizard, follow the corresponding link of the [Generate SQL](#) section of popup menu of the selected table at the Explorer tree.



Let's see the wizard in action on the example of a table with the following SQL definition:

```
CREATE TABLE person (
  id          integer NOT NULL,
  city        varchar(30) NOT NULL,
  full_name   varchar(30) NOT NULL,
  /* Keys */
  CONSTRAINT person_pkey
    PRIMARY KEY (id)
);
```

The table stores sample data:

	id	city	full_name
1	1	New York	John Smith
2	2	Boston	Mary Doe
3	3	Boston	Jason Lee
4	4	New York	Deisy O'Connor

To enforce the referential integrity, we specify 'city' as secondary table:

Primary table

public

person

Secondary table

public

city

The primary table must contain now only 'id' and 'full\_name' columns. The field 'city\_id' will be added to the table automatically.

Primary table fields

Name	
1	id
2	full_name

Secondary table fields

Name	
1	city

Now we have to specify what kind of primary key to be created for the secondary table: surrogate or natural. We create create the 'city' table with a surrogate primary key.

Use surrogate primary key

Surrogate key field name

id

Use natural primary key

Secondary table key fields

Primary	Name
1	city

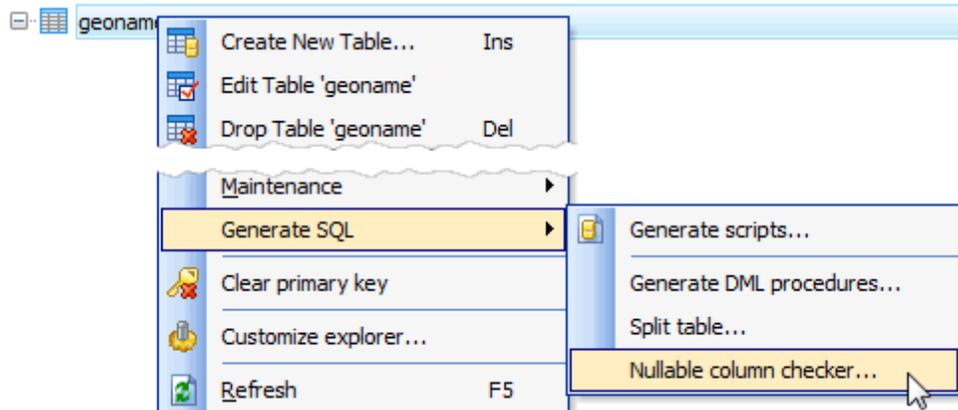
Then click Ready and get the following tables:

id	full_name	city_id
1	John Smith	2
2	Mary Doe	1
3	Jason Lee	1
4	Deisy O'Connor	2

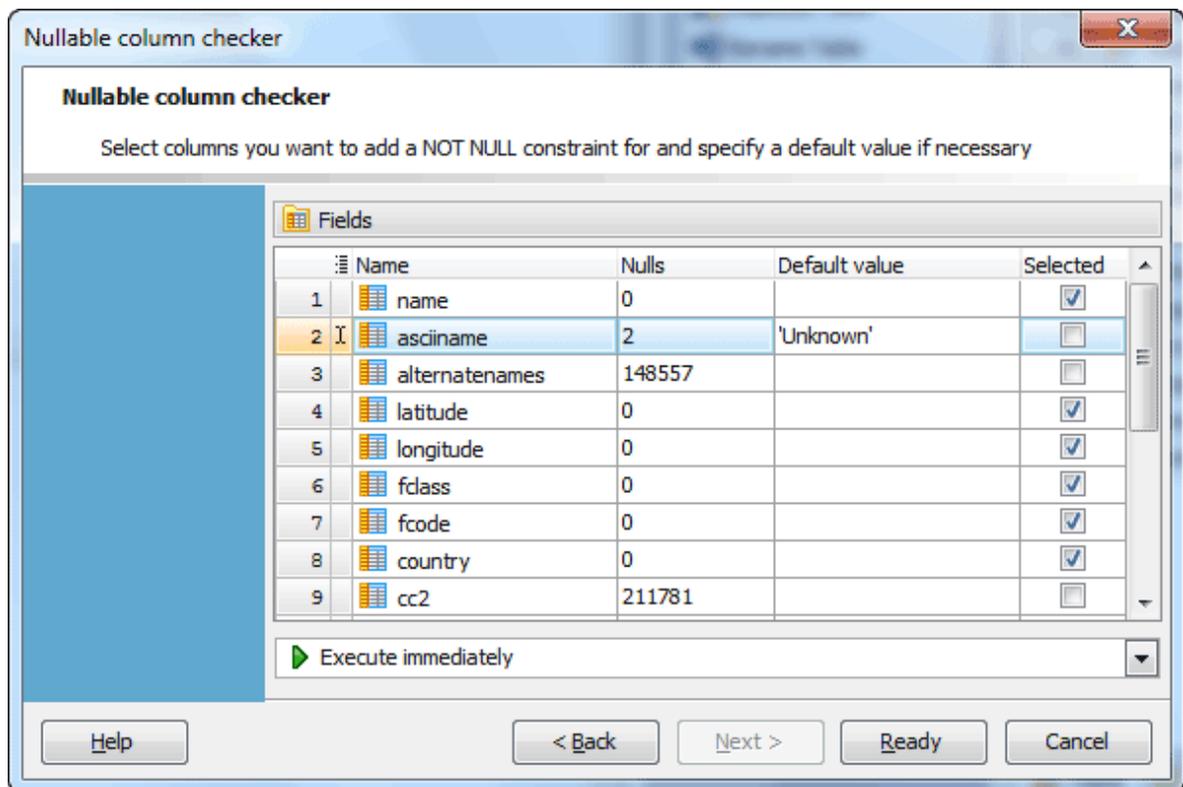
id	city
1	Boston
2	New York

## 9.16 Nullable Column Checker

**Nullable Column Checker** allows you to refactor your database schema by enforcing NOT NULL constraints to all necessary table columns. It suggests candidates for NOT NULL columns among columns of the selected table and generates SQL script to replace all NULL values of selected columns with specified default values and to add the NOT NULL constraint to these columns. To invoke the wizard, follow the corresponding link of the **Generate SQL** section of popup menu of the selected table at the Explorer tree.



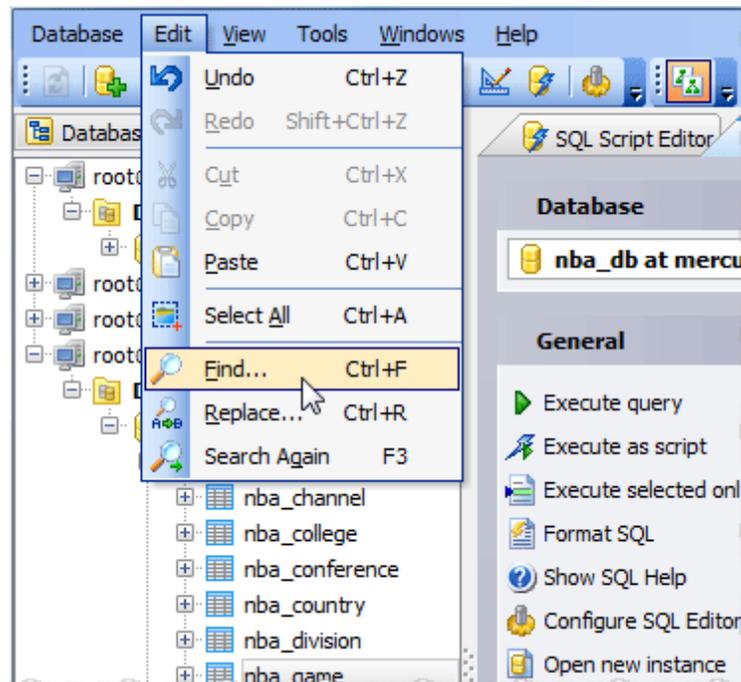
To get SQL scripts enforcing NOT NULL constraints to columns of an existing table, select the necessary columns, specify the default values to be used instead of existing columns NULLs and select the action to perform after the generation. The created scripts can be copied to Clipboard, saved to a file, sent to [SQL\\_Script\\_Editor](#)<sup>[202]</sup> or executed immediately.



## 9.17 Dialogs

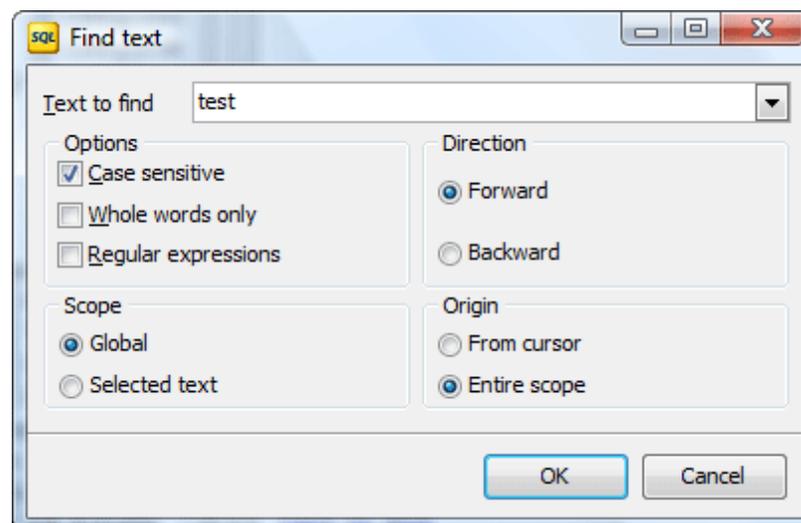
Firebird Maestro provides two dialogs for searching and replacing text in the editor areas of the database tools. Both of them are available through the popup menu of the editor area.

- [Find Text dialog](#) <sup>[249]</sup>
- [Replace Text dialog](#) <sup>[250]</sup>



### 9.17.1 Find Text dialog

The Find Text dialog is provided for quick search for certain text.



### Text to find

Enter a search string or click the down arrow next to the input box to select from a list of previously entered search strings.

**Case sensitive**

Differentiates uppercase from lowercase when performing a search.

**Whole words only**

Searches for words only. (With this option off, the search string might be found within longer words.)

**Regular expressions**

Recognizes regular expressions in the search string.

### Forward

Searches from the current position to the end of the file. **Forward** is the default.

### Backward

Searches from the current position to the beginning of the file.

### Global

Searches the entire file, in the direction specified by the **Direction** setting. Global is the default scope.

### Selected text

Searches within the selected text only, in the direction specified by the **Direction** setting. You can use the mouse or block commands to select a block of text.

### From cursor

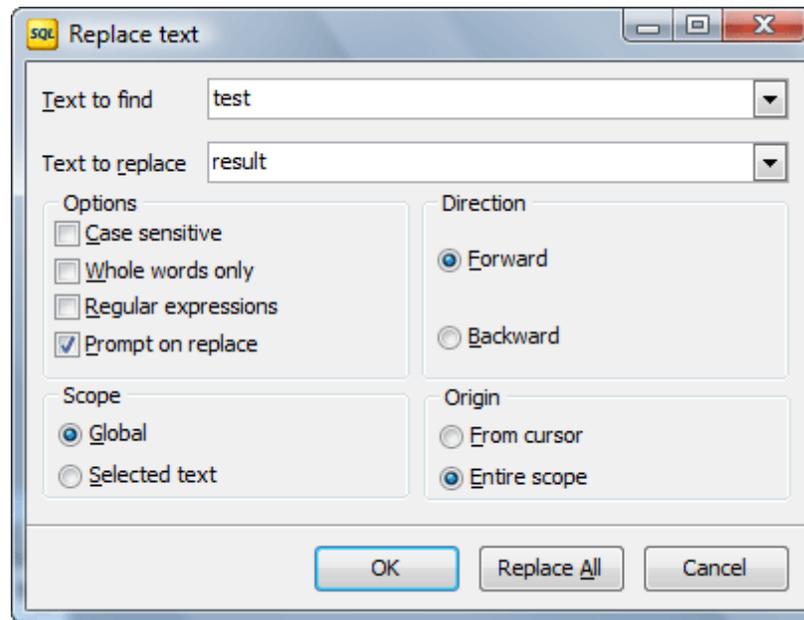
The search starts at the cursor's current position, and then proceeds either forward to the end of the scope, or backward to the beginning of the scope depending on the **Direction** setting. **From Cursor** is the default setting.

### Entire scope

The search covers either the entire block of selected text or the entire file (no matter where the cursor is), depending upon the **Scope** options.

## 9.17.2 Replace Text dialog

The **Replace Text** dialog is provided for searching and replacing text in the editor window.



#### Text to find

Enter a search string. To select from a list of previously entered search strings, click the down arrow next to the input box.

#### Text to replace

Enter the replacement string. To select from a list of previously entered search strings, click the down arrow next to the input box. To replace the text with nothing, leave this input box blank.

#### Case sensitive

Differentiates uppercase from lowercase when performing a search.

#### Whole words only

Searches for words only. (With this option off, the search string might be found within longer words.)

#### Regular expressions

Recognizes specific regular expressions in the search string.

#### Prompt on replace

Prompts you before replacing each occurrence of the search string. When Prompt on replace is off, the editor automatically replaces the search string.

#### Forward

Searches from the current cursor position, to the end of the file. **Forward** is the default Direction setting.

#### Backward

Searches from the current cursor position, to the beginning of the file.

#### Global

Searches the entire file, in the direction specified by the Direction setting. **Global** is the

default scope.

#### From cursor

The search starts at the cursor's current position, and proceeds either forward to the end of the scope, or backward to the beginning of the scope depending on the Direction setting. [From cursor](#) is the default Origin setting.

#### Entire scope

The search covers either the entire block of selected text or the entire file (no matter where the cursor is in the file), depending upon the Scope options.

#### Replace All

Click [Replace all](#) to replace every occurrence of the search string. If you check [Prompt on replace](#), the [Confirm dialog](#) box appears on each occurrence of the search string.

## 10 Server Maintenance

Firebird Maestro provides graphical wizard interface for native Firebird [server maintenance operations](#). To make your work with the server easier, Firebird Maestro also provides some graphical tools for working with the server as a whole.

The following services and server tools are available:

- [Backup Database](#)<sup>[254]</sup>
- [Restore Database](#)<sup>[256]</sup>
- [Shutdown Database](#)<sup>[258]</sup>
- [Bring Database Online](#)<sup>[259]</sup>

## 10.1 Backup Database

The backup and restore components of Firebird Server allow you to create a copy of a database. This copy (called backup) is stored in a location protected from the potential failures of the server running the instance of SQL Server. If the server running the instance of SQL Server fails, or if the database is somehow damaged, the backup copy can be used to recreate, or [restore the database](#)<sup>[256]</sup>. Note, implementing a well-planned backup and restore strategy protects databases against data loss due to damage caused by a variety of failures.

To run [Backup Database Wizard](#), select the [Maintenance | Backup Database](#) main menu item.

### Selecting database to backup

First, you should specify the connection options, the database for backup and the backup file.

#### User name

Supply server user name. Note that only SYSDBA or the owner of the database (the user who created it) can backup it.

#### Password

Specify the valid user's password. If the password is not correct for the specified user name, you will not be able to backup the database.

#### Database

Select the database to backup from the list of all available database profiles (How to create database profile see [Create Database Profiles](#)<sup>[26]</sup>).

#### Backup file

By default, the backup file name coincides with the name of the database file and is stored in the same directory. You can change the backup file name, if necessary. The path to the file and file name you are specifying are on the server side. If you are backing up the database on the originating node (a local database), you can use the ellipsis button on the right of text area and set the necessary path.

### Additional backup properties

#### Ignore checksum

If checked, checksums are ignored during backup. A checksum is a page-by-page analysis of data to verify its integrity. A bad checksum means that a data page has been randomly overwritten; for example, due to a system crash. Checksum errors stand for data corruption, and Firebird normally prevents you from backing up a database if bad checksums are detected.

#### Ignore transaction in Limbo

If checked, limbo transactions are ignored during backup. When limbo transactions are ignored during backup, it ignores all record versions created by any limbo transaction, finds the most recently committed version of a record, and backs up that version. Limbo transactions are usually caused by the failure of a two-phase commitment. They can also exist due to the system failure or when a single-database transaction is prepared.

#### Backup metadata only

If checked, database data is excluded, when backing up, saving only its metadata. It is

useful if you want to retain a record of the metadata before it is modified or create an empty copy of the database.

[Old metadata description](#)

If checked, backs up data in old-style format.

[Convert to tables](#)

If checked, external files are converted to internal tables.

[Garbage collection](#)

If checked, garbage collection operations are performed during backup. Garbage collection marks the space used by old versions of data records as free for reuse.

#### Format

You can specify [Transportable](#) and [Non-transportable](#) format values. To move a database to a machine with a different operating system from the machine on which the backup was performed, make sure that the Format option is set to [Transportable](#). This option writes data in a generic format enabling you to move to any machine that supports Firebird.

[Verbose](#)

If checked, status messages are not displayed during the backup.

#### Output file name

This field is available if the [verbose](#) option is checked. You can specify an output file to log status messages during the backup. If verbose is checked and output file is not specified, then this opens a standard text display window to display status messages during the backup.

#### Generate command line

Follow the link to get a command line for [GBAK](#) which will include all the options specified above. The [Command Line Builder](#) allows you to copy the generated line to clipboard or save it to a batch file.

Click the [Ready](#) button to start the backup database process.

## 10.2 Restore Database

The backup and restore components of Firebird Server allow you to create a copy of a database. This copy (called [database backup](#)<sup>[254]</sup>) is stored in a location protected from the potential failures of the server running the instance of SQL Server. If the server running the instance of SQL Server fails, or if the database is somehow damaged, the backup copy can be used to recreate, or restore the database. Note, implementing a well-planned backup and restore strategy protects databases against data loss due to damage caused by a variety of failures.

To run [Restore Database Wizard](#), select the [Maintenance | Restore Database](#) main menu item.

### Selecting database for restore

Supply the server [User name](#). Note that only SYSDBA or the owner of the database (the user who created it) can restore it.

Specify the valid user's [Password](#). If the password is not correct for the user name, you will not be able to restore database.

You can use an existing database for restore. For this you should select the [Use existing database](#) item, then select database from all available database profiles.

To create new database, select the [Create new database](#) item and edit [Database Profile](#)<sup>[29]</sup>. If [Create new database](#) is specified, you can replace the existing database and register new database profile using the corresponding check-boxes.

Provide the [Backup file](#) path and name. Note that the path and the name are on the server side. If you are restoring the database on the originating node (a local database), you can click the ellipsis button on the right of text area and set the file.

### Setting additional properties

[Deactivate indexes](#)

If checked, indexes are deactivated. Normally, indexes are rebuilt when a database is restored. If the database contains duplicate values in a unique index when it is being backed up, restoration fails. Duplicate values can be introduced into a database, if indexes have been temporarily made inactive.

[Don't recreate shadow files](#)

Shadow files are identical, physical copies of database files in a database. If checked, shadow files are not recreated.

[Don't enforce validity conditions](#)

If you redefine validity constraints in a database with data already entered, your data might no longer satisfy the validity constraints. You might not discover this until you try to restore the database, when an error message about invalid data appears. If checked, validity conditions are not enforced while restoring.

[Commit after each table](#)

If checked, the metadata and data for each table are restored together, committing one table at a time. This option is useful when you are having trouble restoring a backup file; for example, if the data is corrupt or invalid according to integrity constraints.

Use all space

Check this field to restore a database with 100% fill ratio on every data page, instead of the default 80% fill ratio.

 Verbose

If checked, status messages are not displayed during the restore.

**Output file name**

This field is available if the [verbose](#) option is checked. You can specify an output file to log status messages during the restore. If verbose is checked and output file is not specified, then this opens a standard text display window to display status messages during the restore.

**Generate command line**

Follow the link to get a command line for [GBAK](#) which will include all the options specified above. The [Command Line Builder](#) allows you to copy the generated line to clipboard or save it to a batch file.

Click the [Ready](#) button to start the restore process.

## 10.3 Shutdown Database

Maintaining a database often involves shutting it down. Only SYSDBA or the owner of a database (the user who created it) can shut it down. The user who shuts down the database then has exclusive access to the database.

After a database is shut down, the database owner and SYSDBA are still able to connect to it, but any other user attempting to connect gets an error message stating that the database is shut down. To allow user access to the database back, [bring the database online](#)<sup>[259]</sup>.

To shut down a database, select the [Maintenance | Shutdown Database](#) main menu item.

### Connection options

#### User name

Supply server user name. Note that only SYSDBA or the owner of the database (the user who created it) can shut it down. The user who shuts down the database then has exclusive access to the database.

#### Password

Specify the valid user's password. If the password is not correct for the specified user name, you will not be able to shutdown database.

#### Database

Select database to backup from all available database profiles (How to create database profile see [Create Database Profiles](#)<sup>[26]</sup>).

### Shutdown properties

#### Mode

Defines shutdown mode. The possible options are: *Forced*, *Deny transactions*, *Deny attachments*.

#### *Forced*

In this mode all transactions, that are still active at the stated time, are aborted regardless of their type or importance, and all users are forcefully disconnected. As Firebird transactions function stably and securely, there are very few areas of application where this forced mode should not be used.

#### *Deny transactions*

In this mode all transactions must be executed by the stated time. Any new transactions that are started are blocked. If there are any transactions that are still active by the stated time, the database shutdown is not executed.

#### *Deny attachments*

With this option all active user attachments must finish their work by the stated time. If some attachments are still active by the stated time, the database shutdown is not executed.

#### Wait (sec)

The period of time (in seconds) until the shutdown is executed can be specified here.

## 10.4 Bring Database Online

After a database is [Shut down](#)<sup>[258]</sup>, it must be restarted (brought back online) before users can access it. To bring database online, select the [Maintenance | Bring Database Online](#) main menu item.

### User name

Supply server user name. Note that only SYSDBA or the owner of the database (the user who created it) can bring it online.

### Password

Specify the valid user's password. If the password is not correct for the specified user name, you will not be able to bring database online.

### Database

Select database to backup from all available database profiles (How to create database profile see [Create Database Profiles](#)<sup>[26]</sup>).

## 11 Options

Firebird Maestro allows you to customize the way it works within the [Options](#) dialog. To open the dialog, select the [Tools | Options](#) main menu item.

The window allows you to customize the options grouped by the following sections:

- [Application](#)<sup>[261]</sup>  
General Firebird Maestro options: environment style, confirmations, window restrictions, explorer tree, [SQL Editor](#), [Visual Query Builder](#), etc.
- [Editors & Viewers](#)<sup>[283]</sup>  
Customizing of all the SQL editors - [SQL Editor](#), [SQL Script Editor](#), etc.
- [Appearance](#)<sup>[291]</sup>  
Customizing program interface - bars, trees, menus, etc.

Besides, the [Options](#) dialog allows you to export all program settings to a \*.reg file for future use, e.g. on another PC (see [Export Settings](#)<sup>[300]</sup> for details).

It is a good idea to check through these settings before you start working with Firebird Maestro. You may be surprised at all the things you can adjust and configure!

## 11.1 Application

The [Application](#) section allows you to customize common rules of Firebird Maestro behavior. The section consists of several tab; follow the links to find out more about each of them.

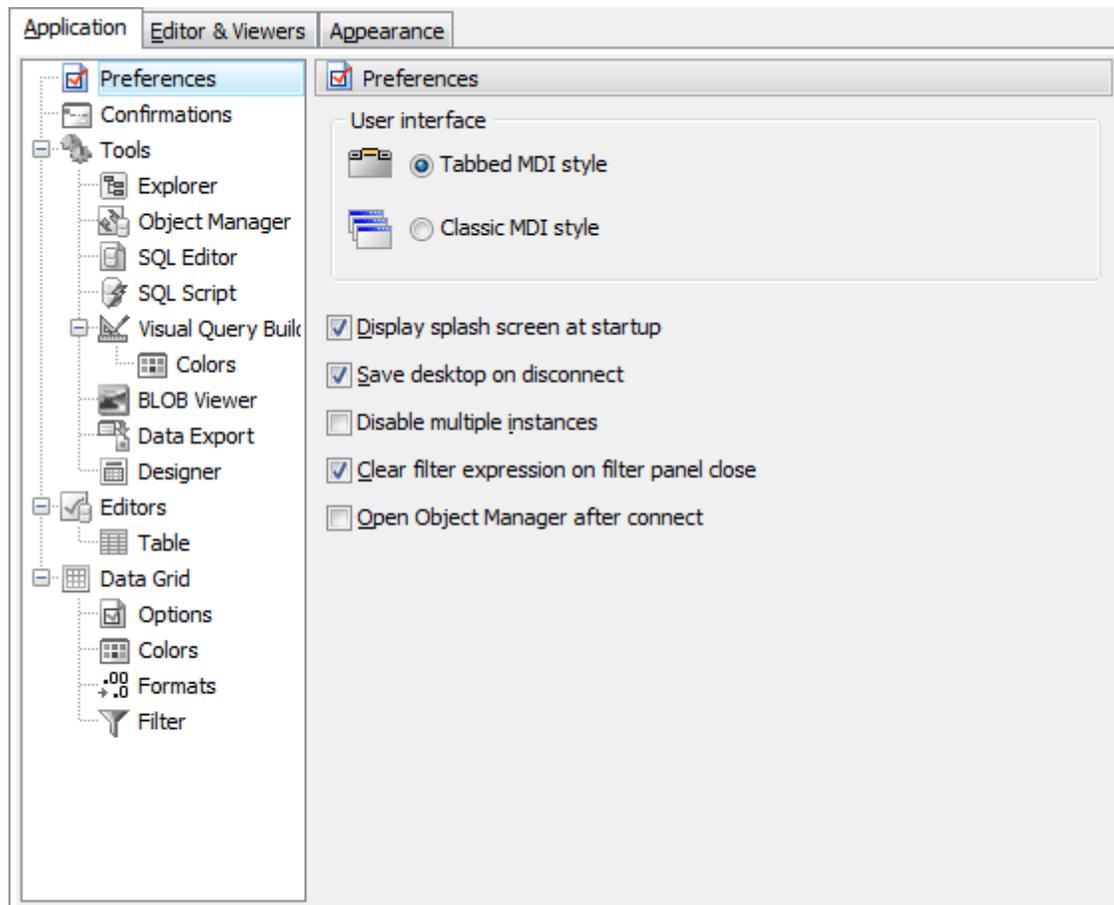
- [Preferences](#) <sup>[261]</sup>
- [Confirmations](#) <sup>[262]</sup>
- [Directories](#) <sup>[264]</sup>
- [Tools](#) <sup>[264]</sup>
  - [Explorer](#) <sup>[266]</sup>
  - [Object Manager](#) <sup>[267]</sup>
  - [SQL Editor](#) <sup>[267]</sup>
  - [SQL Script Editor](#) <sup>[268]</sup>
  - [Query Builder](#) <sup>[269]</sup>
  - [BLOB Viewer](#) <sup>[271]</sup>
  - [Export data](#) <sup>[272]</sup>
  - [Database Designer](#) <sup>[273]</sup>
- [Object Editors](#) <sup>[274]</sup>
  - [Table](#) <sup>[276]</sup>
- [Data Grid](#) <sup>[276]</sup>
  - [Colors](#) <sup>[279]</sup>
  - [Formats](#) <sup>[280]</sup>
  - [Filter](#) <sup>[281]</sup>

### 11.1.1 Preferences

User interface area allow you to select your favorite UI style according to your preferences.

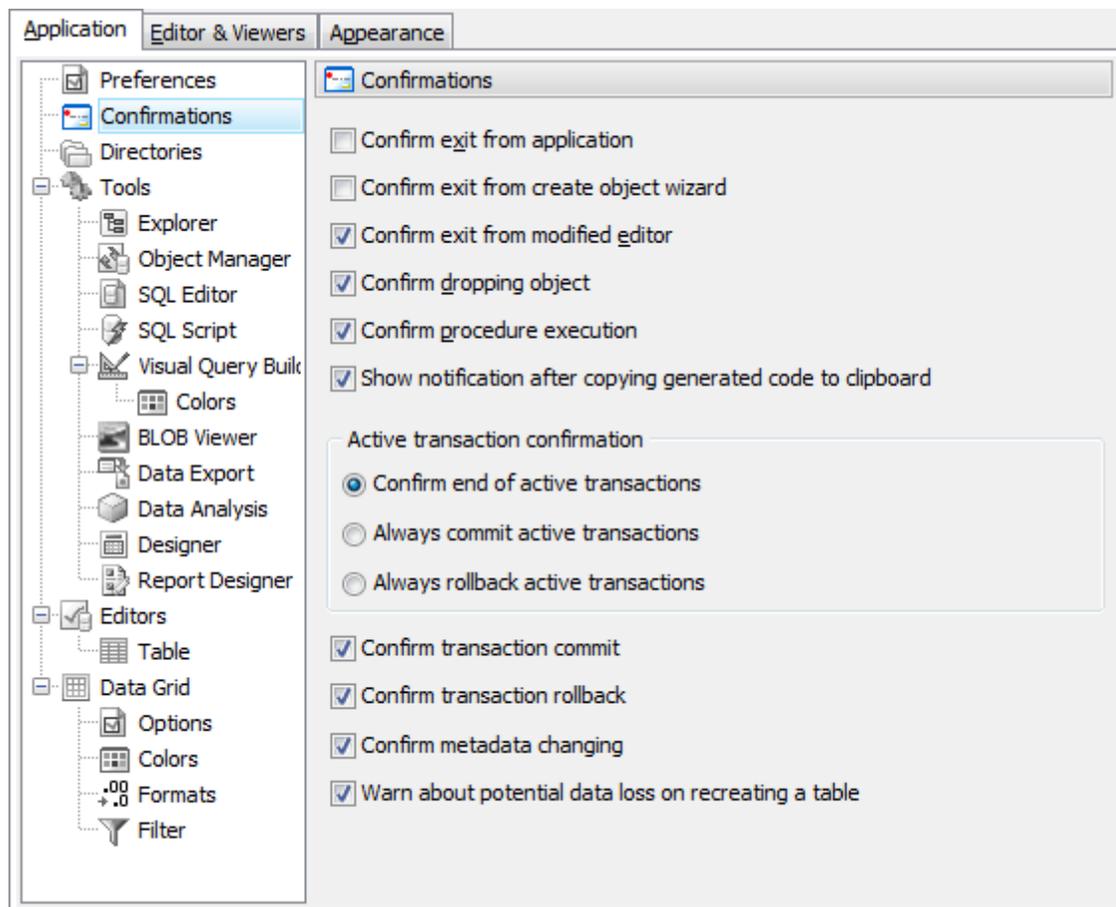
- [Display splash screen at startup](#)  
Displays the splash screen on Firebird Maestro startup.
- [Save desktop on disconnect](#)  
Saves all the database windows and their positions on disconnecting from the database.
- [Disable multiple instances](#)  
Prohibits running multiple instances of Firebird Maestro.
- [Open Object Manager after connect](#)  
Opens the Object Manager window after connection is established.
- [Clear filter expression on filter panel close](#)  
Clears the filter applied to the explorer tree and all the instances of Object Manager

after the filter panel is closed.



### 11.1.2 Confirmations

Use this tab to manage application confirmations.



**Confirm exit from Create Object Wizard**

If this option is checked, the program requires confirmation each time you want to exit the Create Object Wizard.

**Confirm exit from modified editor**

If this option is checked, the program asks you to confirm exit from the editor, if you have made any changes.

**Confirm dropping object**

If this option is checked, the program requires confirmation for dropping database object.

**Confirm exit from application**

If this option is checked, the program requires confirmation when you want to exit <% PRODUCT\_NAME%>.

**Transaction confirmation**

Select whether you will be prompted to commit or rollback active transaction or Firebird Maestro will commit or rollback transactions without asking.

**Confirm metadata changing**

If this option is checked, the program requires confirmation for changing metadata.

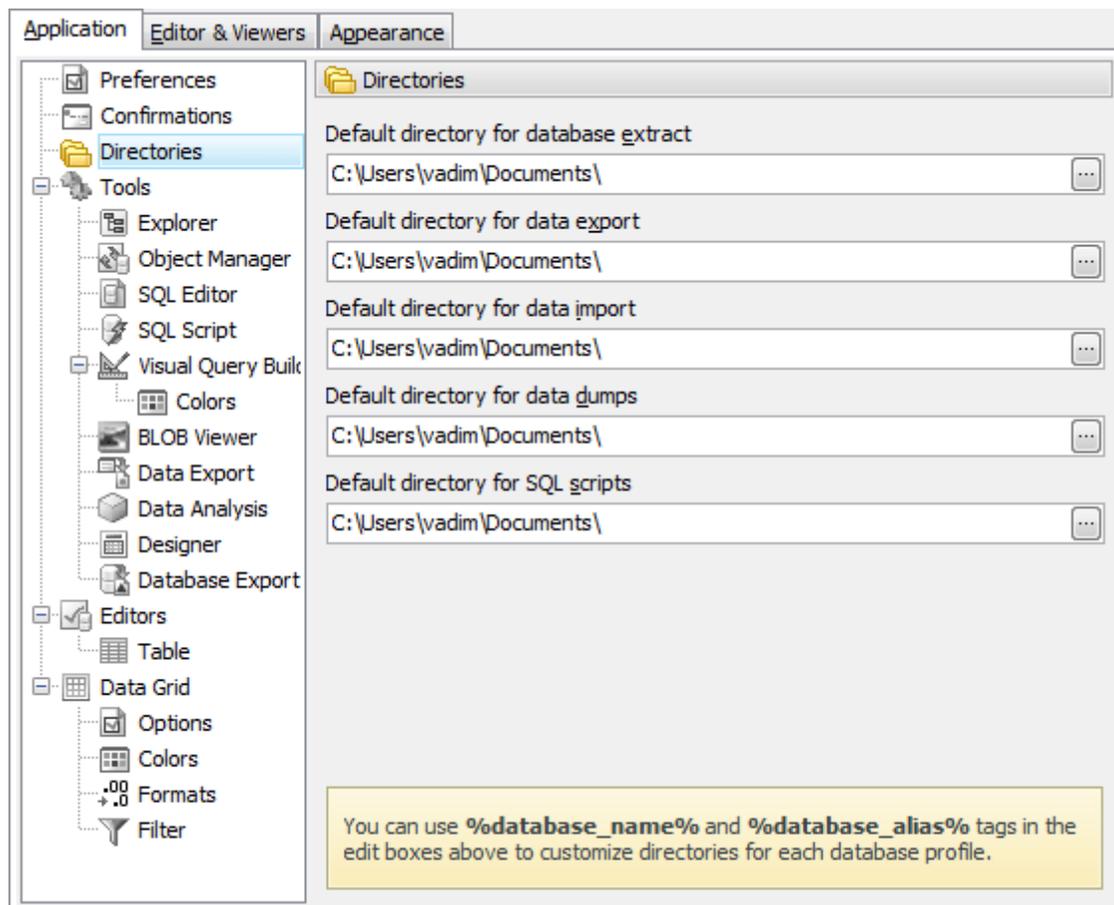
### 11.1.3 Directories

The tab allows you to specify default directories to be used on database profiles creating. You can use such variables as %database\_name%, %database\_alias%, and %user\_name%.

#### Example:

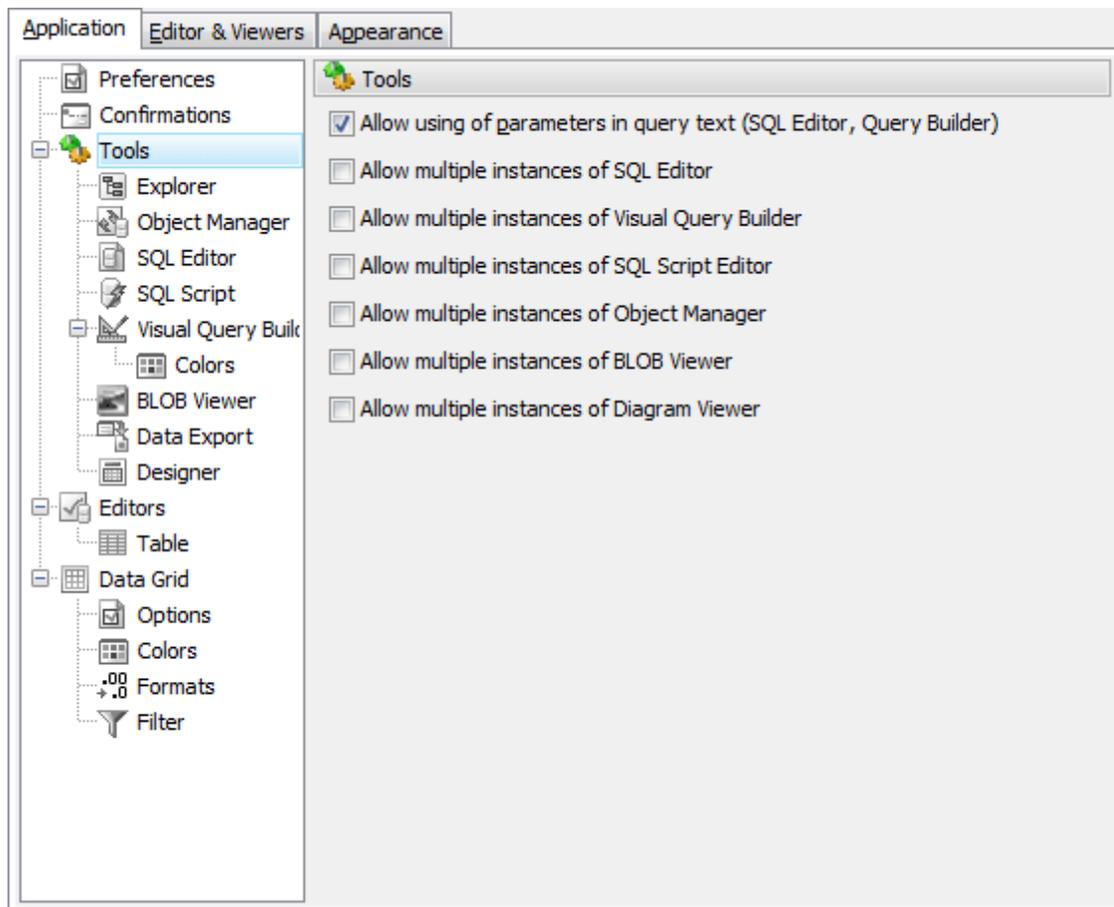
To store all SQL scripts in folders sorted by databases in the "C:\SQL Scripts\" directory, specify the default directory for SQL scripts as follows:

*C:\SQL Scripts\%database\_name%*



### 11.1.4 Tools

Below you will find a detailed description of the following tools options.

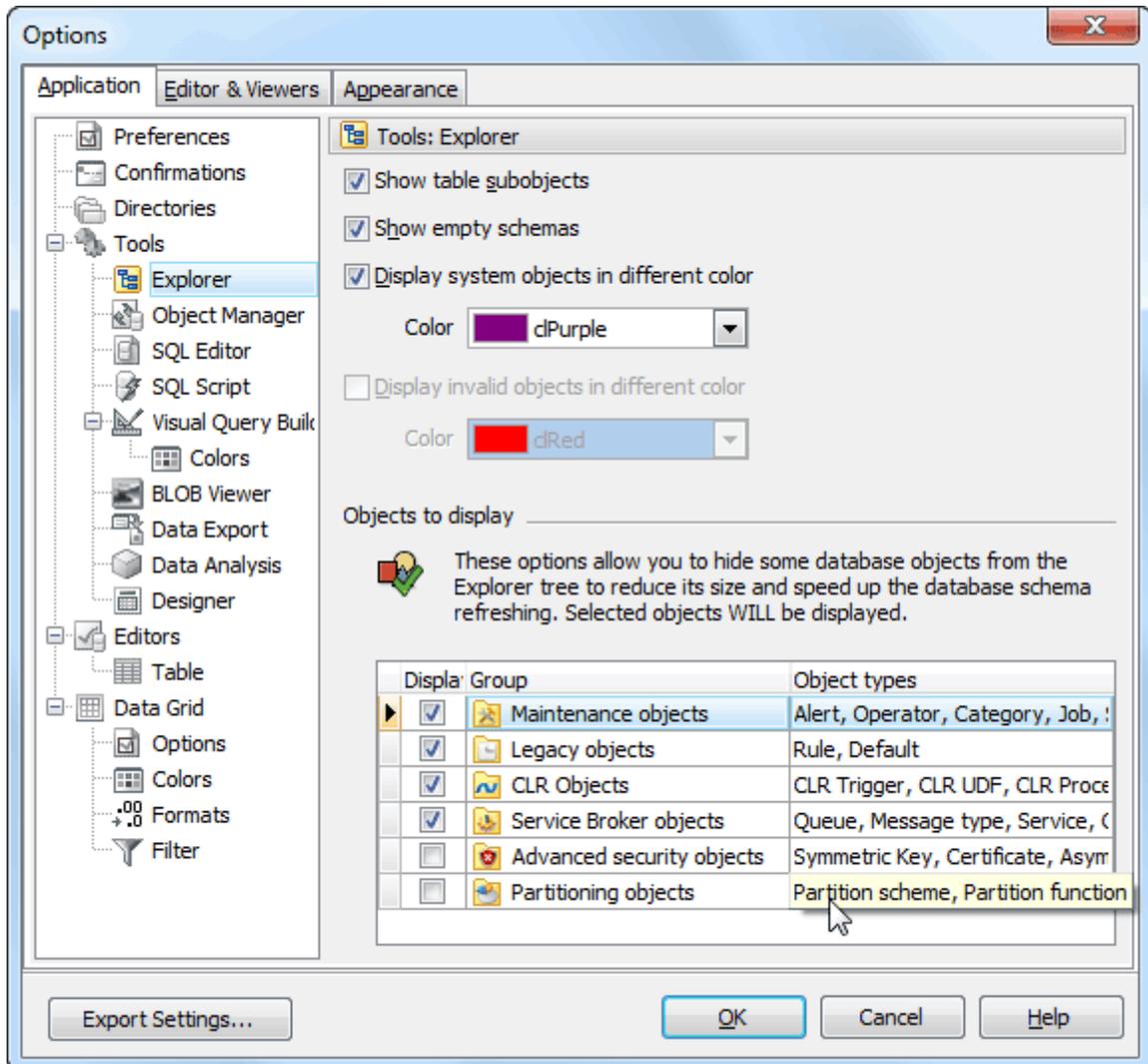


- [Allow using of parameters in query text](#)  
 Check this option to be able to use query parameters in [SQL Editor](#)<sup>[151]</sup> and [Visual Query Builder](#)<sup>[156]</sup>.
- [Allow multiple instances of SQL Editor](#)  
 Check this option to be able to use multiple instances of [SQL Editor](#)<sup>[151]</sup> simultaneously.
- [Allow multiple instances of Visual Query Builder](#)  
 Check this option to be able to use multiple instances of [Visual Query Builder](#)<sup>[156]</sup> simultaneously.
- [Allow multiple instances of SQL Script Editor](#)  
 Check this option to be able to use multiple instances of [SQL Script Editor](#)<sup>[202]</sup> simultaneously.
- [Allow multiple instances of Object Manager](#)  
 Check this option to be able to use multiple instances of Object Manager simultaneously.
- [Allow multiple instances of BLOB Viewer](#)  
 Check this option to be able to use multiple instances of [BLOB Viewer](#)<sup>[211]</sup> simultaneously.
- [Allow multiple instances of Diagram Viewer](#)  
 Check this option to be able to use multiple instances of [Diagram Viewer](#)<sup>[217]</sup>

simultaneously.

#### 11.1.4.1 Explorer

Below you will find a detailed decryption of the following explorer options.

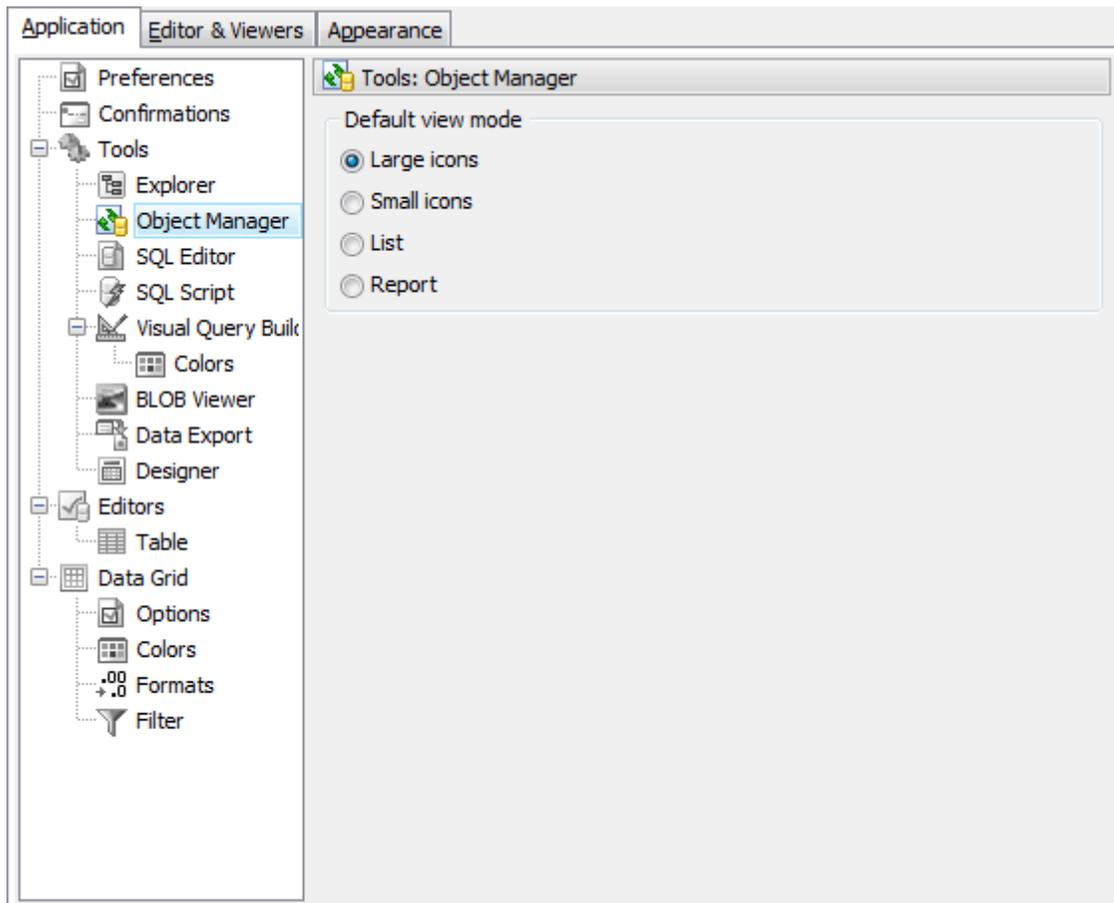


- Show table subobjects**  
Shows/hides table subobjects (fields and indexes) in the explorer tree.
- Sort profiles by aliases**  
Sorts profile aliases alphabetically in the explorer tree.
- Expand the "Tables" node after connection**  
Shows all database tables in the explorer tree after connecting to the database.
- Expand the "Queries" node after connection**  
Shows all database queries in the explorer tree after connecting to the database.
- Display system objects in different color**  
Represents all system objects in selected color.

You can also exclude/include rarely used objects from/to the Explorer tree. Manage object groups to be displayed at Explorer with corresponding checkboxes.

#### 11.1.4.2 Object Manager

Below you will find a detailed decryption of the following [Object Manager](#) options.

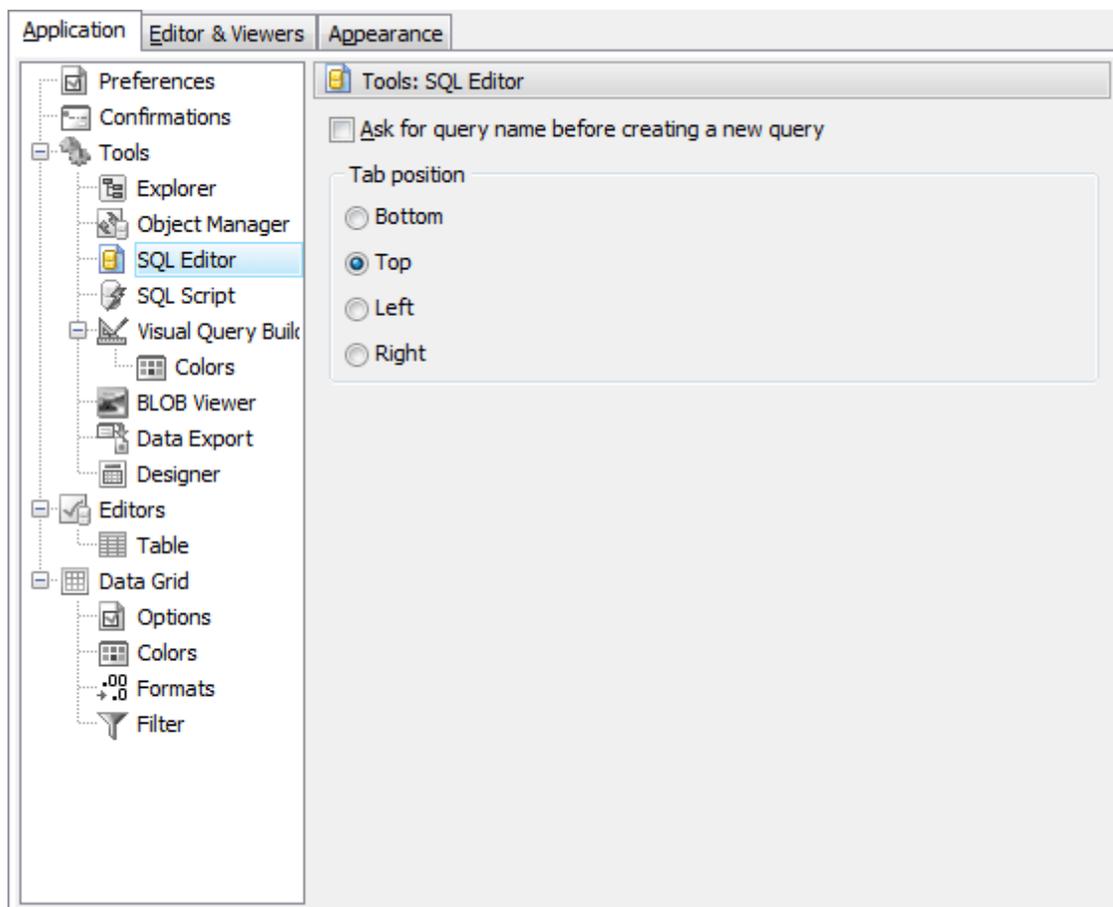


##### Default view mode

Defines which view mode (*large icons, small icons, list or report*) is applied to Object Manager by default.

#### 11.1.4.3 SQL Editor

Below you will find a detailed decryption of the following [SQL Editor](#) options.



**Ask for query name before creating a new query**

If this option is checked, [SQL Editor](#)<sup>[151]</sup> asks for a query name each time you create a new query.

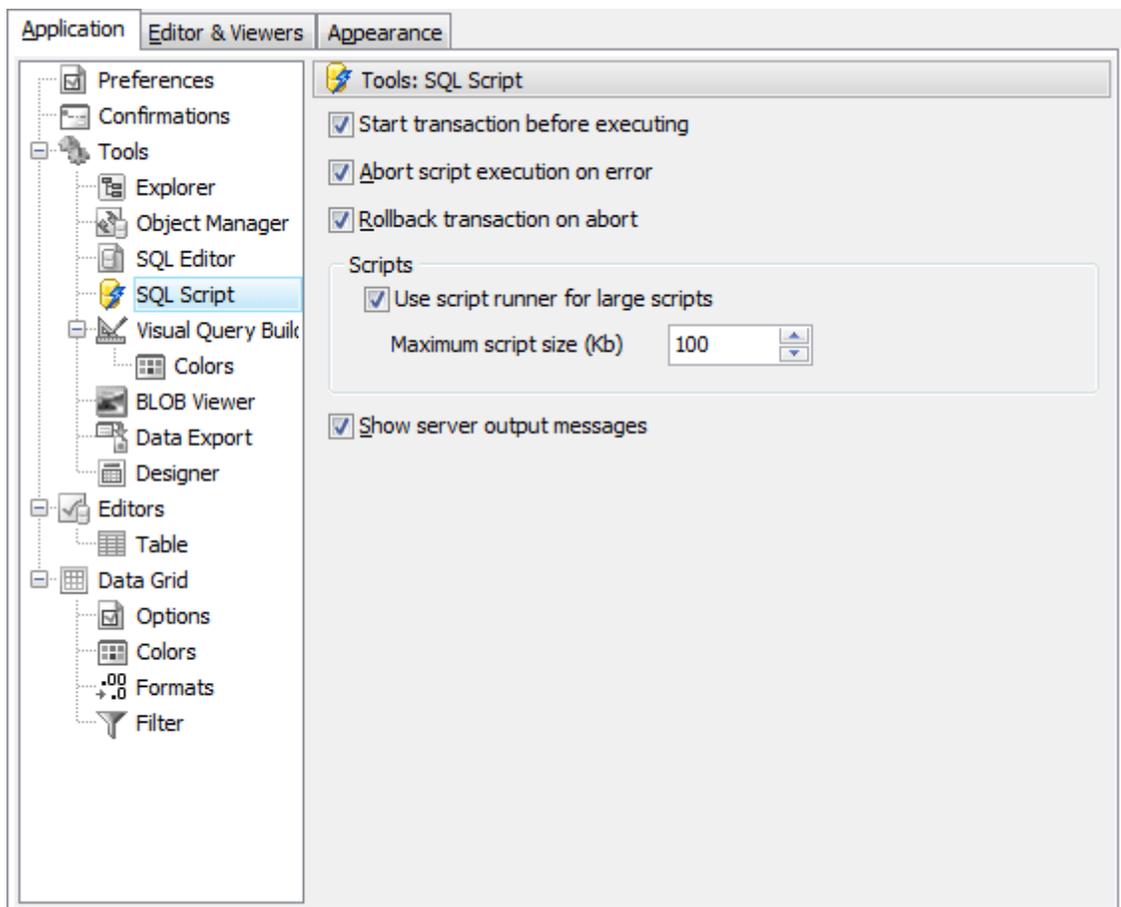
**Auto commit**

Check the option to execute queries in autocommit mode (default value) or leave it blank to manage transactions manually.

You can also select [position](#) of query tabs.

#### 11.1.4.4 SQL Script Editor

Below you will find a detailed description of the following [SQL Script Editor](#) options.



**Abort script execution on error**

If this option is checked, script execution aborts when an error occurs.

**Rollback transaction on abort**

This option evokes automatic rollback on script execution abort.

**Use script runner for large scripts**

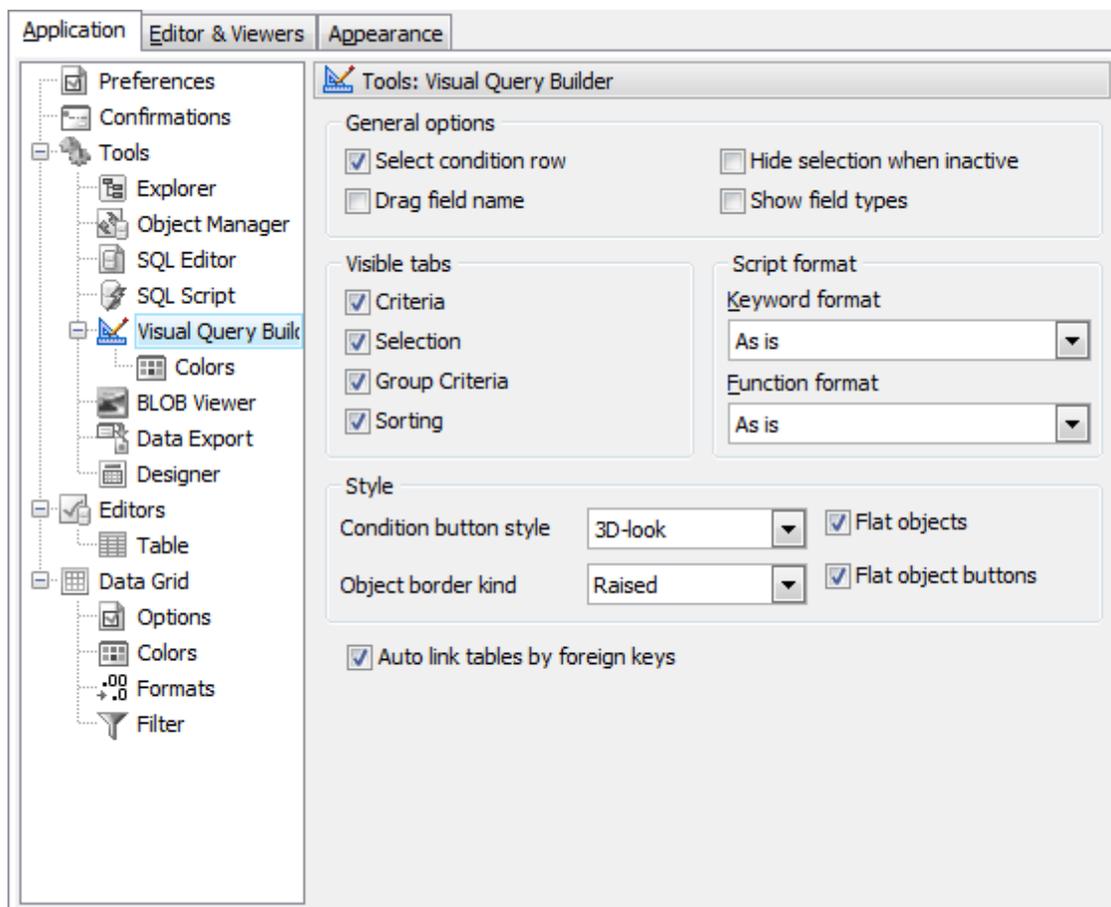
Check the box to execute large script in the fastest way. You can change the maximum size of a script to execute without script runner.

**Show server output messages**

Turn the option ON to see warning messages generated by the server.

#### 11.1.4.5 Query Builder

Below you will find a detailed decryption of the following [Query Builder](#) options.



**Select condition row**

Displays the selected condition in different row on the **Criteria** and **Grouping Criteria** tabs of [Visual Query Builder](#)<sup>[156]</sup>.

**Drag field name**

Displays the dragged field name in the **Builder** area.

**Hide selection when inactive**

Hides the selection when the query builder is inactive.

**Show field types**

Displays the field type next to the field in the table box.

#### Visible tabs

These options specify which the query builder tabs are available and which are not. Check them to make the appropriate tabs visible.

#### Script format

These options specify the case formatting of keywords and functions in query text on the **Edit** tab. **As is** saves the original case, **Uppercase** sets all the keywords/functions to upper case, **Lowercase** sets all the keywords/functions to lower case, and **First upper** sets the first letters of all keywords/functions to upper case.

## Style

These options specify how different the [Query Builder](#) objects look like - 3D, flat, etc.

### Auto link tables by foreign keys

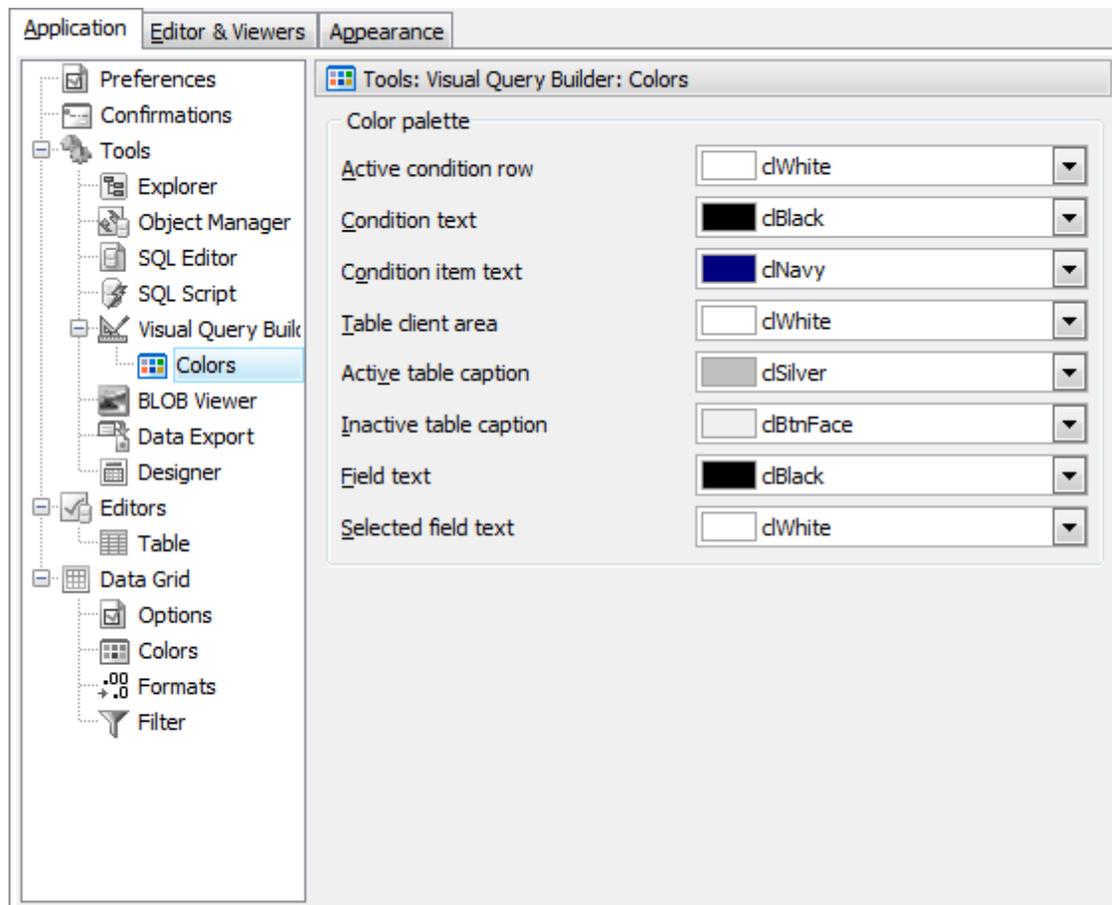
If tables that have foreign key reference are placed in [Query Builder](#), in diagram they will be auto linked.END

## Colors

These options define colors of the different [Query Builder](#) elements: condition row, active caption, table client area, etc. Click an item to select a color for the appropriate [Query Builder](#) element.

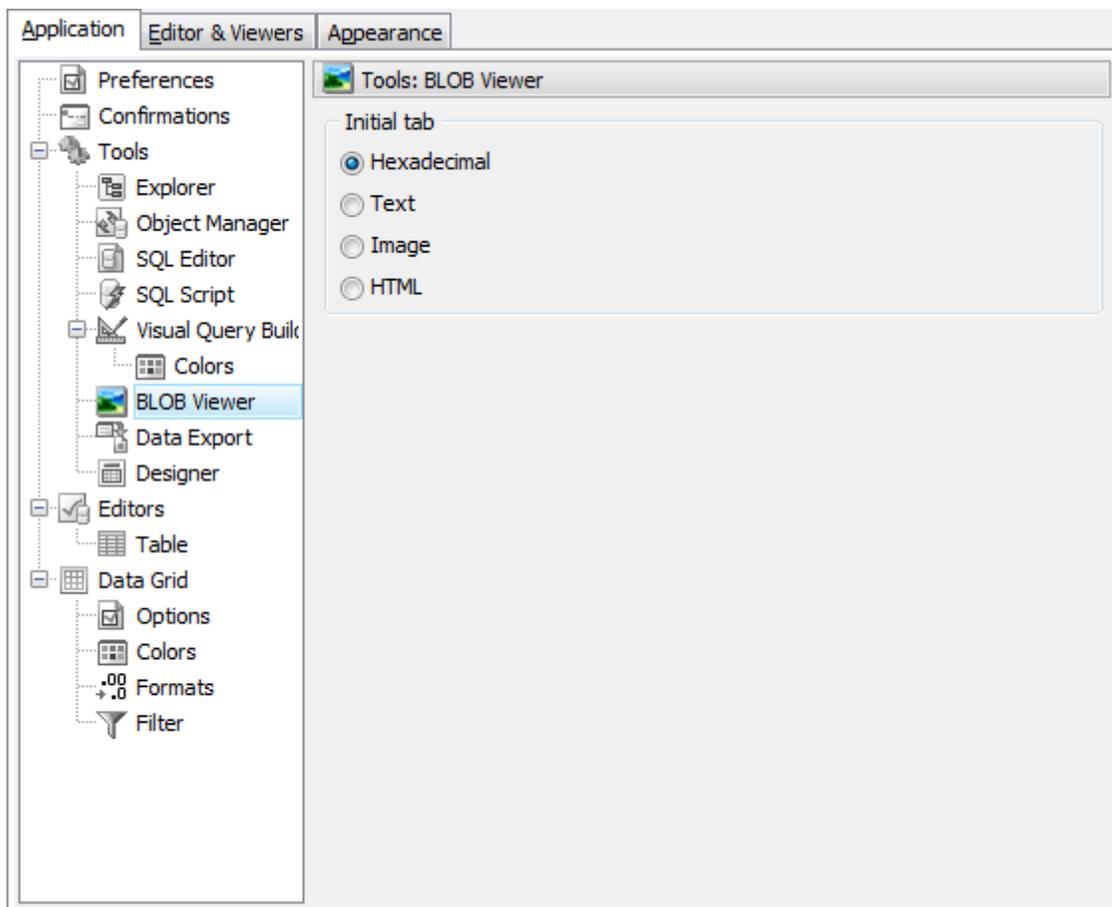
### 11.1.4.5.1 Colors

The tab is provided to editing of the [Query Builder](#) color schema. Customize colors for all editor element according to your preferences.



### 11.1.4.6 BLOB Viewer

Below you will find a detailed decryption of the following [BLOB Viewer](#)<sup>[21]</sup> options.



#### Initial tab

Specifies which tab of **BLOB Viewer** should be active when it is initially opened.

#### 11.1.4.7 Data Export

This window allows you to customize formats applied to exported data. Edit the format masks to adjust the result format in the way you need.

In *numeric* formats using digit placeholder (`#` or `0`) you can specify the format of number. For example, integer 1234567890 with `# # # # # # 0` integer format is represented like 1 234 567 890. The locations of the leftmost '0' before the decimal point in the format string and the rightmost '0' after the decimal point in the format string determine the range of digits that are always present in the output string.

Conversion and their description for *date*, *time* and *date time* format:

dd	day of the month, represented by 1 or 2 symbols. For example, the first day of month is 1
DD	day of the month, represented only by 2 symbols. For example, the first day of month is 01
mm	minutes

MM	month
yy	year, represented by 2 symbols. For example, 2006 year will be 06
yyyy	year, represented by 4 symbols. For example, 2006
h	hour, represented by 1 or 2 symbols. For example, 2
hh	hour, represented only by 2 symbols. For example, 02

(".", ",", ":", ";") symbols can be placed as separators in format masks for *integer*, *float*, *date*, *time*, *date time*, *currency* types.

[Auto save format strings](#)

Auto saves format strings when they are changed (e.g. at the [Adjusting data formats](#) step in [Export Data Wizard](#)<sup>182)</sup>).

Using [Set defaults](#) button, you can set default values of data formats.

#### 11.1.4.8 Database Designer

The following topic provides a shot [Database Designer](#)<sup>233)</sup> retrofitting's description.

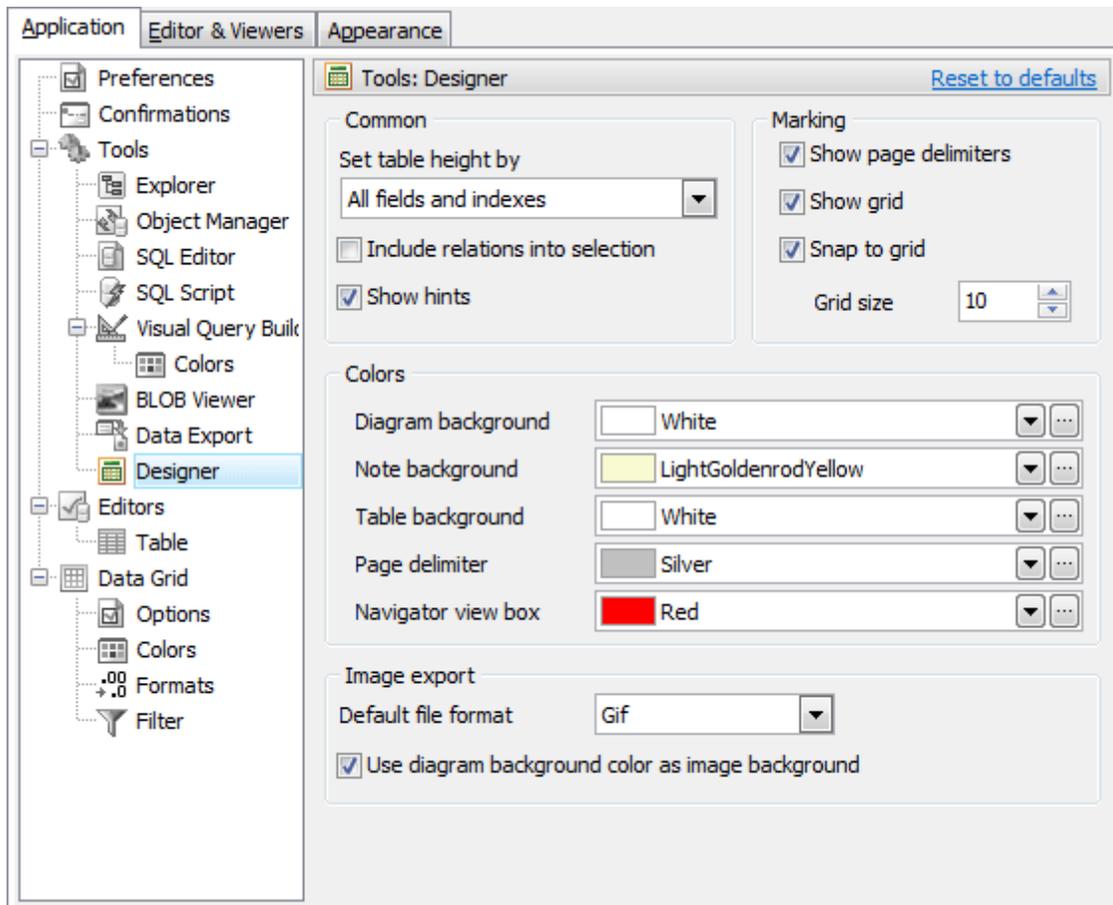
The [Set table height](#) option determines what the table attributes will be represented at the diagram ([Caption only](#), [Key fields](#), [All fields](#) or [All fields and indexes](#)).

Frequently it is necessary to line up some tables and objects on the diagram in a column. One of the ways that you may find convenient to do this is to take advantage of the grid. You can enable showing of the grid by checking the [Show grid](#) clause at the [Marking](#) options. Then diagram will be covered by points disposed on the same interval between.

If you enable snap to grid function by using the [Snap to grid](#) checkbox, when you move the table or other object, its upper left corner "snaps" to the nearest grid point. This feature will assist you to line up objects both horizontally and vertically. Diagram objects moved on a diagram can be automatically snapped to the grid points even if the grid is not displayed on the diagram.

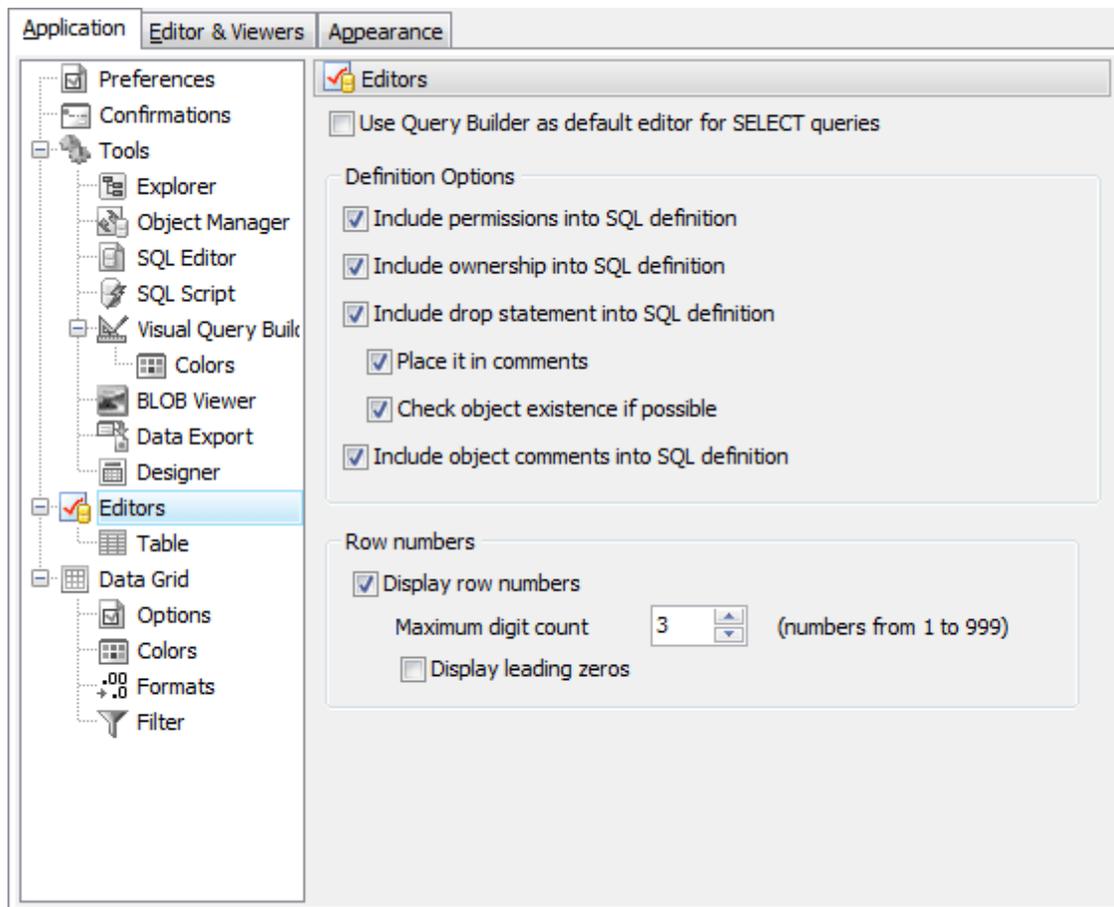
Interval between grid points can be changed as [grid size](#).

The [Colors](#) options are to attune the Designer appearance to your taste. Here you change diagrams and tables background colors, the colors of page delimiter and Navigator view box.



### 11.1.5 Object Editors

Below you will find a detailed description of the following object editors options.



[Open each object editor in a new window](#)

With this option checked a new child window opens each time you open an object for editing, otherwise the edited object is being changed in the existing object editor (except the existing object editor is in modified state).

[Use Query Builder as default editor for SELECT queries](#)

With this option enabled all the SELECT queries will be opened in [Visual Query Builder](#)<sup>[156]</sup> instead of [SQL Editor](#)<sup>[157]</sup>.

[Include permissions](#)

If checked, the SQL definition includes all the GRANT statements, which are applied to the object. Let's assume that a user named 'john' has rights to read the data from the table 'customers', and a user named 'michael' can delete data from that table. In this case the script includes itself the following forms:

```
GRANT SELECT ON TABLE "customers" to "john";
```

```
GRANT DELETE ON TABLE "customers" to "michael";
```

**Note:** Please take a look at the topic Grant (Firebird SQL Reference) to learn more about security management in Firebird server.

[Include drop statement](#)

If checked, the SQL definition includes the drop statement.

[Place it in comments](#)

With this option drop statement will be placed in comments of the SQL definition.

[Include object comments into SQL definition](#)

With this option enabled comments that are specified for the object and object subitems are placed in SQL definition.

#### [Row numbers](#)

This options group allows you to manage the row numbering of the subobjects lists such as files, indexes, parameters and so on.

To enable/disable the numbering, use [Display row numbers](#) checkbox. You can set the number columns width with [Maximum digit count](#). (I.e. for the value '3' the max column number will be 999).

For uniformity you can use the [Display leading zeros](#) option. With this option enabled and maximum digit count '3' you numbering column will be of the form: '001, 002, 003, ...'.

### 11.1.5.1 Table

#### [Initial tab](#)

Specifies which tab of [Table Editor](#)<sup>[68]</sup> should be active when it is initially opened.

[Retrieve record count before loading data in the data grid](#)

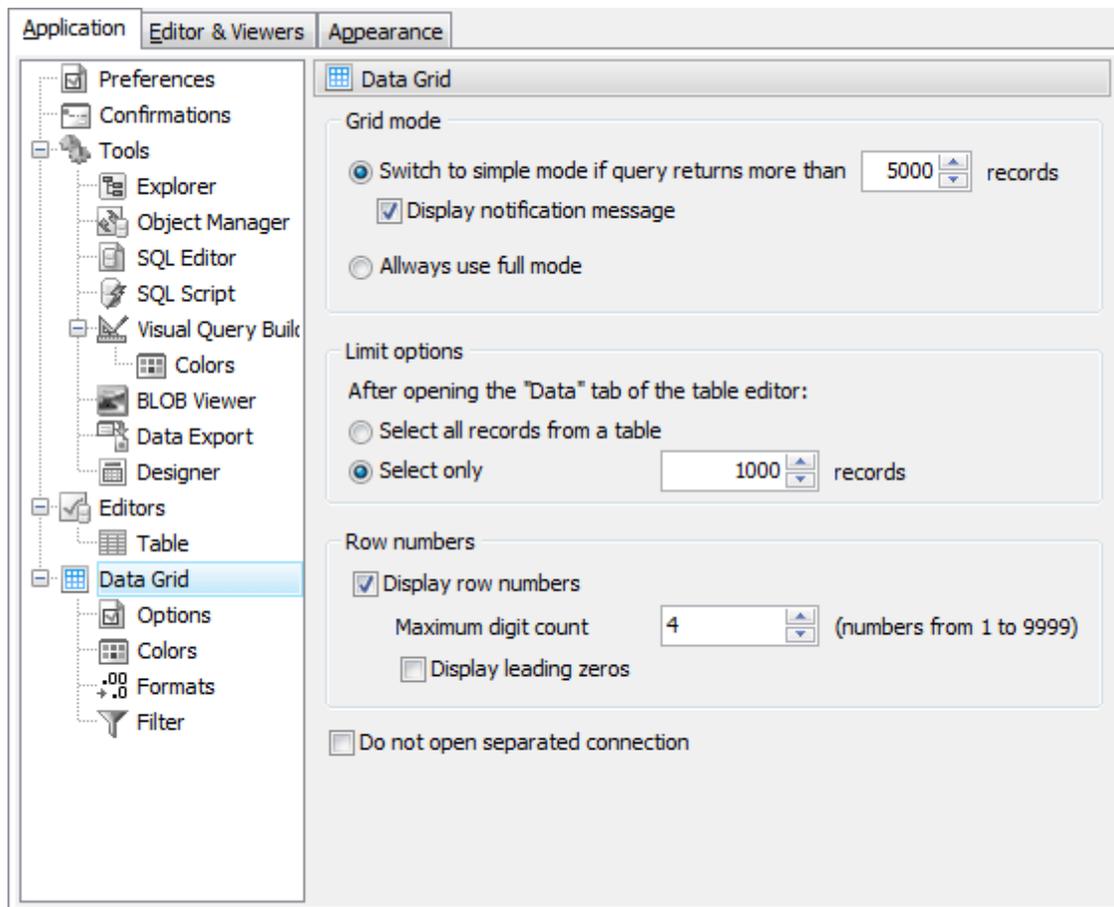
With this option enabled all the SELECT COUNT(\*)... query is executed before loading data in the data grid.

#### [Default field type](#)

Specifies the field type appearing in [Field Editor](#)<sup>[72]</sup> by default.

### 11.1.6 Data Grid

Below you will find a detailed description of the following data grid options.



Firebird Maestro provides you with [two grid modes](#)<sup>[167]</sup> of viewing data:

- Fool grid mode allows you to group, filter and sort data in a usual way.
- Simple mode is provided for working with large records number. For data fetching speed-up, filtering, sorting, and grouping features are not enabled in this mode.

You can use [notification message](#) to indicate simple mode.

Set the number of records to switch to simple mode automatically or select [Always use full mode](#).

#### Limit options

Allows you either to select all records from table after opening the Data tab, or select only specified number of rows on one page with an ability to rotate pages and view all data.

#### Row numbers

This options group allows you to manage grid rows numbering.

To enable/disable the numbering, use [Display row numbers](#) checkbox. You can set the number columns width with [Maximum digit count](#). (I.e. for the value '3' the max column number will be 999).

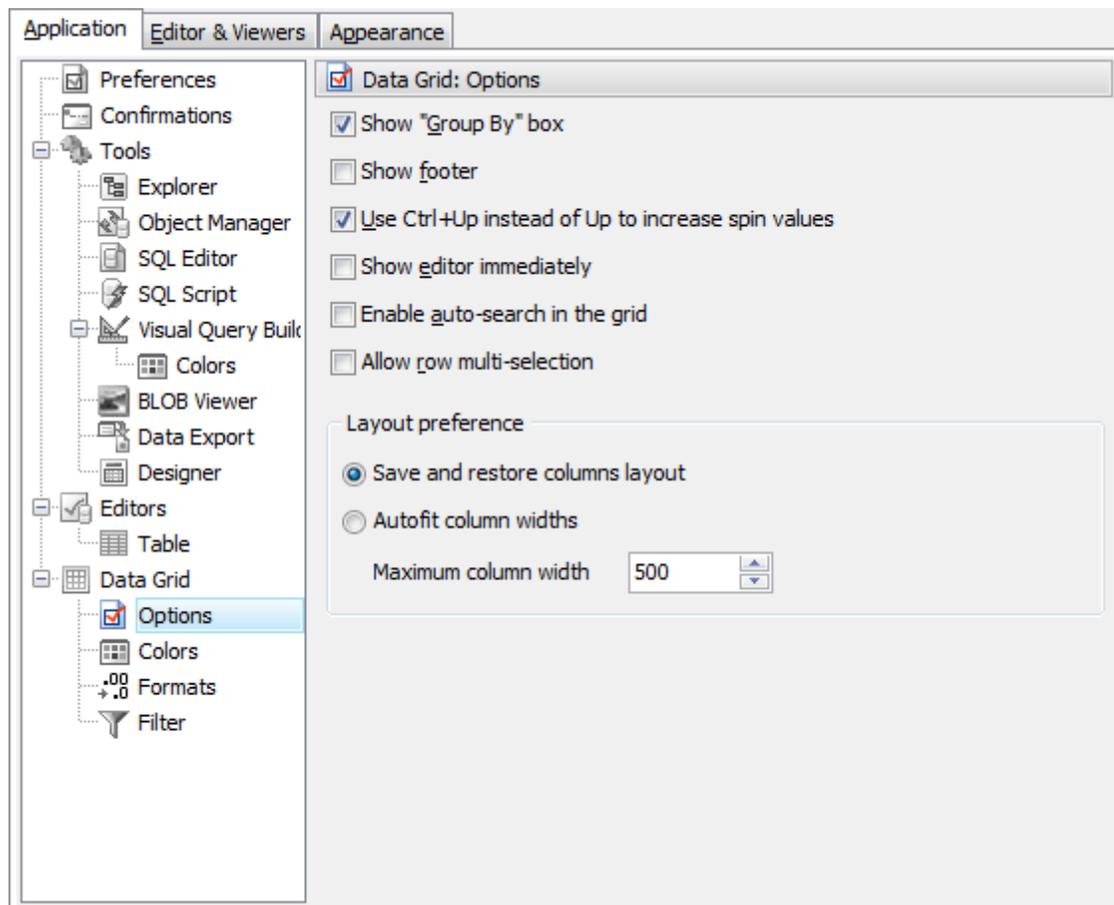
For uniformity you can use the [Display leading zeros](#) option. With this option enabled and maximum digit count '3' you numbering column will be of the form: '001, 002, 003, ...'.

Do not open separated connection

With this option enabled a new connections for fetching data is not opened. This gives you an ability to work with data a little bit faster, because time for opening a new connections is not demanded.

### 11.1.6.1 Options

Below you will find a detailed decryption of the data grid options.



Show "Group By" box

Shows the box on the top of the grid view for grouping data by fields.

Show footer

Shows the footer on the bottom of the grid view.

Use Ctrl+Up instead of Up to increase spin values

Allows you to use Ctrl+Up and Ctrl+Down key combinations for editing the spin for numeric fields.

Show editor immediately

Allows editing the cell value right after the cell is clicked.

Enable auto-search in the grid

Allows you to search records in the grid by the first letters.

[Allow row multi-selection](#)

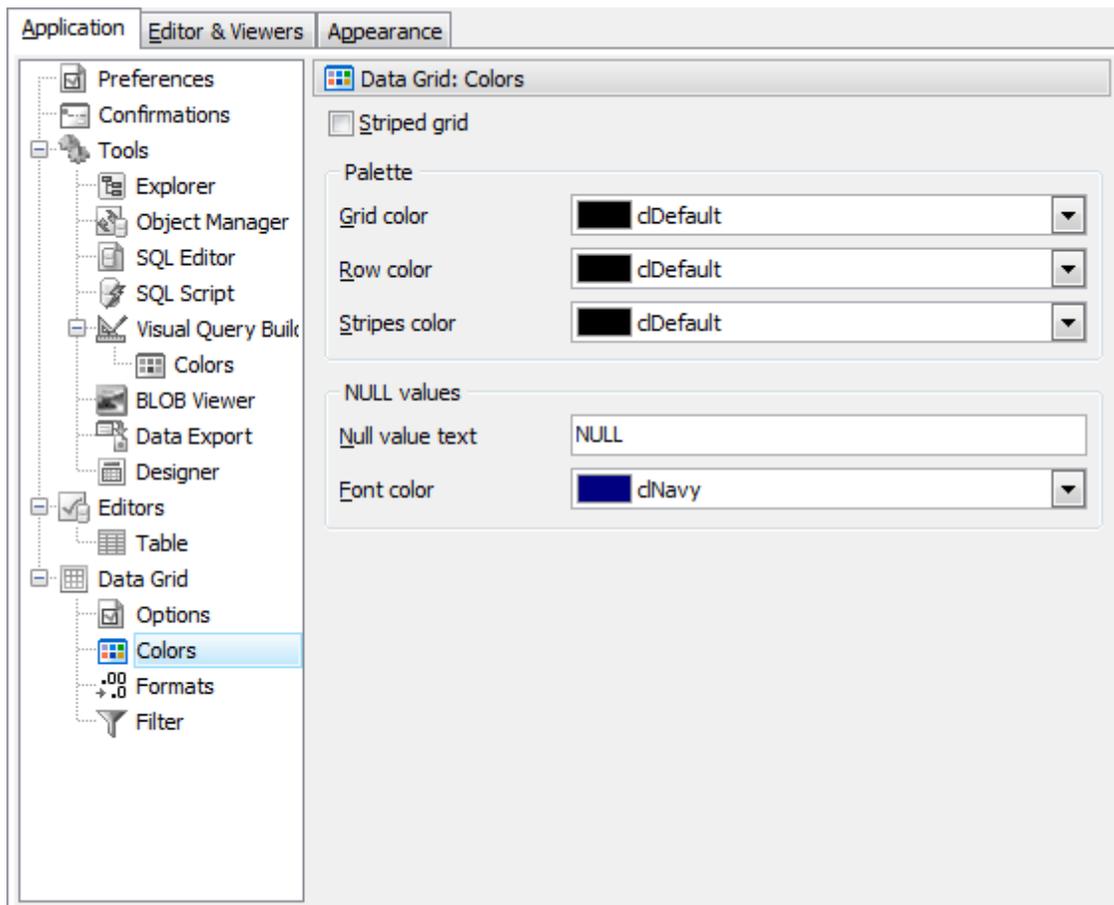
Allows you to select multiple records using the Ctrl and Shift keys.

[Layout preference](#)

Select whether Firebird Maestro should remember the column positions for the grids or fit them automatically.

### 11.1.6.2 Colors

Below you will find a detailed decryption of the following colors options.



[Striped grid](#)

Displays the odd grid rows in a different color defined by the [Stripes color](#) option.

[Grid color](#)

Defines the background color of the data grid.

[Row color](#)

Defines the color of the selected row in the data grid.

[Stripes color](#)

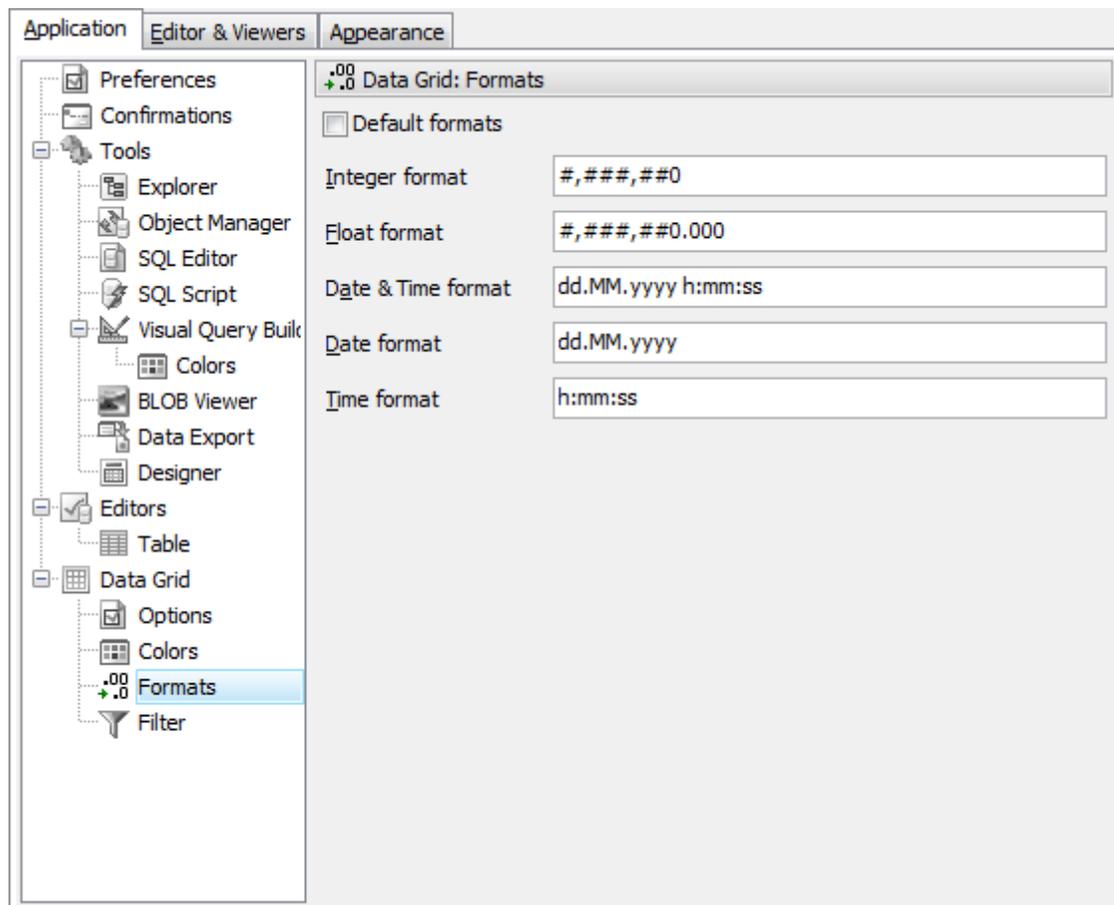
Defines the color of the odd rows if the [Striped Grid](#) option is on.

### Null values

Use [Null value text](#) to define the text that stand for the NULL value and use [Font color](#) to set the color for displaying this text.

### 11.1.6.3 Formats

Below you will find a detailed decryption of the following formats options.



This window allows you to customize formats applied to data in grid. Edit the format masks to adjust the result format in the way you need.

In *numeric* formats using digit placeholder (# or 0) you can specify the format of number. For example, integer 1234567890 with # # # # # # 0 integer format is represented like 1 234 567 890. The locations of the leftmost '0' before the decimal point in the format string and the rightmost '0' after the decimal point in the format string determine the range of digits that are always present in the output string.

Conversion and their description for *date*, *time* and *date time* format:

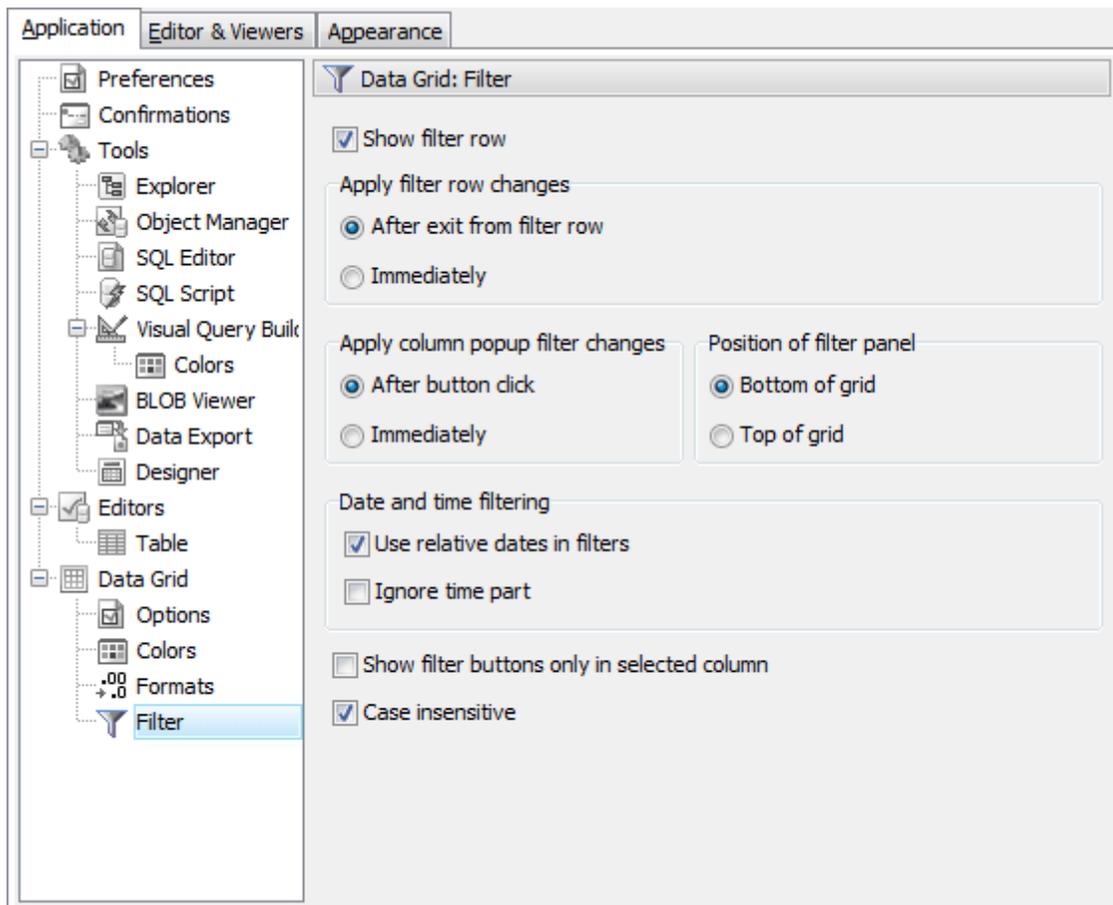
dd	day of the month, represented by 1 or 2 symbols. For example, the first day of month is 1
DD	day of the month, represented only by 2 symbols. For example, the first

	day of month is 01
mm	minutes
MM	month
yy	year, represented by 2 symbols. For example, 2006 year will be 06
yyyy	year, represented by 4 symbols. For example, 2006
h	hour, represented by 1 or 2 symbols. For example, 2
hh	hour, represented only by 2 symbols. For example, 02

":", ",", ".", ":" symbols can be placed as separators in format masks for *integer*, *float*, *date*, *time*, *date time*, *currency* types.

#### 11.1.6.4 Filter

These options allows you to customize data filtering in grids.



Show filter row

---

When checked the filter row is always represented in the data grid as an additional row.

[Apply filter row changes](#) and [Apply column popup filter changes](#) allows you to manage the speed of the data filtering. To speed-up the process select [Immediately](#) as the time the filter you are set will be applied.

Change the [Position of filter panel](#) and customize timestamp data filtering: check the [Use relative dates in filters](#) box to include in column popup filter such options as "Yesterday", "Today", "Tomorrow", "Last 30 day", "Last week", "Next week", and others; check the [Ignore time part](#) box to neglect time part of timestamp data under the filtering.

By default filter buttons are shown at all columns header, to [show filter button only in selected column](#), check the corresponding option.

You can specify the case sensitivity of the grid filter with the [Case insensitive](#) checkbox (ON by default).

## 11.2 Editors & Viewers

The [Editors & Viewers](#) section allows you to set the parameters of viewing and editing the SQL statements within Firebird Maestro.

- [General](#) <sup>[283]</sup>
- [Display](#) <sup>[284]</sup>
- [SQL highlight](#) <sup>[285]</sup>
- [PHP highlight](#) <sup>[287]</sup>
- [XML highlight](#) <sup>[286]</sup>
- [Code Insight](#) <sup>[288]</sup>
- [Code Folding](#) <sup>[289]</sup>

**See also:** [SQL Editor](#) <sup>[151]</sup>, [SQL Script Editor](#) <sup>[202]</sup>, [Visual Query Builder](#) <sup>[156]</sup>, [Table Editor](#) <sup>[68]</sup>.

### 11.2.1 General

If the [Auto indent](#) option is checked, each new indentation is the same as the previous when editing SQL text.

[Insert mode](#)

If this option is checked, insert symbols mode is default on.

[Use syntax highlight](#)

Enables syntax highlight in the object editor window.

[Always show links](#)

If this option is checked, hyperlinks are displayed in the editor window. To open a link click it with the **Ctrl** button pressed.

[Show line numbers](#)

If this option is checked, line numbers are displayed in the editor window.

[Show special chars](#)

If this option is checked, special chars (like line breaks) are displayed in the editor window.

[Use smart tabs](#)

With this option on the number of tab stops is calculated automatically, depending on the previous line tab.

[Convert tabs to spaces](#)

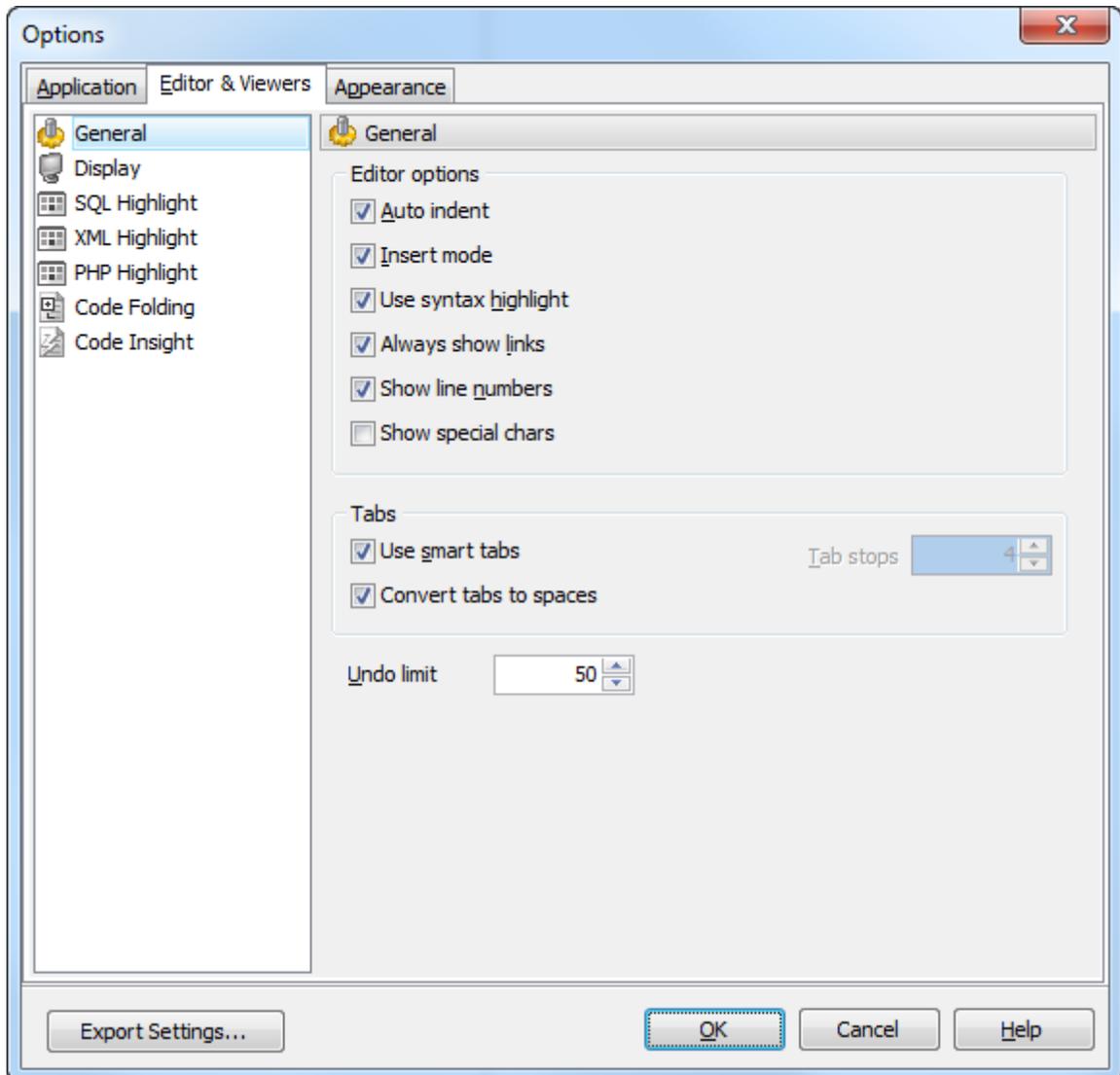
If this option is checked, each time you press the Tab key, the appropriate number of spaces will be added to the edited text.

[Tab Stops](#)

Defines the tab length, used when editing text.

### Undo Limit

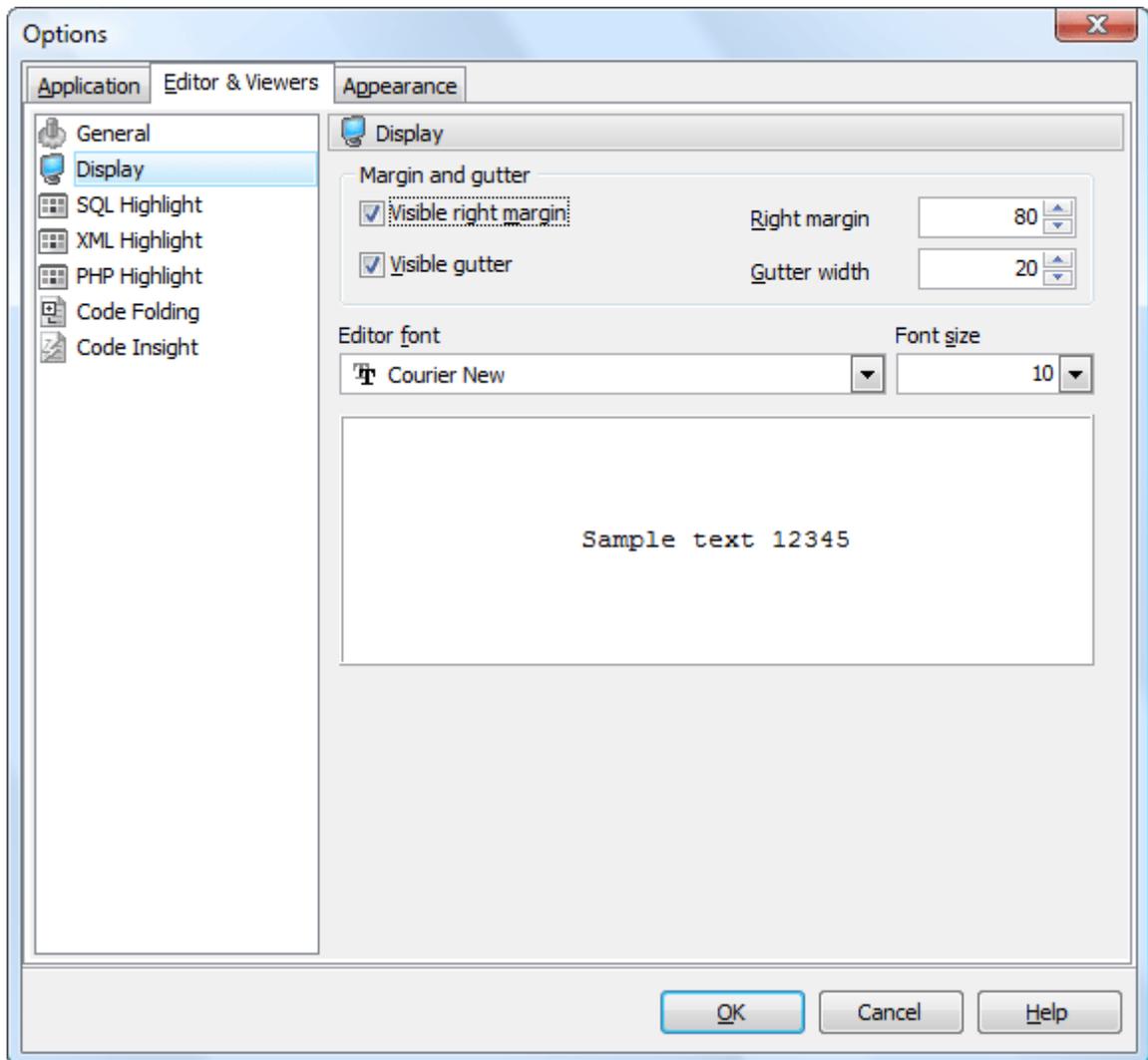
Defines the maximum number of changes possible to be undone.



## 11.2.2 Display

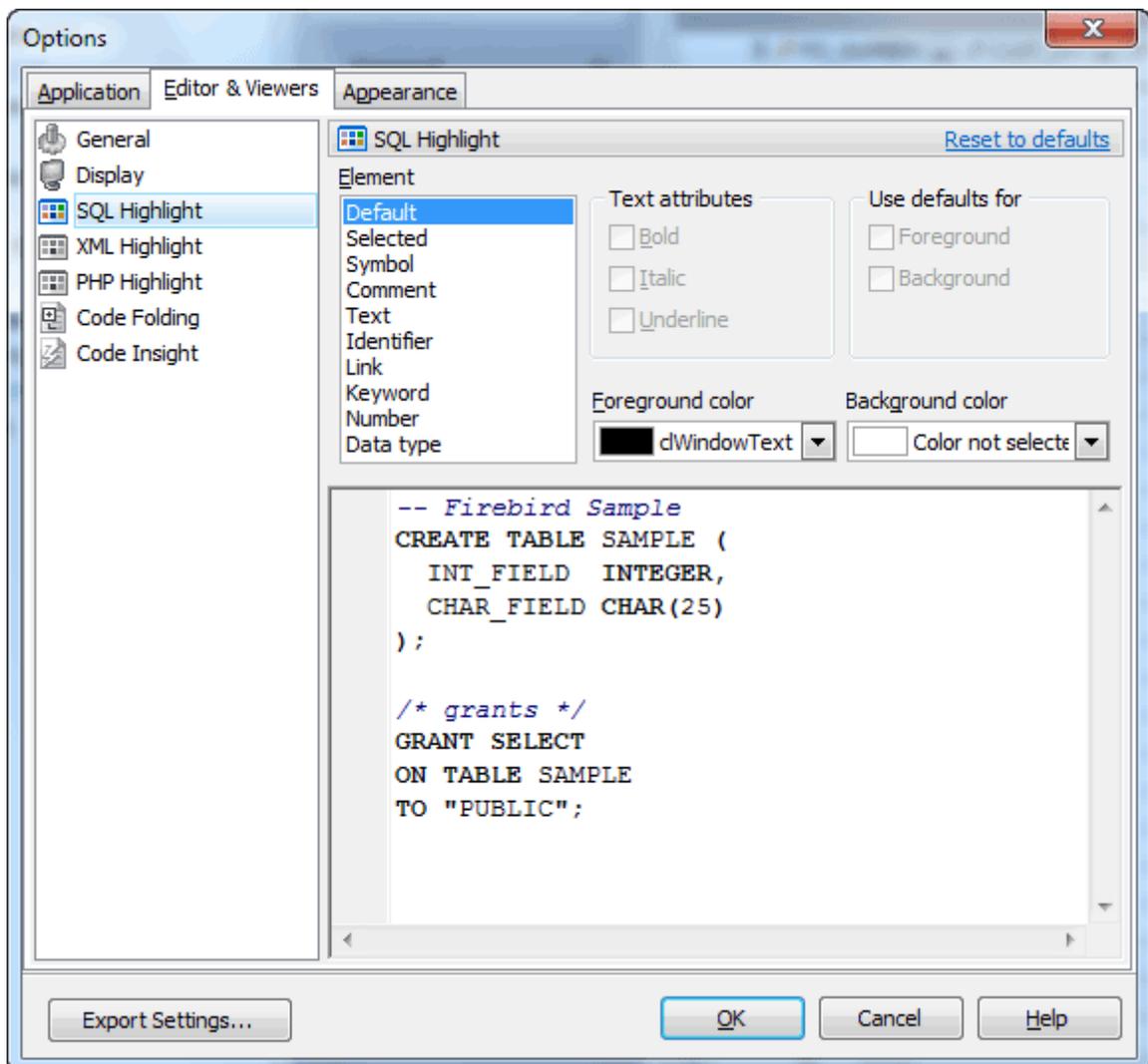
You can disable/enable the right text margin and the gutter of the editor area, set the position of the right text margin as [Right margin](#), and [the Gutter width](#).

Use the [Editor font](#) and [Font size](#) to define the font used in all program editors and viewers. The panel below displays the sample of the selected font.



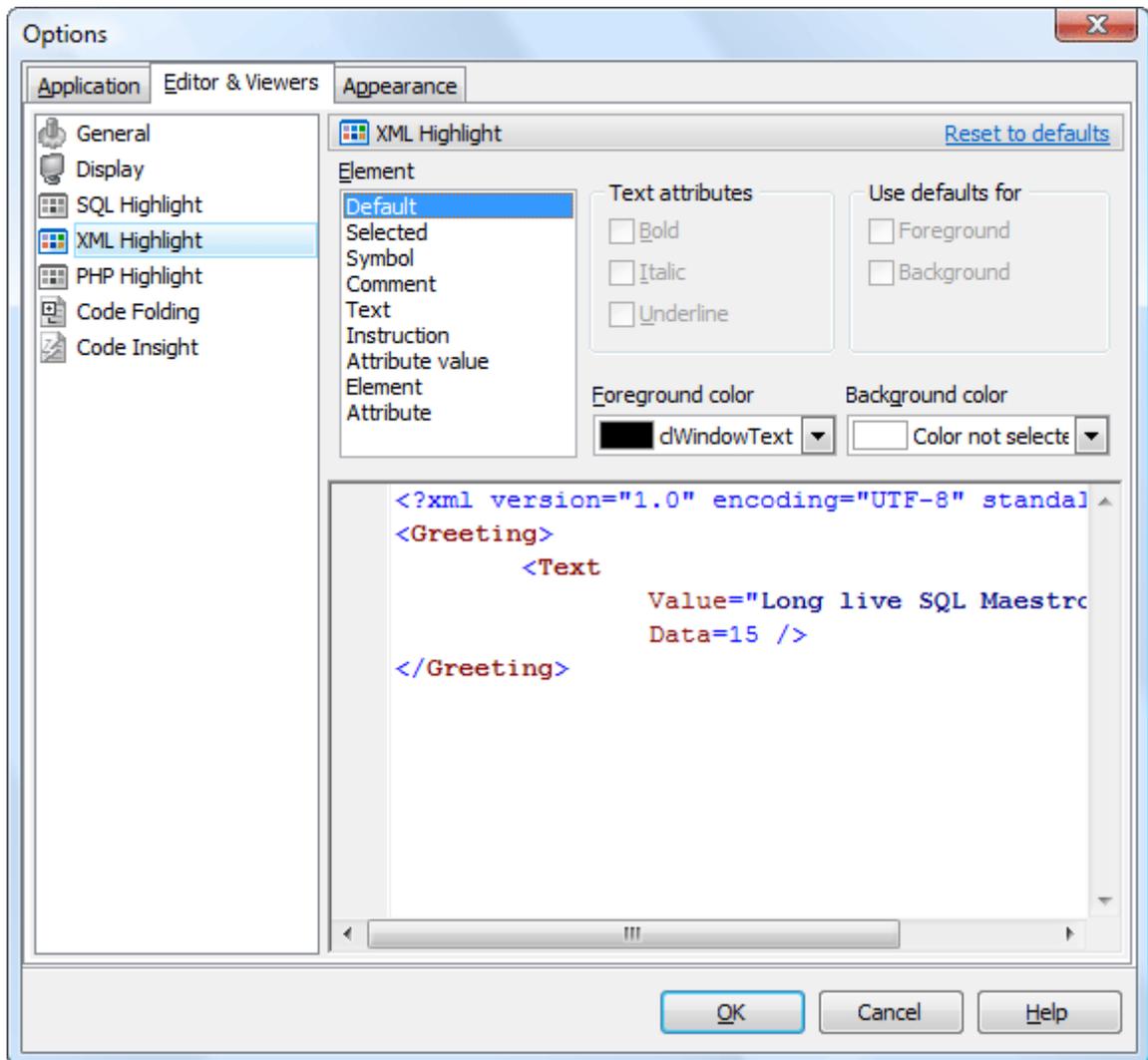
### 11.2.3 SQL highlight

Use the **SQL highlight** item to customize syntax highlight in all SQL editors and viewers, e.g. in *SQL Editor*, *Query Builder*, *Table Editor* and others. Select the text element from the list, e.g. *comment* or *SQL keyword* and adjust its foreground color, background color and text attributes according to your preferences.



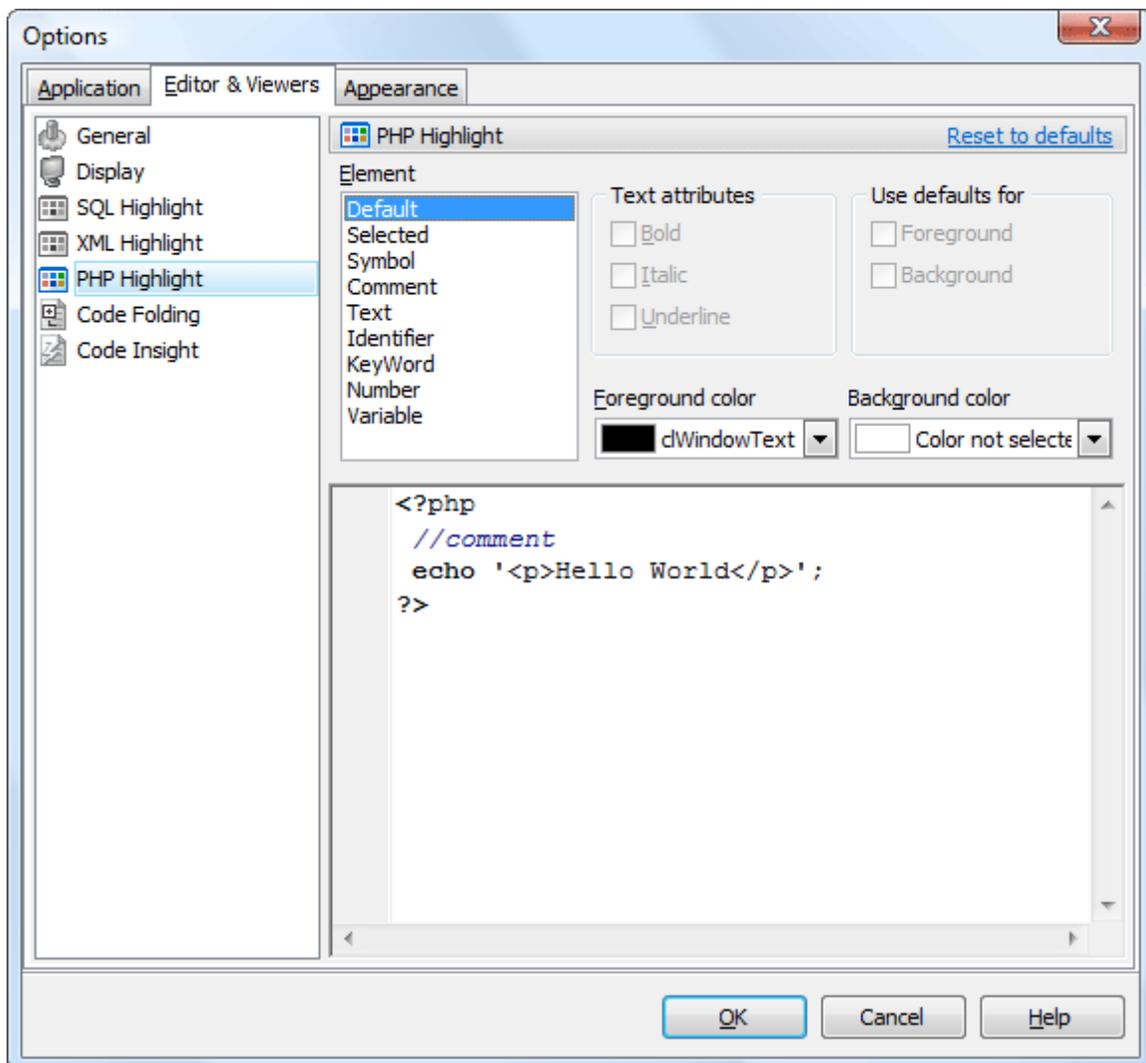
### 11.2.4 XML highlight

Use the **XML highlight** item to customize XML syntax highlight for the text representation of BLOBs in **BLOB Viewer/Editor**. Select the text element from the list, e.g. attribute or attribute value and adjust its foreground color, background color and text attributes according to your wishes.



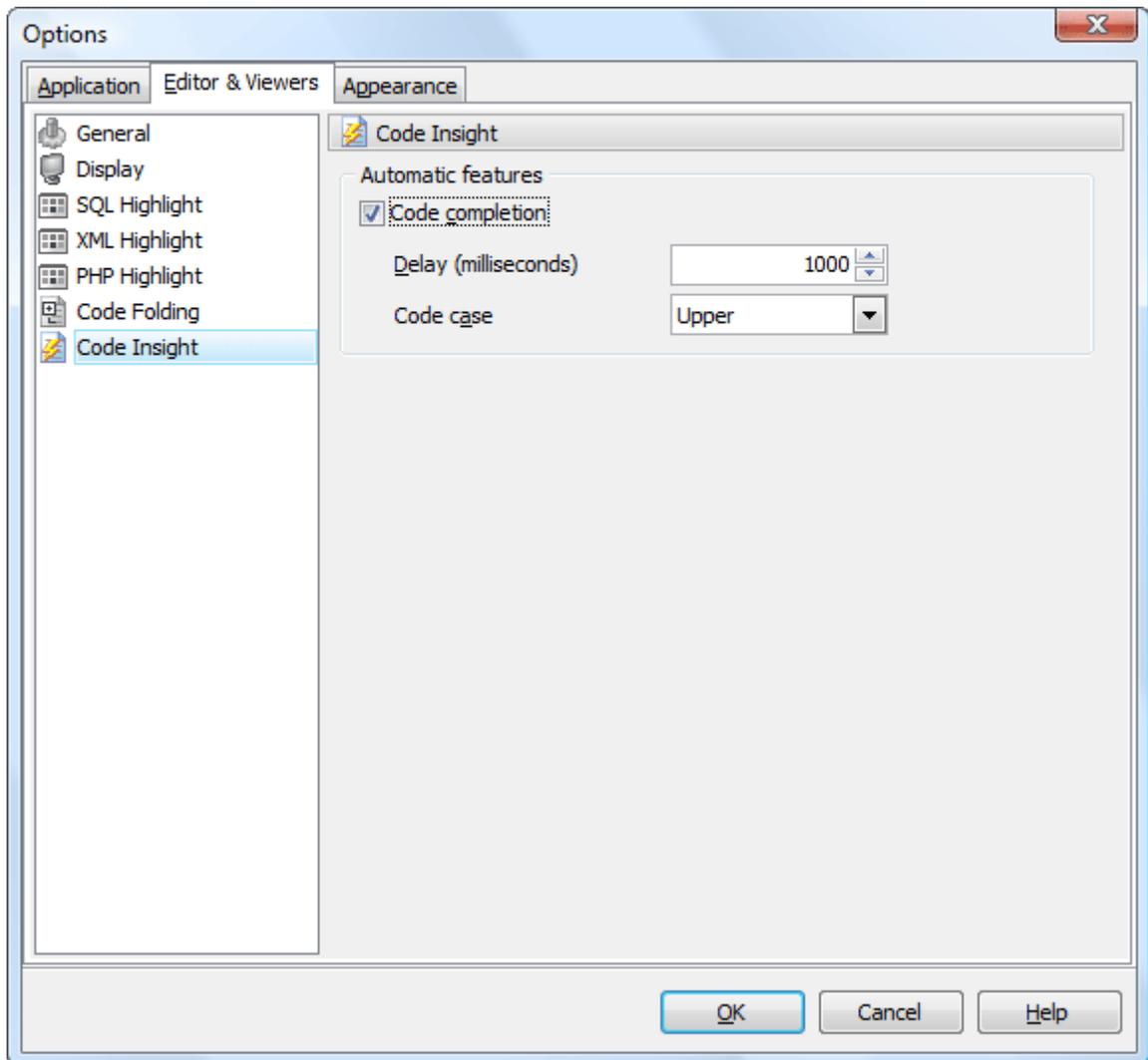
### 11.2.5 PHP highlight

Use the **PHP highlight** item to customize PHP syntax highlight for the text representation of BLOBs in **BLOB Viewer/Editor**. Select the text element from the list (e.g. Keyword, Comment, Identifier), and adjust its foreground color, background color and text attributes according to your wishes.



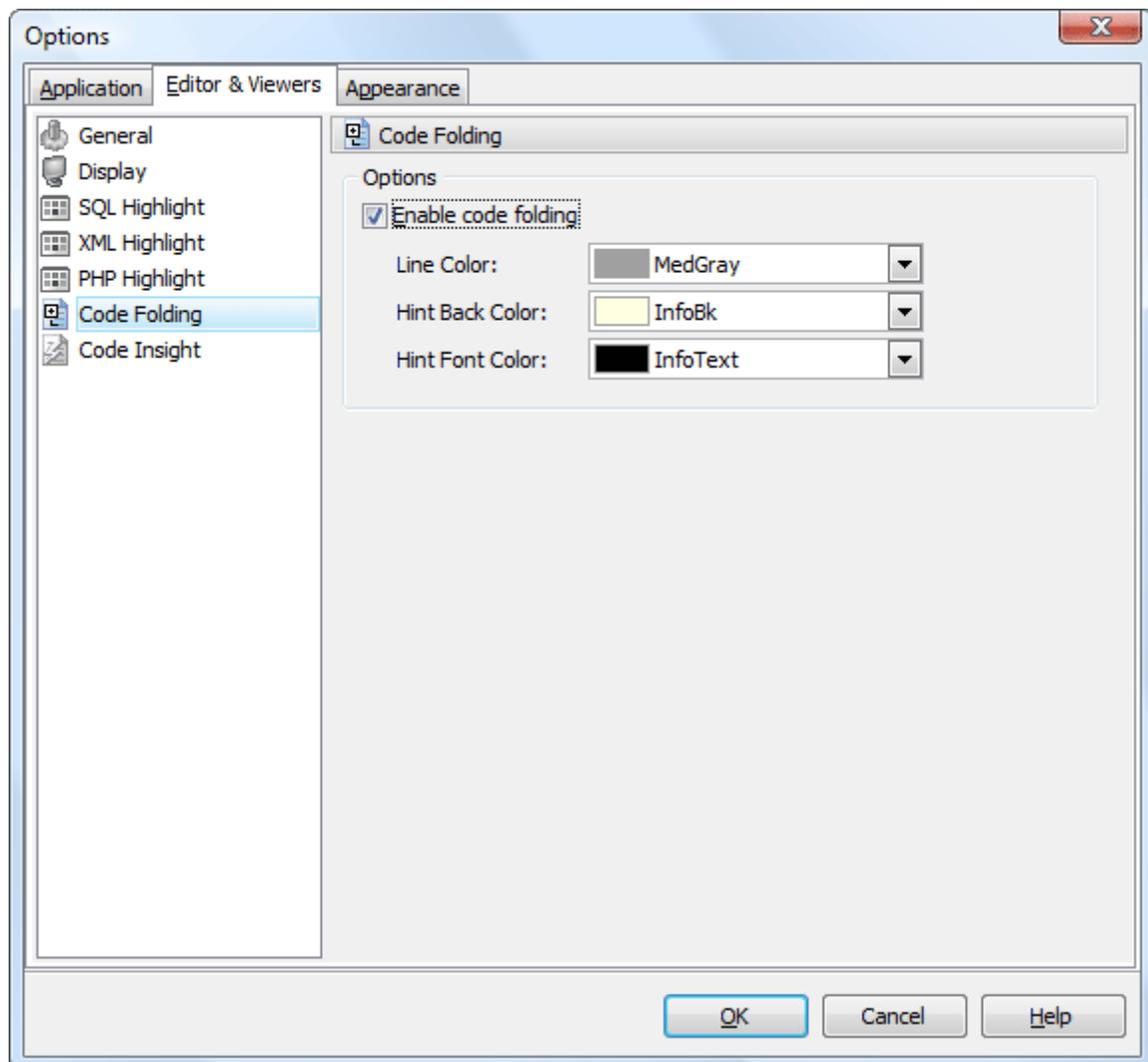
### 11.2.6 Code Insight

You can disable/enable the code completion with the corresponding option and also set the time it appears as *Delay*, and case of words inserted automatically.



### 11.2.7 Code Folding

The [Code Folding](#) item group makes it possible both to view the whole text and to divide it into logical parts (regions). Each part can be collapsed and extended. In extended mode the whole text is displayed (set by default), in collapsed mode the text is hidden behind one text line denoting the first line of the collapsed region.



You can enable/disable code folding in SQL editors and viewers and customize the colors of its items.

## 11.3 Appearance

The [Appearance](#) section allows you to customize the application interface style to your preferences.

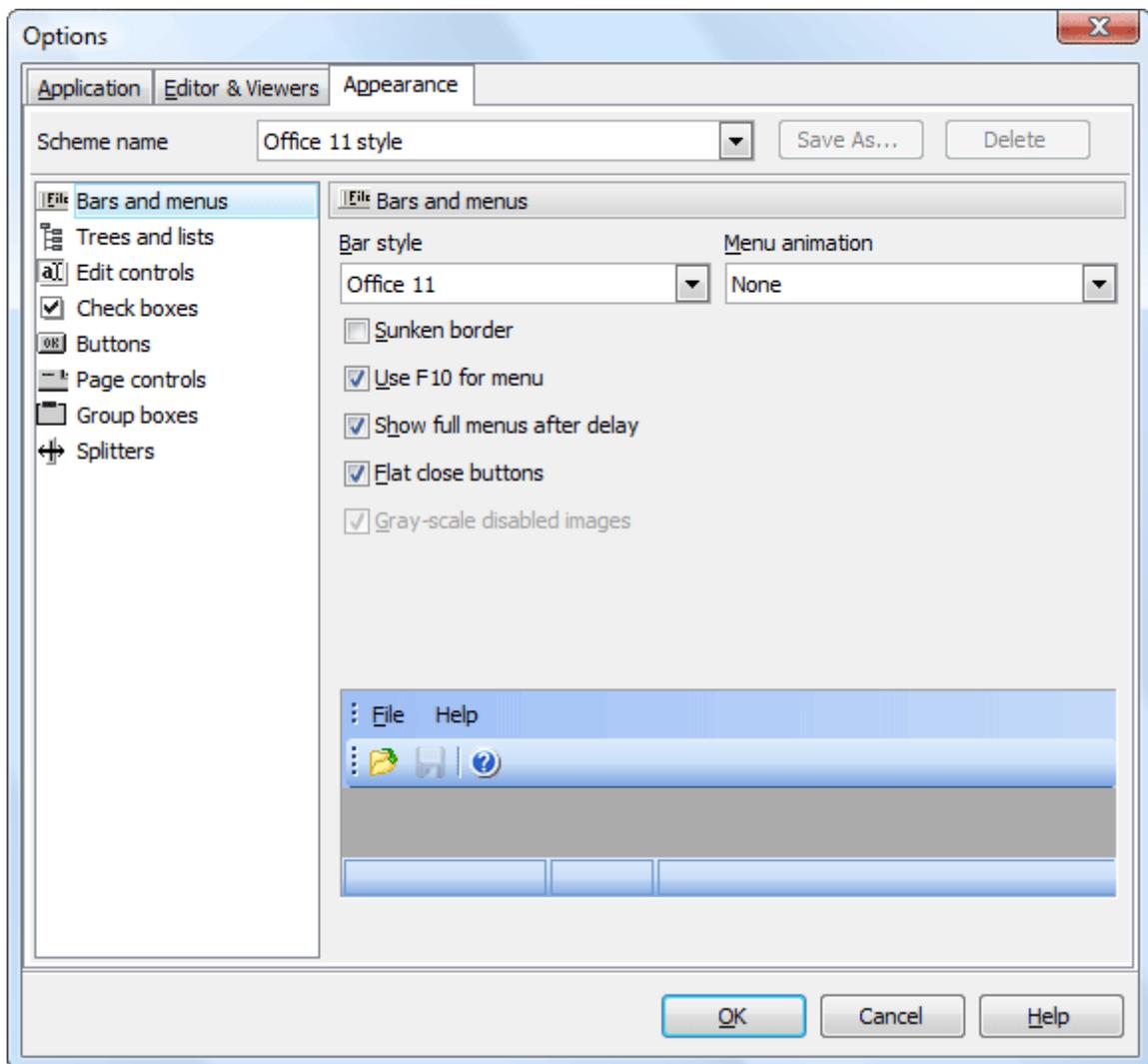
Use the [Scheme name](#) box to select the interface scheme you prefer: *Office XP style*, *Windows XP native style*, etc. You can create your own interface schemes by customizing any visual options ([Bars and menus](#), [Trees and lists](#), [Edit controls](#), [Check boxes](#), [Buttons](#), etc.) and clicking the [Save As](#) button. All the customized options are displayed on the sample panel.

- [Bars and menus](#) <sup>291</sup>
- [Trees and lists](#) <sup>292</sup>
- [Edit controls](#) <sup>293</sup>
- [Check boxes](#) <sup>294</sup>
- [Buttons](#) <sup>295</sup>
- [Page controls](#) <sup>296</sup>
- [Group boxes](#) <sup>297</sup>
- [Splitters](#) <sup>298</sup>

### 11.3.1 Bars and menus

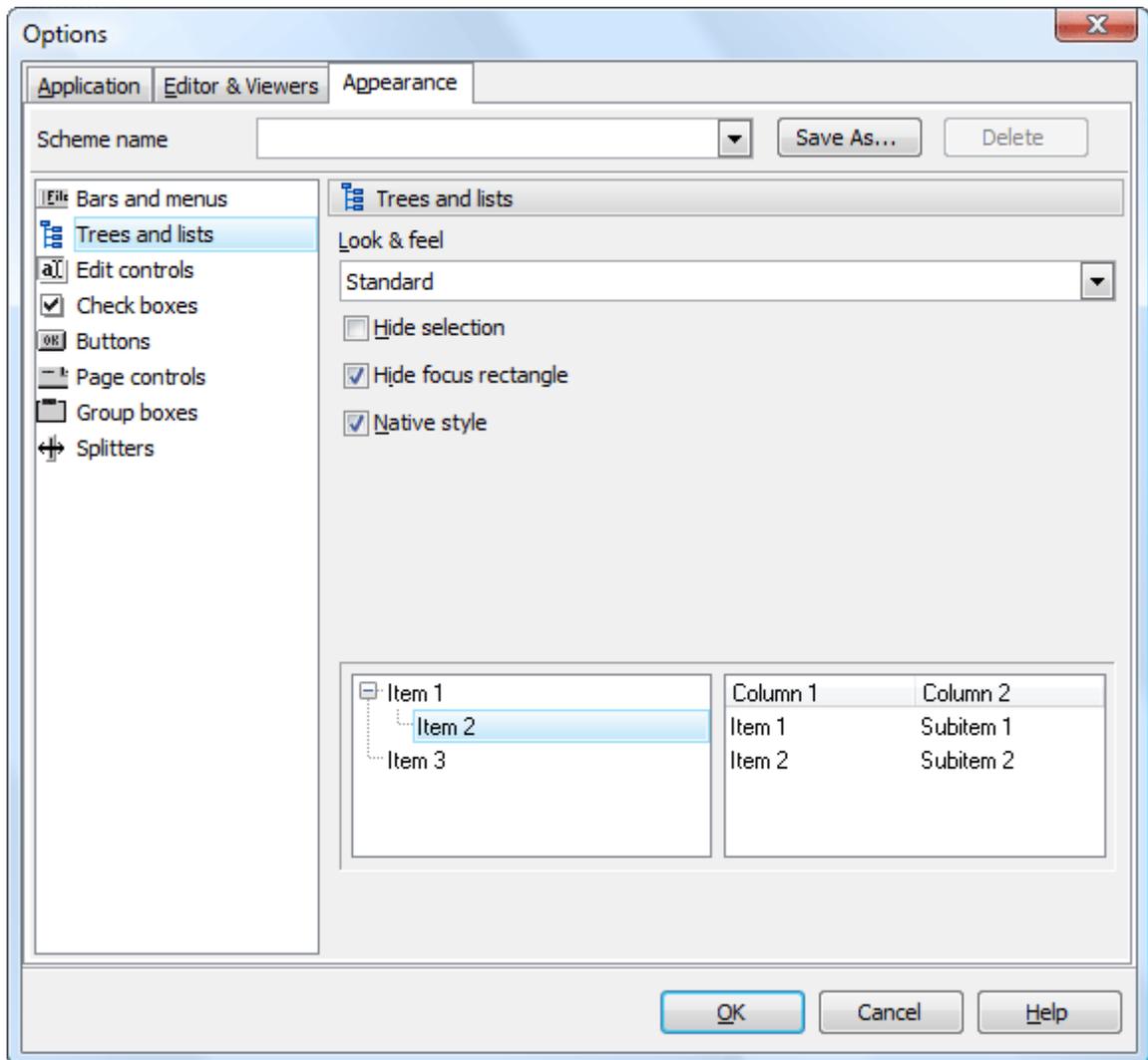
Use the [Bars and menus](#) item to customize Firebird Maestro toolbars style and menu animation.

The item allows you to select Bar style and menu animation from the corresponding drop-down lists and to enable or disable such options as sunken border, F10 key for opening menu, viewing full menus after delay, flat close buttons, gray-scale images.



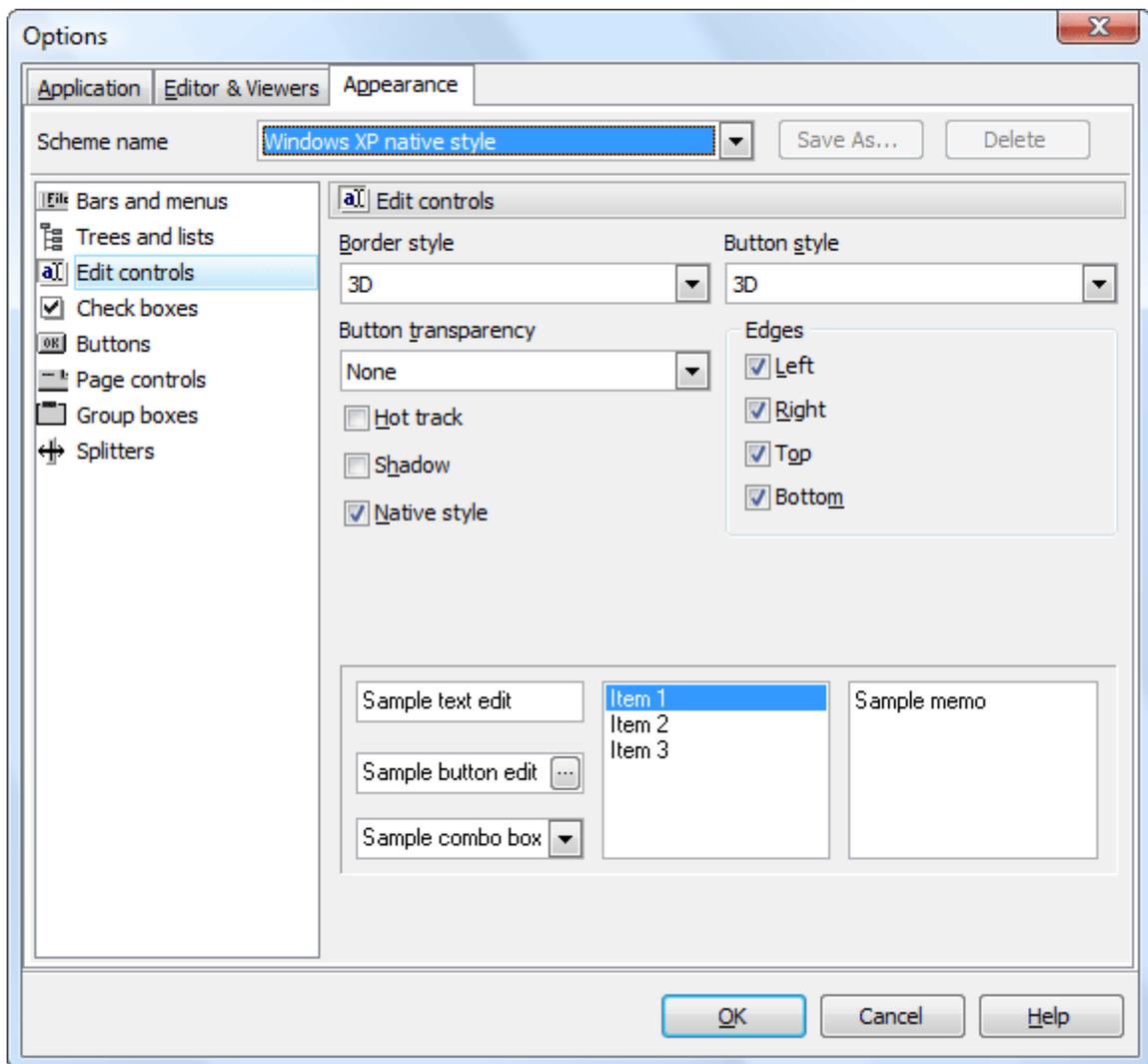
### 11.3.2 Trees and lists

Use the **Trees and lists** item to select various tree view options. Use the item to select *standard*, *flat* or *ultraflat* styles, check or uncheck the *hide selection*, *hide focus rectangle* and *native style* options.



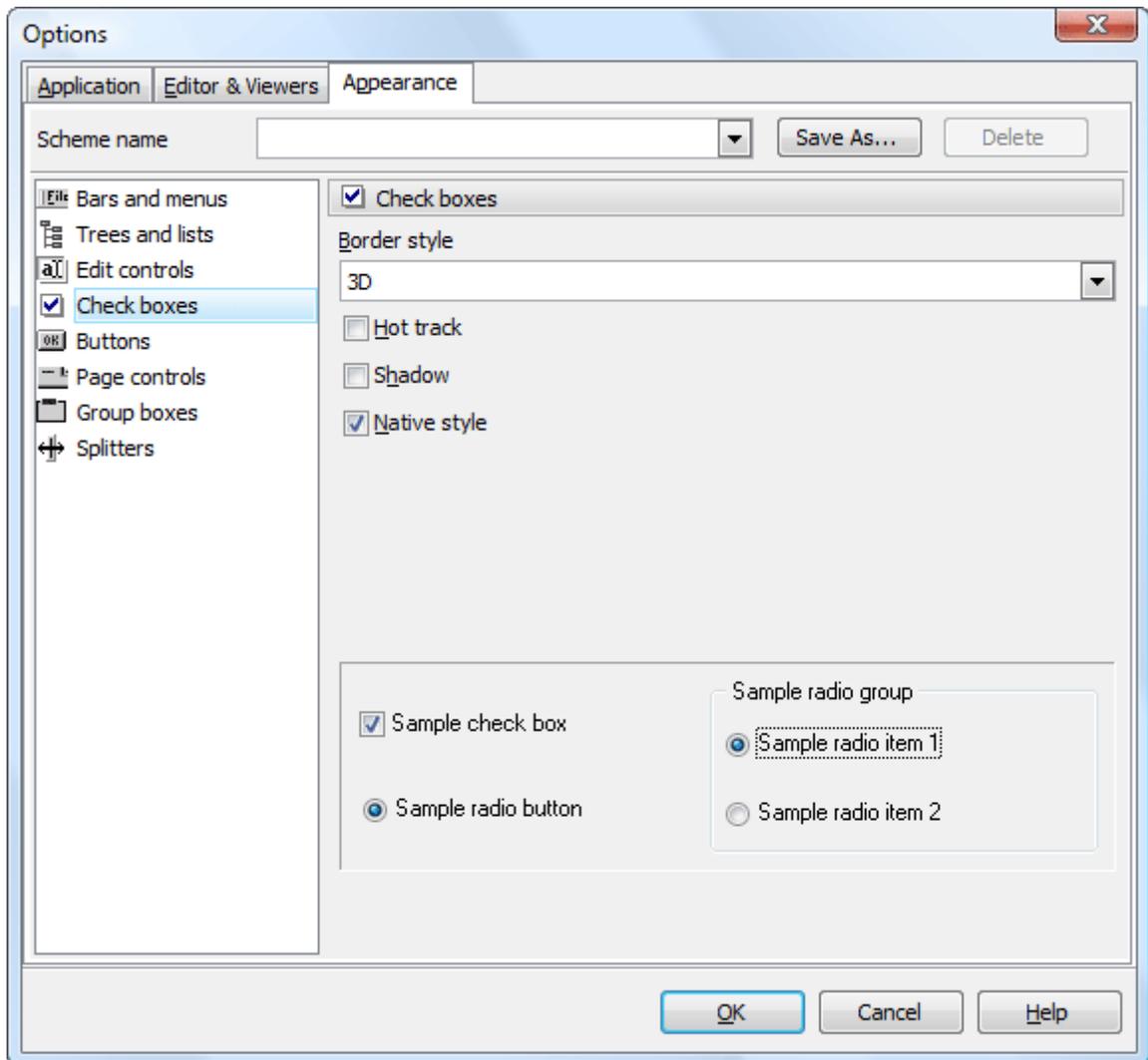
### 11.3.3 Edit controls

Use the [Edit controls](#) item to customize the appearance of different Firebird Maestro edit controls. The tab allows you to select the edit controls border style, button style and transparency, enable/disable hot tracks, shadows, native style and customize edges. It is also possible to define samples for the text edit, button edit and combo box controls.



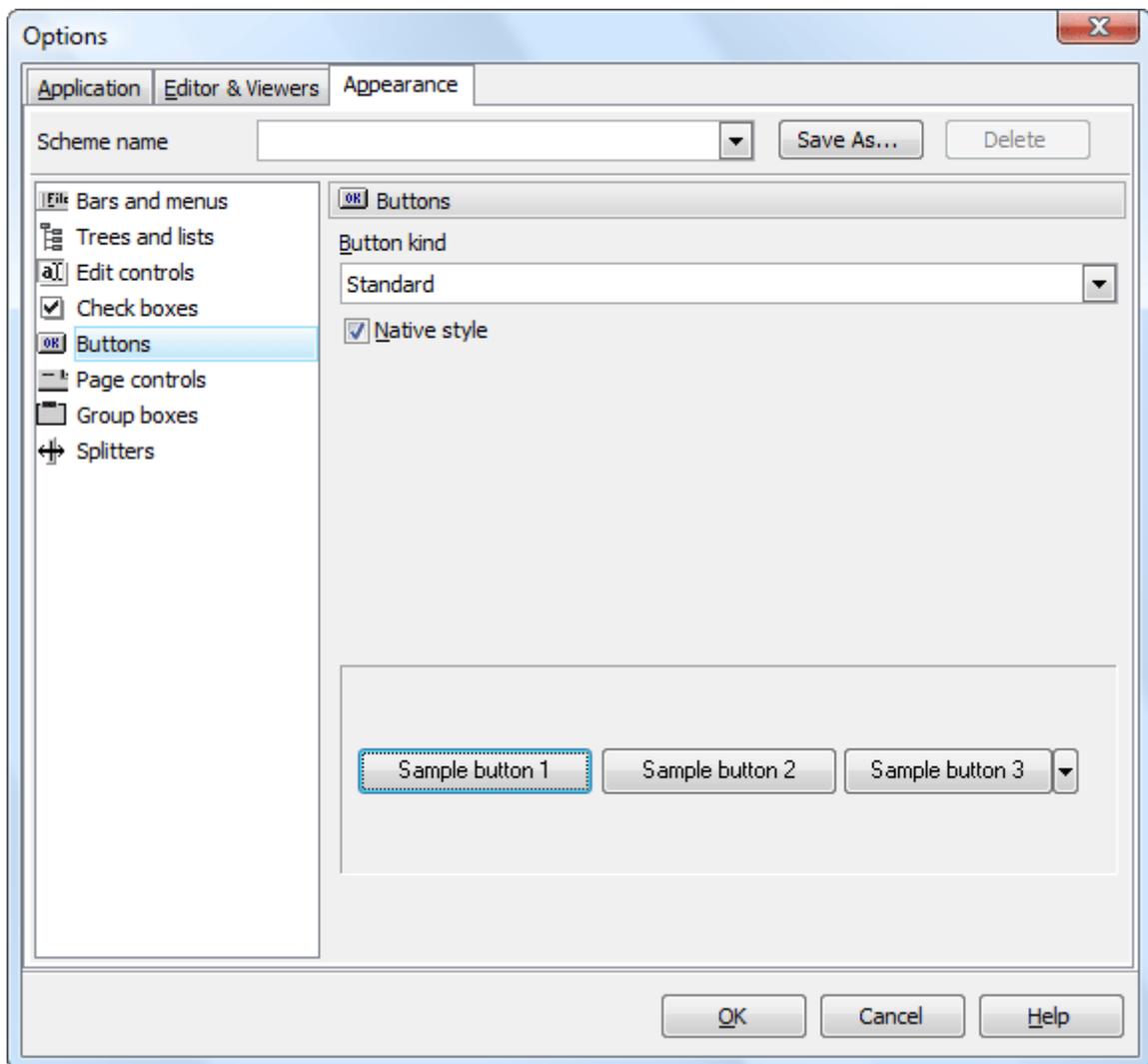
### 11.3.4 Check boxes

The [Check boxes](#) item allows you to customize the appearance of check boxes and radio buttons. The tab allows you to customize the appearance of check boxes: set border style, enable/disable hot tracks, shadows, native style. It is also possible to define samples for check boxes and radio buttons.



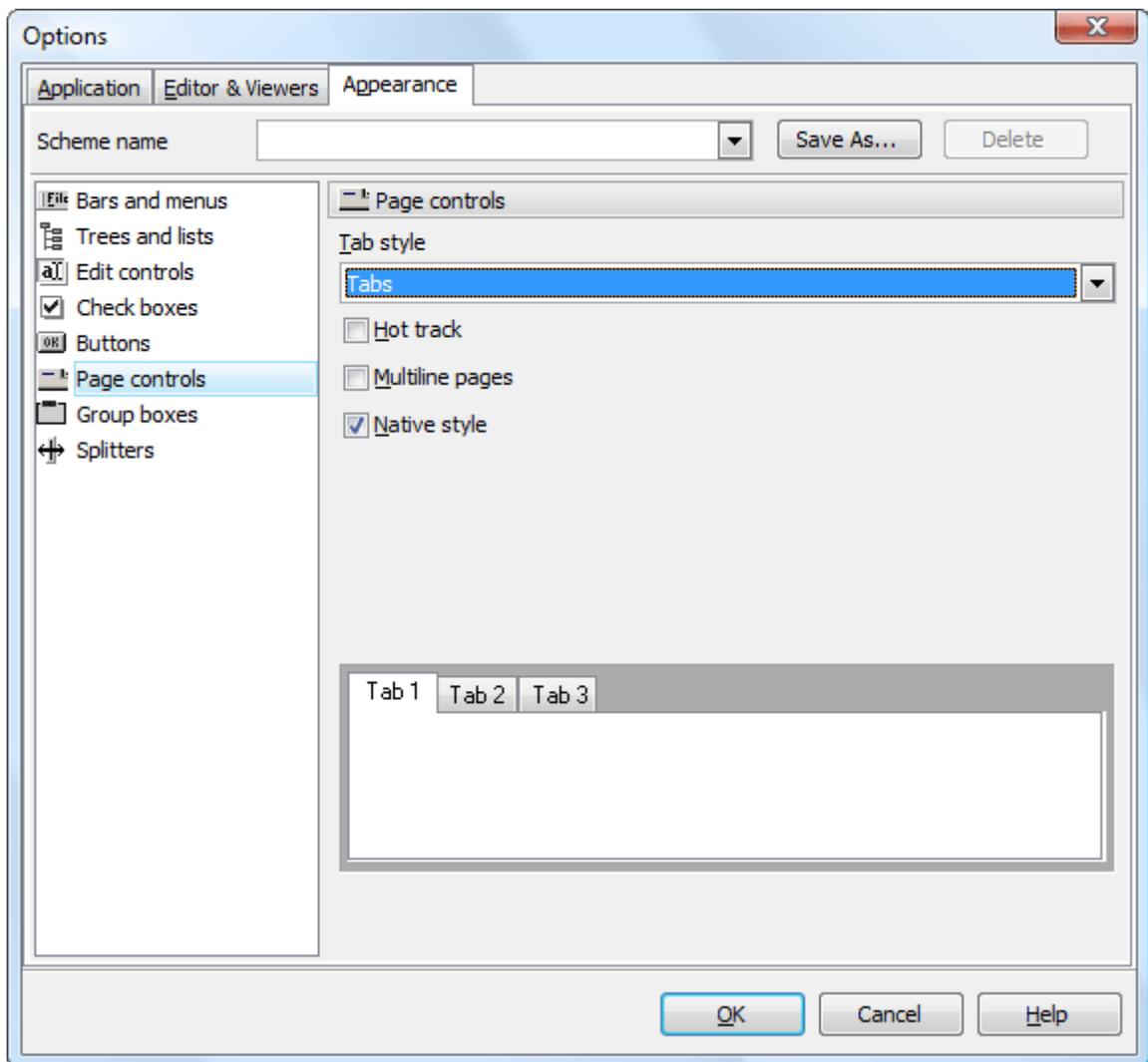
### 11.3.5 Buttons

Use the [Buttons](#) item to customize Firebird Maestro buttons. The tab allows you to adjust the appearance of buttons and define sample buttons as well.



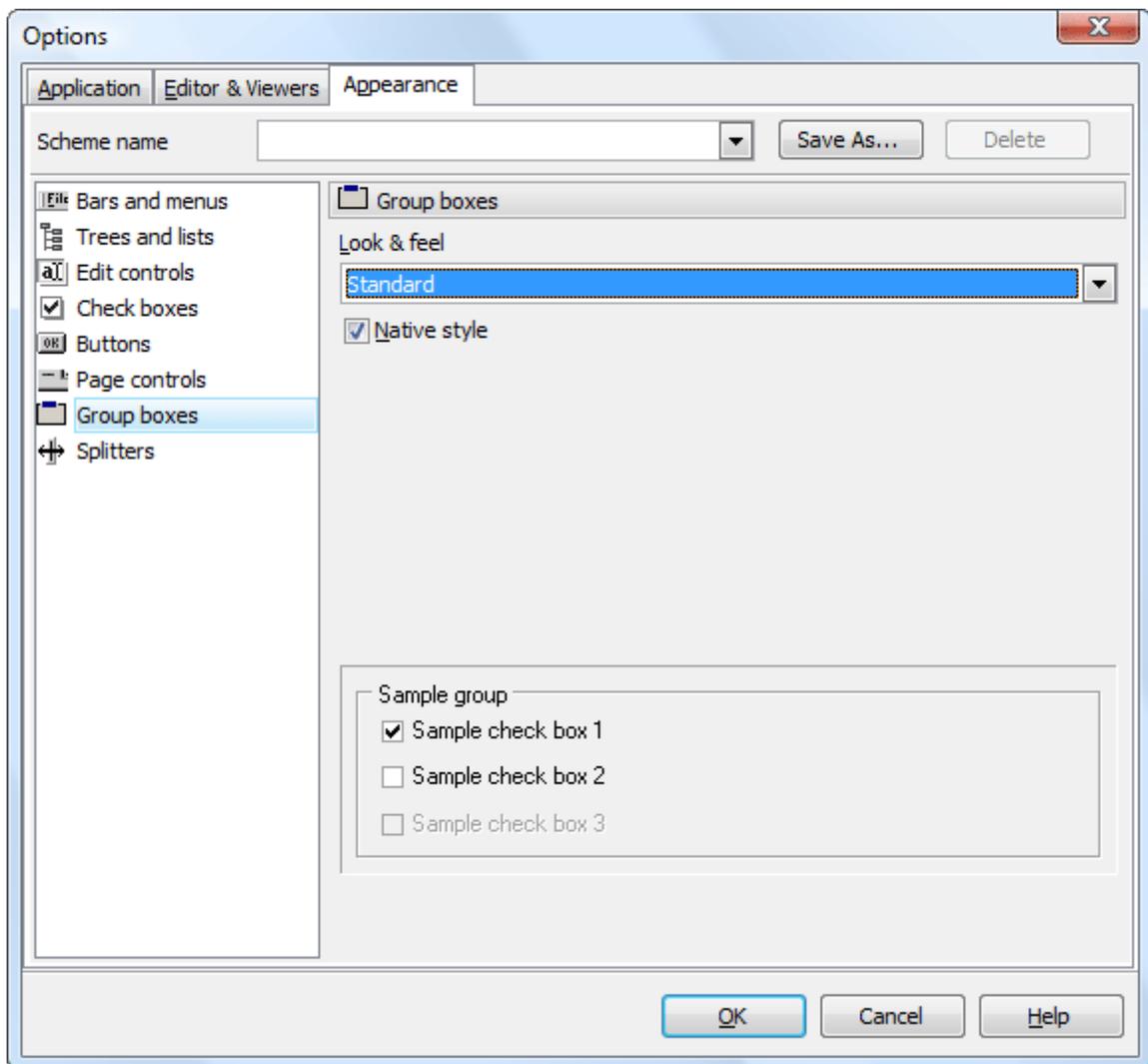
### 11.3.6 Page controls

The [Page controls](#) item allows you to customize the style of all Firebird Maestro page controls. The tab allows you to select tab styles, enable/disable hot track, multi-line pages and native style.



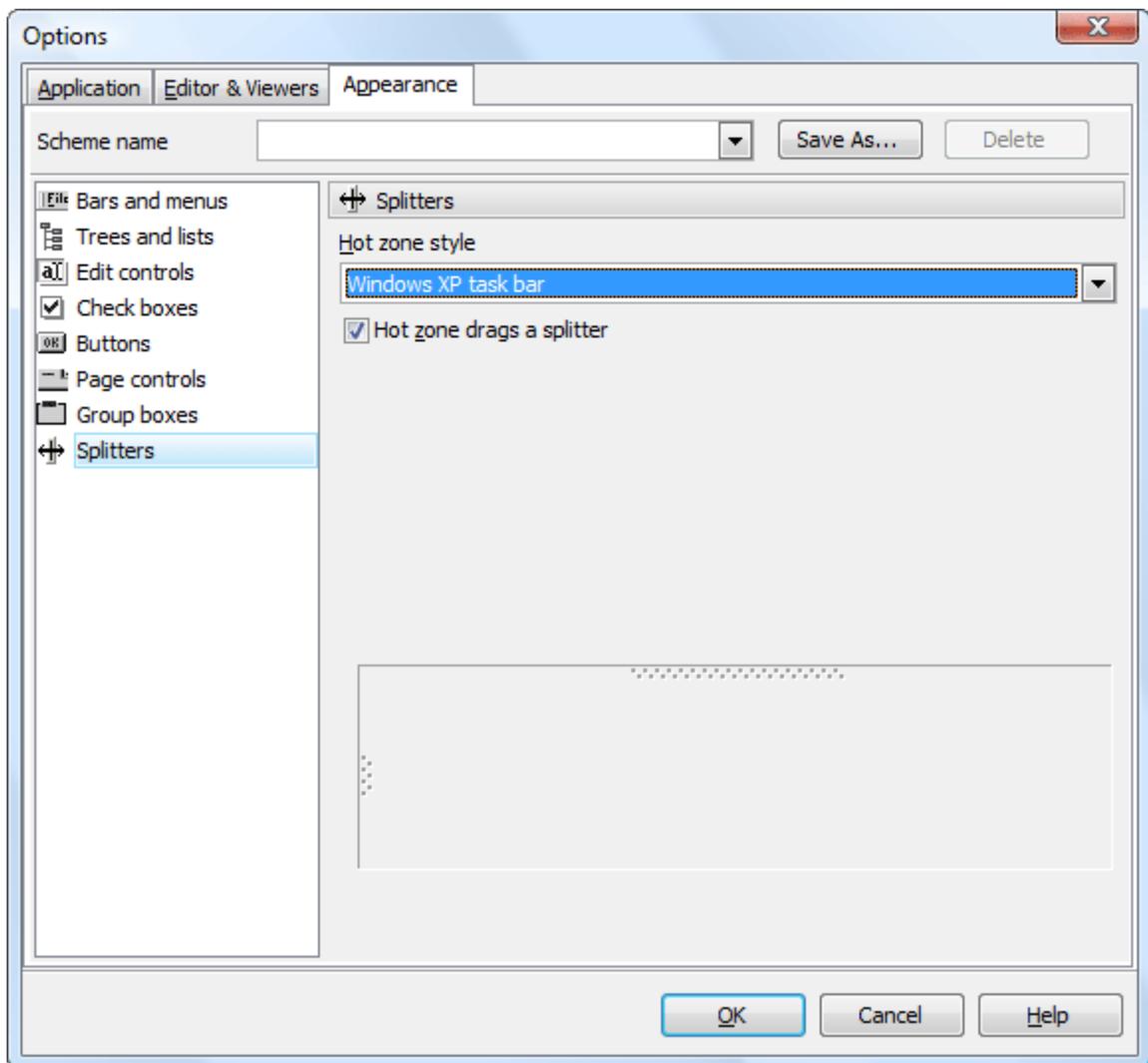
### 11.3.7 Group boxes

Use the [Group boxes](#) item to customize all Firebird Maestro group boxes according to your preferences. Use tab to apply styles for group boxes, enable/disable native style and define samples.



### 11.3.8 Splitters

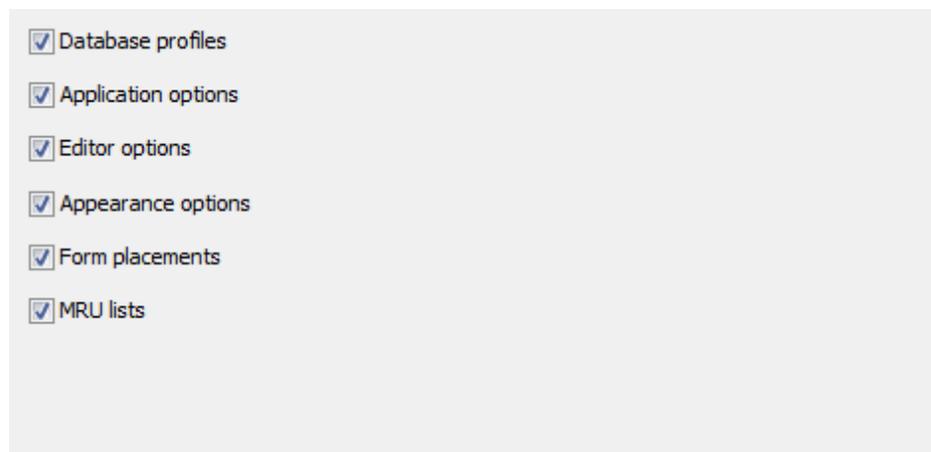
Use the [Splitters](#) item to customize all Firebird Maestro splitters according to your preferences. Use the tab to select hot zone style (*Windows XP task bar*, *Media Player 8*, *Media Player 9*, *Simple* or *none*) and specify the [Hot zone drags a splitter](#) option.



## 11.4 Export Settings

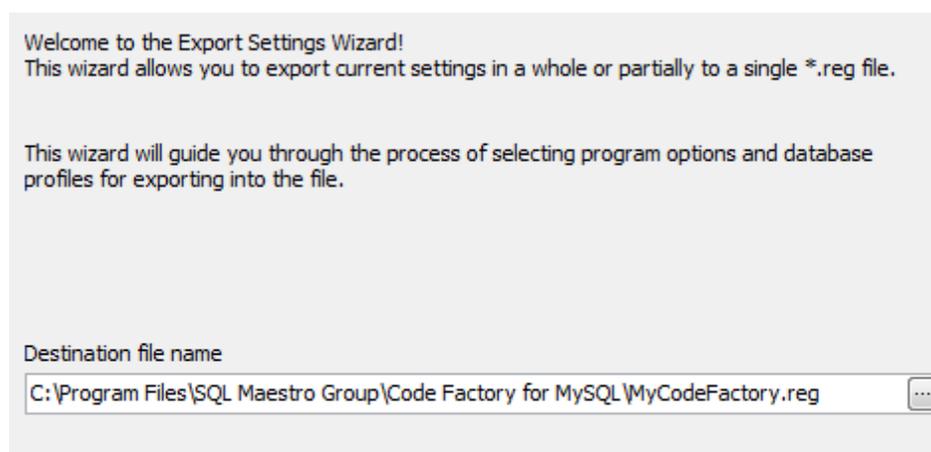
Export Settings Wizard allows you to export all or partial Firebird Maestro settings to single \*.reg file which can be applied to the application of Firebird Maestro installed on another machine or used to backup previous settings. To run the wizard, select the Tools | Options main menu item and click Export Settings in the [Options](#) <sup>[260]</sup> dialog.

- [Specifying destination file to save settings to](#) <sup>[300]</sup>
- [Specifying settings categories to save](#) <sup>[300]</sup>
- [Select database profiles to save](#) <sup>[301]</sup>
- [Saving settings](#) <sup>[301]</sup>



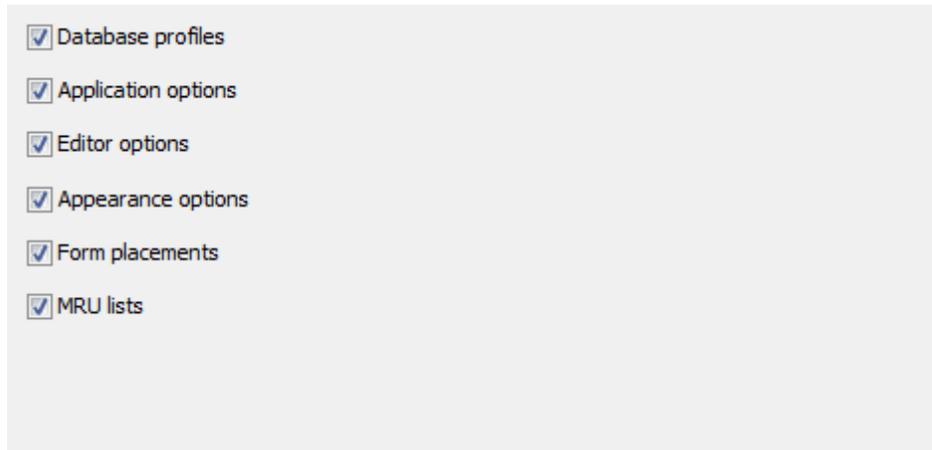
### 11.4.1 Specifying destination file

Specify a \*.reg file to extract Firebird Maestro setting to.



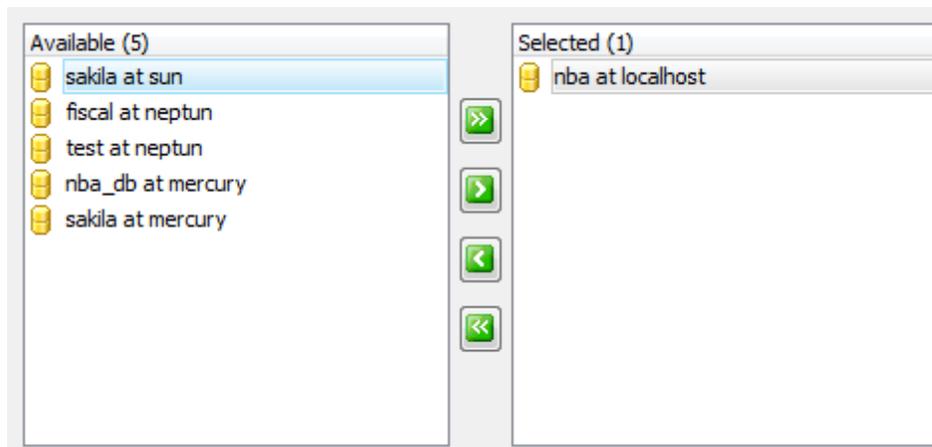
### 11.4.2 Selecting setting categories

The options of this step specify the information saved to the result file, e.g. Database profiles, [Application options](#) <sup>[261]</sup>, etc.



### 11.4.3 Selecting database profiles

Select database profiles to save their settings by moving them from the [Available Databases](#) list to the [Selected Databases](#) one.



### 11.4.4 Saving settings

Click the [Ready](#) button to start the extracting. The process log is displayed in the [Export log](#) box.

## Export log

The command(s) completed successfully.  
Exporting editor options...  
The command(s) completed successfully.  
Exporting appearance options...  
The command(s) completed successfully.  
Exporting form placements...  
The command(s) completed successfully.  
Exporting MRU lists...  
The command(s) completed successfully.



Click "Ready" to export settings.

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